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ECONOMIC POLICY IN THE EUROPEAN  
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# ECONOMIC POLICY IN THE EUROPEAN UNION MEMBER COUNTRIES

September 14-16, 2016  
Petrovice u Karviné, Czech Republic

**Part 1**

**Proceedings of  
14<sup>th</sup> International Scientific Conference  
ECONOMIC POLICY IN THE EUROPEAN  
UNION MEMBER COUNTRIES**

**Organized by Department of Economics and Public Administration of the Silesian University in Opava, School of Business Administration in Karviná and Department of National Economy of the VŠB-Technical University of Ostrava, Faculty of Economics**

**The conference was financially supported by the Moravian-Silesian Region and Karviná City**

**September 14-16, 2016  
Petrovice u Karviné, Czech Republic**

**PART 1**

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## ***Dear Authors and Participants of the Conference***

The fourteenth international scientific conference “Economic Policy in the European Union Member Countries” was held on September, the 14th to 16th this year. It was organized by the Department of Economics and Public Administration, School of Business Administration in Karvina, Silesian University in Opava, in cooperation with the Department of National Economy, Faculty of Economics, VŠB - Technical University of Ostrava. The conference was held under the auspices of the Rector of the Silesian University in Opava Assoc. Prof. Pavel Tuleja and Dean of the School of Business Administration in Karvina, Silesian University in Opava Prof. Daniel Stavárek, with the financial support of the Moravian-Silesian Region and the city of Karvina.

Discussion took place in the thirteen conference sessions, with the topic of monetary and fiscal policy, labour market, competitiveness, regional disparities, social and migration policies or doing business in the European Union. Participants also discussed the possibilities of new forms of cooperation and exchanged the experiences with their activities both in academic and scientific field. I am very glad that we have managed to find a common language when discussing such a broad topic which the economic policy of the EU member countries is. I believe that the conference has contributed to deepening of mutual scientific cooperation.

Many thanks to the organising team for preparing the conference, smooth running of it and for the help in formation of the proceedings. Thanks also to you, the authors, not only for inspiring discussions, but especially for creating the high-quality papers. The proceedings contain only papers that have successfully passed a double-blind referee process. There have always been two referee reports on each paper. The referees selected are distinguished scholars from Czech as well as foreign universities.

I hope that organising of the conference will continue in tradition in the future and I believe we will meet in the following years and analyse problems that are interesting for all participants. On behalf of the organising committee I look forward to further cooperation.

**Dr. Ingrid Majerova**

**Chair of the Conference**

**Deputy Head of Department of Economics and Public Administration**

**Silesian University in Opava**

**School of Business Administration in Karviná**





# CONTENTS

## PART I

|                                                      |                                                                                                                                                             |     |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Adámek Emil                                          | <b>CAN GOOGLE TRENDS DATA HELP US MODELLING INFLATION? AN EMPIRICAL EVIDENCE FROM THE CZECH REPUBLIC</b>                                                    | 1   |
| Adámek Pavel                                         | <b>CORPORATE RESPONSIBILITY AS A RESPONSE TO GLOBALIZATION</b>                                                                                              | 11  |
| Badura Ondřej                                        | <b>AN INFLUENCE OF RELATIVE INCOME ON THE MARGINAL PROPENSITY TO CONSUME – EVIDENCE FROM CZECH REPUBLIC</b>                                                 | 21  |
| Balcarová Pavlína                                    | <b>THE DYNAMICS OF COMPETITIVENESS IN THE EUROPEAN UNION</b>                                                                                                | 34  |
| Bednářová Pavla,<br>Hovorková Valentová<br>Vladimíra | <b>THE DEVELOPMENT OF MACROECONOMIC IMBALANCES IN EUROPEAN COUNTRIES IN THE PROCESS OF INTEGRATION</b>                                                      | 44  |
| Beran Vlastimil,<br>Franek Jiří                      | <b>A COMPARISON OF THE SOCIAL BENEFITS SYSTEMS IN THE CZECH REPUBLIC ON MODEL HOUSEHOLDS DURING RIGHT-WING (2011) AND LEFT-WING (2015) GOVERNMENTS RULE</b> | 54  |
| Beránková Vendula                                    | <b>OCA INDEX VS. MAASTRICHT CRITERIA: THE CASE OF SELECTED EU COUNTRIES</b>                                                                                 | 64  |
| Bočková Nina,<br>Meluzín Tomáš                       | <b>EUROPE 2020 INDICATOR: RESEARCH AND DEVELOPMENT IN CZECH MANUFACTURING</b>                                                                               | 72  |
| Breinek Pavel                                        | <b>THE AGEING AND ECONOMIC PERFORMANCE IN OECD COUNTRIES</b>                                                                                                | 81  |
| Brindzová Zuzana                                     | <b>INDEBTEDNESS METHOD OF REGULATING LOCAL GOVERNMENT UNITS IN SELECTED COUNTRIES</b>                                                                       | 91  |
| Drobiszová Agata                                     | <b>SOCIAL SPENDING: APPROPRIATE INSTRUMENT FOR PROMOTING ECONOMIC GROWTH IN THE LONG-TERM?</b>                                                              | 102 |
| Duda Danuta                                          | <b>USING BROWNFIELDS FOR PRODUCTION OF ELECTRIC POWER THROUGH COGENERATION TECHNOLOGY IN THE MORAVIAN - SILESIA REGION</b>                                  | 109 |
| Dvoroková Kateřina,<br>Hodula Martin                 | <b>MEASURING OF THE REAL CONVERGENCE IN THE EUROPEAN UNION: PRE-CRISIS EVIDENCE</b>                                                                         | 120 |
| Fífešková Elena,<br>Nemcová Edita                    | <b>INSTITUTIONAL FRAMEWORK OF THE DEVELOPMENT OF THE EU MANUFACTURING INDUSTRY</b>                                                                          | 132 |
| Fojtíková Lenka                                      | <b>CHINA-EU INVESTMENT RELATIONS: TOWARDS A NEW INSTITUTIONAL FRAMEWORK</b>                                                                                 | 144 |
| Franc Aleš                                           | <b>LABOR MARKET CONSEQUENCES OF POPULATION AGEING IN THE EU</b>                                                                                             | 156 |
| Gajdová Karin                                        | <b>REGIONAL DISPARITIES OF SELECTED ECONOMIC INDICATORS IN THE CZECH-POLISH BORDER</b>                                                                      | 164 |

|                                                   |                                                                                                                               |     |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----|
| Gregor Jiří                                       | <b>HAS THE INTEREST RATE PASS-THROUGH CHANGED AFTER THE FINANCIAL CRISIS IN THE CZECH REPUBLIC?</b>                           | 173 |
| Habánik Tomáš                                     | <b>COMPARING SOCIAL SERVICES FOR THE HOMELESS IN THE CZECH AND SLOVAK REPUBLIC</b>                                            | 182 |
| Halásková Martina                                 | <b>PUBLIC ADMINISTRATION IN EUROPEAN UNION COUNTRIES: APPROACHES TO THE EVALUATION</b>                                        | 191 |
| Halásková Renáta,<br>Slovák Svatopluk             | <b>SELECTED ISSUES OF SOCIAL POLICY IN EU COUNTRIES</b>                                                                       | 202 |
| Helisek Mojmír                                    | <b>PROSPECTS FOR THE PARTICIPATION OF THE CZECH KORUNA IN ERM II</b>                                                          | 212 |
| Heryán Tomáš,<br>Kajurová Veronika                | <b>WHAT AFFECT THE EARNINGS OF THE HOTEL INDUSTRIES IN VISEGRAD GROUP?</b>                                                    | 223 |
| Horská Helena,<br>Milučká Daniela                 | <b>GREEK ECONOMIC CRISIS – IS THE EXCHANGE RATE DEVALUATION THE LAST WAY OUT OF IT?</b>                                       | 231 |
| Horúcková Michaela                                | <b>EU EMISSIONS TRADING SYSTEM: A PROMISING WAY TO SIGNIFICANTLY REDUCE GHG EMISSIONS? A CASE STUDY OF THE CZECH REPUBLIC</b> | 241 |
| Hvozdenska Jana                                   | <b>THE PREDICTION OF ECONOMIC ACTIVITY GROWTH BY SOVEREIGN BOND SPREADS IN SCANDINAVIA</b>                                    | 250 |
| Chrančoková Martina                               | <b>GAINING KNOWLEDGE THROUGH THE MIGRATION OF SLOVAK MIGRANTS – MOTIVES, BENEFITS, AND RISKS OF THEIR MIGRATION</b>           | 258 |
| Jajkowicz Ondřej,<br>Tichá Michaela               | <b>EMPLOYMENT IN SHADOW ECONOMY IN THE CZECH REPUBLIC: ESTIMATION USING THE LABOUR APPROACH</b>                               | 267 |
| Janků Jan,<br>Macek Rudolf,<br>Klíková Christiana | <b>POLITICAL BUSINESS CYCLES IN THE OECD COUNTRIES: AN INITIAL ANALYSIS</b>                                                   | 274 |
| Kajurová Veronika                                 | <b>STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH IN VISEGRAD GROUP COUNTRIES</b>                                               | 286 |
| Kapounek Svatopluk,<br>Kučerová Zuzana            | <b>SUPPLY DRIVEN LENDING ACTIVITIES IN THE EU: EVIDENCE FROM INSTRUMENTAL VARIABLES</b>                                       | 294 |
| Karasová Katarína                                 | <b>REGIONAL LABOUR MARKET DISPARITIES IN THE SLOVAK REPUBLIC</b>                                                              | 303 |
| Košťuríková Ivana                                 | <b>DEPENDENCE OF THE EFFECTIVE TAXATION ON THE CORPORATE INCOME TAX RATE IN THE EUROPEAN UNION</b>                            | 314 |
| Kotlánová Eva                                     | <b>THE ROLE OF FISCAL POLICY IN AFFECTING INCOME INEQUALITY</b>                                                               | 323 |
| Kotýnková<br>Magdalena                            | <b>INDUSTRY 4.0: WILL THE CONCEPT AFFECT THE WORLD OF WORK?</b>                                                               | 330 |
| Krebs Vojtěch,<br>Barák Vladimír                  | <b>SOCIAL, HEALTH AND OTHER SERVICES FOR HOMELESS PEOPLE</b>                                                                  | 338 |

|                                                                    |                                                                                                                                                             |     |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Kuczevska Joanna,<br>Morawska Sylwia                               | <b>IMPLEMENTATION OF SMALL BUSINESS ACT REGARDING<br/>A SECOND CHANCE POLICY FOR EUROPEAN SMES –<br/>THE CASE OF POLAND</b>                                 | 346 |
| Kurowska-Pysz<br>Joanna                                            | <b>PARTNERSHIP MANAGEMENT IN POLISH-CZECH MICRO-<br/>PROJECTS IN EUROREGION BESKIDY</b>                                                                     | 358 |
| Laboutková Šárka,<br>Žák Milan                                     | <b>TRANSPARENCY OF LOBBYING: A THEORETICAL<br/>APPROACH</b>                                                                                                 | 368 |
| Lebiedzik Marian                                                   | <b>EVALUATION OF PREPAREDNESS OF SELECTED CENTRAL<br/>AND EASTERN EUROPEAN COUNTRIES FOR JOINING THE<br/>EURO ZONE ACCORDING TO THE MAASTRICHT CRITERIA</b> | 378 |
| MacGregor<br>Pelikánová Radka,<br>Beneš Marek,<br>MacGregor Robert | <b>EUROPEAN (MIS)RECONCILIATION OF RULES AGAINST<br/>MISLEADING COMMERCIAL PRACTICES – THE LAST<br/>DECADE’S CRUSADE OF THE COMMISSION AND CJ EU</b>        | 389 |
| Mádr Michal                                                        | <b>TRANSITION FROM HYBRID REGIME TO DEMOCRACY<br/>AND ECONOMIC PERFORMANCE: CASE STUDIES<br/>OF CROATIA AND SERBIA</b>                                      | 399 |
| Machová Zuzana,<br>Kotlán Igor                                     | <b>THE INFLUENCE OF TAX FAIRNESS ON TAX EVASION<br/>IN DEVELOPED COUNTRIES</b>                                                                              | 408 |
| Majerová Ingrid,<br>Nevima Jan                                     | <b>DISPARITIES IN HUMAN DEVELOPMENT INDEX<br/>IN THE COUNTRIES OF VISEGRAD GROUP PLUS</b>                                                                   | 416 |

## CAN GOOGLE TRENDS DATA HELP US MODELLING INFLATION? AN EMPIRICAL EVIDENCE FROM THE CZECH REPUBLIC

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### Abstract

A lot of various determinants can be used to modelling inflation. The aim of this paper is to find which factors influence the inflation rate in the Czech Republic and to assess whereas Google Trend (GT) data can improve the estimates of inflation rate. This paper presents a several models of inflation rate in the Czech Republic based on some traditional theories such as Purchasing Power Parity (PPP) theory or Balassa-Samuelson (BS) effect. Also, some of these models are adapted to the conditions while some of the traditional presumptions of these theories are not valid. Inflation rate, therefore, can be explained using data for productivity, exchange rate, interest rates, wages or prices of some commodities. Moreover, each model form includes data from GT. Since internet plays an important role in our lives nowadays, it is possible, that searching queries can reflect behaviour of economic subjects. Quarterly data (2004 – 2014) are used in regression analysis. It was found that GT data improve most of model specifications.

### Keywords

Inflation rate, Exchange rate, Balassa-Samuelson effect, Google Trends

### JEL classification

C22, E31, E37

## 1 Introduction

A lot of various determinants can be used to modelling inflation. The Purchasing Power Parity Theory (PPP) is one of the oldest theories, which describes relationship between exchange rate and inflation. It was described by Cassel (1922) after WWI. Another important theory is Balassa-Samuelson (BS) effect (described in Balassa (1964) and Samuelson (1964)). According to this approach the prices of tradable goods and services are determined by arbitrage opportunity, so the relative version of PPP is valid for them. On the other hand, PPP is not valid in case of non-tradable goods and services (because arbitrage is not possible). The theory states that faster growth of productivity in tradable sector leads to faster growth of prices in non-tradable sector.

Nevertheless, this effect seems to be almost insignificant in the case of developed countries, because the productivity growth difference between two developed countries is negligible. On the other hand, transitioned economies have experienced rapid productivity growth. Moreover, the growth in the tradable sector exceeded the growth in the non-tradable one. That is why the discussions about BS effect related to transition countries has arisen in nineties. A lot of studies try to estimate its influence in the case of Central European (CE) or Central and East European (CEE) countries.

Authors such as Égert (2011) or Mihaljek and Klau (2008) make an econometric models based on PPP theory and BS effect. They include also other variables in their estimates (such as prices of imported commodities and so on). Lojschová (2003) changes the model for the cases, that some of the presumptions (for example that labour is homogenous, or that interest rate differential between domestic and foreign country is constant) of BS effect are not valid.

In this paper, both above mentioned conceptions are combined. Moreover, there is included another variable. By using Google Trends data, we aim to approximate expectations of economic agents. The main idea behind this approximation is that the more people search word “inflace” (inflation in Czech) in internet search queries, the higher inflation rate they expect. The aim of this paper is to find which factors influence the inflation rate in the Czech Republic and to assess whereas Google Trend (GT) data can improve the estimates of inflation rate.



The reminder of this paper is structured as follows. The role of searching queries is described in the Section 2. Section 3 summarises existing empirical studies. Models and data are defined in the Section 4. Results are introduced in the Section 5. We conclude and discuss results in the last section.

## **2 Nowcasting and Role of Searching Queries in Macroeconomics**

Firstly, there is nowcasting described in this section. There is also mentioned how searching queries can help to model and predict economy. Some basic facts about GT data are described in this section as well.

### **2.1 Nowcasting**

Nowcasting has recently become popular in economics. Standard measures such as GDP are available after a long delay. The idea is that signals about the direction of change in GDP can be extracted from a set of data which are available before official GDP is published. The idea of nowcasting can be seen in other sciences as well. In the field of epidemiology, for example, Polgreen et al. (2008) and Ginsberg et al. (2009) show that search data could help predict the incidence of influenza-like diseases.

This work was widely publicised and stimulated several further findings in epidemiology, but also in other sciences. Einav and Levin (2014) discuss the opportunities of using “Big Data” for economic research. They suggest to use social media data to capture market inflation expectations. Also, Lamont (1997) explore the frequency of appearances of the word “shortage” on the front pages in newspapers (the Wall Street Journal and the New York Times). He excludes appearances linked to non-economic phrases (such as shortages of blood, organs or priests). He finds that there exists a significant relationship between the frequency of appearances of the word “shortage” and the inflation rate in the U.S. Moreover, he states, that this variable can be used to predict inflation.

### **2.2 Google Trends Data**

A lot of possible search queries can be used. Since Google is the worldwide most popular search engine, the data available from Google are used in this paper. Google Trends provide a time series index of the volume of internet search queries of phrases searched by users based by location and time. It is an index number from 0 to 100. 100 stands for time period (data are available weekly or monthly) where the number of searches was the highest.

A line trending downward means that a search term's relative popularity is decreasing. But that doesn't necessarily mean the total number of searches for that term is decreasing. It just means its popularity is decreasing compared to other searches (Goggle, 2016).

## **3 Review of Empirical Studies**

Égert (2011) analyses the impact of economic catching-up on annual inflation rates in the European Union with a special focus on the new member countries of CEE. Using an array of estimation methods, he shows that the Balassa–Samuelson effect is not an important driver of inflation rates. Cardi and Restout (2014) investigate the relative price and relative wage effects of a higher productivity in the traded sector compared with the non-traded sector in a two-sector open economy model. They highlight the role of wages and imperfect mobility of working force. Égert et al (2003) studies the Balassa–Samuelson effect in nine CEE countries. Using panel cointegration techniques, they find that the productivity growth differential in the open sector leads to inflation in non-tradable goods.

Lojschová (2003) uses time series and panel regression analyses to estimate role of BS effect in four CE countries (the Czech Republic, Slovakia, Poland and Hungary). She finds empirical evidence of BS effect in these countries. Égert (2002) finds long-term cointegration relationship between BS effect and relative prices in the Czech Republic, Hungary, Poland, Slovakia and Slovenia during transition process.

Choi and Varian (2012) use GT data to predict the rate of unemployment in United States. Koop and Onorante (2013) test the possibilities of use GT data to capture major turns and structural changes in some macroeconomic variables such as production, inflation or unemployment. Kristoufek (2013) find a strong correlation between GT search queries and the value of digital currency Bitcoin. Guzman (2011) states that Granger Causality tests indicate that the GT data a metadata anticipate the inflation rate by 12 months in case of U.S.

## 4 Estimated models and Data

Particular forms of models are described in this section. Also, presumptions of each model are summed up in this section, because each model has different ones. This chapter includes data description as well.

### 4.1 Models

There exist a lot of possible models in empirical literature. Eight models are estimated in this paper, based partly on Lojschová (2003) and Égert (2011). The presumptions of these models are mentioned in this section. Those models labelled with *gt* include data from GT as well. There are several presumptions of these models based on economic theory. Common presumptions of all models are that:

- labour intensity in tradable sector equals labour intensity in non-tradable sector,
- capital is mobile,
- all firms are under the perfect competition.

Individual presumptions of each model are depicted in the Table 1. The BS effect presumes that labour is homogenous, hence people can move between tradable and non-tradable sector within country. Lojschová (2003) uses variable to approximate wages differences between tradable and non-tradable sector. The variable *WAGES* (see Chapter 4.2) is used in this paper as well. Labour is, therefore heterogeneous in models, where this variable is used. Another classical presumption of the BS effect claims that PPP theory holds for tradable, hence exchange rate is used as one of determinants of inflation rate. Lojschová (2003) uses inflation rate differential in tradable sector instead of exchange rate in the case that PPP theory is not valid. This approach is used also in this paper. The last presumption of BS theory is that one country cannot affect the world level of interest rate. This assumption can be relaxed by using interest rate differential.

**Table 1.** Individual presumptions of each model

| Individual presumptions of each model                                                                                                    | Model  |        |        |        |
|------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|
|                                                                                                                                          | A, Agt | B, Bgt | C, Cgt | D, Dgt |
| Labour is homogenous (in the tradable and non-tradable sectors) and mobile within country, but not internationally.                      | no     | yes    | no     | x      |
| Labour is heterogeneous (in the tradable and non-tradable sectors) and/or not completely mobile within country, but not internationally. | yes    | no     | yes    | x      |
| PPP theory holds for tradable goods.                                                                                                     | no     | no     | yes    | no     |
| Interest rate differential is constant, the Czech Republic cannot affect the world level of interest rate.                               | no     | no     | no     | yes    |

Source: Lojschová (2003), edited by author

## 4.2 Data

Data are described in this section. There is also explained, how the variable influences the dependent variable in the case of depending variables. Data sources are mentioned in this section as well.

### Inflation rate differential: $p$

The dependent variable in all models is the variable  $p$ . There are more options, how to measure inflation rate. In this paper, GDP deflator is used to measure price level. The usage of some of price indices would cause the danger of endogeneity in some of models (in those, where variable for tradable goods is used). The variable is  $p$  therefore computed as:

$$p = p_{CZ} - p_{EA}, \quad (1)$$

where  $p_{CZ}$  is inflation rate in the Czech Republic and  $p_{EA}$  is inflation rate in euro area (both Czech and euro area's inflation rate are based on GDP deflator). Data for both seasonal adjusted nominal and seasonal adjusted real GDP for both countries were gathered from Eurostat Database (Eurostat, 2016).

### Exchange rate: $E$ ; +

Exchange rate ( $E$ ) is defined as a bilateral nominal exchange rate (CZK/EUR) at the end of period (quarter) in this paper. This variable is included in those models, where PPP theory is expected to be valid. Higher values (depreciation) should cause rising of inflation rate. Data were obtained from ARAD – Data Series System (CNB, 2016).

### Balassa-Samuelson effect: $bs$ ; +

The variable labelled as  $bs$  is linked to the Balassa-Samuelson effect. The definition of tradable and non-tradable sector is not united in empirical papers. The lack of available data implies that most authors consider either all industry (such as Égert, 2002 or Fischer, 2004) or just manufacturing (Jazbec, 2002) as tradable sector in the case of transition countries. In this paper, the variable  $bs$  presume that only manufacturing is tradable sector. The residuals are considered as non-tradable sector. Lojschová (2003) compute this variable as:

$$bs = (1 - \alpha) \left( \frac{\delta}{\gamma} \Delta a_t^T - \Delta a_t^N \right) - (1 - \alpha^*) \left( \frac{\delta^*}{\gamma^*} \Delta a_t^{T^*} - \Delta a_t^{N^*} \right), \quad (2)$$

where parameter  $\alpha$  is the share of traded components in consumption basket,  $t$  is a time,  $a$  is logarithm of the productivity in particular sector,  $T$  and  $N$  represents tradable and non-tradable sector, respectively and parameters  $\gamma$  and  $\delta$  denote labour intensities in tradable and non-tradable sector respectively. While considering that factor intensities in both countries are constant, Equation (2) can be written as:

$$bs = (1 - \alpha)(\Delta a_t^T - \Delta a_t^N) - (1 - \alpha^*)(\Delta a_t^{T^*} - \Delta a_t^{N^*}). \quad (3)$$

An increase in this variable should lead to rising of inflation rate differential. The productivity ( $A$ ) is computed as value added per employee in each sector. The series were sessional adjusted using Census X12 technique. Data were gathered from Eurostat Database (Eurostat, 2016) based on “*Nomenclature générale des Activités économiques dans les Communautés Européennes*” (NACE) classification.

### **Interest Rate Differential: $I$ ; -**

One of the assumptions of traditional approach to BS effect is that the difference between domestic and foreign interest rates are constant. Some authors, such as Lojschová (2003) try to improve their models including interest rate differential into that equation. Because both Czech National Bank (CNB) and European Central Bank (ECB) targeting inflation rate; the policy rates ( $I$ ) are used instead of money market rates in this paper. The variable  $I$  is therefore computed as follows:

$$I = I_{CZ} - I_{EA}, \quad (4)$$

where  $I_{CZ}$  and  $I_{EA}$  represents monetary policy interest rates in the Czech Republic and euro area, respectively. This variable should have negative influence on inflation rate differential. Data (at the end of period) were obtained from ARAD – Data Series System (CNB, 2016) and from ECB – Database (ECB, 2016).

### **Change in the Foreign Exchange Reserves: $FER$ ; +**

Another important variable represent the change of foreign exchange reserves and it is label as  $FER$ . Since conventional instruments of monetary policy (monetary policy interest rates) was not sufficient in the Czech Republic, CNB uses foreign exchange operation with the purpose of increasing inflation rate. Therefore, the higher value of variable  $FER$ , which is defined as the change of foreign exchange reserves of the Czech Republic, should lead to higher inflation rate in the Czech Republic. Data were obtained from ARAD – Data Series System (CNB, 2016).

### **Differential in Wages between Tradable and Non-tradable sector: $WAGES$ ; +**

The differential in wages between tradable and non-tradable sector ( $WAGES$ ) is computed as the ratio of wages and salaries to number of employees in relevant sector. It is linked to BS effect. Actually, in case of use only variable  $bs$  it can be considered as so called Baumol-Bowen effect or domestic Balassa-Samuelson effect. This effect assume that labour is homogenous (in the tradable and non-tradable sectors) and completely mobile within country. That is why wages equals between tradable and non-tradable sector. In fact, there exit a lot of reasons why this assumption may not be valid. That is why variable  $WAGES$  is used in some models. As it was mentioned above, there is no united classification of tradable and non-tradable sector in current literature. Since variable  $WAGES$  is linked with variable  $bs$ , the tradable sector is defined the same as it is in BS effect. Increase in wages should lead to rising of inflation rate differential. The series were sessional adjusted using Census X12 technique. Data were gathered from Eurostat Database (Eurostat, 2016) based on “*Nomenclature générale des Activités économiques dans les Communautés Européennes*” (NACE) classification.

### **Prices in the Tradable Sector: $p_T$ ; +**

There is need of variable measuring prices in the tradable sector in some of the models (in those which presume that PPP theory is not valid). Variable  $p_T$  is used for this purpose. It is defined as Producer Price Index (PPI) in manufactured products. Since the dependent variable is defined as GDP deflator, the usage of two different price indexes should lower the danger of endogeneity of the model. The variable is computed as:

$$p_T = p_{T\_CZ} - p_{T\_EA}, \quad (5)$$

where  $p_{T\_CZ}$  and  $p_{T\_EA}$  stands for inflation rate (based on PPI) in the Czech Republic and euro area, respectively. The higher inflation rate in tradable sector should cause rising of aggregate inflation rate. Data for both countries were gathered form the Eurostat Database (Eurostat, 2016).

## External Factors: Prices of Food: *FOOD*; + and Oil: *OIL*; +

There are also prices of some external factors included in the models. The variable *FOOD* represents imported prices of food based on methodology of Eurostat, Eurostat (2016). It is defined as YoY change of food prices. Quarterly data were computed as the averages from monthly data. Data were obtained from Eurostat Database (Eurostat, 2016). The growth of food prices should lead to higher inflation rate. The variable *OIL* stands for external prices of oil. It was approximated using Euro Brent Spot Price. Quarterly data was computed from monthly changes in the index. Data are available from Energy Information Administration (EAI, 2016). The growth of this variable should lead to growth of inflation.

## Google Trends Data: *GT*; +

Variable *GT* is used for the GT data. It approximates expectation of current inflation. The higher current expectations are, the higher inflation will be. Data from Google Trends allows us to download searching queries in the selected country. The word “inflace” (inflation in Czech) is used in this paper. Other phrases (such as “míra inflace” – inflation rate, “zdražování” – price increase, or “růst cen” – price growth) turn out to be insignificant. Quarterly data were computed from weakly data available from Google (2016). The variable is computed as the change in the quarterly data.

## 5 Results

There are results presented in this section. Firstly there are some descriptive statistics. Then there are results of estimated models.

### 5.1 Preliminary look at the data

Tables 2 and 3 report descriptive statistics of used variables. In the case of regression analysis it is important, that data should be stationary. The PP test could not reject the null hypothesis (time series has a unit root) in the case of the variable *WAGES* only. Nevertheless, the null can be rejected in the 11 % level of probability. Also, Augmented Dickey-Fuller (ADF) test as well as Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test show that this variable is stationary in 1 % and 10 % level of probability, respectively. All variables, therefore, can be considered as stationary and they can be used in regression analysis.

**Table 2.** Descriptive Statistics of Variables

| Variable             | Expected sign | Mean    | Median  | Maximum | Minimum  |
|----------------------|---------------|---------|---------|---------|----------|
| <i>p</i>             | dependent     | 0,0041  | 0,0084  | 0,0581  | -0,0715  |
| <i>E</i>             | +             | -0,0041 | -0,0065 | 0,0853  | -0,0482  |
| <i>bs</i>            | +             | 0,0055  | 0,0022  | 0,0963  | -0,0621  |
| <i>I</i>             | -             | -0,0024 | 0,0000  | 0,5000  | -0,7500  |
| <i>FER</i>           | +             | 11780   | 836     | 245991  | -64341   |
| <i>WAGES</i>         | +             | 0,0009  | -0,0017 | 0,0654  | -0,0857  |
| <i>p<sub>T</sub></i> | +             | -0,0022 | -0,0029 | 0,0425  | -0,0255  |
| <i>FOOD</i>          | +             | 2,9672  | 1,2667  | 32,7333 | -30,0667 |
| <i>OIL</i>           | +             | 1,9121  | 2,3333  | 22,4533 | -52,3400 |
| <i>GT</i>            | +             | 43,3492 | 45,1667 | 79,0000 | 15,0000  |

Source: own calculations

Since variables can influence each other with a lag, all models were tested with delays as well. Since the horizon of monetary policy in the Czech Republic comes up to six quarters, each variable was lagged up to 6 periods ( $t = 0, 1, \dots, 6$ ). Individual lags are based on the cross-correlations. The variables  $E$  and  $bs$  have the highest influence with the 4 periods lag, variable  $WAGES$  with 1 period lag and variable  $p_T$  with 2 periods lag.

**Table 3.** Descriptive Statistics of Variables

| Variable | Expected sign | Standard Deviation | Skewness | Kurtosis | PP - p-value |
|----------|---------------|--------------------|----------|----------|--------------|
| $p$      | dependent     | 0,0240             | -0,7982  | 4,4064   | 0,0002       |
| $E$      | +             | 0,0254             | 1,0977   | 5,3799   | 0,0009       |
| $bs$     | +             | 0,0264             | 0,7320   | 5,3311   | 0,0000       |
| $I$      | -             | 0,3084             | -0,1970  | 2,5558   | 0,0000       |
| $FER$    | +             | 52818              | 2,2328   | 10,4456  | 0,0000       |
| $WAGES$  | +             | 0,0310             | -0,0048  | 3,4187   | 0,0065       |
| $p_T$    | +             | 0,0133             | 0,9154   | 4,7739   | 0,0022       |
| $FOOD$   | +             | 15,3506            | -0,0860  | 2,8839   | 0,1097       |
| $OIL$    | +             | 12,4102            | -2,3083  | 10,8686  | 0,0000       |
| $GT$     | +             | 14,9465            | -0,0765  | 2,5354   | 0,0001       |

Source: own calculations

## 5.2 Estimated Models

Table 3 reports the results of the estimated models. As concerns Model A all variables have an expected sign. Also, R-squared is quite high (over 60 %). By including GT data to this specification (Model Agt) the results get even better. All variables are now significant and have a right sign. Moreover, the value of R-squared is now almost 65 %. The Durbin-Watson statistic (DW) is nearly 2 in both Model A and Model Agt.

The difference between Model A and Model B is that Model B presumes that labour is homogeneous between tradable and non-tradable sector, hence variable  $WAGES$  is excluded. This model obviously provides worse results (R-squared, Adjusted R-squared and DW) than Model A. By including GT data, the results remain almost unchanged.

Model C presumes that PPP theory is valid, hence prices of tradable goods can be replaced by exchange rate. Nevertheless, the exchange rate is not significant in this model. Also, the value of R-squared is lower than in the case of Model A. By including GT data the results get better but Model Agt still seems to be better than Model Cgt.

Model D presumes that the Czech Republic cannot affect the world level of interest rate. Therefore, the interest rate differential is excluded from this model. Instead, the prices of imported commodities are included in it. Both variants with GT data (Model Dgt) and without GT data (Model D) provide similar results, which both are worse than in the cases of Model A or Model C.

To sum it up, Model A provides the best results, especially in the case, that GT data are included in it (Model Agt). All variables are significant and have a right sign. Model explain 64.62 % of variability of the differential in the inflation rate between the Czech Republic and euro area.

**Table 3.** The Outputs of the Models

|                      | A         | Agt       | B         | Bgt       | C         | Cgt       | D         | Dgt       |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <i>E</i>             |           |           |           | 0,0579    | 0,0548    |           |           |           |
| <i>bs</i>            | 0,1357    | 0,1843*   | 0,0873    | 0,1195    | 0,1472    | 0,2022*   |           |           |
| <i>I</i>             | -0,0206** | -0,0184** | -0,0238** | -0,0224** | -0,0204** | -0,0179*  |           |           |
| <i>FER</i>           | 0,0001*** | 0,0001*** | 0,0001*** | 0,0001*** | 0,0001*** | 0,0001*** | 0,0001*** | 0,0001*** |
| <i>WAGES</i>         | 0,3085*** | 0,3320*** |           |           | 0,2910*** | 0,3198*** |           |           |
| <i>p<sub>t</sub></i> | 0,4390**  | 0,3758*   | 0,4205*   | 0,3742    |           |           | 0,5372**  | 0,5092**  |
| <i>FOOD</i>          |           |           |           |           |           |           | 0,0003*   | 0,0002    |
| <i>OIL</i>           |           |           |           |           |           |           | 0,0000    | 0,0000    |
| <i>GT</i>            |           | 0,0004*   |           | 0,0003    |           | 0,0004**  |           | 0,0001    |
| R-squared            | 0,6047    | 0,6462    | 0,4579    | 0,4796    | 0,5512    | 0,6087    | 0,4937    | 0,4998    |
| Adjusted R-squared   | 0,5430    | 0,5777    | 0,3922    | 0,3982    | 0,4811    | 0,5330    | 0,4192    | 0,4089    |
| Durbin-Watson        | 2,1162    | 2,0709    | 1,7636    | 1,6777    | 2,1636    | 2,1414    | 1,8527    | 1,8061    |

Note: values of coefficients are depicted for each variable; OLS method is used in all models; each model includes intercept; \*, \*\*, \*\*\* denote 10%, 5% and 1% probability respectively.

Source: own calculations

## 6 Conclusion

Model Agt seems to be the best model to identify factors influencing inflation in the Czech Republic. In this specification, exchange rate is replaced by prices of tradable goods. We can therefore conclude that PPP theory might not be valid in the Czech Republic.

Also, the interest rate differential significantly influences the inflation rate differential. It suggests that the Czech Republic can affect the world level of interest rate. Lowering interest rates (monetary policy rates) in the Czech Republic can increase the inflation rate in the Czech Republic relatively to euro area.

The impact of the BS effect is ambiguous in the case of this model. The variable *bs* is not significant in the Model A (it is significant on the 15 % level of probability). On the other hand, when GT data are used (Model Agt), this variable is significant at 10 % level of probability and it has a correct sign (which would suggest that the growth of productivity in the Czech Republic relatively to euro area, can lead to growth of inflation rate differential between these areas). This finding corresponds to other empirical papers. Paper dealing with time period in the nineties and around 2000 (such as Lojschová, 2003 or Égert, 2002) find the BS effect significant. On the other hand, newer papers, such as Égert (2011), state that BS effect is not an important driver of inflation rate. The possible explanation is that the volume of the BS effect is disappearing during time.

The influence of wages is indisputably significant, hence it shows that there are significant differences between tradable and non-tradable sector and labour is not homogeneous or the workforce is not completely mobile within country. This finding is consistent with Cardi and Restout (2014) or Lojschová (2003). Most of papers dealing with BS effect in Central European countries neglect the role of wages and presume that labour is homogenous. In other words, they explore rather Baumol-Bowen effect (domestic Balassa-Samuelson effect) than BS effect. The finding that wages are not the same in tradable and non-tradable sector suggests that we should focus either on BS effect than on Baumol-Bowen effect.

Also, it was found, that GT data are significant in the case of Model A and Model C. The value of R-squared is higher about 4.5 percentage points in Model Agt relatively to Model A and about 5.5

percentage points in the case of Model Cgt relatively to Model C. It suggests that GT data can be used to approximate expectations about inflation and it can be used in future researches.

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## **CORPORATE RESPONSIBILITY AS A RESPONSE TO GLOBALIZATION**

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### **Abstract**

This paper examines responses to globalization in some of contemporary corporate social responsibility (CSR) earliest initiatives related to globalization. Understanding the phenomenon of globalization is a necessary part of comprehending the context within which contemporary corporate responsibility has emerged. This paper aims to introduce and describe an approach for incorporating CSR into the global strategic planning and decision-making process using a conceptual framework. The emphasis is on identification how globalization has affected CSR at the national level. We used global CSR and the autonomy of national CSR proposition to assess the relationship between global and the local. National Czech CSR frameworks are seen as a product of the global models (frameworks) that shape national-level CSR approach. The findings underline the impact of the global on the national; this does not mean that national CSR had no impact on global frameworks.

### **Keywords**

Corporate Social Responsibility, globalization, frameworks, initiatives.

### **JEL classification**

F64, M14

## **1 Introduction**

In the global economy, territorially bound nation states are seen to lose their political and socio-economic power over free market forces and economic actors like multinational corporations (Mäkinen and Kourula, 2014). Furthermore, it is argued that multinational corporations as the powerful citizens of the ‘borderless global world’ increasingly take over the traditional political and socio-economic responsibilities of state institutions and governments (Scherer and Palazzo, 2011; Matten and Crane 2005; Scherer and Palazzo, 2007).

Understanding the phenomenon of globalization is a necessary part of comprehending the context within which contemporary corporate responsibility has emerged. Globalization exaggerates and exacerbates by making things quicker, larger, and more visible than before, and this has increased the pressure on companies to act responsibly (Blowfield and Murray, 2014). For some, corporate responsibility is about making the benefits of globalization accessible to more people, by either limiting the need for government intervention or making new resources available for human development (Block and Barnett, 2005). It can be also be seen as a reflection of the interdependence of government and business, under which the former looks to the latter to create wealth in order to retain power, while the latter looks to the former to develop human capital and maintain stability (Stopford et al., 1991). What is more, reflecting the general widespread growth in self-regulation and voluntary agreements by business, corporate responsibility can be regarded as an element of a new system of global governance that sits alongside the democratic model of national government that is promoted by the most powerful countries (Blowfield, 2005).

Therefore, the aim of this paper is to assess the interactions between global institutional pressure and national Corporate Social Responsibility (CSR) approach and evaluate situation in the Czech Republic in using “national” and “global” frameworks associated with CSR. For confrontation and determination is carried out a preliminary study, whose results will point to the use of standardization in CSR. We argue that the national context is significant in defining the relationship between companies and state (government approach). The globalization should be examined in terms of how it effects the local (national) approach. In the Czech Republic, it is possible to see the signals of this emerging global division of CSR in national approach and business practice. This is due to the

emerging number of voluntary initiatives and organizations that are direct to the spread of CSR. An increasing number of companies is engaging in responsible activities, the public awareness of CSR is rising, and customers are giving higher importance to CSR of companies in their choice. Despite the situation has been changing, CSR remains as unknown or not well understood term for large portion of both the public and business sector.

The current CSR landscape is complex and multi-faceted. Some of contemporary corporate responsibility's earliest initiatives were related to globalization. The Rio Earth Summit, for example, brought together different sectors of society to address global environmental challenges. It succeeded in sending the message that business could and should act, and indirectly encouraged business and environmental groups to work together on initiatives (Blowfield and Murray, 2014).

In 1999, the UN announced its Global Compact to bring companies together with UN agencies, labour organizations, and civil society to promote responsible corporate practices and to help business be a part of the solution to the challenges of globalization. At its 2007 Summit meeting in Heiligendamm, the leaders of the Group of Eight (G8) nations underlined the importance of corporate social responsibility. Noting the potential of CSR to ensure that the processes of globalisation also addressed social issues, G8 leaders highlighted the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (ILO Declaration) and the OECD Guidelines for Multinational Enterprises (OECD Guidelines), and stressed the United Nations Global Compact as an important CSR initiative. Governments in advanced industrialized countries play an increasingly important role in driving the CSR agenda forward. By CSR, we refer to “the responsibility of enterprises for their impacts on society” (European Commission 2011). Czech Republic is no exception, also adopted, and developed its action plan on CSR, which is a non-legislative document and determines the strategic approach to CSR. Each area of this national approach in the following article is reviewed in detailed view.

## **2 Corporate Social Responsibility in a Globalizing World**

We could see the CSR has become virtually synonymous with globalization and transnationality. Many CSR initiatives have domestic origins and some of the central works of modern-day CSR focus on businesses' domestic, not their transnational or global responsibilities. The field's preoccupation with the international and global has led to a conspicuous omission: national-level CSR efforts have received little attention to date. National CSR provides a relatively strong test of world society theory: it is not evident a priori that national responsible business organizations have anything to do with world society or global culture (Kinderman, 2015). Whereas world society “transcends particular national states and societies” (Meyer, Pope, and Isaacson, 2015), national CSR associations are national level, responsible business groups. They are attuned to national culture, institutions, and social and environmental concerns. Multinational companies are often members in national CSR associations, but, in most cases, the vast majority of member companies are domestic. Consequently, national CSR associations are domestically focused; at most, they are hybrids or institutional bridges between the global and the local.

Whereas global normative pressures have fostered CSR's global diffusion and a proliferation of global CSR frameworks (Lim and Tsutsui 2012), national CSR associations may be autonomous from these global processes, given their embeddedness in national traditions and institutional frameworks (Habisch et al. 2005; Visser and Tolhurst 2010; Grayson and Nelson 2013). The global CSR draw on the core insight of the world society approach that worldwide models and cultural scripts shape national institutions and practices and proposes that national CSR associations track global developments. It is important to emphasize that the world society approach does not deny that “the contested transnational structuration of CSR is particularistically adapted to national-sectoral settings” (Shanahan and Khagram, 2006).

But, at its core, the global CSR downplays local variation and sees global frameworks and institutional pressures as the driving forces of CSR at the national level (Kinderman, 2015). Lim and

Tsutsui argue that “changes in the global normative environment have prompted many corporations to pledge commitment to CSR principles” (Lim and Tsutsui, 2012). Longhofer and Schofer (2010) find that “global dynamics constitute or construct local activity... The primary impetus behind domestic ... associations may be traced to the resources and culture of world society” (Longhofer and Schofer, 2010). On the other hand we could identified the autonomy of national CSR. This implies that the establishment of national CSR associations does not coincide with important developments at the global level. National CSR associations are subsystems with large degrees of autonomy orb no connection at all to global frameworks and world cultural principles.

In the Czech Republic does not have so much autonomy and are largely taken over the international (global) standards defining approaches to CSR not only within the EU. The only positive factor may be found in the origin of our own initiatives in CSR awards and to develop certification standards IQNet SR 10, which is based on ISO 26000. Subsequently they will be presented international standards, which are significant in terms of their penetration into the Czech environment. Firstly, we focus on defining global standards (initiatives) and their application areas and then, secondly, we state the multinational standards and their application in the EU and then we turn into the local "national" initiatives affecting CSR.

In this complex universe there are two foremost international instruments relevant to CSR the ILO Declaration and the OECD Guidelines and one important international CSR initiative the UN Global Compact (UNGC) which have either been developed and formally agreed by governments or received high-level recognition by governments at an international level. These private CSR initiatives have been developed to address a range of different sectors, issues and communities, with new initiatives constantly emerging to address new challenges. The United Nations Global Compact alone has been the subject of dozens of books and hundreds of articles, and there are no signs that this interest is abating. Yet, despite their combined membership of several thousand companies and their significant role in shaping responsible business practice, there are at most a handful of treatments of the national CSR initiatives that exist in many countries across the world (Kinderman, 2015).

This core set of internationally recognised principles and guidelines represents an evolving and recently strengthened global framework for CSR. European integration of these frameworks fully follows the CSR promotion. National CSR organizations are rooted in particular national traditions, institutions, and cultures. They arise at different times and take different forms in different countries. Their membership ranges from a few dozen companies in fledgling organizations to over a thousand in well-established ones. As important as they are, even the largest and most prominent national CSR associations only represent a minority of their country’s businesses (Kinderman, 2015). From the standpoint of creation and access to shaping national (local) standards and defining global influence must be defined factors shaping national CSR priorities in the next section.

## **2.1 Contextual Factors Shaping National CSR Priorities**

A wide range of government-led CSR initiatives can be identified in Member States of EU, for example: from ‘softer’ initiatives such as awareness-raising and promotional activities, to ‘harder’, legislative actions. Despite CSR being considered the responsibility of enterprises for their impacts on society, due to the breath of issues covered under the CSR umbrella, legislation plays a role to varying degrees at Member State level. With regard to basic human rights and rights of workers, many countries refer to the importance of international standards and how these are enshrined in national legislation. Some Member States have also decided to enact firmer measures with regard to company reporting on CSR issues. This has led to a certain blurring of the lines between a more ‘voluntary’ concept of CSR and governments setting guidelines for social responsibility activities undertaken by companies.

One of the critical factors in shaping countries’ CSR approaches and activities (as well as the maturity of their policies) is the structure of their economy. As well as exposure to trade and global supply chains, the structure of the economy in terms of the number of (domestically headquartered)

multinational companies and the share and importance of SMEs and micro-economies also impacts on CSR approaches. Not only are strategies affected by the make-up of the domestic economy, but this also plays a role in the level of stakeholder engagement. With their close ties to their local communities, such small businesses often have a heightened awareness of their social responsibility in the local context, whether or not any initiatives taken are officially labelled as CSR or not.

In countries where cultural, political and organisational awareness of CSR has traditionally been low and such policies and approaches are only beginning to emerge, the focus tends to be on awareness raising activities and building stakeholder engagement, with other approaches developing subsequently. Where there is a lower exposure to global markets, as well as in countries particularly affected by the economic crisis, particular emphasis tends to be placed on social policies, for example approaches to supporting employment opportunities for young and disadvantaged people and ensuring social inclusion (Compendium, 2014).

We summarize existing National Action Plan on CSR (NAPs) on CSR in EU and their level of development (Table 1). In a number of countries, these are follow-up plans from previous strategies, whereas in others the documents constitute the first plan or policy document of its kind. A further five countries had NAPs close to completion and/or under discussion in their national Parliaments. Seven Member States were in the process of developing their NAPs but a lack of a NAP does not imply an absence of any CSR initiatives.

**Table 1.** Current state of development of National Action Plans on CSR

| Countries with current CSR NAPs                                                                                                              | Countries with NAPs close to completion | Countries with NAPs under development                          | Countries without plans to develop a formal NAP |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| Belgium, Bulgaria, Cyprus, Czech Republic, Germany, Denmark, Estonia, Finland, France, Italy, Lithuania, the Netherlands, Poland, Sweden, UK | Austria, Ireland, Hungary, Malta, Spain | Croatia, Greece, Latvia, Portugal, Romania, Slovenia, Slovakia | Luxembourg                                      |

Source: National Public Policies in the European Union, 2014.

In EU was identified a gradual shift of ministerial responsibilities for CSR policies from ministries of social affairs and employment to economics and trade ministries (also in the Czech Republic) in area of implementation of NAPs in national environment. Finally, in EU national and regional governance structures also influence CSR approaches. More centralised administrations primarily develop policies at this level, whereas in countries with devolved regional administrations there is often significant activity at this level as well. This can lead to different approaches being developed in the regions, but also provides the opportunity for peer learning and practice cross-fertilisation.

### 3 Trends in Penetration of CSR Guidelines and Principles in the Czech Republic

The current concept of corporate social responsibility represents a coherent set of activities and practices that are an integral part of the control strategy of social, environmental and economic organisations, and are implemented by organisations on a voluntary basis beyond the scope of their legal obligations, motivated by a desire to help to improve conditions in society. Social responsibility includes, for example, areas associated with human rights, employee care, job creation, diversity, equal access to employees, lifelong education, prevention of environmental pollution, the use

of renewable sources, saving energy, water and other resources, the fight against corruption, transparency and the quality of products and services.

In the Czech environment, social responsibility is perceived as a concept, which should be applied primarily by commercial enterprises. However, this is something that should also be focused on by non-governmental non-profit organisations and state and local government authorities, as these are responsible for the impact their activities have on society. Therefore, the National Action Plan covers the social responsibility of organisations, and includes all these subjects under this term. The NAP is being designed together by representatives of government, academia, European Parliament, and associations of socially responsible companies, and will recommend areas of CSR that the Czech Republic should focus on. The domain of CSR in the Czech Republic was traditionally reserved for multinational companies that have had CSR embedded in values of the foreign corporations. Nowadays the number of Czech companies interested in the responsible way of doing business is growing and companies realize that CSR is something they should engage in.

Long-term financial success of the company increasingly goes hand in hand with our reporting and commitment to CSR. A responsible approach to business has brought demonstrable benefits. The number of organizations that publish their corporate responsibility activities is constantly growing. The positive fact we found in a growing number of businesses involvement in areas that were previously the domain of the public sector, starting with health, education, after protecting the environment. Businesses are no longer merely part of the market, its creator and there is potential for growing social innovation.

Organizations in the Czech Republic initially implemented CSR in the form of one-off projects from the sub-areas. Gradually, companies began to integrate CSR into the management system and becomes an integral part of their overall strategy. The most common activities e.g. employee care, measures to protect the environment and help communities, relationships with suppliers and others. The valuation is primarily a systemic approach and synergistic effects. They were the basis for the formation the Czech Republic National Award for CSR announced annually. Then, a penetration of international CSR principles into the Czech environment in the form of UN Global Compact, OECD Multinational Guidelines, Global Reporting Initiative and ISO 26000. Amount of resources and opportunities subscribe to CSR and sustainability is growing. Initiatives, standards and guidance are on the rise at the national and global levels. International UN Global Compact brings together over 13,000 organizations in more than 165 countries around the world (from April 2015, also operates in the Czech Republic), this number continues to grow.

The differences between separate standards are focused on the stakeholders or it depends on the methodology. There is the importance to highlight the London Benchmarking Group (LBG), which is implemented in the Czech Republic as “Standard odpovědná firma” (SOF). These is using for data verification into list “TOP Firemní Filantrop” in Czech and Slovak Republic, also for Giving List in Great Britain and reporting about all CSR activities either.

A set of Principles for Better Self and Co-Regulation was published in early 2013, and a ‘Community of Practice’ was set up (as an online platform) to facilitate the exchange of knowledge and good practice in this area. For evaluation of CSR the Korp method in the Czech Republic was developed. In the year 2011, the Quality Council of the Ministry of Industry and Trade of the Czech Republic made the national programme for the evaluation agreement of the management system of CSR

Since 2015, the *Global Compact Network Czech Republic* helps to root the initiative within different national, cultural, and language context. Its role is to facilitate the progress of companies (both local firms and subsidiaries of foreign corporations) engaged in the Global Compact with respect to implementation of the ten principles, while also creating opportunities for sharing knowledge, learning, collective action, and partnership. Through dialogue, including the political, the network enables participants to influence actively CSR policy in the Czech Republic. The host entity of Czech local network is the Association of Social Responsibility. Currently, (June 2016) this

network has 27 participants including private and public sector. The UN Global Compact contains ten principles and asks companies to adopt a set of core values in the following areas: human rights, labor, environment and anti-corruption. The Czech Republic has demonstrated a commitment to the UNGPs through the formulation of National Action Plans on Business and Human Rights, which comply with international guidelines.

The second important international framework are the *OECD Guidelines for Multinational Enterprises* annexed to the OECD Declaration on International Investment and Multinational Enterprises (MNEs). They are recommendations providing principles and standards for responsible business conduct for multinational corporations operating in or from countries adhered to the Declaration. Governments adhering to the OECD Guidelines are obliged to set up National Contact Points (NCPs). Their main role is to further the effectiveness of the Guidelines by undertaking promotional activities, handling enquiries, and contributing to the resolution of issues that arise from the alleged non-observance of the Guidelines in specific instances (Compendium, 2014). The Czech government have developed CSR activities to promote, encourage and support multinationals operating in their country to adopt these OECD Guidelines. The Czech Republic has established information, dissemination and awareness raising measures in relation to the OECD Guidelines in the form of electronic open-access information portal (launched in 2014).

*ISO 26000* is the standard for social responsibility for all organisations. It was produced by the International Standards Organisation in 2010. To ensure consistency, ISO has entered into special agreements with the ILO, the Global Compact, the Global Reporting Initiative and the OECD. ISO 26000 does not offer guidance on social responsibility performance reporting. However, the ISO 26000 content does cover a very similar range of topics to that in the GRI Reporting Guidelines. The ISO guidance provides a structure for companies to organise their activities, which can then be measured and presented in the company's report following GRI guidance. In Czech Republic was developed national guidance tools for companies wishing to be ISO 26000 compliant. Still, no formal accreditation process is available for the ISO 26000 standard.

Reporting on non-financial aspects of business performance is becoming an increasingly common measure of assessment of business' CSR achievements. Different rules apply in relation to what has to be reported, by whom, and as part of which official reporting procedure. The full independent verification of such information can thus remain an issue (Compendium, 2014). Transparency in doing business is one of the current trends in CSR in the Czech Republic. Companies start to include information about their CSR activities on their web sites, in their annual reports, or in specialized reports on CSR they create. The number of companies that create a specialized report is still very limited. In fact, many branches of multinationals send data to their mother companies that prepare a report for the whole region where they operate. Up until now, not many companies have used standardized reporting frameworks to create their own local reports. The companies start to realise the benefits of creation of a local GRI report and there is a potential that this new trend of reporting will extend in the near future.

Some governments have introduced mandatory reporting for companies (typically larger companies) on their CSR activities. Some of these focus on human rights or the environment or whether the companies have a CSR policy (e.g. Denmark, UK, and France). In the Czech Republic, there is no obligation for either the public or the private sector have thus audited CSR reports (e.g. GRI), exists only voluntary approach. Next part of the paper focuses on the performance of National Action Plan on CSR, which is the main core document, based on international (global) principles, which are designed to application level for EU countries.

### 3.1 National Action Plan on CSR

To manage CSR promotional and coordination activities, in 2008 the Quality Council of the Czech Republic set up a specialised Corporate social responsibility section, whose task is to coordinate CSR activities at the national level with the aim of fulfilling the strategic plans of the National Quality

Policy in the field of social responsibility for the period 2011 – 2015. Members of the Specialised Section are representatives of business associations, public administration, professional organisations and non-governmental non-profit organisations and the academic sphere.

Besides the Quality Council, CSR in the Czech Republic is also promoted by other non-governmental organisations, e.g. Business for Society (BfS), the Business Leaders Forum (BLF) and regional organisations (e.g. the Social Responsibility Institute in Ostrava and the Social Responsibility Association in Plzeň). These organisations operate more or less independently of the Quality Council and it is essential to seek ways of assuring effective cooperation. The traditional passive approach is based on that fact that the Czech Republic had not developed any of its internal special programs and took the opinions and goals stemming from the common EU approach stated for national NAPs in Member States. The purpose of the Czech NAP is to help to develop the concept of corporate social responsibility in the Czech Republic and thus to promote the development of society, the economy and the competitiveness of the Czech Republic. The primary intentions of the strategic document of the National Action Plan for Corporate Social Responsibility in the Czech Republic are: to support the application of social responsibility by organisations; to strengthening the understanding and credibility of the concept of social responsibility in society, and to support CSR in enterprises and other organisations in the Czech Republic by providing the relevant information (NAP, 2014). These priorities are based on recommendations of EU for stated National CSR priorities. An executive authority mandate fulfilment of individual goals set priorities is of the Ministry of Industry and Trade.

Currently, at its meeting on 25th January 2016, the government approved an updated strategic material, the National Action Plan for Corporate Social Responsibility in the Czech Republic, whose updated version continues to be the strategic and open material of non-legislative nature. The Government is aware of the fact that the CSR is highly relevant topic not only for the big companies but also for small and medium-sized enterprises in the regions, their employees and the community around them as well as for the public administration. It takes dialogue and cooperation between the CSR stakeholders as essential for ensuring the coherence of procedures and obtaining feedback and for further development of social responsibility in the Czech Republic.

The main objectives of the updated NAP include firstly, enhancing the understanding and credibility of the concept of social responsibility in the society; secondly, supporting the development of social responsibility in organizations; and thirdly, sharing experience and transferrin the international know-how. The Czech government will thus endeavour to ensure that the updated NAP get into the awareness of the Czech society and lead not only the companies to a responsible and sustainable undertaking (National Action Plan for Corporate Social Responsibility in the Czech Republic, updated version 2016). The following section expands the scope of the paper on a preliminary study where a sample of companies, it is determined whether they have implemented some elements of national or international CSR standards and principles.

### **3.2 Methodology of the Preliminary Study**

The preliminary study investigates to define approach in CSR pervasive integration into European enterprises and identify which standards; guidelines are implemented in Czech micro, small, medium-sized and large enterprises, whether they are developing a proactive approach and incorporate these in their strategic plans. The research methodology is consistent with descriptive e.g. stakeholder theory, which seeks to outline participants' views of what the business organization is doing vis-a-vis its stakeholders through using CSR guidelines, frameworks or principles. Therefore, research assumption was derived “We believe that in Czech environment we can identify a certain degree implemented CSR standards or principles”.

The primary data were collected using a self-administered paper and pencil questionnaire used a rating method. Respondents (managers of selected companies) assessed the approach of the firm by an appropriate standard, which is connected with any pillar of the concept of CSR (namely, economic,



environmental and social pillar). The research is focused on SMEs and large Czech companies, which confirmed to participate in this research. Because it is a preliminary study, so we wanted to achieve the same number of companies: in total has been included in the research of 200 companies (of which 50 micro, 50 small, 50 medium-sized and large enterprises 50). The instrument was validated through the assessment of the percentage/quantitative distribution of test results. The questionnaires were distributed, thoroughly explained, self-administrated, recovered and systematized between September and November 2015. The software program Excel performed calculations.

### 3.3 Results

The result in Table 2 convey the results between different categories of SMEs and large enterprises. The study presented juicy results when we thought that Czech companies use certain standards in the field of CSR, so that they can inform its stakeholders about its activities and thus strengthen their competitiveness and positive impact on society. The results suggest the opposite; only among large companies, we have seen higher levels of use of CSR standards. Microenterprises barely use any standardization and even ultimately ignore the concept of CSR (they are not aware of CSR, but use only selected approaches largely in compliance with the law). Their activities are only going for certification (ISO 9000 and ISO 14000 series), which according to the replies the main reason to have this certification is to obtain customer who require the level of certification.

Based on detailed analysis, the main motivation factors for SMEs was discovered, except the customers requirement, other important stimulus is participation in public tenders for grant opportunity. This motive was also common for large companies, which understand the certification e.g. in terms of quality as standard.

**Table 2.** CSR Standards and Guidelines Using by Czech Companies

| Type of implemented guidelines | Micro | Small | Medium | Large | Total |
|--------------------------------|-------|-------|--------|-------|-------|
| ISO 14000 series               | 2     | 6     | 15     | 23    | 46    |
| EMAS                           | 0     | 0     | 0      | 1     | 1     |
| ISO 9000 series                | 8     | 17    | 21     | 37    | 83    |
| ISO 26000                      | 0     | 0     | 1      | 5     | 6     |
| OHSAS 18001                    | 0     | 4     | 6      | 18    | 28    |
| OECD Guidelines                | 0     | 0     | 0      | 2     | 2     |
| UN Guiding Principles          | 0     | 0     | 0      | 3     | 3     |
| LBG                            | 0     | 0     | 0      | 4     | 4     |
| GRI                            | 0     | 0     | 3      | 4     | 7     |
| IQNet SR 10                    | 0     | 1     | 2      | 3     | 6     |
| CSR award participation        | 0     | 0     | 1      | 5     | 6     |
| Total of guidelines            | 10    | 28    | 49     | 105   |       |

Source: own research

ISO 9000 series certification is a dominant framework in large companies (Table 2), which in absolute numbers by 37 companies (out of 50) use the ISO 9000 series and 23 enterprises use the ISO 14000 series. Voluntary standards in the form of recommendations in ISO 26000 are only used in six cases. In the Czech Republic, the standard is not very widespread, because of the very low publicity. A vague approach for the upcoming season gives to speculate if this standard has become one of the conditions for obtaining grants, so you can expect a large increase in its implementation. For the purposes of Czech, accreditation arose frameworks that is used for the purpose of certification and was identified in six companies. Large companies use other international guidelines very rarely, namely e.g. GRI and LBG in only four companies and OECD Guidelines in two companies surveyed.

It should be noted that were the enterprises operating in a global market environment with a high impact on the environment and society, because these companies have voluntarily engage in these standards for the purpose of long-term sustainability, not only business.

The results show the fact that the multinationals companies implemented principles because of the overlap of their activities in a number of countries, and can thus adopt a uniform approach and perception as to the local national levels, as well as in overall terms from the perspective of their stakeholders. The opposite approach to only local or national standards is access in SMEs that have used initiatives and a sample of companies showed at least partial utilization rates of these standards. There is clear potential in terms of both governmental and non-governmental organizations to disseminate approaches to CSR was among SMEs and can point to the fact that topical or local initiatives developed in the concrete conditions of the country are prevailing here.

#### **4 Conclusion**

In the Czech Republic is the concept of social responsibility primary advocated by businesses (business-led initiative). The state may support the spread of this concept by creating the right conditions for its deeper propagation, helping to promote it, and supporting socially responsible activities. The potential is also higher activity of local municipalities within regions that can develop direct activities for all interest groups and are "closer" to businesses and other organizations working locally. The Czech Republic is in the stage of raising awareness or disseminating good practices in relation to these international standards. Results showed that the use of standardization approaches were found to a greater extent only in large enterprises. Conversely, SME sector is very specific, and there were found only the ISO series standard. Concerning the research assumption, we have discovered that there is relationship between size of the company and the use of appropriate standards in CSR. In the preliminary study we have identified some research limitations, specifically in area of local action of respondents, the sample size is based on the confirmation of cooperation within research (it's not a random selection) and the number of the units of analysis in our study is dictated by the type of research problem. In addition, we used the simple analytical methods, which are basis for subsequent research of dependencies between selected factors of CSR according to the size of the company.

Overall, we can say that the main standards of the European Commission's view are almost never used in the Czech Republic and examples we identified only in large multinational enterprises. Therefore, it is necessary to focus on more awareness of CSR in the SME sector, because SMEs provide two out of three private sector jobs and contribute to more than half of the total value added created by businesses in the EU. Therefore, the impact that a shift to more sustainable and socially responsible SME business practices could have on Europe's society, economy and environment is potentially significant.

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## AN INFLUENCE OF RELATIVE INCOME ON THE MARGINAL PROPENSITY TO CONSUME – EVIDENCE FROM CZECH REPUBLIC

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### Abstract

This study deals with the question whether there is a relationship between the marginal propensity to consume and the status of the household in income distribution represented by a relative income. If so, then the current assumption of mainstream theory of consumption about the constant marginal propensity to consume could no longer be considered realistic and it will be necessary to take the element of relative income as a new key determinant of general consumption function. The aim of this work is to identify, describe and prove an influence of relative income on the marginal propensity to consume using data from Czech Republic and thus to prove the correctness of Duesenberry's relative income hypothesis. To achieve this goal, we use a panel regression, which results clearly confirm the validity of the initial hypothesis about the existence of functional dependence of the marginal propensity to consume on the relative income and thus it fully supports the idea of interdependent concept of utility and consumption. This finding also implies a number of recommendations for policy-makers.

### Keywords

relative income, marginal propensity to consume, Duesenberry's hypothesis, interdependent utility, consumption function

### JEL classification

D11, D12

## 1 Introduction

Consumption represents a key determinant of economic thought in many ways, not so much for its immense practical significance, but rather because it de facto represents the essence of economics itself, the essence of the issue of infinite needs and finite resources. Both in terms of microeconomics, that consumption hypothesis are always necessarily based on, and within a macroeconomic approach the widely accepted theory of consumption of mainstream economics seems to be very well formulated and developed and as such it has remained virtually unaltered for nearly 60 years. But is this theoretical concept entirely accurate and complete? Couldn't even here be one of the major determinants of the general consumption function omitted? Now these questions are our starting point, the motive for creation of this work.

Since the fifties of the 20th century the approach of permanent income theory and lifecycle hypothesis has prevailed in professional circles of economic theory. This mainstream view of the basic economic laws determining household consumption is established in professional economic texts to such an extent that the different approaches are practically not visible. However, this doesn't mean that there are not any alternative hypotheses of consumer behavior. We can find many critical perspectives on the standard theory of consumption, but often it is only a solution of narrowly focused issues, the pieces of a mosaic of complex alternative theory, that as a whole remains fragmented across countless of professional studies as pointed out by Ackerman (1997). And if this comprehensive theory arose after all, still it was ignored for various reasons. And that is exactly also the case of Duesenberry's relative income hypothesis - consumer concept, based on the idea of interdependent utility, which has the potential by theoretical way to challenge a complete validity of the consumption theory of mainstream economics, and ultimately and primarily to significantly enrich the basic pattern

of generally accepted consumption function of LC- PIH (life cycle - permanent income hypothesis) <sup>1</sup> (Mason, 2000).

Income and price are the key determinants of consumer choice as for mainstream economics. Relative income hypothesis, however, points out the fact that if the consumer is also affected by consumption habits of his surroundings, then the income itself must be seen in two ways: in absolute and in relative terms. From these two concepts of basic economic determinant of general consumption function it stems also two channels of influence on the total amount of consumption. Absolute concept of income implies a direct effect, already well known from the Keynesian consumption function. Higher disposable income will lead to a proportionately greater amount of consumer spending. Variable of disposable income then figures in the functional form of consumer equation simply as the independent variable directly explaining the level of consumption. While the relative concept of income, at least according to the principles of Duesenberry's hypothesis, implies an indirect effect. Higher disposable income will lead to higher position of household across income distribution and according to interdependent concept of utility and consumption also to a lower value of the marginal propensity to consume (MPC). The decline of MPC then, as an element transforming disposable income into consumption, negatively affects the ultimate level of consumption. The position of household in income distribution is then represented in the consumption pattern as an independent variable, which indirectly through MPC affects the level of consumption.

The problem is that while absolute (direct) income effect is a matter of general well-known and virtually undisputed, relative (indirect) income effect remains often completely ignored by professional economic communities, whether in the form of Keynesian consumption function or access of LC-PIH. It is true that every relevant and really applicable model must be extracted of elements that have not a major impact on it. However, is also the relative income effect the insignificant element, which should be completely removed out of the consumption function without a trace? Is the interdependent concept of utility from the consumption a matter totally irrelevant? If so, then this whole work is a pointless effort.

The aim of this work is to identify, describe and prove an influence of relative income on the marginal propensity to consume using data from Czech Republic and thus to prove the correctness of Duesenberry's hypothesis.

## 2 Relative income hypothesis

*"Professor Duesenberry's study of the impact of budgetary and aggregative empirical consumption data on the received theory of consumer behavior is one of the most significant contributions of the postwar period to our understanding of economic behavior."* written in his review by Kenneth Arrow (1950, p. 906), his time respected neoclassical economist and later Nobel prize laureate in economics.

The relative income hypothesis is fundamentally built on criticism of established neoclassical preconditions for the creation of demand and Keynesian theory of consumption based on them. The main and fundamental idea with which Duesenberry (1949) comes to the field of knowledge in order to confront these established relationships of mainstream economics is a complex social concept of consumer and revision of Veblen's demonstration effect (Veblen, 1899), which the author gives a particular dimension through income distribution of households.

We can find two fundamental propositions in the work of James Duesenberry, let's say postulates, on which the theory of relative income stands and which are the basis for its further implications (Palley, 2010, p. 6):

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<sup>1</sup> A theoretical approach to consumption, based on original works: Modigliani (1954) and Friedman (1957). In the case of adding an element of rational expectations, then it can be primarily referred to the so-called random walk model, as defined by Hall (1978).

- a) „*The strength of any individual’s desire to increase his consumption expenditure is a function of the ratio of his expenditure to some weighted average of the expenditures of others with whom he comes into contact.*“
- b) „*The fundamental psychological postulate underlying our argument is that it is harder for a family to reduce its expenditure from a higher level than for a family to refrain from making high expenditures in the first place.*“

The real foundation of the new model is, however, the first claim. The author himself called this effect as *keeping up with the Joneses* or the effect of relative income. The principle is mainly simple. The consumer is not isolated from others, he lives in a world where he every day meets his friends, colleagues, family, his neighbors and so on. And not only he meets them, especially he is confronted with their consumption. He sees what they buy, what they spend for, by what they form their standard of living, their position in society. He sees what Thorstein Veblen saw in his theory, the so-called pompous ("pointless") consumption. Unlike Veblen (1899), for the majority of the population these consumer expenditures aren't pointless, because it allows them to reach the intangible social values – a status. And that's what this is about. Our consumer shall see how people around him buy goods for their ceremonial value, before his eyes they increase the value of their status, strengthen their social position and even he does not want to be left behind. Therefore if the consumer belongs to low-income households (his disposable income ( $Y_D$ ) is under the society-wide weighted average ( $\bar{Y}_D$ )), then he spends more of his disposable income just to demonstrate that he can afford it, just to catch up with social status of others. His  $MPC$  is then relatively high. Conversely, high-income households<sup>2</sup> (whose  $Y_D$  is above the society-wide weighted average) usually already have valuable status, therefore they haven't such a motivation to "catch up with someone", they don't have to spend so much of their income and vice versa they save more, simply because they can afford it. So we come to the first simple implication:

$$MPC_1 > MPC_2 > \dots > MPC_n \quad (1)$$

where the higher value of the index  $n$  stands for a household with a higher value of relative disposable income ( $Y_{RD}$ ), most simply expressed as:

$$Y_{RD} = \frac{Y_D}{\bar{Y}_D} \quad (2)$$

Put simply marginal propensity to consume can be written as a negative functional dependence of relative (disposable) income, as similarly shows Palley (2010):

$$MPC = c(Y_{RD}) \quad 0 < c < 1; \dot{c} < 0 \quad (3)$$

The total amount of household consumption  $C$  is then given by the product of disposable income and the marginal propensity to consume, which is not constant now (as naively assumes the mainstream theory of consumption), but it depends on the position of the entity in the curve of income distribution:

$$C = c(Y_{RD}) \cdot Y_D \quad (4)$$

<sup>2</sup> As you can see, for simplicity, there is described a mechanism of functioning at only two types of households: high and low income. This is however only a demonstration of the principle, which otherwise could be applied to any number of categories (social classes), as shown immediately afterwards in Equation 1.

Plain view on the derivation of the final rule of general consumption function, especially on the relationship between  $MPC$  and  $Y_{RD}$  (Equation 3.) can logically evoke questions like: Isn't such a general notation too trivial? Would it be possible at this point to express the dependence of marginal propensity to consume on relative disposable income in particular functional form? We find in the later part of this work that the real version of this relationship is not such a trivial matter, it depends on the number of other factors and it simply can't be expressed in the general shape like this. There are only a number of methods by which this relationship can be approximated into particular form. One of these ways is, as we could see, the central theme of this work.

### 3 Methods and data

The first thing, we need to realize at this point, is that the marginal propensity to consume of households doesn't change due to the amount of disposable income, but depending on the relative disposable income, just as shown in Equation 3., and this is a fundamental difference! This is essentially a central idea of discussed hypothesis, a key contribution to the debate on the form of consumption function. As literally written by Alvarez-Cuadrado and Long (2011, p. 1489): *"For any given relative income distribution, the percentage of income saved by a family will tend to be unique, invariant, and increasing function of its percentile position in the income distribution. The percentage saved will be independent of the absolute level of income. It follows that the aggregate saving ratio will be independent of the absolute level of income."* An important factor is that although the  $MPC$  and therefore also  $APC$  of households differs substantially across the Lorenz curve of distribution of disposable income (which we can figure out even with simplest common sense, but no longer with the standard theory of consumption), it is this way only because of the effect of relative income, which does not exist at the aggregate level<sup>3</sup>. Average propensity to consume for the whole economy is then constant in the long term, thus the relative income hypothesis is entirely consistent with the observation presented by Kuznets, Epstein and Jenks (1946)<sup>4</sup> seventy years ago.

Whatever is the strength of the effect of relative income throughout income distribution in the society, the  $MPC$  for every household, more precisely a category to which the household belongs, is always given by a functional relationship due to its relative disposable income. And as it is well known, the function generates for any given situation only one result, therefore, each type of household also has only one marginal propensity to consume. Maybe the above sounds trivial and like a commonplace, but it is important to realize that the  $MPC$  of different groups of households doesn't change over time *ceteris paribus*<sup>5</sup>, it is independent on the absolute amount of income and so it has for each  $Y_D$  a constant value. But first and foremost, as the previous lines try to imply and how sadly Palley (2010) himself, whose model we use as a basis, forgot to mention, the above applies to types of households, to the categories to which they belong, not to individual households themselves and their individual consumption functions. This is a fundamental difference again!

The biggest shortcoming of the standard model of consumption in the form of LC-PIH can therefore be seen in a constant characteristic of value of marginal propensity to consume for all kinds

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<sup>3</sup> The indicator may only be relative compared with another value. But aggregate scale only shows one type of household - the "aggregate" one. Therefore disposable income has nothing to be compare with, respectively, is equal to the average disposable income. After substituting into the formula 2,  $Y_{RD}$  is always equal to one and whether the  $MPC$  inferred form it takes any value, it will be constant throughout the progress of consumption function. And because it is linear and based in the origin of coordinates, the average propensity to consume is also constant taking equality  $MPC = APC$ .

<sup>4</sup> Widely appreciated and respected study that using macroeconomic data from the US for nearly 70 years proves that even during rapid long-term growth of real income, the average propensity to consume hadn't virtually changed, just as the autonomous component of consumption wouldn't exist. This discovery thus de facto entirely denies a validity of Keynesian consumer theory in the long run.

<sup>5</sup> Changing values of  $MPC$  in time could in our case characterize only one thing, a change in the distribution of disposable income, thus de facto enlargement or reduction of income inequality.

of income categories. To refute this erroneous assumption is then precisely the goal of the following analysis.

### 3.1 Methods

Let's recall at this point that the main motive of this work is to prove an influence of relative income on the value of its marginal propensity to consume, particularly by formulation of a specific form of its possible functional form. The term of relative income thus still remains the key concept for us. From the principle point of view it is de facto a quantification and therefore the possibility of mathematical-economic interpretation of the issue of households position in the distribution of disposable income. From the definitional point of view it is a ratio of disposable income to the society-wide weighted average, as shown in Equation 2. Now we have only left to specify precisely the variable of  $\bar{Y}_D$ . The theoretical basis, which is given us in the legacy of work of James Duesenberry, retains us a relative freedom in this area. So it is necessary to carefully consider the suitability and the most convenient explanatory ability of chosen definition. For the needs of further analyzes the variable  $\bar{Y}_D$  was defined as the society-wide weighted average of  $Y_D$ , where the weights were set by the average numbers of household members in the income categories:

$$\bar{Y}_D = \frac{\sum_{i=1}^n Y_{D_i} \cdot w_i}{\sum_{i=1}^n w_i} \quad (5)$$

where  $Y_{D_i}$  characterizes the income of  $i$ -th income category,  $w_i$  the average number of household members in the  $i$ -th income category and  $n$  number of these categories. The central issue here was to set the weights and so our definition best matches the original concept and sense of relative income effect.

For actual try of expressing a specific form of assumed functional dependence we use a regression analysis by estimation of regression coefficients using the least squares method. Due to the nature of the input data, in particular due to the limited number of statistically measured income categories (small number of observations), the classical regression could lead to distorted results, therefore, will use panel regression.

The form of general formula of wanted univariate linear regression model depends on whether we use a panel regression method for fixed or random effects. Which of these panel regression methods is more suitable for expression of wanted dependency will be shown up by Hausman's test at a later stage of the analysis, so it is necessary now to still consider both options. In the case of using fixed effects the regression equation is given by:

$$MPC_{i,t} = \alpha_i + \beta \cdot Y_{RD_{i,t}} + u_{i,t} \quad (6)$$

where  $MPC_{i,t}$  - the marginal propensity to consume for the category  $i$  at time  $t$  is expressed by  $\alpha_i$  - level constant (an intercept) for the  $i$ -th income category, product of  $Y_{RD_{i,t}}$  - relative disposable income for the  $i$ -th category at the time  $t$  and the regression coefficient  $\beta$  expressing the sensitivity of the marginal propensity to consume to the relative disposable income. Variable  $u_{i,t}$  symbolizes the random component. In a more detailed breakdown the level constant  $\alpha_i$  for each category is divided into two subfolders, where:

$$\alpha_i = \beta_0 + \gamma_i \quad (7)$$

where  $\beta_0$  is the basic level constant, to which it applies  $\beta_0 = \alpha_1$ . A constant  $\gamma_i$  is then an added fixed impact for given income category for  $i \in \{2; \dots; I\}$ , where  $I$  is the number of categories. By simply rewriting  $\alpha_i$  according to the Equation 6. we get new more detailed form of the general expression of wanted regression equation using fixed effects:



$$MPC_{i,t} = \beta_0 + \gamma_i + \beta \cdot Y_{RD_{i,t}} + u_{i,t} \quad (8)$$

Since in the case of using fixed effects method (for a given entity) we subsequently need also to verify the appropriateness of using time fixed effects, it is necessary to consider other one order of magnitude more detailed breakdown of level constants  $\alpha_i$ , which could now be broken down given shape:

$$\alpha_i = \beta_0 + \gamma_i + \tau_t \quad (9)$$

where newly for level constant it applies the condition  $\beta_0 = \alpha_1$  only for  $t = 1$  and where  $\tau_t$  is an added fixed impact due to the time period for  $t \in \{2; \dots; T\}$ , where  $T$  stands for the number of such time periods. Again, by a new rewriting  $\alpha_i$  in Equation 6. we can write down a general expression of wanted regression equation using fixed effects for given categories and time:

$$MPC_{i,t} = \beta_0 + \gamma_i + \tau_t + \beta \cdot Y_{RD_{i,t}} + u_{i,t} \quad (10)$$

For regression estimation based on random effects the wanted relationship is characterized more simply and clearly in the form:

$$MPC_{i,t} = \alpha + \beta \cdot Y_{RD_{i,t}} + u_{i,t} + \varepsilon_{i,t} \quad (11)$$

where newly  $\alpha$  represents a level constant for all categories,  $u_{i,t}$  is a random component between categories and  $\varepsilon_{i,t}$  a random component within an income category.

Either way, an important prerequisite of any possible resulting variations of panel regression is a negative value of the coefficient  $\beta$ , because according the principles of Duesenberry's hypothesis with increasing relative disposable income the marginal propensity to consume must necessarily decline, as demonstrated by Equation 3.

Since the linear function is not the only way of expressing of wanted relationship, let's provide also economic formulation of equations for alternative estimation of considered dependency - to express the regression by polynomial. Therefore there will also be one by one made estimates of polynomials from second to seventh degree in the following analysis and their results (especially the statistical significance of the model and the value of the coefficient of determination) will be compared with the default model of a simple linear function. In the most detailed scenario, i.e. when using fixed effects for time and entity the estimated equations will have a following form:

second degree polynomial:

$$MPC_{i,t} = \beta_0 + \gamma_i + \tau_t + \beta_1 \cdot Y_{RD_{i,t}} + \beta_2 \cdot Y_{RD_{i,t}}^2 + u_{i,t} \quad (12)$$

third degree polynomial:

$$MPC_{i,t} = \beta_0 + \gamma_i + \tau_t + \beta_1 \cdot Y_{RD_{i,t}} + \beta_2 \cdot Y_{RD_{i,t}}^2 + \beta_3 \cdot Y_{RD_{i,t}}^3 + u_{i,t} \quad (13)$$

fourth degree polynomial:

$$MPC_{i,t} = \beta_0 + \gamma_i + \tau_t + \beta_1 \cdot Y_{RD_{i,t}} + \beta_2 \cdot Y_{RD_{i,t}}^2 + \beta_3 \cdot Y_{RD_{i,t}}^3 + \beta_4 \cdot Y_{RD_{i,t}}^4 + u_{i,t} \quad (14)$$

fifth degree polynomial:

$$MPC_{i,t} = \beta_0 + \gamma_i + \tau_t + \beta_1 \cdot Y_{RD,i,t} + \beta_2 \cdot Y_{RD,i,t}^2 + \beta_3 \cdot Y_{RD,i,t}^3 + \beta_4 \cdot Y_{RD,i,t}^4 + \beta_5 \cdot Y_{RD,i,t}^5 + u_{i,t} \quad (15)$$

sixth degree polynomial:

$$MPC_{i,t} = \beta_0 + \gamma_i + \tau_t + \beta_1 \cdot Y_{RD,i,t} + \beta_2 \cdot Y_{RD,i,t}^2 + \beta_3 \cdot Y_{RD,i,t}^3 + \beta_4 \cdot Y_{RD,i,t}^4 + \beta_5 \cdot Y_{RD,i,t}^5 + \beta_6 \cdot Y_{RD,i,t}^6 + u_{i,t} \quad (16)$$

seventh degree polynomial:

$$MPC_{i,t} = \beta_0 + \gamma_i + \tau_t + \beta_1 \cdot Y_{RD,i,t} + \beta_2 \cdot Y_{RD,i,t}^2 + \beta_3 \cdot Y_{RD,i,t}^3 + \beta_4 \cdot Y_{RD,i,t}^4 + \beta_5 \cdot Y_{RD,i,t}^5 + \beta_6 \cdot Y_{RD,i,t}^6 + \beta_7 \cdot Y_{RD,i,t}^7 + u_{i,t} \quad (17)$$

However, it is also necessary to point out now, that the expressing of observed dependency by polynomial higher than the first degree considerably complicates the subsequent economic interpretation of wanted regression coefficients  $\beta_1$  to  $\beta_7$ . They now, due to the expected negative dependency of marginal propensity to consume on relative disposable income, don't have to be all negative, as it applies for a simple linear function. Their accents nor any possible economic interpretation of those coefficients will therefore be the subject of further analysis. In the case of estimating the regression function by a polynomial we focus only on a comparison of achieved statistical and econometric results with the original model of linear function just to verify whether linearity is really suitable in wanted functional form, or whether it should be replaced by a different function – particularly by a polynomial of higher degree in our case.

### 3.2 Data

The prerequisite of negative linear dependency of  $MPC$  on  $Y_{RD}$  is tested here using the example of aggregate data for the budgetary situation of households in Czech Republic, therefore, all the input data for the aforementioned analysis were taken from the database of Český statistický úřad (2016). The original input data are annual statistics between the years 1999-2014, which resulted in essentially two time series, which are further divided into ten another subfolders. Followed 16 observations are then basically written in two variables:

$Y_D$  - average nominal disposable income of household per capita in CZK,

$C$  – average nominal consumption of household per capita in CZK.

As can be seen, we work with the mean values per person. For better demonstration of the validity of Duesenberry's hypothesis this procedure is certainly preferable. An important finding is also already mentioned secondary division of basic variables. Indicators  $Y_D$  and  $C$  are both equally divided into ten another subfolders reflecting income and consumption situation of different types of households arranged ascendingly by deciles of disposable income. Finally we register 20 input time series here, divided into 10 panels by the types of income categories. Indicators directly entering the subsequent panel regressions are  $Y_{RD}$  calculated according to formula 2, respectively 5 and  $APC$  expressed by formula:

$$APC = \frac{C}{Y_D} \quad (18)$$

It is then necessary at this point to realize that we work with income categories here (not with individual households), for which the value of  $APC$  is independent on  $Y_D$  and in the absence of an intercept it is at any point equal to  $MPC$ . That's why we could use this this simple equivalence here, where  $MPC$  values are substituted by the average propensity to consume. In conclusion we note that

although the original input data in this study are nominal expression of consumption and disposable income, but due to the relative nature of indicators  $MPC$  and  $Y_{RD}$  the unwanted effect of changes in the price level is to be fully canceled out anyway.

#### 4 Results

At first a stationarity of data directly entering the panel regression was tested. According to the results of Levin-Lin-Chu unit root test the time series of  $MPC$  and  $Y_{RD}$  are stationary, at least at the 5% significance level, which we work with also in the further analysis.

Fig. 1. shows the development of the marginal propensity to consume across income categories. At first glance, it is evident that the value of  $MPC$  isn't constant in any of the categories and so it deflects over time. Thereby according to the principles Duesenberry's hypothesis it implies that also the intensity of the relative income effect is not constant over time. Although this finding is not the primary goal of this work, it is also to be discussed in the final chapter. Far more significant fact arising from Fig. 1., however, is that the average value of the  $MPC$  falls across income categories. At this point, without further detailed analysis, we can already conclude that the assumption of concept of LC-PIH about a constant value of  $MPC$  for all income categories does not correspond to empirical observations. However, only this finding, of course, will not be enough for us. The motive of this study was not so much to deny the full validity of the mainstream theory of consumption, but rather to prove the initial premise that the declining value of the marginal propensity to consume across the distribution of disposable income can be explained by the indicator of relative income.

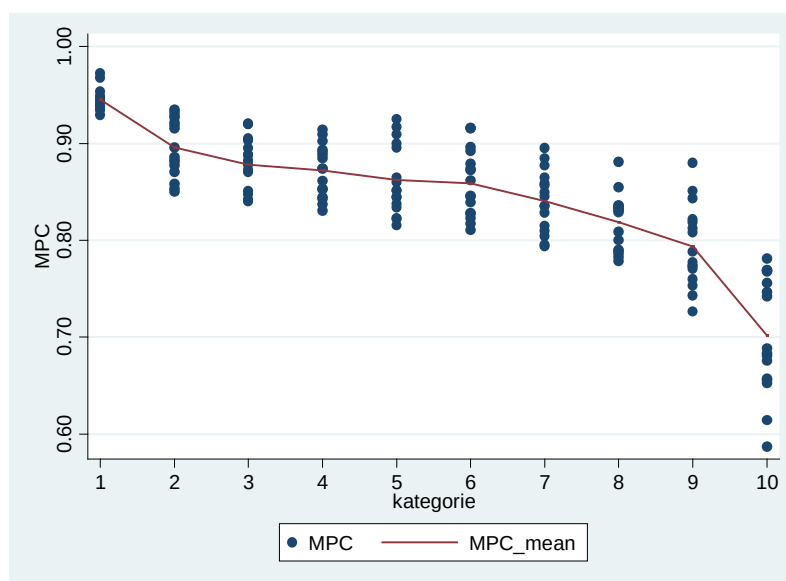


**Fig. 1.** Development of  $MPC$  across income categories (Source: own calculations and processing in Stata 12)

Fig. 2. is used for preliminary visual assessment of the expected dependence. Although the linear dependence of both followed quantities is quite obvious at this point, only a graphical analysis is obviously not enough for us. The aim here was to mathematically approximate this relationship by the regression equation.

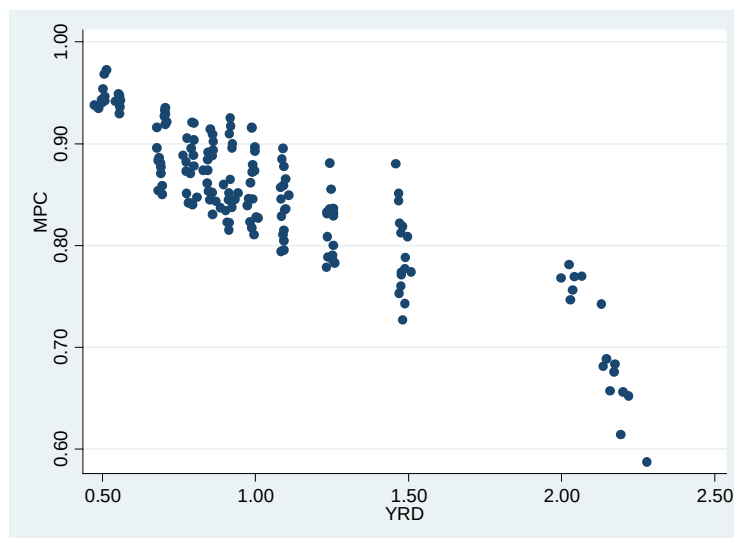


**Fig. 2.** Visual assessment of linear dependence of  $MPC$  and  $Y_{RD}$  (Source: own calculations and processing in Stata 12)

Before it can be proceeded to the actual final estimate of regression parameters of mentioned dependency, it is necessary for the panel nature of the data to decide whether it should be used a method of fixed or random effects, in other words, whether there are differences significant enough in the wanted functional relationship between the categories that they must be captured in a separate level constant just for each category. This dilemma is unambiguously solved by executed Hausman's test when its results indicate that a suitable panel regression in this case is the method of fixed effects and virtually at any level of significance.

Now when the statistical significance of differences between the various income categories was tested and thereby verified, it is suitable to check the same also for the time variable. The test of statistical significance of level constants for each year using the classic F-test then unambiguously shows that it will be necessary to include these time fixed effect into the model.

The results of the final panel regression using fixed effects for categories and individual years are summarized in Tables 1. and 2. In this final estimation of the desired functional form we use a robust method of estimation of standard error using White's estimator, thereby the model was protected against a possible autocorrelation and heteroskedasticity. An important finding is the information about a very high value of the coefficient of determination, which indicates that nearly 96% of the variability  $MPC$  was explained just by  $Y_{RD}$ , which is an increase of 14 percentage points compared to the situation when the model is estimated without time fixed effects. The high value of  $R^2$  then clearly confirms the main initial assumption about the influence of relative disposable income on the marginal propensity to consume.

There is no doubt that model as a whole is statistically significant, as well as the regression coefficient and all partial level constants. The key element - the wanted regression coefficient  $\beta$  achieves exactly according to our expectations a negative value, which can't be influenced nor by potential standard error. The resulting model corresponds to an initial economic theory and predicts that a change in the relative disposable income by 0.1 changes also the value of the marginal propensity to consume of given income category in the opposite direction by 0.04346.

**Table 1.** Final estimation of linear function according to Equation 10., part 1

|                        |        |
|------------------------|--------|
| Number of observations | 160    |
| F (25, 134)            | 130.27 |
| Prob > F               | 0.0000 |
| $R^2$                  | 0.9598 |
| $\bar{R}^2$            | 0.9524 |

Source: own calculations and processing in Stata 12

**Table 2.** Final estimation of linear function according to Equation 10., part 2

| $MPC$         | Coefficient | Standard error | t     | P> t  |
|---------------|-------------|----------------|-------|-------|
| $Y_{RD}$      | -.4346      | .0447          | -9.72 | 0.000 |
| $\beta_0$     | 1.2224      | .0237          | 51.65 | 0.000 |
| $\gamma_2$    | .0247       | .0100          | 2.48  | 0.014 |
| $\gamma_3$    | .0475       | .0137          | 3.48  | 0.001 |
| $\gamma_4$    | .0706       | .0164          | 4.32  | 0.000 |
| $\gamma_5$    | .0883       | .0194          | 4.56  | 0.000 |
| $\gamma_6$    | .1167       | .0222          | 5.27  | 0.000 |
| $\gamma_7$    | .1425       | .0266          | 5.36  | 0.000 |
| $\gamma_8$    | .1873       | .0332          | 5.65  | 0.000 |
| $\gamma_9$    | .2642       | .0439          | 6.02  | 0.000 |
| $\gamma_{10}$ | .4527       | .0732          | 6.18  | 0.000 |

Source: own calculations and processing in Stata 12

We have found a definite relationship between the marginal propensity to consume and relative disposable income. It remains now only to verify that here used linear function is indeed an appropriate approximation of observed dependency. Although Fig. 2. clearly indicates that the relationship between  $MPC$  and  $Y_{RD}$  is really linear in its functional form, but do not rely solely on visual assessment and let's try to express the followed regression by some more complex equation. For this purpose we use higher polynomial from 2. to 7. degree, which on the one hand allow diverse variations of the regression curve and at the same time they remain linear in their estimated parameters.

**Table 3.** Estimates of polynomial functions

| Polynomial degree | $R^2$  | F statistics | Prob > F |
|-------------------|--------|--------------|----------|
| 1                 | 0.9598 | 128.13       | 0.0000   |
| 2                 | 0.9614 | 127.46       | 0.0000   |
| 3                 | 0.9644 | 132.43       | 0.0000   |
| 4                 | 0.9644 | 126.74       | 0.0000   |
| 5                 | 0.9644 | 121.52       | 0.0000   |
| 6                 | 0.9645 | 121.95       | 0.0000   |
| 7                 | 0.9659 | 121.95       | 0.0000   |

Source: own calculations and processing in Stata 12

Table 3. summarizes for us the most important characteristics of the models estimated using polynomial functions from 1. to 7. degree where the polynomial of first degree is de facto a simple linear function we originally used and thus it serves for comparison of achieved results. Formally, they are estimates of the Equations 12. to 17. and also the original linear function (Equation 10.), in all cases using a method of fixed effects for categories and time. As mentioned earlier, the individual regression parameters in polynomial of degree higher than one lose its economic interpretation, therefore Table 3. does not deal with them and their accents and size will not be discussed in any way. Served apart from the fact that all estimated models are no doubt statistically significant, we are most interested in the value of the coefficient of determination, more precisely in its change. As we can see, this increase is very slight, even at the highest polynomial of seventh degree, where explained variability of  $MPC$  was increased only by 0.61 of percentage point compared to the baseline linear function. Given the increase of complexity of approximation function, this increase of explained variability is matter of quite marginal and insignificant. In economic speech, the yields of simplicity and elegance of simple linear function are substantially greater than the yields associated with a more complex expression of wanted relationship. We can now clearly state what was already obvious from a visual assessment from the Fig. 2., and so that the most appropriate expression of dependency of the marginal propensity to consume on relative disposable income is a polynomial of first degree, thus a linear function.

In conclusion, let's emphasize that the result of Hausman's test significantly influenced the very predictive ability of the resulting model. The necessity of using of fixed effects method means that the regression relationship between the  $MPC$  and  $Y_{RD}$  can not be expressed in a fully general way and elegantly by only one equation (which would be possible using random effects) and therefore it depends on what income category we are situated (and in what year, how proved by the test of statistical significance of the time fixed effects). The final functional dependence of the marginal propensity to consume on relative disposable income for income categories has then a following form:

$$MPC_{i,t} = 1,2224 + \gamma_i + \tau_t - 0,4346 \cdot Y_{RD_{i,t}} + u_{i,t} \quad (19)$$

where specific values for  $\gamma_i$  are listed in Table 2.

## 5 Conclusion

The primary motive of this work was to find and prove an influence of relative (disposable) income on the value of marginal propensity to consume. To achieve this goal, we have used primarily a panel regression for data from Czech Republic, but at fist the issue of specific definition of relative

disposable income itself had to be solved. There is no doubt that relative income affects the marginal propensity to consume, which concurrently means, that validity of “keeping up with the Joneses” effect is finally proved. And as indicated by the very high value of the coefficient of determination and statistically significant regression coefficient of relative income, this dependence must become a new key factor of the general consumption function.

The mainstream theory of consumption, mainly represented by the concept of LC-PIH, assumes a constant value of  $MPC$  for all types of income categories. However, as it is shown by the results of our study, this assumption can no longer be considered realistic. Marginal propensity to consume remains unchanged in relation with disposable income only for a given income category, not for individual households. If the income situation of household changes, it will shift to the new income category and at the same time it will fix the new value of  $MPC$ . Household consumption function then doesn't have a constant slope (opposed to the consumption function of income categories) as mistakenly assumed by the mainstream theory of consumption, but it is under a concave characteristic. Because this is happening due to the effect of relative income, it is appropriate at this point to emphasize again that the mainstream microeconomics distinguishes only between income and substitution effect. Duesenberry's theory, as well as the conclusions of this study require to add further subdivision and so to distinguish between income effect of absolute (direct) and relative (indirect).

Although the impact of relative income on the marginal propensity to consume was unequivocally confirmed, the issue of its precise nature still remains open. Approximation of followed dependency, of course, depends on a functional form, which is used for it, and here utilized linear function or polynomials of higher degree are certainly not the only option. What's more, it may not even be the most appropriate. It is important to realize that, at least in terms of statistics, there is no only one correct and objective functional form, this is only just what we define it. And the definition of a new, elegant and more convenient functional relationship of  $MPC$  and  $Y_{RD}$  better and more accurately describing consumer behavior of households so remains the motive for further scientific research.

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## THE DYNAMICS OF COMPETITIVENESS IN THE EUROPEAN UNION

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### Abstract

In the last decades all advanced economies and economic integrations has been interested in competitiveness enhancing. Also the EU representatives are aware of the importance of increasing competitiveness of individual member states as well as the relevance of the decreasing differences among EU economies. Competitiveness at national level has still ambiguous meaning and different attitudes to competitiveness provide different results. In the contribution the importance of the long-run qualitative competitive advantage is stressed. The competitiveness of a country is defined as its ability to create innovations and to draw on the existing technologies, which is called as quality competitiveness. The goal of the contribution is to verify, whether the competitiveness of the EU member states increase and the heterogeneity in the European Union decrease simultaneously. After the composite indicator construction its development is analyzed and the convergence or divergence tendency of the quality competitiveness in the EU is verified. It was proved, that competitiveness in all EU economies increased in the time period 2000-2012. The results of beta and sigma convergence analysis showed, that the heterogeneity in the European Union decreased in the observed time period.

### Keywords

National competitiveness, convergence, European Union, heterogeneity, innovation, sustainability.

### JEL classification

F62, O32, O52.

## 1 Introduction

Measuring and comparing competitiveness of countries becomes a phenomenon in the last two decades. Despite this obvious trend competitiveness at national level has still ambiguous meaning. Formerly competitiveness was perceived as a synonym for export performance of a country (Frohberg, Hartmann, 1997, Ezeala-Harrison, 1999, ECB, 2005, Cheptea et al, 2005) or in the sense of price competitiveness (Turner, Van't Dack, 1993, Turner, Golub, 1997, Felipe, 2005). Currently competitiveness has much broader meaning and usually is measured by composite indicators based on numerous individual indicators (Cho, 1994, Cho, Moon, 2000, Zinnes, Eilat, Sachs, 2001, Kovačič, 2005, Aiginger, 2006, Fagerberg, Srholec, Knell, 2007, Klvačová, Malý, 2008, Berger, Bristow, 2009, Delgado, Ketels, Porter, Stern, 2012, Swagel, 2012, Aiginger et al, 2013, Ezeala-Harrison, 2014, Hallwirth, 2015). But still there is no consensus about the definition of competitiveness at national level and its globally comparable indicator.

The competitiveness enhancing is in the centre of attention of policy makers in all advanced economies as well as economic integrations. The European Union has already accepted two competitiveness strategies. The first one was the Lisbon strategy (launched in 2000), which set for the whole EU the new strategic goal for the forthcoming decade: "to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" (European Parliament, 2000). The next strategy Europe 2020 set a less ambitious goal for the time period 2010-2020: "turn the EU into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion" (European Commission, 2010).

To achieve the competitiveness growth of the whole European Union in global context it is necessary not only to increase competitiveness of EU member states, but also to decrease differences in competitiveness among the individual EU economies. The importance of increasing homogeneity in the European Union in the area of both nominal and real variables is stressed for example by Slavík (2007), Marelli (2007), Marelli, Signorelli (2010) or Barbosa, Alves (2011). As the European Union

consist of 28 economies, it is necessary enhancing competitiveness of all individual member states continually. So the EU can overcome other advanced economies.

The goal of the contribution is to verify, whether the competitiveness of the EU member states increase and the heterogeneity in the European Union decrease in the same time. Competitiveness of a country is defined as its ability to create innovations and to draw on the existing technologies.<sup>1</sup> The resulting composite indicator is called as quality competitiveness. This attitude to competitiveness emphasizes the long run capacity of an economy and corresponds with the priority of smart growth based on knowledge. The heterogeneity trend is analyzed with the use of beta and sigma convergence methods.

The composite indicator construction as well as the methods of beta and sigma convergence are introduced in the next section. The results follow in the third section, where the development of the composite indicator in the time period 2000-2012 is analysed and beta and sigma convergence model results are discussed. The last section gives the main conclusions with respect on the goal stated above.

## 2 Methodology and data

The concept of quality competitiveness is based on the methodology presented by Fagerberg, Srholec, Knell (2004 and 2007). In their original work the authors distinguished four aspects of competitiveness, price, demand, technology and capacity. Especially technology and capacity competitiveness are crucial for long-term sustainability of competitive advantage. The composite indicator of quality competitiveness is based on these two important aspects. As suggested Fagerberg, Srholec, Knell (2004, 2007), technology competitiveness consists of several factors, which influence the ability of a country to innovate. In this contribution it is covered one indicator of science and technology inputs (gross domestic expenditure on R&D), two indicators of science and technology outputs (patent applications to the European Patent Office, articles in scientific journals) and two indicators of ICT infrastructure quality (fixed and mobile telephone subscriptions, internet users). Capacity competitiveness reflects the ability of a country to draw on the existing technologies and with respect to the methodology of Fagerberg, Srholec, Knell (2004, 2007) the composite indicator consists of several indicators, which reflect the quality of education (tertiary and secondary school enrolment, school life expectancy), accessibility and quality of financial markets (domestic credit to private sector, real interest rates, gross savings) and government efficiency (regulatory quality, political stability, property rights and corruption). All individual variables creating the composite indicator of quality competitiveness, their abbreviations, which are used onwards, units and data sources are in the Table 1. According to data availability, in the contribution the time period from 2000 to 2012 is analyzed. All calculations are made in Gretl, Statistica or MS Excel.

Because the development of competitiveness in the European Union will be analyzed in the 13 years long time period, it is necessary to gain a composite indicator, which is easily comparable in space and also in time. Following the methodological handbook published by OECD (2008), the composite indicator of quality competitiveness was draw up for all EU economies and the whole time period. First, all individual variables must be normalized to get comparable units. As suggested for example Rozmahel et al (2013) or Kotlán, Machová (2012), the min-max normalization method was used and data were normalized as a panel data according to the following formula (1):

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<sup>1</sup> The definition draw on the attitude to competitiveness presented by Fagerberg, Srholec and Knell (2004, 2007), who distinguished technology and capacity competitiveness. Technology competitiveness is defined as “ability to compete successfully in markets for new goods and services” (Fagerberg, Srholec and Knell, 2004, p. 11). Capacity competitiveness reflects “the ability to exploit such innovations economically” (Fagerberg, Srholec and Knell, 2004, p. 14). The combination of technology and capacity competitiveness was labelled as quality competitiveness in this contribution.

$$I_{qc}^t = \frac{x_{qc}^t - \min_{t \in T} \min_c (x_q^t)}{\max_{t \in T} \max_c (x_q^t) - \min_{t \in T} \min_c (x_q^t)} \quad (1)$$

where  $t$  is a year,  $c$  is a country and  $q$  is an individual indicator of competitiveness. All data achieved values from the interval  $<0, 1>$ .

The next step in construction of the composite indicator is the weights estimation. There are several possibilities how to estimate weights of individual indicators, from the easier one (equal weights or experts opinion) to some more sophisticated statistical methods. In this contribution principal component analysis and factor analysis is used to estimate the weights of individual indicators. The results are in the Figure 1.<sup>2</sup> The composite indicator was computed as a weighted average of normalized individual indicators. It can reach values from 0 to 1, where lower value means less competitive country and higher value stands for more competitive economies. Furthermore it is possible to say, that increasing value of composite indicator means enhancing competitiveness of a country.

**Table 1.** Individual variables of the composite indicator

| Variable                                 | Abbreviation | Unit                                | Source                      |
|------------------------------------------|--------------|-------------------------------------|-----------------------------|
| Gross domestic expenditure on R&D        | GERD         | % of GDP                            | Eurostat                    |
| Patent applications to the EPO           | PAT          | per million inhabitants             | Eurostat                    |
| Articles in scientific journals          | JOU          | per inhabitant (15-64)              | ISI Web Of Knowledge, Ameco |
| Fixed and mobile telephone subscriptions | TEL          | per 100 inhabitants                 | World Bank (WDI)            |
| Internet users                           | INT          | per 100 inhabitants                 | World Bank (WDI)            |
| Tertiary school enrolment                | TSE          | % gross                             | World Bank (WDI)            |
| Secondary school enrolment               | SSE          | % gross                             | World Bank (WDI)            |
| School life expectancy                   | SLE          | years                               | UNESCO (UIS)                |
| Domestic credit to private sector        | CRE          | % of GDP                            | World Bank (WDI)            |
| Real interest rates                      | R            | %                                   | Ameco, www.hnb.hr           |
| Gross savings                            | S            | thousand EUR per inhabitant (15-64) | Ameco                       |
| Regulatory quality                       | RQ           | -2,5 to 2,5                         | World bank (WGI)            |
| Political stability                      | PS           | -2,5 to 2,5                         | World bank (WGI)            |
| Property rights                          | PR           | 0 to 100                            | The heritage foundation     |
| Freedom from corruption                  | COR          | 0 to 100                            | The heritage foundation     |

Source: Fagerberg, Srholec and Knell (2004, 2007), own modification.

Methods of beta and sigma convergence are applied when assessing the development of the heterogeneity in the European Union. If beta/sigma convergence would be proved, it means, that heterogeneity in the European Union decrease. Both methods sourced on the neoclassical theory and were distinguished by Sala-i-Martin in 1990 (cited in Sala-i-Martin, 1996). Beta convergence model is based on the comparison of average growth and the initial position of a country. If the initially less competitive economies enhance their competitiveness faster and thus are catching up initially more competitive countries, it indicates beta convergence. In this contribution the extended beta convergence model is applied, which is based on panel data (see for example Canova, Marcet, 1995, Tondl, 1999 or Marelli, 2004). The following equation (2) is estimated:

<sup>2</sup> The estimation process is quite long and exacting and thus is not explained in this paper. For more details see for example OECD (2008).

$$\ln\left(\frac{y_{i,t}}{y_{i,t-1}}\right) = \alpha + \beta \cdot \ln(y_{i,t-1}) + \varepsilon_i \quad (2)$$

where  $y_{i,t}$  is competitiveness of a country  $i$  in time  $t$  and  $y_{i,t-1}$  is competitiveness of a country  $i$  in time  $t-1$ . If the parameter beta, i.e. the relationship between dependent variable (annual growth of competitiveness) and independent variable (competitiveness in the base year), is negative, it indicates beta convergence. If  $\beta > 0$ , it points out beta divergence of competitiveness in the European Union.

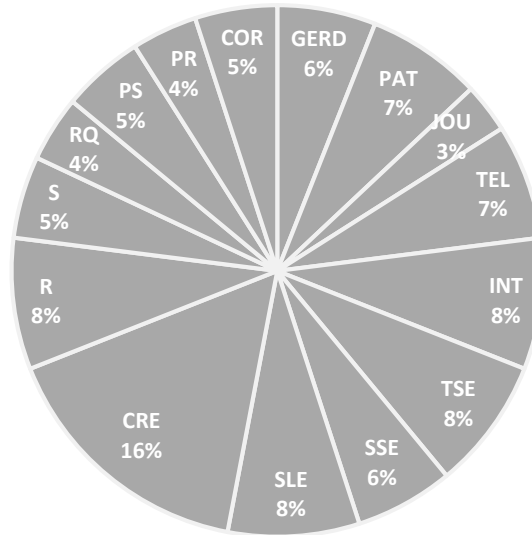


**Fig. 1.** Weights of individual variables in the composite indicator construction (Source: Own calculations based on Eurostat, Ameco, World Bank, ISI Web of Knowledge, Worldwide governance indicators, Index of economic freedom, Unesco, www.hnb.hr)

Sigma convergence is defined with the use of standard deviation development in time. The equation (3) expresses the formula for computing the standard deviation, where  $N$  is a number of economies included (i.e. 28 EU economies),  $y_{i,t}$  is competitiveness of a country  $i$  in time  $t$  and  $\mu_t$  is the average value of the competitiveness in the whole EU. If standard deviation decreases in time, thus  $\sigma_t > \sigma_{t+1}$ , it indicates sigma convergence in the European Union. Otherwise it points out a tendency to diverge.

$$\sigma_t = \sqrt{\frac{1}{N} \sum_{i=1}^N (\ln y_{i,t} - \mu_t)^2} \quad (3)$$

### 3 Results

The competitiveness of the EU economies is expressed by the composite indicator. In the Figure 2 it is shown the comparison of competitiveness in the European Union in the first year (i.e. 2000) and in the last year (i.e. 2012) of the time period 2000-2012. All countries are ranked according to the composite indicator value in the year 2000 from the least competitive Romania to the most competitive Sweden. In contrast to the bottom of the ranking, where the order of countries is in the year 2012 almost invariable, it was identified new leader on the top. Denmark achieved continuous increase of competitiveness in the whole time period and became the most competitive economy out of the EU. The least competitive countries are from the South-East Europe, but also Slovakia, Hungary, Poland and Czech Republic are placed among the least competitive countries from the EU. On the contrary, the most competitive economies are northern countries and Netherlands.

Competitiveness of all EU economies was in 2012 higher than in 2000, which is certainly positive result. Some countries grew faster and move ahead (Denmark, Lithuania or Estonia), other enhance competitiveness rather moderately and move in the ranking back (United Kingdom, Belgium, Italy, Hungary or Poland).

What is not obvious from the Figure 2, but still important, is the fact that competitiveness of all EU economies was increasing in the whole time period. The only exception is Belgium, Italy, Greece and Sweden, where a short run (one or two years) decline during the time period is observable. Noticeable increase in the composite indicator is apparent in all new EU member states (i.e. countries, which enter EU in the year 2004 and later). The competitiveness growth in old member states was in most cases rather moderate. This indicates to decreasing heterogeneity in the European Union. Furthermore there can be identified two countries in the Figure 2, which lose momentum, namely United Kingdom and Belgium. The reason can be found among the individual indicators of capacity competitiveness. In Belgium there was a huge decline in the secondary school enrolment in the year 2003. As secondary school enrolment was higher than 100% in Belgium, this decline was expectable and just short-run. In United Kingdom the problem seems to be much significant, as the indicators of gross savings and regulatory quality are decreasing continually.

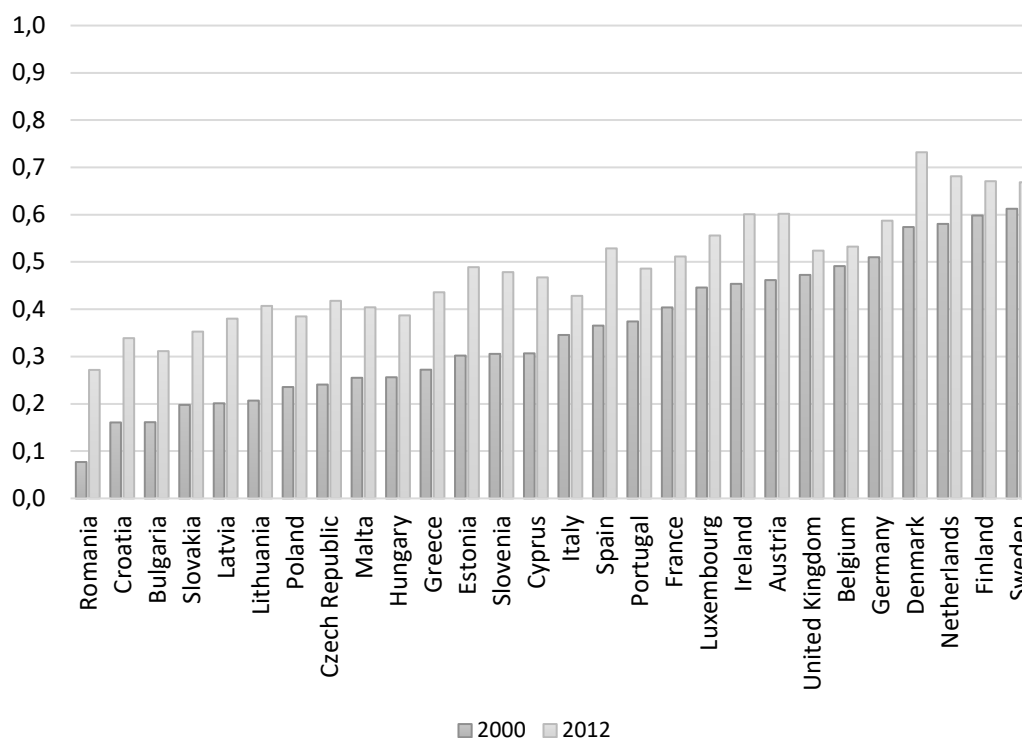


**Fig. 2.** Quality competitiveness of the EU member states in 2000 and 2012 (Source: Own calculations based on Eurostat, Ameco, World Bank, ISI Web of Knowledge, Worldwide governance indicators, Index of economic freedom, Unesco, [www.hnb.hr](http://www.hnb.hr))

Hereafter the beta convergence model is used to verify, whether the less competitive economies enhance their competitive ability faster and are catching up more competitive countries in the European Union. As the number of countries in the sample is relatively small and according to the Hausman test results, the panel data model with fixed effects is applied. As it was mentioned above, the competitiveness composite indicator in time (t-1) is used as the explanatory variable. The dependent variable is defined as the interannual growth of the composite indicator. The results of the panel data regression analysis are shown in the Table 2. The estimated beta parameter is negative ( $\beta = -0,171$ ), which indicates beta convergence. The lower is the value of the composite indicator in time (t-1), the higher interannual growth between time t and (t-1) the country achieved. The parameter as well as the whole model are statistically significant on the 1% significant level. Thus the previous

preliminary results are confirmed, i.e. the initially less competitive economies (typically new member states, which enter EU in the year 2004 or later) improve their competitive ability faster and are catching up more competitive countries (mostly Northern and Western European countries). Although this process is rather slow, the difference between the least and the most competitive economy was in the year 2012 lower, than in the first year of the observed time period.

**Table 2.** Extended beta convergence model results

|                        | coefficient | stand. error | t-ratio | p-value  |
|------------------------|-------------|--------------|---------|----------|
| constant               | -0,121      | 0,011        | -10,850 | <0,00001 |
| comp_t-1               | -0,171      | 0,012        | -13,980 | <0,00001 |
| LSDV R <sup>2</sup>    |             | 0,515        |         |          |
| p-value (F-test)       |             | <0,00001     |         |          |
| p-value (Hausman test) |             | <0,00001     |         |          |

Source: Own calculations based on Eurostat, Ameco, World Bank, ISI Web of Knowledge, Worldwide governance indicators, Index of economic freedom, Unesco, [www.hnb.hr](http://www.hnb.hr).

The sigma convergence model is based on the development of the standard deviation. Thus results of sigma convergence model does not say anything about the development trend of competitiveness in the European Union. It only provides information about changes in heterogeneity in the whole country group. In the next Figure 3 the standard deviation trend is shown in the time period 2000-2012. The declining trend is apparent, which confirms sigma convergence of competitiveness in the European Union. The standard deviation of the composite indicator in the European Union is in 2012 about half in comparison with the year 2000. The time trend coefficient is statistically significant at 1% significance level and high coefficient of determination confirm quality of the results. A small disturbance of the declining trend is observable in the last two years (2011-2012), which was caused mainly by the opposite development of capacity competitiveness in some EU economies. In 2011 competitiveness of Sweden, Denmark and Netherlands increased markedly, but competitiveness of some less competitive economies decreased (above all in Greece, Italy, Estonia or Latvia). But still standard deviation is in 2012 much lower than in the beginning of the observed time period.

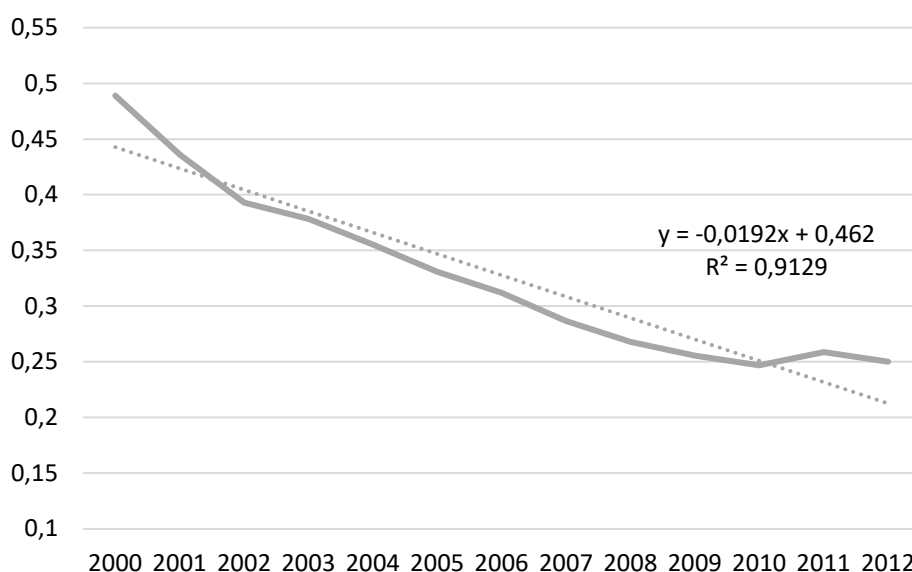


**Fig. 3.** Sigma convergence model results (Source: Own calculations based on Eurostat, Ameco, World Bank, ISI Web of Knowledge, Worldwide governance indicators, Index of economic freedom, Unesco, [www.hnb.hr](http://www.hnb.hr))

## 4 Conclusion

The main goal of the contribution was to verify, whether the competitiveness of the EU member states increase and the heterogeneity in the European Union decrease simultaneously. Competitiveness of a country was defined as its ability to create innovations and to draw on the existing technologies. For competitiveness evaluation the composite indicator of quality competitiveness was constructed. Quality competitiveness is based on several factors, which influence the ability of a country to innovate and also the ability of a country to draw on the existing innovations economically. Altogether the composite indicator consists of 15 individual variables, which were introduced in the Table 1. The composite indicator was constructed in that way, that it could be comparable in time and in space.

It was shown, that competitiveness in all countries in the European Union was in the year 2012 higher than at the beginning of the observed time period. Furthermore competitiveness in all EU economies has stable increasing trend in the whole time period, with the exception of few countries, where a short-run decline occurred during the time period (maximum biyearly). In general it is possible to say, that the absolute increase of the composite indicator during the whole time period was bigger in the new member states (i.e. countries, which enter EU in 2004 or later), which are less competitive than Northern and Western European countries. This can indicate, that the heterogeneity in the European Union decreased in the time period 2000-2012.

For convergence analysis the methods of beta and sigma convergence were applied. The beta convergence model evaluates the relationship between the competitiveness in the base year and the interannual growth of competitiveness. As this relationship is negative, we can confirm beta convergence of competitiveness in the European Union. The initially less competitive economies (mainly the new member states) are improving their competitive ability more dynamically and thus the heterogeneity in the European Union is decreasing. Decreasing standard deviation just confirm the conclusions about decreasing heterogeneity in the European Union, while sigma convergence was proved in the observed time period.

Increasing competitiveness in all EU member states together with decreasing heterogeneity in the EU can be assumed as a good precondition to increasing competitiveness of the whole European Union in the global world. Moreover the competitive advantage based on knowledge and human capital offers the long run potential as it is sustainable for the future. The success of the European Union in this area could positively influence other aspects of national competitiveness, which were not considered in this contribution (such as social and ecological indicators).

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## THE DEVELOPMENT OF MACROECONOMIC IMBALANCES IN EUROPEAN COUNTRIES IN THE PROCESS OF INTEGRATION

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### Abstract

The economic crisis has revealed the existence of significant and long persisting external and internal macroeconomic imbalances in European countries. The aim of the article is to evaluate the development of macroeconomic imbalances in 28 European countries in the course of the years 2004 – 2014, and to find out how this development in the member countries of the Eurozone differed from the European countries outside the Eurozone. Macroeconomic imbalances were defined on the basis of Macroeconomic Imbalances Procedures (MIP) Scoreboard. On the basis of the evaluation of the individual indicators development, it is possible to say that from the year 2008 the overall development of macroeconomic imbalances was disproportional and at the same time the countries of Eurozone showed higher proportion of countries with imbalances. The conclusions arrived at also do not support the Hypothesis of Integration Process Endogeneity.

### Keywords

Macroeconomic Imbalances, Macroeconomic Imbalances Procedures, European Integration, European Monetary Union.

### JEL classification

F02, F45, O11

## 1 Introduction

Macroeconomic balance is an important prerequisite of sustainable economic growth. It contributes to the creation of new jobs, facilitates structural changes and the inflow of foreign investments, results in better functioning of the financial sector and strengthens private investments. A complex assessment of macroeconomic imbalances needs to include internal imbalances, external imbalances and competitiveness and their mutual links and relations. The occurrence of macroeconomic imbalances is caused by a number of factors. It is related to the level of economy, to the course of an economic cycle, to the situation on financial markets, to the behaviour of economic entities or to the monetary and fiscal policy. Global macroeconomic imbalances increased in the period of the world economy expansion as a result of high development of the financial sector, liberalisation of capital flows, sufficiency of free financial means, low interest rates and optimistic expectations of the future development. Regulation (EU) 1176/2011 on prevention and correction of macroeconomic imbalances defines a macroeconomic imbalance as "any trend giving rise to macroeconomic developments which are adversely affecting, or have the potential to adversely affect, the proper functioning of the economy of a Member State or of the Economic and Monetary Union, or of the Union as a whole", while excessive imbalances are "severe imbalances that jeopardise or risk jeopardising the proper functioning of the Economic and Monetary Union" (EUR-Lex 2011).

The aim of the analysis in the following article was to evaluate the development of macroeconomic imbalances using a comparative overview Macroeconomic Imbalances Procedures (MIP) in European countries in the years 2004 – 2014, and mainly to draw conclusions whether in the area of macroeconomic imbalances the Eurozone countries (monetary union, EMU) showed development in time different from the development in European countries outside the Eurozone which represent a lower degree of economic integration (common market, non EMU). The research questions were focused mainly on the fact whether in European countries there was a decrease in macroeconomic imbalances in time or not? In what way were economic imbalances influenced by the economic crisis? In European countries the development of economic imbalances was

monitored in a time line on the basis of the number of countries which showed economic imbalances, i.e. exceeded the thresholds of macroeconomic imbalances indicators. Macroeconomic imbalances were evaluated in the course of 11 years (in the years 2004 – 2014) in 28 European countries, a more detailed analysis was performed for each indicator always for three groups of countries – for European countries (EU), Eurozone countries (EMU) and European countries outside the Eurozone (non EMU). With regards to the fact that the numbers in these groups changed with time as the European countries started to use the Euro, the following figures were counted in relative (expressed as a percentage) expressions. This approach enabled:

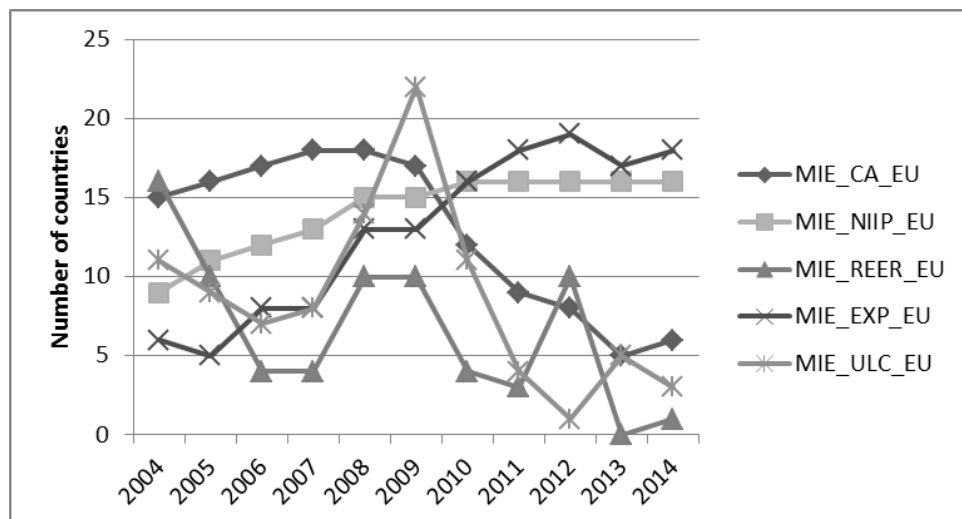
- First to find out the share in percent of the number of the Eurozone countries (EMU) and the countries outside the Eurozone (non EMU) with a specific type of imbalance in the whole group of EMU and non EMU countries. The results are presented in left parts of the individual graphs.
- It is further possible to determine the share of the EMU and non EMU countries with an imbalance in the total number of all EU countries with an imbalance. The results are presented in right parts of the respective graphs.

The calculations and graphs were prepared by means of Microsoft Excel software. The sources of the data were as follows: Alert Mechanism Report 2012, 2013, 2014, 2015, 2016 (Reports of the Commission to the European Parliament, Council, European Central Bank and European Economic and Social Committee, prepared in accordance with Clauses 3 and 4 of regulation (EU) 1176/2011 on prevention and correction of macroeconomic imbalances defines a macroeconomic imbalances); statistic database Eurostat Data, national accounts of EU countries (EC 2016); Czech Statistical Office, Eurostat database(CZSO) and official reports and documents of the European Commission.

## 2 External economic imbalances

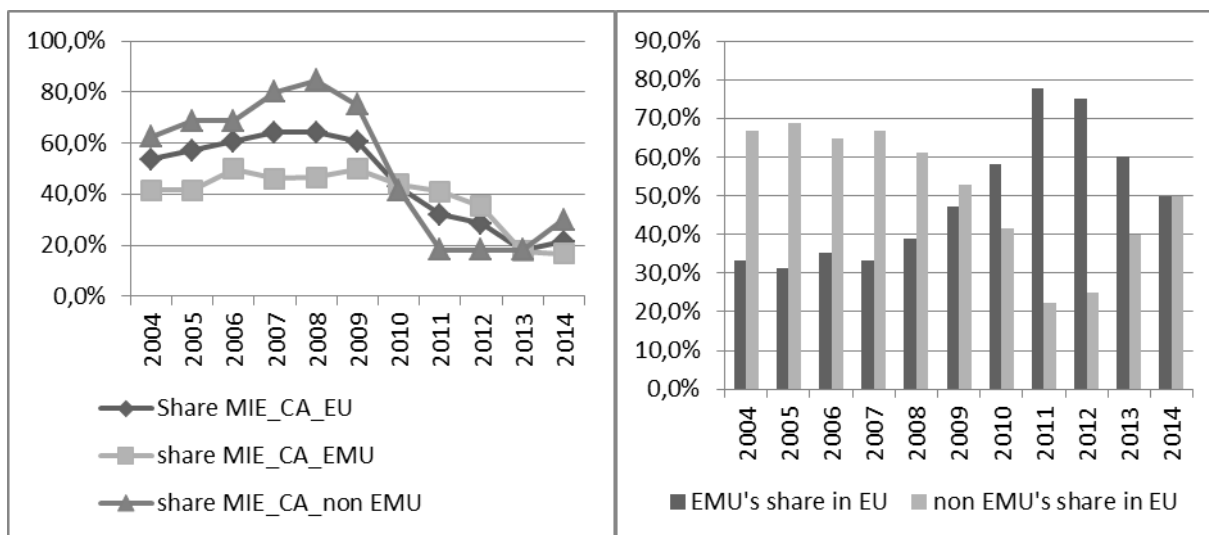
External economic imbalances are, as a part of the Macroeconomic Imbalance Procedure monitored by means of five indicators (EC 2012), which are: Three-Year Backward Moving Average of the Current Account Balance as a percent of GDP (MIE\_CA), Net International Investment Position as a percent of GDP (MIE\_NIIP), Percentage Change over Three Years of the Real Effective Exchange Rate deflated by HISC relative to a set of 42 industrial countries (MIE\_REER), Percentage Change of Export Market Shares over five years (MIE\_EXP) and Percentage Change over Three years of Unit Labour Nominal Costs (MIE\_ULC). The following graph on Figure 1 shows the number of European countries with the occurrence of an external imbalance in the monitored period.

**Fig. 1.** The development of the number of countries with an external macroeconomic imbalance (Source: authors' own: EC: Statistical Annex of AMR 2015)



From the Figure 1 it is obvious that the origination, existence and development of external macroeconomic imbalances are causally related to the economic development in European countries, or to the degree of the growth of their real GDP. According to the European Commission (EC 2013) the growth potential of the EU has significantly decreased in the last seven years, i.e. since the crisis broke out. According to the EC's estimations, the annual growth of the potential EU product decreased by a little more than 2 % in 2005 and less than 1 % in 2014. According to Eurostat Data (2016) the total performance of the economy of the EU member countries in the period of 2004 - 2013 showed the average speed of growth of 1.1 % a year and of the Eurozone 0.8 %, and in both the cases there is a significant difference in the development in the years 2004 – 2008 and 2009 – 2013. In 2014, the EU GDP was 13,075,000 million EUR, in this total amount the share of the Eurozone was 73.4 % and the share of the five biggest economies of the EU member countries together (Germany, France, the UK, Italy and Spain) was 71.0 %. Apart from a long-term negative demographic development the medium-term slowdown in the economic activity can be accounted to small growth of productivity and slow accumulation of capital (Havik, K. et al., 2014). The post-crisis development in the European countries worsened external imbalances mainly in the indicators of Net International Investment Position and their Shares in Export Markets. On the other hand, a decreasing number of countries struggled with imbalances in the Three-Year Backward Moving Average of the Current Account Balance, a sharp decrease occurred in a number of countries with an imbalance in the Changes in the Unit Labour Costs. A change in the trend of development since 2013 which will directly reflect the effects of economic revival in the EU countries represents an interesting finding. The first indicator which characterises an external imbalance is the Three-Year Backward Moving Average of the Current Account Balance the development of which is shown in in Figure 2.

**Fig. 2.** The development of the indicator of the Three-Year Backward Moving Average of the Current Account Balance expressed in percent of GDP (MIE\_CA) (Source: authors' own: AMR 2016. *Alert Mechanism Report 2016*)

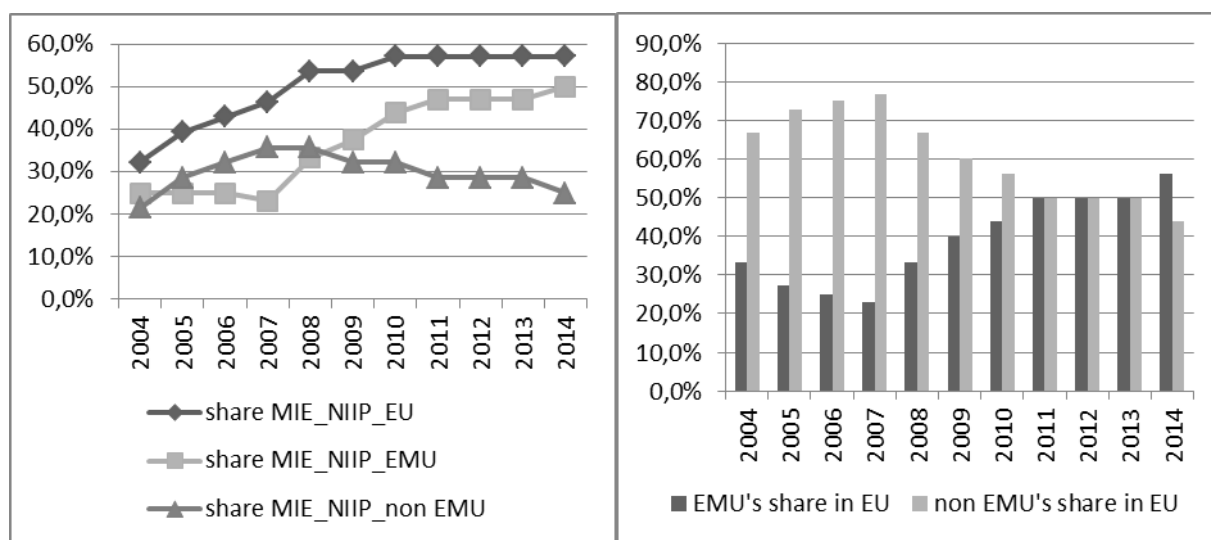


From both the graphs in Figure 2 a significant change in the years 2009-2010 is apparent. In the period before the crisis a bigger number (in percent) of the countries outside EMU showed an imbalance of the indicator and they significantly exceeded the values for the EU countries as well as the most successful group of the EMU countries. In the course of the crisis the situation completely changed and already in 2011 only 18.2 % of the non EMU countries showed an imbalance in current accounts, which is significantly less than in the case of the EU sample (32.1 %) and also the EMU (41.2 %). In 2013 the values for all the three groups were similar, approximately 18 % of the countries in a given group showed an imbalance in the current account balance. In 2014 the

proportion of the non EMU countries with an imbalance started to increase again, which indicates higher "sensitivity" of the the current account balance to economic shocks in this group of countries. The right part of Figure 2 then shows in detail the development of an imbalance for the share of the EMU (non EMU) countries with an imbalance in the total number of countries with an imbalance. The balancing of the current account balance was considerably uneven in the European countries, which was connected predominantly with the reflection of low demand, mainly of investments, in both debt and credit countries (EC 2015:6). According to the European Commission (AMR 2015) the necessary correction of high deficits of current accounts in a number of countries continued in the years 2012 - 2014, specifically in Ireland, Cyprus, Greece, Spain, Portugal, Romania and Slovenia. Italy also showed a slight surplus while France maintained a slightly negative current account balance. The growing export played an important part in current accounts mainly in Bulgaria, Greece, Slovenia, Lithuania, Romania, Portugal, and to a smaller extent also in Spain and Ireland. The Eurozone as a whole maintained relatively high external surplus, very high surpluses were seen in Germany and the Netherlands, the surpluses of which highly exceeded the thresholds of the comparative overview. These high and long-term surpluses can represent economic ineffectiveness in relation to low domestic investments and demand, which in medium-term horizon can contribute to slower economic revival. In the case of Germany also the geographical structure of the current account surplus changed when the balance increased in relation to the rest of the world while the balance in relation to the Eurozone decreased for the reason of the decrease in German export to the Eurozone countries.

The Net International Investment Position provides an aggregated view on a net financial position of a country towards non-residents. Both parts of Figure 3 delimit the development of the net investment position of European countries.

**Fig. 3.** The development of the indicator of the net international investment position as a percent of GDP (MIE\_NIIP)  
 (Source: authors' own: AMR 2016. Alert Mechanism Report 2016)



The growing trend of the share of the countries with an imbalance (exceeding the threshold of -35 %) was characteristic for the EU and EMU groups of countries. The share of the EMU/non EMU countries in the total number of countries with an imbalance (the right part of Figure 3) was evenly distributed from the year 2011 while till 2011 imbalances of the indicator prevailed in the non EMU countries with a maximum difference in 2007 when only 23.1 % of the countries with an imbalance were members of the Eurozone (76.9 % represented non EMU European economies). In 2014 the share of the number of the EMU countries exceeded the share of the number of non EMU countries, which is in accordance with the set trends of development. In 2014 the scope of external obligations

in the EU was very wide and their sustainability was highly endangered (EC 2015:9). With regards to the fact that the development of the net investment position of a country is significantly related with the indicator of the current account balance, the improvement of the net international investment position to a safer level requires smaller deficits or even surpluses for a long-term period and more dynamic economic activity (EC 2012a). At the same time, according to the European Commission (EC 2013a), the risks related to a negative net international investment position, including the impact on economic activity and financial stability, depends to a high extent on the structure of the obligations; in this respects countries with a big volume of direct international investments from abroad, namely Bulgaria, Czech Republic, Estonia, Lithuania, Latvia and Ireland, were better off than the countries the negative net international investment positions of which reflected mainly external debts. For economies with the biggest negative net international investment positions their current account balances are already sufficient for the stabilization and slow reduction of their net external debt in a medium-term horizon (EC 2015:10). This applies mainly to Ireland, Spain, Latvia, Romania and Portugal, but neither to Greece nor to Cyprus. The data for France and the UK indicate continuous growth of net external obligations of these countries.

### 3 Internal economic imbalances

Every year, as a part of the Macroeconomic Imbalances Procedures (MIP) internal macroeconomic imbalances are evaluated by means of six indicators (EC 2012) which are: Year-on-Year Deflated Percentage Change in the House Price Index adjusted for inflation (MII\_HPI), Private Sector Credit Flow (consolidated) in percent of GDP (MII\_PSCF), Three-Year Backward Moving Average of the Unemployment Rate (MII\_UR), Private Sector Debt (consolidated) in percent of GDP (MII\_PSD), General Government Sector Debt in percent of GDP (MII\_GGD) and Year-on Year Percentage Change in Total Financial Sector Liabilities (non-consolidated data) (MII\_FSL). The number of European countries with internal macroeconomic imbalances (i.e. the number of countries with the values of comparative overview indicators which exceeded the set thresholds) in the monitored period of 2004 – 2014 is shown in Figure 4.

**Fig. 4.** The development of the number of countries with an internal macroeconomic imbalance  
 (Source: authors' own: EC 2015. Statistical Annex of Alert Mechanism Report 2015)

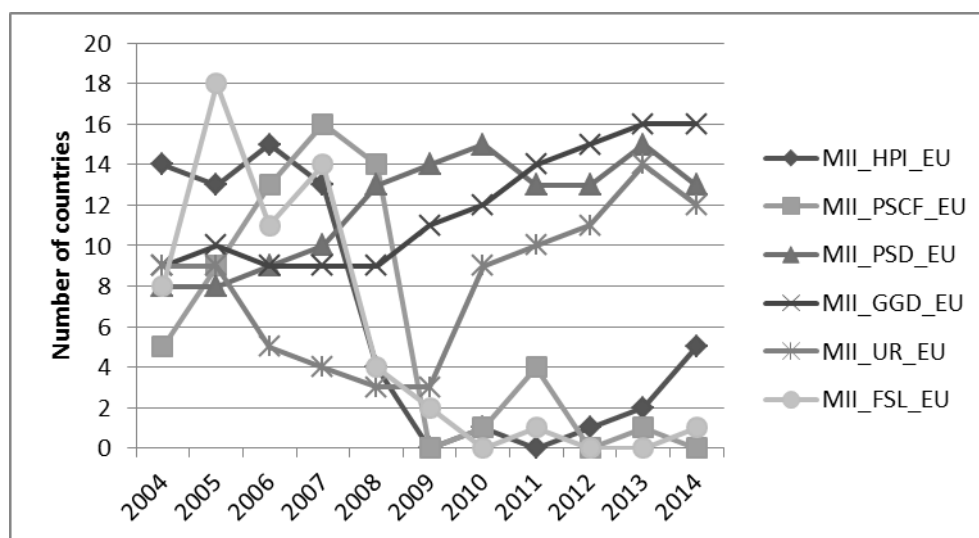


Figure 4 again shows clear visible interconnection between the development of the values of internal macroeconomic imbalances indicators with economic development in European countries

and strong impact of economic recession on the change in the trend in European countries is visible there. From 2007 a continuously growing number of countries showed excessive indebtedness of both private and public sector, significant problems appeared in the majority of European labour markets, and towards the end of the monitored period, these indicators thresholds were exceeded by approximately a half of all the EU countries. On the other hand, from 2008 the number of countries with an imbalance in the indicators of percentage changes in the house price index, private sector credit flow and year-on year percentage change in total financial sector liabilities has sharply decreased.

The indicator of the private sector credit flow (consolidated) in percent of GDP represents a flow alternative of the private sector debt indicator (consolidated) in percent of GDP, which expresses a state value and its development is illustrated in Figure 5.

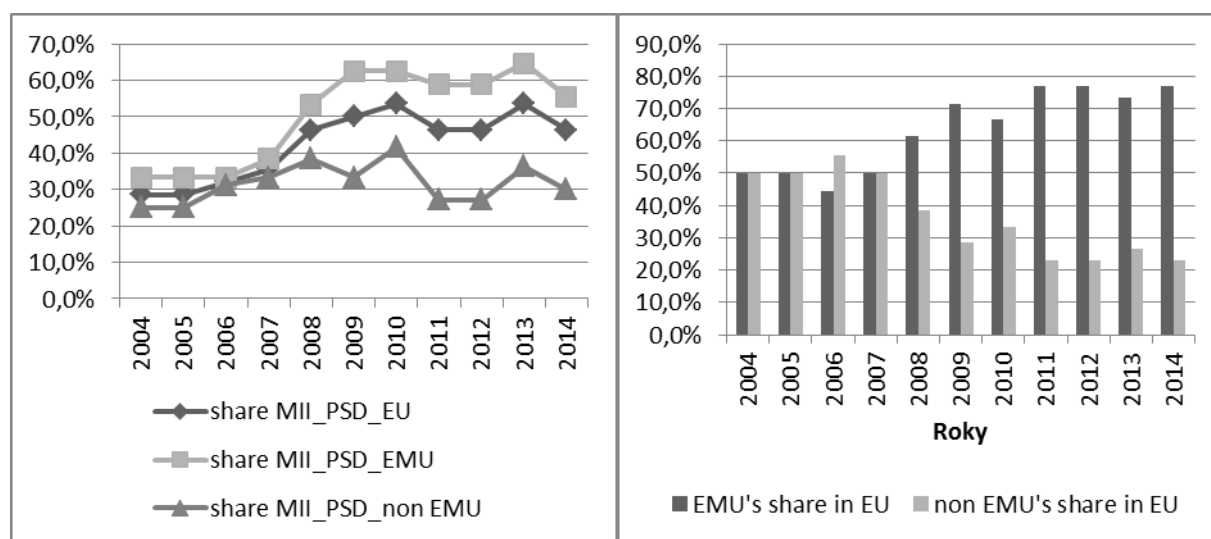


**Fig. 5.** The development of the private sector debt indicator (consolidated) in percent of GDP  
 (Source: authors' own: EC 2015. Statistical Annex of Alert Mechanism Report 2015)

The mutual interconnection of both the indicators was also demonstrated in their "similar" development in time. In their study Classens and Kose-Ayhan (2013) prove that before the crisis broke out a boom of credits and external funding occur which eventually leads to recession. The year 2008 was marked by the escalation of the increasing indebtedness of all the European countries, but with a different subsequent development. While in the after-crisis period the limit threshold is exceeded approximately by every sixth country outside the Eurozone, in the group of the Eurozone countries it is already each third country. This development can be seen in the graph in Figure 5. In the majority of the European countries the private sector debt remains high and the European countries solve their problems according to whether the excessive debt is in the sector of households, such as in the Netherlands or Denmark, the business sector, e.g. in Bulgaria and Slovenia, or in both the sectors, such as in Ireland, Greece, Spain or Cyprus. EC 2015: 12) According to the study *Private Sector Deleveraging: Where Do We Stand?* published in the Quarterly Report of the Euro Area (EC 2014), negative credit flows into the private sector, indicating active payment of debts, represented the main factor in the reduction of the debt of households in the last few years which accelerated in Spain, Portugal and Ireland and also in the reduction of business debt in Malta, Slovakia, the UK and in Spain.

General Government Sector Debt is defined as a total gross debt in its nominal value outstanding at the end of the year, consolidated inside and between individual sub-sectors of governmental institutions. In each economy there is a very strong interaction between general government sector and private sector and if the general government sector is supposed to reduce debt and increase savings, then it is suitable to compensate for the negative influence of the



restrictive governmental policy by the reduction of savings in the private sector. V. Izák (2015) studied the mutual relationships between private and general government sector debts and by means of Granger's causality demonstrated a mutual relationship between the private and general government sector debts. The high share of debts in the DGPs in the European countries nor only in the general government sector but also in sectors of households and non-financial businesses is also confirmed by empirical analyses (Bouis et al., 2013; Izák 2013). The culmination of the ratio between the general government sector debt and private sector debt occurred in the crisis years in 2007 mainly in Austria, Denmark, Estonia, Spain, France, Italy and the Netherlands and in 2008 in Belgium, Finland, Hungary, Poland, Portugal and Sweden. The economic and financial crisis in Europe is characterised by mutual interdependence between individual economic sectors and therefore the relations between private sectors and general government sector represent a potential source of an internal imbalance and financial vulnerability resulting from it. Figure 6 illustrates the development of the General Government Sector Debt as % of GDP.

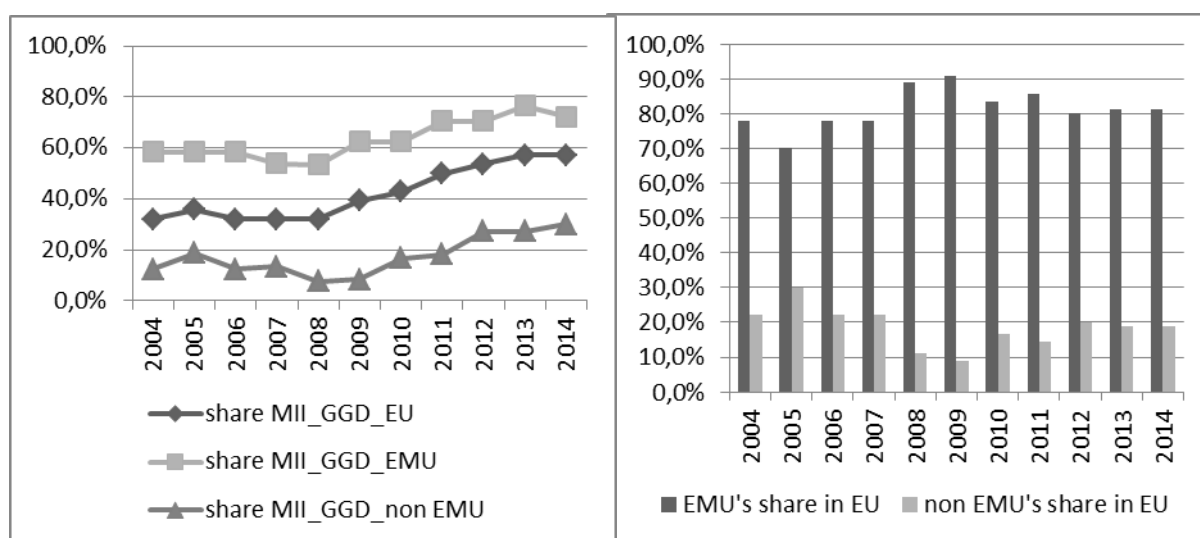


**Fig.6.** Development of the general government sector debt as % of GDP  
 (Source: authors' own: EC 2015. Statistical Annex of Alert Mechanism Report 2015)

Figure 6 shows an unsatisfactory development in the EU countries in the indicator of the general government sector debt as % of GDP as a whole, from the original 30 % countries which exceeded the threshold in 2004 the number of countries became practically double and in 2014 already 16 countries out of EU-28 showed indebtedness higher than 60 % GDP. The ratio in EMU and non EMU countries increased symmetrically when in both the groups there was an increase by 20 %, but the resulting ratio values are completely different: among EMU countries, 80 % countries in the group exceeded the threshold while among non EMU countries only less than 20 %. In a number of cases the most indebted governments of Greece, Portugal, Italy, Ireland, Cyprus and Belgium had to face significant problems, or countries with the fastest increase in the ratio of the public debt to GDP such as Spain, Croatia and Slovenia the problems of which were further strengthened by high debts of the private sector and negative prognoses of the economic and demographic development (EC 2015)

#### 4 Conclusion

The aim of the chapter was to evaluate the development of internal macroeconomic imbalances in the 28 EU countries in the course of the years 2004 – 2013, and to answer the question whether and how this development in the member countries of the Eurozone differed from the European countries outside the Eurozone. As far as external macroeconomic imbalances are concerned, in the

course of the monitored period the indicator of the net investment position significantly worsened and unfavourable development was also seen in the indicator of the share of a country in export markets. On the other hand a decreasing number of countries have shown imbalances in the three-year backward moving average of the current account balance, the change in the unit labour costs and the change of the real effective exchange rate. From a more detailed analysis of the development of the external macroeconomic imbalances in the groups of the EMU (non EMU) countries it is obvious that:

- As regards the indicator of the three-year backward moving average of the current account balance in percent of GDP, out of the total number of the countries with an imbalance there were 66.7 % of non EMU in 2004, in 2011 only 22.2 % and in 2014 the countries outside the Eurozone constituted exactly a half of the countries with an imbalance. In this group of countries also higher "sensitivity" of the current account balance can be seen as a reaction to occurring economic shocks.
- As far as the indicator of the net international investment position is concerned, the share of the EMU/non EMU countries in the total number of countries with an imbalance was evenly distributed and from the year 2011 the imbalances of the indicator prevailed in the non EMU countries with the maximum difference in the year 2007 when only 23.1 % of the countries with an imbalance were members of the Eurozone (76.9 % were represented by non EMU European Economies).
- The imbalance of the change over three years of the real effective exchange rate deflated by HISC relative to a set of 36 industrial countries in per cent was shown by a relatively small number of European countries (up to 10 countries) in the monitored period (with the exception of 2004). In 2013 no case of appreciation of the real effective exchange over the indicative threshold was seen. In fact, in several member countries it was the rate of decline (weakening) of the real effective exchange rate that exceeded the threshold, with regards to the development of the nominal exchange rate of the euro (and outside the Eurozone of the other national currencies).
- An unsatisfactory situation could also be seen in the five-year export market shares changes in per cent in all the European countries. With time the number of countries in which an imbalance was indicated grew practically continuously and out of the total number of the countries with an imbalance the majority proportion was constituted by the EMU countries which is significantly higher than the proportion of the non EMU countries, mainly from 2009 when the proportion of the EMU countries was 84.6 % out of 13 countries with an imbalance up to 72.2 % out of 17 countries with an imbalance in 2014.
- Also in the development of the indicator of the nominal ULC, % change (3 years) differences are apparent between individual studied groups: the proportion of the non EMU countries in the total number of countries with an imbalance was higher than of the EMU countries up to 2008, and from 2009 the trend became opposite and with the exception of 2012, the percentage proportion of the countries which are the EMU members is higher. In 2014 out of the number of the countries which exceeded the thresholds, 67 % were EMU countries and only 33 % were non EMU countries.

The analysis of internal macroeconomic imbalances shows that in the course of the monitored period the indicators of unemployment rate (3 year average), general government sector debt and private sector debt significantly worsened and in 2014 more than half of all the EU countries exceeded the thresholds. On the other hand, in the indicators of the year-on-year change in deflated house prices, private sector credit flow and the indicator of year-on-year change in total financial sector liabilities the number of countries with an imbalance steeply decreased after 2007. From a more detailed analysis of the development of the internal macroeconomic imbalances in the groups of the EMU (non EMU) countries it can be concluded that:

- The commencement of the crisis in 2009 had an extremely strong impact on the correction of overvalued house prices and the development the year-on-year change in deflated house prices in percent is similar for the group of the Eurozone countries and the group of the countries outside the Eurozone.
- In 2008 the private sector credit flows started practically to stagnate and this remained in the group of the non EMU countries up to 2014 and at the same time this year was marked by the escalation of the private sector increasing indebtedness in all the European countries and then in the after-crisis period the limit threshold is exceeded approximately by every sixth country outside the Eurozone, in the group of the Eurozone countries it is already every third country.
- An unsatisfactory development was detected in the indicator of the General Government Sector Debt as % of GDP where from the original 30 % countries in an imbalance in 2004 the number of the countries became practically double and in 2014 already 16 countries out of the EU-28 showed indebtedness higher than 60 % GDP. The ratio in EMU and non EMU countries increased symmetrically when in both the groups there was an increase by 20 %, but the resulting ratio values are completely different: among EMU countries, 80 % countries in the group exceeded the threshold while among the non EMU countries only less than 30 %.
- In the indicator of year-on-year change in total financial sector liabilities in % the development is apparently different till the year 2008 when the threshold was exceeded approximately by half of the European countries while the proportion of the non EMU countries was significantly higher than of the Eurozone countries and subsequently negative credit flows were registered in the countries going through the financial crisis and relatively low in the majority of the other European economies.
- The indicator of unemployment rate (3 year average) is characterised by a completely different development in the pre-crisis period and after the year 2009 when the unemployment rate grew significantly in all the European countries with the exception of Germany, Malta and Austria and the development is almost identical for both the groups of countries, in 2014 twelve European countries exceeded the threshold for the indicator. The proportion of the countries in the total number of the countries with an imbalance is however different as 75 % is represented by the EMU countries and only 25 % by the non EMU countries, from which it can be concluded that labour markets in the EMU countries adjust more slowly than labour markets in the non EMU countries.

On the basis of the development of individual indicators it is possible to state that till 2008 - 2009 external and internal macroeconomic imbalances were more often seen in the countries outside the Eurozone and the Eurozone countries were characterised by bigger external and internal stability with the exception of the the indicator of the general government sector debt as % of GDP This trend changed after 2009 since when the proportion of Eurozone countries in the number of the countries with an imbalance was higher in all the monitored indicators. From this point of view therefore the countries outside the Eurozone managed the crisis and post-crisis period better than the Eurozone countries, which could be a result of the possibility to use tools of autonomous monetary policy and the possibility to modify an exchange rate in the non-EMU countries and at the same time of the non-existence of adequate mechanisms which would compensate for the loss of these tools in the countries with a single monetary policy. The conclusions arrived at also do not support the Hypothesis of Integration Process Endogeneity which assumes growing mutual interconnection and consonance of the economies in time and in connection with the achievement of qualitatively higher level of integration.

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## **A COMPARISON OF THE SOCIAL BENEFITS SYSTEMS IN THE CZECH REPUBLIC ON MODEL HOUSEHOLDS DURING RIGHT-WING (2011) AND LEFT-WING (2015) GOVERNMENTS RULE**

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### **Abstract**

Social system in the Czech Republic incorporates some safety mechanisms that may protect an individual or a whole household in the case of a difficult life situation. But there is always a danger that there could be individuals who exploit this system or use it in their favour. One of economic instruments for identification of disputable occurrences in the social system is the marginal effective tax rate on employed person. This method is used for the analysis of tax and benefit system (dis)incentives impact on labour supply. On two selected model households we can illustrate when there is a favourable situation in the case of tax and social benefits interaction. This means when it is favourable for the household to work and when to rely on social benefits. In this paper we analyse years 2011 and 2015. The reason is twofold: different political views on the social security system (right-wing and left-wing governments); economic development since the 2008 crisis, when the revitalization of the economy had profound influence on the social security system and also on the individuals and households' decision making.

### **Keywords**

Household, individual, wage, unemployment, social benefits.

### **JEL classification**

D31, J22.

## **1 Introduction**

The goal of this paper is to emphasize differences in executed social policy in the Czech Republic during left-wing (2015) and right-wing (2011) governments. The key question is whether there exist differences not only on theoretical but also on practical basis. In this paper we are not trying to ponder about the sense of the social system. Social system represents one of the fundamental functions of the government – the allocation function. It symbolises the difference between human and animal society. Human society cares about weak, sick and disabled people. We are proud to demonstrate that we are looking after our peoples and defend them against predators and life threatening situations. Some of us see this as the basic of humanity and they ask what else make us different or better from animals. A man can help also another living being, but a man is a man. Developed countries have accepted the social system as their incremental part long ago, de facto it is one of the symbols of developed countries. This has been formally confirmed by introducing this kind of behaviour and care about those in need into their constitutions.

However, it seems even those developed countries, including members of the European Union (EU), are not totally willing to support such social systems and concept of the welfare state is failing to be sustainable and efficient under current conditions. Reasons for inefficiency are plentiful. One of the most important is the fourth demographic transition, when the life expectancy is increasing and the rate of birth is decreasing (Kalibová, 2002). Amount of countries' governments and citizens debts causes illiquidity and passing of debt burdens on later generations (Tabellini, 1989) and last but not least political changes in behaviour of the society cause further problems.

When comparing 27 EU member countries Jara and Tumino (2013) the Czech Republic was sharing similar traits to other new member states that have joined the EU after 2004, based on the tax system and redistribution of income. These new member states de facto have similar problems with low-income employees that face the social benefits system.

Comparison based on left or right-wing policies perspectives in EU member states is difficult because of different definitions of social benefits in each country. So the results would be biased.

Under the term social system, we perceive only a small part that it is represented by a term the social policy of the state. This includes basic social benefits that the households are entitled to – state social support benefits<sup>1</sup> and benefits in material need<sup>2</sup>. Altogether those social benefits in 2015 amassed 22 594 500 thousand CZK which is 4,6% of the total expenditures of the Czech Republic on the state social policy. In the whole state budget is this number more negligible. An interest in this area of the social system has risen throughout the years, because what is not negligible is that this number has multiplied 5 times since 2008 till 2015.

After recuperation from the crisis the Czech labour market faces a problem with deficient labour force. This deficit is increasing, despite Czech Republic had in 2015 the highest number of employed people since the global crisis. Why there is a lack of labour force, when at the end of the year 2015 there were 453,1 thousand job applicants. An explanation can be given by an economic theory based on several macroeconomic grounds: rigidity of the labour market, structural unemployment or Diamond paradox (Diamond, 1971). This macroeconomic problem is also significantly influenced by decision making of individuals (Gronau, 1977).

Existence of individuals that in given time solve their difficult life situation and therefore are not able to fend for themselves is undisputed. After solving personal, health or other life problems is an individual facing a decision, whether it is more convenient for him to work or remain reliant on social benefits. Theoretically a working individual should earn more money that he would receive from the social system. This hypothesis will be tested in this paper.

Since the global crisis in 2008 the Czech Republic should have recovered and experienced a phase of economic cycle of expansion. The reality was not that straightforward. Economy of the Czech Republic had experienced reoccurring downturns. This have been mirrored by the number of governments (five) that have ruled over the period from 2008 to 2015. It is worth to mention that reasons for this number of government changes was not only influenced by negative economic results but also by miscellaneous political affairs.

## **2 Labour market vs Social benefits**

The labour market is segmented (Harrison and Sum, 1979). It is not a single market, but a group of separated not competing individual markets. One of the theories of labour market segmentation is the economic theory of the dual labour market (Gordon et al., 1973). Initially it divides the labour market into primary and secondary. The candidate for the post of primary labour market has a very low probability that it gets into a situation where he needed social benefits. This does not mean that they never used unemployment benefits. On the other hand, the candidate for the secondary labour market is totally in the opposite situation. This is due to the characteristics of the secondary labour market.

People are often make decisions, whether it is worthwhile to start working or rely on social benefits, those individuals are candidates for the place in the secondary labour market. Secondary labour market limits the candidates with lower wage levels, lower prestige, worse working conditions, career option for them is almost non-existent, there is a high fluctuation of jobs with shorter or longer periods of unemployment. All these factors lead logically job applicants to think that the certainty of social benefits is better than any uncertainty in the secondary labour market.

There is place for social policy issued by authorities elected by the whole society. Inconsistent view of governments from across the political spectrum is evident. The leftist government would like to establish a social system that is more egalitarian with redistribution of wealth and privilege. The leftist government tends to implement socially responsible state. These goals do not lead to an increase in unemployment as it might seem. Conversely, achievement of these objectives should

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<sup>1</sup> In this category we consider only the contribution to childcare and contribution for housing.

<sup>2</sup> In this category we consider only the contribution to livelihood and back payment for housing.

support a synergy effect that would reduce the unemployment and enable social peace. The right-wing government would like to establish a social system that will preserve traditional and cultural values and practices. One of its many tasks is to reduce the influence of the state (minimal role of the government) to an individual's life. These objectives should mainly influence the economy through low inflation.

These declared efforts of left and right governments, however, are the ways in which they would like to achieve their ideological vision of social order and of course to win votes for the next elections. The real implementation of social policy is considerably different. The right-wing government introduced a new subsistence level in 2007 increased it in 2012 under Prime Minister Petr Nečas. Since this increase of subsistence levels there was no change and it is not planned in the near future, despite the fact that from 2014 the Czech Republic is ruled by a left-wing government.

In the case of social policies not implemented in a way expected from leftist and rightist governments, it still depends on the economy itself. In which part of the economic cycle it is and the ensuing consequences. The economic situation is affecting the labour market in the form of many variables: the average gross salary in the various sectors and occupations, unemployment, employment, labour demand and supply. These quantities are still intertwined among themselves. But the fact remains that when the economy is in good shape the number of unemployed is decreasing. In the Czech Republic, however, the growing economy is not followed by a decrease in number of applications for social benefits or in the amount of benefits paid.

The social system in the Czech Republic has to be supportive to people in difficult life situations. But mostly it helps people who have certain common characteristics. To this group we can include persons with social and health problems that escalated into economic problems, such as disabled people (mentally and physically), persons with various types of addictions, members of broken families (single mothers), etc. The social security system also helps other groups of persons that are in economic distress because of occurring life events such as long-term unemployment, women returning from maternity or parental leave, people in retirement age, a person socially maladjusted, graduates and people with low job mobility (Mareš, 1998).

## 2.1 Methodology

A comparison of the years 2011 and 2015 was selected based on the following reason. To follow the development of the social system after the global crisis of 2008 is possible only in these selected years. Those are the years when without interruption ruled the right-wing party and in the other left-wing party to allow comparison of the social benefits system during their governments.

Selection of compared periods could be realized also based on different rules for example sowed by Harding et al. (2009).

The year 2009 is not appropriate due to the censure of the already second government of Miroslav Topolánek. Although this was a right-wing government it did not rule over the whole year. During 2010 the government was ruled by a caretaker government of Jan Fischer, which was followed by the right-wing government of Petr Nečas. This year is unsatisfactory for two reasons. First, Fischer's government lacked the right (mandate) to change the social system. Although the system functioned on the basis of right-wing principle. Inability to correct the system in the period after such a strong global crisis by right-wing ideas could be representative. However, the second reason is that since the second half of the year, although ruled by right-wing government, but there is no continuity in its policy on the caretaker government. Finally, in the year 2011 there was the time when it ruled throughout by an undisturbed right-wing government, the government of Prime minister Petr Nečas. This government continued throughout the year 2012, but the 2011 is closer to the crisis from 2008, so it was the year 2011 was selected as a model of right-wing government.

Between 2013 and 2014 the government was ruled under the prime minister Jiri Rusnok. It was again a caretaker government as in the case of Minister Jan Fischer. The leftist government ruled

under Prime Minister Bohuslav Sobotka without interruption only in 2015. Therefore, the year 2015 was selected as the model of a left-wing government.

The tool to determine whether it is beneficial for individuals to work in a particular social system and the state of the economy, is the marginal effective tax rate (METR).

The marginal effective tax rate is a method that began to be used by the OECD and the European Union for the calculation including individual types of households and based on calculations that predict household's decision-making process. This method allows to determine using knowledge of all input variables, whether it is worthwhile for individuals to work or not. The result of this method is clear, but it should be seen as the probability of the phenomenon. There are other impacts that this method in itself does not capture. The final decision is influenced by an individual's character, experience, knowledge etc. is expected to some extent, individual rationality, which is ready to work, even if it loses leisure time (McConnell and Brue, 1992).

The amount of such remuneration, where the individual has left the social benefits system and returned to work, is different for each individual. Generally, it can be assumed that the lower income limit is the amount of the minimum wage, which is the lowest fee for full-time job. In 2011 the minimum wage was 8,000 CZK. In 2015 it was already higher (9,200 CZK). Eligible social benefits will play an important role also. If this amount is higher than the minimum wage, it is rational that the individual goes to work. People who are using the social system the most, are those participating and working in sectors that belong to the secondary labour market. Generally, remuneration for work does not have a normal distribution, but the left-sided asymmetric division. Remuneration in the secondary labour market is even more skewed to the left. The upper income limit for an individual who could be characterized as an individual without qualification, skills and other soft skills, cannot be generalized on the basis of his desires. Especially, if we take into account the Dunning-Kruger effect (Kruger and Dunning, 1999). We can rely on the definition established by Eurostat that defined low-income employees. The upper income limit is then taken as two-thirds of the national median gross wage (Bezzina, 2012). In this article the lower income limit for low-income employees will be the minimum wage in the reference year and upper income limit for low-income employees' will be the median gross wage in the reference year.

The marginal effective tax rate of employed persons is calculated as follows (Beer, 2003):

$$METR(EP) = 1 - \frac{\Delta NEI}{\Delta GEI}, \quad (1)$$

where  $METR(EP)$  stands for marginal effective tax rate of employed persons,  $\Delta NEI$  is change of in the net earned income and  $\Delta GEI$  is change of the gross earned income.

The change in net income is defined as a function of changes in the gross income from labour, marginal tax rates, including a contribution to social and health insurance paid by the employee and the rate of decreasing the value of social benefits. The indicator is affected by the change in gross income, taxes and social benefits. Taxes include personal income tax and contributions to social security and health insurance paid by the employee. Social benefits account for calculation are only those which are derived from the amount of the taxpayer's income and his family.

Calculation of the marginal effective tax rate can be broken down into the sum of the marginal rates of individual income or outlet components:

$$METR(EP) = \frac{\Delta IT + \Delta SSC_{EE} - \Delta PB - \Delta PD - \Delta SP - \Delta SA}{\Delta GEI} \quad (2)$$

where  $IT$  are personal income taxes,  $SSC_{EE}$  are social security contributions paid by employees,  $PB$  is housing allowance,  $PD$  are child benefits,  $SP$  are other social benefits,  $SA$  are benefits due to social need,  $GEI$  is gross earned wage.

The value of  $METR(EP)$  represents the percentage of effective proportion if their gross income is increased by one unit (Paul, 2005). Czech system of social benefits is constructed as the difference



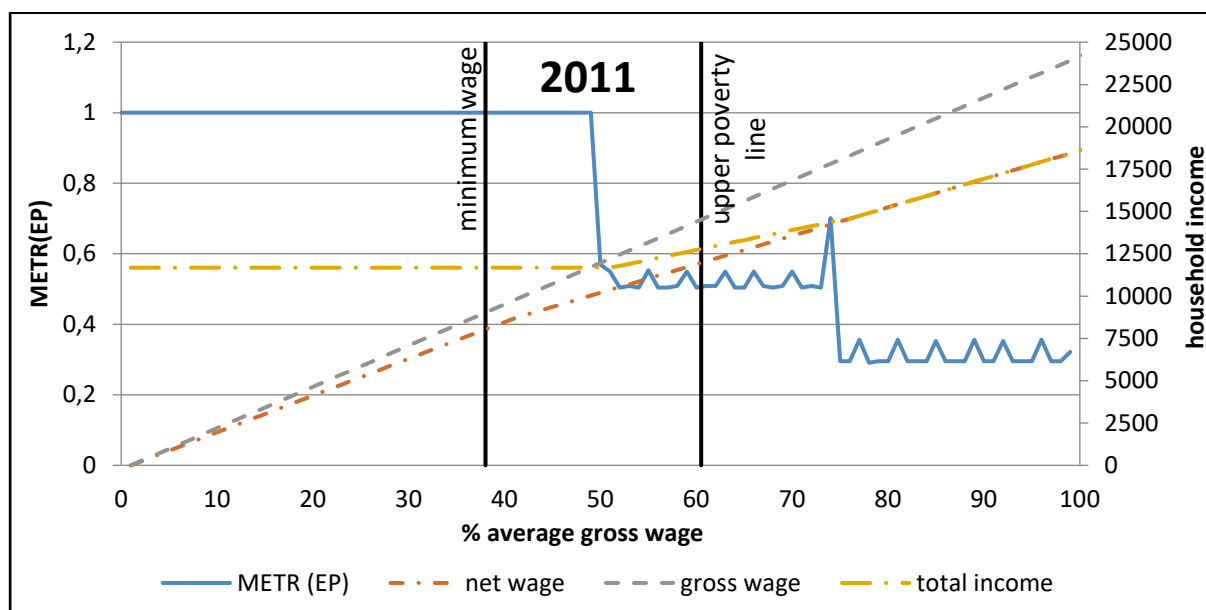
between income after taxes and living minimum. De facto such situations occur, that increase in the amount that the employee earns, leads to loss of funds from social benefits. This is not an unusual situation where increased income from work is lower than lost social benefits. If the values of the marginal effective tax rate exceeds the value of 1, it represents a situation when individuals will get reduced net income, if they earn more by working. In such a case it would be irrational to work more. The individual gets into the poverty trap. An individual is in a situation where he cannot do better. The social system should not generate such a situation. It is contrary to reason for its inception; it discourages individuals from working. It does not motivate him to return to the labour market after overcoming difficult life events.

All input variables for the model households are obtained from the Czech Statistical Office and the Ministry of Labour and Social Affairs of the Czech Republic. Social benefits were calculated according to the applicable laws of the reference year. Formula and procedure for calculating social security benefits can be found in Beran (2013).

Selection of model households was influenced by the high statistical frequency in the Czech economy and also to determine the functioning of the social system. First reference model household is a household of one individual: 1 + 0 + 0 (Beran, 2013). This individual is long-term unemployed and not entitled to unemployment benefits. Receives standard social benefits and decides whether it is financially worthwhile to work. Second model of household is a household of four persons: 1 + 1 + 2. This household consists of two minors and two adults. Both are long-term unemployed and so they receive only a standard social benefits. One of them is deciding whether it is worthwhile to work.

### 3 Comparison of results of investigated years

For better transparency of results in the years 2011 and 2015 we have chosen a graphical instrument. There are two charts for each year for particular type of household. These charts will capture the calculated value of the marginal effective tax rate (METR) on the left vertical axis and the right vertical axis includes value of gross income, net income and total household income, including social benefits. Two vertical lines represent the lower income threshold in the form of minimum wages and upper income limit low-income employees.



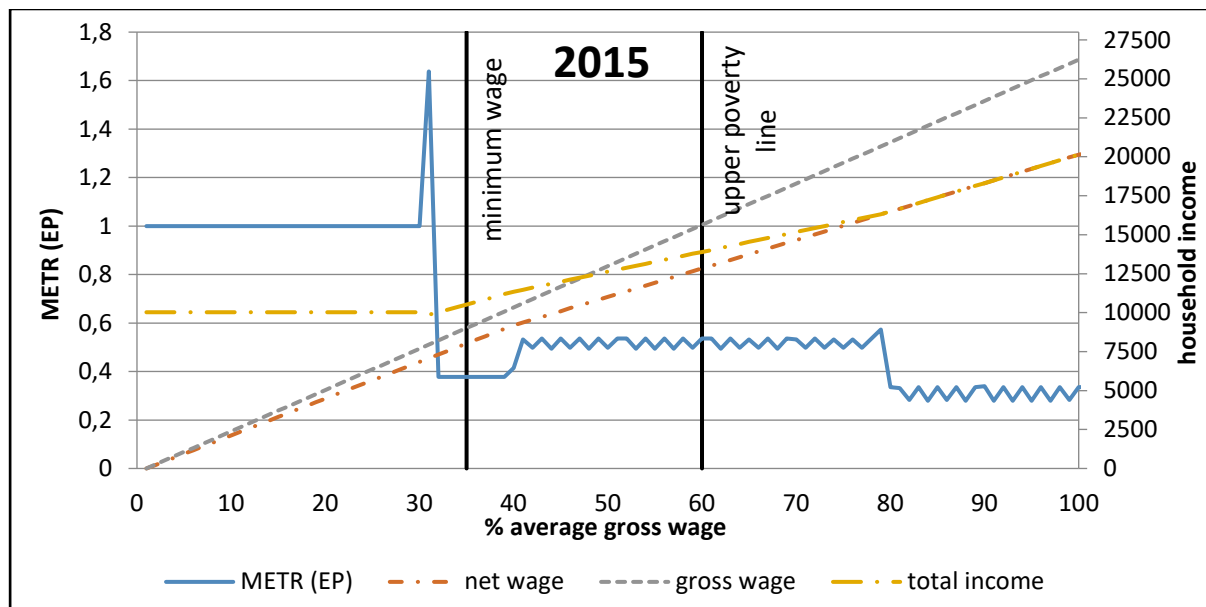


**Fig. 1.** Household 1+0+0 (Source: own elaboration)

From the graph on the Fig. 1, we can see that while in 2011 the value of METR (EP) equals 1 as it holds up to 50% of the average gross wage, then in 2015, it is already at 30% of the average gross wage, which is before the minimum wage. The reason for this phenomenon is the loss of entitlement to aid in material need living allowance and housing supplement. Yet an individual will earn the same amount by working as he gained through social benefits before, up to 45% of the average gross wage. If he could earn an amount equalled to the upper income levels of low-income workers, he would have earned less than 3,000 CZK more than being on social benefits. It depends entirely on the decision of each individual to consider whether it is worthwhile to work. The probability of remaining inactive increases with the length of unemployment.

Values of METR (EP) in 2011 reached higher levels than in 2015. However, even in a reference year they are not at levels that would objectively motivate an individual to work. The significant jump in front of the minimum wage in 2015 is a loss of the right to assistance in material need living allowance and housing supplement. In 2011, one was definitely more demotivated to work than in 2015. Nevertheless, in 2015 the value of METR (EP) is economically at a level that does motivate individuals to work.

Interestingly a combination of economic growth and adaptation of the benefits system by leftist government is more motivating to work. An important adjustment to the social benefits system is an example of normative for housing freezing. During the reign of the right-wing government there was a yearly increase. While in the left governments they remained frozen. In Prague, where rents are highest in the Czech Republic, the normative for housing has increased by 9.83% and the during the left-wing government only by about 0.12%. These figures should be seen in the context of the policy carried out by these governments.

Right-wing government at that time has carried out the rent deregulation. Rents have risen and standards of living had to react to this situation. It is questionable to say that the normative for housing responded to rising rents or rents had responded to the growing normative for housing. However, it has opened a vicious circle that culminated in the Czech Republic in the scandal "trade with poverty." The poorest individuals were in turn paying rent higher than wealthier individuals. The reason was simple, full rent was paid by individuals through social benefits.

Left-wing government on the contrary, has implemented a policy that aimed to end this "business with poverty." Changing not only the amount of normative for housing, but also the principles of payments for social cases in hostels. They were trying to repair a system that had in himself many shortages and led to a fivefold higher social benefit payment. The efforts to stop "trade with poverty"

is a strategy that introduces the concept of social housing. The success of this strategy will be know much later.

A four-member household with adult individuals belonging to low-income workers is always in Czech social benefit system is entitled to benefits. For the evaluation of the policies of individual governments need to simulate a household that finds itself in financial distress. Neither of the adults is working. Would it have been worthwhile for one adult to return to work without simultaneous activation and the second adult? The probability that they would find work both at the same time is very negligible. This finding is important because the social system is to help member of the society, but would not bind him and making interdependent. The Czech Republic is constantly threatened and perhaps even it is more threatening that once an individual has relied on the social system, so it can not break away from it. In the case of a family (multi member household), this phenomenon even multiplies.

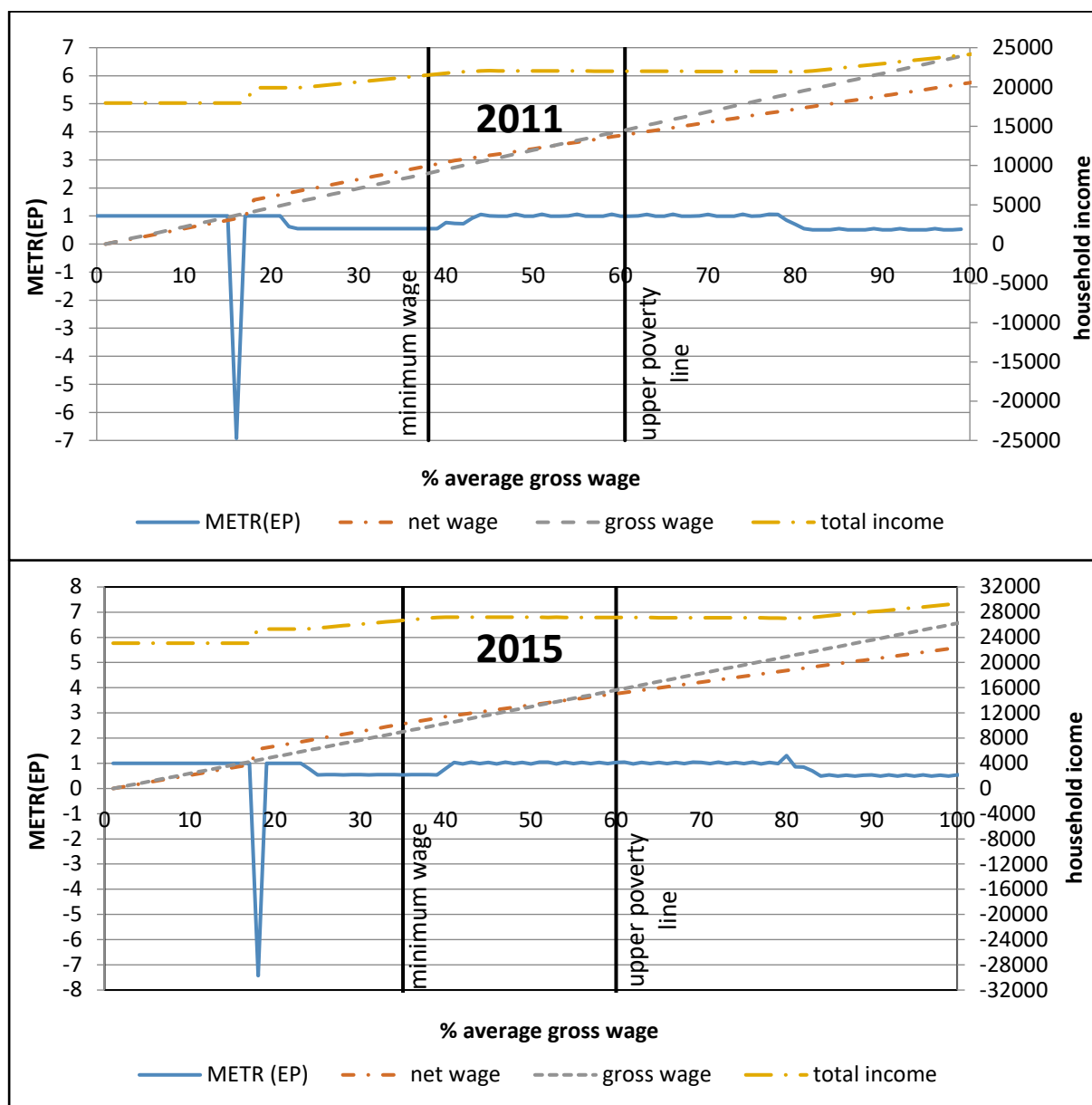


Fig. 2. Household 1+1+2 (Source: own elaboration)

From a visual point of view, the graphs on Fig. 2 display no difference. They differ only in the values that are determined by economic developments in the economy in the Czech Republic. The

average gross wage in 2011 was 24 436 CZK. In 2015 it amounts to 26 500 CZK. This increase in five years has affected the right vertical axis in both graphs, but with a minimal extent it has influenced the METR (EP) on the left vertical axis. The difference in the values of METR (EP) among the investigated years is a maximum of 0.5. The result is that in the interval of low-income employees there is one individual for whom it is not worthwhile to start working even in one of the reference years. On the upper income limit of low-income employees, the household received about 4,000 CZK more than if the individual did not go to work. We can see the rule that, the longer a person is out of employment then a compensation in the form of 4000 CZK is inadequate. He has already learned to live on benefits that will cover all costs associated with housing. He is so accustomed to a different lifestyle and from his point of view, "the loss of free time or restrictions on his liberty" in the form of labour and the ensuing financial reward is not fully compensated.

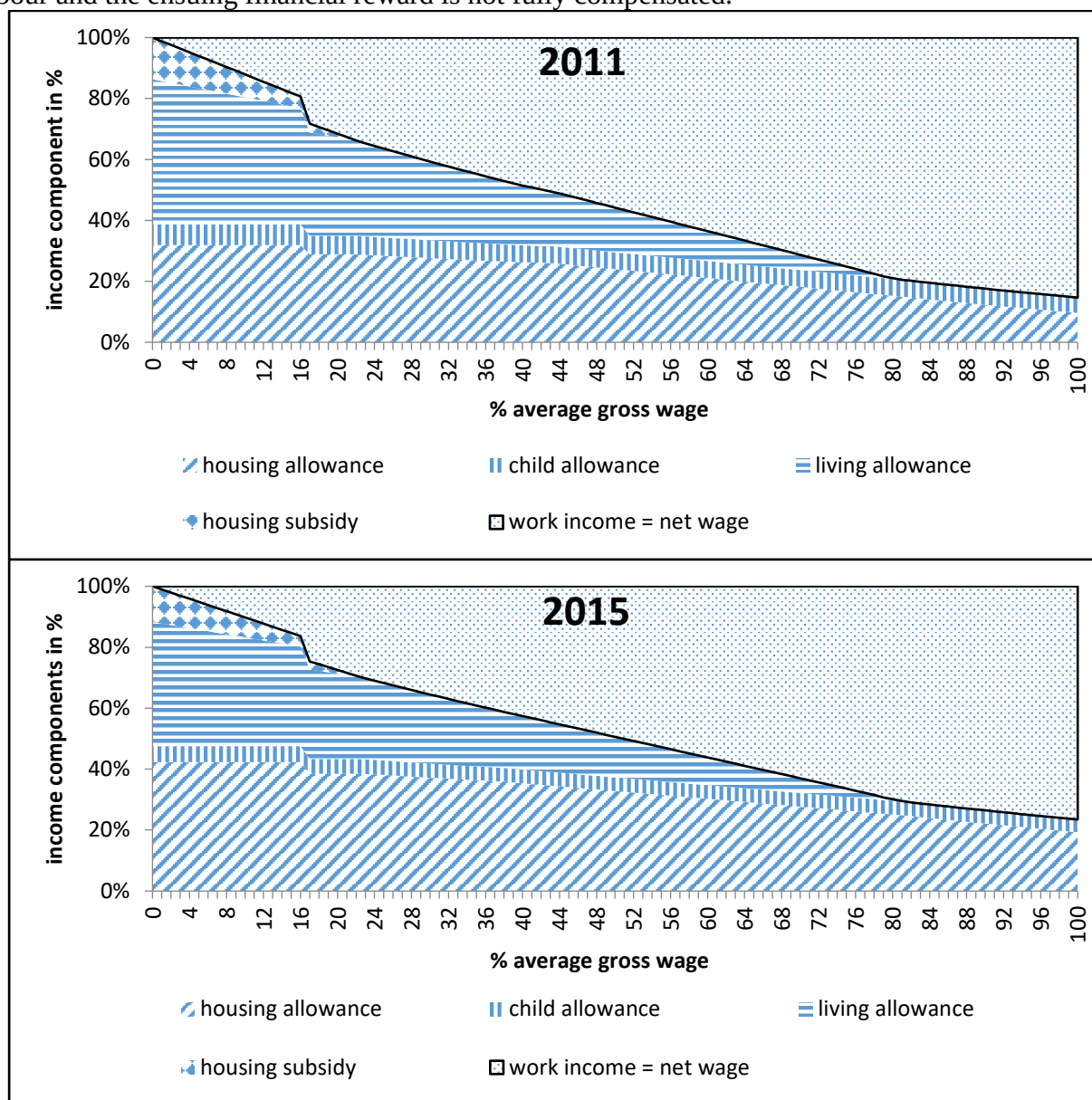


**Fig. 3.** Decomposition of household income 1+1+2 (Source: elaboration)

Figure Fig. 3 shows a slightly different view of the total household income. It is the decomposition of total income on the individual components, which in a single percent of the average gross wage forms. If the individual is earning minimum wage (lower income limit), thus its net income from work represented in 2011 approximately 47% and in 2015 about 39%. Remainder to 100% is a social

benefit. Proportions of years in the form of 8 pp is the same. This can be explained by an increase in the minimum wage and average gross wages between the investigates years. Minimum wage increased by 1200 CZK and the average gross wage increased by approximately 2000 CZK. Due to the increase of both quantities but in a monospaced ratio by dividing the net employment income de facto declined. When the upper income limit of low-income employees already covered in 2011 of about 64% and in 2015 about 56% of the net income from total income. A distinctive feature of this type of household is ineligibility for social benefits and at a value of 100% of the average gross wage. In 2011, social benefits make 15% of 100% of average gross wages and in 2015 around 23%. Even from the perspective of household's income decomposition arises that if this type of households falls into a difficult situation and relies on social benefits, so it is almost unrealistic for adults to start working again. It is important to realize what the consequences of such actions are, should parents educate children and the consequences for their future life. This is another additional cost which is not possible express at the moment.

#### 4 Conclusion

The aim of paper was focused on comparison and review the social benefits system in the Czech Republic in the 2011, during the right-wing government and in the 2015 during the left-wing government. Two types of households were studied. A separately living individual and a household of four with two minor children and two unemployed adults already receiving social benefits. The method used for comparison is called the marginal effective tax rate.

The social benefits system in 2015 (left-wing government) has been for separately living individual more stringent than in 2011 (right-wing government). It should be noted, however, that even stricter benefits system failed to ensure that the individual was forced to start working. In 2015, labour income exceeded social benefits before the upper income limit of low-income employees. The difference in income is (taking into account all the variables that must be taken into account when deciding to work or not to work) so low that it is not possible on a general level to determine whether an individual finds a job and can withstand it.

In the case of four-person household, the situation has remained almost unchanged. If this type of households falls into a situation where it receives social benefits, in economic terms the social benefits system lacks incentives that would motivate to finding a job and keeping it. The social benefit system perceives minors as an important factor and by taking this into account the calculated benefits increase. For politicians it is difficult to deal with the transformation of a minor child in front of their voters. This is perhaps the reason for immutability of social benefits for households with dependent children.

We can suppose that an individual or a household of four is not concerned by the government that is leading the country (left or right-wing). Politicians are accountable to their voters. There is not a lot of room for difference in real policy execution, although in theory the differences are clearly marked. A change could imply on the one hand loss of current voter but also can win hearts of the future ones. The result is very unpredictable. This is the reason why the governments in the Czech Republic use more or less the same social benefits policies.

The Czech Republic is one the new member states that have joined the union back in 2004. The biggest barrier that these states have to overcome is a slow convergence in incomes together with increasing living costs. Price convergence increases much quicker. This conflict of economic measures can be conceived as a main disincentive to future growth of these countries.

Ultimately, the greatest impact on the amount of social benefits in the Czech Republic should be the economic growth. How bad the economy was and it was not worthwhile to work. The actual change in the rules of left-wing and right-wing governments to have affected the final result of the above social benefits far less. The Czech Republic has a standard problem in the area of social benefits when the earnings of low-income employees are equal to or less than the amount of social benefits.

Until there is a change in this area, the system of social benefits will exhibit these shortcomings in the future.

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## OCA INDEX VS. MAASTRICHT CRITERIA: THE CASE OF SELECTED EU COUNTRIES

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### Abstract

In all probability, the most famous monetary union in the world is the Eurozone, which now consists of nineteen European countries. The other nine EU member states are in the statute of candidate countries. The aim of the article is to assess an appropriateness of selected EU countries standing out of the Eurozone for their membership in this monetary union according to the Maastricht criteria and the OCA index.

The Treaty on European Union (the Maastricht Treaty) adjusts the convergence criteria, which the candidate country has to fulfil if it wants to join the Eurozone. These five economic criteria assess the suitability of applicant countries for the membership and they are evaluated every year in the Convergence Report. On the other hand, the OCA index is based on the optimum currency area theory and its criteria. This index includes variables that are important in deciding the country's entry into the monetary union. In this case, the OCA index is computed by using a panel regression method, while the original equation of Bayoumi and Eichengreen (1997), who estimated the OCA index first, is used. The sample covers the period from 2000 to 2014. Based on these results, it is possible to assess how selected countries fulfil the Maastricht criteria of convergence and whether the results are in the line with the OCA index.

### Keywords

Monetary Union, Optimum Currency Area, Eurozone, OCA Index.

### JEL classification

E42, E52

## 1 Introduction

The creation of monetary union is not something new in the world or not in the Europe. The reasons for creation of such a union can be different - historical, economic or political. There are few monetary unions such as the United States of America, the Eastern Caribbean Currency Area or the Central African Economic and Monetary Community in the world. But these days, probably the most famous monetary union is the monetary integration within the European Union – the Eurozone, which now consists of nineteen European countries. The other nine EU member states are in the statute of candidate countries for their membership in the Eurozone. Assess, whether the country is a good candidate for membership in the monetary union, it is not as simple as it might seem at first glance. Undoubtedly, joining the monetary union brings the country certain benefits (removing of the transaction costs of exchange, removing of the exchange rate risks, or intensification of competition and pressure on production quality, etc.). But on the other hand, the membership in the monetary union also brings some disadvantages. And probably the biggest disadvantage is the loss of autonomous monetary policy – member country is losing the possibility to react to potential economic shocks. It is necessary, that these benefits outweigh the obvious disadvantages. The optimum currency area theory and its criteria are an appropriate instrument by which it is possible to assess the costs and benefits of membership in the monetary union.

The aim of this article is to evaluate an appropriateness of nine selected EU countries for their membership in the Eurozone according to the OCA index, which was created by Bayoumi and Eichengreen (1997). The OCA index is based on the optimum currency area theory and its criteria.

The remainder of the paper is organized as follows. Next section deals with the theoretical basis of this paper, methods and data are introduced in the next section. Then, results are discussed. The conclusion is offered in the final section.

## 2 Optimum Currency Area

Optimum currency area is a relatively young economic theory dating back to the 60s of the 20th century. In this period, the first landmark studies were written. These studies formed the basis of the optimum currency area theory and enable its further development. Namely it is the work of:

- Robert Mundell: *A Theory of Optimum Currency Areas* (1961);
- Ronald McKinnon: *Optimum Currency Area* (1963);
- Peter Kenen: *The Theory of Optimum Currency Areas: An Eclectic View* (1969)<sup>1</sup>.

Based on these studies, three basic criteria for the optimum currency area were established. Concretely, these criteria are: Mundell criterion of workforce mobility, McKinnon criterion of openness of the economy and Kenen criterion of the diversification of production. These three criteria are very often accompanied by the criterion of alignment of economic cycles. When examining individual criteria, however we run into a problem, because empirical testing of fulfilling the OCA criteria does not give a clear answer to the question whether the ground for adoption of the single currency is advantageous or not. It is very difficult to assess what degree of fulfilment of the criteria and what combination of their performance is satisfactory, and what is not. The optimum currency area index is trying to overcome these problems (Hedija, 2011).

### 2.1 OCA Index

The OCA index assesses the costs and benefits of adopting the single currency. This index was first used by Tamim Bayoumi and Barry Eichengreen (1997) in their article *Ever Closer to Heaven? An Optimum Currency Area Index for European Countries*. The authors wanted to develop a tool that would allow assessing on the basis of the OCA theory whether the country is suitable candidate for adopting the single currency. Hedija (2011) suggests that the OCA index is constructed as a bilateral index, which assesses the appropriateness of introducing a single currency in the two countries. It is built on the optimum currency area theory and comes to the realization that the country's adoption of the single currency is the better, the smaller the tendency has nominal exchange rate to oscillate countries. These mutual fluctuations in nominal exchange rates of the currencies in the index are examined, depending on the level of fulfilment of the four criteria of optimum currency area:

1. the alignment of business cycles;
2. the similarity of economic structure;
3. the interdependence of trade;
4. the size of the economy.

It is clear that the OCA index is based on traditional approaches of the optimum currency area theory. It was originally compiled from a sample of 21 countries<sup>2</sup> during the period 1983 – 1992 using a panel regression method. The equation of Bayoumi and Eichengreen (1997), who estimated the OCA index, is defined as follows:

$$SD(e_{ij}) = \beta_0 + \beta_1 SD(\Delta y_i - \Delta y_j) + \beta_2 DISSIM_{ij} + \beta_3 TRADE_{ij} + \beta_4 SIZE_{ij} \quad (1)$$

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<sup>1</sup> The issue of optimum currency area is also engaged in a number of other, respectively recent studies. Their authors are e.g. Bayoumi and Eichengreen (1997), Fidrmuc and Korhonen (2003), Cincibuch and Vávra (2000), Mongelli (2002), Horváth and Komárek (2002), Kučerová (2005), Mink, Jacobs and Haan (2007), Bachanová (2008), Eichengreen (2008), Skořepa (2011) or Hedija (2011).

<sup>2</sup> European Union countries that were members at the time the article was published, without Luxembourg (i.e. Belgium, Denmark, Finland, France, Ireland, Italy, Netherlands, Portugal, Austria, Greece, the United Kingdom, Spain, Sweden), followed by Norway, Switzerland, USA, Canada, Australia, New Zealand and Japan.



where  $SD(e_{ij})$  is the standard deviation of the exchange in the logarithm of bilateral exchange rate at the end of the year between countries  $i$  and  $j$ ,  $SD(\Delta y_i - \Delta y_j)$  is the standard deviation of the difference in the logarithm of a real GDP between countries  $i$  and  $j$ ,  $DISSIM_{ij}$  is the sum of the absolute differences in the shares of agricultural, mineral, and manufacturing trade in a total merchandize trade,  $TRADE_{ij}$  is the mean of the ratio of bilateral exports to domestic GDP for two countries  $i$  and  $j$ ,  $SIZE_{ij}$  is the mean of the logarithm of the two GDPs measured in U.S. dollars.

The variable  $SD(\Delta y_i - \Delta y_j)$  is the standard deviation of the difference in the logarithm of real GDP of two countries. The real GDP (in prices of year 2005) is measured in U.S. dollars. It is computed as the difference of annual real GDP for each country:

$$SD(\Delta y_i - \Delta y_j) = SD \left[ \ln \frac{RGDP_{i(t)}}{RGDP_{i(t-1)}}; \ln \frac{RGDP_{j(t)}}{RGDP_{j(t-1)}} \right] \quad (2)$$

where  $SD$  is standard deviation,  $RGDP_{i(t)}$  is real GDP of country  $i$  in time  $t$ ,  $RGDP_{i(t-1)}$  is real GDP of country  $i$  in time  $t-1$ ,  $RGDP_{j(t)}$  is real GDP of country  $j$  in time  $t$  and  $RGDP_{j(t-1)}$  is real GDP of country  $j$  in time  $t-1$ .

The variable  $DISSIM_{ij}$  is the sum of the absolute differences in the share of individual components<sup>3</sup> in total bilateral trade. It attains values from 0 to 2. The value 0 means the same structure of bilateral trade. The value 2 means that commodity structure of bilateral trade of two countries is absolutely different. In this case, lower value implies better conditions to adopt a common currency. The variable has the following specification:

$$DISSIM_{ij} = \sum_{A=1}^N \left| \frac{XA_{ij}}{X_{ij}} - \frac{XA_{ji}}{X_{ji}} \right| \quad (3)$$

where  $XA$  is the export of each economic category,  $X_{ij}$  is total export from country  $i$  to country  $j$  and  $X_{ji}$  is export from country  $j$  to country  $i$ .

The variable  $TRADE_{ij}$  is the mean of the ratio of bilateral trade (import plus export) to nominal GDP of countries  $i$  and  $j$ . This nominal GDP is measured in U.S. dollars. The variable  $TRADE_{ij}$  was computed as follows:

$$TRADE_{ij} = MEAN \left[ \frac{X_{ij}}{GDP_i}; \frac{X_{ji}}{GDP_j} \right] \quad (4)$$

where  $X_{ij}$  is nominal export from country  $i$  to country  $j$ ,  $X_{ji}$  is nominal export from country  $j$  to country  $i$ ,  $GDP_i$  is nominal GDP of country  $i$  and  $GDP_j$  is nominal GDP of country  $j$ . Higher value of this variable means better conditions to adopt a common currency because common currency is more convenient for countries which have higher level of bilateral trade.

The variable  $SIZE_{ij}$  represents the size of the economies. It is computed as the mean of the logarithm of real GDP of countries  $i$  and  $j$ . Again, the real GDP (in prices of year 2005) is measured in U.S. dollars.

<sup>3</sup> The variable  $DISSIM_{ij}$  is computed using the UN's Basic Economic Categories (BEC) classification which distinguishes economic categories into 7 parts: 1. Food and beverages; 2. Industrial supplies; 3. Fuels and lubricants; 4. Capital goods; 5. Transport equipment; 6. Consumption goods; 7. Others.

$$SIZE_{ij} = MEAN \left[ \ln RGDP_i; \ln RGDP_j \right] \quad (5)$$

where  $RGDP_i$  is the real GDP of country  $i$  and  $RGDP_j$  is the real GDP of country  $j$ .

## 2.2 Data

Data for variables  $SD(\Delta y_i - \Delta y_j)$ ,  $SIZE_{ij}$  and  $OPEN_{ij}$  is used from the World Bank Database (World Bank, 2016). Variables  $DISSIM_{ij}$  and  $TRADE_{ij}$  are calculated with the use of the data from the United Nations Commodity Trade Statistics Database (Comtrade, 2016) and the World Bank Database (World Bank, 2016). Data for variables  $SD(e_{ij})$  is used from Eurostat (Eurostat, 2016). For all calculations, an annual data from the period 2000 – 2014 are used.

## 3 Results

In this case, the OCA index is compiled from a sample of nine selected European countries during the period 1983 – 1992. These countries are: Bulgaria, Croatia, the Czech Republic, Denmark, Hungary, Poland, Romania, Sweden, and the United Kingdom. Of course, the panel regression method is used. The equations of the OCA index look like follows (standard errors of coefficient estimates are in parenthesis):

$$OCA\ index = 0,016 + 0,474\ SD(\Delta y_i - \Delta y_j) + 0,031\ DISSIM_{ij} + 0,145\ TRADE_{ij} - 0,12\ SIZE_{ij} \quad (6)$$

(0,0518)                  (0,0045)                  (0,0731)                  (0,0113)                  (0,2702)  
 $n = 126$                    $R^2 = 0,515$                    $SE = 0,022$

The equations for calculating the OCA index receives a specific form. Estimated values of coefficients  $\beta$  express the sensitivity of the index to the explanatory variable. When calculating the OCA index, both equations are used. The index is computed from annual data from the period 2000 – 2014. This selected time series are divided into two periods: pre-crisis period (2000 – 2007) and post-crisis period (2008 – 2014). Then, the OCA index for the whole period 2000 – 2014 is computed. This allows the appreciation of the OCA index over the time. The lower the OCA index is the more suitable candidate for adopting common currency the country is<sup>4</sup>. The empirical results are introduced in following Table 1.

**Table 1.** OCA Index

| Country        | 2000 – 2007 | 2008 – 2014 |
|----------------|-------------|-------------|
| Bulgaria       | 0,0476      | 0,0385      |
| Croatia        | 0,0401      | 0,0316      |
| Czech Republic | 0,0412      | 0,0429      |
| Denmark        | 0,0346      | 0,0337      |
| Hungary        | 0,0440      | 0,0428      |
| Poland         | 0,0427      | 0,0443      |
| Romania        | 0,0496      | 0,0443      |
| Sweden         | 0,0376      | 0,0394      |
| United Kingdom | 0,0327      | 0,0378      |

Source: own calculations

<sup>4</sup> Variables are computed for all nine EU countries outside the Eurozone, but there is a problem, because some data are not available for the Eurozone. So, when calculating variables  $DISSIM_{ij}$  and  $TRADE_{ij}$ , Germany is used instead of the Euro Area.

In the Table 1, there are presented results based on the mentioned equation (6). But the variable  $SIZE_{ij}$  is not included in calculations, because this variable seems to be statistically insignificant. Therefore, the OCA index is calculated in this case only by significant variables  $SD(\Delta y_i - \Delta y_j)$ ,  $DISSIM_{ij}$  and  $TRADE_{ij}$ . The best values are observed in Croatia and Denmark. Conversely, the worst values of the OCA index are in Poland and Romania. It should be also noted that since 2008 the OCA index has significantly improved in Bulgaria, Croatia and also Romania. On the other hand, since 2008 the OCA index has got worse in the Czech Republic, Hungary, Poland, Sweden and the United Kingdom.

The assessment of the appropriateness of adopting a common currency using the OCA index is not entirely clear or straight forward. And although the OCA index can be used as a convenient additional instrument by which it is possible to determine the appropriateness of countries for the membership in the Eurozone, the candidate countries must fulfil the convergence criteria if they want to adopt the European Union's single currency. These five criteria are set out in the Treaty of Maastricht (European Union, 2016):

- **HICP inflation (12-months average of yearly rates):** Inflation rate shall not exceed the HICP reference value, which is calculated by the end of the last month with available data as the unweighted arithmetic average of the similar HICP inflation rates in three EU member countries with the lowest HICP inflation plus 1,5 percentage points (note: EU member states with a HICP rate significantly below the Eurozone average do not qualify as a benchmark country for the reference value and will be ignored, if it can be established its price developments have been strongly affected by exceptional factors).
- **Government deficit:** The ratio of the annual general government deficit relative to gross domestic product (GDP) must not exceed 3 % at the end of the preceding fiscal year. If not, it is at least required to reach a level close to 3 %.
- **Government debt:** The ratio of gross government debt to GDP must not exceed 60 % at the end of the preceding fiscal year. Or if the debt-to-GDP ratio exceeds the 60 % limit, the ratio shall at least be found to have “sufficiently diminished and must be approaching the reference value at a satisfactory pace”.
- **Exchange rate:** Applicant countries should have joined the exchange-rate mechanism (ERM II) under the European Monetary System (EMS) for two consecutive years and should not have devalued its currency during the period.
- **Long-term interest rates:** The nominal long-term interest rate shall be no more than 2.0 percentage points higher than the unweighted arithmetic average of the similar 10-year government bond yields in three EU member states with the lowest HICP inflation.

The European Commission every year examines the progress with convergence in applicant countries with derogation in edited Convergence Reports. The last Convergence Report 2016 (European Central Bank, 2016) examine whether applicant states satisfy conditions for adopting the single currency. Results are presented in following Table 2.

**Table 2.** Fulfilment of Convergence Criteria

|                 | Inflation rate | Government deficit | Government debt | ERM II       | Long-term interest rate |
|-----------------|----------------|--------------------|-----------------|--------------|-------------------------|
| Reference value | Max. 0,7 %     | Max. 3 % GDP       | Max. 60 % GDP   | Min. 2 years | Max. 4 %                |
| Bulgaria        | - 1,0 %        | 2,1 %              | 26,7 %          | No           | 2,5 %                   |
| Croatia         | - 0,4 %        | 3,2 %              | 86,7 %          | No           | 3,7 %                   |
| Czech Republic  | 0,4 %          | 0,4 %              | 41,1 %          | No           | 0,6 %                   |
| Denmark         | 0,2 %          | 2,1 %              | 40,2 %          | Yes          | 0,8 %                   |
| Hungary         | 0,4 %          | 2,0 %              | 75,3 %          | No           | 3,4 %                   |
| Poland          | - 0,5 %        | 2,6 %              | 51,3 %          | No           | 2,9 %                   |
| Romania         | - 1,3 %        | 0,7 %              | 38,4 %          | No           | 3,6 %                   |
| Sweden          | 0,9 %          | 0,0 %              | 43,4 %          | No           | 0,8 %                   |
| United Kingdom  | 0,1 %          | 4,4 %              | 89,2 %          | No           | 1,8 %                   |

Source: Convergence Report, European Central Bank (2016)

Only Denmark fulfils all five criteria (note: the Convergence Report concludes that none of these countries examined fulfils all conditions for adopting the euro at this stage because of bad compatibility of legislation). Satisfactory values are reached also in the case of Bulgaria, the Czech Republic, Poland and Romania. The only problem is that these countries have not joined the ERM II yet. Hungary has additionally problems with high government debt and Sweden with inflation. Finally, the worst evaluation was found out in Croatia and then of course in the United Kingdom<sup>5</sup>. Both countries have problems with high government deficit and high government debt.

Compared with the results of the OCA index, there may be some differences. The biggest differences are in the case of the Czech Republic, Croatia, Poland and Romania. The Czech Republic, Poland and Romania fulfil four of the five convergence criteria, but according to the OCA index these countries obtain the worst values. Conversely, Croatia fulfils only two of the five convergence criteria, but according to the OCA index it reached the best values. Only in the case of Denmark, the results of the OCA index responds to the convergence criteria.

#### 4 Conclusion

Probably the most famous monetary union is the Eurozone, which now consists of nineteen European countries. Nine EU member states are in the statute of candidate countries. The aim of this article was to assess an appropriateness of selected EU countries standing out of the Eurozone for their membership in this monetary union according to the Maastricht criteria and the OCA index.

The research was based on traditional approaches of the optimum currency area theory. It was used the methodology of Bayoumi and Eichengreen (1997) who estimated the OCA index. The OCA index was computed for the period 2000 – 2014.

The best values of OCA index were observed in Croatia and Denmark. Conversely, the worst values of the OCA index were in Romania and Poland. Note that after the crisis, the OCA index had significantly improved in Bulgaria, Croatia and Romania. On the other hand, it has got worse in the Czech Republic, Hungary, Poland, Sweden and the United Kingdom since 2008. According to these results it may be concluded that there were some countries, which were more appropriate for the

<sup>5</sup> These results correspond to the negative attitude of Britain towards the monetary integration and the integration process, as well as the validity of the opt-out clause or the UK's decision to leave the European Union.

membership in the Eurozone. Applicant countries can be divided into three groups. First group, the main candidates for the membership in the Eurozone, consists of Denmark and Croatia. These countries reach satisfactory degree of convergence. Second group consists of the Czech Republic, Bulgaria, Sweden, Hungary and the United Kingdom. These countries gradually converge to the Eurozone. And finally, the third group of countries, which has a small degree of convergence, includes Romania and Poland.

But the OCA index can be used only as a convenient additional instrument by which it is possible to determine the appropriateness of countries for the membership in the Eurozone. If the country wants to adopt the European Union's single currency, it must fulfil all the Maastricht criteria. The European Commission every year examines whether applicant states satisfy conditions for adopting the euro. Only Denmark fulfilled all five criteria, but according to the Convergence Report there were problems with bad compatibility of legislation. Satisfactory results were reached also in the case of Bulgaria, the Czech Republic, Poland and Romania. The only problem is that these countries have not joined the ERM II yet. Other countries obtained worse results. Hungary had additionally problems with high government debt and Sweden with inflation. Finally, the worst evaluation was found out in Croatia and then in the United Kingdom. Both countries had problems with high government deficit and high government debt.

Compared with the results of the OCA index, some significant differences were found out. The biggest differences were in the case of the Czech Republic, Croatia, Poland and Romania. The Czech Republic, Poland and Romania fulfilled four of the five convergence criteria, but according to the OCA index these countries obtained the worst values. Conversely, Croatia fulfilled only two of the five convergence criteria, but according to the OCA index it reached the best values. It is necessary to say, that Denmark reaches the best results in both cases. So, only in the case of Denmark, the results of the OCA index respond to the convergence criteria.

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## EUROPE 2020 INDICATOR: RESEARCH AND DEVELOPMENT IN CZECH MANUFACTURING

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### Abstract

Czech R&D spending is low by Europe 2020 strategy. To stimulate business R&D, in 2005 the Czech government introduced R&D Tax Deductible and in 2014 Research and Innovation Strategy for Smart Specialisation. The present paper studies the relationship between R&D Expenditure and firm Gross Added Value. The aim of this paper is to analyse the significance of R&D intensity in different time periods and eleven branches. The research sample is comprised of 976 private domestic enterprises and foreign affiliates in manufacturing. The data was obtained from the Amadeus Bureau Van Dijk Electronic Publishing database and the Czech Statistical Office Database in the period 2007 to 2014. The authors find that R&D intensity in selected manufacturing branches have, on average, a positive effect to growth Europe 2020 indicator - R&D intensity of the Czech Republic.

### Keywords

Research, Development, Trend, Manufacturing, Innovation Policy.

### JEL classification

C22, F43, O30, O52

## 1 Introduction

The subject of this study is the relationship between Research and Development (R&D) expenditure and growth of Gross Added Value (GVA) in selected branches of Czech manufacturing. R&D and Innovation is currently becoming an entrepreneurial phenomenon. The ratio of Gross Domestic Expenditure on R&D (GERD) to Gross Domestic Product (GDP), one of five key Europe 2020 strategy indicators, is also known as R&D intensity. The European Commission has set an R&D intensity objective at 3% of GDP, one-thirds of which should be financed by the public sector, two-thirds by the private sector. The Czech government didn't accede to this objective. In 2007, the Czech's R&D intensity is defined at 1.71% of GDP (EA-19 1.81%), financed 54% by the private sector (source: CZSO). Thus the public sector investment aim (1.42%, versus 1%) has been achieved but, the private sector contribution is lagging. In 2014, is R&D intensity defined at 2.00% (EA-19 2.12%), public sector financed 49.2% (1.47%, vs. 1%). Among the new EU member states, the Czech Republic, after Poland, was the second country in terms of the amount that private sector to invest in R&D in 2014. Still, however, it was significantly lower amount than in 2014 to invest in R&D population comparable to western and northern EU states. (European Commission, 2016) The reason for these European indicators' objective and public R&D support for private enterprises is the common belief that specificity of R&D generates numerous market failures leading to a private R&D under-investment and suboptimal equilibrium on the market. The R&D government support in the Czech Republic is in particular constitutes a subsidy programs of the Ministry of Industry and Trade (MIT), the EU Structural Funds and R&D Tax Incentives. R&D Tax Deduction increased growth in popularity partly tax incentives in manufacturing. (Bočková and Meluzín, 2012)

Despite the growing importance of the Czech private sector is its share of the total expenditure on R&D (56%) still lower than the EU28 mean (64%). Conversely, shares of the two other major sectors of performance (public and university), the total expenditure on R&D in the Czech Republic are above the EU28 mean. (CZSO, 2016)

Among foreign-controlled corporations and domestic private companies there are significant differences in the way funding for their R&D activities. While foreign-controlled enterprises financed their R&D expenditure in 2014 of more than 95% from private sources (domestic and foreign), domestic private enterprises use to finance R&D activities at a much greater degree of public sources. Inconsiderable amount contributes to corporate research state in 2014; enterprises have come through direct aid to 4.8 billion CZK. Direct government R&D support in 2014 benefited a total of 1,106 enterprises, i.e. 47% of those who carried out R&D. Empirical evidence seem to show, during the period 2007-2014, a negative association between public and private R&D expenditure. Czech public sector expenditures were declining and funding of public foreign sources was growing. In 2014 there was a change of trend. (CZSO, 2016)

The main objective of this paper is to investigate more comprehensively the global effects of R&D Intensity dependence of R&D Expenditure in manufacturing industry. We provide new empirical evidence based on data for 11 leadership's branches of manufacturing for the period 2007–2014. The research sample is comprised of 976 private domestic enterprises and foreign affiliates in manufacturing. We collect data on GVA from MTI and CZSO for the period 2007 – 2014. We used the software STATISTICA 12 for forecast of the Gross Added Value and R&D Intensity in selected branches of manufacturing industry for fiscal years 2015 and 2016. This study discusses these interesting topics by focusing on the Europa Strategy 2020 objectives.

## 2 Literature review

The most important source of financial support for R&D activities in the Czech Republic in 2007 as in previous years was the private sector (private funding). Its share of R&D funding in the Czech Republic reached 54.0%. (CZSO, 2008) The share of private sector R&D financing activities declined in 2007-2014. In 2014 grew to 50.8%, but the value of 2007 didn't reached. (CZSO, 2016)

Various sources of The Global Competitiveness Index literature have, either explicitly or implicitly, identified a relationship between the level of firm specific technological knowledge and the ability of firms to ensure the inimitability of such knowledge in order to sustain competitive advantage. (Radenkovic, Devedzic, Jovanovic, 2014)

First, the essential terms “R&D expenditure” and “R&D Intensity” have to be defined, as well as their properties and dimensions. The R&D expenditures (Chan et al. 1990; Woolridge and Snow, 1990; Doukas and Switzer, 1992) are one of possibility to measured innovation in empirical studies. R&D, while it is typically well codified, is a measure of input to the innovation process rather than output. Also data on R&D expenditures have several disadvantages. First, companies, in particular small companies may generate technological advances outside formal R&D laboratories which R&D expenditures may not capture (OECD, 2009). Second there is evidence that small-scale and often informal R&D tends to be undercounted in R&D surveys and that the quantity of R&D measured in small companies may be quite sensitive to questionnaire design (Kleinknecht et al., 1991). Third, R&D covers a wide variety of activities, ranging from – far from the market – basic research, via applied research up to development. Fourth, companies can use their innovative resources with varying degrees of efficiency (Brouwer and Kleinknecht, 1996) Efficient usage of R&D expenditures can only be achieved by reducing the failure rate.

R&D intensity for a country is defined as the R&D Expenditure as a percentage of (GDP) (European Commission, 2016). R&D, defined as a firm's R&D investments as a proportion of its total sales, is the major tool by which enterprises design firm specific technological knowledge as it portays the investment share directed towards the creation and absorption of technological knowledge (Almor et al., 2004).

Based on The European System of National and Regional Accounts (ESA 2010) and System of National Accounts 2008 - 2008 SNA the European Commission defines R&D intensity as the ratio



of a firm's R&D investment to its revenue (the percentage of revenue that is reinvested in R&D). The sum of GVA at basic prices over all industries plus taxes on products minus subsidies on products gives gross domestic product. GVA of the total economy usually accounts for more than 90 % of GDP. As an aggregate measure of production, GDP is equal to the sum of the gross value added of all resident institutional units (i.e. industries) engaged in production, plus any taxes, and minus any subsidies, on products not included in the value of their outputs. GVA is the difference between output and intermediate consumption (European Commission, 2016).

Therefore, definition of R&D intensity proceeds from the European Commission in this paper. We use R&D Expenditure and Gross Added Value in each selected manufacturing branches.

Guzzini and Iacobucci, 2014 developed a model to demonstrate that the higher propensity of affiliated firms to invest in R&D may rely simply on the incentives provided by ownership shares in controlled firms and may not require the presence of cooperative behaviour by member firms as claimed in the literature on business groups. Brautzsch et al., 2015 used a technique that was more in line with the nature of R&D, namely that it was an investment which already generates economic effects (added value, outcome, employment). The stabilizing short-term effects derived from R&D activities. In addition, R&D activities imply long-term effects i.e. an important contribution to growth as well as to national and international competitiveness of the enterprises.

During the economic crisis (2008 – 2009) only a few enterprises were able to increase their R&D Expenditure. The majority had to reduce their R&D funding considerably (Archibugi and Filippetti, 2011; Archibugi et al., 2013). A shortfall or disruption of R&D projects would have had negative consequences during the time of crisis and beyond. A survey among beneficiaries of the R&D program ZIM found that without public funding, the vast majority of firms would have been forced to cancel or postpone their R&D projects or to downsize them as a result of the crisis (Kulicke et al., 2010).

## 2.1 Subject of analysis

In the case of the Czech R&D program initiated the government has stimulated R&D in a wide variety of industries, especially Tax Deductible in 2005. More R&D subsidies were initiated in reaction to the economic crisis. The Czech Statistical Office (CZSO) evaluates the questionnaire VTR - 5-01, on which we focus in our study offers funding R&D private sectors with all innovative enterprises. There are including enterprises conducting R&D, regardless of whether it is their main or secondary activity.

The choice is related to the manufacturing in the Czech Republic due to the fact that manufacturing is considering the most significant industry for the development of Czech economics since it is the largest sector of the Czech economy.

According to CZSO and its survey in 2014, the Czech Republic, like in most other EU countries dominate R&D enterprises in the long term enterprises with principal activities in the manufacturing industry. In 2014, these enterprises if expenses are conducted R&D accounted for 56% of the total expenditure of the private sector and in enterprises under foreign-controlled, it was even two-thirds.

If in our country within the manufacturing industry goes most of the money on R&D in enterprises with principal activities in the automotive and mechanical engineering (medium high-tech industries), in advanced countries, the EU has often played prim called High-tech industries such as pharmaceutical, electrical or aviation industry (CZSO, 2016).

The period taken into consideration is from 2007 to 2014 so as to examine the effect of the crisis on R&D intensity in Czech manufacturing. The examined business are named in the text as enterprises in accordance with § 210 - 302 of The New Civil Code, in force since 2014.

**Table 1.** Distribution of companies by industry branch

| NACE         |                                                                          | 2007          |                          | 2014          |                          |
|--------------|--------------------------------------------------------------------------|---------------|--------------------------|---------------|--------------------------|
|              |                                                                          | Frequen<br>cy | Part of<br>sample<br>[%] | Frequen<br>cy | Part of<br>sample<br>[%] |
| <b>10</b>    | Manufacture of food products                                             | 45            | 6.00                     | 63            | 6.45                     |
| <b>19</b>    | Manufacture of coke and refined petroleum products                       | 1             | 0.01                     | 1             | 0.01                     |
| <b>20</b>    | Manufacture of chemicals, chemical products                              | 83            | 11.14                    | 88            | 9.01                     |
| <b>21</b>    | Manufacture of basic pharmaceutical products                             | 20            | 2.82                     | 28            | 2.87                     |
| <b>22</b>    | Manufacture of rubber and plastic products                               | 42            | 5.84                     | 79            | 8.09                     |
| <b>25</b>    | Manufacture of fabricated metal products, except machinery and equipment | 92            | 12.27                    | 133           | 13.62                    |
| <b>26</b>    | Manufacture of computer, electronic and optical products                 | 85            | 11.41                    | 95            | 9.73                     |
| <b>27</b>    | Manufacture of electrical equipment                                      | 96            | 12.8                     | 124           | 12.70                    |
| <b>28</b>    | Manufacture of machinery and equipment                                   | 185           | 24.83                    | 247           | 25.30                    |
| <b>29</b>    | Manufacture of motor vehicles, trailers and semi-trailers                | 65            | 8.72                     | 72            | 7.37                     |
| <b>30</b>    | Manufacture of other transport equipment                                 | 31            | 4.16                     | 46            | 4.71                     |
| <b>Total</b> |                                                                          | <b>745</b>    | <b>100</b>               | <b>976</b>    | <b>100</b>               |

Source: Author's calculation, CZSO.

Table 1 depicts the proportion of innovative enterprises in selected branches at the beginning of the period studied. This means the total number of enterprises not divided by size or type of ownership.<sup>1</sup> In 2007, 745 enterprises invested in research and development. The largest number of enterprises was seen in the engineering and electrical industries. By 2014, the number of innovative enterprises had risen to 976, while the proportion of individual branches had remained practically unchanged.

One enterprise remained in CZ NACE 19. A growth in the number of innovative enterprises of 5.7% and 28.6% was seen in the chemical and pharmaceutical industries. The most pronounced growth was seen in the rubber industry, in which an 88% increase in innovative enterprises was seen.

## 2.2 Methodology

The aim of the paper was to determine the share of the most important sectors in the manufacturing industry in the R&D intensity of the Czech economy and to predict using the least squares method whether the selected branches or the manufacturing industry as a whole will achieve the goals set out in the Europe 2020 strategy by the year 2020. Secondary data were incorporated into two datasets, with the first containing data on total R&D expenditure and the second containing the enterprises' own expenditure not including government support. The Czech Statistical Office obtains information about funding sources for R&D expenditure from R&D active enterprises. There were 1764 R&D active enterprises in private sector in 2007. The number grew to 2391 enterprises in 2014. This number includes enterprise regardless of their size and sector of competence. We selected enterprises from the most R&D active manufacturing branch. (see Tab. 1) The period studied was divided into the periods before and after the economic crisis. We propose the following hypotheses: 1) The level of enterprises R&D intensity is increasing with the growth of GVA; 2) Czech manufacturing enterprises fulfil the objective of “2020 European Strategy” - 2% R&D expenditure to GDP (GVA). Our dependent variable is R&D intensity: measured as the ratio of R&D expense to GVA.

<sup>1</sup> i.e. domestic enterprises and enterprises under foreign control

We quantified the R&D intensity and annual change of GVA in each manufacture branch before and after the economic crises. For testing the statistical hypothesis and forecast of R&D intensity and Gross Value Added we used statistical software Statistica 12.

### 3 Results

The Czech Republic Research and Development Results published by the CZSO indicate that corporate expenditure in the manufacturing industry is on the increase. The private sector has made the greatest contribution to the growth in research and development expenditure in the last two years. In 2014, a total of 47.6 billion CZK was expended on R&D in this sector, i.e. more than half of all expenditure on R&D in the Czech Republic. This growth was largely the result of means being drawn from the Operational Programme Research and Development for Innovation which reached a climax. The greatest growth in total expenditure in relation to GAV in the period 2007–2009 was seen in the electronics industry, followed by the pharmaceutical industry.

Development of business enterprise R&D expenditure and the development of the total R&D expenditure is depicted in the Figure 1.

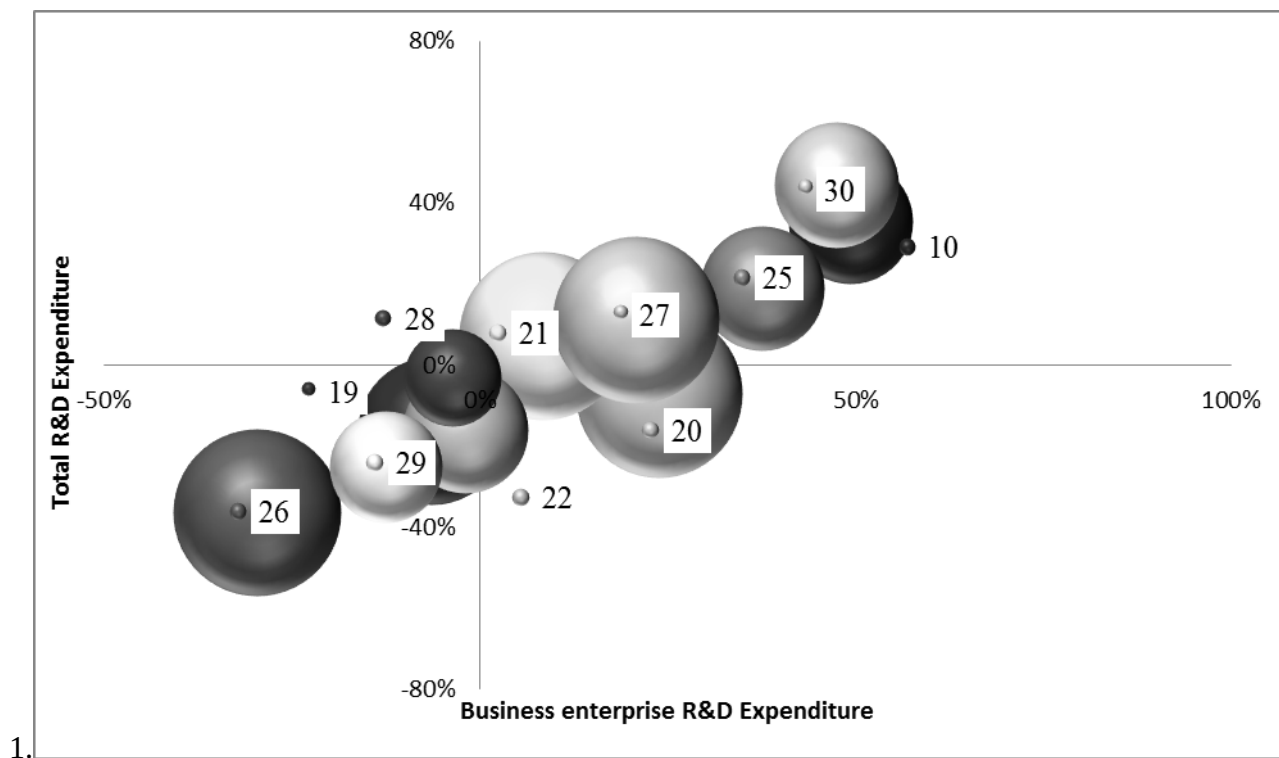


**Fig. 1.**Development of R&D Expenditures before the crisis (Source: Author’s calculation; CZSO)

Business enterprise R&D expenditure was different before and after the crisis. The growing total and business enterprise R&D expenditure before the crisis were seen in the pharmaceutical industry, metalworking, manufacture of food products and manufacture of motor vehicles, trailers and semi-trailers. Manufacture of motor vehicles, trailers and semi-trailers grew the most. Of the total R & D expenditure and business fell in the automotive, electronic, coke-making and rubber manufacturing industry. Business enterprise R&D expenditure and the total R&D expenditure have not changed in the Manufacture of machinery and equipment n.e.c. GVA has not changed during the reference period for Manufacture of rubber and plastic products. Manufacture of coke oven products grew by 31.7% and Manufacture of food products grew by 4.7%. Business enterprise R&D expenditure grew directly

proportionally with GVA only in the manufacture of food products. Enterprises in the manufacture of machinery and equipment n.e.c. increased their R&D investment by 27.7%, despite a decline GVA of 20.5%. The total R&D expenditure increased by 47.4% in the NACE 30. Significant government support for R&D expenditure was in the manufacture of fabricated metal products, except machinery and equipment. GVA decreased by 11.5%, but business enterprise R&D expenditure grew by 19%, with the government's support by 37.6%. In the electronics industry R&D expenditures have decreased the most. The decline in business enterprise R&D expenditure was 36.3%, total R&D investment decreased by 29.7%.

The situation was different in the period 2009-2014. In seven sectors, enterprises increased their R&D expenditure. This was in NACE 20, 22, 25, 26, 27, 28 and 30. Business enterprise R&D spending grew more than total R&D spending. R&D expenditure increase in the automotive industry too. The total R&D expenditure followed the trend of business enterprise R&D expenditure. Electrical industry invests in R&D daringly. GVA growth was gradual, but enterprises have increased their investment in R&D by 238%. Negative trend of development of R&D intensity is seen in Manufacture of coke and refined petroleum products. GVA grew, but R&D spending declined by 24% and 33%. (see Fig.2)

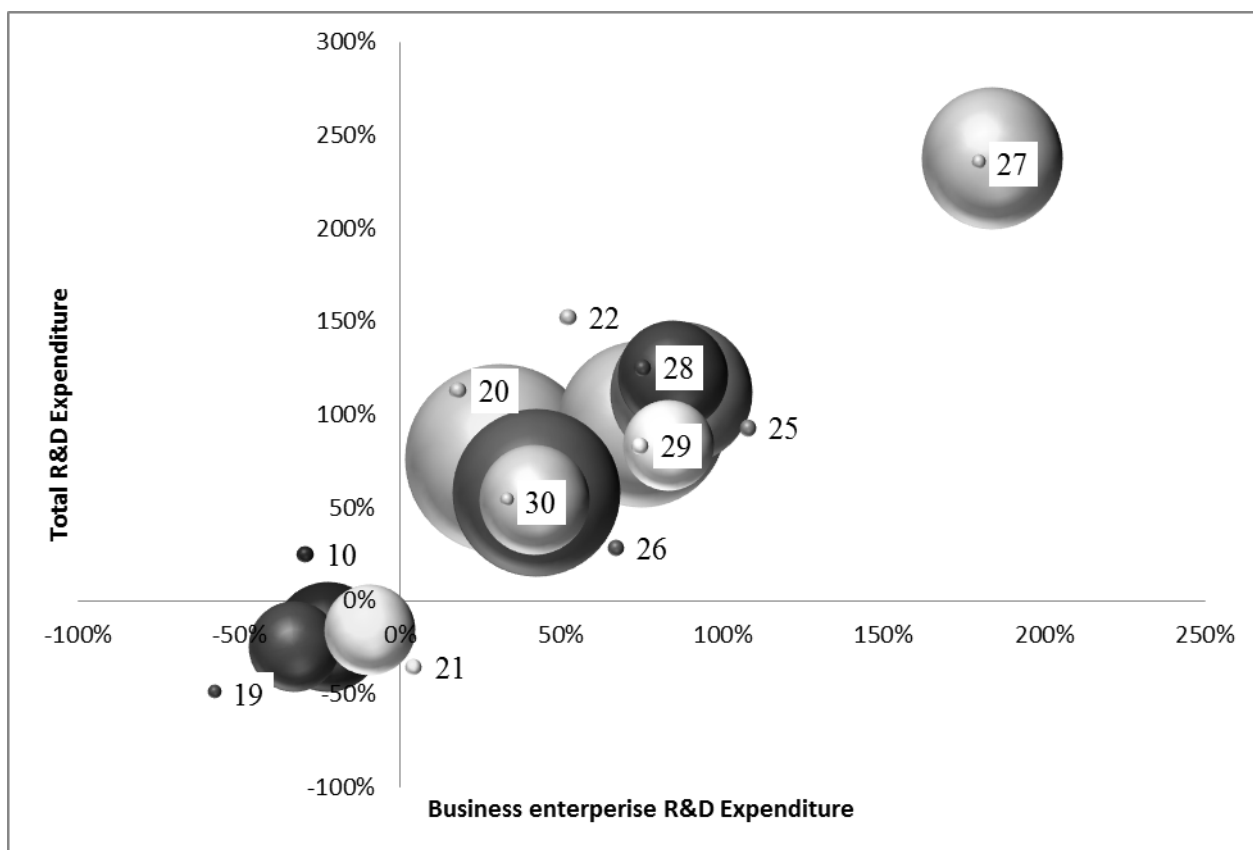


**Fig. 2.** Development of R&D Expenditure after the economic crisis (Source: Author's calculation; CZSO)

The observed sectors differed in R&D intensity in the monitored period. Data of R&D intensity is not available for 2015. For known values for the period 2007-2014 calculation range forecasts (prediction interval) was created by software Statistica 12 for the years 2015 and 2016. (see Table 2)

**Table 2.** Development of business R&D intensity and prediction to 2015 – 2016

| NACE | 2007 | 2009 | 2014 | 2015* | 2016* |
|------|------|------|------|-------|-------|
| 10   | 0,36 | 0,43 | 0,34 | 0,38  | 0,38  |
| 19   | 0,18 | 0,54 | 0,11 | 0,09  | 0,16  |
| 20   | 2,14 | 2,65 | 2,95 | 2,96  | 3,35  |
| 21   | 7,15 | 7,53 | 5,82 | 5,07  | 4,80  |
| 22   | 1,00 | 0,77 | 1,25 | 1,03  | 1,12  |
| 25   | 0,42 | 0,56 | 0,88 | 0,88  | 1,01  |
| 26   | 3,26 | 2,47 | 2,71 | 1,73  | 1,71  |
| 27   | 1,30 | 1,63 | 3,55 | 3,05  | 3,51  |
| 28   | 2,08 | 2,27 | 3,93 | 4,17  | 4,87  |
| 29   | 2,75 | 2,30 | 2,87 | 2,51  | 2,66  |
| 30   | 5,98 | 6,96 | 8,01 | 8,96  | 8,74  |

(Source: Author's calculation; CZSO)

#### 4 Discussion

Financial means in corporate R&D are highly concentrated in the Czech Republic in spite of the relatively large number of R&D units (2,400). If we divide the above total expenditure on R&D in the private sector of 47.6 billion CZK into expenditure by individual corporate entities, a quarter (25%) of expenditure came from the budgets of just ten enterprises. The volume of their expenditure was matched by the means expended by the 90% of R&D units with the lowest expenditure. A half (48%) of all R&D expenditure in the private sector in the Czech Republic further corresponded to the investments of the fifty leading corporate entities.

#### 5 Conclusion

This paper analyses the R&D Expenditure and firm Gross Added Value. Czech Republic ranks among ‘innovation’-driven economies, where companies compete by producing and delivering new and different products and services by using the most sophisticated processes.

R&D Investment in the private sector in the Czech Republic is at a relatively high level within the EU. In the studied period of 2007 – 2014, R&D expenditures by enterprises meet the target set by the “2020 European Strategy” for the private sector. R&D activities imply long-term effects an important contribution to growth as well as to the national and international competitiveness of the enterprises.

During the economic crisis of 2008 – 2009 a few firms were able to increase their R&D expenditure; the majority had to reduce their R&D budgets considerably (Archibugi and Filippetti, 2011; Archibugi et al. 2013). Businesses in the food and other industries have increased their R & D spending the most in the period before the economic crisis. Enterprise R&D intensity declined in the period after the economic crisis. The R&D intensity grew after the economic crisis in the manufacture of fabricated metal products, except machinery and the manufacture of electrical equipment. Our result raises the question of the macroeconomic effect in the case of an alternative use of public money. Fiscal policy measures used during the economic crisis covered a variety of applications. The R&D Tax Deductible program which can be added to investments in manufacturing was only one type of support.

The hypothesis “The level of enterprises R&D intensity is increasing with the growth of GVA” failed to confirm for all sectors. The hypothesis is valid for the manufacturing industry as a whole.

Czech manufacturing achieved the R&D Investment objective for the “2020 European Strategy” in 2013. Our second hypothesis was confirmed. The processing industry is only one part of the private sector for R&D Investment. Therefore, it is possible to own R&D expenditures in this sector increase.

Fiscal policy and R&D support programs outside the manufacturing industry stimulates other sectors for R&D spending.

Future research of the R&D intensity could consider the impact of R&D expenditure to ownership shares and the size of the controlled companies. Or how soon could Czech Republic close the R&D gaps against developed EU countries (Sweden, Denmark).

## 6 Acknowledgement

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## THE AGEING AND ECONOMIC PERFORMANCE IN OECD COUNTRIES

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### Abstract

The changes in age distribution of society should affect economic performance in many countries. There are three main channels through which population ageing might influence long term economic growth: the size of the workforce, amount of savings and labour productivity. The pessimists argue that ageing leads to decline of both savings and firm's investment, slower capital accumulation and lower productivity. The optimistic view refers to changes of individual saving schemes and longer working life. The purpose of the paper is to evaluate the effects of ageing on economic performance. We analyse how the ongoing changes in age structure of population can affect selected determinants of the long term economic growth in OECD countries. On the basis of short literature review we try to describe theoretical relationship between the ageing and long term economic growth. The quantitative analysis could help to verify the importance of the ageing for prosperity. In general, the effects of demographic changes on economic output are ambiguous. Population ageing can harm accumulation of physical capital but the effect on productivity is doubtful. Thus, the adverse effects resulting from national accounting might be compensated by productivity increase.

### Keywords

The ageing, long term economic growth, labour supply, savings, investment, productivity

### JEL classification

J11, J21, J24, O15, O16

## 1 Introduction

Many industrial countries have been facing the transformation of the age distribution of society. The changes in size of working population, savings schemes and productivity growth are three main channels through which population aging affects the growth of national economy. Pessimists suggest that the aging can harm economic growth because of lower savings of the elderly. It should lead to decline in firm's investment, capital accumulation and labour productivity. They also worry about the decrease of innovations, financial market instability or increase of public expenditures. The others argue that the aging can actually stimulate economic growth because people will adjust by saving more and working longer.

The increase of relative number of the elderly and slower growth of population and workforce are results of both higher life expectancy and lower fertility. The ongoing decline in mortality of all age cohorts influences the support ratio. This measure is expected to decrease but if the elderly decide to stay longer at work, the ratio of working age population to the total population might also raise. The second cause of population aging is the fact that families have less children. While the increase of fertility rate (and labour force) likely enhanced economic growth after the Second World War, the opposite should occur in the future. The old dependency ratio, i.e. the ratio of old people to those of working age, will increase as young age cohort is diminishing. The changes of these two variables indicate the effects of ageing on workforce and thus likely on economic output.

It seems that the ageing of population couldn't have entirely negative effects on economic prosperity. How does the aging influence economic growth in the long run, it depends on relative changes in labour supply, physical and human capital and technological efficiency (Gómez and de Cos, 2008). The goal of the paper is to identify the effects of the ageing on economy. Firstly, we shortly describe how the demographic changes can affect the economic output. Secondly, we briefly focus on the development of main indicators of population ageing. The analysis of relationship between population ageing and labor supply, savings, investment and productivity is subject of following chapters. The extent to which selected variables develop together is examined next. We will also try to evaluate the importance of ageing for economic prosperity.



## 2 Data and methodology

The ageing of society is often seen as a burden for economic growth in the long run. We will try to identify the relationship between the related demographic variables and selected determinants of long term economic growth. The choice of variables is based on growth theory that is briefly mentioned in the article. The main demographic measures are fertility rate (defined as the number of children per women), live expectancy at 65 (expressed as average number of years that person at that age can expect to live) and population growth. The effects of ageing on labor force are measured by simple support ratio (expressed as the share of population aged 15 to 64 (working age population) to total population) and old dependency ratio (defined as the ratio of people older than 65 to the working age population). The retirement age is expressed as average effective age of retirement (calculated by OECD as a weighted average of withdrawals from the labor market at different ages over a 5-year period for workers initially aged 40 and over). (The analysis includes only average effective age of retirement of men.) Economic variables are savings (expressed as a ratio of national savings to GDP), gross fixed capital formation and total factor productivity growth (both measured as annual change). The enrolment ratio (measured as total enrollment in tertiary education as a percentage of the total population of the five-year age group following on from secondary school leaving) represents human capital variable. In the analysis all measures are used as an average annual growth rates that are calculated as geometric average. The data covers 27 OECD countries over the period 1995 to 2013 and comes from statistics published by OECD, World Bank, IMF, UN and Conference Board. The sample of countries includes 21 European countries (19 EU member countries), 4 Western Offshoots countries and 2 Asian countries.<sup>1</sup>

On the basis of descriptive statistics we try to evaluate how the population ageing should affect economic growth. First, we shortly describe the development of measures of demographic changes. Secondly, we use simple linear regression to identify possible relationship between ageing and long term economic growth. It isn't perfect method to analyse the effects of ageing on economic performance but it can reveal potential dependencies. In other words, simple linear regression might help to imply the importance of population ageing for economic prosperity. Thirdly, we calculate correlation matrix to verify the results of simple linear regression. This inverted technique allows us to assess the theoretical assumptions and then highlight other possible connections between population ageing and economic performance.

## 3 The population ageing and long term economic growth

Neoclassical theory claims that aggregate output is determined by the size of labour force, the amount of disposable capital and used technology. Thus, the population ageing can influence national economy through changes in working population, savings and productivity. If the industrial countries experience diminishing labour force and raising number of retired persons then the long term economic growth might be slower. Under these circumstances the economic output depends on relatively smaller ratio of aged workers. (On the contrary, larger share of working age population can contribute to successful economic development.) However, not only labour supply but also savings are usually higher in working population compared to the elderly (Bloom, Canning and Fink, 2008 and Bloom and Sousa-Poza, 2013).

Theoretically, there should be statistically significant relationship between demographic variables and aggregate savings. Life span hypothesis suggests that people tend to smooth consumption over the life cycle. The younger cohorts usually borrow money to finance spending and its average propensity to consume is higher. The elderly are expected to behave similar way. They deaccumulate

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<sup>1</sup> These countries are Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, South Korea, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Sweden, Switzerland, the United Kingdom and USA.

savings to raise money for consumption or save less than during working life. Thus, the working people are the main savers in the economy. They have usually higher earnings and both lower propensity to consume and higher propensity to save. Feldstein (2006) implies that the faster the growth of population is the higher saving should be. It can explain why population ageing and slower population growth can decrease the share of income that is saved. Afterwards, smaller amount of national savings might also lead to decline of firm's investment that slows down the rate of implementation of new technology and harms the productivity growth.

Similarly, Carone et al. (2005) argue that the ageing affects real economy directly through labour supply and productivity. The main determinants of productivity are quality of workforce, capital intensity and total factor productivity. The labour quality depends on the quality of human capital and age structure of the workforce. It is worth to keep in mind that individual age cohorts have different stock of human capital and their productivity varies over the life cycle. The capital to labour ratio is influenced by saving rate and marginal return of capital. And total factor productivity largely reflects technological progress and rate of innovation. Carone et al. (2005) also emphasize that total factor productivity is rooted in labour inputs.

In general, ongoing demographic changes might influence investment to human capital because longer longevity makes people more valuable assets (Bloom et al., 2001). Thus, the population ageing should be associated with increasing accumulation of human capital. Bloom and Sousa-Poza (2013) suggest that lower fertility rate usually means healthier, clever and better educated children because parents devote sources to smaller number of descendants. As health, knowledge and education are transformed into higher productivity, lower fertility rate can stimulate economic growth. (It should be one of explanation of the negative relationship that is identified in Fig. 1.)

According to Gómez and de Cos (2008) both the education and learning by doing affect the quality of human capital and hence the productivity of the economy. Because the balance between formal education and experience is usually reached when individuals are between 35 and 54 years old, the economy with the larger share of prime age workers could be more productive. Therefore, labor productivity is influenced not only by the quality of human capital but also by the age structure of society. Feldstein (2006) further suggests that every generation of new workers acquires better education and skills. And if the younger cohorts obtain new skills more easily than the elderly then population ageing tends to decrease productivity.

The endogenous growth models offer additional channels through which the demographic changes might affect economic performance. For example Prettnner and Prskawetz (2010) mention the amount of scientists that determinates the rate of technological progress, changes in demand for innovative goods as well as the changes in human capital and thus labour productivity. Prettnner (2013) also emphasizes technological progress as a key determinant of long term economic growth. If the population ageing can influence the incentives in research and development then the product per capita can be changed either. Finally, Prettnner and Prskawetz (2010) point to the endogenous models with human capital. The positive relationship between educational productivity and income per capita is the outcome of these models. In this case society can compensate negative effects of ageing by investment to education (and human capital).

#### **4 The demographic changes, labour force and economic growth**

The demographic transition leads to changes in size and age structure of population and workforce. In selected OECD countries the average annual population growth was between the year 1995 and 2013 only 0,49%. The exceptions are Australia, Ireland and New Zealand where the annual growth exceeded 1%. Other relatively rapidly growing societies in the Europe were Spain (0,9%), Norway (0,8%) or Switzerland (0,76%). On the other hand, Germany, Hungary and Poland experienced the decline of population growth. In the Czech Republic the population size had increased by 0,09% per year.

There are two important factors causing population ageing. First, the average fertility rate in OECD countries had decreased by 0,11% over the period of 1995 to 2013. The largest decline was observed in Korea (1,74%), Poland (1,62%) or Slovakia (1,2%), whereas the fastest increase was recorded in France (0,9%) and Slovenia (0,85%). The average growth rate of fertility rate in the Czech Republic was about 0,7% per year. Second, the life expectancy at 65 increased between the year 1995 and 2013 it in selected OECD countries about 18,73% and the average annual growth was 0,87%. The Czech Republic, Ireland, Korea, Poland and Slovenia experienced annual increase higher than 1%. The slowest growth around 0,55% was recoded in Sweden. People in the Czech Republic could expect to live about 14,45 years after 65<sup>th</sup> birthday in 1995 but in the year 2013 in was 17,5 years. The life expectancy at 65 had increased by 0,8% per year.

The ongoing demographic changes in OECD countries raise the questions about the effects of ageing on aggregate output and long term economic growth. There is negative but insignificant relationship between population growth and GDP per person employed. However, Fig. 1 shows negative relationship between average annual fertility rate and average annual growth rate of GDP per person employed. (If we take into account only the European countries, the findings are very similar.) It means that the lower fertility rate is associated with the higher economic growth per person employed. (This findings are in compliance with prediction of Solow growth model.) In case of life expectancy at 65, there is a significant positive relationship but we must be caution because of causality. It is possible that higher economic growth creates conditions facilitating longer life after age 65 (e.g. better health care or long term care). However, economic theory suggests that the relationship between economic performance and demographic changes is likely more complex.

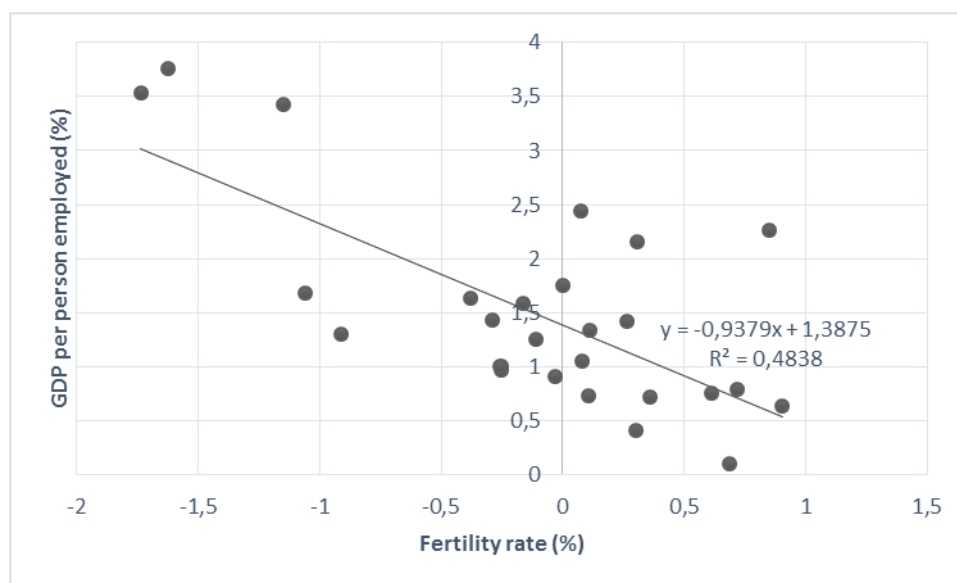


Fig. 1. The fertility rate and GDP per person employed, average annual growth rates (Source: OECD, World Bank)

As mentioned above, the most obvious relationship between demographic changes and economic performance should be through the effects on labour supply. The simple support ratio is often used as a measure of the relative size of labour force. It is calculated as a share of people aged 15-64 to total population. If we consider selected OECD countries, this ratio remained between the years 1995 and 2013 practically unchanged. (Excluding non-European countries don't change our findings.) However, we can observe some differences among counties. Slovakia and Poland experienced the average annual growth rate of simple support ratio higher than 0,3% whilst we can see the negative growth in Japan (0,6%), Italy (0,3%) or Denmark (0,2%). In the Czech Republic we can see annual increase around 0,02% during this period. The relationship between the average annual growth rate of simple support ratio and average annual growth rate of GDP per person employed over the period 1995 to 2013 shows Fig. 2. (If we focus only on the European countries, we can see more statistically

significant relationship.) It suggests that the share of working age population to total population is positively associated with GDP per person employed. In other words, all countries had positive economic growth per person employed, but this growth was slower in economies experiencing lower growth (or decline) of share of working age population. This finding meets the predictions of endogenous growth model (see Prettnner and Prskawetz (2010)).

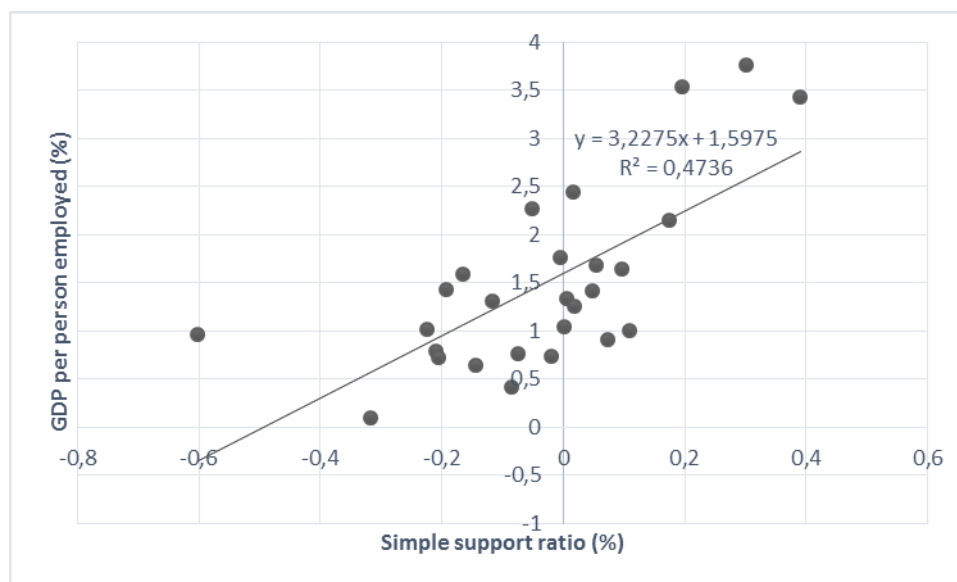


Fig. 2. The simple support ratio and GDP per person employed, average annual growth rate (Source: OECD)

The development of the share of the elderly can be measured by the old dependency ratio. It is ratio of older dependents, i.e. people older than 64, to the working age population, i.e. those ages 15-64. The average annual growth rate of old dependency ratio in selected OECD countries was 1,37% but total increased was 66,56%. (If we consider only the European countries then the average annual growth rate of old dependency ratio was 1,21% and total increased was 52,13%.) Between the year 1970 and 2013 the fastest annual growth rate of this measure can be seen in Sweden (2,06%), Italy (2,45%), Japan (3,80%) and Korea (3,95%). The exception is Norway where this ratio decreased annually by 0,25%. In the Czech Republic old dependency ratio had increased by 1,31% per year and total increase between selected years was 36,48%. If we look at the data, we can't see any significant relationship between old dependency ratio and GDP per person employed. It means that rising share of older people to working age population shouldn't harm economic growth.

The negative effects of ageing on economic performance can be suppressed by adjustments in labour supply or institutional framework. Both reforms of pension system and labour markets could provide later the retirement age, higher labour participation of women or earlier entrance of student to labour markets (Börsch-Supan, 2013). If it is right, we should see some changes in the age when people go into retirement. Then average effective age of retirement should be positively correlated with an increase of life expectancy. In spite of relatively high increases of both life expectancy at birth and the share of the elderly to total population, average effective age of retirement remained in OECD countries almost unchanged. Although people might change economic behaviour in the future, the data suggests that adjustment in length of working life has not occurred yet.

## 5 Effects of the ageing on savings, investment, human capital and productivity

In theory, higher dependency ratio is associated with the decrease of savings needed for investment. Actually, we can't see any statistically significant relationship between average annual growth rate of savings and the average annual growth rate of selected demographic variables. For example, between the year 1996 and 2013 the saving rate remained the same, but the old dependency ratio had

dramatically increased. The mentioned negative but insignificant relationship between average annual growth rate of saving rate and average annual growth rate of old dependency ratio is obvious from Fig. 3. (This relationship is among European countries even less statistically significant.)

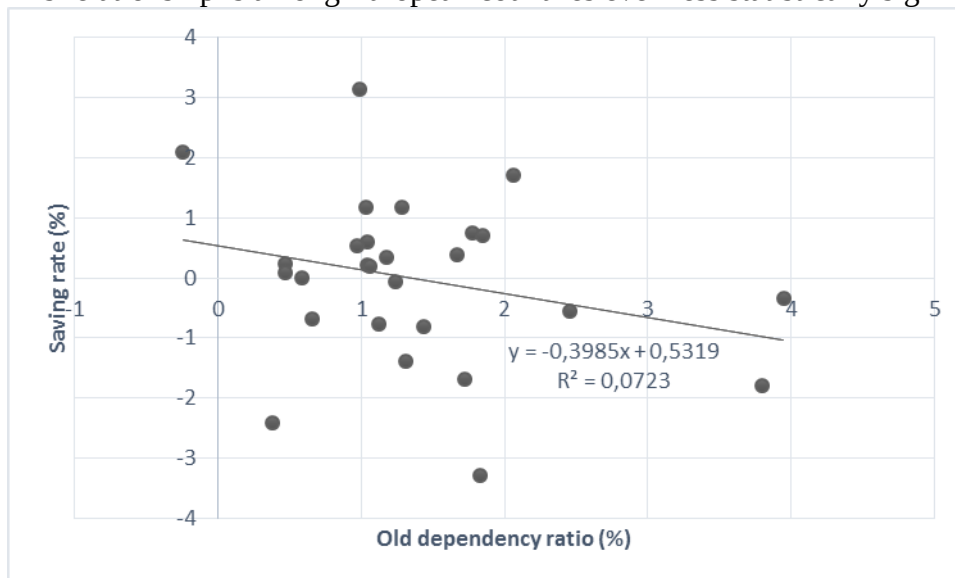


Fig. 3. The old dependency ratio and savings, average annual growth rates (Source: World Bank, IMF)

The poor reliance of saving on changes in demographic structure of society doesn't mean that it couldn't change in the future. And if the ageing of society leads to changes in savings or changes in labour supply influencing returns of investment, the result should be the changes in firm's investment (IMF, 2004). By the way, Fig. 4 presents relatively strong relationship between average annual growth rate of simple support ratio and average annual growth rate of gross fixed capital formation. (We excluded extreme values for Japan. And if we exclude other non-European countries, the results remain practically the same.) It means that countries experiencing slower or negative annual growth rate of ratio of workforce to total population have also lower growth rate of capital formation. This finding should partially confirm the concerns that the population ageing can have negative effects on capital stock. One of the explanations might be that countries facing decline of workforce need less capital formation to keep capital intensity unchanged.

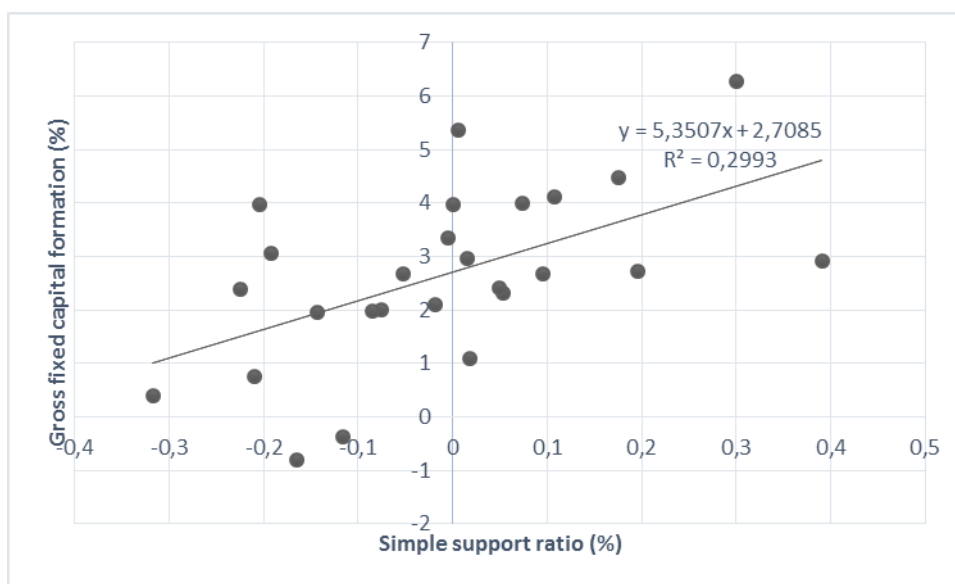


Fig. 4. The simple support ration and gross fixed capital formation, average annual growth rates (Source: OECD)

The economic growth depends not only on accumulation of physical capital. The quality of human capital plays an important role too. The chapter 3 implies that the human capital is the crucial determinant of labor productivity and affects total factor productivity of the economy. The empirical findings support theoretical suggestions (see chapter 3). The available data shows the negative relationship between the average annual growth rate of fertility rate and the average annual growth rate of total factor productivity. It should mean that lower fertility rate leads the higher human capital accumulation and economic productivity. Fig. 5 shows positive relationship between the average annual growth rate of simple support ratio and the average annual growth rate of total factor productivity. In other words, the countries with lower growth rate of working age population to total population experienced slower growth rate of total factor productivity and vice versa. (This relationship is more statistically significant if we consider only the European countries.) The negative effect of the ageing should imply limited implementation of innovation where the societies face relative decline of work force.

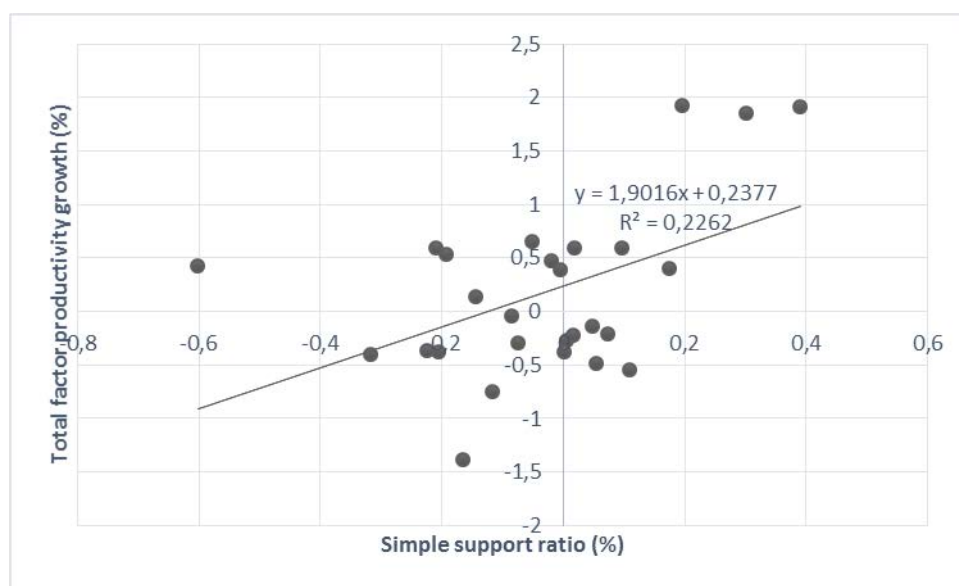


Fig. 5. The simple support ration and total factor productivity, average annual growth rates (Source: OECD, The Conference Board Total Economy Database™)

## 6 The population ageing and long term economic growth

Tab. 1 presents the correlation matrix of main indicators of population ageing and selected determinants of long term economic growth. The calculations include the average annual growth rate of variables to verify the potential dependence of economic performance on demographic structure of society. It covers 27 selected OECD countries over the period of 1995 to 2013. The critical value for a confidence level of 95% is 0,3809 and -0,3809 for  $n = 27$ . The correlations confirm some above-mentioned findings.

**Table 1.** The ageing and determinants of economic growth, correlation matrix

| FR | LE65   | PG     | SSR     | ODR     | AEAoR   | S       | GFCF    | TFPG    | ER      | GDPpPE  |        |
|----|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 1  | -0,276 | 0,2566 | -0,4839 | -0,2919 | 0,4173  | 0,0069  | -0,1699 | -0,4495 | -0,24   | -0,6955 | FR     |
|    | 1      | -0,061 | 0,2265  | 0,2845  | -0,0462 | -0,1958 | 0,1108  | 0,3165  | 0,3714  | 0,5232  | LE65   |
|    |        | 1      | 0,1912  | -0,3152 | 0,3712  | 0,1837  | 0,419   | -0,1622 | -0,6799 | -0,2559 | PG     |
|    |        |        | 1       | -0,4238 | -0,0241 | 0,1615  | 0,6319  | 0,4757  | 0,1312  | 0,6882  | SSR    |
|    |        |        |         | 1       | -0,1684 | -0,2689 | -0,3971 | 0,2568  | 0,1302  | 0,1224  | ODR    |
|    |        |        |         |         | 1       | 0,1459  | 0,1334  | -0,2523 | -0,2355 | -0,2699 | AEAoR  |
|    |        |        |         |         |         | 1       | 0,4334  | 0,0311  | -0,1747 | -0,175  | S      |
|    |        |        |         |         |         |         | 1       | 0,308   | -0,2152 | 0,3868  | GFCF   |
|    |        |        |         |         |         |         |         | 1       | 0,2489  | 0,683   | TFPG   |
|    |        |        |         |         |         |         |         |         | 1       | 0,4802  | ER     |
|    |        |        |         |         |         |         |         |         |         | 1       | GDPpPE |

Source: Author's calculation.

If we look at Tab. 1, we can see some false correlation (e.g. the correlation between life expectancy at 65 and fertility rate) but other calculations might be theoretically explained. For example, there are statistically significant correlations between simple support ratio and fertility rate and between simple support ratio and old dependency ratio. Decreasing fertility rate leads to drop of total population and simple support ratio have to rise. (Assuming that the decline of younger cohorts is relatively higher than decline of total population). And if the increasing number of the elderly causes the growth of the old dependency ratio then the share of working age population to total population must be decreasing. Similarly, the positive correlation between the growth of GDP per person employed and life expectancy at 65 might imply that richer societies can devote more resources to support the elderly.

We also find significant positive correlation between population growth and gross fixed capital formation. As mentioned above, the countries experiencing slower population growth need less capital accumulation to keep capital intensity stable. Alternatively, if the society maximize the consumption per worker then slower population growth causing decline of consumption of capital leads to smaller marginal product of capital. The drop of marginal product of capital brings about decrease of saving rate and firm's investment. This explanation is based on Solow growth model. (However, if we exclude non-European countries, this relationship remains positive but statistically insignificant.)

Gross capital formation is also positively correlated with simple support ratio and negatively correlated with old dependency ratio. Once more, if the economy experiences decrease of share of working population to total population then society doesn't need to devote so many sources to the accumulation of physical capital. The same is valid for old dependency ratio which measures the share of the elderly to working population. Finally, we notice the positive correlation between savings and gross capital formation. It confirms the fact that higher national savings are transformed into larger amount of physical capital. (In case of the European countries the relationship between gross capital formation and old dependency ratio and relationship between gross capital formation and savings are statistically insignificant. On the other side, we find significant positive correlation between gross capital formation and total factor productivity growth.)

The negative correlation between fertility rate and total factor productivity growth should be explained by higher quality of human capital (see Bloom and Sousa-Poza (2013)). Better education and superior skills to adopt latest technology make young cohorts more productive. In other words, higher investment in human capital leads to more productive economy. It could compensate the negative effects of labor force decline on long term economic growth. (However, this relationship is among the European countries also negative but statistically insignificant.) This assumption is partially confirmed by negative correlation between population growth and gross enrollment ratio.

On the other hand, there is significant positive correlation between simple support ratio and total factor productivity growth. Gómez and de Cos (2008) or Prettnner and Prskawetz (2010) offer some explanation which were mentioned above. It seems that skills and experiences of workers and demand for innovations play an important role in determining productivity.

In accordance with Solow growth model, there is likely negative relationship between the fertility rate and growth of GDP per person employed. (We can also see negative but insignificant correlation between population growth and growth of GDP per person employed.) If the decrease of fertility rate leads to lower rate of working population then higher capital intensity can cause increase of GDP per person employed. The positive correlation between simple support ratio and GDP per person employed supports previous findings of this paper. If the shrinking share of working population is associated with decrease of total factor productivity then the decline of simple support ratio can cause decrease of GDP per person employed. In other words, the increase of simple support ratio likely leads to the growth of labor productivity. The positive correlations between GDP per person employed and gross fixed capital formation, total factor productivity growth or enrollment ratio indicates that higher capital intensity, multi factor productivity or human capital can stimulate economic growth.

The correlation matrix also suggests that the population ageing doesn't harm some important determinants of economic growth. First, there is positive but statistically insignificant relationship between simple support ratio and saving. So it is not definite that the falling share of working age population to total population has negative effect on national savings. In case of old dependency ratio, we can see negative but also insignificant influence of rising share of the elderly to working population on national savings. The same is true for dependence of savings on life expectancy at 65. Secondly, we don't observe that the ageing leads to longer working live of individuals because the average effective age of retirement remained unchanged. Finally, the increasing ratio of the elderly to working population doesn't suppress the growth of GDP per person employed.

## 7 Conclusion

Although used analyses allow only limited insight into relationship between population ageing and economic performance, we can make some suggestions. The development of demographic variables and determinants of long term economic growth over the period 1995 to 2013 indicate that demographic changes might affect long term outcome in selected OECD countries. First, we can notice negative effects of both slower population growth and decline of working age population on gross fixed capital formation. On the other hand, population ageing likely haven't harmed national savings yet. The decrease (or stagnation) of simple support ratio also has had negative influence on total factor productivity and GDP per person employed (i.e. labour productivity). (But higher share of people aged 65 or older hasn't caused the decrease of GDP per person employed.) Fortunately, the decline of fertility rate is seems to be positively associated with total factor productivity growth. Therefore, potential undesirable effects of demographic changes on economic performance should be suppressed by improvements in human capital, labour productivity or total factor productivity. (In general, although statistical significance of indicated relationships might vary among different groups of countries, the results are relevant for all industrial countries.)

These findings don't offer unambiguous answer whether the population ageing has adverse effects on economic output. Some determinants of long term economic growth have worsened as the societies have gone through demographic changes. The development of other determinants is seemed to be favourable to compensate the detrimental influence of population ageing. And of course, some variables associated with economic prosperity have remained unchanged. As a result, anticipated negative effects following from national accounting should not occur or should be softened by changes in productivity (and by structural reforms). However, more precise analyses are needed.



## 8 Acknowledgement

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## INDEBTEDNESS METHOD OF REGULATING LOCAL GOVERNMENT UNITS IN SELECTED COUNTRIES

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### Abstract

The aim of the article is to compare the growth of debt in single countries of European Union, special Slovak and Czech Republic, not only on local government level but also in public sector as such and to offer a suggestion adjustment. The topic of the growth of public debt is being an important part of discussions and summits in coherence with financial crises. We analyzed the debt of Slovak republic as a country, debt of local government and municipalities, too. The same analyze we did for Czech Republic. The last part of article includes comparison of single results of both countries and we are providing some suggestion adjustments for a better financial management of single countries and local units that can be used in the near future.

### Keywords

the financial health of public finance, higher territorial units, the public debt, the debt regulation

### JEL classification

H61, H63, H68.

## 1 Introduction

An important part of maintaining the financial health of public finance for the local and regional authorities is an undoubtedly the control of their debts. Due to this fact it is required to regularly publish a database with those information that are concerning their financial health in order to make them more available to the citizens and also in order to allow citizen to compare them according to the key indicators. Based on this, the informed citizen can put a pressure on mayors, supervisors and chairmen of higher territorial units in order to farm responsibly.

In order to evaluate the current status of public finance, it is an important indicator the structural primary balance of public administration that assesses the results of operations of the public sector for the previous period. It represents the value of the budget balance of public administration, adjusted by the economic influence of business entities of the state administration, by the entities of local government and by the National Bank of Slovakia, further the impact of the economic cycle, one-off effects and the costs aimed to manage government debt.( The office of RRZ, 2015)

## 2 The comparison of the development of regions in SR and CR

As a first indicator that will give us relevant comparison is the development of the structural balance of public administration that is controlled by the independent institution- Council of fiscal responsibility in Slovak Republic. In the Czech Republic, there is a supervising authority the Ministry of Finance of Czech Republic.

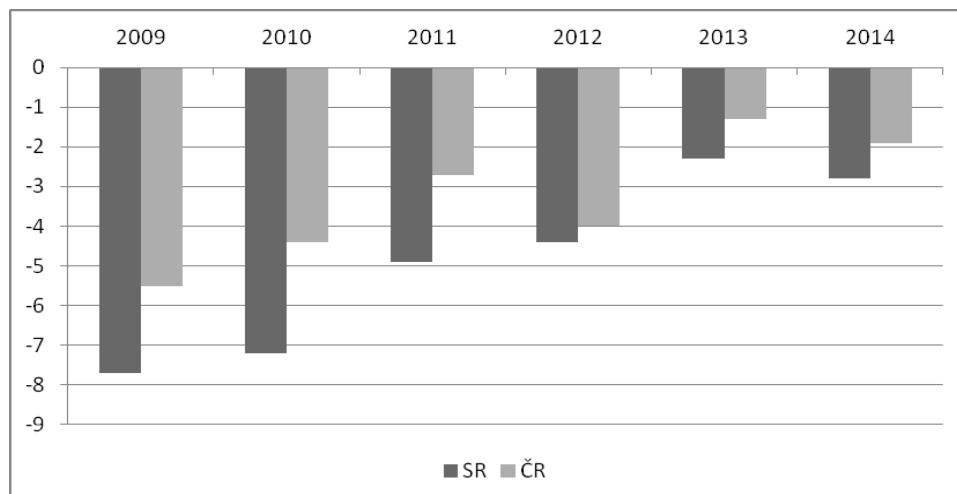


**Fig. 1.** The comparison of the development of structural balance of the public administration in SR and ČR (%)  
 (Source: [www.ec.europa.eu](http://www.ec.europa.eu))

According to the above-mentioned chart related to the development of structural balance of the public administration, the Slovak Republic has reached higher values in comparison with Czech Republic, for the monitored period. In 2012, the balance has grown in the Czech Republic to the level of 4%. It was due to the fact of lower households expenditures for the final consumption. In recent years, there has decreased also the economic activity of the country, on average there was also a significant reduction in economic performance of many other EU countries. (Czech Confederation of Commerce and Tourism, 2013.) Due to the consolidation, the Slovak republic could significantly reduce the balance of the public administration for years 2011-2013.

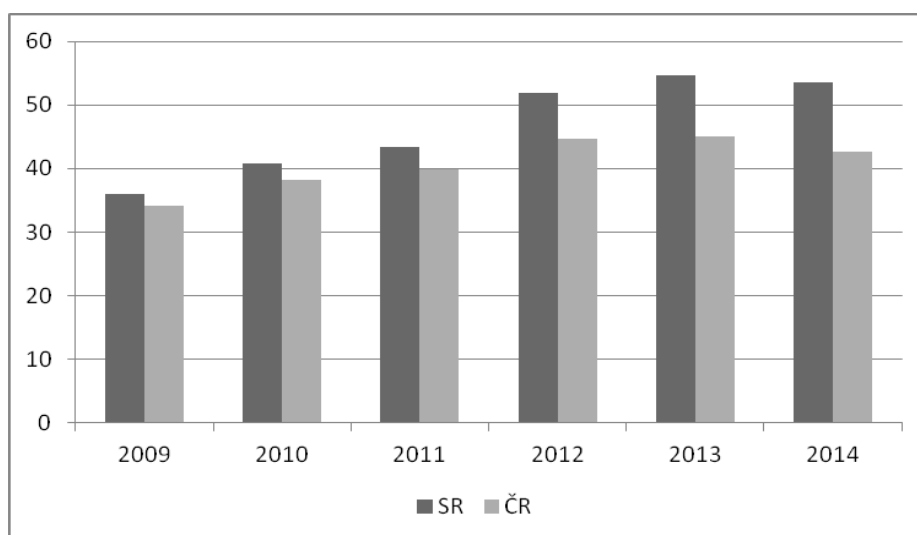


**Fig. 2.** The comparison of the development of public debts in SR and CR (%)  
 (Source: [www.ec.europa.eu](http://www.ec.europa.eu))

In terms of debt limits we can evaluate the development of the public debt in Czech Republic as a sustainable to the maximum limit of 50%, the highest value was reached in 2013 at a level of 45.12% of GDP. On the contrary, the Slovak Republic has exceeded the level of 50% from 2012 and thus has revised down to the level of the third sanction band in 2014. Already in 2013, after reaching the second sanction zone, there was sent a letter by the minister of finance, to the National Council referring the reasoning the levels of debt. In 2014, there has decreased the debt to the level of the second zone (53-55%) due to the new methodology ESA2010. (Fisher, R. 2016.)

In order to the international comparability of the fiscal position we can use an indicator – the gross public debt that represents the obligations of individual countries in relation to the creditors. In the chart we can see that, for the period of the first three years, there was approximately the same increase in gross debt, but in 2012 there was slightly higher increase in Slovak Republic compared to our neighborhoods. (Pollitt, Ch., Bouckaert, G. 2011) The reason could be the upcoming parliamentary elections, as we have already previously mentioned. Its growth in SR has further continued again, in contrast with the Czech Republic, that has entered downward trend, especially in 2014. Since 2013, there is the Stabilization plan of the government debt in Czech Republic, which is lead under the auspices of the Ministry of Finance of the Czech Republic, associated with the effective involvement of the available liquidity of the Czech state treasury together with the budget surplus of the Czech Republic. (MFČR. 2014) In 2014, there was a decrease of the Slovak debt due to the enacted one-off measures that should be supportive to reduce debt also in the future. (Ochoťnický, P. 2012)

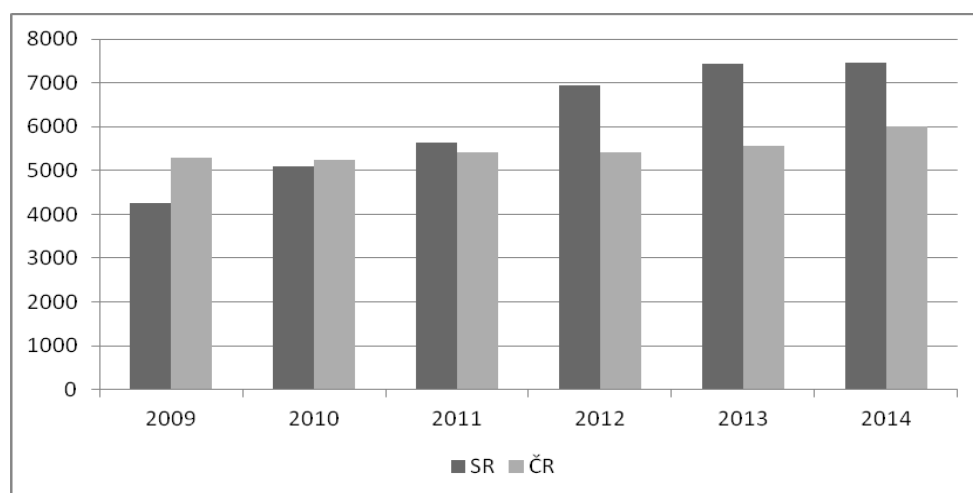


**Fig. 3.** The comparison of the development of the debt per capita in SR and CR (in Eur)  
 (Source: [www.ec.europa.eu](http://www.ec.europa.eu))

With the increase of Slovak public debt since 2012, there is also increasing the debt per capita that is comparatively higher than in the Czech Republic. Even according to the chart we can see, that in 2009 the debt has exceeded the level of 5.000 Euros and in 2010 the level of the debt per capita in the Czech Republic is only slightly higher than in our country, in amount of 5.233 Euros. It represents a slight decrease compared with the previous year. In 2014, the amount of debt per capita has reached the maximum value in Slovak Republic on the level of 7.460 Euros, in the conditions of Czech Republic in amount of 6.007 Euros per capita, while the debt has been slightly increasing over the past three years. (Greene, J. 2012)

In order to compare the development of regions in SR and CR we can use the indicators of the development related to the debt service and the regions debt per capita. In Czech republic, we have chosen 8 regions; in Slovak republic were selected 8 higher territorial units.

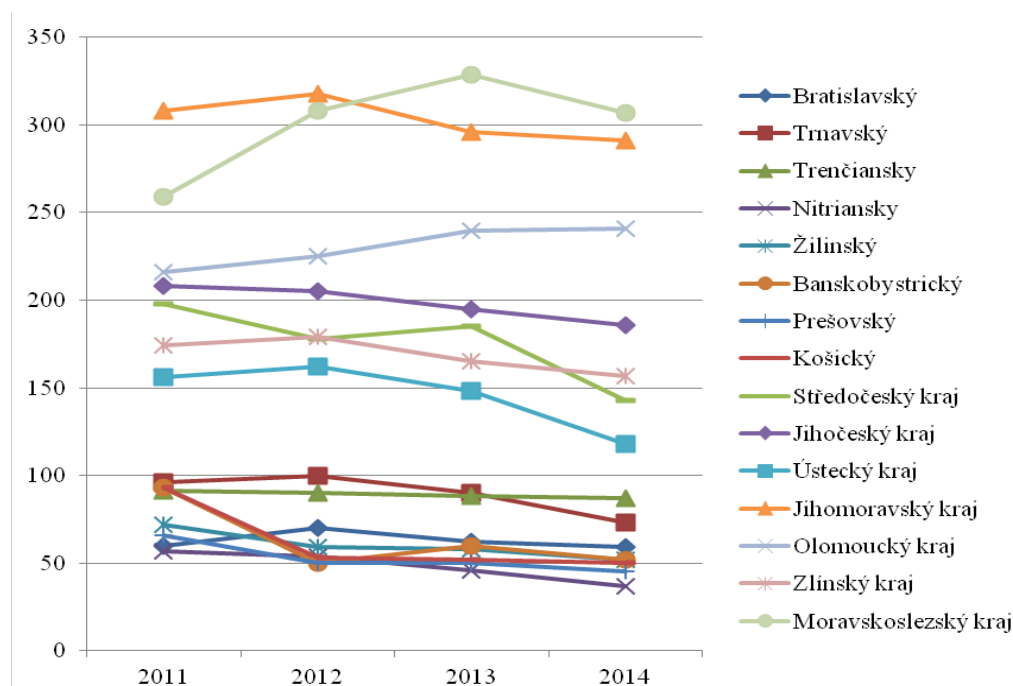


**Fig. 4.** The comparison of the development of the debt service in SR and CR (in Eur)  
 (Source: MFSR, MFCR)

The amount of expenses associated with the servicing of debt could be shown by the values in the chart related to the development of debt service. In Slovakia, there are reached the highest values in Trnava, Trenčín and Žilina region in 2013. The lowest figures are reached in Prešov region and also in Bratislava region. In the Czech Republic, there are reached the highest amounts in Stredočeský (Central Bohemian) region and Ústecký region and the lowest amounts are reached in Jihomoravský region (South Moravia).

In the chart, there are presented the data related to the amount of debt per capita of the relevant region, where we can see in average the difference of double amount of the debt in Czech regions than in the Slovak regions. This result can be evaluated also from the positive angle; the Slovak regional centres are not so heavily indebted concerning the number of population living in cities than in a case of Czech cities, where the debt was significantly higher. According to the previous analysis, in the chapter five, we know that the Czech regions have been investing into the development of infrastructure in recent years, further into the reconstruction of hospitals, modernization of sports facilities, improving of education. Typically, the Czech regions are increasing their debts over years. For this purpose they spare money in order to reduce this overall debt due to the one-time pay in a certain time period (of about 10 years) and thus to reduce expenses associated with the servicing of the debt. (Gruber, J. 2011.)

Due to the indicators related to the basic balance, to the total debt, to the debt service and to the amount of debt per capita we can compare the development of the debt in regional cities during the monitored period in Slovakia and the Czech Republic. (Kušnířová, J. – Válek, J., 2014)

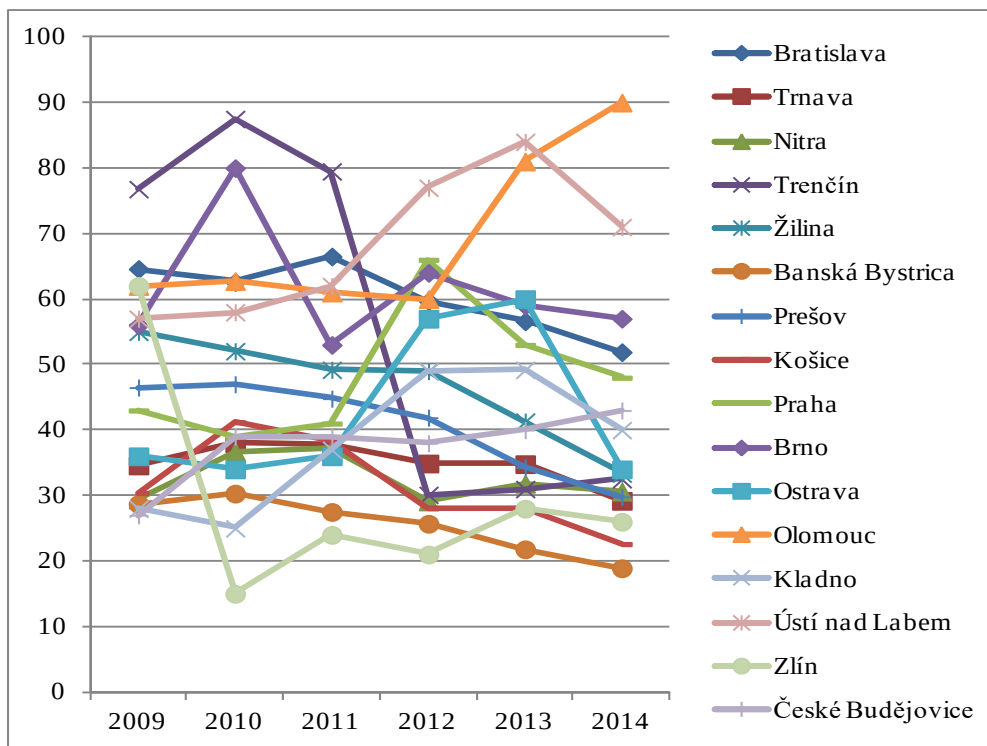


**Fig. 5.** The comparison of the development of the total debt of cities in SR and CR (in %)  
 (Source: MFSR, MFČR)

Comparing the evolution of total debt in the regional cities in Slovakia and in the Czech Republic we can see on the chart, that the lowest amount of the debt relative to the current income for the previous year, are reached, in average, in the regional town Zlín in the Czech Republic and in Banská Bystrica in Slovakia. On the contrary, the highest amount of the debt is reached by the cities of Olomouc and Bratislava.

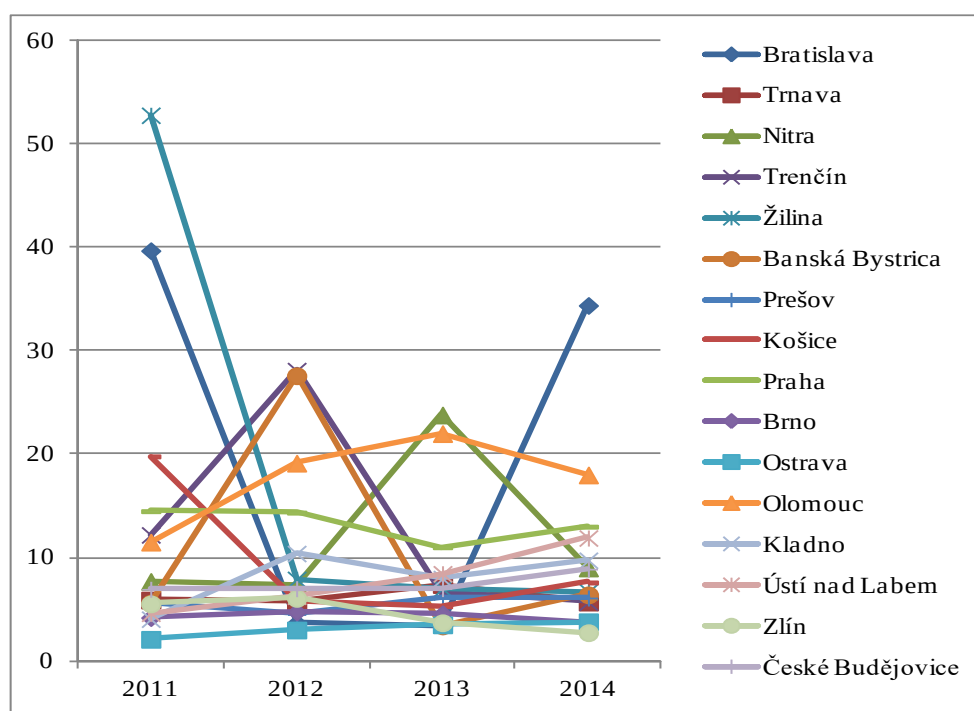


**Fig. 6.** The comparison of the development of the debt service of the cities in SR and CR (in %)  
 (Source: MFSR, MFČR)

For the next indicator related to the development of the debt service we could only compare the data from 2011, as there does not exist any longer period related to the Czech regional cities. It should be emphasized, that some of the figures that are visible in the previous year, might be caused by the inclusion of all repayment of early lump debts that should not be counted as expenditures for the repayment of principal and interest payments. Following this fact, this indicator is not entirely credible, due to the fluctuations that are shown on the Slovak and also on the Czech side. Resulting from the chart data, we can see, that the highest level of expenses associated with the servicing of the debt is reached by the regional city of Olomouc and Bratislava.

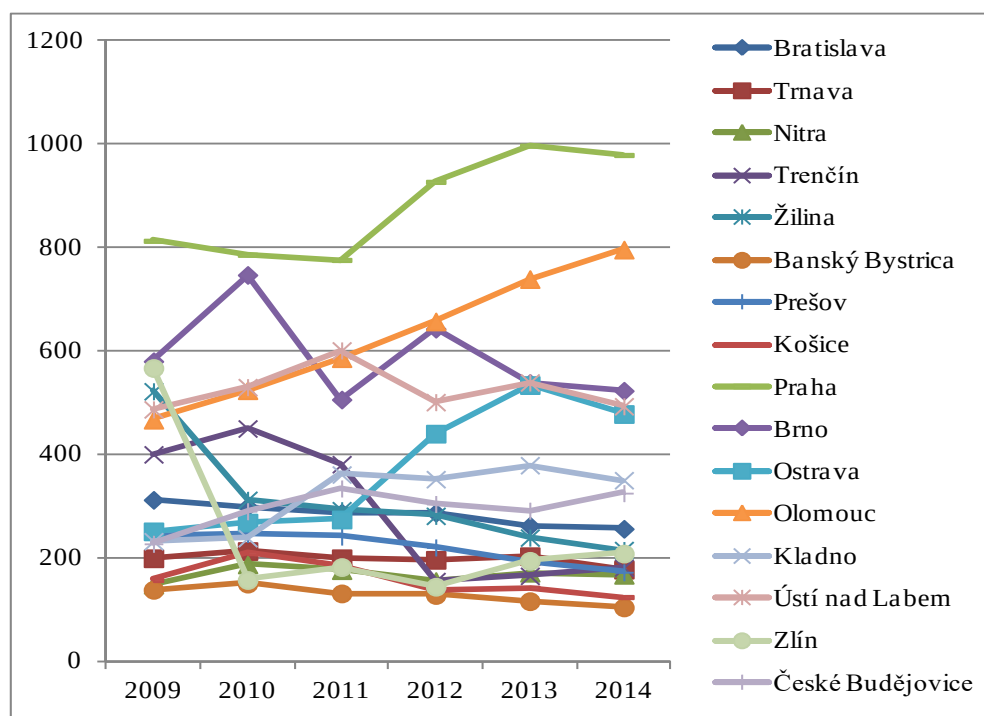


Fig. 7. The comparison of the debt per capita in SR and CR (in Eur)  
 (Source: MFSR, MFČR)

The lowest amount of the debt per capita is reached in Slovakia in 2013 in the city Banská Bystrica- in amount of 116 Eur, in the Czech republic it is reached in the regional city Zlín, where the amount of the debt per capita in 2012 was reached in the amount of 144 Eur. The highest level is reached in Slovakia in amount of 522 Eur- in the regional city Žilina in 2009, in the Czech republic in 2014 (excluding Prague) was the highest amount of the debt per capita reached in Olomouc (in amount of 796 Eur), that is hardly struggling with their debt.

### 3 Possibilities of the debt regulation

There are many ways, how to regulate the debt of countries, particularly the setting of the effective fiscal policy. It should concern especially budgets, in that the total amount of expenses should be not exceeding the total amount of revenue. During the implementation of the budget, there may occur some unexpected deviations, to which respond the government. In case of the positive effects, the government may use the additional resources in order to reduce deficit and debt (acceleration of consolidation) or the new measures worsening the budget balance, particularly through the higher expenditures and risk coverage of the budget. Conversely, in case of some unpredicted negative effects, the government may either adopt some additional measures to comply with the budgetary objectives or it may translate these influences into the deterioration in the budget balance. In most cases, the final result consists in a combination of the unpredicted effects, the risks coverage and also of some relevant measures of the government. (Hyman, N. 2011)

It is necessary to pay a relevant attention to the current level of indebtedness and to strive for its gradual reduction or its single repayment, due to the recoverable financial payment or due to more preferable loans that would ultimately represent lower burden for the economy. Certainly, it is important to not borrow even more than it is really necessary. The implications of the present actions will be bear by the future generations as their burden, even without their any intervention. In terms of the potential impacts on the economic growth, there are very important some relevant presumptions related to the disbursement of EU funds, beside the management of public finance and also in addition with the established budget targets.

In a case of the fiscal responsibility policy, there should be established more strictly rules for its compliance, such as a reduction of penalty bands to the level of 40-45%, only from this point the government representatives would be forced to think more in deep how to set up the budget for the following period in order to meet this threshold and to not exceed it. Slovakia and also the Czech Republic could be thus inspired in relation to the compliance of the stabilization of the state debt ratio for the last two years, where they are successful, even though the rules of the fiscal responsibility are still not anchored in the Constitution.

### **3.1 Possibilities of the debt regulation in the Czech Republic**

The municipalities and regions in the Czech Republic can obtain some forms of subsidies that are paid based on the comprehensive financial relationship of the state budget to the local budgets, based to the grant from the chapter of general public treasury administration, further based to the subsidies of the chapters of individual ministries, state extra-budgetary funds to the EU funds. Municipalities also receive subsidies from the regional budgets. The most of the grants are given for the specific purpose and they are liable to the accountancy. Their nature is in a form of ordinary or capital subsidies. Difficulties in obtaining grants for the villages consist in the excessive complexity and in the lack of transparency of the system and also in a long-term continuing lack of rules by its provision. Generally, in the Czech Republic, there is too high proportion of special-purposed subsidies; typically they represent up to two thirds of the total amount of subsidies given for the specific purpose. The main sources of income in the Czech Republic regions are the subsidies from the state budget. In particular, it is more-less the contribution that serves for the state administration. Local government entities may also use the financial funds from the structural funds of EÚ. (Provazníková, R. 2015.) However, the state is not liable for the way of farming the villages and regions

The reasons of debt increase in the Czech Republic on the basis of the analysis:

- non-profit projects (their implementation does not bring any additional financial funds in order to reduce debt by its repayment),
- allocation of grants and criteria for allocation of investment subsidies,
- implementation of the EU structural funds (it requires some mutual participation in relation to the project financing),
- easy access of villages to obtain loans (they represent the low-risk clients),
- lack of regulation of property rights, the sanction mechanisms (relevant settlement of the debt limits in regions - villages, the Act related to the management of local authorities can limit it only indirectly, there is an absence of a forced administration)
- introduction of a ban on the speculative investments for the local authorities (they have the opportunity to execute a business also on the capital market)
- there is missing some agency or a monitoring body that would monitor and take control over debts and would analyse the credit risks (there are only two private agencies providing a credit rating)



- a transparent reporting of finance in communities (villages) / regions (to not hide and to not keep the amount of debt as a secret).

The risk of repayment of debts exists rather in smaller municipalities where they have not sufficient administrative background and qualifications. The view on the indebtedness of municipalities / provinces should be judged on the base of the purpose for the village indebtedness, of the size of assets concerning the overall economic situation of the territorial unit.

The preventive measures of the regions should consist in the use of external resources to finance capital expenditures and not to finance current ordinary expenditures. There should be essential to implement relevant legislation in a case of bankruptcy that would further define the procedures and steps to be taken in a case of region- and municipalities- insolvency. Further, to set up some agency as an independent institution that would regularly monitor the size of indebtedness of municipalities / regions, to introduce a scale of regular management ratings. At a present, the Ministry of Finance of the Czech Republic is the monitoring body, but it serves rather to the general overview. It operates only formally; its disadvantage is also the lack of the legal regulation that would deal more in deep with the debt limits and with the manners how to post-pone highly indebted municipalities, i.e. a recovery mode and a forced administration, as it is already implemented for example in Slovakia. The main reason for it is a reliable and accurate display of a settlement of the municipalities and regions, based on that is further derived an overall evaluation of management methods and a possible regulation in debt.

### **3.2 Possibilities of the debt regulation in the Slovak Republic**

The Council of a Fiscal Responsibility in the Slovak Republic (The office of RRZ, 2015.) refers to a number of risks associated with the implementation of national fiscal responsibility rules for the Slovak Republic in the future. On one hand, there is positively evaluated that the government continues to present its intention to achieve the approximately balanced budget in 2017. Due to the compliance with this commitment at the European level, there can be enhanced the credibility of Slovakia, in the eyes of investors. On the other hand, the intended aim to achieve the medium-term objective brings several risks. The inadequate performance measures of the government debt reduction beyond sanctioning zones are considered as the potential risks. It is required to create a sufficient scope for the fiscal policy, especially in in good times, when the economy produces higher tax revenues and lower expenses. The government has missed a number of positive effects related to the acceleration of consolidation; on the other hand, there have increased the aimed levels of the budgetary deficits by the actualization of the three-years budget. According to the Council of a Fiscal Responsibility, the introduction of expenditure limits, which are assumed by the constitutional law, could greatly help to the consolidation in good times.

The Council of a Fiscal Responsibility has identified the overestimation of non-tax revenues, the low level of expenditures in the health sector and in the local government the saving measurements without their further explanation. The decrease in debt, due to the permanent measures of the government, should occur from 2016 for the first time. It is due to the planned reduction in the deficit and the increase of the economic growth. Despite the fact that the disposable income in years 2014 to 2015 have contributed to the reduction of the gross debt, it is not sufficient to reduce sanctions outside the zones until 2018, even the government has met all the aimed targets in the consolidation macroeconomic scenario of the Ministry of Finance. In such a case, the debt would reach the level of 49.2% of GDP. So far, there is only one identified risk coverage in 2016. It is the potential savings resulting from the co-financing that is resulting from lower spending of EU funds, but this may be partly offset towards less favourable macroeconomic developments due to

slower spending. Despite to the budgets draft, there were not created any reserves related to the possible deterioration in the economic development and to the failure to meet budgetary targets.

From the long-term sustainability of the planned improvement in the structural balance of the debt reduction in 2016, there is more favourable starting position. If these objectives are fulfilled, the long-term sustainability of public finances in comparison to its level in 2015 will improve. Meeting this objective in 2016 will depend on the priorities of the new government, further on the continuity of transferring the control over the budget, including also its early awareness with the possible positive and negative budgetary risks. The advantage for the fulfilment of the objective may be that if the new government identifies with the settled goals but the risks of the budget are confirmed, the government will have enough time to react by the adoption of the additional measures.

In case of local territorial units, the budget proposal assumes a relatively high volume of budget surpluses resulting from the rapid annual growth in tax revenue, from the assumption of limitation of the operating expenditure, especially in villages, and from the maintenance of a low level of own investment expenditure. Taking into account the actual development of operating expenses in the past, an accelerated rise of the long-term low capital expenditure and the estimated risk projected for 2015, it may result in worsening of the economic activity of government by the amount of 100 million EUR in 2016. It is due to the actual development of expenditures of local territorial units in the first half of the year 2015. The law on the budgetary rules of the public sector enables to shift the unused capital expenditures into the next year. In case of a positive impact on the deficit in 2015 (it means until 2016, there will be transferred higher amount of the unused expenses than it was in 2015), increase the risk of their use in the coming years. Therefore, the potential risk for 2016 depends on the outcome in 2015. Furthermore, since 2015, there is an effective rule related to the penalization of the local municipalities that are exceeding a specified amount of debt. It will be evaluated during the year 2016 for the first time, on the basis of actual data at the end of 2015. The rule is more strictly as the debt limit for the public administration by the same upper limit of 60%, compared to the proportion of current income of municipalities and not to their economic performance. If the total amount of the debt of the municipality or higher territorial unit reaches 60% of the actual current revenues of the previous financial year and more, the municipality or higher territorial units are obliged to pay the fine imposed by the Ministry of Finance, amounting to the level of 5% of the difference between the total debt and the amount of 60 % of real current incomes of the previous financial year.

The scope for the introduction of measures to control indebtedness in Slovak Republic:

- the undefined approach to the debt reduction,
- the government has still not settled the expenditures limits,
- the overestimation of non-tax revenue in forecast,
- a failure to establish a reserve for a possible deterioration in the economic development,
- more strictly compliance with the financial regulations,
- a need for implementation of the additional measures to meet the budget objectives.

Based on the above-listed issues related to the indebtedness of the Slovak Republic, we can say that the number of all-over measures is not so high, but it is necessary to take into account more rigorous approach in order to solve problems related to the indebtedness. With the entrance of the new government, after this year's parliamentary elections, should relate also additional complementary measures to reduce the potential risks, especially with regard to the future generations that will consequently repay the debts.

## 4 Conclusion

The maintenance of a human health is so important as the maintenance of the financial health of public finance for the municipalities and regions. Therefore, it is required a regular disclosure of a database with relevant information, related to their financial health, in order to make them more available to all citizens that could use them for the comparison, according to the selected key indicator. Only the informed public sector can put a relevant pressure on mayors, chairmen or directors of higher territorial units in order to execute their “business” more responsibly.

We have the ability to elect deputies to the parliament and to elect the president of the country, as well as we have the option to vote for the mayors of villages or larger cities. In order to answer a question regarding who should be elected for the mayor, there should be helpful to us the financial results of the individual municipalities that were driven by many different mayors. The comparison of the economic results should be available to the general public, according to the law on free access to information due to the official website of the municipalities. As free citizens living in a democracy, we have the opportunity to intervene in a certain decision-making processes, for example during the sessions of the municipal council, which should be accessible to the public in most cases, we have the opportunity to express our opinion in relevant scope. One could perhaps say that it does not make a sense as it is probably not important what the "ordinary" citizen say?! Unfortunately, it is not always this case. If the number of inhabitants do not agree, by the use of some petition or in the form of some complaints, the municipality representatives / regions representatives would have to listen them and adequately reflect to their requirements. Due to higher pressure, such as a protest, it can be achieved the abolishment of the proposed regulation or even more the abolishment of already implemented regulation. It may refer to a solution of elimination of the hidden landfills, of an introduction of parking system or a creation of a special territory for the dog person in the village. However, it is required to be aware of all current events by the citizens, to know when and how to present their opinion, if there is anything in principle against the benefits to the citizens and try to propose a simpler solution to the problem, which could ultimately also spare the financial funds in the budget of the municipality / territorial units and thus could be satisfied both parties.

Due to the analysis of the indebtedness development we have tried to refer to some ways of the indebtedness of public sector in Slovakia and in the Czech Republic due to the local territorial municipalities (regions) and regions cities of the both states. In addition to the obtained data related to the creation of our own database, we came to the result that not all the required data are available to the public, what should people naturally assume in a present time. This fact has caused to us more difficulties in the scope of our deeper investigation. Nevertheless, we have tried to analyse the progress of the indebtedness and thus we came to the certain measures that could be used to regulate and to control the issue of indebtedness.

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## **SOCIAL SPENDING: APPROPRIATE INSTRUMENT FOR PROMOTING ECONOMIC GROWTH IN THE LONG-TERM?**

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### **Abstract**

The aim of this article is to examine the effects of changes in social spending on economic growth in the long term by using panel VAR model with impulse response functions. The empirical analysis is made on OECD countries in the period 1980-2014. Exogenous variables in the estimated panel VAR model are standard growth variables expressed as gross fixed capital formation and the aggregate capital productivity. Endogenous variables are then fiscal variables, i.e. the social spending and the tax revenues. A third endogenous variable is GDP per capita. The empirical analysis suggests that social spending have not impact on economic growth in the long term. Impulse response functions showed that changes in social spending (both impulse and step) affect economic growth only in the short term, the changes disappear within four years. It is possible to conclude that policy makers should use social spending as a tool for the creation of an appropriate institutional framework rather than an instrument for the purposeful promotion long-term economic growth.

### **Keywords**

Government Expenditure, Economic Growth, Fiscal Policy, Tax Revenue.

### **JEL classification**

H50, H20, O40

## **1 Introduction**

Social spending makes up a relatively large part of the expenditure and they play an important role nowadays, because of an aging population and the assumption that there is pressure to increase these spending. Therefore, it is appropriate to investigate how these spending influence economic growth, and whether it is possible to use them to support economic growth in the long term.

From this reason, the aim of the article is to examine the effects of changes in social spending on economic growth in the long term by using panel VAR model with impulse response functions.

The empirical analysis is made on OECD countries in the period 1980-2014. Important part of the analysis performed using the VAR panel model is the design of impulse response functions. They are based on the estimated regression coefficients of the three equations of the model. These are, first, the function of the "impulse" that simulate the effects of one-off changes (shocks) explanatory variables on the variable being explained, and also a function of the "step" that simulate permanent changes in the variables. Exogenous variables in the estimated VAR model are standard growth variables expressed as gross fixed capital formation and the aggregate capital productivity. Endogenous variables are then fiscal variables, i.e. the social spending and the tax revenues. A third endogenous variable is GDP per capita.

## **2 Literature Review: Social Expenditure and Economic Growth**

Individual parts of the expenditure can influence growth in different ways. For more details, see Drobiszová and Machová, (2015); Kneller, Bleaney and Gemmell (1999) or Drobiszová (2015). Also corruption can play role, see Jajkowicz and Drobiszová (2015). In this article we will focus on one particular part of the expenditure, i.e. to social spending.

The current empirical work examining the impact of social spending and economic growth are not clear. In principle, it is possible to divide economists dealing with this issue into two ideological groups. One group argue that social spending has a positive effect on economic growth and the others claim the opposite.

The authors, who maintain that redistributive spending, including social spending, rather negatively affect economic growth, arguing that the increase in these expenses reduces the savings rate, and thus economic growth. This is due to the fact that increasing expenditure brings with it increasing level of taxation, as a source of financing. This reduces the motivation to work and to invest in human capital. Another factor that negatively affects economic growth is crowding out of private investment (see eg. Agénor, 2010; Afonso, Furceri, 2008; Afonso et al., 2005; Schaltegger and Torgler, 2004; Foelster and Henrekson 2001 or Devarajan, Swaroop and Zou, 1996). Afonso, Schuknecht and Tanzi (2005) add that the larger public sector with relatively high social spending, does not automatically mean effective provision of the benefits of the welfare state and higher economic growth.

The second group of authors trying to disprove the generally accepted assumption that social spending rather negatively affects economic growth. Aaron (1982) examined whether indeed social spending negatively affect savings rates, and hence economic growth, and concludes that the empirical evidence does not support this assumption. Social spending according to empirical studies may even have a positive effect on economic growth, if they improve social cohesion and political stability (Sala-i-Martin, 1992). Expenditure on pensions, which are part of social spending, in turn can increase productivity in the labor market, which operates on the productivity of physical capital and subsequently positively to growth. If we accept the premise that productivity decreases with age, so appropriately modified pension system can motivate older and therefore less productive individuals to retire and give place to younger, more productive (Sala-i-Martin, 1996). Another argument for the positive impact of social spending on economic growth that social spending provide individuals incentives to invest in human capital, which has a direct impact on growth through this channel and indirectly by increasing the productivity of physical capital (Buiter and Kletzer, 1993 and Belletini and Berti Ceroni, 2000).

Based on the literature review above goes to say that influence social spending on economic growth is still an open question. To obtain reliable results, it is therefore necessary to carry out an empirical analysis on the longest possible period of time. Therefore, the empirical analysis in this article is based on a time series, comprising 34 years (period 1980-2014) and 34 OECD countries. From a methodological point of view is used a dynamic panel.

### **3 Empirical Analysis: Methodology and Data**

It is important in the case of examining the relationship between particular fiscal variables (in our case social spending and tax revenue) and economic growth the dynamics of their linkages. Changes in social spending are reflected in the economy with a lag, essential is also monitor how long these effects in the economy persist, whether it is only temporary, or it results in permanent changes in economic performance. Theoretical and empirical literature has also shown that the social spending affects not only economic growth, but also of course the level of taxation as a source of their funding. Likewise, it is advisable to monitor how economic growth responds not only to social spending, but also on taxation, which is used as a source of funding for social spending. In other words, it is necessary to monitor the mutual influences of the variables named above.

This can be achieved via VAR model. It is a model that works with endogenous and exogenous variables. Endogenous variables are considered those variables for which it is expected and examined their relationship. These variables are gradually input in the model as a dependent and independent variables. VAR models belong to a group of dynamic models, which are not suitable to estimate using the least squares method. The following analyzes were then used to estimate the generalized method of moments (GMM) and Arellano-Bond's estimator (Arellano and Bond, 1991). Using a robust estimator in calculating the covariance matrices (White Period method) ensured that the estimation results of standard deviations of parameters and hypothesis tests were correct with regard to a possible occurrence of autocorrelation and heteroscedasticity. With regard to the interpretation of the results were the variables adjusted to logarithmic form (below referred to as a log). For each variable, before

the actual empirical analysis, tests were carried stationarity by use of tests unit roots by Levin, Lin, Chu (2002), also according to the work Im, Pesaran, Shin (2003) and Maddala, Wu (1999).

Important part of the analysis performed using the VAR model is the design of impulse response functions. They are based on the estimated regression coefficients of the three equations of the model. These are, first, the function of the "impulse" that simulate the effects of one-off changes (shocks) explanatory variables on the variable being explained, and also a function of the "step" that simulate permanent changes in the variables.

Exogenous variables in the estimated VAR model are standard growth variables expressed as gross fixed capital formation and the aggregate capital productivity. Endogenous variables are then fiscal variables, i.e. the social spending and the tax revenues. A third endogenous variable is GDP per capita, it is case of standard indicators in extended neoclassical model of growth (Barro, 1990). Other equations are in accordance with the above theory selected arbitrarily.

Real gross domestic product per capita in PPP was dependent variable. Independent variables included control growth variables, i.e. gross fixed capital formation as a percentage of GDP, and human capital expressed as index of human capital.

The second group of independent variables was formed by fiscal variables. The model included both the revenue and part of expenditure side of the budget; fiscal balance was omitted to avoid perfect collinearity of the variables. Tax burden represents the revenue side of the budget, and is examined by means of tax revenues to GDP in purchasing power parity. Different types of taxes as a source of funding for social expenditure can also affect the resulting impact on economic growth. For reasons, that each country has a different way set the social system and the source of financing of social spending, we acceded to the perception of taxes as a whole in this article. For more detailed empirical analysis how different types of taxes impact the economic growth see Kotlán, Machová and Murín, 2015. Part of expenditure from budget is represented by social spending. They are examined on the basis of standard classification COFOG (European Communities, 2007). Social expenditure is therefore perceived as the sum of all subsets of expenditure belonging into this category according to COFOG. Specifically it is expenditure on old age, survivors, incapacity-related benefits, health, family, active labour market programmes, unemployment, housing, and other social policy areas. The sum of these items are considered as social expenditure in this article. Social spending is relative to GDP for empirical analysis in this article. For more detailed empirical analysis how different types of spending impact the economic growth see Machová, Kotlán and Drobiszová, 2015.

Data were taken from the database of the OECD (OECD iLibrary), specifically from national accounts statistics, tax statistics and statistics in social spending. Data for human capital was withdrawn from the Penn World Table (version 8.1).

#### **4 Results of Empirical Analysis**

Software which we used can not directly estimate the VAR model as a whole, therefore the model was estimated by individual equations. In the first model the dependent variable is GDP per capita. In the second model, the dependent variable is tax revenue and in the third model is dependent variable social spending. Given the focus of the work is the estimation results of the second and third equation VAR model seems rather less substantial but are important for further exploration of the persistence of the impact of social spending on other variables in the economy. For clarity, all three models are placed in a Table 1.

The results in Table 1 show that if for some reason occur to increase of economic growth, it will have positive impact on tax revenues and a negative impact on social spending with a year late. It is caused by increase of economic growth which lead to increase in the number of employed and the growth of income of individuals, who thus pays higher tax, which is reflected as an increase in tax revenues. Also, the growth of disposable incomes of individuals who raise the marginal propensity to consume, it will also increase the income from indirect taxes. Due to economic growth, as already

noted, unemployment decreases, causing a decrease in social spending, in the form of lower spending on unemployment benefits or social benefits.

**Table 1.** Interaction among the different variables (OECD countries, period 1980-2014)

| Dependent variable          | d(log(GDP per capita)) | d(log(tax revenues)) | d(log(social spending)) |
|-----------------------------|------------------------|----------------------|-------------------------|
| d(log(GDP per capita.(-1))) | 0,042 (1,70)*          | 0,594 (2,92)***      | -0,170 (2,92)***        |
| d(log(capital formation))   | 0,353 (32,47)***       | 0,194 (3,33)***      | -0,515 (-62,06)***      |
| d(log(human capital))       | 0,988 (2,60)***        | -3,828 (-1,14)***    | -3,02 (-5,21)***        |
| d(log(tax revenue(-1)))     | 0,034 (1,55)           | -0,029 (-0,77)       | -0,069 (-1,52)          |
| d(log(social spending(-1))) | 0,062 (3,75)***        | 0,523 (5,90)***      | 0,044 (2,53)**          |
| Number of observations      | 922                    | 922                  | 921                     |
| J-statistic                 | 28,7                   | 23,9                 | 32,1                    |
| Instrument rank             | 32                     | 32                   | 32                      |

Note: The t-statistics, which are corrected for heteroscedasticity and autocorrelation, are in parentheses; standard deviations are calculated using robust estimators; \*\*\*, \*\*, \* indicates significance level of 1%, 5%, 10%.

Source: own calculations

In the event that there is an increase of social spending it will lead to increase of economic growth and tax revenues with one year's delay. The empirical analysis suggests that social spending has a positive effect on economic growth, with a year's delay. If there is increase in social spending, it is required to raise finance from a particular source, which in most cases are taxes that also will increase tax revenues.

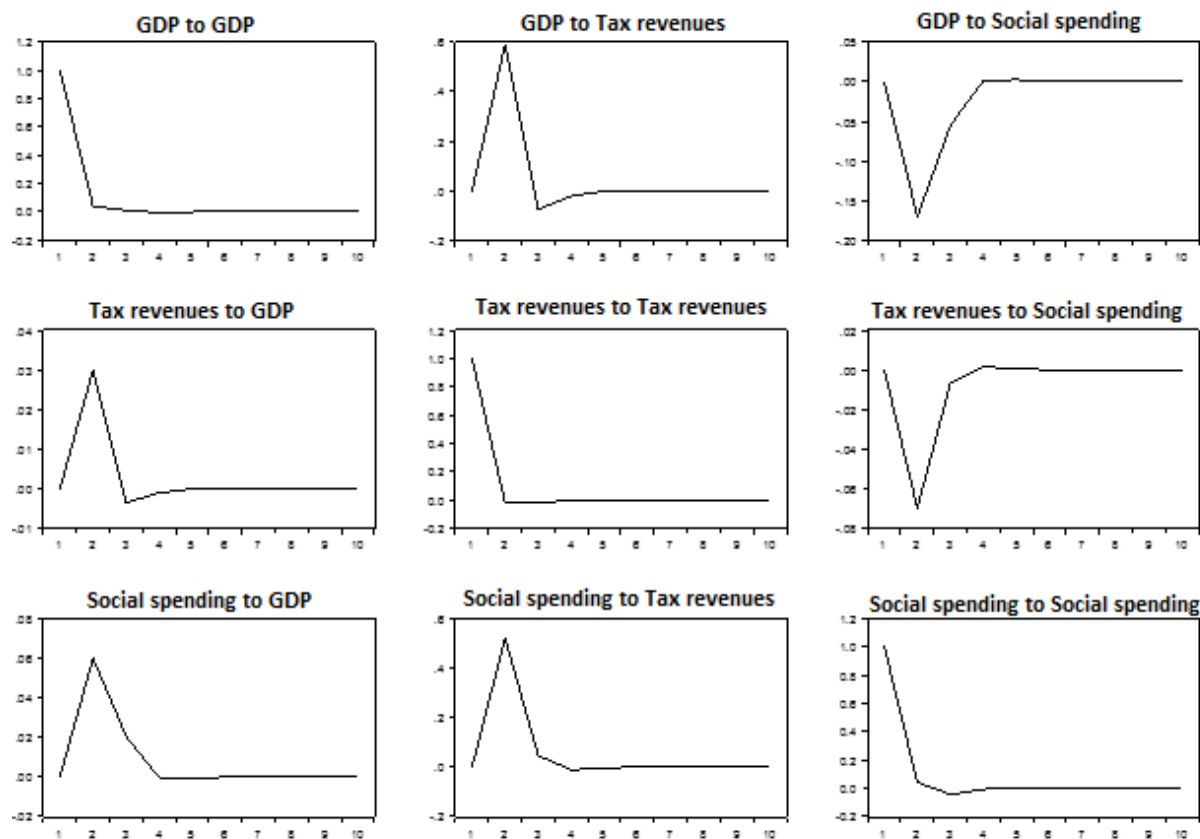


**Fig. 1.** The function of the "impulse" for each variable (Source: own calculation)



Consequently, there has been to construct a function of "impulse" and "step". Individual graphs for all the variables can be seen in Fig. 1 and 2. In terms of the focus of work is always the most important graph, which is located in the lower left of the image 'social spending on GDP'.

In Fig. 1, it is apparent from the graph 'expenditure on GDP', the one-time increase social spending (function 'impulse') has not influence on economic growth in the longer-term. Although economic growth with a year's delay will increase, but this effect during the four years disappear. It is in line with the Keynesian theory of demand. From the growth model used in the article it is also apparent that the expectations and preferences of consumers also have an impact on economic growth. If social spending increases abruptly in one year, and recipients of social spending due to increased incomes begin to consume more, it increase their marginal rate of consume. Also they expect that increase social spending will continue, and their consumption will increase. But government has not increased social spending in the next year and recipients of social spending reconsider their consumer behavior to increasing marginal rate of savings, it resulting in positive impact on economic growth disappear in the fourth year.

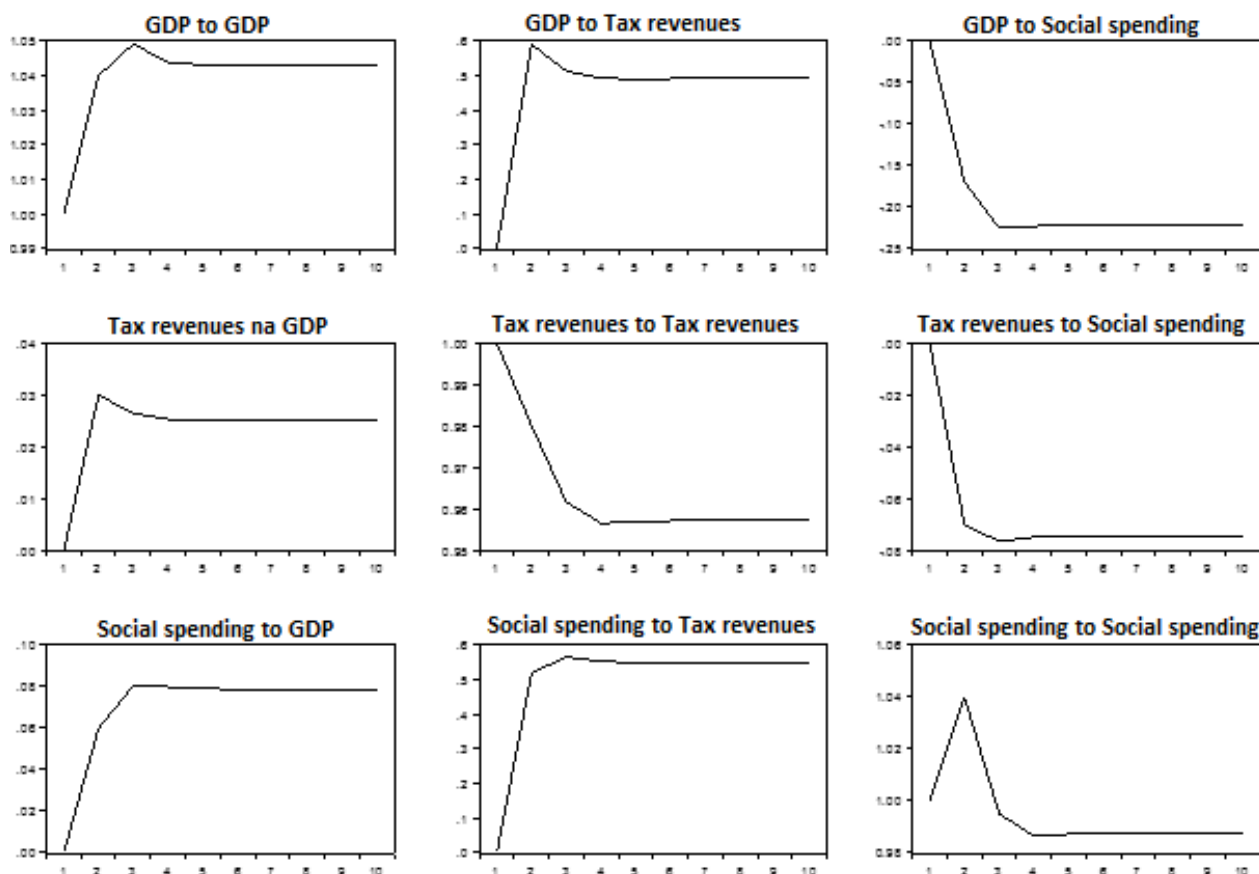


**Fig. 2.** The function of the "step" for each variable (Source: own calculation)

In the case of a function "step" which mean a permanent increase in social spending. Social spending have impact on economic growth only three years, then growth has stabilized at a new level according to the chart 'expenditure on GDP' in Fig. 2.

## 5 Conclusion

Social spending makes up a relatively large part of the expenditure and it is therefore appropriate to ask, how these spending influence economic growth, and whether it is possible to use them to support

economic growth. From this reason, the aim of article is to examine the effects of changes in social spending on economic growth in the long term by using panel VAR model with impulse response functions. The empirical analysis is made on OECD countries in the period 1980-2014. Important part of the analysis performed using the VAR panel model is the design of impulse response functions. They are based on the estimated regression coefficients of the three equations of the model. These are, first, the function of the "impulse" that simulate the effects of one-off changes (shocks) explanatory variables on the variable being explained, and also a function of the "step" that simulate permanent changes in the variables. Exogenous variables in the estimated VAR model are standard growth variables expressed as gross fixed capital formation and the aggregate capital productivity. Endogenous variables are then fiscal variables, i.e. the social spending and the tax revenues. A third endogenous variable is GDP per capita.

Main conclusions of this article results that the one-time changes (function 'impulse') in social spending have not impact on economic growth in the long-term. This increase in spending will initially have a positive effect one year later. But this positive effect on economic growth disappears within four years and economic growth stabilize at the same level. In the case of a function "step" which mean a permanent increase in social spending, there is positive impact on economic growth only three years and subsequently economic growth stabilizes at one level. Social spending thus even in this case do not affect economic growth in the long term.

It is possible to conclude that social spending is not the appropriate tool for promoting economic growth in the long term. Although social spending can temporarily positively affect economic growth, but only in the short term. Policymakers should therefore use social expenditures only to establish the necessary institutional framework and not as a tool for achieving economic growth. In the case that politicians use this tool, it is more about monitoring their own benefit - reelection, rather than achieving economic growth in the long term.

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## USING BROWNFIELDS FOR PRODUCTION OF ELECTRIC POWER THROUGH COGENERATION TECHNOLOGY IN THE MORAVIAN - SILESIAN REGION

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### Abstract:

The Czech Republic, as well as all European Union Member States, must respect EU laws and implement the following directives into their national legislations; Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC or new Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants. In the Moravian-Silesian Region there are many non-functional mines, called brownfields, from which mine gas is mined. Electrical energy can be produced from the mine gas (methane) through cogeneration technology. The Moravian-Silesian Region is highly affected by mining activities, therefore the use of these brownfields, i.a. for cogeneration units, appears to be economically and environmentally appropriate. The aim of this article is to describe and evaluate the use of brownfields for cogeneration units, and thereby generating electrical energy in the Moravian-Silesian Region.

### Keywords:

Brownfields, Cogeneration technology, EU, Mine gas, the Moravian-Silesian Region.

### JEL classification:

K320, K330, N900, R110, R120.

## 1 Introduction

The first written mention of black coal in the Ostrava Region dates back to the beginning of 1750's, more precisely to 1753. Discovery of coal in Karvina dates back to 1776 and was crucial for the development of Karvina. During the 20th century, a large increase of mining activities is noticed and thereby the inflow of labour forces in the Moravian-Silesian Region. In the period of 1990 -2001, there was a rapid decline of mining activities in the Moravian-Silesian Region leading to reduction of labour forces. Due to this decline, there are currently many non-functional mines in the Moravian-Silesian Region, i.e. brownfields, from which mine gas is mined. Electrical energy can be produced from the mine gas (methane) through cogeneration technology. The Moravian-Silesian Region is highly affected by mining activities, therefore the use of these brownfields, i.a. for cogeneration units, appear to be economically and environmentally appropriate even from the perspective of the EU legislation. Suitable regeneration of brownfields offers new opportunities for businesses and thus the increase of economic activity in the regenerated area, related to job creation and elimination of environmental burdens. The aim of this article is to describe and evaluate the use of brownfields for cogeneration units, and thereby generating electrical energy in the Moravian-Silesian Region.

## 2 The History of Mines in the Moravian-Silesian Region and Their Ownership

The history of the Moravian-Silesian Region and mines in Karvina is closely linked to the family of Larisch-Mönnich. The family of Larisch occupied themselves with agriculture until the end of the 18th century. The change came with the beginning of the coal-mining (Hajzlerová and Matrošová, 2009).

## 2.1 The History of Mines and Their Ownership – in the 18th and 19th century

The first written mention of black coal in the Ostrava Region dates back to the beginning of 1750's, more precisely to 1753. The coal was discovered in coal beds in the valley Burňa, in the place of a former coking plant Trojice in Slezská Ostrava (Březina, 2005). However, until the end of that century the initiation of mining in the Austrian part of Ostrava was slow especially due to the lack of interest of local investors (OKD, 2012).

Black coal was found in Karvina in 1776 and it was crucial for the development of Karvina. At that time, John Erdmann Florian Larisch, the owner of the area including not only Karvina, but also wider surroundings, was searching for coal and iron ore, when the coal seam was found on the hill Čechovice. In literature, the place of the black coal discovery is also called Ptáčník or Plážník and the second place of the discovery, Kamienčok, is mentioned, too. The beginnings of mining and its subsequent expansion, the opening of new mines and the establishment of other industrial enterprises fundamentally changed not only the lives of the residents of Karvina, but it also brought many immigrants who came from different corners of the country seeking for livelihood in Karvina. Over time, the landscape has changed, too. Although the coal was very cheap, there was no demand and the sales floundered. The stoves in households were not adapted to coal, as they were heated by wood. Likewise, ironworks or blacksmiths used charcoal in the processing of iron (Hajzlerová and Matrošová, 2009).

Coal mining was stopped for a complete lack of sales for several years. In 1785 there was the second attempt with mining and sales with exactly the same result. Coal mining in Karvina began for the third time in 1794. In the first fifty years the mines with various names were successively opened: Adam, Edvard, Bartholomeus, Eva, Stefanus, Suzanna, Klára, Ursula, Daniel, Eliáš and others. Over time, mining of black coal became increasingly profitable due to reduction of forest areas which caused the shortage of charcoal. Thanks to the development of railways and new railway constructions, for which more iron production was needed, the demand for black coal increased (Hajzlerová and Matrošová, 2009).

The turning point in the evolution was the beginning of iron production in Vítkovice for which coking coal was essential. Therefore mining reached a million tons in 1860's. The rapid development of railways and iron production encouraged mining and began to change the landscape dramatically. The population increased more than ten times in a short period (OKD, 2012).

In the first half of the 19th century all mines in Karvina belonged solely and exclusively to Larisch-Mönnichs. Mining in the first half of the 19th century cannot be compared to the methods of mining during the rise in the second half and towards the end of the 19th century. 34 mine pits mining black coal were built in Karvina and the surrounding area until 1850's.

No other village of the Ostrava – Karvina region could boast of a greater number of mine cannons. Mining was not a separate working industry until 1850. The changes of mining methods in 1860's and the arrival of foreign experts on mining formed a separate mining industry, which was later handed down as the main and only job from generation to generation. Besides the Larisch-Mönnichs, there was the second mining entrepreneur Frantisek Handwerk, who together with Count Žerotín mined a strong coal bed near the old church in 1852. In 1862 the mine field was sold to the the Těšínská Chamber belonging to the Austrian Archduke Albrecht Habsburg. Since the 1860's there were two owners of mine fields in Karvina, the Larisch-Mönnichs and the Těšínská Chamber. Based on the testament by Archduke Albrecht, the Těšínská Chamber belonged to Archduke Friedrich. When the Archduke sold all industrial enterprises, the property of the Těšínská Chamber became the basis of the share capital of Mining and Metallurgical Company, which commenced its activities in 1906.

Mining and Metallurgical Company incorporated the mine Hohenegger, which was founded in 1883, Barbora (formerly Austria) founded in 1908, and Gabriela founded in 1852. The Larisch-Mönnichs were the owners of the mine Jan Karel, which was founded in 1860, Jindřich founded in 1856, František founded in 1856, Hlubina founded in 1871 (Hajzlerová and Matrošová, 2009).

## **2.2 The History of Mines and Their Ownership – 20th century**

The First World War affected all sectors of production quite significantly, coal mining was no exception. Coal production declined and men were called up for military service. Coke production decreased, too. This situation did not last for a long time, because it was not possible to wage war without coal and coke. Railroads needed more coal for transportation of a large number of different transports and iron industry needed coal to supply war materials to the front. Therefore, men working in the mines were exempted from military service in order to ensure a sufficient number of miners for coal mining and coke production. Unlike 1914, when the production fell significantly, it reached its maximum in 1916 and 1917 (Hajzlerová and Matrošová, 2009).

The end of the war meant a complete disintegration for the Ostrava-Karvina mines. At the same time, there was a great social tension manifesting itself in frequent strikes. After the general strike in January 1918 the military administration of mines collapsed (OKD, 2012).

The formation of the independent state was welcomed by most inhabitants of the Ostrava Region, however, at the same time the local mines had to face a situation they were not prepared for. The newly formed republic represented only a small market, moreover, foreign entities were starting to establish themselves in the Czechoslovakian market, especially from Poland and Germany. Export was therefore directed mainly to less developed countries of south-eastern Europe which did not possess their own sources. During the First Republic the process of capital concentration continued. The number of mining companies in the district decreased to seven by 1937: Rakouská báňská a hutní společnost, Vítkovické horní a hutní těžířstvo, Severní dráha Ferdinandova, Kamenouhelné závody Orlová-Lazy, Larisch-Monnichovy doly a koksovna, Kamenouhelné doly a koksovna Jana Wilczka, Státní báňské ředitelství in Poruba. Despite the fact that the mines (as well as the whole Ostrava Region) were severely afflicted by the world economic depression, during the First Republic there was a new expansion in mining. This might be evidenced by the figure of total quantity of coal mined in 1937 – mining in the whole district reached the record of nearly 13 million tons (OKD, 2012).

## **2.3 The OKD Mines Owner in the Moravian-Silesian Region**

During the Second World War mining and all related activities were subordinated to the German war economy. After the war, national administration was established. Shortly after, all mines and some other industrial companies in the country were nationalized by the President's Decree no. 100/45. Based on this decree, the Ostrava-Karvina Mines, a state-owned company, was established on 7 March 1946 with the retroactive effect as of 1 January 1946. The company also included coking plants, preparation plants, power plants, farms and forests.

Another change took place in 1953 when the company was dissolved retroactively as of 31 December 1951 and Kombinát OKD was established performing centralized control. It has managed activities of the newly set-up companies called “trusts” since 1955. However, this structure did not last for a long time. It was cancelled in 1957 and the so-called VHJ (production economic units) were formed the following year. Kombinát OKD was replaced with OKD Association. The independent coking plants were integrated in this new company. Another restructuring took place on 1 July 1965. As the competences were broadened, the company name was changed to Ostravsko-Karvinské doly (the Ostrava-Karvina Mines). This business trust was led by the Headquarters controlling all business units of the former OKD Association. In 1977 a state-owned economic organization of OKD, concern based in Ostrava was established. It was dissolved on 31 December 1988 to be replaced on 1 January of the following year by OKD, a state-owned company.

The state-controlled phase of development of OKD was ended on 1 January 1991 by the Federal Minister of Economy who dissolved the state-owned company and established a joint-stock company of OKD owned by the government.

On 31 December 1990, the state-owned OKD was dissolved without liquidation and the joint-stock company Ostrava-Karvina Mines (OKD, Inc.) exclusively owned by the government was established as its legal successor on 1 January 1991. OKD, Inc. then launched a restructuring process: mining

and surface activities were merged into larger organizational entities and internal business units (vnitřní organizační jednotka VOJ) and OKD subsidiaries were formed.

The key restructuring steps involved a swift closure of Ostrava mines, subsequent headcount reduction and a gradual privatization of the company. Between 1990 and 2001, mining activities were idled in 14 mining sites in the parts of Ostrava and Petřvald concerning the area of 180.0 km<sup>2</sup>.

In 1998, there was a change in the ownership structure of OKD. The state lost its majority share and KARBON INVEST, Inc. became the majority shareholder. In autumn 2005, this company bought the state share and it became the main shareholder of OKD (95.89 %). In the very same year, RPG Industries, Ltd. based in Cyprus acquired a majority share in KARBON INVEST, a. s.; RPG Industries, Ltd. is owned by a group of international institutional and private investors led by the Czech financier Zdeněk Bakala. At the end of 2005, ČMD merged with OKD.

In December 2005, the OKD Board of Directors approved the proposal to split the company. This process was concluded by dissolution of the previous OKD that was deleted from the Companies' Register establishing several independent entities as its legal successors. The core (mining) activity was passed over to OKD, Inc. (a successor joint-stock company with a new company ID and Tax ID). Other activities not related directly to core mining activities were split off and integrated in other successor companies (OKD, 2012). OKD is currently in bankruptcy and insolvency proceeding was commenced on the proposal of the debtor.

The only working mines can be found now only in Karvina (merged mines ČSA – Jan Karel a Lazy) and Darkov (Hajzlerová and Matrošová, 2009).

### 3 Brownfields

The term "brownfield" is taken from the English language and can be understood as a brown field. However, the term also denotes old industrial areas, which remained empty after finishing of production and they have been slowly deteriorating. There is a huge amount of brownfields in the Moravian-Silesian Region and they represent significant environmental burden for the Moravian-Silesian Region. These deteriorating industrial areas often negatively affect the overall appearance of the city (Březina, 2005).

The term "brownfield" is not used in any legal regulation of the Czech Republic. When compared with foreign legislation in the field of planning and urbanism there are major differences:

- regeneration of brownfields as the main trend of development of villages and towns is not promoted enough
- institutional tools available for regeneration are not rooted in legislative planning
- legislation does not contain specific tools for interventions in the area (with the exception of decontamination areas)
- town and country planning legislation rarely addresses the economic aspects of the territory development (Doleželová, 2015).

Legislation in Czech Republic related to the issue of brownfields is: Act No. 183/2006 Coll. on town and country planning and building code (Building Act), as amended, Act No. 114/1992 Coll. of the National Council on nature and landscape protection, as amended or Act No. 334/1992 Coll. of the Czech National Council on the Protection of Agricultural Land Fund.

Building Act addresses for example these areas, which may relate to brownfields:

a) objectives and tasks of town and country planning in § 18 and § 19 of the Building Act, where the efforts of the preferential use of already developed areas to development of new areas are confirmed. The task of the town and country planning is especially to examine and assess the need of changes in the area, public priorities in their implementation, their contributions, problems, risks in respect to, for example, public health, environment, geologic structure of the area, impact on the public infrastructure and its economical utilization, to determine the condition for renewal and

development of the settlements' pattern and for the quality of housing or to determine the necessary redevelopment, reconstruction and reclaiming interventions into the area (§ 26 Building Act).

b) analytical materials of planning containing the ascertainment and assessment of the state and development of the area, its values, limitation of the changes in the area due to protection of public priorities, arising from the regulations or stipulated under the special regulations or arising from the properties of the area, programmes for executing the changes in the area, ascertaining and assessing the area sustainable development, and determination of problems for solution in the planning documentation

c) the planning provision on a building ban, which is issued as a general provision according to the rules of administrative procedure, it limits or prohibits the building activity within the delimited area to the necessary extent, in case it could deteriorate or make the future use of the area according to the planning documentation impossible, if its task specification has been approved, or under another decision or provision within the area, by which the use of the area is regulated (§ 97 Building Act).

**Benefits from reclamation of brownfields can be generally determined in many areas:**

- reduction of the "local unemployment rate"
- reduction of negative impacts on the environment due to urbanization
- improving the health status of the population due to less environmental contamination.

**The main barriers to further development of brownfields include:**

- lack of funding for the reclamation of land, including both public and private investments,
- failure to define and clarify the term "responsibility" for the formation of brownfields, it is often unclear ownership,
- the uncertainty of the final outcome of the reclamation process
- pressure of the market environment
- reluctance to invest in difficult conditions, which are further influenced by socio-economic problems and requirements (Šebestová and Wagnerová, 2005).

Underground coal mining, which caused the declines of surface, formed the appearance of the landscape in the Moravian-Silesian region. The gradual degradation of the environment and the surrounding landscape caused by coal mining was an inevitable tax for the economic prosperity of the region (Martinec et al., 2005).

There are some regions in the Czech Republic, which have been involved in the regeneration solution since 2000. The Moravian-Silesian Region has been involved in the programs of inhibition and restructuring of mining activities. Open areas were seen as necessary for the construction of new industrial zones, which should create new jobs (Doleželová, 2015).

Historical development shows that almost all territory for construction used by human being (in case of industrial buildings unreservedly) are repeatedly used for new activities. It is unfavourable that their revitalization is preceded by a complete and long-lasting devastation of the area with unwanted aesthetic, ecological, economic and social consequences. A bad situation of lands and their reputation also devalues the land in the wider area and discourages their use. System solutions are therefore focused on reducing the time between the demise (inhibition) activities and starting the subsequent usage of the combining economic and administrative provisions (tools) (Tížková, 2005). In Table 1 the basic steps for regeneration of brownfields are mentioned.



**Table 1.** Basic steps for regeneration of brownfields

| Land Management                                                                                      | Financing                                                                                                         | Development strategy                                                                                                                    |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| - gain control over the territory (buy land or involve the current owner in the development company) | - government, EU, region, municipalities, private sector (developers and users), PPP - Public Private Partnership | - identify the potential role of different parties in the process (government, region, municipality, private sector)                    |
| - prevent the speculations in access to lands                                                        | - source and amount of funding will depend on the end use                                                         | - create an outline for prioritizing development (factors: economic development, employment, environment, market demand, financing ...) |
| - create a development plan of the entire territory                                                  | - based on a viable development plan and financial feasibility study                                              | - identify possible alternative use of a brownfield land (territorial plan)                                                             |
| - decontaminate the area, perform demolition, reconstruction                                         | - will never be enough money available for regeneration of all brownfields                                        | - insert the regeneration of brownfields in the overall strategy for regional and municipal development of land and real estate         |
| - improve arrival and technical infrastructure                                                       |                                                                                                                   |                                                                                                                                         |
| - realize objects - to repair and/or build new units                                                 |                                                                                                                   |                                                                                                                                         |
| - to sell/rent the land according to approved Development Plan                                       |                                                                                                                   |                                                                                                                                         |

Source: Tížková, 2005.

#### 4 Cogeneration Technologies and Their Benefits

The Preamble to Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (EED – Energy Efficiency Directive) states in paragraph 35: „High-efficiency cogeneration and district heating and cooling has significant potential for saving primary energy, which is largely untapped in the Union. Member States should carry out a comprehensive assessment of the potential for high-efficiency cogeneration and district heating and cooling.“

Cogeneration units are highly sophisticated process units designed for combined production of power and heat. It is a combination of a combustion engine, a generator, a set of heat exchangers, and a control system by means of local, PC-assisted remote, and even cell-phone control of cogeneration units.

The small, gas-engine based cogeneration units are part of the decentralized energy sources. This means that the power and heat are produced close to the site of consumption, so that there are no longer losses caused by power transmission and distribution.

The power from cogeneration unit is either used for internal consumption of the building where a cogeneration unit is installed or supplied into the grid. The heat from cogeneration units is utilized to heat buildings, to prepare hot service water or process heat. Cogeneration units also serve as backup electric energy sources where this energy must be supplied around-the-clock. With an absorption cooler, the heat generated in the cogeneration process can be used for the production of cold for technological purposes or air conditioning. In such cases, we speak of trigeneration, i.e., combined production of power, heat, and cold. The dominant fuel used in powering cogeneration units is natural

gas. However, the number of facilities that use biogas, landfill gas, sewage gas or other alternative fuels as, for example, mine gas, expands abruptly in recent years.

As for other alternative power production methods that make use of such renewable energy sources as, for example, sun or wind, the greatest benefit of cogeneration is that it is capable of creating precisely the desired amount of energy for any desired time. For this reason, cogeneration is sometimes referred to as controllable energy source. The dispatching control of larger number of CHP units makes it possible to create so-called distributed power plants (sometimes referred to as virtual power plants), i.e., systems composed of numerous smaller power sources in several localities that, from external point of view, function as one single unit with a higher power output. These power plants are capable of providing certain system services, thus compensating for the imbalances in the power supplied by the photovoltaic or wind-based systems, etc. (Tedom, a.s., 2016).

It is a generally known fact that fossil sources of energy (oil, coal, natural gas) are depletable sources, the use of which is accompanied by negative externalities such as environmental pollution (Otáhal, 2009), worsened quality of life of local population (Pasten and Santamarina, 2012) or reduced tourism potential (Frantál and Kunc, 2011). Another less favourable trend concerning exploitation of depletable resources is the climate change and global warming (Turton and Barreto, 2006).

Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and hydrofluorocarbons (HFCs) are examples of greenhouse gases whose absorption of solar radiation is responsible for the greenhouse effect. Greenhouse effect is the build-up of heat in the atmosphere near the earth's surface (troposphere) caused by greenhouse gases. Just as the glass walls in a greenhouse increase the temperature of the air inside, the greenhouse effect warms the surface of the planet. Without the natural greenhouse effect, the temperature would be below freezing point. However, human activities have greatly intensified the natural greenhouse effect, causing global warming and triggering climate change (European court of auditors, 2014).

The control of European energy consumption and the increased use of energy from renewable sources, together with energy savings and increased energy efficiency, constitute important parts of the package of measures needed to reduce greenhouse gas emissions and comply with the Kyoto Protocol to the United Nations Framework Convention on Climate Change, and with further EU and international greenhouse gas emission reduction commitments beyond 2012. Those factors also have an important part to play in promoting the security of energy supply, promoting technological development and innovation and providing opportunities for employment and Regional development, especially in rural and isolated areas. In order to reduce greenhouse gas emissions within the EU and reduce its dependence on energy imports, the development of energy from renewable sources should be closely linked to increased energy efficiency (Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC). Therefore, even in the context of reducing greenhouse gas emissions in the EU, this method is the development and utilization of electrical energy, i.e. producing electric energy from methane through cogeneration technology, ecologically and economically appropriate.

According to the new Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants are set limits for emissions of sulphur dioxide, nitrogen oxides a particles from medium combustion plants. Specifically, the directive includes: mandatory system of registration of medium combustion plants, specific limits for emissions of sulphur dioxide, nitrogen oxides a particles from medium combustion plants and deadlines for their introduction, obligation of Member States to apply more stringent emission limits in establishments situated in areas, where the air quality does not reach the required level, the requirement that operators of installations of the emissions monitor and report on non-compliance with the limit values – including that on the level of the member states, a system of inspections in the environmental field for medium combustion plants was

created, or the introduction of other measures for compliance of a legislative was formed – and to take the necessary provisions in case of violations of the rules, the creation of a mechanism for reporting, specific rules on penalties applicable to infringements of the rules. This directive, have to be implemented in the law of Member States by 19 December 2017. Cogeneration units already meet the standards referred to in this Directive and this contributes to minimization of air pollution during the combustion of methane.

## **5 Using Brownfields for Cogeneration Technology in the Moravian – Silesian Region**

In spite of the fact that coal mining was terminated, the release of methane continues to occur even though in lesser extent and it has a declining trend. Before the inhibition of mines in 1990, the underground was ventilated thanks to 17 vent areas, i.e. 17 main fans that were installed on the surface of the air shafts. The capacity of methane controlled through ventilation of mines reached about 135 thousand m<sup>3</sup> methane per day at the end of the 19th century, and at times of the largest coal mining activity in the 1960's it was up to 1354 thousand m<sup>3</sup> methane per day.

After the liquidation of underground mines, methane is still released into the mining cannons and loosened rocks. The cubic space allowing the accumulation of mine gas is estimated to 50 mil.m<sup>3</sup> in the region of Ostrava basin and to 19 mil.m<sup>3</sup> in Petřvald basin (Vavrušák, 2005).

Electrical energy can be produced from this mine gas (methane) through cogeneration technology. The cogeneration units were installed in non-functional mines in the Moravian-Silesian region, namely the mines František (since 2007), Odra Přívoz (since 2007), Paskov (since 2007), Rychvald (since 2007), Vrbice (since 2005), Žofie (since 2007).

The cogeneration units were also installed in the mines Dukla and Sviadnov in 2007, but at the time of their installation, these mines were still working.

Cogeneration units produce from 580 kW/h to 2000 kW/h of electric power. Cogeneration units produce the same amount of electric power as heat. The heat is utilized only in 50-70% e.g. for heating brownfields (mine František) or in the manufacturing lines of car lights (mine Rychvald).

In Fig. 1 The cogeneration units on brownfields in the dysfunctional mines in the Moravian-Silesian Region are mentioned. The cogeneration units are: a former mine František, where there are 3 cogeneration units with the power output of about 1200 kW, 1600 kW, 1600 kW, a former mine Paskov, where there are also 3 cogeneration units each with the power output of 1600 kW, a former mine Rychvald with 3 cogeneration units with the power output of about 330 kW, 1600 kW and 2000 kW, a former mine Odra Přívoz, where there is a cogeneration unit with the power output of 770 kW, Vrbice 580 kW, Žofie 1200 kW, Dukla 1600 kW and Sviadnov 770 kW.

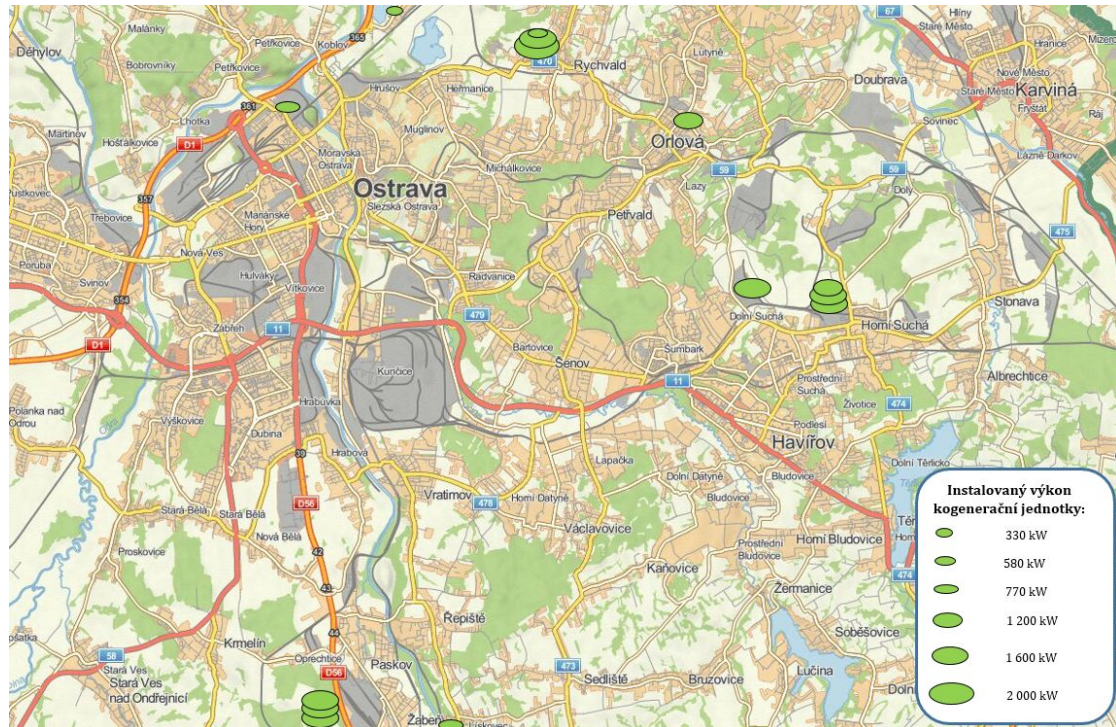


**Fig. 1.** A map of cogeneration units (and their installed capacity), which are located on brownfields in the Moravian-Silesian Region (Source: basemap ([www.katastralni-mapa.cz](http://www.katastralni-mapa.cz)))

In Fig. 2 there are the cogeneration units on the brownfield of the former mine František (marked with a red circle). On the right side of the cogeneration units a degassing station of a former mine František, where mine gas is pumped, is located.



**Fig. 2.** Cogeneration units on the brownfield (a former mine František) (Source: own)

Cogeneration units are also installed on the functional mines in the Moravian-Silesian Region, namely the mines: Darkov, where there have been two cogeneration units since 2007 each with the power output of about 1600 kW, Chlebovice (since 2006) with the power output of 770 kW, Jan Karel with two cogeneration units since 2008 each with the power output of 1600 kW, Lazy two cogeneration units since 2008 each with the power output of 1600 kW and Staříč since 2007 with the power output of 1600 kW.

## 6 Conclusion

The image of the Moravian-Silesian Region has been linked with mining and inhibition and followed by closure of most mines. It affected the neighbourhood, the environment, the citizens of the Moravian-Silesian region and also the high unemployment rate. Brownfields are formed in the areas of former mines in the Moravian-Silesian Region. These brownfields are remainders of mining and these areas are desolated. Their condition significantly influences the structure of the settlement due to their aesthetic defect and it also has an impact on their surroundings. Mine gas (methane) is still mined on these brownfields in the Moravian-Silesian Region), and it can be used for production of electric power through cogeneration technology. According to the EU directives, namely Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC or new Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants, The European Union forms its vision of energy in the future based on the cogeneration units and the ideas are involved in the legislation. Cogeneration units produce from 580 kW/h to 2000 kW/h of electric power. Cogeneration unit produces as much electric power as heat. Methane is an example of greenhouse gas which can absorb solar radiation and is responsible for the greenhouse effect, which causes global warming and climate changes. Therefore, in the context of reducing greenhouse gas emissions in the EU, this method of development and utilization of electrical energy, i.e. producing electric energy from methane through cogeneration technology, is ecologically and economically appropriate, as there is minimum air pollution.

## 7 Acknowledgement

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## MEASURING OF THE REAL CONVERGENCE IN THE EUROPEAN UNION: PRE-CRISIS EVIDENCE

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### Abstract

The paper deals with an application of econometric techniques for modelling of real convergence. Economic convergence in general is understood as a process of decreasing of differences in the economic level and efficiency of individual countries, and therefore it serves as a starting point of the international comparison and important part of macroeconomic analyses as well. When the Czech Republic joined the EU in 2004, agreed to take steps to become a member of a higher degree of integration as soon as possible. For this purpose, to determine whether the EU member states are ready to join the Eurozone, nominal convergence criteria were defined, but they are not primarily used to determine the real convergence. The main goal of this paper is to evaluate the hypothesis that the economic level of the Czech Republic and the Eurozone states converged in the pre-crisis period 1995-2009 to the average economic level of the Eurozone. The theoretical part of the paper is devoted to the methodological bases of the economic convergence. The empirical part is aimed at econometric modelling of real convergence of economic level in selected economies. The final part of the paper summarizes main findings of the paper that confirmed the real convergence process within the Czech Republic and Eurozone countries before economic crisis in period 1995-2009.

### Keywords

Real convergence, Gross domestic product, speed of convergence, Convergence half-life.

### JEL classification

C21, E13, E63, O47

## 1 Introduction

In 2004 historically biggest enlargement of the European Union of ten middle and east Europe countries has occurred. Together with nine other states the Czech Republic became a member of the European Union in that year. Joining the EU, the Czech Republic agreed to take steps to become a member of a higher degree of integration as soon as possible – the economic and monetary union. Till now (November 2012) from nine countries, which has joined the EU, together with the Czech Republic, only five of them (Cyprus, Malta, Slovenia, Slovakia and Estonia) has met the conditions to accept a common currency euro.

Whether to accept euro or not is strictly in a competence of a member states and it depends on their preparedness to join the Eurozone. Also for the Czech Republic the question of acceptance a common currency is still valid. With considering the fact that the Czech economy has been hit by the economic crisis, as well as other world economies, but also because of the prevailing euroscepticism of the current political representation of the Czech Republic, there is a continual reassessment of the expected date of the possible euro adoption.

Study of the economies real convergence has become a phenomenon of answering the question of euro readiness not only in the Czech Republic. For this purpose, to determine whether the EU member states are ready to join the Eurozone were defined the Maastricht (convergence) criteria as a key indicator. These criteria imply if country is converging or diverging, but they are primarily used not to determine the real convergence. Nominal convergence assesses the fulfillment of these criteria but it is also important to assess the real economies convergence. An indicator of gross domestic product per capita in purchasing power parity is the most widely used for the analysis of real convergence. With some exaggeration we can say that when the GDP per capita in PPP of one economics gets

closer to another, there is a real convergence of economic levels and vice versa, when these indicators drift apart, there is a divergence. The article is devoted to study the real convergence of economic level of the Czech Republic in comparison to the Eurozone. The aim of this paper is to verify the hypothesis that the economic level of the Czech Republic and the Eurozone (EA17) converged in period from 1995 to 2009 to the average economic level of the Eurozone. The default method is cross-sectional analysis of surveyed economies.

Chapter 2 and Chapter 3 of this article introduce the theoretical basics to convergence. The term convergence is presented in a relation to economic growth theory as well as are introduced the basic concepts of convergence. The first chapter ends with an identification of the key convergence concept used in this analysis. The second chapter is shortly devoted to general overview of studies which deal with real convergence of economic level of the Czech Republic. Studies, which have been published before the Czech Republic joined the EU, are focused mostly on real convergence of middle and east Europe countries to EU. The issue of the Czech Republic convergence to Eurozone is getting ahead after the CR admission to EU. This article was inspired mostly by the study of Slavík (2007) which examine the real convergence of the Czech Republic to the EU and other countries. Slavík(2007) analyzes six models which are divided by integrated countries and by time period. He uses cross data analysis and to compare the convergence of identified groups he calculates the speed of convergence and convergence half-time.

Chapter 4 is devoted to Gross Domestic Product (GDP) per capita in purchasing power parity (PPP). Furthermore, the difference between PPP and PPS is explained. The PPP is more suitable when dealing with comparison in space and the PPS when dealing with comparison in time. In this article the PPS is used for it replicates precisely the GDP dynamic character.

Chapter 5 describes graphically the GDP per capita in PPS in the Czech Republic and in EU17 countries development. This chapter ends with a graphical projection of the speed of convergence of the Czech Republic and EU17 countries.

Chapter 6 includes theoretical and practical approaches to econometric modelling of real convergence of economic level. At the end of the chapter is defined articles regression equation. Chapter 7 serves to the purposes of econometric model application in chosen countries.

## **2 Economic Convergence from the Perspective of Growth Theories**

Exact convergence specification is a very complex issue because this term is used in various modifications which depend on the type of analyzed problem. The term convergence is to be found across different science disciplines, such as: medical care, biology and mathematic. Specific meaning gets convergence in economy.

Economic convergence is a process when the differences in economic level as well as in efficiency of particular countries (regions) are reduced, e.g. see Staníčková (2013). In case of opposite effect and the differences are getting bigger, we speak of divergence. In the center of attention does not stand only the differences reduction or growth, but it is crucial to study how fast these changes happen. Economic convergence and the speed then becomes a center of interest of economic comparisons, see Brada and Kutun (2001), Bruha and Podpiera (2011), Cribfield et al. (1995), Fung (2009), Palan and Schmiedeberg (2010), Quah (1996), Sala-i-Martin (1996), Skott (1999), Taylor (1999), Verspagen (1995), where the comparative-economic analysis in terms of time is applied.

According to the economic analysis the convergence is primarily divided by the analyzed quantities to nominal and real convergence. Although the real convergence is related with nominal and it is necessary to assess these approaches as a parallel developing processes, it is important to point out that the very understanding of nominal and real convergence is not united among individual authors. Nominal convergence is defined as a process of economies approximation from the price perspective, or in other words as a tendency of economies to achieve the same level of nominal variables such as: inflation rate, interest rates, exchange rate or GDP per capita in common currency,



see Frait and Komárek (2011). In a big picture, the nominal convergence can be understood to as a fulfillment of the Maastricht criteria.

Convergence is also strongly related with long term economic growth e.g. economic growth theory. This theory explores factors which can influence the economic growth pace in particular countries and also explain the differences between their real products per capita. Chronologically speaking the beginnings of studying the convergence can be seen in a study of absolute convergence. The absolute convergence assumes the convergence to a steady state, which is identical for all economies, and which is influenced by an individual characteristics and parameters of the researched economy (savings, population growth, depreciation degree of capital goods, etc.). All economies have the same steady state in this theoretical approach; however, countries with lower GDP per capita have higher growth rates in real terms. Because of this it is important to keep the condition of economies homogeneity valid. Then we speak about conditional convergence. The convergence is conditioned by variables that affect different stable states (savings rate, parameters of the production function, government policies influencing the position of the production function, infrastructure, etc.). If the convergence is measured in the terms of homogenous group of economies with similar institutional characteristics, it can be described to as the conditional convergence. OECD countries are the typical block of countries for measuring the conditional convergence. On the other hand, the convergence of Bangladesh and the USA can hardly be expected.

Above mentioned types of convergence (conditional and absolute) can be verified by  $\beta$ -convergence and  $\sigma$ -convergence. The application of these approaches is dependent most of all on the methodological framework for convergence types studies.

The concept of  $\beta$ -convergence (Furceri, 2005; Michelacci and Zaffaroni, 2000; Pfaffermayr, 2009) is based on the neoclassical theory of the economic growth, which postulates that the initially poorer countries evince more dynamic growth. Thus the poorer countries gradually converge to richer countries, whose growth rate is not so high. GDP growth is negatively dependent on the initial economic level (Smrčková et al., 2008)

$$\frac{1}{T} \log \left( \frac{Y_{iT}}{Y_{i,0}} \right) = \alpha + \beta \log Y_{i,0} + \gamma Z_i + \varepsilon_i, \quad (1)$$

where the left side of the equation is the average growth of GDP per capita in the real formulation of the purchasing power parity during the period from 0 to  $T$ , which is dependent on the initial economic level  $Y_{i,0}$  and a set of exogenous factors  $Z_i$ .  $T$  variables express the number of analyzed years,  $\alpha$  indicates the tiered constant,  $\beta, \gamma$  are coefficients,  $\varepsilon_i$  is a random component. Index  $i$  denotes particular economies. The  $\beta$ -convergence occurs when there is a negative direction of the beta line. The concept of  $\beta$ -convergence is used in this article.

The concept of  $\sigma$ -convergence (Dalgaard and Vastrup, 2001; Lucke, 2008; Miller and Upadhyay, 2002) comes also from the neoclassical theory of the economic growth, according to which all countries converge to the same level of maturity or to the same economic performance. Sigma convergence is then defined as a lowering of the variance (dispersion) of the logarithm of real GDP per capita between economies in time. Mathematically written:

$$\sigma_t^2 > \sigma_{t+1}^2, \quad (2)$$

where  $\sigma_t^2$  is variance of the logarithm of real GDP per capita measured between period  $t$  and  $t + 1$ .

### 3 Review of Studies Dealing with Real Convergence of the Czech Republic Economic Level

Among older real convergence studies concerning the Czech Republic it is good to mention Frait and Komárek study from 2001. The subject of this study is to analyze nominal and real convergence in transitive economies. After the year 2000 the issue of real convergence of the Czech Republic to EU or to Eurozone was very discussed theme and many publications were written during this time period (see Nachtigal and Tomšík, 2002).

In Žďárek study from 2006 is put the real convergence growth rate from 1995 to 2005 of countries, which have joined the EU on 1<sup>st</sup> May 2004, in line. From this study emerge that the Czech Republic has not shown any extraordinary growth rate of real convergence (numeric change 4,6 pp). In comparison with Poland this growth rate is half as slow, compared to Slovakia is third the size. Žďárek(2006) also analyzes the connection between convergence of economic level and price level in newly accepted EU countries. Another study exploring the real convergence of countries which have joined the EU together with the Czech Republic is one from Šikulová (2006).

Vintrová and Žďárek study from 2007 is also aimed at advancement in the field of real convergence of new EU member states from 2004. Vintrová (2007) is further elaborating the real convergence in central Europe within five countries. Tuleja (2007) explores the real convergence of the Czech Republic and Poland to Eurozone.

Slavík (2007) study is dealing with the real convergence of GDP per capita in PPP of the Czech Republic and another EU member states to the “old” member countries. Slavík analyzes six models in total which he divides according to sorted countries and time period. Chosen model from Slavík study, which is comparable to the one used in this article, states that in observed time period the chosen countries have converged by the speed of convergence 1,4 %. The cross section time series analysis is used to calculate beta-convergence.

Dvoroková et al. (2011) and Dvoroková et al. (2012) in her studies deals with real convergence of economic and prices level of EU countries. In all are analyzed four models concretely two various time series for each variable. The time series differ by the year 2009 which is implied in one model and removed from the second one in order to quantify the financial crises 2008-2009 effects. Publication deals also with the convergence speed calculation and has come to the same conclusions comparable to Slavík (2007) study. To calculate the real convergence, the cross section and panel data analysis can be used, more closely for example Melecký and Nevima (2010).

#### **4 GDP in Purchasing Power Parity as a Basic Real Convergence Indicator**

Key role when analyzing the real convergence is played by the data base. Mostly the real convergence (convergence of economic level of different countries or regions) is measured by GDP per capita in PPP. Basic calculations of PPP for EU countries are provided by Eurostat and OECD in three year intervals based on extensive way of determining the course of use of GDP. Eurostat perform also interpolations and extrapolations based on less sophisticated access.

Research study from the Ministry of Finance of the Czech Republic (Smrčková, 2008) states, that international comparisons can be pursued in current or constant purchasing power parity. Current parity explains economic output in common current monetary unit and they are used more often. World Bank together with OECD uses international USD. This monetary unit expresses the total quantity of goods which is possible to buy in a particular year in the USA for one American dollar. For this purpose, the PPS unit (Purchasing Parity Standard) was created. PPS presents an artificially created unit in which the differences between purchasing parity of monetary units of EU member states are narrowing. The data in PPS are considered to be equal the sum of GDP data for all 27 member states re-count according to exchange rate to EUR (earlier to ECU) and the same value expressed in PPS. This calculated figure (index) is more suitable for space comparisons.

The second way to compare is use of constant parity of particular chosen time period (ordinarily the time period is calendar year). The advantage of this count is that it precisely replicates the GDP and population dynamicity. The disadvantage is the abstraction from exchange relation changes and structure. The comparison method by constant parity is practically more transparent and resistant although the results are dependent on chosen parity basis. This way of comparing gain in importance in particular countries which are major producers and exporters of goods which are under often prices changes influence and are causing an extreme volatility of exchange relations.

The measuring of real convergence is carried out through chosen macroeconomic aggregate and therefore the measurement can be realized by two channels. First is labor productivity growth which

will draw ahead of the growth in reference countries. Second channel is an economic activity growth as well as employment ratio growth which can happen as a consequence of demographic changes of economically active population. Therefore, the labor productivity growth is the crucial real convergence factor. It can be measure by GDP per worker development or the worked hour development.

Helísek (2010) states the real convergence is expressed by economic indicators such as: convergence of economic level (GDP per capita), convergence of price levels, economy cycles harmonizing and structural similarity of economies.

## 5 Default Economic Level Influence

Economic level is mostly express in a form of GDP per capita. In case of evaluation of the economic level relationship among two economies it is possible for the convergence process to be written formally as follows:

$$\frac{y_{1,t}}{y_{2,t}} < \frac{y_{1,t+1}}{y_{2,t+1}}, \quad (3)$$

where  $y$  is the income per person if unit 1 (catching up economy) and 2 (advanced economy) at time  $t$  and  $t + 1$ .

The Czech Republic belongs together with countries, which became members of the EU after 2004, to the group of catching up economies. Initial economic level has therefore a significant influence on the speed of convergence. From the neoclassical theoretic model arises the fact, that countries with lower per capita income are more distant from the steady state, i.e. from their technical and economic possibilities (Barro and Sala-i-Martin, 2004). From this it is possible to deduce the fact, that these countries have sufficient requirements for growth because they are able to adopt experiences and technologies from more advanced part of the world (the beta-convergence concept). It is possible to verify these theoretical findings in recent development of the Czech Republic.

Fig. 1 shows the initial economic level of the Czech Republic and seventeen Eurozone countries in the year 1995 (basis for the calculation is EA17). Fig. 2 follows with the GDP in PPS in the CR and EA17 development in last analyzed year 2009.

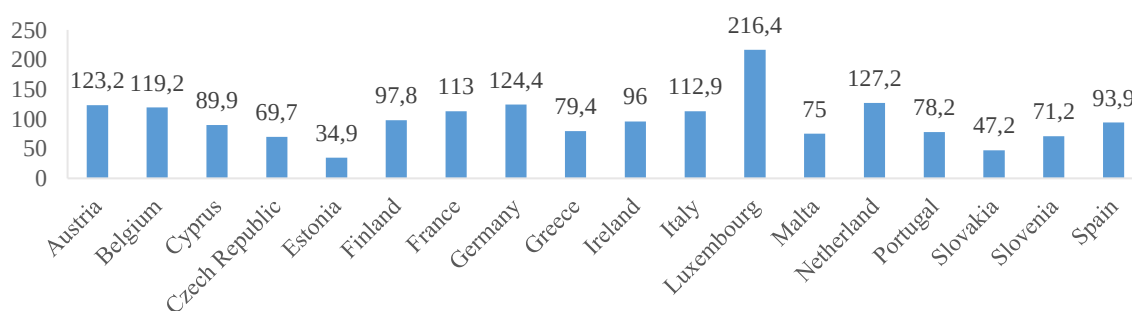


**Fig. 1.** GDP in PPS in the Czech Republic and EU17 development, 1995 (EA17 = 100) (Source: The World Bank (2016), own calculation)

As seen by the old member states such as Germany or France the GDP has decreased. In Germany the GDP per capita was 124,4 % of GDP of EA17 in 1995 and 107,3 % in 2009, getting a total drop by 17,1 %. GDP of France has dropped from 113 % in 1995 to 97,8 % in 2009, meaning overall drop by 15,2%. On the other hand, the GDP per capita has grown in Slovakia by 16,7 % or Estonia by 18,6 %. The Czech Republic shows also increasing trend but not as noticeable as by previous two countries. In 1995 GDP per capita was 69,7 % of overall GDP per capita of EA17 and it grew by 4 % to 73,7 % in 2009.

Vintrová and Žďárek (2007) states that the Czech Republic catching up effect, to advanced EU countries, has a few deviations. Because of 1997-1998 recession the CR was diverging and economic level has been receding from the average EU level. There was a major turnaround in this development after the year 2000 when the Czech Republic economic level has convergence to average EU-27 level by total speed 2 pp. a year.

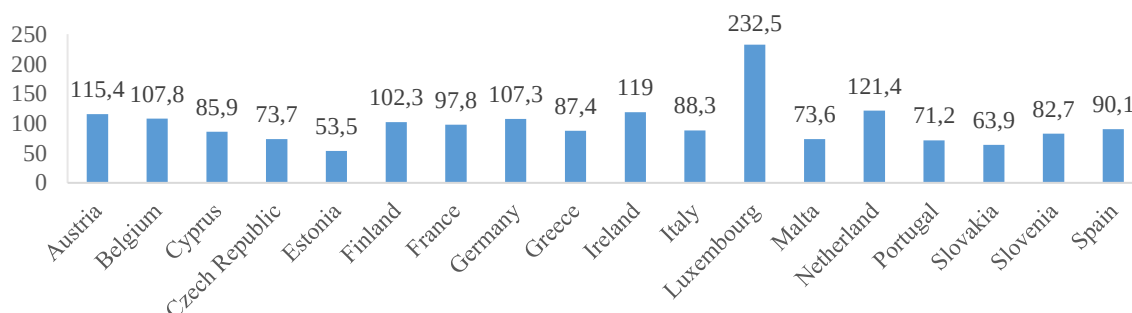


**Fig. 2.** GDP in PPS in the Czech Republic and EU17 development, 2009 (EA17 = 100) (Source: The World Bank (2016), own calculation)

Although this article analysis uses cross-sectional analysis, it is possible to review the CR convergence of economic level by a simple graphical analysis which contains initial economic level of analyzed economies in 1995 and also change of this economic level between 1995-2009 (see Fig. 3). The greatest possible speed of convergence can be seen by economies in upper left quadrant containing economies of Estonia and Slovakia, which have the lowest initial economic level in 1995, but grew fastest, which corresponds to neoclassical assumption of real convergence. On contrary the divergence can be identified by e.g. France, Italy or Germany whose economies were declining in monitored time period. In case of the Czech Republic as interesting seems comparison to Slovenia which has similar initial economic level. While the CR was negatively affected by recession in the end of millennium, Slovenia was permanently growing.

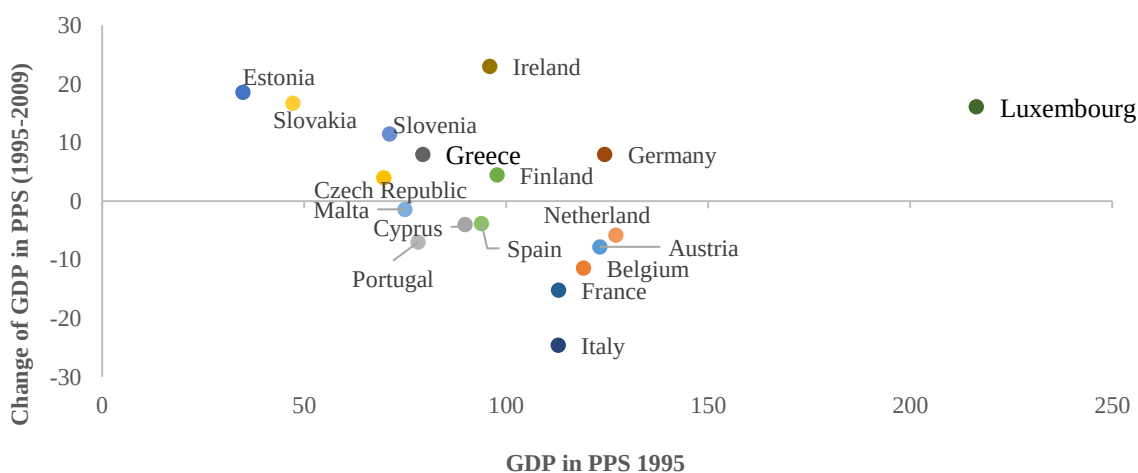


**Fig. 3.** The Czech Republic and EA17 speed of convergence between 1995-2009 in relation to initial economic level (EA17 in 1995=100) (Source: The World Bank (2016), own calculation)

Countries, which have become members of EU in 2004 just like the Czech Republic, are able to being analyzed through achieved GDP growth rate. While in Estonia, Slovakia, Slovenia and the Czech Republic the economic growth accelerated, in Cyprus and Malta was the economic growth

decelerating which was caused especially by economic decrees in times of recent recession (the GDP decrease in 2009).

The integration in single market and increase in the foreign direct investment attractiveness enabled quick production restructuralization and new markets findings. Especially former Czechoslovakia was typical by its extensive manufacturing. Far better initial position has Slovenia which was integrated in western markets from early 80<sup>th</sup>, see Vintrová and Žďárek, 2007.

## 6 Econometric Model of Real Convergence

There are three basic approaches used to study convergence among various economies which depend on characteristics of the data used for the analysis. The approaches are: cross-sectional analysis, time series analysis and panel data analysis. For the needs of this article was chosen the cross-sectional analysis. Author of the most known reference to this approach to study convergence is Baumol (1986) who has in his study of the real convergence developed conventional way to analyze convergence. The key aspect of this approach is an estimation of “original growth equation” which Baumol created on the basis of graphical illustration of statistical data. Based on observed dependencies he constructed the original growth equation:

$$\frac{1}{T} [\ln(y_{i,T}) - \ln(y_{i,t_0})] = \beta_1 + \beta_2 \ln(y_{i,t_0}) + \varepsilon_i, \quad (4)$$

where  $T$  is end of the time period,  $y_T$  is real GDP per capita at the end of the time period,  $t_0$  is initial time period,  $y_{t_0}$  is real GDP per capita at the beginning of the time period,  $\beta_1$  is intersection,  $\beta_2$  is slope parameter,  $\varepsilon$  is stochastic error,  $i$  is index of particular countries.

Barro and Sala-i-Martin (1992) and Mankiw et al. (1992) have derived a regression dependence from theoretical framework of the economic growth. Mankiw et al. (1992) have created a regression equation from the estimation of convergence from Solow and Swan model. Barro and Sala-i-Martin have come out of the Ramsey (1928), Cass (1965) and Koopmans (1965) models. The difference between models is in the way of determining savings rate. For simplification it is possible to work on assumption of Mankiw et al. (1992) who's presented the original growth equation in a form:

$$\frac{1}{T} [\ln(y_{i,T}) - \ln(y_{i,t_0})] = 1 - e^{-\sigma(T-t_0)} \frac{\alpha}{1-\alpha} \ln(s_{t_0}) - (1 - e^{-\sigma(T-t_0)}) \frac{\alpha}{1-\alpha} \ln(\delta - \mu) - (1 - e^{-\sigma(T-t_0)}) \ln(y_{t_0}), \quad (5)$$

where  $T$  is end of the time period,  $y_T$  is real GDP per capita at the end of the time period,  $t_0$  is initial time period,  $y_{t_0}$  is real GDP per capita at the beginning of the time period,  $\sigma$  is parameter denouncing the speed of the convergence,  $\alpha$  is proportion of capital income on total income,  $s$  is savings ratio,  $\delta$  is amortization rate,  $\mu$  is labor growth rate.

The approaches able to explain real processes in the economy come from the endogenous growth theory (Romer, 1986), (Romer, 1990), (Lucas, 1988), (Rebelo, 1991) etc. These models take into consideration additional factors such as: education, population, institutional environment level etc., and are able to theoretically generalize empirically proved development of the economies getting closer to advanced countries. Particular economies therefore show various steady states (conditional convergence, see Barro and Sala-i-Martin, 1992). Model based on this concept has following form:

$$\frac{1}{T} \ln \left( \frac{y_{i,T}}{y_{i,0}} \right) = \alpha + \beta \ln(y_{i,0}) + \gamma X_i + \delta C_i + \varepsilon_i, \quad (6)$$

where  $i$  marks monitored economy, 0 and  $T$  are initial and final period,  $y$  is output per worker,  $T^{-1} \cdot \ln \left( \frac{y_{i,T}}{y_{i,0}} \right)$  is growth rate,  $X_i$  is vector of  $i$ -region containing structural variables such as investment rate into physical and human capital and population growth,  $C_i$  is control vector of variables marking regional deference's in steady states,  $\varepsilon_i$  is non-explained part of the time series,  $\alpha, \beta, \gamma, \delta$  are parameters (Mankiw et al., 1992).

Input analysis is focused entirely on convergence of economic level approximated GDP per capita in PPP and is analyzed by following modified regression form:

$$\frac{1}{T} = \left( \frac{Y_{iT}}{Y_{i,0}} \right) = \alpha + \beta \log Y_{i,0} + \varepsilon_i, \quad (7)$$

where  $i$  marks monitored economy, 0 and  $T$  is initial and final time period,  $y$  is GDP in PPP,  $\varepsilon_i$  is non-explained part of the time series,  $\alpha, \beta$  are parameters.

## 7 Model Application

Model analyzes the economic level convergence of all Eurozone economies and also the Czech Republic economy using the cross-sectional method during years 1995 (initial time period) and 2009 (final time period). By adding the variables into the equation (7) it is possible to acquire final model for testing chosen economies convergence:

$$\frac{1}{15} \log \left( \frac{Y_{i,2009}}{Y_{i,1995}} \right) = \alpha + \beta \log Y_{i,1995} + \varepsilon_i, \quad (8)$$

where number 15 in fraction on the left side of the equation denotes number of observed years from 1995 to 2009,  $Y_{i,1995}$  is GDP per capita in PPP of  $i$ -country (from EA17 and CR) in year 1995,  $Y_{i,2009}$  is GDP per capita in PPP of  $i$ -country (from EA17 and ČR) in year 2009,  $\alpha$  level constant,  $\beta$  is coefficient marking convergence (divergence),  $\varepsilon_i$  is random component.

Beta convergence model is used to verify hypothesis that economic level of the Czech Republic and Eurozone economies (EA17) converged in time period from 1995 to 2009 to the average economic level of Eurozone. Zero and alternative hypothesis is possible to define as follows:

- $H_0$ : parameter  $\beta > 0$ , is a positive number – EA17 economies and the CR diverge from oneself from 1995 to 2009,
- $H_1$ : parameter  $\beta < 0$ , is a negative number – EA17 economies and the CR converge to oneself from 1995 to 2009.

### 7.1 Input Data

Statistical input data of GDP per capita in PPS of particular Eurozone economies and the Czech Republic from 1995 to 2009 were drawn from the World Databank database. The parity used to calculate time series was Eurozone economy which is composed of 17 countries. Used database contained all of the data. Therefore, was no use to estimate the missing data by extrapolation or interpolation methods. To retrieve the independent variable  $\left( \frac{Y_{i,2009}}{Y_{i,1995}} \right)$  was necessary to calculate GDP per capita in PPS ratio for each economy from EA17 and the CR. The calculated ratios were subsequently logarithm using decimal logarithm and each ratio were then divided by number of observed years (15). Retrieved vector represents dependent variable in regression model. Explained variable  $Y_{i,1995}$  GDP per capita in PPS from the year 1995 were logarithm by decimal logarithm.

### 7.2 Parameter Estimation

To estimate regression model parameters was used program SPSS Statistics 18.0. In case when all classic assumptions of model are met, it is possible to estimate vector of unknown regression coefficients using method of ordinary or generalized least squares. Hušek (2007) states that advantage of this method is, compared to other estimated techniques, the fact that it provides estimates with optimal characteristics even for small observed samples and the calculation procedure for determining the numerical values of estimated parameters is simple. In addition, Hušek says, that LSM is a solution to all line of other sophisticated econometric estimation procedures. Table 1 displays summary of the economic level beta convergence model by equation (8).

**Table1.** Summary of the Economic Level Beta Convergence Model

**Model Summary<sup>b</sup>**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | ,664 <sup>a</sup> | ,441     | ,406              | ,00376                     | 2,885         |

a. Predictors: (Constant), X

b. Dependent Variable: Y

Source: own calculation in SPSS.

Correlation coefficient value (R) means, that the GDP per capita in PPS from 1995 to 2009 development was by 66,4 % dependent on explanatory variable development, i.e. on initial values of GDP per capita in observed economies. Determination coefficient (R Square) states, that the explanatory variable (initial GDP per capita in PPS in 1995) explains  $\Delta \left( \frac{Y_{i,2009}}{Y_{i,1995}} \right)$  in observed time period by 44,1 %. In Table2 estimated regression coefficients are displayed.

**Table2.** Estimated regression coefficients

**Coefficients<sup>a</sup>**

| Model        | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|--------------|-----------------------------|------------|---------------------------|--------|------|
|              | B                           | Std. Error | Beta                      |        |      |
| 1 (Constant) | -7,375E-5                   | ,001       |                           | -,081  | ,936 |
| X            | -,018                       | ,005       | -,664                     | -3,550 | ,003 |

a. Dependent Variable: Y

Source: own calculation in SPSS.

Based on model results it is possible to accept alternative hypothesis  $H_1$ : parameter  $\beta < 0$ , is a negative number– EA17 economies and the CR converge to oneself from 1995 to 2009. The question is now by what speed the Eurozone economies and the Czech Republic economy converged. To calculate the speed of convergence it is used following formula:

$$\frac{1}{T} \log \left( \frac{Y_{i,T}}{Y_{i,0}} \right) = \alpha - \left( \frac{1-e^{-\beta \cdot T}}{T} \right) \cdot \log Y_{i,0} + \varepsilon_i, \quad (9)$$

where the symbolic correspond to analogic functional relationship introduced in previous formulas. Coefficient  $\beta$  states the speed of convergence to steady state (i.e. EA17 countries average), concretely by how much percentage is the gap between real and steady state in one period reduced.

By modeling real economies convergence, it is able to confirm the validity of theoretical concept of  $\beta$ -convergence because parameter  $\beta$  is negative which signalizes the convergence of observed economies. Calculated speed of convergence of economic level was on average 1,6 % during analyzed time period. This coefficient is able to interpret also by use of convergence half-life which states, that countries narrow half of their gap to steady state in 44,3 years. In case when the parity to calculate time series was whole EU economy the speed of convergence is 1,8 % and convergence half-life is 38,5 years.

## 8 Conclusion

Although the Czech Republic is a member of the European Union since 2004 it is still not participating on already created economic and monetary union. But these steps are somehow limited

by long term fulfillment of the Maastricht convergence criteria and by real preparedness of the Czech Republic to entry the Eurozone. Phenomenon of the last few years is a discussion among scientist but also among public whether the CR is ready to enter the monetary union. There is great number of articles and research papers in which authors are trying to verify the theoretical concept of monetary union optimality using findings from the growth theories on real monetary-integration processes taking place in Europe. In this spirit it is eligible even for the Czech Republic to analyze its preparedness and advantageousness of joining the EU monetary union.

On the general question – whether the country is or not ready to accept common currency, is able to answer from various point of view. If the convergence is considered by an exhaustive determined Maastricht's convergence criteria than the state can be clearly quantified. If the alternative measuring scale is chosen, that there is a great number of factors which are able to assess the countries preparedness on accepting common currency and the answer to the original question is not so clear now. The country preparedness can be evaluated by real convergence optics. The real convergence can be measure by the economic cycles harmonization or by economic and price level converging. And the economic level convergence stands in a center of attention of this article.

The estimated beta-convergence model of economic level examined the hypothesis that the economic level of the Czech Republic and Eurozone (EA17) economies has converged to average Eurozone economic level in time period from 1995 to 2009. This hypothesis was based on analysis results confirmed. The convergence can be confirmed as a fact also in Estonia, Slovenia and Slovakia. On the other hand, divergence tendencies in monitored time period can be seen in Malta and Cyprus. The speed of convergence came out 1,6 % which means that the gap between real and steady state is in average narrowing by 1,6 % by a year. The calculation of the convergence half-life has determined that to narrow the gap between real and steady state by half will take 44,3 years (according to development of the GDP per capita in PPS indicator from 1995 to 2009).

Given issue was solved using different method, namely panel data analysis (Dvoroková et al., 2011; Dvoroková et al., 2012). When calculating the speed of convergence of economic level of the Czech Republic to Eurozone was discover value 1,81 % together with convergence half-life 38 years. The results confirmed model robustness when using real convergence ex-post quantification.

The question of convergence is now influenced by continuously going economic recession which negatively affects nominal but far more significantly real convergence. Thanks to Eurozone debt crisis it was possible to detect deterioration of Maastricht's criteria fulfillment by the Czech Republic, deepening of indebtedness danger.

## 9 Acknowledgement

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## INSTITUTIONAL FRAMEWORK OF THE DEVELOPMENT OF THE EU MANUFACTURING INDUSTRY

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### Abstract:

Despite its declining relative contribution to the EU economy manufacturing remains the key contributor for value creation. According to a great number of experts Europe is at the beginning of the fourth industrial revolution. Along with large-scale changes accelerated by manufacturing raises this process several questions about its institutional framework. The raising attention to industrial policy within the EU comes at a time of increasing complexity and importance of global value change, when globalisation and increasingly competitive environment has forced the EU to increase its competitiveness levels and also to create a favourable climate for entering and successful establishing on foreign markets. Main aspiration of the submitted paper is to analyse whether and what changes of economic policy are necessary if benefits are to be gained from new manufacturing and industrial technologies. The paper examines to what extent a greater coordination and also integration of EU industrial policy is needed to meet the challenges of Industry 4.0

### Keywords:

Manufacturing industry, industrial policy, competitiveness, global value change

### JEL classification:

L16, L52, L60

## 1 Introduction

The EU's industry's relative share of has been declining; however, its importance in the value-generation process still remains critical. Multiple experts believe that Europe faces the beginning of the 4<sup>th</sup> industrial revolution. The vast technical – economic and societal changes accelerated by the industry inevitably raise the issue of their institutional support – will it be necessary to modify the character of the current industrial policy and how much? The associated reasons include the completion of a big transformation of the whole industrial production sphere through interconnected digital technologies, robotics, and traditional industry into a highly integrated value chain. The “Renaissance” of interest in the industrial policy comes in a period of increased complexity and importance of value exchange, growing competitiveness of developing economies. These factors apply even to those regions and markets that used to be, until recently, dominated by the developed Western economies. The industrial policy is currently an instrument supporting the strategic intentions of the European Union's and its individual states' development. It focuses on the Union's competitiveness reinforcement, economic growth support, and employment. The policy should adequately respond to the deepening integration processes in the EU and the need to reinforce the EU's position during the search for global solutions of urgent societal challenges associated with climate changes, population aging, and sustainable utilization of limited resources (EC 2015). This contribution identifies the basic changes faced by the EU manufacturing industry and approaches through which the industrial policy will accelerate structural adaptation to the global challenges.

## 2 Development Trends of the EU Manufacturing Industry

During the past two decades, the world economy experienced radical changes, which were caused, among others, by the growth and growing competitiveness of countries like China, India, and other

quickly developing economies, and new players that must be considered in the competitive fight. The significant shifts in the area of world trade and capital flow drastically changed the geography and structure of the global value exchange. The liberalization of international trade and capital flows contributed to the significant transformation of global completion; however, these changes were primarily affected by the Internet and digital society that moved the world towards another technological border. Last but not least, it is necessary to mention that during the past 15 years, the world overcame two recessions. The decline caused by the second “great recession”, its consequences, and search for their elimination methods continue to be the dominant topic of the economic-political agendas of both the developed and developing economies. In this context, the policy creators’ great challenge rests in the distinguishing between long-term structural changes and changes caused by cyclical demand fluctuations (Pashev, K. (ed) et. al., 2015).

## 2.1 Relative Decrease of the Manufacturing Industry’s Importance

One of the primary long-term trends is the EU economy’s structural shift away from manufacturing industry to services. The scope and speed at which this trend demonstrated itself during the past two decades inevitably raises the question, whether and how much is such a trend beneficial and sustainable. It is obvious that the industry’s role in the economic development process changes with time. During the process of increasing economic maturity, the manufacturing industry’s GDP share reaches its peak (20 – 35% GDP) approximately in that period when a given country’s incomes reach the middle level. Behind this level, consumption shifts towards services, the number of new jobs in services begins to get ahead of the creation of jobs in the manufacturing industry, and the industry’s GDP share begins to decrease. The employment in the industry follows a similar trend. For example, in Germany, the industry employment rate of 1970 decreased from 35% to only 18% in 2008 (McKinseyGlobalInstitute,2012). Also, the advancement of the individual economies is accompanied by changing attributes from which the industrial sector’s importance for economy is determined. It is currently, for example, the quick work productivity growth whose primary drive is technical advancement and its associated innovations or trade development. It is increasingly critical for dealing with societal challenges, especially during the decreasing of energy and material demands or limitation of greenhouse gas emissions. In response to the decrease of the industry’s relative importance, the European Commission issued its 2012 announcement in which it set its goal to increase the industry’s share of the EU’s economy from 16 to 20% by 2020 (EC 2012).

In 2000 – 2014, the share of the gross added value generated by the manufacturing industry in the EU’s total gross added value decreased from 18.8 % to 15.3 %, i.e. by 3.5 percentage points (Fig. 1).

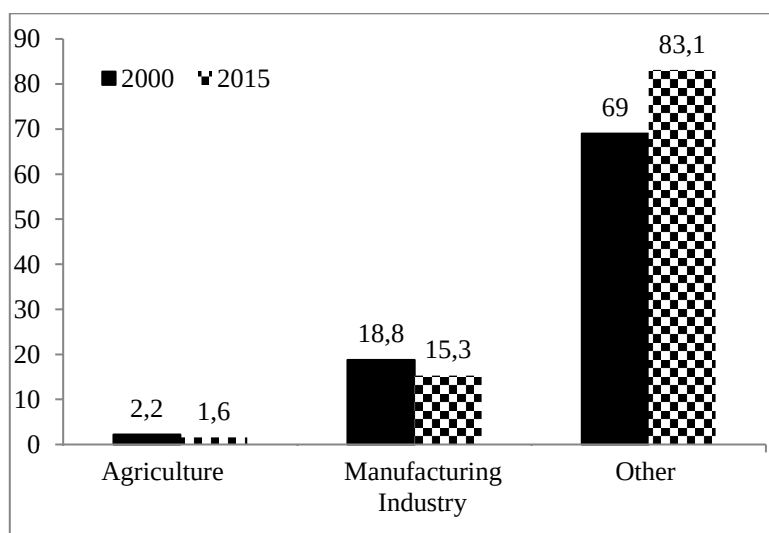


**Fig. 1** Shares of selected sectors in the gross added value generation in the EU in 2000 and 2014 (Source: Eurostat)

These indicators developed differently in the individual countries; however, the decreasing trend was demonstrated during the given period by the big majority of them. The share of manufacturing industry in the gross added value generation only increased in the 3 EU countries, Czech Republic, Hungary, and Poland (Fig. 2).

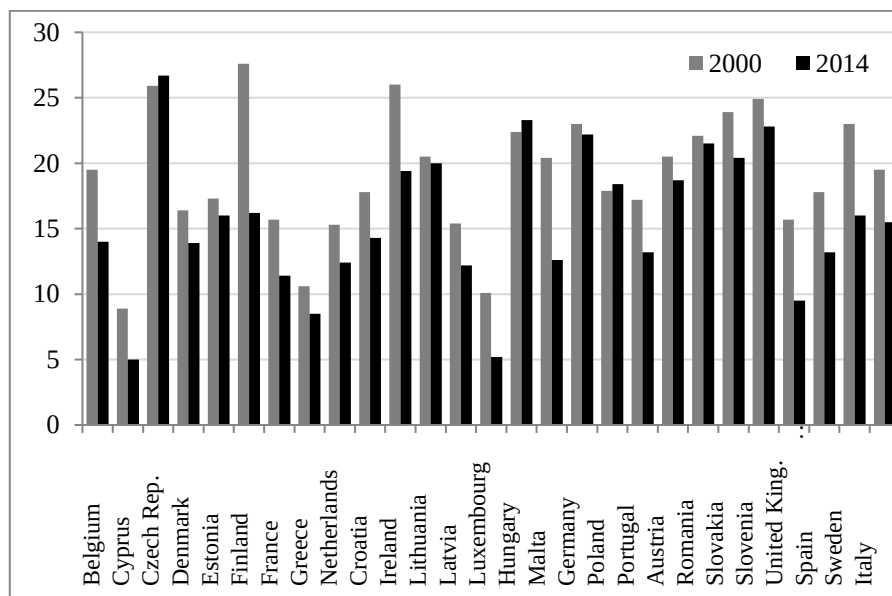


**Fig. 2** Shares of manufacturing industry in the gross value added generation in the EU countries (Source: Eurostat, own calculations)

The countries with the greatest decrease of their manufacturing industry's share in gross value added generation include Cyprus, Luxembourg, and United Kingdom, whose manufacturing industry's share in the total gross value added generation was low already in 2000. Besides that, significant decreases were also identified in Finland, Sweden, and Malta, where in 2000 the manufacturing industry's share in the total gross value added generation exceeded 20%. The fact is that in 2008 – 2014, the volume of industrial production grew in fewer than the half of the EU member countries, as indicated in figure 3.

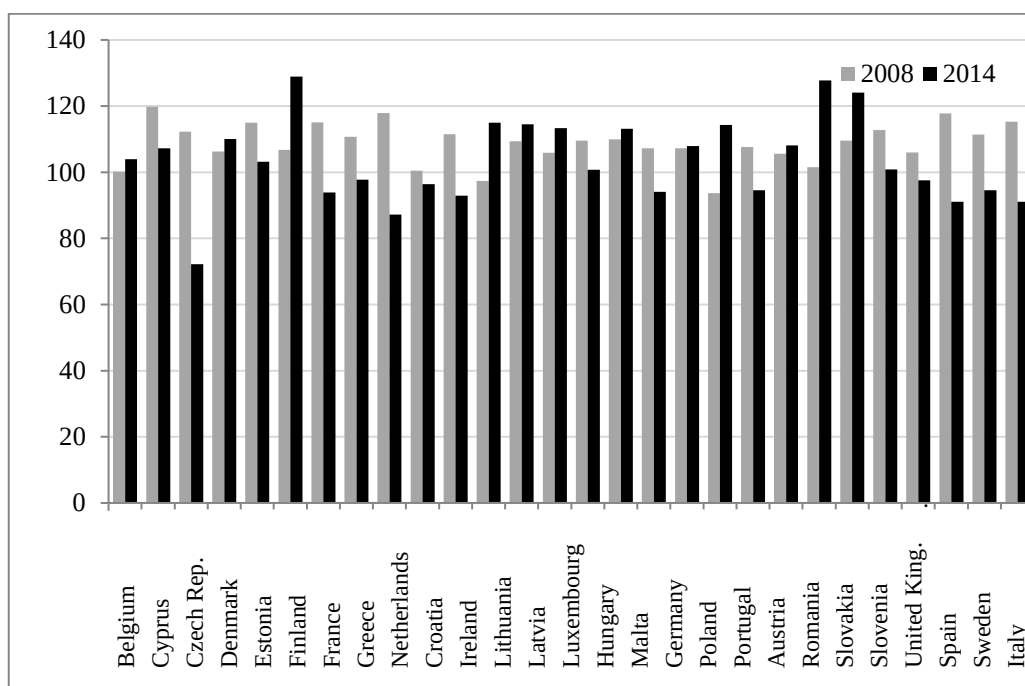


**Fig. 3** Development of industrial production in 2008 and 2014 (previous year = 100%)  
 (Source: Eurostat, own calculations)

The decreasing share of the industry may also be explained, among others, as it was already stated, by the more significant growth of the service sector. In some countries, this trend may be associated with their decreased international competitiveness. Considering the given development, the EC's aforementioned goal – to increase the industry's share in GDP generation from 16% to 20% by 2020 – seems to be overly ambitious. Therefore, its completion in the foreseeable future seems to be at least questionable. The relative share of the manufacturing industry in GDP generation globally decreased during the past 30 years. Paradoxically, this relative decrease actually demonstrated its strengthening position in the economy. The manufacturing industry's greater productivity increase (which allowed the reduction of unit prices of its products), compared to the total economic production, resulted into a relative decrease. A strategy focused on reversing this trend and desire to increase the manufacturing industry's share in GDP generation above the 20% level could be risky because the industry would lose its natural strength – greater productivity growth, and this certainly was not the EC's intention (Veugelers, 2013). By setting this goal, the EC wished to send a clear signal that it continues finding the industry extremely critical for the Union's further development. In 2002 – 2015, in the European Union, the trends of industrial employment basically followed the production development, and the year over year differences were less significant. Deindustrialization and delocalization contributed to the fact that during the pre-crisis period (till the end of 2006), including 2010 and partially 2011, the industry employment decreased year over year even despite the year over year industrial production growth.

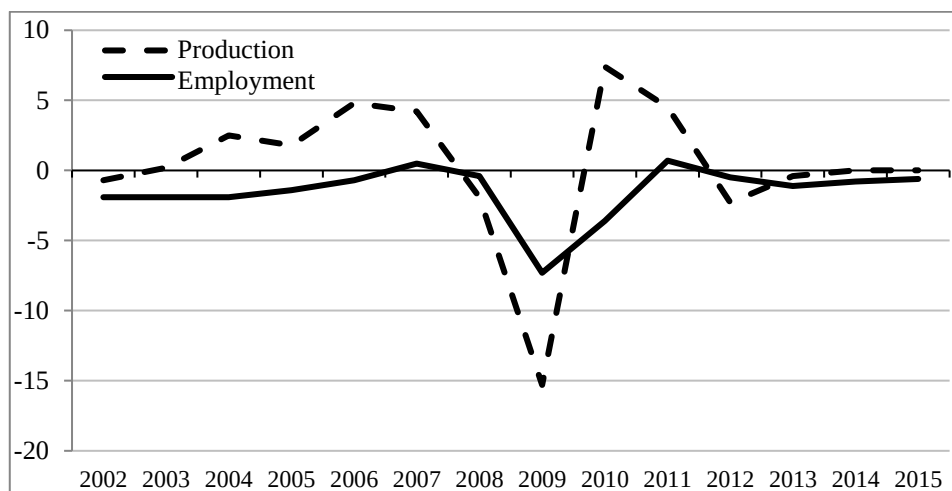


**Fig. 4** Year over year development of production and employment in the manufacturing industry  
 (Previous year = 100%) (Source: Eurostat, own calculations)

The decreased volume of industrial production impacted both the employment structure and the individual EU countries in different ways. Differences were primarily identified among the individual categories per the qualification structure. During the recession, the most vulnerable group included low qualification workers in the manufacturing industry. Regarding the differences among the individual EU countries, one may see Europe’s strong polarization into its slowly growing “centre” and “periphery” with a high public debt and unemployment (Cirillo – Pianta, 2014). If we take the industrial production volume reached in 2008 as the basis (equal to 100%), then, for example, in 2013, only Germany, Austria, and Netherlands reached their pre-crisis levels after the recession period when the industrial production development indices experiences limited decreases. Progress was only achieved by Poland whose 2013 industrial production exceeded its 2008 industrial production by 18%. After a dramatic decrease, Ireland reached its 99% level. The majority of countries in the Central and Northern Europe were unable to reach their pre-crisis levels: the industrial production volumes of France, United Kingdom, Sweden, and Denmark reached their 89% level and Finland reached its 83% level (the Finnish and Dutch GDPs decreased in 2012 and 2013 as well). Industrial production decreased most dramatically in the South European countries; in 2013, Portugal only reached the 88% of its 2008 level, Italy 79%, Spain 76%, and Greece 73% (UNIDO, 2013, WIIW 2015). This extended crisis caused the permanent decrease of production capacities in the majority of industrial fields and countries. The greatest destruction of economic activities may be observed in the EU’s Southern “periphery” (McKinsey Global Institute, 2012).

The capital-intensive manufacturing industry faces its urgent both short-term and long-term challenges. Regarding the short-term ones, one of the most urgent problems was the fragmentation of financial markets in Europe that complicated access to financial sources. This primarily affected both small-size and mid-size companies since there are most dependent on bank loans. In some of the EU’s Southern countries, even operating capital financing was in danger. That is why one of the post-crisis priorities was to fix Europe’s bank problems and create better functioning capital markets, including risk capital. Easier access to financing and support of business environment, including founding new companies, was the goal of the European Commission’s financial support program titled “Program for the competitiveness of enterprises and small-size and mid-size enterprises”.

## 2.2 Economic Importance of the Manufacturing Industry

The industry's decreasing share in the economic output attracts the policy makers' interest for multiple reasons:

- The development of the service sector fundamentally depends on a strong manufacturing industry that supplies equipment and material inputs and, most importantly, utilizes commercial services. There is a lasting concern that if the manufacturing industry continues to be extensively relocated to the third countries, some of the value chain services may follow it. Therefore, the evaluation of the manufacturing industry's importance must include indirect links and induced impacts on other activities in the national economy.
- Services are less tradable than products, and their exporting potential is lower than the one of the manufacturing industry's products. Even if the EU's manufacturing industry currently only generates about 15% of the value added, its share in the total export exceeds 40%. This fact is extremely important for further economic growth; especially because the 90% of the world's economic growth originates outside the EU. A whole third is achieved by China (IMF 2010), while the decisive ratio of research and development (approximately one third), as the economic growth accelerator, occurs at manufacturing industry enterprises, which, resultantly, generate innovations usable in other branches as well.
- The “deindustrialization” process must be evaluated at a greater context and not only through simple ratio indicators.

The development has proven that the manufacturing industry is indispensable for all the other branches of the economy. Already in 2013, the European Committee (EC 2013) stated that the “additional final demand in the manufacturing industry generates approximately more than a half of the total demand of the whole economy”. In the majority of countries, the initial impulse of their increased interest in industrial policy was the economic and financial crisis in 2008 – 2009. The crisis-induced decrease of production volumes and employment in the manufacturing industry eventually critically affected the economic growth. Despite the other tendencies of its development, it confirmed that its importance does not decrease. Besides that, the crisis generated doubts about the market mechanism, especially the flow of finances and its ability to direct investments to the “right” branch and renew the economy's growing tendencies.

## 3 Current Challenges of the EU Industrial Policy Shaping

More than 35-year development since the publication of Bangemann's document “Industrial Policy in an Open and Competitive Environment” (1990), which officially started the initiatives in the area of industrial policy formulation at the Union's level, confirmed the justness of the government's involvement in the field of both theory and practical industrial policy application. Despite that, there are still serious practical objections. They include the risk of state's failure, then the risk of focusing the individual formulated measures exclusively to revenues. Despite the declared horizontally industrial policy, there is still a concern that individual measures will be abused for specific protectionist targets.

The development of Europe's industrial policy from 1945 to the crisis in 2008 features two mutually different phases.<sup>1</sup>The first phase lasted approximately to 1980, and it was characterized by selective targeted strategies focused on the support of the individual branches, so-called “national champion” who were to start the given country's economic growth. Most frequently, these were high-tech sectors whose development was to reduce and bridge the technological and production gap between Europe and the United States. Economies of scale were considered the critical driving force behind the development of international competitiveness as well. One may generally state that this

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<sup>1</sup>Owen, G. 2012. Industrial Policy in Europe since the Second World War: What Has Been Learnt?, ECIPE Occasional Paper, 1/ 2012, s.2



type of interventions was rather unsuccessful because, despite them, the deindustrialization and transfer of manufacturing industry capacities to so-called newly industrialized countries continued. That is why we may, in the second phase, attach the adjective “horizontal” to the industrial policy. Its centre of gravity at the Union’s level and the individual member countries’ level was in the creation of favourable entrepreneurial environment supporting growing competitiveness. Direct support of the selected branches was limited, and multiple institutions focused on supporting research cooperation in the EU were created. However, the productivity increase in the U.S.A. in the 90<sup>th</sup> lead to the suggestion that a slightly different model could be more suitable, a model that would also stimulate the growth of high - tech firms through their improved access to risk capital. The world economy globalization brought multiple new opportunities, but also threats to the industries of advanced economies’ industries. To make the EU’s industry successful in the competitive fight and to secure its growing productivity, an industrial policy reflecting on this new global reality handle new challenges. The consequences of the 2008 – 2009 crisis coupled with the late post-crisis reconstruction of the EU’s manufacturing industry and growing share of the newly industrialized countries in both the traditional and high-tech value chain indicators were actually the catalyst of new thinking in the area of the EU’s industrial policy.

Europe currently faces the beginning of a new industrial revolution, which is considered the fourth jump forward of this type. That was why it was labelled “Industry 4.0.”. The solution is in the new social-economic behaviour of people and human society. However, the preconditions include inevitable steps in technological preparation based on the latest cyber and other modern technologies and methods. The concept of the fourth industrial revolution was initially worked on by the German government in order to create a coherent political framework in support of preserving and increasing the German industry’s competitiveness. Industry 4.0. means a wide-scope transformation of the whole sphere of industrial production through interconnecting digital technologies and robotics with conventional industry (suppliers, factories, distributors, even the product itself) into a highly integrated value chain. It is a completely new philosophy, which changes the whole society and affects a whole portfolio of areas from industry through technical standardization, security, education system, legal framework, science and research, up to the labour market and societal system.

The transition from computer and robotic support of production or administration tasks utilized in an isolated manner is technologically enabled by the rapid development occurring in these areas:

- Communication technologies
- Information and computer technologies
- Cybernetics and artificial intelligence methods and techniques
- New materials and biotechnologies

System-wise, it rests in 3 key visions (MPO, 2015):

- Vision of horizontal integration of all the sub-systems – from systems securing order receipt and confirmation, through production, up to product shipping and securing warranty and post-warranty service or possibly termination of a given product’s life cycle.
- Vision of vertical integration of all the sub-systems – from the lowest level of automatic control of physical processes (with responses expected basically within tens of milliseconds) without any production section management up to ERP (enterprise resource planning) by systems within hours and days.
- Vision of complete computer integration of all the engineering processes – from draft assignment through design, development, realization, testing, and verification up to product life-cycle planning.

Therefore, Industry 4.0 depends on the development of multiple new innovative technologies:

- Application of information and communication technologies in the information digitization process and system integration at all product creation levels and their use (including logistics and supplier relationships), including their applications at the individual firms and outside of them;
- Cyber-physical systems, which use information and communication technologies for monitoring and checking of physical processes and systems. They may include integrated sensors, intelligent robots, which are able to configure not only their own settings, so they immediately fit their created product, or additional production equipment like 3D printing;
- Network communication including wireless and Internet technologies used to interconnect machinery, systems, and people both at factories and with suppliers and distributors;
- Simulations, modelling, and virtualization of product and production process design;
- Collecting large amounts of data and its analysing and using either right at the factory or through the analysis of big data files and cloud computing;
- Greater support of labour force through information and communication technologies, including robots, expanded reality, or intelligent tools.

The industrial production digitization will cause far reaching changes of production processes, their outputs, and business models. Intelligent factories will increase production flexibility. The rapid machinery configuration capability will allow small sample production; therefore, it will be possible to adjust production to customers' requirements as much as possible. This level of flexibility also stimulates innovations since prototypes or new products may be produced quickly and without any need for complex tool changing or new production line setting. The time periods necessary to produce individual products will shorten as well. Digital design and virtual modelling of production processes may shorten the time from product design up to product delivery. For example, some authors estimate that data-supported supplier chains may accelerate the production process up to 120% and reduce the product's delivery to its market to 70% (EC, 2015).

Experts estimate that the realization of Industry 4.0. will cause annual production effectiveness increases by 6 to 8%. The Boston Consulting Group foresees that only in Germany, there it will increase the country's GDP by 1% during a ten-year period, creating up to 390,000 job positions (Boston Consulting Group, 2015).

The European Committee already stated in its 2014 announcement, “For a European Industrial Renaissance” that digital technologies (including cloud computing, big data files, new industrial Internet applications, intelligent factories, robotics, and 3D printing and design) are inevitable for increasing the European industry's productivity since they will enable creating new business models and production of new products and services (EC, 2014a).

While considering the need to modify the current industrial policy in order to meet the goals of the Industry 4.0 initiative, it is necessary to include the expected changes. In connection with Industry 4.0, some authors consider three dimensions of changes: technological, social, and entrepreneurial paradigm change (Carlberg et al., 2016). Regarding the technological change, the main driving force behind changes in the value exchange area is digitization. The majority of enterprises realized the need to adjust; therefore, they are ready for digitization. The significant challenges faced by these enterprises include especially the protection of intellectual property, personal data and privacy; system design and uptime; protection of the environment, health, and security. Multiple countries created their public institutions in support of greater cyber security.

Information on the changes expected in connection with the completion of the social area goals of Industry 4.0 is, for the time being, with the exception of the stakeholders, relatively limited. Bigger firms basically favour changes, while the other firms are rather careful and reserved. While there is the “skill” gap (including the willingness gap), which prevents one's adjustment to a uniform digital market, the requirements for qualifications necessary to handle challenges of Industry 4.0 will be much greater. The bridging of this gap requires the implementation of new forms of work, which,

however, have not only positive, but also negative impacts on employees, and the difference between demand and domestic (both at the states' level and the whole EU's level) offer of qualifications and skills is currently solved through sophisticated immigration strategies. The support of abilities required by Industry 4.0 is not uniform in the EU. This may increase the concentration of labour force in the current centres and greater competition among them.

Regarding business models and changed entrepreneurial paradigm, the goals of Industry 4.0 generate challenges for MSP, especially in the supply chain area (costs, risk, reduced flexibility, and limited strategic independence). The public sector may play a specific role in the creation of an ecosystem that will help adjust MSP to the requirements of Industry 4.0; however, the research of this area is still insufficient. Standardization represents the primary challenge for the Industry 4.0 implementation. In connection with this, it seems to be quite inevitable to subordinate all the standards, including the in-house ones, to the requirements and international standards created together with the big global players through international platforms like the Industrial Internet Consortium.

However, it is most critical to determine whether Industry 4.0 will secure the EU's dominant position in the competitive fight on the world markets or whether its realization is only necessary for the EU to maintain its current position, or, in the worst-case scenario, whether the international diffusion of technologies through supranational corporations will inevitably transfer the industrial leadership to the rapidly developing economies like China.

#### **4 Conclusion**

Without a specific form of targeted industrial policy, the individual countries, regardless of their level of economic development, may hardly find their constructive responses to the current multiple challenges – whether it is the creation of new job positions and poverty reduction, engagement in technical development and global value exchange, support of effective and clean energy utilization, or reduction of the climate change impacts, and “green” economy support. Since a viable industry needs conditions, which gradually developed with time, one's desire to emulate some of the past industrial models in order to cope with the current challenges may not be completely meaningful. The EU's development confirms that one's focus on sector-specific measures should be replaced with the successful creation of suitable environment for companies – both in the industry and services – so they can compete with their non-European competitors. This requires, among others, investments into education, research, development, and infrastructure, including investments into a more favourable entrepreneurial climate – favourably priced energies and intelligent regulation.

Due to the strong connection between innovations, internationalisation, and work productivity, the successful and meaningful realization of Industry 4.0 very much requires coordinated approach and mutual connections among industrial policy, technical policy, single market policy, policy on information and communication technologies, and the whole service sector. A highly-integrated economic system requires a coherent set of policies focused on the improvement of entrepreneurial environment in every area. Any desires to only support a single sector at the expense of others would probably lead to a significant decrease of both effectiveness and overall economic growth.

The manufacturing industry simply does not only mean tangible product production any more. It may proceed further in multiple directions. The manufacturing industry, as the core of the European economy, has the necessary potential to successfully cope with big societal challenges resulting from the current development megatrends. The changes of customer demand, types of products and their production, production procedures, supplier-consumer relationships, all this gradually lead to the significant changes of ways in which the individual firms produce and offer their products since it is increasingly difficult or even impossible to produce things and satisfy customer needs in the traditional way. Europe needs a deliberate policy that favourably impacts the entrepreneurial environment, features fewer limiting regulations, and creates correct general conditions.

From the Union's perspective, Industry 4.0 may be included in both defensive and proactive strategy: defensive one in the sense of helping Europe preserve its domestic manufacturing industry and proactive one through helping Europe increase its competitiveness and ease its access to new markets. For example, lack of labour force due to demographic changes may be (partially) compensated by automation and increased productivity of machinery and equipment, i.e. reduced need for manual labour. Since the EU as a whole, on average, features relatively adequate labour force qualification, one may presume that the realization of Industry 4.0 will benefit the EU. Even despite the fact that some of its areas still do not have enough of qualified labour, which will have to be obtained from the non-EU countries.

The EU supports the completion of changes in the industry through its industrial policy and subsidizing of its research and development infrastructure. Its member countries also support their national initiatives like Industrie 4.0 in Germany, the Factory of the Future in France and Italy, and Catapult centres in the United Kingdom. However, challenges stay. The need for investments, changed business models, modern data processing, issues of legal liability and intellectual property, norms and increased labour force qualifications are all the problems that must be solved if the EU is to profit from its new production and industrial technologies. It is no surprise that Europe is not the only region in the world, which sees its future in manufacturing industry digitization. The National Network for Manufacturing Innovation got established in the United States. Its proposed budget is 1 billion U.S. dollars from public sources, and its goal is to unite the national research centres dealing with digital production and design research. It was expected that the individual firms operating in the Asian-Pacific region would invest in 2012 about 10 billion U.S. dollars into the development of the Internet of things, while the invested should reach up to 60 billion U.S. dollars by 2020. If the EU is to maintain its competitiveness and reach its goal set in Europe 2020, i.e. its intelligent, sustainable, and inclusive economic growth, the European industry must grasp the productivity and growth potential offered by the realization of Industry 4.0.

If the industrial policy concept helps reach these goals, only then it will be possible to realize Industry 4.0 and reverse the deindustrialization process and increase the share of the industry's value added set to 20% by 2020. The industrial policy's focus must be shifted to the identification of long-term meaningful conditions supporting development. The desire to secure a country's position in the global competitive environment requires significant qualitative changes in the education system, research, development, labour market, and institutional frame – in order to create conditions for technological advancement and innovation dynamics. Only a country or enterprise capable of competing in the “digital and robotic world” will be competitive.

In the interest of successful realization of the goals and challenges on Industry 4.0, the EU's industrial policy will have to be more deeply connected with the educational, science, technical, and innovation policies. Especially areas like the support of international standardization, economic competition, intellectual property protection, and security inevitably require their uniform rules, procedures, and frames. Therefore, it becomes necessary to reassess the current perception of the EU's industrial policy, especially the fact that despite all the common frame rules and principles of industry guiding, the majority of measures were only suggestions made to the individual member countries. During the formulations of their own industrial-political measures, they had to make sure they were not in conflict with the EU's single market rules and economic competition principles. Therefore, successful coping with the new challenges requires a more uniform and more coordinated industrial policy at the EU level, i.e. a policy whose both title and actual implementation would feature the word “common”.

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## CHINA-EU INVESTMENT RELATIONS: TOWARDS A NEW INSTITUTIONAL FRAMEWORK

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### Abstract

Nowadays, China and the European Union (EU) belong to the most important players in the world economy from different aspects. Although China has gradually liberalised its economy since the end of the 1970s, which was in compliance with its economic reforms, a new situation in China's trade and investment relations with the third countries occurred after China's entrance into the World Trade Organization (WTO). The object of the paper is to compare the development of foreign direct investment (FDI) flows in China and the EU after China's entrance into the WTO and to specify the Chinese-EU investment relations. Data about investment flows point out a different development in both countries in 2001-2015. The EU and China are an important source to each other as well as recipients of FDI. Despite the growing values of China's FDI flows, the untapped potential between China and the EU is obvious. The cultivation of the investment area in China and the new investment policy in the EU should help them to fulfil their long-term strategies and investment plans.

### Keywords

Comprehensive Investment Agreement, Inward Foreign Direct Investment, Outward Foreign Direct Investment, the Belt and Road Initiative, WTO.

### JEL classification

F2, F6, O1, P5

## 1 Introduction

Investments are the motor of economic globalisation and integration. They are usually the source of growth and new jobs, technological improvement and innovation. Innovation especially has become the driving force for competitiveness in the knowledge economies in Europe and in the world as well (Skokan and Staníčková, 2011). All of these sources contribute to the overall socio-economic development largely determined also by the level of disparities between regions and countries as mentioned e.g. by Melecký (2015). The economic and trade structure of a country usually becomes different under their influence. According to the WTO (2013), investments are one of the main factors that will shape world trade and influence the comparative advantages of a country in the future.

The European Union classifies the issue of FDI into the common commercial policy and give each of them beginning with the Treaty of Lisbon considerably more weight. Force of the Lisbon Treaty has fundamentally changed the exercise of powers by the European Union in the regulation of foreign direct investment. Prior to December 1, 2009 issue of foreign investment were the domain of the EU Member States, the Lisbon Treaty was shifted most responsibilities in this area at Union. With effect from 1 December 2009 because FDI newly included in the common commercial policy. In it exercises exclusive jurisdiction and its Member States can continue on its own behalf, in principle can not (Navrátil, 2016).

Three decades ago, China started to apply the open door policy as a part of its significant economic reforms that contributed to the achievement of China's economic growth and the accumulation of capital. On the one hand, the movement of large investment flows from developed countries to China was especially motivated by the endeavour to achieve a lower production cost and to become more competitive in the world market. On the other hand, the significant gains from foreign trade brought China long-term economic growth and a more significant position in the world economy. Nowadays, China is the largest economy in the world (measured by Purchasing Power Parity), accounting for more than 19 trillion USD, and it is also the leading exporter, accounting for 12 % of world merchandise export, and a country with the highest reserves of

foreign exchange and gold that reached 3.2 trillion USD in 2015 (Cia.gov., 2016). The entrance of China into the World Trade Organization (WTO) in 2001 also contributed to a bigger openness of the Chinese economy.

The object of the paper is to compare the development of foreign direct investment (FDI) flows in China and the EU after China's entrance into the WTO and to specify the Chinese-European Union (EU) investment relations. China and the European Union with its 28 Member States are currently the largest world economies, but with a different living of standard of their inhabitants. Both, China as well as the EU, have accepted long-term strategies and plans in order to also be competitive in the future. Another object of the paper is to show the incorporation of each other into their national development strategies. The structure of the paper is as follows: firstly, the methodology of FDI flows and data will be described. Secondly, the development of FDI in China and the EU will be compared in the period 2001–2014. Thirdly, the EU-China investment relations will be introduced and lastly, the main facts will be summarised in a conclusion.

## 2 Methodology and data

The subject of the analysis is foreign direct investments (FDI) in mainland China (i.e. China, excluding two special administrative regions such as Hong Kong and Macao) and the EU. Foreign direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is a resident in another economy. According to the OECD definition, Foreign direct investment reflects the objective of establishing a lasting interest by a resident enterprise in one economy (direct investor) in an enterprise (direct investment enterprise) that is resident in an economy other than that of the direct investor (OECD, 2008). A foreign direct investor is an entity resident in one economy that has acquired, either directly or indirectly, at least 10% of the voting power of a corporation (enterprise), or the equivalent for an unincorporated enterprise, resident in another economy. A direct investment enterprise is an enterprise resident in one economy in which an investor resident in another economy owns, either directly or indirectly, 10% or more of its voting power if it is incorporated or the equivalent for an unincorporated enterprise (OECD, 2008). The individual parts of FDI are introduced in Equation (1):

$$\text{FDI} = \text{EQUITY CAPITAL} + \text{REINVESTMENT OF EARNINGS} + \text{OTHER CAPITAL} \quad (1)$$

Data about the direct investment flows for the recorded economy are followed on a directional basis in this paper, i.e. according to the direction of the investment. Based on this methodology, there are inward and outward FDI. They express financial transactions/positions between directly and indirectly owned incorporated and unincorporated enterprises. Inward direct investment, also called direct investment in the reporting economy, includes all liabilities and assets transferred between resident direct investment enterprises and their direct investors. It also covers transfers of assets and liabilities between resident and non-resident fellow enterprises, if the ultimate controlling parent is non-resident. Outward direct investment, also called direct investment abroad, includes assets and liabilities transferred between resident direct investors and their direct investment enterprises. It also covers transfers of assets and liabilities between resident and non-resident fellow enterprises, if the ultimate controlling parent is resident. Outward direct investment is also called direct investment abroad. Thus FDI net inflows are the value of inward direct investment made by non-resident investors in the reporting economy. FDI net outflows are the value of outward direct investment made by the residents of the reporting economy in external economies (WB, 2016).

Data about inward and outward FDI were obtained from the UNCTAD, the Ministry of Commerce of China (MOFCOM) and the National Bureau of Statistics of China. They cover the period 2001–2015 and were published in USD.



### 3 Development of FDI and the investment environment in China and the European Union

The EU-28 is recently the largest source and destination of FDI in the world measured by stocks and flows. Some of its Member States, such as Germany, France, the Netherlands, Ireland, Spain and Italy, are among the top 20 economies with the highest FDI outflows in the world and the United Kingdom, Spain, France and Poland are among the top 20 host economies in the world (UNCTAD, 2015).

China has recorded an increase of FDI flows (inflows and outflows) for several years, which was caused, *inter alia*, by the positive political and economic conditions in China since the beginning of the 1980s. China's economic policy has recently relied on its own comparative sources and tried to consolidate the internal market in order to create optimal production conditions (Baláž, Szökeová, Zábojník, 2012). The first wave of FDI outflows to China was connected especially with investments in special economic zones that were founded in the east coast regions of China. The Chinese government has supported the FDI inflows to these zones by different investment stimuli, including providing cheap transport, guaranteeing tax free holidays, etc. The last wave of FDI inflows occurred in China after its entrance into the World Trade Organization in 2001, which was connected with the liberalisation of the trade and investment conditions in China. Fojtíková and Kovářová (2013) state that China's FDI inflows were on average 3.35 times larger after China's accession to the WTO.

However, although China is more populous and a larger country than the EU with its 28 Member States (EU-28),<sup>1</sup> the level of its FDI did not reach the level of the EU's investment flows in the monitored period. It is obvious both from the absolute values of FDI (see Fig. 1) and the relative values that are expressed in the value of FDI per capita (see Fig. 2 and Fig. 3). The comparison of FDI flows in China and the EU in the absolute values in 2001–2014 shows that their development was different (see Fig. 1). While in the EU the highest inflows as well as FDI outflows were recorded in 2007, i.e. before the financial and economic crisis in the world, China's FDI flows (inflows and outflows) gradually increased during the whole monitored period. It firstly signalises the interest of foreign investors in the Chinese market also at the time of crisis and secondly the growing investment of Chinese enterprises abroad, which is in compliance with China's long-term economic and political “Going Out” strategy. Contrary to China, the EU's investment activity was negatively influenced by the economic crisis in the world, followed by the debt crisis of the Eurozone, which caused the weakening of the euro and also the credibility of the EU market. The last tendency, which is obvious from Figure 1, is a variable development of FDI flows in the EU, but an unchanging development in China, where the value of FDI inflows was higher than FDI outflows for the whole period. However, the differences in the level of China's FDI outflows and inflows were lower at the end of the monitored period. It is also the result of the fact that China has been a part of numerous global value chains, which have become a dominant feature of the contemporary world economy.

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<sup>1</sup> The total area of China was 9.6 mill. km<sup>2</sup> and the population reached more than 1,367 mill. in 2015. The EU-28 covers an area of 4.3 mill. km<sup>2</sup> and the population was 513.9 mill. at the same time (Cia.gov., 2016).

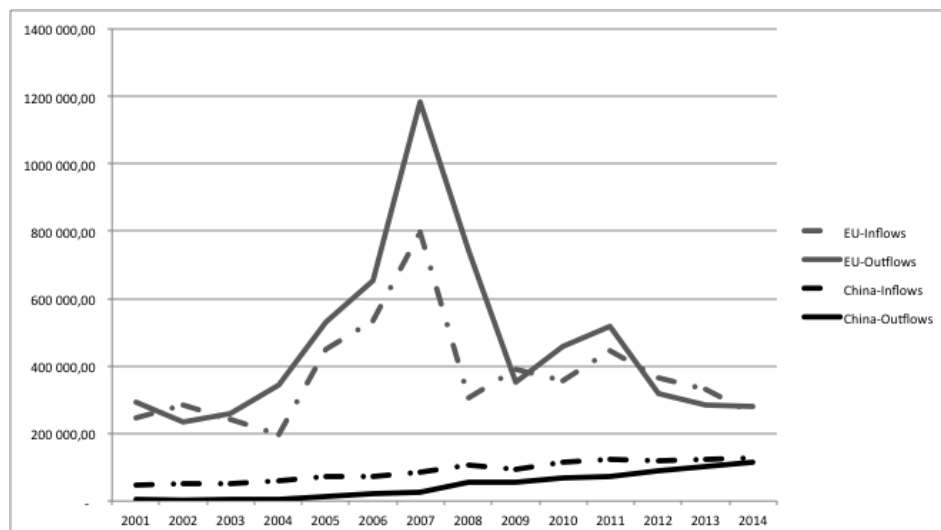


**Fig. 1.** Development of FDI flows in China and the European Union in 2001–2014 (mill. USD) Source: UNCTADStat, 2016, own elaboration

The development of FDI flows in China and the EU also confirms the development of FDI in relative terms. While the level of EU’s inward FDI per capita was higher than the world average, Chinese inward FDI per capita was lower than the world average for the whole period. In 2014, the value of inward FDI per capita was about 92 USD in China, more than 502 USD in the EU and almost 181 USD in the world. While the EU’s inward FDI in 2014 remained at the same level as in 2001, the Chinese inward FDI increased 2.5 times during the monitored period (see Fig. 2).

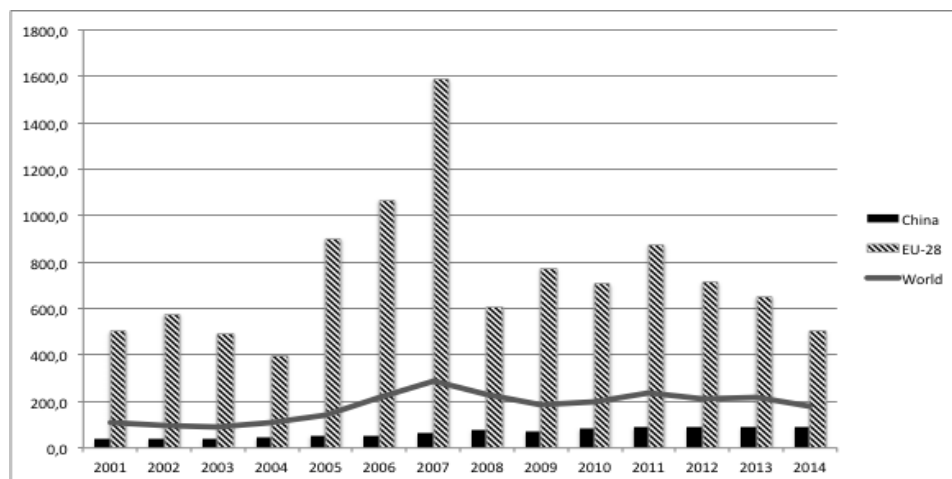


**Fig. 2** Inward FDI in China, the EU and the world in 2001-2014 (USD/cap.) Source: UNCTADStat, 2016, own elaboration

Foreign investment in China has several forms, such as joint ventures, wholly foreign-owned enterprises, participation in partnership enterprises, or mergers and acquisitions of Chinese domestic enterprises. Thus wholly foreign-owned enterprises remain the most common forms of foreign investment enterprises in China with a more than 58% share in the realised FDI in 2012 (WTO, 2014). In 2014, newly approved foreign-invested enterprises in China amounted to 23,778 (MOFCOM, 2015). Investment in China is regulated by several laws and related administrative

regulations and rules.<sup>2</sup> The approval and verification of investment projects is carried out by the State Council, i.e. the central China's National Development and Reform Commission (NDRC) and the Ministry of Commerce of the People's Republic of China (MOFCOM). Foreign investment enterprises must also register with the State Administration for Industry and Commerce (SAIC) or a provincial commercial department. Registration requirements are the same as for domestic enterprises, but may vary slightly depending on the sector of activity. For this purpose, NDRC published the Catalogue for the Guidance of Foreign Investment Industries. The last version of the catalogue was updated in 2015. Industries are placed into three categories based on how open they are to foreign investment: (1) encouraged, (2) restricted and (3) prohibited.<sup>3</sup> It enables China's government to regulate FDI flows in China in compliance with the national development strategies and the Five-Year Plans<sup>4</sup>. Although the number of restricted investment categories declined from 79 to 38 in 2011–2015, several restrictions that were removed in the November 2014 draft were reinstalled, and some of the new revisions appear to be more restrictive to foreign investors (The US-China Business Council, 2015).<sup>5</sup>

In order to promote the economic development of China, a preferential tax regime in specific regions, i.e. in the Central-Western Region, also operates. This includes Special Economic Zones, Coastal Open Cities, Economic and Technological Development Zones, the Binhai New Area of Tianjin, the Pudong New District of Shanghai and the Three Gorges of the Yangtze River Economic Zone (WTO, 2014). While the Central-Western Region may currently benefit from a lower income tax and tax exemptions, the East Region (Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan) is not tax advantaged, regardless of the fact that it accounted for 81.2 % of the realised FDI value in 2012 (WTO, 2014). Davies (2013) also argues that in the most recent year, the Eastern Region continued to absorb the overwhelming majority of foreign investment by a number of projects and utilised foreign investment value.

The development of outward FDI in Figure 3 shows that the EU's value of outward FDI/per capita in 2014 was almost seven times higher than in China. However, while the EU recorded a similar value of outward FDI per capita in 2014 as in 2001, China increased it almost 16 times, i.e. from 5.3 billion USD in 2001 to 83.2 billion USD in 2014. The highest amounts of FDI were invested in Asia, i.e. almost 68 % of the total China's overseas FDI (NBS, 2014).

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<sup>2</sup> Namely, the Law on Sino-Foreign Equity Joint Ventures, the Law on Sino-Foreign Cooperative Joint Ventures, the Law on Wholly Foreign-Owned Enterprises, the Law on Partnership Enterprises, the Company Law, the Anti-Monopoly Law, etc.

<sup>3</sup> Foreign companies that invest in encouraged industries may receive some form of incentives in the form of preferential tax treatment provided under the Enterprise Income Tax Law or a duty-free treatment for equipment imported within the total investment amount for self-use. Unlike the encouraged industries, foreign companies investing in restricted industries may be subject to extra steps in the approval process or restrictions on their operations. In general, the encouraged category includes those that use improved technology and are less polluting, while the restricted areas to invest in are those deemed to employ outdated technologies or over-exploited scarce natural resources, or to harm the environment.

<sup>4</sup> Currently, the Thirteenth Five-Year Plan for 2016–2020 is carried out. For more information see, for example, KPMG (2016).

<sup>5</sup> Davies (2013) argues that the investment protectionist trend erodes for example the perceived discrimination against foreign-owned companies in government procurement. Specifically, China is not a member of the WTO Government Procurement Agreement.

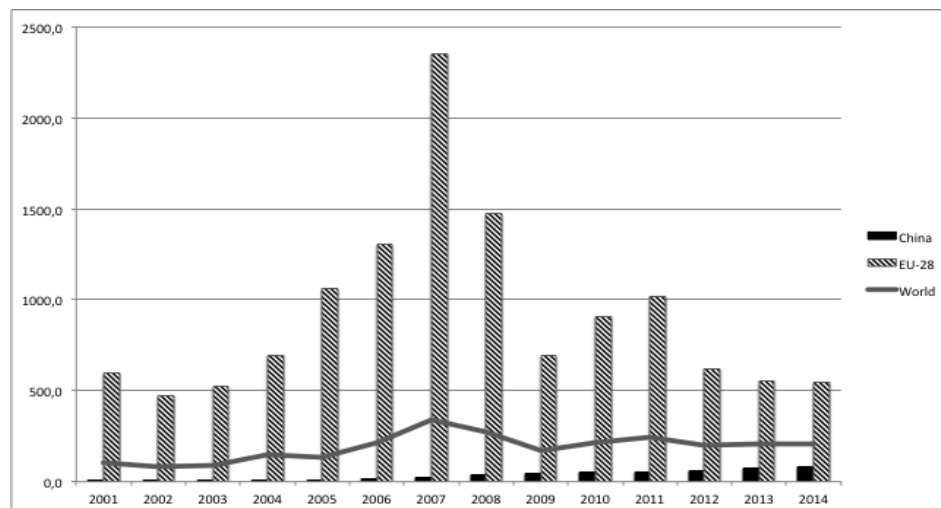


**Fig. 3** Outward FDI in China, the EU and the world in 2001-2014 (USD/cap.) Source: UNCTADStat., 2016, own elaboration

China invests especially in ASEAN countries, because of the similar language and cultural background, a favourable government policy supporting FDI inflows and also in the establishment of the China-ASEAN Free Trade Area. The motivation of Chinese companies to invest in Africa is to secure access to natural resources. The Chinese investment in Africa has been five times larger in proportion to the size of the economy than in the rest of the world. A large part of these investments has focused on minerals, raw materials and infrastructure. Energy and metals are the principal investment areas, accounting for nearly 70% of the total outflows since 2005. However, China tries to diversify its assets and location portfolios, which is confirmed by these data - China does not just own 1.3 trillion USD in the U.S. treasury bonds anymore, it now owns a coal mine in Australia, a 14% share in a car manufacturer in France, or a 20% stake in the Standard Bank in South Africa (OECD, 2014). Despite the growing Chinese FDI outflows, overseas assets are only 7 % of the Chinese GDP, while the FDI in the world amounts to almost 34 % of the world GDP (UNCTADStat, 2016).

The Chinese government encourages not only inward, but also outward investment. Manufacturing overcapacity, insufficient domestic demand and increasing energy and resource consumption are the main reasons for Chinese overseas investments. The administrative measures are similar to inward investment. Basically, Chinese investors have to seek approval and verifications from three regulatory bodies, i.e. the NDRC, MOFCOM and the State Administration of Foreign Exchange (SAFE). The nature of the procedure depends on factors such as the type of investor (state or private)<sup>6</sup>, the place, the sector and the size of investment. The Outbound Foreign Investment Catalogue indicates the sectors and countries where outward investments are currently encouraged. Supported areas (regions or sectors) usually result from the national Five-Year plans and development strategies.<sup>7</sup> From this point of view, the implementation of the New Silk Road Economic Belt represents the recent initiative of the Chinese government with the object to promote an orderly and free flow of economic factors, highly efficient allocation of resources and deep integration of markets by enhancing the connectivity of Asian, European and African continents and their adjacent seas (The State Council, 2015). According to MOFCOM (2016), the “One Belt and One Road” investment accounted for 14.8 billion USD in 2015, up 18 % year-on-year and flowed especially to Singapore, India, Malaysia and Indonesia. However, the Central and Eastern European

<sup>6</sup> Most of the investments in China are conducted by state-owned enterprises under the administration of the central government.

<sup>7</sup> The idea to invest overseas was firstly initiated by China’s government in 1999 via the “go global” policy (also referred to as the Go Out Policy or the Going Global Strategy) with the intention to encourage Chinese enterprises, mainly state-owned enterprises.

(CEE) countries play a special role in this Chinese initiative. The framework of economic cooperation between China and 16 countries from the CEE region creates the so-called “16+1” platform (or Warsaw initiative) that was initiated by the Chinese Prime Minister Wen Jiabao during his visit to Warsaw in 2012. On the one hand, a mutual economic cooperation grants the CEE countries access to the Chinese capital, but on the other hand, Chinese investors will gain full market access and know-how technologies. Because the 11 countries included in the platform are members of the EU, China gains access to the EU market through the so-called “Eastern Door” (Jaroch, 2016).

On the whole, when the EU is not considered as one unit and FDI flows are expressed in absolute values, then China became the largest foreign direct investment (FDI) recipient in the world, in which the flows of its FDI amounted to 129 billion USD in 2014. It was historically a high level, mainly because of the increase in FDI in the services sector. At the same time, China also became the third largest investor in the world after the USA and Hong Kong. The value of China’s FDI outflows accounted for 116 billion USD. Those who had significant influence on this development were multinational enterprises (MNEs), which increased their investment abroad. Although China’s FDI inflows were higher than FDI outflows, investment by Chinese MNEs abroad grew faster than FDI inflows to China in 2014 (UNCTAD, 2015). In 2015, Chinese overseas FDI rose to nearly 120 billion USD, which was below the inward FDI of 126.3 billion USD, so China remained a net importer of capital (Daily News, 2016).

#### **4 Chinese-EU investment relations**

Diplomatic relations between the EU and China were established in 1975 and the creation of the EU-China Comprehensive Strategic Partnership in 2003 has especially deepened and broadened cooperation in wide areas. One of the most important areas, i.e. trade cooperation, has been developed on the basis of the 1985 EU-China trade and cooperation agreement. The entrance of China into the WTO in 2001 had a positive influence on their mutual trade, because many obstacles to trade were gradually removed. In 2014, the EU was China’s largest trading partner (13.4 % of the total share) and China was EU’s second largest trading partner. Although the economic cooperation between the EU and China has been developing since the mid-1980s, not all potential has been exploited yet. China currently accounts for just 2–3 % of the overall European investments abroad, whereas the Chinese investments in Europe are rising, but from an even lower base (European Commission, 2016b). According to Chinese statistics, Europe’s share, i.e. the EU-28, Switzerland and Norway, in Chinese outward FDI reached about 8 % in 2013 (NBS, 2014). Chinese outward FDI in Europe hit another record in 2015, highlighting the potential for China as a source of productive capital (Haneman, T. and M. Huotari, 2016). There is evidence that the intensity of business relations between the individual member States of the EU and China stimulates Chinese investment. This suggests that the FDI policy to encourage EU outward investment is a useful tool to generate inward FDI from China (Clegg and Voss, 2012).

In 2010, the European Commission issued A strategy for smart, sustainable and inclusive growth – Europe 2020<sup>8</sup>, in which it emphasised the need to build strategic relations with emerging economies. At the same time, the European Commission identifies China in the document Towards a comprehensive European international investment policy as a potential partner for an investment agreement (European Commission, 2013).<sup>9</sup> In parallel with this, in April 2010 the European Commission President Jose Manuel Barroso and Chinese Prime Minister Wen Jiabao supported the idea of deepening and enhancing the EU-China bilateral investment relations. The EU-China Joint Committee and a Joint EU-China Investment Taskforce were established in order to find out the

<sup>8</sup> “Europe 2020” is EU’s ten-year jobs and growth strategy launched by the European Commission in 2010.

<sup>9</sup> The Lisbon Treaty grants the EU exclusive competence in the area of FDI that are a part of the Common Commercial Policy of the EU. (European Commission, 2010).

possibilities of potential negotiations about an EU-China investment agreement. In 2011, a public consultation on the EU-China future of investment relations was also conducted. The consultation showed that China is becoming an important destination for European investment despite persisting and significant investment barriers. Thus a broad majority of EU investors expressed their support and interest in the EU negotiating an agreement with China so as to enhance the conditions for European investors in China (European Commission, 2013).

The EU's as well as China's development goals<sup>10</sup> represented a potential for synergies to enhance cooperation on both sides. In this vein, the EU-China 2020 Strategic Agenda for Cooperation was agreed on at the EU-China summit in 2013 as the guiding document of their relationship. Negotiating a comprehensive EU-China Investment Agreement represents one of the key initiatives that is included in the document with the object of achieving prosperity in both countries. The first round of negotiations took place in Beijing in January 2014 and seven negotiation rounds took place until June 2016. Dialogue about topics concerning the bilateral trade and investment relations is led in the frame of the annual EU-China summit and the EU-China High Level Economic and Trade Dialogue (HED) by the annual Joint Committee. The latest HED was held in Beijing in September 2015. The EU and China representatives reaffirmed a strong interest in each other's national initiatives, namely the Investment Plan for Europe<sup>11</sup>, and the Silk Road Economic Belt and the 21<sup>st</sup> Century Maritime Silk Road (the Belt and Road Initiative), and discussed synergies between these initiatives and established the EU-China Connectivity Platform to explore synergies on connectivity plans, strategies and policies and to identify areas where to enhance cooperation and develop a pipeline of projects (European Commission, 2015). A bilateral investment agreement should lead to the liberalisation of investment and the elimination of restrictions for investors to each other's market. The expression “comprehensive” means that the agreement will incorporate bilateral cooperation and dialogue on sustainability issues and a dispute settlement mechanism, and should allow companies to challenge governmental decisions with regard to unfounded investments and market access obstacles (Foreign Trade Association, 2015). Practically, it means that the bilateral investment agreements that China has signed with some EU Member States until now will be substituted by one comprehensive investment agreement. The conclusion of an investment agreement is considered by political representatives as the first step to a bigger free trade agreement.<sup>12</sup> However, at the moment the progress is slow and more effort is needed to accelerate the task.

Regarding Chinese FDI in the EU, the United Kingdom recorded the largest amount of invested capital in 2000–2015 in the total value of 15.1 billion EUR. On the other hand, Latvia recorded only 3 million EUR of the Chinese invested capital at the same time. Chinese investment increasingly extends beyond the “Big Three” economies (Germany, France and the United Kingdom), which brings intra-EU competition for Chinese capital (Haneman, T. and M. Huotari, 2016). The cumulative value of Chinese FDI in the individual EU countries in 2000–2015 is

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<sup>10</sup> The Chinese government has already put forward a number of targets related to outward FDI in the previous 12th Five-Year Plan for the period 2011–2015, including, *inter alia*, increasing the total outward FDI stock to 500 billion USD by the end of 2015, increasing the number of Chinese overseas contracted projects and Chinese people going to work abroad to the total number of one million by the end of 2015, etc. According to the 12th Five-Year Plan, priority was also given to specific sectors such as energy, energy conservation, raw materials, biotechnology, agriculture, services, high-end manufacturing and innovative technologies (The State Council, 2016).

<sup>11</sup> A weak economic growth in the EU was the reason for formulating the Investment Plan for Europe by the president of the European Commission Jean-Claude Juncker in November 2014. The main object of the plan is to remove obstacles to investment, to provide technical assistance to investment projects and to make smarter use of new and existing financial resources. The plan should mobilise investments of at least 315 billion euros in three years, i.e. from 2015 by mid-2018. (European Commission, 2016a). China is the first non-EU Member State which announced its contribution to the plan in the value of up to 10 billion EUR. The priority of China's investment in the Juncker Plan should be digital economy (ChinaEU, 2016).

<sup>12</sup> The ambitious idea of such a trade agreement was already formally included in the summary of the bilateral summit in 2014.

recorded in Table 1. In 2015, the biggest transactions were ChemChina’s acquisition of the Italian tyre maker Pirelli, Anbang’s acquisition of the Dutch insurer Reaal NV and China Investment Corporation’s acquisition of two shopping centres in France and Belgium. Investment by Chinese companies in new green field projects also grew, but only accounted for a fraction of the total investment (Haneman, T. and M. Huotari, 2016).

**Table 1** Chinese FDI in the EU Member States (Value of cumulative investment from 2000–2015, million EUR)

| Order | Country        | FDI    | Order | Country        | FDI |
|-------|----------------|--------|-------|----------------|-----|
| 1.    | United Kingdom | 15 164 | 15.   | Greece         | 405 |
| 2.    | Italy          | 11 186 | 16.   | Bulgaria       | 222 |
| 3.    | France         | 9 485  | 17.   | Czech Republic | 207 |
| 4.    | Germany        | 7 905  | 18.   | Denmark        | 134 |
| 5.    | Portugal       | 5 527  | 19.   | Ireland        | 108 |
| 6.    | Netherlands    | 5 279  | 20.   | Finland        | 103 |
| 7.    | Hungary        | 1 975  | 21.   | Malta          | 69  |
| 8.    | Belgium        | 1 680  | 22.   | Slovakia       | 40  |
| 9.    | Sweden         | 1 592  | 23.   | Lithuania      | 32  |
| 10.   | Spain          | 1 520  | 24.   | Cyprus         | 31  |
| 11.   | Romania        | 741    | 25.   | Estonia        | 23  |
| 12.   | Austria        | 506    | 26.   | Slovenia       | 8   |
| 13.   | Luxembourg     | 495    | 27.   | Croatia        | 4   |
| 14.   | Poland         | 462    | 28.   | Latvia         | 3   |

Source: Haneman and Huotari, 2016

Since 2000, Chinese investors have diversified the range of industries in the EU in which they invest. From an early focus on high technology, infrastructure and heavy industry, investment is now growing in the services sector (according to KPMG<sup>13</sup> it is a tertiary industry) – in healthcare, finance, media and entertainment – and coming into liberalised infrastructure sectors such as telecommunications equipment (Cleg and Voss, 2012). In the frame of the secondary sector, the Chinese investment in the supply of electricity, gas and water has increased significantly (KPMG, 2016). In terms of the ownership status of Chinese investors in the EU for the period 2000-2011, it is estimated that state-owned enterprises accounted for 72 % and private-owned enterprises for 28 % of the investment amount. However, in terms of the numbers of deal, private-owned enterprises are responsible for 63 % and state-owned enterprises for 37 % (European Chamber, 2013)<sup>14</sup>. Thus the role of state capital in China is maintained.

## 5 Conclusion

The integration of China into the world economy, especially after its entrance into the WTO, has brought the prosperity of Chinese economy, but also a better opportunity to get on the Chinese market for foreign producers and exporters. Nevertheless, the level of FDI flows (inflows and outflows) in the absolute as well as relative expression was always higher in the EU than in China in 2001–2014. The development of FDI flows was also different in both units. In the absolute term, while the EU recorded the highest level of FDI flows before the world economic crisis in 2007, China gradually increased its FDI flows during the whole monitored period. In China, the value of FDI inflows surpassed the value of FDI outflows, although the difference between FDI inflows and outflows was the smallest at the end of the monitored period. In the EU, the value of FDI outflows

<sup>13</sup> For more information see KPMG (2016).

<sup>14</sup> The same trend but a different value was confirmed by KPMG (2016) that compared the data in 2010 and 2015.

was higher than FDI inflows for the whole time. In the relative term, while the value of inward FDI remained at the same level in the EU, it increased 2.5 times in China in the monitored period.

Trade and investment cooperation between China and the EU takes different forms and is carried out on a different scale with the individual Member States of the EU. It is given by the economic characteristics of the countries, but also by their historical ties. Regardless of this fact, the framework of trade and investment cooperation of the EU Member States with China has to be formulated, according to the Lisbon Treaty, unanimously for the all EU Member States, i.e. in the frame of the Common Commercial Policy. Thus the substitution of bilateral investment agreements by one comprehensive investment agreement is necessary and also demanding for both sides. However, providing clear rules of the dispute settlement mechanism as well as insuring intellectual protection rights represents important areas of the new investment agreement that make the negotiation about this agreement more difficult. Special attention should also be given to China's state-owned enterprises. They distort the market environment and make business less transparent. From the long-term aspect, it is demanding to follow not only the amount of Chinese recently invested capital, its structure and forms, but also the new investment opportunities for the EU enterprises.

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## LABOR MARKET CONSEQUENCES OF POPULATION AGEING IN THE EU

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### Abstract

This paper deals with the effects of labor market consequences of population ageing in the EU. Special attention is devoted to the role of labor market institutions. The main aim of the paper is to explore which labor market institutions have significant impact on the unemployment rate of older workers. This is analysed in a panel of 17 EU countries for the period 2004-2013. The main results are that active labor market policy measures have a positive impact on the unemployment. This surprising result is probably influenced by recent economic crisis. Secondly, there is negative impact of collective bargaining coverage and EPL on unemployment. There are no significant differences in impact of labor market institutions on unemployment of prime-aged and older workers.

### Keywords

Labor market, population aging, labor market institutions, unemployment.

### JEL classification

E24, J40

## 1 Introduction

One of the most important characteristic of demographic development is aging and decreasing population. All European Union countries face these problems with different intensities from one region to another. In the EU as a whole the demographic old-age dependency ratio (people aged 65 or above relative to those aged 15-64) is projected to increase from 27,8 % to 50,1 % within the period 2013-2060 (European Commission, 2015). Labor force projections show a rise in participation rates of older workers (aged 55+), reflecting the combined effect of the rising attachment of younger generations of women to the labor market, together with the expected impact of pension reforms. According to European Commission (2015) three distinct periods can be observed for the EU as a whole (see Fig. 1):

- 2007-2011: the working-age population is growing and therefore supportive of growth;
- 2012-2022: the working-age population is declining as the baby boom generation enters retirement but this is cushioned by projected increase in the employment rates of women and older workers;
- from 2023: the projected increase in employment rates is slower and is dominated by falling of the working-age population and the number of persons employed.

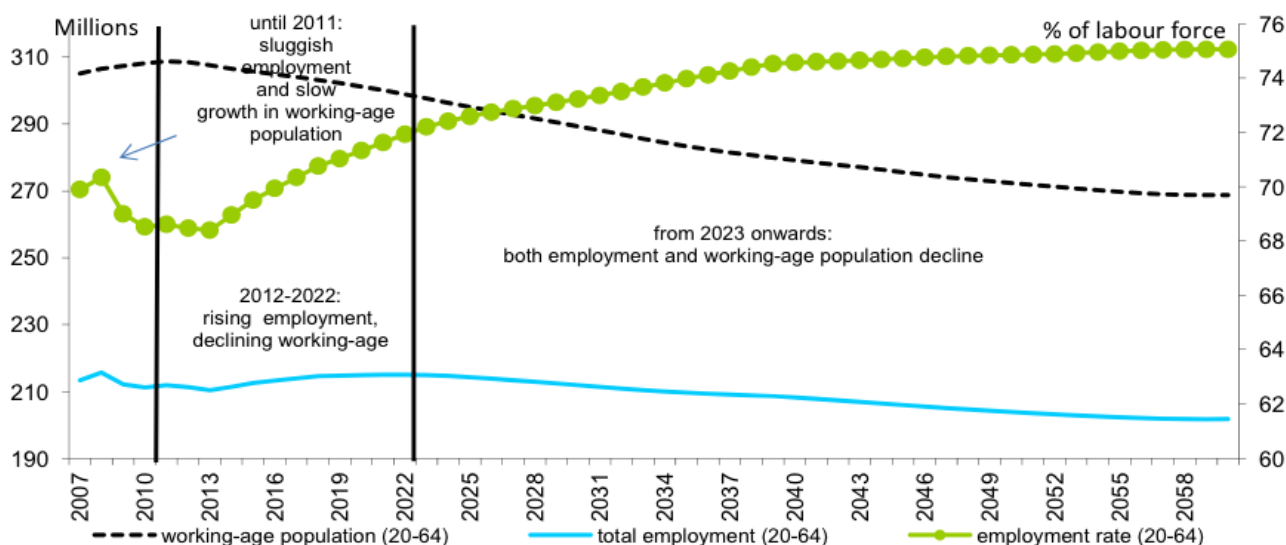


**Fig. 1.** Impact of Population Aging on Employment (Source: EC, 2015, p. 3)

There are just a few studies on impact of population ageing on labor market results, specifically on unemployment of older workers. There is a lack of literature investigating the impact of labor market institutions on unemployment of older workers. The aim of the paper is to identify labor market institutions which have significant effect on these results. The paper is organized as follows. The next two sections are theoretical foundation of empirical analysis. In section 2 a general impact of population ageing on the unemployment of older workers is discussed. In section 3 there is a literature review on consequences of various labor market institutions on unemployment. On the basis of this review institutional variables were selected in model specification. In section 4 data and model specification are presented. A panel data set for 17 EU countries from 2004 to 2013 is used for the empirical analysis. In section 5 the results of the empirical analysis are discussed. Section 5 concludes.

## 2 Population Ageing and unemployment

Older workers seek employment and are hired or fired mostly in the same labor markets as all other workers. It is hard to find special labor markets for older workers that exist for disabled workers. There are various channels through which population aging influences unemployment rate of older workers.

Complex problem is the relationship between age and productivity levels. On the one hand older people tend to have higher wages and many age related salary supplements due to higher number of years of employment. They are also thought to be more reliable and to have more experiences and better skills than younger workers. On the other hand they may be less productive due to higher risk for health issues and lower flexibility in accepting new assignments. They can learn in a lesser degree and are less suitable for training. This creates a discrepancy between wages and productivity of older workers, so employers will prefer to hire younger workers who are generally cheaper and more productive. Consequently, increasing share of older workers in total labor force must increase unemployment rate of old workers and the general rate of unemployment must therefore increase.

As Boeri and van Ours (2013) point out, the age/productivity profile is not exogenous to labor market institutions. Labor market institutions aimed to facilitate early departure from the labor force in the past. Individual productivity declines if the worker does not invest to keep his human capital

up-to-date. This is something like self-fulfilling prophecy; if the worker expects early retirement, he will be unwilling to invest in training. Similarly, the employer will be less eager to invest in training programs.

Another important channel is the change of demand and consumption structure. Demand for final goods is age specific. Young people tend to demand for specific goods that are less interesting for old people and vice versa. Increasing demand for services in health care sector, in education of adults and life-long learning and in leisure related sectors (e.g. tourism) can be expected. Consequently, the demand for labor in these sector must expand. Corresponding shift in labor force between industries is slowed down by various labor market frictions; structural and frictional unemployment are therefore likely to increase during this shift. Older worker are less flexible; find it difficult to move, to drive longer to work and to switch among different areas of work (Troha and Čepar, 2015). The quick technological advance and changing population age-structure may require shifting jobs and qualification that are more difficult at an older age. So, older workers are less mobile in terms of geographic and sectorial mobility compared to younger workers.

The low rate of employment of older workers may result from deliberate government policy to reduce youth unemployment. As the OECD (2006) states, “the claim that fewer jobs for older workers result in more jobs for younger workers, though unfounded, is providing especially stubborn.” Early retirement policies were supported jointly by government, employers and unions to reduce labor supply. According to Boeri and van Ours (2006) decline in rate of employment of older workers is a long-term phenomenon which was partly stimulated by high unemployment rates that emerged in many European countries in 80s. Early retirement of older workers is necessary to lower unemployment rate of young people.

Long-term unemployment among older workers is higher than among prime-aged and young workers. Chéron et al. (2013) confirms that job search by the unemployed falls with age. Because of shorter horizon of older workers, firms and workers invest less in job-search and labor-hoarding activities at the end of the life cycle. Older people are less motivated to look for a new job when being unemployed because the time period in which employees benefit from a job is getting shorter with age. Consequently, older people exhibit higher unemployment rates compared to younger workers.

The unemployment of young and older workers can be influenced by fluctuations of economic activity. According to Cahuc et al. (2013) recessions affect unemployment of older workers less than unemployment of young. This means that countries with higher proportion of older workers are less vulnerable to economic shocks and keep higher employment rates in comparison with younger societies.

### **3 The role of labor market institutions**

There are many studies which explore the implications of institutions on unemployment or other labor market results (see e.g. Nickel (1997); Nickel and Layard (1999); Bertola et al. (2002); Boone and van Ours (2004); Betcherman (2013); Flaig and Rottmann (2013)). Although the results are unambiguous, there is a broad consensus that labor market institutions are important determinants of unemployment in the long run. For instance, Nickel (2003) reports that differences in the structure and organization of labor market can largely explain the variations in the unemployment rate in various economies. In contrast Freeman (2005, 2007) argues that available data do not confirm nor disprove negative impact of labor market institutions on the national output. Simultaneously, Freeman notes that impact of labor market institutions on economic performance is influenced by changes in economic environment. In empirical analysis, the effects of the following institutions are analysed: active labor market policy, the tax burden on labor income, the generosity of the unemployment benefit, the strength of trade unions measured by union density and collective bargaining coverage and the minimum wage.

A significant problem when examining the impact of specific market institution is that it can be influenced by another institution. So the effects of another institutions or significant circumstances must be taken into account. National economies are different in their institutional structure, the share of workers organized in trade unions, the extent of coverage by collective agreements, level of centralization of collective bargaining, laws protecting workers or other forms of wage regulations. Differences may result from specific historical development, informal institutions or specific goals of political elites. In addition, these labor market institutions are changing over time as a result of various political and economic shocks.

One of the institutional areas addressed in this paper is active labor market policy (ALMP). This policy is aimed to activate various groups of unemployed. Generally, there are four main types of ALMPs: training, subsidized employment, public employment services and activation. ALMPs aim to reduce mismatch in the labor market because they should promote more active search behavior on the part of the unemployed. However, these policies may lead to opposite results; workers can be locked into training and job creation programs, which can reduce their search activity.

Labor costs may be affected by the size of labor taxation. Growth in tax burden tends to increase costs per worker which leads companies to reduce amount of workers demanded. The result is often the rise in the unemployment rate, especially for threatened groups of workers. Indicator of tax burden according to OECD statistics includes income tax paid by employees, social security contributions and social insurance.

Legislative protection of employees consists of a set of standards and rules that employers must follow when firing employees. More stringent employment protection (EPL) reduces employers' propensity to hire and fire workers. In countries with high EPL, young labor market entrants and women with intermittent participation spells should be over-represented among the unemployed and underrepresented among the employed, who should in turn disproportionately include mature male workers with high labor market attachment (Bertola et al., 2002). Stricter EPL for permanent contracts is unfavourable for flexible jobs and creates so-called two-tier system, where firms rely on a core of employees with full-time permanent contracts.

The system of unemployment benefits is another important institution which protects workers against market risks. Unemployment benefit system (social system in wider sense) is important for motivation of the unemployed to looking for a job actively. Various indicator of generosity of unemployment benefits (UB) stand in empirical studies as variables explaining unemployment and its length. High level of UB generosity increase reservation wage of UB recipients, so (especially young prime aged) workers reduce their search intensity and increase duration of their unemployment spells. On the other hand longer search process may lead to a higher quality of post-unemployment matching.

The strength of the trade unions is measured by degree of unionization. Because unions increase wage pressure, their existence will raise unemployment (Nickell and Layard, 1999). There are two measures of unionization. One measure is the percentage of workers who are members of unions (union density) and the other is the percentage of workers whose conditions of employment are covered by a collective bargaining agreement. In most European countries collective bargaining coverage is extended to a very high fraction of workers who are not union members.

According economic theory a minimum wage set above the market clearing level tends to increase unemployment. This prediction is unambiguous on the assumption of perfectly competitive labor market. Under imperfect competition the impact of a minimum wage is harder to predict. The introduction of minimum wage can enhance employment under certain circumstances, especially in the short run. Empirical evidence fails to provide convincing results on the effects of the minimum wage on the unemployment.

### *The role of flexible work*

In many European countries, the share of flexible work has increased since the mid-80s, although not at the same degree everywhere. In some countries, such as Belgium, Luxembourg and Germany, it remained roughly constant, increased significantly in Spain, France, the Netherlands, Great Britain and Italy. Especially French and Spanish data are remarkable: the proportion of flexible labor to total unemployment tripled in France, in Spain it roughly doubled. But also in the Netherlands the proportion of flexible work increased from 6 % to nearly 11 % over the same period (EC, 2015).

The boom of flexible work has implications of the elderly workers. It appears there is an inverse relationship between the amount of permanent and flexible employment. In countries with highly regulated labour market the share of flexible employment has increased. In times of economic prosperity temporary jobs instead of permanent jobs are created first. During the economic downturn these temporary jobs are lost at first. Furthermore, flexible jobs are occupied by women or young workers. The higher the proportion of flexible employment, the worse the situation of old workers can be (Muffels, 1998). Especially, if the proportion of flexible jobs in total number of new jobs is significant, prospects of older workers to obtain employment are deteriorating. On the other hand if older workers have permanent contracts compared to younger workers, they are less easily fired.

## **4 Data and model specification**

All secondary data were collected from databases of Eurostat, OECD and ILOSTAT. The data refer to 17 EU countries for the period 2004-2013 (because of data availability). The equation of interest exploits cross-country variation in unemployment of older workers, labor market institutions and change in the inflation rate:

$$u_{it} = \beta_0 + \beta_1 x_{it} + \beta_2 \Delta^2 p_{it} + \varepsilon_{it}$$

where  $u_{it}$  is the unemployment rate (unemployment as a percentage of the labor force) in country  $i$  and time period (calendar year)  $t$ . Variable  $x$  is a vector of these labor market institutions:

- expenditures on ALMP (here normalized according to Boone and van Ours (2004) as expenditures per unemployed person as a percentage of GDP per member of the labor force),
- tax wedge, which is defined as the ratio between the amount of taxes paid by average worker and the corresponding total labor cost for the employer,
- employment protection legislation (EPL) indicators measuring procedures and costs involved in dismissing individual workers,
- net replacement rate (NRR) showing the proportion of net income in work that is maintained after job loss, here used indicator of benefit generosity,
- trade union density is the proportion of paid workers who are union members,
- collective bargaining coverage is a number of employees covered by collective agreement divided by the total number of wage and salary-earners
- incidence of temporary contracts represents indicator of flexible work and is constructed as percentage of total contracts/jobs

Finally,  $\Delta^2 p$  is the change in inflation rate and  $\varepsilon_{it}$  is the error term. On the basis of results of Hausman test the panel regression with fixed effects was used.

## 5 Results and discussion

In order to answer the research question two panel regression models were run; the results are presented for older workers (these in age of 55 and older) and workers in prime age (25-54) for comparison.

**Table 1.** Panel estimations for unemployment

|                                         | <b>Rate of unemployment<br/>Workers 55+</b> | <b>Rate of unemployment<br/>Workers 25-54</b> |
|-----------------------------------------|---------------------------------------------|-----------------------------------------------|
| <b>Const</b>                            | 6,814<br>(19,719)                           | 11,634<br>(23,328)                            |
| <b>ALMP expenditures</b>                | 2,706***<br>(0,750)                         | 3,558***<br>(0,707)                           |
| <b>Tax wedge</b>                        | 0,151<br>(0,156)                            | 0,181<br>(0,148)                              |
| <b>EPL</b>                              | -6,317*<br>(2,980)                          | -7,978**<br>(3,001)                           |
| <b>NRR</b>                              | 0,018<br>(0,079)                            | 0,015<br>(0,078)                              |
| <b>TU density</b>                       | 0,312<br>(0,266)                            | 0,567**<br>(0,220)                            |
| <b>TU coverage</b>                      | -0,142**<br>(0,048)                         | -0,240***<br>(0,067)                          |
| <b>Minimal wage</b>                     | 0,034<br>(0,200)                            | 0,037<br>(0,229)                              |
| <b>Incidence of temporary contracts</b> | 0,008<br>(0,241)                            | -0,256<br>(0,191)                             |
| <b>Inflation change</b>                 | -0,044*<br>(0,021)                          | -0,052**<br>(0,024)                           |
| <b>LSDV R<sup>2</sup></b>               | 0,81                                        | 0,89                                          |
| <b>Within R<sup>2</sup></b>             | 0,67                                        | 0,78                                          |

Estimation with robust standard errors

Standard errors in parentheses, \* p<0,10, \*\* p<0,05, \*\*\* p<0,01

Source: Eurostat database, OECD.Stat (database), ILOSTAT database and own calculations

According to results in table 1, three institutional variables have some explanatory power for unemployment rate of older workers but in the opposite direction than it might be expected. There is positive relation between expenditures on ALMP measures and unemployment and negative relation between EPL and TU coverage. Regarding the public spending on ALMP there are some empirical studies using cross-country time series information concluding that ALMP have a significant negative effect on the unemployment rate (e.g. Scarpetta (1996), Elmeskov et al. (1998), Nickell and Layard (1999)). As Boone and van Ours (2004) point out, there is endogeneity problem in the analysis, because ALMP affect unemployment but it is also unemployment that affects spending on ALMP. Previous studies treat this problem differently and the results are ambiguous. Positive impact in this estimation is probably caused by recent economic crisis, when both the unemployment rate and public spending on ALMP sharply increased.



While the union density has no clear effect and seem to be unimportant in explaining of unemployment of older workers, collective bargaining coverage has negative effect on unemployment both the older and prime-aged workers. The latter finding is consistent with results of Flaig and Rottmann (2013). EPL affects the unemployment in the same direction. This is equivalent of the economic theory, because prime-aged workers are (and older workers can still be) insiders. They already have a job and are sheltered by collective agreement and EPL from labor market adjustment. Outsiders are typically young workers who are first-time jobseekers and hence more affected by unemployment. The result also show that flexible work (here presented by incidence of temporary contracts) does not deteriorate the position of older workers on labor market. This finding is in contrast with predictions of some authors discussed in section 2.

## 6 Conclusion

From the literature review there can be seen that some studies reveal some positive and some a negative impact of population aging on unemployment. The negative impact is caused by lower flexibility of the aging labor force, its higher labor cost, outdated knowledge and competencies. On the other hand older workers tend to more reliable and to have more experiences than their younger colleges. The econometric analysis tried to find out if there are some labor market institutions which have significant impact on unemployment of older workers. Because a large part of this age group is represented by insiders, collective bargaining coverage and EPL have negative impact on unemployment. The positive impact of ALMP can be biased by recent economic crisis. The results show that there is no crucial difference in impact of labor market institutions on unemployment of prime-aged and older workers. The shortcoming of this paper is relatively short panel where the variations in institutions within the countries are relatively small and neglecting potential institutional complementarities.

## 7 Acknowledgement

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## REGIONAL DISPARITIES OF SELECTED ECONOMIC INDICATORS IN THE CZECH-POLISH BORDER

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### Abstract

This paper focuses on the issue of regional disparities and defining specific regional disparities based on selected indicators. Attention is focused on the Czech border regions, which are on the border with Poland. They are monitored mainly negative regional disparities. These can be reduced by taking advantage enough potential in border regions. For cross border cooperation on the Czech-Polish is concentrated in the largest part of the funds of Operating programs of cross border cooperation. These regional disparities in this paper are based on the new proposed definition with which the author is coming. Subsequently there are identified specific disparities three selected indicators, ie. Export performance, unemployment rate and labour costs.

### Keywords

Border regions, Export performance, Labour costs, Regional disparities, Unemployment rate.

### JEL classification

J60, M21, O18.

## 1 Introduction

Regional disparities are often dealt with at national and European level in recent years. Authors of regional disparities are watching them differently. There is currently no same view of regional disparities. Moreover, it is questionable how the disparity to be measured. In this paper there is used new definition of regional disparities, which is proposed by the author. This definition implies also a new way of determining disparities, which are divided into positive and negative. This new view on regional disparities is used when analyzing the state of the selected regions. These are the regions of the Czech-Polish border. Specifically, it is five Czech regions, which are on the border with Poland. These are specific regions, mainly because they are considered peripheral and not sufficiently exploited the potential here that in those regions.

In this paper there is first introduced new definition of regional disparities and after it is used for practise part and determining disparities by selected indicators. Further defines the regions that are under the author's contribution focuses. Following is an analysis of regional disparities through three selected indicators.

## 2 Literature review and new definition of regional disparities

The term disparity comes from the Latin word “*disparatus*”, which in direct translation means divided. The adjective takes the form of disparate, not disparity. The general definition of disparity indicates that the disparity means inequality, inconsistency or even divergence (Fojtíková and Tuleja, 2014). Each region is developing in another way, at a different pace, a different direction, and these differences are being referred as regional disparities. The Ministry for Regional Development defines regional disparities as “*unjustified regional differences in the level of economic, social and environmental development of the regions*”.

Individual regional disparities can have various causes. It is the disparity in natural conditions of different regions, different demographic situation, different economic structures, low labor mobility, low mobility of capital, institutional factors, political decisions or psychological factors.

It is possible to observe two different perspectives leading to marking disparities as negative and positive (Wishlade and Youill, 1997). There is also maintains that while it is possible to take the analogy of two pages and what are the weaknesses and strengths of an object under examination

(Stimson, Stough and Roberts, 2006). Negative regional disparities can be perceived as weaknesses and positive regional disparities as strengths. Weaknesses can usually lead to the key vulnerabilities of examined object, which usually lie in the lack of resources and lack of ability to use available resources (Gajdová and Tuleja, 2013). Strengths usually result in comparative respectively competitive advantages of examined object, which usually consist of a unique and valuable resource and a unique ability to use these resources (Nijkamp, Moomaw and Traistaru-Siedhclag, 2006).

The basis of traditional regional and cohesion policy are negative regional disparity (Hučka et al., 2013). It is based on the principle of solidarity to help less developed regions to more equitable distribution of income or employment, respectively solidarity developed regions with less developed regions, and it is also, among others justified by the need to maintain social consensus among regions and social groups within countries and within the European Union. Themes connected with redistribution approach are largely political. The positive role of regional disparities is in the understanding of the fact that the disparity can be the engine of development and source of comparative advantage. Regional policy is focused on the chances and mobilization of local resources to improve the quality of life of people as a result of development.

The basic structure of disparities is based on defining spheres of appearance. There are regional disparities in the social, economic and territorial spheres. Economic disparities are related to a regional economic performance, the structure of the regional economy, development and human potential. We can include the indicators of employment, unemployment, gross domestic product, labor productivity, industry, agriculture, services and others (Strom and Nelson, 2010). Social disparities are related to population in the wider context of quality of life, standard of living, social equality. We can monitor the density of population, demographic structure, migration activity of the population, labor mobility, health, mortality, educational structure, professional structure, housing, social background, cultural background and educational background. Territorial disparities are associated with geographic, natural, traffic and technical conditions (Tuleja and Gajdova, 2015). In this group we can include for example area, climate, air, water, nature, waste, forests, land, transport infrastructure, technical infrastructure and availability.

It is possible to look at the theory of regional economics in the context of regional inequalities. In spite of that the existence of regional inequality represents a serious problem, and yet there is still no general agreement as to the given inequalities accessed from a theoretical and methodological point of view (Hučka et al., 2013). Grasping territorial disparities impedes a number of factors such as different definitions of convergence and divergence, socio-economic level compared territories, reliability and comparability of the used data, character and duration of the period in where the territory is compared, numerous difficult quantify sphere and many others. Similarly, the amounts of the identified causes and mechanisms that regulate trends regional systems in time is considerable and additionally will increase over time. View of the theories of regional inequalities shows that "liberal, it is endogenous developing paradigm for regional development, which dealt with regional issues chronologically as first, consider spatial tendency for convergence in the long term. Also because it is a non-interventional approach, where is not recommended greater interference to market processes". Furthermore then "all the paradigms of regional development that have followed, ie. Keynesian, a Marxist-Socialist and a modern neo-endogenous approach to the regional development after that consider spatial development as divergent. These paradigms are significantly different in terms of recommendations for the creation of socio-economic conditions and also in terms of their rate of interventionism."

It is important to define the neoclassical approach to the analysis of regional differences in economic performance (Nijkamp, Moomaw and Traistaru-Siedshclag, 2006). The undisputed focus of neoclassical conception of spatial analysis are "so called disparities in regional growth against the background of the principle that the spatial movement of factors of production arises from the possibility of increasing their effectiveness. In reaction to these options are investment decisions caused by the price differences that are gradually diminishing, theoretically up to the level where

further redeployments of factors can't bring improved overall performance" (Hučka et al., 2013). Spatial balance of this type can be understood as "status when all factors are geographically distributed that their use brings in a given market and technological conditions the maximum achievable effect. It is necessary to calculate the basic assumptions characteristic of the neoclassical interpretation: atomistic competition in all markets; full information on prices on the part of economic actors; efforts of operators (companies, households), regardless of use of the possibility to increase own personal gain (profit); All prices (including labor costs - wages) are characterized by unlimited flexibility; "reward" (wages, capital gain) factors of production determines the threshold of their contribution.

Regional disparities are defined on the basis of predefined indicators and it is possible to determine whether the disparities are considered positive or negative. To determine the positive and negative disparity is firstly necessary to clarify the general definition of regional disparities.

Regional disparities are by the author's contribution defined in general as the difference of regional development from the critical (fractional) values of the indicators in the economic, social and territorial area where the critical value is defined as the median of the whole country together with the upper limit of + 5% from the median and lower limit - 5% of the median. The value of +/- 5% is determined based on tolerated deviations from the median, which is set at this level. It can also rely on the traditional concept of the value of the level of significance, that is 0.05 (this value has been introduced into the statistics in 1925 by Ronald Fisher).

Disparity can be determined to be positive and negative depending on the character of the selected indicator. Negative regional disparity according to author is considered such a disparity, which is not desirable in the region, has a negative impact on the region and there is a need to remove this disparity. As positive regional disparity is considered one that is desirable in the region and it is possible to find an advantage as the examined object. To distinguish the disparity in each year, it is always determined the median, where is intended tolerated deviation, ie. upper and lower limits of the median. For every predetermined indicator is set an upper limit of +5% of the median and the lower limit is -5% of the median. Determining whether it is positive or negative disparity depends on the nature of the chosen indicator. If the value of the indicator is above the upper limit, it can be considered as positive the existence of disparities in a given year and region, for example, with the indicator of export performance (in the case of the indicator unemployment rate is a negative disparity). If the value of the indicator is below the lower limit, it can be considered as negative the existence of disparities in a given year and region, for example, with the indicator of export performance (in the case of the indicator unemployment rate is a positive disparity).

### **3 Selected regions**

Border regions are opposed to national regions a specific status, which is trying to countervail. From the perspective of national centers are often the peripheral areas. Border regions in general often suffer from the historical consequences of their peripheral location, lack of integration into the prevailing structures and from that the resulting isolation (Majerova, 2012). Cross-border cooperation in the European Union should help compensate these disadvantages and improve living conditions in the border regions. The peripheral areas also include regions in the Czech-Polish border.

Czech-Polish border regions have in business and labor market considerable economic potential, both countries combines many elements in common, including in particular the similarity of languages, cultural and historical heritage, competitive industries (wood processing, construction) etc. Both countries are currently making great efforts to establish closer business and trade bonds, which would contribute significantly to the economic development of the regions. Economic Chamber of the Czech-Polish border area strive to provide support to economic and trade cooperation, including strengthening the border market. Interested chambers of commerce on both sides of the

border want to achieve full utilization of the potential of local businesses and enhancing their competitiveness in the European Union.

Generally, the regions of the European Union countries are divided according to a uniform system of classifying territorial units for statistics NUTS. Czech Republic is divided into one region NUTS 1, eight NUTS 2 regions (cohesion regions) and fourteen NUTS 3 regions (county). The Republic of Poland is divided into six regions NUTS 1, sixteen NUTS 2 regions (cohesion regions, in the Republic of Poland is a voivodship) and sixty-NUTS 3 regions (sub-regions).

The territory of the Czech-Polish borderland is formed by certain regions of the Czech Republic and Poland. It is problematic to define of regions, which forms the borderland area, there are some discrepancies in terms of data availability and area of the regions of the two countries. In the Czech Republic, the Czech-Polish borderland area is defined by five Czech regions (ie. Regions at NUTS 3). These are the Moravian-Silesian region, Olomouc region, Pardubice region, Hradec Králové region and Liberec region. Statistical data for these regions are in terms of availability at a good level. Czech Statistical Office provides a great variety of data that allow comparison of these regions. A different view is the definition of the Czech-Polish borderland area for the Polish side, where it is not so clear. This area consists of six Polish subregions (NUTS level 3). This is a region Bielski and Rybnicki (Silesian voivodship) Jeleniogórski and Wałbrzyski (Lower Silesia voivodship), Nyski and Opolski (Opole voivodship), also township Strzeliński (sub-region of Wrocław in Lower Silesia province) and Pszczyński district (sub-region Tyska in the Silesian voivodship). Availability of data at the regional level in Poland is not as sufficient as in the Czech Republic. Additionally, the NUTS 3 regions of Poland are considerably smaller than NUTS 3 regions of the Czech Republic. In Poland, there are statistically more monitored NUTS 2 regions, which are quite a bit larger than the NUTS 2 regions of the Czech Republic. Therefore, there occurs a problem in terms of comparability regions Czech-Polish borderland across the borders of both countries.

The author focuses on Czech regions Czech-Polish borderland. It is already mentioned five regions - the Moravian-Silesian Region (abbreviation MSK), Olomouc region (abbreviation OLK), Pardubice region (abbreviation PAK), Hradec Králové region (abbreviation HKK) and Liberec region (abbreviation LBK). It is dropped from the analysis of Polish regions and attention is paid to the Czech regions because of the analysis at the lowest possible regional level in terms of data availability. For the analysis of the Polish Republic would need to monitor regional level higher, which would not be possible in terms of the needs analysis of specific indicators that are not available. In general it is alleged that the Polish market has a certain resemblance to the Czech market, and that cooperation between Czech companies with Polish firms should be no problems. But the reality is different from interviews with business representatives as well as the survey shows that this is not like that, to establish cooperation with Polish companies is sometimes complicated.

In tables in this paper there are using abbreviations of regions. The map of selected regions is seen in the Figure 1.



**Fig. 1.** Map of selected regions of the Czech-Polish border (Source: our modification)

#### 4 Regional disparities by selected economic indicators

For measuring regional disparities are determined the following indicators that define the regional disparity among the regions of the Czech-Polish border. Determined indicators, that regional disparity among the regions of the Czech-Polish borderland are defined through are according to the author:

1. Export performance
2. Unemployment rate
3. Labour costs
4. Educational level of the unemployed
5. Transport Infrastructure
6. Emissions of pollutants
7. Construction work

As indicated the general definition provided for regional disparities, disparities can be observed in three separate spheres. It is an economic, social and territorial sphere. To these spheres it is possible to assign by the author selected indicators, which allows to define regional disparity. Regional disparities in the economic sphere can be measured by an indicator Export performance and the unemployment rate and by Labour costs. Regional disparities in the social sphere can be measured by an indicator Educational level of the unemployed. A regional disparities in the territorial sphere can be measured by an indicator Transport infrastructure and Pollutant emissions and Construction work.

In the following subchapters, the individual disparities are identified by three established economic indicators. For individual subchapters it is kept uniform style methodology. Is selected time series for ten years, i.e. since 2004 (when the Czech Republic entered the European Union) in 2013 (which is most of the indicators last year detectable in terms of available data).

##### 4.1 Disparity by indicator Export Performance

Using established indicator of export performance is possible to monitor the disparity, which is formed in the regions of the Czech-Polish borderland to the whole. In this set of indicator disparity is defined as the difference between exports of goods per capita of each region and the critical value of goods exports per capita in the Czech Republic. The disparity is possible to distinguish as a positive and negative. To distinguish the disparity in individual years is set critical value which is intended for upper and lower limits. Specifically, the export performance indicator is calculated upper limit of

+5% of the median and the lower limit is -5% of the median. In the case that the value of the export performance in the region is above the upper limit, there occurs a positive disparity and in the case that the value of the export performance is below the lower limit, there occurs a negative disparity.

On the basis of predetermined criteria for determining positive and negative disparities in case of monitoring indicators of export performance, we can say that in regions where the median indicator of the country is higher than 5%, it is a positive disparity. Further, in case that the value of the indicator is lower than 5% it is a negative disparity. And if there is a difference only slightly from the median (range +5% and - 5%) is not possible to determine positivity/negativity disparities. Specific values of the upper and lower limits are provided in table no. 1 below. In the table are also intended positive and negative disparities across regions and in individual years. Positive disparity is highlighted in green, negative disparity is highlighted in red, and the objective value is highlighted in yellow.

In Table 1, it is possible to see the indicator value export performance in regions of the Czech-Polish border. For determining the length of the time series for all indicators set out a ten-year time series, i.e., from 2004 to 2013. However, in the case of export performance indicator (applies only to this single indicator) it is the most recent year available, 2010.

In Moravian-Silesian region is a positive disparity reported in the last three monitored years, where the indicator exceeds the upper limit criterion value. In the Olomouc region are proved negative disparity in all years of the period, the indicator value export performance is always below the lower limit criterion value. Positive disparities are evident in the Pardubice and Liberec region, where export performance is at a high level and the value of the indicator moves above the upper limit criterion value. Very fluctuating development is in the Hradec Králové, where the disparity in export performance in 2004 proves to be positive, then oscillates between the objective value (the lack of disparity) and negative disparity (in 2006 and 2008). In tables in this paper there are using abbreviations of regions.

**Table 1.** Positive and negative disparity with indicator Export performance (in CZK)

|             | 2004   | 2005   | 2006   | 2007   | 2008   | 2009   | 2010   |
|-------------|--------|--------|--------|--------|--------|--------|--------|
| MSK         | 142111 | 161477 | 180496 | 200288 | 207680 | 181309 | 223209 |
| OLK         | 124653 | 121709 | 129789 | 147475 | 150927 | 111410 | 122926 |
| PAK         | 259711 | 282003 | 303342 | 374748 | 366362 | 339557 | 456111 |
| HKK         | 170942 | 169493 | 163126 | 186921 | 177633 | 149945 | 185131 |
| LBK         | 193209 | 216562 | 217734 | 232053 | 205273 | 180157 | 202906 |
| Median      | 158399 | 162091 | 175500 | 194382 | 192344 | 152675 | 183728 |
| Upper Limit | 166319 | 170196 | 184275 | 204101 | 201961 | 160309 | 192914 |
| Lower Limit | 150479 | 153986 | 166725 | 184663 | 182727 | 145041 | 174542 |

Source: own processing.

## 4.2 Disparity by indicator Unemployment rate

The second selected indicator is the unemployment rate. The indicator can be used to measure regional disparities in the economic sphere. Disparity measured by this indicator is defined as the difference between unemployment counties Czech-Polish border and the median unemployment rate of the Czech Republic. In the case of this indicator it is necessary to clarify the possible disparity considered positive and the negative. It is important to clarify from what point of view is the disparity seen. In this thesis, it is seen in the higher unemployment rate as a negative phenomenon also from a business perspective, as they are then faced with the problem of employment of workers sufficiently competent in their area of business.

In case of monitoring indicators of unemployment rate, it is possible to say that in regions where it is an indicator of the country's median higher than + 5%, with a negative disparity. Further, in case



that the value of the indicator is lower than -5% it is a positive disparity. And if there is a difference only slightly from the median (range + 5% to - 5%) it is not possible to determine positivity / negativity disparities. Specific values of the upper and lower limits are provided in Table. 3. In the table are also intended positive and negative disparities in different regions and in different years using a color distribution, the positive disparity is highlighted in green, negative disparity is highlighted in red and criterion value is highlighted in yellow.

The Moravian-Silesian region occur throughout the period to exhibit negative disparities, since the value of the indicator unemployment rate is well above the criterion value. The negative trend is also evident in the Olomouc Region, where the exception of 2012 (which is the value level criterion values) are also being reflected negative disparity in the unemployment rate indicator. The Pardubice Region was the unemployment situation is positive, but in 2013 it has already demonstrated a negative disparity. A similar situation is seen also in the Hradec Kralove region. Also, there is the development of moderately volatile. In 2004, the value of the indicator unemployment rate with a positive manifestation of disparity but then there is an increase of this indicator and also the speech negative disparity.

**Table 2.** Positive and negative disparity with indicator Unemployment rate (in %)

|             | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|-------------|------|------|------|------|------|------|------|------|------|------|
| MSK         | 14,5 | 13,9 | 12,0 | 8,5  | 7,4  | 9,7  | 10,2 | 9,3  | 9,5  | 9,9  |
| OLK         | 12,0 | 10,0 | 8,2  | 6,3  | 5,9  | 7,6  | 9,1  | 7,6  | 7,7  | 9,2  |
| PAK         | 7,0  | 5,6  | 5,5  | 4,4  | 3,6  | 6,4  | 7,2  | 5,6  | 7,7  | 8,4  |
| HKK         | 6,6  | 4,8  | 5,4  | 4,2  | 3,9  | 7,7  | 6,9  | 7,1  | 7,1  | 8,2  |
| LBK         | 6,4  | 6,5  | 7,7  | 6,1  | 4,6  | 7,8  | 7,0  | 7,2  | 9,3  | 8,3  |
| Median      | 6,9  | 6,6  | 6,3  | 5,0  | 3,9  | 7,1  | 7,1  | 7,2  | 7,5  | 7,5  |
| Upper Limit | 7,3  | 7,0  | 6,6  | 5,3  | 4,1  | 7,4  | 7,5  | 7,5  | 7,9  | 7,9  |
| Lower Limit | 6,6  | 6,3  | 5,9  | 4,8  | 3,7  | 6,7  | 6,8  | 6,8  | 7,2  | 7,1  |

Source: own processing.

### 4.3 Disparity by indicator Labour costs

The third indicator is indicator Labour costs. These are monitored on a national, regional or international level. Their level affects both market position and decision making of enterprises and entrepreneurial activity, business climate and the possibility of substitution of capital and labor. Labour costs are the base of production and total replacement costs. Their amount and structure decisions about competitive position in the local and world markets (Gajdová and Tuleja, 2014). They represent a certain link between the economic and social spheres. Their level and dynamics are correlated with the level and dynamics of labour productivity, the relative level of producer and consumer prices.

Labour cost indicators are based on data from the Czech Statistical Office. They are the sum of compensation, including wages, social benefits, social costs, personnel costs and taxes. This is the value attributed on average per employee per month. Using this indicator, it is then possible to watch the disparity to the whole.

In the analysis of labour costs it is important to understand the perspective from which this indicator is monitored. In terms of social and in terms of personnel is desirable higher value of labour costs. Allowing workers to gain more salary so on. But in the case of tracking this indicator by businesses is a different approach. For businesses, the preferred lower the value of labour costs, which will affect overall corporate costs. This view is also used when analyzing labour cost indicators within this paper.

Labour costs indicators allows to specify the disparity defined as the difference between labour costs in the region of the Czech-Polish border and median (with a tolerated deviation) of this indicator

for the Czech Republic. Labour costs is significantly important especially for small and medium-sized enterprises. This is a basic item costs of individual enterprises (Rice, 2013). The higher the cost of labour in the region, it is for the enterprise less advantageous. This way you can distinguish positive and negative disparity, which is monitored by the indicator. In the case of labour cost indicators in the region is above the median Czech Republic + 5%, it is a negative regional disparity (from a business perspective). And if the labour cost indicators in the region is below the median of the Czech Republic - 5%, it is a positive disparity.

Table 3 there are disparities are tracked and colour coded disparity positive and negative. Positive disparity is highlighted in green, negative disparity is highlighted in red and the critical value (ie. The median value of the Czech Republic together with a tolerated deviation of + / 5%) is highlighted in yellow. When monitoring labour cost indicators and the disparities in the Czech regions Czech-Polish border is evident that move around the median of the Czech Republic. In most cases there is therefore no disparity reported to the whole. Positive disparity is found only in the Olomouc Region and Hradec Kralove in 2006, and Pardubice Region in 2007. Negative disparity occurs most frequently in the Moravian-Silesian Region. At the edge of this disparity reported in 2004, 2005, 2008, 2011 and 2012. So fluctuate between the median value and above the upper limit. For a company this is a positive phenomenon, but for businesses it is a negative trend.

**Table 3.** Positive and negative disparity with indicator Labour cost (in CZK)

|             | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| MSK         | 25790 | 25806 | 26078 | 28442 | 31093 | 29675 | 30301 | 31427 | 32151 | 31876 |
| OLK         | 22620 | 23443 | 24112 | 26883 | 28280 | 27561 | 28063 | 29189 | 30040 | 30109 |
| PAK         | 23852 | 22991 | 25215 | 25011 | 28958 | 27740 | 28039 | 29156 | 29756 | 30240 |
| HKK         | 22555 | 23342 | 24190 | 26377 | 28956 | 28285 | 28804 | 29582 | 30421 | 30973 |
| LBK         | 24177 | 26692 | 26217 | 26220 | 29424 | 28892 | 29924 | 30854 | 31522 | 31796 |
| Median      | 23459 | 24147 | 26038 | 27279 | 29417 | 28589 | 29198 | 29816 | 30541 | 31008 |
| Upper Limit | 24632 | 25354 | 27339 | 28643 | 30888 | 30018 | 30657 | 31307 | 32068 | 32558 |
| Lower Limit | 22286 | 22939 | 24736 | 25915 | 27946 | 27159 | 27738 | 28325 | 29014 | 29458 |

Source: own processing.

## 5 Conclusion

In this paper there is introducing the new definition of regional disparities and then use this definition in analyze of disparities in the Czech-Polish border. Analysis of disparities is done through three indicators like Export performance, Unemployment rate and Labour costs

Regional disparities are by the author's contribution defined in general as the difference of regional development from the critical (fracture) values of the indicators in the economic, social and territorial area where the critical value is defined as the median of the whole country together with the upper limit of + 5% from the median and lower limit - 5% of the median. And it is possible to identify positive or negative disparity. In the Czech regions of the Czech-Polish border fluctuates between positive and negative disparities within the selected time series. However bad the situation is largely the monitoring indicator disparities through unemployment rates where they are in the final year of negative disparity in five selected counties.

## 6 Acknowledgement

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## HAS THE INTEREST RATE PASS-THROUGH CHANGED AFTER THE FINANCIAL CRISIS IN THE CZECH REPUBLIC?

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### Abstract:

This paper examines interest rate pass-through in the Czech Republic. Lately, after the financial crisis, banks have reacted sluggishly on the monetary easing in the Czech Republic. Thus, the intention is to find out, if there is any change in interest rate pass-through caused by the financial crisis. To fulfil this intention, I use an ARDL modeling approach on two subsample of data covering the pre and post crisis period. The results suggest that the interest rate pass-through for large corporate loans rate is complete before the financial crisis, however, the strength of the pass-through is lesser by half after the financial crisis. Similarly, it is valid for the small corporate loans rate and for the mortgage loan rate. Although the interest rate pass-through is not complete in these cases, the pass-through is still weaker after the crisis. Therefore, banks react more slowly on the monetary policy rate changes since the outbreak of the financial crisis.

### Keywords:

Pass-through, lending rate, ARDL model, financial crisis

### JEL classification:

E43, E52, C22

## 1 Introduction

Since the Great recession, there have been hold serious discussions about the efficiency of the transmission mechanism. During the post-crisis period, the monetary easing did not seem sufficiently effective in the countries of the European Union. The policy of the low interest rate did not lead to the recovery of economies fast enough. Even the ‘zero’ interest rate policy did not change the situation and monetary authorities were forced to use an untraditional monetary policy as the quantitative easing or the negative interest rate. The focus of this paper will be concentrated on the situation in the Czech Republic, where the consequences of the financial crisis and also the sovereign crisis were noticeable. The Czech National Bank have used the low-interest rate policy together with the devaluation of the Czech currency during the crisis period. The attention in this work is aimed on interest rates, more precisely on the pass-through from a reference rate to retail rates. The goal is to find out, if the strength of the interest rate pass-through in the Czech Republic has been affected by the financial crisis with focus on mortgage rate, small corporate loans rate and large corporate loans rate.

The literature about the research of pass-through is vast. Studies for the European Union are different and not united. Mostly, there are evidences of a heterogeneous pass-through across the countries (Hofmann, 2006; Gambacorta, 2004; Belke, Beckmann and Verheyen, 2012; Santis and Surico, 2013). Therefore, there is not any clear proof, that the interest rate pass-through has the same behavior in all countries. However, after the financial crisis, most authors confirm, that the pass-through is weaker after the crisis. The study by Gambacorta, Illes and Lombardi (2015) validates that hypothesis. They used cointegration model for examination of the long run relationship between a money market interest rate and banks’ lending rates, and they proclaimed that the lesser pass-through is caused mainly due to higher evaluation of the risk. Belke, Beckmann and Verheyen (2012), who used ARDL model, found out that the higher pass-through is more visible for short-term lending rates. Thus, the pass-through of mortgage rates should be weaker. The evidence of weaker interest rate pass-through after the crisis in the Czech Republic was stated in the paper by Havránek, Iršová and Lešánovská (2015). They confirmed weaker pass-through after the crisis for corporate loans rates.

In this paper, the ARDL modeling approach is used for examination of the transmission mechanism. I estimate simple model of the interest rate pass-through before and after the financial crisis to verify hypothesis about weaker post-crisis transmission.

Results suggest that the interest rates pass-through is substantially weaker after the financial crisis for all examined lending rates. Therefore, the paper disproves the conclusion about the pass-through of the mortgage rate made by Havránek, Iršová and Lešánovská (2015), who claimed that the mortgage rate pass-through is stronger after the crisis.

The rest of the paper is organized as follows: Chapter 2 includes basic information about data. Chapter 3 presents methodology. Chapter 4 shows and discusses achieved results. Chapter 5 presents conclusion. The end of the paper includes references and annexes.

## 2 Data

Data are given in monthly frequency and the tested period is set from January 2004 to February 2016. Since the research is focused only on the Czech Republic, all data were collected from database of the Czech National Bank. The data are divided into two subsamples (the pre-crisis period and the post-crisis period) for the purpose of estimations. The pre-crisis period starts on January 2004 and ends on August 2008. The post-crisis period starts with the month of the Lehman Brothers bankruptcy (September 2008). Therefore, the post-crisis period starts on September 2008 and ends on February 2016.<sup>1</sup>

Intention of the paper is to examine the pass-through from a money market interest rate (capital market interest rate) to a lending rate of banks, more precisely the interest is focused on the pass-through of the mortgage rate, and the rates of loans for non-financial corporations. Firstly, it is necessary to define an appropriate money market rate, which represents the cost of funding of banks. According to Hofmann (2006) short term loan rates, which are in this case loan rates for non-financial corporations, react on the behavior of interbank money market rate. This assumption was tested with the use of the Prague Interbank Offered rate (PRIBOR) with different length of maturity. On the other hand, the long term rates like mortgage rates should be explain by long term market rates, which could be by rates of the government bonds. In case of the Czech Republic, the government bonds are defined as bonds with maturity of ten years. To examine that relationship, the correlation test is applied.

Table 1 presents correlation between banks' loan rates and money market rates (capital market rates in case of the government bond rate). For the purpose of the estimation lending rate of loans for non-financial corporations is divided into two groups. The first group is for small loans. It is defined as loans up to 30 million of Czech crowns. The second group includes the lending rate of large loans over 30 million of Czech crowns for non-financial corporations. One can notice, that both lending rates of loans for non-financial corporations are highly correlated with each PRIBOR. The highest correlation is detected in the case of PRIBOR with maturity of 6 months, which means that this lending rate will be used for the estimations as the reference lending rate. In some papers, there could be found that appropriate cost of funding for short-terms loans is monetary policy rate (Gambacorta, Illes and Lombardi, 2015), or day to day money market rate (Weth, 2002), but in this paper the highest correlation between rates seems like the reasonable argument for choosing 6 months PRIBOR. It is also in accordance with the paper by Havránek, Iršová and Lešánovská (2015).

Now, the lending rate for mortgages should be highly correlated with the rate of government bonds according to the theory. Several researchers (Weth, 2002; Hofmann, 2006; Havránek, Iršová and Lešánovská, 2015) used exactly this relationship for the examination of the pass-through to the mortgages rate. Table 1 confirms this theory and the government bond rate is the most convenient reference rate for the mortgages loan rate.

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<sup>1</sup> The term “post-crisis period” can be misleading since the time of the actual crisis is included into this period. Hence, every mention of the post-crisis period in this paper refers to the period from September 2008 to February 2016.

**Table 1** - Correlation between banks' lending rates and market rates

| Correlation | PRIBOR<br>Day to day | PRIBOR<br>1 week | PRIBOR<br>3 months | PRIBOR<br>6 months | PRIBOR<br>12 months | GBY<br>10 years | REPO rate |
|-------------|----------------------|------------------|--------------------|--------------------|---------------------|-----------------|-----------|
| NFC small   | 0.912495             | 0.945013         | 0.955862           | <b>0.957614</b>    | 0.955360            | 0.876181        | 0.941583  |
| NFC large   | 0.876937             | 0.915113         | 0.946986           | <b>0.955488</b>    | 0.953512            | 0.806966        | 0.905601  |
| Mortgages   | 0.721898             | 0.767173         | 0.804582           | 0.828334           | 0.844101            | <b>0.953544</b> | 0.759732  |

Source: Czech National Bank

All matched lending rates are presented in the Figure 1. It is clear that all lending rates of banks are highly correlated with the reference rate. On the left side of the Figure 1, there is shown the relationship between lending rates of banks for non-financial corporations and 6 months PRIBOR. It is evident, that lending rates are bounded tighter during the pre-crisis period, so the mark up between individual rates is lower. The relationship between the mortgage rate and the government bond rate is presented on the right side of figure 1. One can see, that the mortgage rate is smoother, but the trend of the rate is similar and comparable with the government bond rate. Also, the most important is the evidence of higher spread at the end of the tested period.

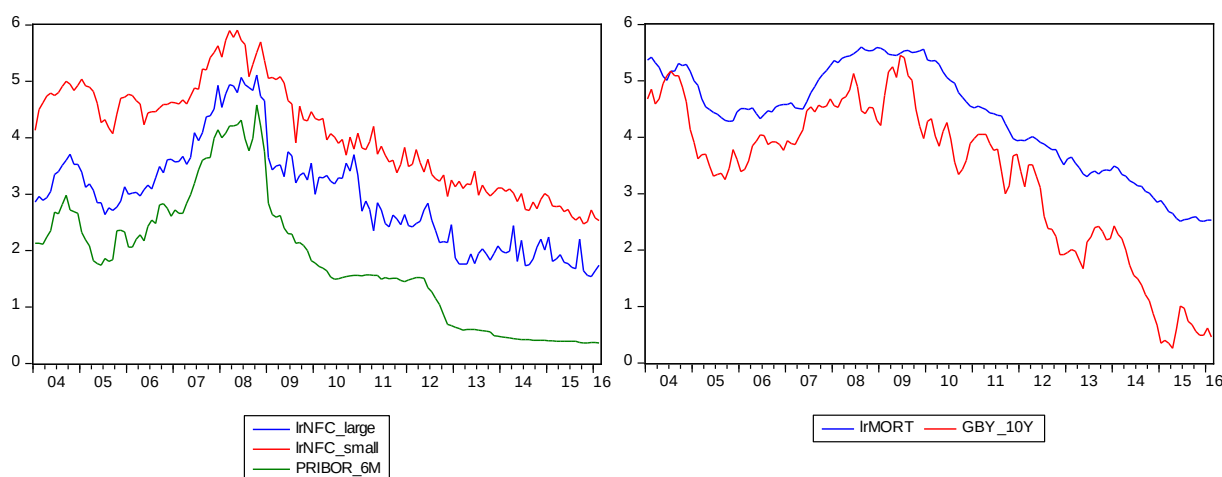


**Figure 1** – Comparison of the lending rates (Source: Czech National Bank)

For complete analysis of the data, the actual spreads between lending rates are shown in the Figure 2. It is important to emphasize these specific graphs because they directly show the change of the actual pass-through. On the left-top side of the figure 2 is displayed spread between the lending rate of large loans for non-financial corporations and 6 month PRIBOR. Similarly, on the right-top side of the figure 2 is shown the same graph but for small loans. The black line in graphs indicates the mean value of the spread from the pre-crisis period<sup>2</sup>. One can see, that the spread of the lending rate for large loans is stable during the pre-crises period, but since the end of the year 2008 the spread of the lending rates soars and hits a peak on November 2010, then the spread falls rapidly. After that, the spread has growing tendency until the end of the examined period, which indicates that the actual pass-through is most probably weaker after the crisis.

Interestingly, the spread of the lending rates for small loans of non-financial corporations seems to be much more stable after the crisis than before it. The rapid growth after the outbreak of the crisis is still highly visible but after that strong increase, the spread looks almost stable.

Now, let's take a look on the spread between the mortgage loan rate and the government bond rate. One can notice, that the financial crisis per se did not have any strong impact on the mortgage lending

<sup>2</sup> Pre-crisis period is defined since January 2004 until August 2008.

rate and consequently, it also did not have any effect on the spread of these rates. On the other hand, it is visible that policy of low interest rate has led to higher mark-up at the end of the period.

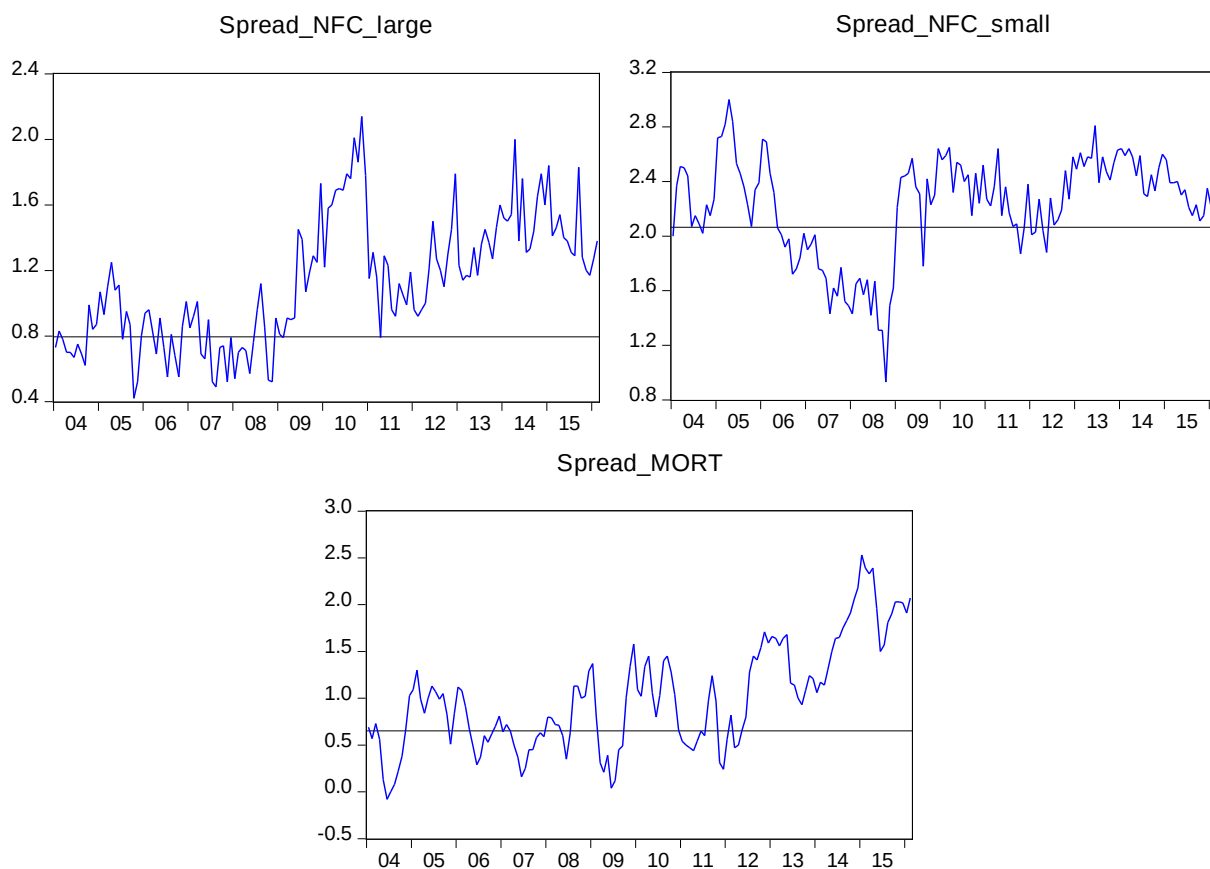


**Figure 2** – Spread between the bank lending rate and the reference rate (Source: Czech National Bank)

### 3 Methodology

In this section, the methodology of the estimation will be introduced. Since the intention of the paper is to examine the long run relationship between banks' lending rate and a reference rate, the most suitable method of the estimation appears to be the Autoregressive Distributed Lag (ARDL) model developed by Pesaran and Shin (1999) and further extended by Pesaran, Shin and Smith (2001). The Advantage of this model is, that it allows to use stationary time series  $I(0)$ , and also time series integrated by order one  $I(1)$  at the same time. However, it is not recommended to use the ARDL model in case of the second order integration  $I(2)$  of the time series. Therefore, at the beginning, it is necessary to ensure, that used time series variables are not integrated by the second order  $I(2)$ . To verify that, the Augmented Dickey-Fuller (ADF) test is applied. The results are presented in the annex table 1A and 1B. According to those results, it is clear that all series are  $I(0)$  or  $I(1)$ , which means that the ARDL model can be used.

To examine the pass-through from a reference rate to the bank specific lending rate, I define the long run co-integration relationships:

$$lr = \alpha_0 + \alpha_1 refr_t + u_t, \quad (1)$$

where  $lr$  is banks' lending rate,  $\alpha_0$  is a constant, which represent a long term mark up between money market rate and bank's lending rate,  $\alpha_1$  is the actual coefficient of the long-run pass-through,  $refr_t$  is a money market rate (the PRIBOR rate with six months maturity) in case of equations, where the dependent variables are the lending rates for non-financial corporations, or a capital market rate (the

government bond rate with the maturity of ten years) in case of the equation with the mortgage rate as a dependent variable. Finally,  $\varepsilon_t$  is an error term.

The error correction equation can be written as follows:

$$\Delta lr = \gamma_0 + \gamma_1 lr_{t-1} + \gamma_2 refr_{t-1} + \sum_{i=1}^{p-1} \xi_i \Delta lr_{t-i} + \sum_{j=0}^{q-1} \theta_j \Delta refr_{t-j} + \varepsilon_t, \quad (2)$$

where first three terms represent the long-run relationship, and another two terms show the short-run dynamics. If the time series are mixed of I(0) and I(1), it is necessary to check the actual existence of co-integration relationship, so the null hypothesis  $\gamma_1 = \gamma_2 = 0$  of non-evident co-integration should be rejected. For this purpose, the Bound test will be used. It allows to check estimated F-statistic value with the border critical values for I(0) and I(1). This methodology was proposed by Pesaran, Shin and Smith (2001). If the value of F-statistic is higher than the upper bound value, then the co-integration relationship can be confirmed.

The long-run coefficient could be easily expressed from equations 2 in followed form:

$$\alpha_0 = -\frac{\gamma_0}{\gamma_1}, \alpha_1 = -\frac{\gamma_2}{\gamma_1}. \quad (3)$$

There is an expectation that the long-run coefficient of the reference lending rate should have value equal to 1 ( $\alpha_1 = 1$ ), which means that there is a complete pass-through from the reference rate to the banks' lending rate. The assumption of the complete pass-through should be valid for the pre-crisis period. Hence I expect that the long-run coefficients of reference lending rates will be equal to one in the period from January 2004 to August 2008. However, in the period after the August 2008, I expect deterioration of the pass-through.

In summary, there will be estimated three different equations for the examination of the simple pass-through from reference rates to banks' lending rates. Those three equations will be estimated for the pre-crisis period as well as for the post-crisis period. Therefore, there will be estimated six ARDL models in total.

## 4 Results

In this part, the results of the estimation are presented. Table 2 presents results of the estimation for the pre-crisis period. According to the ARDL bounds test, the long-run cointegration relationship between variables can be confirmed. It is determined by the value of F-statistic, which is higher than the upper bound critical value for all estimated models. The primer attention is focused on the long-run pass-through coefficients, which should be equal to one for the complete pass-through. One can see, that for the mortgage rate the coefficient is almost 0.8, which characterizes a strong pass-through, however, it is not complete. Also, there is an interesting fact, that the reference rate for mortgages does not have any influence on the mortgages rate in the short-term period. The short-run pass-through is significant only for lending rates of corporations.

The pass-through to the lending rate of small loans provided to non-financial corporations is also strong, but not complete. The value of the coefficient is 0.79. On the other hand, the results of the model for lending rate of large corporate loans imply complete pass-through. Moreover, the coefficient of the speed of adjustment reflects fast adjustment from the reference lending rate to the lending rate of large corporate loans. In compare to the first two models, the speed of adjustment is almost three times higher, respectively, 4 times higher in case of the mortgages lending rate. In other words, a change of the reference lending rate is reflected in the lending rate for large corporate loans in extant of 90% in the following month. Meanwhile, the differences in the reference lending rate are visible only from 21% in the following month for the mortgage rate, and from 40% in the following month for the lending rate of small corporate loans.

Now, the results of the pre-crisis period can be compared with the results of the post-crisis period, which are presented in the table 3. As I stated before, it is expected that the strength of the pass-



through should be lower in the period after the August 2008. These expectations are fulfilled in all models. The pass-through coefficient is lower by 0.1 in case of mortgages rate, and by 0.3 (0.4) in case of small corporate loans rate (large corporate loans rate). Moreover, the speed of adjustment is much lower for the mortgages rate as well as for large corporate loans rate. It indicates that the crisis has affected not only the strength of the pass-through, but also the speed of adjustment. However, the results are slightly different for small corporate loans, where the speed of adjustment is higher in the post-crisis period.

**Table 2** - Simple pass-through from reference rate to lending rate of banks in the pre-crisis period

|                                   | <b>Mortgages<br/>ARDL (1,1)<sup>T</sup></b> | <b>Small loans for NFC<br/>ARDL (1,0)<sup>T</sup></b> | <b>Large loans for NFC<br/>ARDL (3,2)</b> |
|-----------------------------------|---------------------------------------------|-------------------------------------------------------|-------------------------------------------|
| <b>LR pass-through</b>            | 0.792***<br>(0.084)                         | 0.794***<br>(0.103)                                   | 0.979***<br>(0.022)                       |
| <b>Speed of Adjustment</b>        | -0.210***<br>(0.028)                        | -0.397***<br>(0.080)                                  | -0.925***<br>(0.103)                      |
| <b>SR pass-through</b>            | 0.009<br>(0.047)                            | 0.330***<br>(0.107)                                   | 0.371***<br>(0.074)                       |
| <b>SR pass-through (-1)</b>       |                                             |                                                       | -0.332***<br>(0.115)                      |
| <b>Included observations</b>      | 55                                          | 55                                                    | 53                                        |
| <b>ARDL Bounds test (5%)</b>      | 17.896 (4.68 - 5.15)                        | 9.099 (3.62 - 4.16)                                   | 25.616 (3.62 - 4.16)                      |
| <b>Hist. J-B test</b>             | 0.873 (0.05)                                | 0.243 (0.05)                                          | 0.716 (0.05)                              |
| <b>Hetero. B-P-G test</b>         | 0.0608 (0.05)                               | 0.1099 (0.05)                                         | 0.4897 (0.05)                             |
| <b>Ser. Cor. LM test (4 lags)</b> | 0.2518 (0.05)                               | 0.3302 (0.05)                                         | 0.6727 (0.05)                             |

**Notes:** \*\*\* - significant variable at the 1 % level of significance, \*\* - significant variable at the 5 % level of significance, \* - significant variable at the 10 % level of significance. The period of estimation is from January 2004 to August 2008. SR means short-run period, and LR means long-run period. Lag length in ARDL models was chosen according to Schwarz Criterion (SC) with setting of four maximum lags. Symbol T denotes the unrestricted linear trend used in estimated equation. Standard errors are presented in parentheses at the top part of the table. At the bottom of the table is verification of the model (values in parentheses are critical values and the estimated value should be higher than critical value for correct verification).

**Table 3** - Simple pass-through from reference rate to lending rate of banks in the post-crisis period

|                                   | <b>Mortgages<br/>ARDL (2,0)</b> | <b>Small loans for NFC<br/>ARDL (2,0)<sup>T</sup></b> | <b>Large loans for NFC<br/>ARDL (1,1)<sup>T</sup></b> |
|-----------------------------------|---------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| <b>LR pass-through</b>            | 0.692***<br>(0.072)             | 0.506***<br>(0.077)                                   | 0.543***<br>(0.124)                                   |
| <b>Speed of Adjustment</b>        | -0.062***<br>(0.012)            | -0.528***<br>(0.109)                                  | -0.461***<br>(0.087)                                  |
| <b>SR pass-through</b>            | 0.004<br>(0.025)                | 0.311***<br>(0.119)                                   | 0.734***<br>(0.163)                                   |
| <b>Included observations</b>      | 90                              | 90                                                    | 90                                                    |
| <b>ARDL Bounds test (5%)</b>      | 9.231 (3.62 - 4.16)             | 9.150 (4.68 - 5.15)                                   | 9.062 (4.68 - 5.15)                                   |
| <b>Hist. J-B test</b>             | 0.744 (0.05)                    | 0.023 (0.05)                                          | 0.582 (0.05)                                          |
| <b>Hetero. B-P-G test</b>         | 0.17766 (0.05)                  | 0.2781 (0.05)                                         | 0.1201 (0.05)                                         |
| <b>Ser. Cor. LM test (4 lags)</b> | 0.3681 (0.05)                   | 0.5664 (0.05)                                         | 0.3292 (0.05)                                         |

**Notes:** \*\*\* - significant variable at the 1 % level of significance, \*\* - significant variable at the 5 % level of significance, \* - significant variable at the 10 % level of significance. The period of estimation is from September 2009 to February 2016. SR means short-run period, and LR means long-run period. Lag length in ARDL models was chosen according to Schwarz Criterion (SC) with setting of four maximum lags. Symbol T denotes the unrestricted linear trend used in estimated equation. Standard errors are presented in parentheses at the top part of the table. At the bottom of the table is verification of the model (values in parentheses are critical values and the estimated value should be higher than critical value for correct verification).

In summary, the theory of weaker pass-through after the financial crisis can be confirmed for all examined banks' lending rates. These results are in accordance with paper by Gambacorta, Illes and

Lombardi (2015), who tested the pass-through of corporate lending rates in four largest economies in the European Union. If only the corporate loans were taken into account, the results would be also consistent with the paper by Havránek, Iršová and Lešánovská (2015), who stated that stronger pass-through is evident after the financial crisis in case of lending rates for large and small corporate loans in the Czech Republic. However, in their paper, they found out that the pass-through for the mortgages lending rate is stronger after the financial crisis, which is in direct contrast with the results of this paper. This difference could be caused by their shorter sample of observations because the growing trend of the spread between the reference rate and the mortgages rate is the most obvious during the last 3 years (see Figure 2) and they used data only until the end of the year 2013.

## 5 Conclusion

It can be proclaimed that the theory of weaker pass-through after the financial crisis can be confirmed for the Czech Republic. The results clearly show a strong and almost complete pass-through from reference rates to banks retail rates during the pre-crisis period. In fact, there is the complete interest rate pass-through in the case of the large corporate loans rate. However, the interest rate pass-through has been changed after the outbreak of the financial crisis. According to results, it is clear that transmission mechanism has been disturbed and it has affected the interest rate pass-through. Higher mark-up between reference rates and banks' lending rates is evident, especially in case of the large corporate loans rate, where the transmission is almost half-size weaker in the post-crisis period in compare to the pre-crisis period.

Since there is an incomplete pass-through in the economy, the Czech National Bank should be more careful with the using of the 'zero' interest rate policy. It does not have to bring desired effects because banks lower their lending rates in a lesser extent. Also, a liquidity trap can play an important role on the transmission mechanism and the lowering of interest rates is in this case ineffective.

Now, it is essential to find out which factors are behind weaker pass-through after the financial crisis. Therefore, the direction for a future research should be aimed on the finding of those factors. Mainly, the credit risk should be included into the estimations. Also, it would be beneficial to include the factor of a competition among banks.

## 6 Acknowledgement

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## Annex

Annex Table 1A – Augmented Dickey-Fuller unit root test

| 2004M01 – 2008M08                                                                     |                  |                  |                  |                    |                  |                    |                   |                     |
|---------------------------------------------------------------------------------------|------------------|------------------|------------------|--------------------|------------------|--------------------|-------------------|---------------------|
| H <sub>0</sub> : TIME SERIE<br>has a unit root                                        | lrMORT<br>t-Stat | lrNFCS<br>t-Stat | lrNFCL<br>t-Stat | PRIBOR6M<br>t-Stat | GBY10Y<br>t-Stat | nplrMORT<br>t-Stat | nplrNFC<br>t-Stat | CAPTASTSR<br>t-Stat |
| <b>ADF test statistic</b>                                                             | <b>-1.204</b>    | <b>0.562</b>     | <b>1.021</b>     | <b>1.102</b>       | <b>-0.325</b>    | <b>-3.183*</b>     | <b>-4.490***</b>  | <b>-3.356*</b>      |
| Test crit. values: 1%                                                                 | -4.137           | -2.608           | -2.612           | -2.608             | -2.608           | -4.134             | -3.555            | -4.134              |
| 5%                                                                                    | -3.495           | -1.947           | -1.948           | -1.947             | -1.947           | -3.494             | -2.916            | -3.494              |
| 10%                                                                                   | -3.177           | -1.613           | -1.613           | -1.613             | -1.613           | -3.176             | -2.596            | -3.176              |
| <i>First Difference</i>                                                               |                  |                  |                  |                    |                  |                    |                   |                     |
| <b>ADF test statistic</b>                                                             | <b>-5.157***</b> | <b>-6.055***</b> | <b>-2.859***</b> | <b>-5.706***</b>   | <b>-4.362***</b> | <b>-7.928***</b>   | <b>-6.103***</b>  | <b>-7.908***</b>    |
| Test crit. values: 1%                                                                 | -4.137           | -2.608           | -2.612           | -2.608             | -2.609           | -4.138             | -3.557            | -4.137              |
| 5%                                                                                    | -3.495           | -1.947           | -1.948           | -1.947             | -1.947           | -3.495             | -2.917            | -3.495              |
| 10%                                                                                   | -3.177           | -1.613           | -1.613           | -1.613             | -1.613           | -3.177             | -2.596            | -3.177              |
| Test equation                                                                         | tr & intr        | none             | none             | none               | none             | tr & intr          | intr              | tr & intr           |
| lag length - Automatic selection: Schwarz Info Criteriom (SIC), Maximum lags: 12 lags |                  |                  |                  |                    |                  |                    |                   |                     |

Source: Czech National Bank (2016)

Annex Table 1B – Augmented Dickey-Fuller unit root test

| 2004M01 – 2008M08                                                                     |                  |                  |                  |                    |                  |                    |                   |                   |
|---------------------------------------------------------------------------------------|------------------|------------------|------------------|--------------------|------------------|--------------------|-------------------|-------------------|
| H <sub>0</sub> : TIME SERIE<br>has a unit root                                        | lrMORT<br>t-Stat | lrNFCS<br>t-Stat | lrNFCL<br>t-Stat | PRIBOR6M<br>t-Stat | GBY10Y<br>t-Stat | nplrMORT<br>t-Stat | nplrNFC<br>t-Stat | CAPASTR<br>t-Stat |
| <b>ADF test statistic</b>                                                             | <b>-2.308</b>    | <b>-4.326***</b> | <b>-4.544***</b> | <b>-5.918***</b>   | <b>-4.133***</b> | <b>-0.419***</b>   | <b>-3.856**</b>   | <b>-2.514</b>     |
| Test crit. values: 1%                                                                 | -4.066           | -4.064           | -4.066           | -4.067             | -4.066           | -4.064             | -4.064            | -3.506            |
| 5%                                                                                    | -3.462           | -3.461           | -3.462           | -3.462             | -3.462           | -3.461             | -3.461            | -2.894            |
| 10%                                                                                   | -3.157           | -3.157           | -3.157           | -3.157             | -3.157           | -3.157             | -3.157            | -2.584            |
| <i>First Difference</i>                                                               |                  |                  |                  |                    |                  |                    |                   |                   |
| <b>ADF test statistic</b>                                                             | <b>-7.051***</b> | <b>-10.71***</b> | <b>-12.97***</b> | <b>-8.842***</b>   | <b>-7.659***</b> | <b>-7.437***</b>   | <b>-2.716</b>     | <b>-10.03***</b>  |
| Test crit. values: 1%                                                                 | -4.066           | -4.067           | -4.066           | -4.066             | -4.067           | -4.066             | -4.068            | -3.506            |
| 5%                                                                                    | -3.462           | -3.462           | -3.462           | -3.462             | -3.462           | -3.462             | -3.463            | -2.895            |
| 10%                                                                                   | -3.157           | -3.157           | -3.157           | -3.157             | -3.157           | -3.157             | -3.158            | -2.585            |
| Test equation                                                                         | tr & intr        | tr & intr        | tr & intr        | tr & intr          | tr & Intr        | tr & Intr          | tr & Intr         | Intr              |
| lag length - Automatic selection: Schwarz Info Criteriom (SIC), Maximum lags: 12 lags |                  |                  |                  |                    |                  |                    |                   |                   |

Source: Czech National Bank (2016)

## COMPARING SOCIAL SERVICES FOR THE HOMELESS IN THE CZECH AND SLOVAK REPUBLIC

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### **Abstract**

Homelessness as a social phenomenon existing in a modern society, with its complexity and its entire impact, represents a current challenge for developing and developed countries world-wide. From the point of view of finding solutions, the ways how homelessness is perceived, play a key role in governmental and social policy. It is also important how homelessness is perceived by the majority of population. People without a regular dwelling become a targeted group that is offered social assistance. The scope of social assistance that is available and the solutions found within the condition of homelessness varies from country to country in the European Union. The paper focuses on analysing and benchmarking of social services to assist homeless people living in the Czech and Slovak Republic. It also analyses the determinants affiliated with this issue of homelessness.

### **Keywords**

Homelessness. Social services. Society. Czech Republic. Slovak Republic.

### **JEL classification**

138.

## **1 Introduction**

Homelessness as a social-pathological phenomenon currently represents a phenomenon that affects not only the developing but also the highly-developed countries. Social services in this regard present an important set of options and measures aimed at selected target groups of clients. The aim of this study is to analyze and compare the existing range of social services for homeless people in the Czech Republic and Slovakia, taking into account solutions and approaches used abroad.

## **2 Methodology**

In view of the chosen topic, we decided to carry out an analysis of the existing range of social services intended for the target group of homeless people in the Czech Republic and Slovakia. Through analysis we focus mainly on the range of services provided in both countries, as well as the capacity resources within the provided services. The analysis is complemented by a comparison not only in terms of capacity resources in both countries, but also in terms of the principle of differential approach to addressing the issue, while taking into account the approaches used in selected member states of the European Union (EU), which can be found in the theoretical part of this study.

The said research was done between March and May 2016 by analyzing the register of social service providers. While the acquisition of data in the Czech Republic was carried out solely by analyzing the register of social service providers, registered under the Ministry of Labor and Social Affairs, in Slovakia, we were forced to perform an analysis of each region separately, in order to obtain current and objective information. In terms of research, we have focused on the existing services intended solely for homeless people, whereby we also state that due to the fact that the shelters / asylum homes provide social services on the basis of various criteria, due to the potential occurrence of homelessness we present the range and the capacity resources of all facilities regardless of for whom they are intended.

### 3 Theoretical part

The society in its direction comes across a number of shortcomings within that may give rise to social risks, which negatively effect the achievement of social objectives (Horváth, 2013). The right to housing can be characterized as one of the fundamental rights of every individual living in a society, nevertheless, many people do not have this option nowadays, or they live in inadequate conditions (Bratt, et al. 2006). Homelessness in its deep essence can be considered a manifestation of social exclusion in its extreme form, which does not only include the homeless life, but the given state is also subject to a number of factors, whereby Fitzpatrick et al. (2012) state the interdependence of these factors. In this regard, they further point out to the cases from practice, when a person affected by the loss of home may also suffer from various forms of addiction, or was released from institutional care, or accommodates his/her lifestyle and preferred modes of behavior to the street culture (which includes petty crime, begging, or prostitution in order to survive). Loss of home is an important factor that changes and affects the further course of life of the affected individual. The previous security, feelings of safety and background are being forgotten upon the arrival of an individual on the street, where he/she has to deal with the manifestations of social isolation, loss of privacy, or the feeling of constant threat resulting from residing at public areas (Vágnerová, et al., 2014).

Markovič (2013) classifies homeless people as an economic minority. Homeless people are considered in this context to be one of the target groups of social work, in an effort to minimize and prevent further growth of this social and pathological phenomenon in the society (Horváthová, 2016). However, the degree in which the issue is being addressed varies across different countries. The scope of available assistance is primarily implemented in the form of social services, which according to Dávideková (2014) represent a broad range of assistance provided to people in need (clients), who have found themselves in an unfavorable life situation. Social services are provided by public and private providers.

Matoušek (2011) defines the very term of social services as all services, whether of long or short-term nature, which are provided to clients not only to improve the quality of their life, but also to protect the interests of the entire society. The offer a range of social services is carried out according to the focus on the target group of clients, to whom they are addressed. Social services are mainly addressed to those who are socially disadvantaged or in unfavorable social situation. Their scope is defined by law, and they represent an important part of the social protection system of the state. These forms of assistance is used to mitigate or overcome a complicated situation of clients, where the focus is on the support for their social re-inclusion (Bočáková et al., 2016).

#### 3.1 Approaches in addressing homelessness in selected EU countries

Although the European Union (EU) is an important project of common European integration, the process of addressing the issue of homelessness is different and visible among its member states. The differences are presented by the existence or non-existence of local or national strategies aimed at addressing the issue of homelessness.

Fitzpatrick (2010) recalls in this context the EU's interest in finding the ways of solving this social phenomenon. According to Fitzpatrick, the possible solutions includes the system of prevention and further development of services for homeless people, which is complemented by the Housing First model, whose primary role lies in the immediate provision of housing to people affected by the loss of home, whether it concerns individuals or families.

Geerstema (2013) states that at the initiative of the European Commission a pilot experiment was carried out between August 2011 and July 2013 in five different cities, in order to provide immediate housing for people who did not have this option. The experiment was focused on flexibility and availability of immediate housing, which predetermines the basis for further life of people and the associated things. The cities and countries were selected according to their

advancement, as well as the differences in their social protection systems. The project aimed at providing immediate housing, unlike the previously functioning multi-stage system of existing social services, which may take several years of time, while not all clients are able to withstand such a long period. The results of the project showed a high success in four cities – Amsterdam, Glasgow, Copenhagen and Lisbon, where the vast number of clients managed to keep their housing. Budapest showed significantly lower results, what was conditioned not just by the lack of finance, but also by the lack of state support of homeless people too. Despite this, however, the pilot project of the European Commission can be considered a success, able to significantly eliminate long-term and repeated homelessness in different EU Member States.

The principle of Housing First is also applied in several countries, such as the USA, the Netherlands, Sweden and Finland, which also opted for a policy to reduce long-term homelessness in order to transfer the homeless from provisional shelters into newly built housing units, as well as promotion and prevention in order to maintain supported housing, in conjunction with the expansion of measures to prevent homelessness (Pleace et al., 2015).

Bredherton and Pleace (2015) add that the researches also showed positive results in the model of providing immediate housing in the UK. Based on the research findings, the authors further state that the project has demonstrated a high success rate in reducing long-term and repeated homelessness, which had a positive impact on the improvement of mental and physical health of clients, as well as improvement of social interactions and restoration of contacts with the family and loved ones.

## **4 Work results and discussion**

### **4.1 The system for providing social services to the homeless in the Czech Republic**

In the Czech Republic, the terms of homeless person and homelessness are not defined. Nevertheless, an important role in the process of dealing with homelessness is played by Act No. 108/2006 Coll. on social services, which in its content uses the terms, *such as people without shelter*, or *people in unfavorable social situation linked with loss of housing*. The law in its main essence is focused on the definition and adjustment of the spectrum of social services, as well as the related aspects (registration of social service providers).

In terms of social services, we can talk about social counseling, social care and social prevention. The issue of homelessness is mostly addressed by social prevention services, whose primary role lies in preventing the social exclusion of persons at risk due to crisis life situations, socially disadvantaged backgrounds, behaviors and lifestyles leading to conflicts with society. The range of services for the target group of homeless people is defined through access to social services within the asylum shelters and half-way homes, which represent a higher level of services, or through low-threshold offer of low-threshold day centers, dormitories, and field programs. The primary objective becomes a pursuit of society in elimination and further expansion of socio-pathological phenomena (Pavelková, 2014).

It is important to note that, although the Social Services Act defines another set of social services (for example, contact centers) bundled with the target group of homeless people, this paper concentrates solely on those services, which primarily relate to the aforesaid target group.

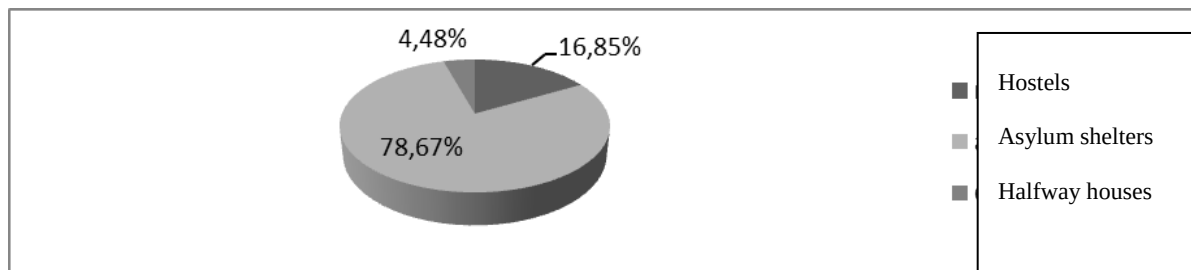


**Fig. 1.** Percentage of selected social services for the homeless in the Czech Republic emphasising the securing of shelter as of 30 May 2016 (Source: Ministry of Labour and Social Affairs, author's calculations).

In terms of finding the right instruments to address homelessness in the Czech Republic, it is necessary to emphasize that this process was influenced not just by adoption of the Social Services Act, but also by activities of non-governmental organizations as part of accepting the *Strategy for Social Inclusion of the Homeless*, a project whose primary objective consists of a proposed package of solutions addressing the homeless as well as drawing the attention of both the government and society to the issue of homelessness. (Pavelková, 2014). An important step also happened in 2011, when the first nationwide census of homeless people took place (however, only attended by people using social services), as well as the adoption of the *Concept of preventing and tackling homelessness in the Czech Republic 2020* (The concept of preventing and tackling homelessness in the Czech Republic 2020, 2013).

Based on this concept and the census of homeless people, Snopek et al. (2014) further state that a document was written in response to initiatives of NGOs, experts and members of the public active in social housing and human rights, entitled as the *Platform for Social Housing*, based on which this initiative responded to the long-term absence of a systematic solution and approach to the problem. In this document attention is shall also paid to a working model from abroad the so-called “*housing first*”, through which housing would be available not only for persons or groups of persons at risk of losing home, but also for those who are already on the street. According to the presenters, this model would also represent a form of prevention against the occurrence of homelessness. With respect to the immediate aid, it would subsequently show, whether client is sufficiently motivated and able to maintain the housing.

Snopek et al. (2014) justify the project of social housing in the Czech Republic by the following factors:

- a) A growing number of homeless people;
- b) Increased financial unavailability of housing, coupled with increased financial burden of households;
- c) Discrimination of certain population groups (Roma, migrants) in terms of obtaining housing;
- d) Segregation of households, which has prevented access to housing;
- e) Strong political pressure aimed at limiting government spending on benefits to be provided to people in substandard housing;
- f) Current government approach toward social housing, not addressing the situation of people handicapped by exclusion from housing.

For significant progress can be considered the adoption of the *Social Housing Concept*, approved by the Czech government in 2015, the preparation of which was attended by a platform of specialists from different professions, overseeing the preparation of the project of social housing in the Czech Republic, where the said project is to reflect the prevention of social exclusion and also to include the incentives necessary to ensure that the model of social housing is not abused. The very nature of social housing should be implemented in three forms, including crisis housing, social housing and affordable flats (Social Housing Concept for the Czech Republic for 2015-2025, 2015).



The Act on Social Housing will come into force in 2017 and may become a key tool in the search for effective solutions aimed at minimizing homelessness (Šveřepa, 2015).

## 4.2 The system for providing social services to the homeless in the Slovak Republic

Haburajová-Ilavská et al. (2015) state that the issue of homelessness has been neglected and not comprehensively addressed in Slovakia for a long time. These factors result in the unevenly located set of facilities providing social services for homeless people in individual regions, as well as in the lack of capacity levels of these facilities, particularly emphasizing the low number of low-threshold day centers, in which clients would spend their free time, with the possibility of using food and hygiene service. A significant deficit is also considered the lack of field social workers working with clients directly in the places, where these people are staying.

The process of perceiving and tackling homelessness in Slovakia is undersized, not only in comparison with the Czech Republic, but also with other EU Member States, which results in the inability to address the issue comprehensively. Act No. 448/2008 Coll. on social services does not define the term homeless, but only *a natural person/individual in an unfavorable social situation that has no secured accommodation, or cannot use the existing accommodation*. In addition, a significant deficit can also be considered the lack of funds for further expansion of this set of social services, but also the lack of will at the governmental level to search for a comprehensive program to tackle homelessness.

The actual Act No. 448/2008 Coll. on social services, defines low threshold social services by defining field social services of crisis intervention, low-threshold day center and a dormitory, the low-threshold nature of which determines only a certain range of services, focused primarily on the survival of the client. Shelters, halfway homes and emergency housing facilities provide a higher level of these services. This type of service is oriented towards providing longer-term form of housing, whether for individuals or families with children, but also for adults leaving facilities where social services were provided to them (children living in orphanages or foster homes). The said range of these services also offers the possibility for interest activities, social counseling, dispensation and preparation of food, adjustment of clothing or occupation therapy related to the provision of assistance in further integration of clients. In conjunction with the existing range of services available to this target group, there is also a range of support services, including the provision of services in integration centers, canteens and personal hygiene centers for people, who are unable to provide for their own subsistence.

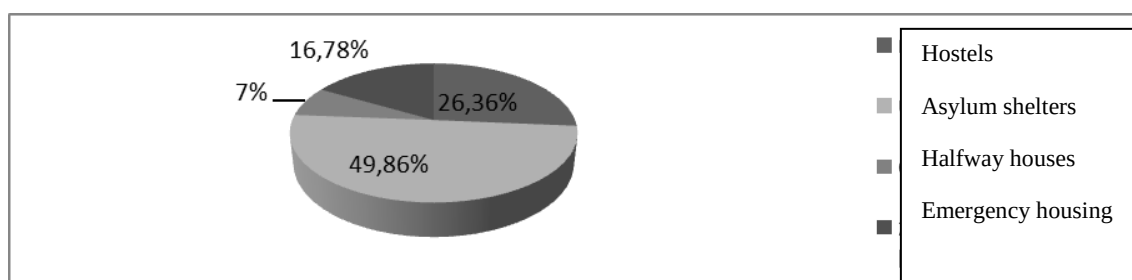


**Fig. 2.** Percentage of selected social services for the homeless in the Slovak Republic emphasising the securing of shelter as of 30 May 2016 (Source: Current register of social service providers, author's calculations).

**Table 1.** Comparison of social services provided to the homeless in the Czech and Slovak Republics as of 30 May 2016

|                                                                   | <b>Czech Republic</b>    |                 | <b>Slovak Republic</b>   |                 |
|-------------------------------------------------------------------|--------------------------|-----------------|--------------------------|-----------------|
| <b>Population<sup>1</sup></b>                                     | <b>10,553,843</b>        |                 | <b>5,426,252</b>         |                 |
| <b>Type of social services</b>                                    | <b>Number of centres</b> | <b>Capacity</b> | <b>Number of centres</b> | <b>Capacity</b> |
| Hostel                                                            | 74                       | 1,548           | 46                       | 1,128           |
| Asylum shelter/refuge                                             | 213                      | 7,228           | 96                       | 2,187           |
| Halfway house/<br>halfway home                                    | 36                       | 412             | 24                       | 307             |
| Low-threshold day centre                                          | 60                       | 1,863           | 20                       | -               |
| Emergency housing                                                 | -                        | -               | 45                       | 712             |
| Outreach programs/outreach<br>crisis intervention                 | 212                      | -               | 29                       | -               |
| <b>Total capacity of<br/>accommodation facilities<sup>2</sup></b> | <b>383</b>               | <b>9,188</b>    | <b>231</b>               | <b>4,334</b>    |

Source: Minister of Labour and Social Affairs; current register of social service providers, author's calculations.

Based on the comparison of the existing social services for the target group of homeless people, it can be concluded that the Czech and Slovak Republic has created a model of social services provided not only to homeless people, but also for other groups of people at risk of losing home, thus constituting a group of potential homeless people. In terms of the number of population, the capacity resources of both countries present approximately equivalent capacity range of provided social services in a whole, but at the same time expressing diametric differences in their various types. While in the case of dormitories and half-way homes, there are minimum differences, striking difference is presented in the form of asylum houses (shelters in Slovakia), where the capacity of the Czech Republic is significantly greater (a difference of up to 5,041 places). Some compensation in this sense can be expressed through the existence of emergency housing facilities in Slovakia, aimed at providing more longer-term accommodation.

Considerable disproportionality can be seen in terms of the number of low-threshold day centers and field programs. While in the Czech Republic there are 60 low-threshold day centres, Slovakia has only 20. In addition, capacities cannot be presented due to a lack of such information about these facilities. Active search for clients through fields programs is an important form of prevention, but attention can be once again drawn to a significant difference, where there is as much as seven times greater number of programs implemented directly in the field in the Czech Republic than in the Slovak Republic.

In this respect, it is necessary to point to different approach in tackling homelessness. While the given phenomenon has been undersized in Slovakia for a long time and the adoption of Act of the Slovak National Council No. 448/2006 Coll. on social services contributed to the start-up of the tackling process, but still only partially (in conjunction with the still not adopted national strategy to tackle homelessness), a number of documents was adopted in the Czech Republic, aimed at finding possible solutions, including the *Strategy for Social Inclusion of the Homeless*, the *Concept of Preventing and Tackling Homelessness in the Czech Republic up to 2020*, as well as the adoption of the *Social Housing Concept* at the government level, which should, as modeled by the EU Member States, put in place a model of social housing, whose ambition would be to minimize the long-term homelessness and thus to create a model of sustainable and affordable housing.

<sup>1</sup> As of 31 December 2015

<sup>2</sup> Not including the field programs / field social services of crisis intervention.

## 5 Conclusion

An examination of the selected issue pointed out to different situation, not just in terms of perception, but also in terms of the approach taken to tackle homelessness in the two countries of the former federation – the Czech Republic and the Slovak Republic. When examining the existing social services for this target group of clients, major differences can be stated, in terms of both the number of facilities providing the said type of social services, but also in terms of capacity resources, resulting in an ever-accruing problem of homelessness in Slovakia. This situation occurred due to a lack of completed surveys, as well as a lack of interest in terms of the political spectrum, resulting only in temporary and short-term solutions, rather than in adopting a comprehensive and lasting solution. In this context, it can be said that the Slovak Republic has been lagging behind on tackling this issue in comparison with the Czech Republic, but also with other EU Member States.

A significant step taken by the Czech Republic can be considered the cooperation between NGOs and experts, alongside their subsequent communication with the political spectrum. A starting social housing project may constitute a significant aspect in limiting the occurrence of homelessness and preventing its further occurrence. In addition, the model would also offer an alternative to the homeless and those at risk of losing their home, as well as the possibility of obtaining immediate housing, instead of the currently existing multistage model of solution.

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## **PUBLIC ADMINISTRATION IN EUROPEAN UNION COUNTRIES: APPROACHES TO THE EVALUATION**

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### **Abstract**

The paper deals with the position of public administration in EU countries from the viewpoint of the European Administrative Area. Attention is paid to selected approaches and options to evaluate public administration in EU countries. Further, the evaluation of selected Worldwide Governance Indicators in EU countries is provided, with a particular focus on government effectiveness and control of corruption, and the evaluation of the financial dimension of public administration with a particular focus on general government expenditures in years 2009–2014 according to the ESA methodology. By use of cluster analysis, financial capabilities of public administrations in EU countries, based on selected indicators (expenditures of the general government sector by levels of public administration) in years 2009–2014, are evaluated. The most marked differences between EU countries in all clusters were found in fiscal decentralisation of expenditures, as opposed to central government expenditures, with the least marked differences.

### **Keywords**

Evaluation, Public administration, Decentralisation, Governance, Public expenditures, EU countries.

### **JEL classification**

H76, H83

## **1 Introduction**

The European Union has no legal document that would prescribe the model of public administration and territorial administrative organisation and that would have to be adopted by the member states. Public administration thus falls within the exclusive power of the member states, which make independent decisions about the systems of public administration and internal organisation, often based on their historical development. As the member states also decide about the form of executive power, about the form, scope, functions and activities of public administration, their organisation is far from identical. Nevertheless, each country is obliged to abide by its internal conditions (economic, cultural, social, territorial, etc.) and to consequently create their own administrative system and arrangement of these relations. Despite specificities and differences of these systems, several comparative aspects can be found in EU countries.

The oldest comparative models of public administration are based on respecting the old law and on the strong authority of the leader, connected with tradition and cult. Comparative administrative science usually consists of two branches, the first of which employs historically comparative methods and the second of which, the spatial one, makes use of geographically comparative methods. The usage of historically – and geographically – comparative methods represents research into developmental associations on the basis of empirical data, leading to considerations of complex systems of public administration and the administrative law, which are traditionally the task of comparative administrative science (Farazmand, 2001; Neubauerová et al., 2003; Onofrei and Lupu, 2010; Kuhlmann and Wollmann, 2014; Halásková, 2015).

On the basis of a theoretical and empirical approach, this paper aims to provide a view on public administration in EU countries and, making use of the selected indicators (governance and financial dimension of public administration), to compare the differences between the individual countries. The area of interest in the EU countries is the comparison of the selected indicators of governance according to the Worldwide Governance Indicators (government effectiveness and control corruption) in years 2009 and 2014 by use of comparative analysis. This analysis is further used in expenditures of the general government sector (total, central and local government expenditures),

fiscal decentralisation of expenditures, public expenditures on general public services and the indicators of the financial aspect of public administration in EU countries in years 2009–2014. By use of cluster analysis, internal similarity within the individual clusters of EU countries is observed, namely in terms of expenditures by general government sector (total, central and local government expenditures as % of GDP and fiscal decentralisation of expenditures in %) as a mean value over the years 2009-2014.

## **2 Theoretical Framework – European Approaches for the Comparison and Evaluation of Public Administration**

Various comparative models, usable for comparative purposes of public administration in EU countries, can be traced in literature (Farazmand, 2001; Neubauerova et al., 2003; Rosenbloom et al., 2009; Matei and Matei, 2011; Hammerschmid et al., 2013; Kuhlmann and Wollmann, 2014; Halásková, 2015). These are mainly concerned with the traditional model of public administration, the model based on the type of state government and administrative levels, the model based on the human resource system, the model based on the geographic and geocultural perspective, the model of local government and territorial organization, and the model based on the Nomenclature of Territorial Units for Statistics.

Evaluation of the effectiveness of public administration and the quality of public services is available at both the European as well as the international level. One concept used for the evaluation of public administration is Governance (World bank, 2016; Žárska et al., 2016). In the present paper, it is defined as traditions and institutions by which the power in the country is exercised. The concept of Good Governance is one of the current trends of modernising public administration. According to Ardielli and Halásková (2015); Zanger (2000), the idea of Good Governance describes a properly functioning public administration of high quality with an integrated element of subsidiarity, allowing the participation of citizens and respecting democratic values and rules of the modern state. Different methods of effectiveness and quality management are used to evaluate public administration. According to Gavurova (2012), system Balance Scorecard (BSC) has been an approved system for measurement and performance control as well as for strategy implementation for almost 20 years, and predominantly in the countries of Western Europe. Evaluation of governance and the effectiveness of administrative institutions, including countries outside the EU, can be also perceived as part of comprehensive evaluative indexes of competitiveness (Čvančarová et al., 2014; Majerová and Horucková, 2014). A number of authors deal with measuring of the efficiency in EU countries at the regional level (NUTS 2) using the DEA method, e.g. Melecký and Staníčková (2011).

Another view on public administration is the level of decentralisation (fiscal, income and tax) and its impact on public services in EU countries, territorial reforms and solutions to financial and economic crises. According to Aristovnik (2012); Finžgar and Oplotnik (2013) and Akin et al. (2016), fiscal decentralisation can be regarded as a crucial element of decentralisation of public administration, based on the idea that providing public goods at the local level is more efficient and economical.

Financing of internal administrative structures in EU countries is compared by means of the ESA (European System of Accounts) methodology. ESA classification deals with the internal division of administrative structures to provide comparison of EU member state management. According to the ESA methodology (Eurostat, 2013a), General Government is a sector that includes institutional units dealing mainly with the redistribution of national budget and property, institutions of public administration on all levels, including social security funds, local self-government (municipal, city and local offices), and institutions partially or fully funded from the national budget, i.e. organisations whose expenses are paid from the budget from no less than 50%). The general government sector consists of four subsectors (Central Government, State Government, Local Government, Social Security Funds).

### 3 Data and Methods

The paper makes use of secondary statistical data obtained from Eurostat and the World Bank. The method of comparative analysis was used to compare selected Worldwide Governance Indicators (government effectiveness and corruption control) and indicators of the financial aspect of public administration (public expenditures of the general government sector, the extent of fiscal decentralisation of expenditures, public expenditures on general public services) in EU countries in years 2009–2014. The selected set comprises 28 EU countries (Belgium-BE, Bulgaria-BG, Czech Republic-CZ, Denmark-DK, Germany-DE, Estonia-EE, Ireland-IE, Greece-EL, Spain-ES, France-FR, Croatia-HR, Italy-IT, Cyprus-CY, Latvia-LV, Lithuania-LT, Luxembourg-LU, Hungary-HU, Malta-MT, Netherlands-NL, Austria-AT, Poland-PL, Portugal-PT, Romania-RO, Slovenia-SI, Slovakia-SK, Finland-FI, Sweden-SE, United Kingdom-UK).

The comparison of public expenditures by levels of public administration in EU countries (total general government, central government and local government expenditures) and fiscal decentralisation of expenditures in 2009–2014, was carried out through hierarchical cluster analysis. It is a multidimensional statistical method used to classify objects. It facilitates dividing observed units (territories, regions, lands) into several groups in such a manner that most similar units are included in the same group (cluster) and, conversely, that the units of individual clusters differ as much as possible. Individual steps of cluster analysis differ depending on how the “closeness” or “distance” of the units is perceived within the groups, also depending on whether the set of units is gradually divided, separated or conversely composed, connected according to selected criteria. Cluster analysis can be classified differently since authors tend to differ in their approaches (Garson, 2014). Various methods are used to measure the distances between points of interval variables. Most often the measures used are Euclidean distance

$$d(X, Y) = \sqrt{\sum (X_i - Y_i)^2} \quad (1),$$

or squared Euclidean distance.

$$d(X, Y) = (X_i - Y_i)^2 \quad (2).$$

A diagram showing the individual steps of cluster analysis is called a dendrogram. The vertical axis helps to find the required rate of clustering and the horizontal axis represents the distance between the individual clusters. Dendrograms visualise the analytical process and the results can be thus viewed in both directions – forward and backward, which enables finding the optimal result. In the present example, the method of hierarchical cluster analysis with the use of Ward’s method and of measuring distance quadrants was used. A box plot was created to compare general government expenditures in EU countries. The upper and lower quartiles define the extent of the variables observed (total general government expenditures, central government expenditures, local government expenditures and fiscal decentralisation of expenditures). The mean value is shown in the box. Statistical data from the Eurostat have been processed using the IBM SPSS Statistics 21 software.

### 4 Evaluation of Selected Indicators of Public Administration in EU Countries – Results and Discussion

The European Union consists of twenty-eight member states, including three with a federal structure (Germany, Austria and Belgium), one quasi-federal state (Spain), and twenty-four unitary states. Still, a large part of unitary states is further divided into decentralised unitary states (Denmark, Finland, France, Netherlands, Sweden, Poland, Hungary, Slovakia, Czech Republic, Romania, Lithuania, Slovenia, Latvia, Estonia and Croatia) and unitary states with a dominant position of the central government (Ireland, Portugal, Greece, Luxembourg and Bulgaria). Also, unitary states with a special position are distinguished (Italy, United Kingdom, Malta and Cyprus). Table 1 outlines the system of state government of the twenty-eight member states.



**Table 1.** System of state government in EU countries

|                |                                             |                                                                                                                                                  |
|----------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Federal states | Belgium, Austria, Germany                   |                                                                                                                                                  |
| Unitary states | Decentralised                               | Denmark, Finland, Sweden, Netherlands, Poland, France, Romania, Hungary, Lithuania, Slovakia, Czech Republic, Slovenia, Latvia, Estonia, Croatia |
|                | Dominant position of the central government | Ireland, Greece, Portugal, Bulgaria, Luxembourg                                                                                                  |
|                | Special position                            | United Kingdom, Spain, Italy, Malta, Cyprus                                                                                                      |

Source: Halásková (2015).

The extent of centralisation and decentralisation of public administration is most often defined by the ratio of central, regional and local government expenditures and total expenditures of public administration, or GDP. Authors, such as Aristovnik (2012) and Finžgar and Oplotnik (2013), agree that decentralisation contributes to an increasing effectiveness and quality of public services as expenditures correspond more to local priorities and preferences, which motivates local governments to improve resource allocation, resulting in an increased transparency of and responsibility for expenditures. Provazníková (2005) holds a different view on fiscal decentralisation, including positive and negative approaches. She describes the relationship between vertical fiscal imbalance, sub national governments dependence on intergovernmental transfers, borrowing autonomy and central government fiscal control.

For the sake of a detailed evaluation, fiscal decentralisation of expenditures (FD exp.) was observed in the countries, presented in Table 2. Results of FD exp. from years 2009–2014 show that federal states, as well as unitary states with a dominant position of the central government, typically demonstrate a weak FD exp. (below 20%). With the exception of Italy and the United Kingdom, weak FD exp. was observed also in unitary states with a special position. The highest FD exp. is typical of Scandinavian countries, with FD exp. above 30%, as well as in the Netherlands (32.2%) and Poland (32%).

**Table 2.** Fiscal decentralisation of expenditures (FD exp.) in EU countries (2009–2014)

| Weak (below 20%)                                                                                                                                                                                       | Middle (between 20–30%)                                                                                                                                               | High (above 30%)                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Malta (1.6), Cyprus (4.2), Greece (6.2), Ireland (11), Luxembourg (12.1), Belgium (13.4), Portugal (13.4), Spain (14), Austria (15.9), Slovakia (16.7), Germany (17.1), Slovenia (19.2), Bulgaria (20) | Hungary (20.6), France (20.8), Lithuania (24.5) Estonia (25.1), Croatia (25.3), Romania (25.6), Czech Republic (26.1), Latvia (26.7), United Kingdom (27), Italy (30) | Denmark (63.7), Sweden (48.5), Finland (41.1), Netherland (32.2), Poland (32) |

Source: Eurostat, author's calculations.

Approaches to the evaluation of administrative systems and their management differ between EU countries. The following section deals with selected indicators of governance in terms of Worldwide Governance Indicators.

#### 4.1 Evaluation of Selected Indicators of Governance in EU Countries

World bank annually releases the Worldwide Governance Indicators (WGI), focused on specific areas of governance. The result of the project is the comparison of aggregate and individual governance indicators in 215 countries, in six areas of governance (Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption). The WGI are a research dataset summarising the views on the quality of governance

provided by a large number of enterprise, citizen and expert survey respondents in industrial and developing countries (Kaufmann et al., 2010; World bank, 2016).

The present evaluation utilises selected indicators of the Worldwide Governance Indicators (Government Effectiveness and Control of Corruption) in EU countries. The ranking of countries in Percentile Indicators ranges between 0–100 (0 corresponds to the lowest and 100 to the highest ranking). Government effectiveness captures the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies. Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and major forms of corruption, as well as grasp of the state by elites and private interests (Kaufmann et al., 2010). Results of the evaluation of WGI in EU countries in years 2009 and 2014 are presented in fig. 1 and fig. 2. The results show that the highest government effectiveness and control of corruption are in Scandinavian countries, but also in the Netherlands, Luxembourg and Germany. This is partially due to a functional system of public administration with an efficient legislature, high prestige of public institutions, elaborate control system, and a high quality of public services, particularly in Scandinavian countries. The lowest rate of government effectiveness and control of corruption was found in Bulgaria and Romania. A low level of the observed indicators of governance was also seen in Italy and Greece, which has a negative impact on the whole system of public administration and governance. These countries have a low prestige and quality of the civil service, an imperfect legislature, internal and external control service of public administration, and a high corruption rate. More detailed information on corruption rate in EU countries is provided in research by, for instance, Linhartová and Volejníková (2015).

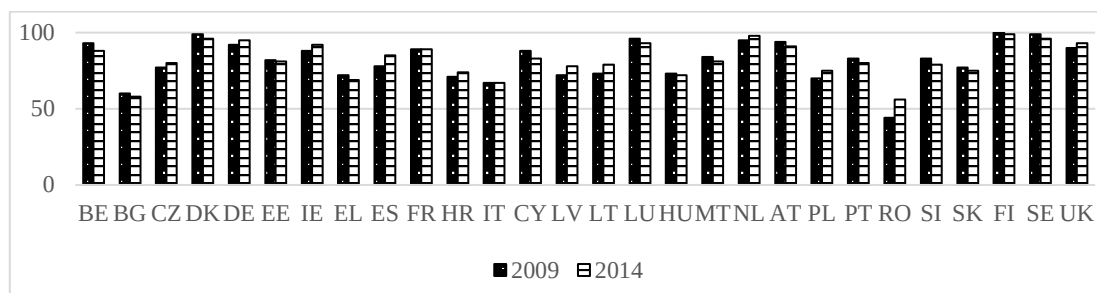


Fig. 1. Government effectiveness in EU countries (Source: World bank)

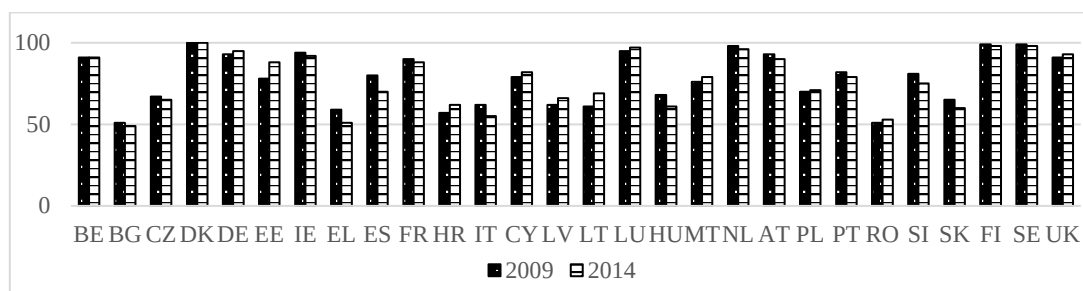


Fig. 2. Control of corruption in EU countries (Source: World bank)

An important prerequisite for the development of public administration is its financial capability. The following section provides an evaluation of financial dimensions of public administration in EU countries.

#### 4.2 Comparison of General Government Expenditure in European Union Countries

As said, structure of public administration differs fundamentally in EU countries. The particular levels of public administration are associated by levels of public budgets and redistribution processes in

terms of socioeconomic development in the countries (Mikušová Meričková and Halásková, 2014). The financial dimension of public administration in EU countries is compared using the following selected indicators: total general government expenditures (expenditures of the general government sector), which can also be compared by means of the levels of public administration using the ESA methodology. Apart from total general government expenditures, attention is also paid to expenditures in two sub-sectors of public administration, namely:

1) Central Government – includes all institutional units whose authority encompasses the whole economic territory of a country, with the exception of the administration of social security funds (e.g. ministries, central offices and organisations managed by them with a nationwide operation and financed from the national budget), and

2) Local Government – includes types of public administration authorities whose competence reaches the local part of the economic territory, with the exception of local social security fund institutions (cities, municipalities and self-government, budgetary and semi-budgetary organizations, municipal, city and local authorities). Expenditures of the sub-sector State Government were not compared in EU countries as these pertain to federal states only (Germany, Austria, Belgium and Spain) (Eurostat, 2013a).

Results of the comparison of total general government expenditures, central government and local government expenditures in EU countries as the average of years 2009–2014 (% of GDP) is seen in Fig. 3. It shows that Scandinavian countries, France, Belgium, Austria, and Greece have the highest total expenditures of the public administration sector, as opposed to Romania and Bulgaria, which have the lowest total general government expenditures. The comparison of central government expenditures showed that the highest are observed in Ireland and the United Kingdom, followed by Denmark, Greece and Malta. The lowest central government expenditures were found in Germany and Spain, which can be partially explained by the existence of the state government level, unlike in the majority of the remaining countries. The highest local government expenditures as % of GDP and strong fiscal decentralisation of expenditures are seen in Scandinavian countries, with Denmark in the lead, whilst small countries with strong centralisation of public administration, Malta, Cyprus and Greece, have the lowest local government expenditures and fiscal decentralisation of expenditures, which is related to their low autonomy of territorial budgets.

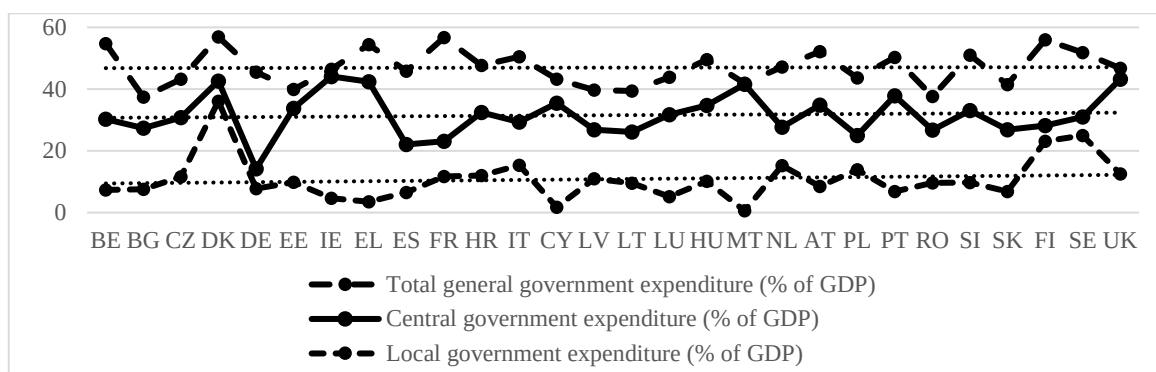


Fig. 3. Comparison of expenditures of the general government sector in EU countries (2009–2014) (Source: Eurostat)

For a more exact classification of public expenditures from the functional point of view, classification of functions of governmental institutions is used (COFOG) (see, e.g. Szarowská, 2013). According to COFOG, general government expenditures on general public services in the EU include executive and legislative institutions, financial and fiscal affairs, external affairs, foreign economic aid, basic research, R&D related to general public services, public debt services, transfers of a general nature between different levels of government (Eurostat, 2013b). Comparison of expenditures of the general government sector in EU countries in years 2009–2014 allocated on public administration and general public services (as % of GDP) is viewed in Fig. 4. Cyprus and Greece indicate the highest

expenditures on general public services (as % of GDP), while Estonia, Romania and Bulgaria the lowest.

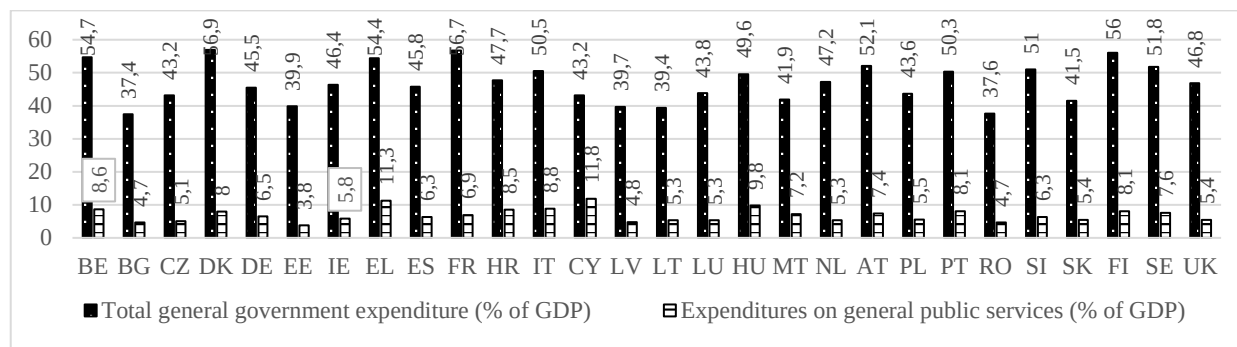


**Fig. 4.** Total general government expenditures and public expenditures on general public services in EU countries 2009–2014 (% of GDP) (Source: Eurostat)

The view changes, however, were public expenditures on general public services in EU countries to be estimated in relation to total government expenditures. Table 3 clearly shows different priorities of allocated total general government expenditures on general public services, which are affected by the total volume of general government expenditures but also by the different structure of expenditures by function in each country. Based on results in Table 3, it may be said that the highest public expenditures on general public services as % of total general government expenditures (as average of years 2009–2014) are in Cyprus (27.3%), Greece (20.8%) and Hungary (below 20%). Conversely, the lowest % of allocated public expenditures on general public services of total general government expenditures were found in Estonia (9.5%), Netherlands (11.2%) and the United Kingdom (11.5%).

**Table 3.** Public expenditures on general public services in EU countries 2009–2014 (% of total general government expenditures)

| Between 9–14 %                                                                                                                                                | Between 14–20%                                                                                                       | Between 20–30%       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------|
| EE (9.5), NL(11.2), UK(11.5),<br>CZ(11.8), LV(12.1), LU(12.1)<br>FR(12.2), SI(12.4), IE(12.5),<br>RO(12.5), BG(12.6), PL(12.6),<br>SK(13), LT(13.4), ES(13.7) | DK(14), GE(14.2), AT(14.2),<br>FI(14.5), SE(14.7), BE (15.7),<br>PT(16.1), MT(17.2), IT(17.4),<br>HR(17.8), HU(19.7) | EL(20.8)<br>CY(27.3) |

Source: Author's calculations according to Eurostat.

#### 4.3 Evaluation of Financial Capabilities of Public Administration in EU Countries by use of Cluster Analysis

Indicators of the financial dimension of public administrations in EU countries over the period 2009–2014 were further compared by means of hierarchical cluster analysis. For the sake of comparison, expenditures by general government sector (total, central and local government expenditures as % of GDP and fiscal decentralisation of expenditures in %) were selected. Results of the cluster analysis and the division of EU countries into four clusters on the basis of their internal similarity of public expenditures are viewed in Table 4. Clusters of EU countries and their similarity or dissimilarity are viewed in the dendrogram (Fig. 5). The most similar expenditures by level of public administration and the rate of fiscal decentralisation of expenditures are, in the first cluster, in Hungary, Slovenia, Austria, Portugal, and Belgium; identical similarity is also observed in the set comprising Bulgaria, Slovakia, and Luxembourg, but also Germany, Spain, and France. A lower similarity of public expenditures was observed in Slovenia and the United Kingdom, but also in Spain and Slovakia.

**Table 4.** Results of cluster analysis based on indicators of the financial dimension of public administration

|               |                                                                                                                       |
|---------------|-----------------------------------------------------------------------------------------------------------------------|
| Cluster one   | Belgium, Germany, France, Hungary, Austria, Portugal, Slovenia, Bulgaria, Luxembourg, Spain, Slovakia, United Kingdom |
| Cluster two   | Czech Republic, Estonia, Croatia, Italy, Lithuania, Latvia, Netherlands, Poland, Romania                              |
| Cluster three | Denmark, Finland, Sweden                                                                                              |
| Cluster four  | Ireland, Greece, Cyprus, Malta                                                                                        |

Source: Author

In the second cluster, the most similar, as regards their public administration expenditures, are Italy, the Netherlands, and Poland, and another set of similar countries comprises Lithuania, Romania, Latvia, the Czech Republic, Croatia, and Estonia. Lower similarity of expenditures is then observed in Latvia and the Netherlands. In the third cluster, the most similar in terms of public expenditures by the level of public administration are Sweden and Finland, lesser similarity is then observed in Denmark and Finland. All countries in the fourth cluster demonstrate identical internal similarity of public expenditures.

The box plot (Fig. 6) compares EU countries divided by public expenditures into four clusters in a form of graphic visualisation.

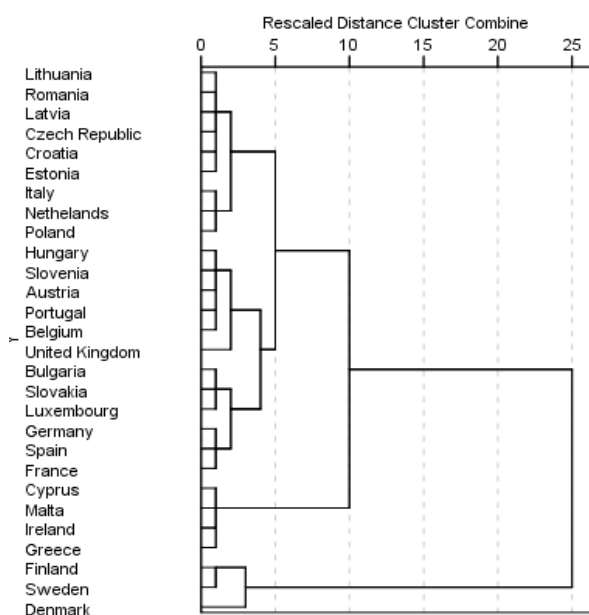


**Fig. 5.** Dendrogram of expenditures on public administration in EU countries (Source: Author)

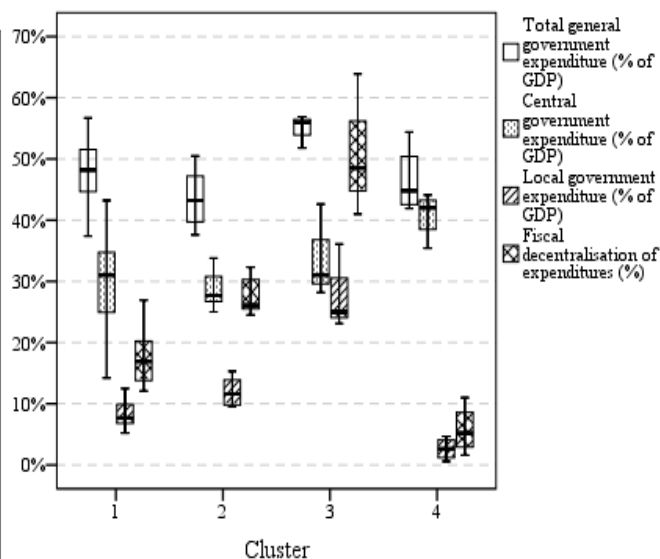


**Fig. 6.** Box plot – Comparison of expenditures on public administration in EU countries (Source: Author)

The first cluster consists of countries with high total public expenditures and low local government expenditures, and a relatively low fiscal decentralisation of expenditures. The widest range of values is in total general government expenditures (FR 56.7%, BG 37.4%) and central government expenditures (UK 43.2% the lowest in DE 14.2%). Countries in the second cluster demonstrated a moderate to high level of fiscal decentralisation of expenditures and a similar structure of expenditures by levels of public administration as in the countries in the first cluster. The widest range of values is in total general government expenditures (IT 50.5%, RO 37.6%). Scandinavian countries (the third cluster) show the highest total general government expenditures, fiscal decentralisation of expenditures and local government expenditures, in comparison to other countries. The widest range of values is in FD exp. (DK 63.9%, compared with FI 41%), smaller range is then in central government and local government expenditures. Countries in the fourth cluster (Ireland, Greece, Cyprus and Malta) show the lowest local government expenditure as % of GDP (IE 4.7%; EL3.5%;

CY 1.8%; MT 0.6%) and fiscal decentralisation of expenditures (IE 11%; EL 6.2%; CY 4.2%; MT 1.6%), but also the highest central government expenditures (the highest: IE 44.1%, the lowest: CY 35.4%).

The comparison of the structure of expenditures by the level of public administration in the 28 EU countries by use of hierarchical cluster analysis showed the most marked differences over the observed period 2009–2014 in countries from the third and fourth cluster, mainly in local government expenditures as % of GDP (third cluster approximately 25%, fourth cluster only 3%) and fiscal decentralisation of expenditures (third cluster with the mean value of approximately 48%, and fourth cluster approximately 6%). Other differences in financial indicators were found in countries in the third and first cluster. The most notable differences in EU countries in all clusters were proved in fiscal decentralisation of expenditures (Denmark 63.9%, Malta merely 1.6%); conversely, hierarchical cluster analysis showed the smallest differences in central government expenditures, which on average reach approximately 30% of GDP (highest in Ireland: 44.1%, lowest in Germany: 14.2%), but also in total general government expenditures. The evaluation of the structures of general government expenditures in EU countries also confirmed the principle of dissimilarity of fiscal federalism, whose fiscal arrangement should take into consideration the differences in people's preferences regarding the structures of public goods and services within a certain area.

## 5 Conclusion

The European perspective applies several approaches to evaluate and compare public administration, its effectiveness, and quality of public services. One form of evaluating public services is Worldwide Governance Indicators, which focuses on selected areas of governance. Results of the evaluation of governance by Worldwide Governance Indicators in EU countries in years 2009 and 2014 showed that the highest government effectiveness and control of corruption is in Scandinavian countries, as opposed to Bulgaria and Romania, with the lowest values.

Another criterion to compare public administration in EU countries was their financial dimension. A particular fiscal system is, similarly to administrative systems, a compromise in the given country and is based on historical, political and other relations. The comparison of financing internal administrative structures in EU countries was carried out by use of the ESA methodology. The evaluation of the financial dimension of public administration by selected indicators in EU countries in years 2009–2014 showed a strong position of Scandinavian countries, with the highest total general government expenditures as % of GDP, local government expenditure as % of GDP and fiscal decentralisation of expenditures. Countries with low decentralisation of public administration include Malta, Cyprus and Greece, where the lowest local government expenditures as % of GDP and fiscal decentralisation of expenditures were found. The lowest total general government expenditures as % of GDP are seen in Romania and Bulgaria. Other results were obtained by comparing central government expenditures as % of GDP in EU countries, where the highest expenditures are seen in Ireland, United Kingdom, Denmark, Greece, and Malta. By contrast, the lowest central government expenditures as % of GDP were found in Germany and Spain, which can be explained by the existence of the state government in these countries.

The comparison of the financial dimension of public administration in the 28 EU countries in years 2009–2014 using hierarchical cluster analysis proved the dissimilarity principle of fiscal federalism, where the most marked differences in public administration expenditures (in local government expenditures and fiscal decentralisation of expenditures) were found in Scandinavian countries (third cluster), compared to Malta, Cyprus, Greece, and Ireland (fourth cluster). The most notable differences in EU countries in all clusters were proved in fiscal decentralisation of expenditures, as opposed to the lowest differences in central government expenditures. Based on the evaluation of selected public administration indicators in EU countries, Scandinavian countries can be considered the most efficient systems of public administration and governance, including the financial potential of public administration. By contrast, Romania and Bulgaria demonstrated the worst level of the

selected indicators of governance, but also the lowest total general government expenditures and public expenditures on general public services as % of GDP from all EU countries.

## 6 Acknowledgement

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## SELECTED ISSUES OF SOCIAL POLICY IN EU COUNTRIES

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### Abstract

The extent of social issues has an impact on current society, and ways of solving them reflect not only on social policy but also on results of economic policy. The role of social policy consists in the elimination of social problems and the attenuation of social and income inequality. Approaches of the EU member states vary, which is related to different economic capabilities and redistribution processes. The paper, in connection with the present issue, provides an analysis of expenditures on social protection by function. Using correlation analysis, the relation between expenditures on social protection on one side, and GDP per capita and income inequality on the other, are assessed using the Gini coefficient and at-risk-of-poverty rate in EU countries in years 2007–2013. The results showed that expenditures on social protection had a positive impact on socio-economic development assessed by the index of GDP per capita. By contrast, expenditures on social protection had a negative influence on the level of income inequality assessed by means of the Gini coefficient as well as the at-risk-of-poverty rate.

### Keywords

Social policy, Redistribution, Social protection expenditure, Income inequality, Poverty, EU countries.

### JEL classification

H5, H53, I38

## 1 Introduction

The idea behind welfare state is a range of redistribution processes, defined by the volume of public expenditures on social protection of the population with the aim to balance the chances in one's life and to use social policy to create conditions to ensure welfare commensurate with the potential of the society (Adnet and Hardy, 2005; Pestieau, 2006; Farnsworth and Irving, 2011; Diamond and Longe, 2013; Barták and Gavurová, 2015; Halásková and Halásek, 2015). “Depending on the welfare state regime, the implications on income inequality and poverty, on incentives and on political sustainability may vary a lot. Social protection system can be defined by its degree of redistributiveness and by its generosity. The first one is characterized by the level of flat benefit awarded to everyone, or by the parameters of means-testing. The second one can be proxied by the share of spending to GDP. This distinction is quite important when comparing countries. In the above distinction of welfare state regimes, the Nordic and Anglo-saxon regimes are both redistributive, but the former are by far more generous” (Pastieau 2006, p. 41).

On the basis of a theoretical and empirical approach, this paper aims to assess the range of redistribution processes, defined by the amount of social spending, and their impact on socioeconomic development, the level of income inequality and poverty in EU countries. In connection with the aim, the research subject is defined, namely the relation between social and economic policy in a narrow view. Using correlation analysis (Pearson's correlation coefficient), the statistical testing deals with the research question as regards the existence of the relation between the extent of expenditures of social protection on one side, and the achieved level of socioeconomic development according to the GDP per capita index, the level of division of available incomes, assessed using Gini coefficient and the at-risk-of-poverty rate on the other.

## 2 Theoretical Framework – Approaches to Welfare State, Significance of Social Transfers Programmes and Income Distribution

Attempts to reduce income and social inequalities are rooted in the history of Europe. In each country, the development of redistribution was different. In the course of the 20th century, models of social protection, varying in their range of redistribution processes, developed in Europe (Adnet and Hardy, 2005). Esping-Andersen's categories draw on Weber's methodological approach in constructing holistic “ideal-types”. These are reflected on in the profile of public expenditure and welfare outcomes across social protection regimes (Adnet and Hardy, 2005; Farnsworth and Irving, 2011; Pestieau, 2006; Diamond and Lodge, 2013).

When considering the redistributive impact of alternative systems of social protection it is important to note that their design features differ in important respects (Bergh, 2005; Goudswaard and Caminada, 2010; Wang, Caminada and Goudswaard, 2012). The differing designs of social programmes influence the distribution of household incomes in different ways. In assessing these impacts it is important to distinguish between targeting, progressivity, and redistribution. *Targeting* is a means for determining either the eligibility for benefits or the level of entitlements for those eligible. In a sense, all benefit systems – apart from a universal “basic income” scheme – are targeted to specific categories of people, such as the unemployed, people with disabilities or those over retirement age. *Progressivity* refers to the profile of benefits when compared to market or disposable incomes – how large a share of benefits is received by different income groups – e.g., do the poor receive more than the rich from the transfer system? *Redistribution* refers to the outcomes of different tax and benefit systems – how much does the benefit system actually change the distribution of household income (Förster and Whiteford, 2009, p. 35).

In the course of the 1990s, European policies aimed at deepening European economic integration changed the general economic context in which social policies were implemented. The single market altered the economic environment of welfare states (Palier, 2006, p. 5). Welfare transfers and services are more often seen as comprising an element of rigidity, as a burden for companies (labour cost) and states (budget deficits) who try to compete in a new, integrated single market. Passive and costly welfare programmes are increasingly denounced as impeding on the competitiveness of firms and countries in this new context. Recognition and response to these issues is said to require radical adaptation of welfare states. This adaptation implies not only policies of retrenchment in social policy, but also a general change to render it more market- and employment-friendly. This shift has sometimes been theorised as a global shift from the typical Keynesian welfare state, where social policy is seen as favouring consumption and growth, to a “Schumpeterian workfare state”, aimed at strengthening the competitiveness of national economies and at subordinating welfare policy to the demands of flexibility (Palier, 2006, p. 6). According to Palier (2006), Vandenbroucke and Vleminckx (2011), Van Kersbergen and Hemerijck, (2012), Diamond, Lodge (2013) solutions promoted at the European level reflect an on-going attempt to find a new compromise between economic and social policies, between European economic integration and persisting distinctive national welfare regimes. In terms of content, this compromise is based on modernisation and improvement of the social model, more than recasting of economic policies.

## 3 Data and Methods

Secondary data were collected from available Eurostat statistics (due to data availability for the indicators assessed – expenditure on social protection, GDP per capita, the at-risk-of-poverty rate, level of income inequality assessed using the Gini coefficient, of the 2007–2013 period).

The object of the quantitative analysis is a set of 28 EU countries, comprising: Belgium (BE), Bulgaria (BG), Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), (France (FR), Croatia (HR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria (AT), Poland (PL),

Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE), United Kingdom (UK).

Key methods of the scientific work are analysis, comparison and abstraction in the theoretical and methodological framework, and synthesis and partial induction in drawing conclusions. In statistical testing of the relation between the extent of expenditures on social protection on one side, and the achieved level of socioeconomic development according to the GDP per capita index, income inequality assessed using the Gini coefficient and the at-risk-of-poverty rate on the other, correlation analysis was applied.

This method is used to measure the strength of linear correlation between two random variables. Values range within the interval  $-1, 1$ ; where the positive or negative value indicates the direction of correlation (positive in the case of correlation, negative in the case of anti-correlation) and its absolute value indicates the strength of correlation. The more the absolute value approaches 1 (or  $-1$  for that matter), the stronger the correlation is. One of the most frequently used calculations of correlation analysis appropriate for the given type of data is the Pearson's correlation coefficient. To express the strength of correlation, the coefficient of determination ( $r^2$ ) was used, which is the squared value of the coefficient of correlation ( $r$ ), expressed in per cent. The coefficient of determination also states the extent of suitability of a model. It shows the part of  $Y$  variability which can be explained by the model (Lynch, 2013, pp. 127-134).

The calculations in the following part are the output of the SPSS Statistics 21.0 software.

## **4 Results and discussion**

In EU countries in the period 2007-2013, expenditures on social protection by function, level of income inequality (expressed by Gini coefficient) and the at-risk-of-poverty rate are analysed firstly. Further, the correlation between the extent of expenditures on social protection and selected socioeconomic indicators are evaluated.

### **4.1 Expenditure on Social Protection in EU Countries in the Period 2007–2013**

Similarities and differences between the systems of social protection in EU countries stem from risk coverage (eligibility to pay benefits), the structure of benefits paid, the form of financing, and system organisation. The form of social-protection financing is assessed simultaneously from three perspectives, which consider 1) the volume of public expenditures on social protection expressed in % from GDP, 2) the share of cash social benefits, 3) the structure of financing resources (Adnet and Hardy, 2005; Spicker, 2014).

In EU countries, expenditures on social protection are analysed at first. According to Eurostat (2012, 2016e), expenditures on social protection are divided into four categories. The first one are expenditures on social benefits, which are resources in the form of cash, products or services. The second category relates to administrative expenses, connected with the system of the provision of social protection. The third and fourth category deal with transfers into other systems and various expenditures. ESSPROS Manual and user guidelines defines social protection as encompassing all interventions from public or private bodies intended to relieve households and individuals of the burden of a defined set of risks or needs, defined through eight functions of social protection: sickness/health care, disability, old age, survivors, family/children, unemployment, housing, social exclusion not elsewhere classified.

Total social expenditure (% of total social benefits) on individual programs in EU countries in years 2007 and 2013 is presented in Table 1. Pension benefits account for the largest share of social expenditures in welfare state; this level is particularly high in Poland and Italy and particularly low in Ireland. The second largest component is sickness/health care, accounting for about 35 per cent in Croatia and the Netherlands. Together old-age and health care account for over 75 per cent of social spending in most EU countries, the exception being Ireland, Denmark., Finland and Luxembourg,

with approximately 63 per cent. For the other function, there is a large diversity that can be explained by social policy objectives.

**Table 1.** Expenditure on social protection by function in EU countries

|    | Old-age and survivors |      | Sickness/ Health care |      | Disability |      | Family/Children |      | Unemployment |      | Housing and soc. exclusion |      |
|----|-----------------------|------|-----------------------|------|------------|------|-----------------|------|--------------|------|----------------------------|------|
|    | 2007                  | 2013 | 2007                  | 2013 | 2007       | 2013 | 2007            | 2013 | 2007         | 2013 | 2007                       | 2013 |
| BE | 40.0                  | 40.3 | 28.3                  | 28.7 | 7.2        | 8.2  | 8.4             | 7.4  | 12.6         | 11.7 | 3.6                        | 3.7  |
| BG | 51.5                  | 50.8 | 27.1                  | 25.8 | 8.3        | 8.2  | 8.7             | 10.5 | 2.0          | 3.2  | 2.5                        | 1.6  |
| CZ | 42.9                  | 47.3 | 32.9                  | 30.6 | 8.0        | 6.7  | 11.4            | 9.1  | 3.4          | 3.4  | 1.5                        | 2.9  |
| DK | 42.4                  | 42.6 | 21.5                  | 20.3 | 13.7       | 13.2 | 13.3            | 11.6 | 4.3          | 5.9  | 4.8                        | 6.4  |
| DE | 43.0                  | 39.5 | 29.9                  | 34.4 | 7.9        | 8.0  | 10.4            | 11.2 | 5.8          | 4.1  | 3.0                        | 2.8  |
| EE | 43.8                  | 44.7 | 33.4                  | 28.1 | 9.3        | 12.0 | 11.6            | 11.1 | 1.2          | 3.2  | 0.8                        | 1.0  |
| IE | 27.8                  | 29.7 | 39.6                  | 33.2 | 5.7        | 5.9  | 15.4            | 13.4 | 8.5          | 14.7 | 3.0                        | 3.0  |
| EL | 51.9                  | 59.3 | 28.1                  | 21.4 | 4.9        | 4.5  | 6.2             | 5.5  | 4.5          | 6.3  | 4.4                        | 2.9  |
| ES | 42.8                  | 47.6 | 31.3                  | 25.5 | 7.5        | 7.4  | 6.2             | 5.3  | 10.1         | 12.9 | 2.2                        | 1.3  |
| FR | 44.8                  | 45.8 | 29.9                  | 28.7 | 6.6        | 6.6  | 8.5             | 7.8  | 5.6          | 6.1  | 4.7                        | 5.2  |
| HR | 37.8                  | 38.0 | 34.9                  | 35.4 | 17.8       | 17.0 | 7.4             | 7.0  | 1.4          | 2.3  | 0.4                        | 0.3  |
| IT | 59.0                  | 60.0 | 25.9                  | 23.7 | 5.7        | 5.5  | 4.4             | 4.2  | 4.4          | 5.9  | 0.7                        | 0.8  |
| CY | 46.3                  | 54.7 | 25.3                  | 20.6 | 3.7        | 3.3  | 10.8            | 6.6  | 5.1          | 8.2  | 8.8                        | 6.6  |
| LV | 45.8                  | 54.7 | 30.9                  | 22.4 | 6.8        | 8.5  | 10.7            | 8.3  | 3.8          | 4.3  | 2.1                        | 1.8  |
| LT | 46.6                  | 47.6 | 30.9                  | 28.2 | 10.2       | 9.6  | 8.3             | 7.7  | 2.8          | 2.7  | 1.2                        | 4.2  |
| LU | 37.2                  | 37.5 | 26.0                  | 25.6 | 12.3       | 10.8 | 16.6            | 15.9 | 4.9          | 6.6  | 2.9                        | 3.5  |
| HU | 43.9                  | 52.4 | 25.8                  | 23.9 | 9.6        | 7.2  | 12.5            | 12.1 | 3.5          | 2.3  | 4.8                        | 2.1  |
| MT | 52.2                  | 53.8 | 29.1                  | 30.8 | 6.4        | 3.9  | 6.0             | 6.4  | 2.8          | 3.3  | 3.4                        | 1.9  |
| NL | 42.6                  | 41.8 | 32.4                  | 34.9 | 9.0        | 7.9  | 5.9             | 3.8  | 4.3          | 5.6  | 5.7                        | 6.5  |
| AT | 48.6                  | 50.5 | 25.9                  | 25.3 | 7.8        | 7.1  | 10.6            | 9.7  | 5.3          | 5.5  | 1.9                        | 1.9  |
| PL | 60.0                  | 60.1 | 21.9                  | 24.0 | 9.5        | 8.4  | 4.9             | 4.8  | 2.3          | 1.7  | 1.5                        | 1.1  |
| PT | 50.1                  | 56.2 | 28.4                  | 23.8 | 10.0       | 7.7  | 5.3             | 4.6  | 5.1          | 6.9  | 1.2                        | 0.9  |
| RO | 45.5                  | 54.8 | 26.7                  | 26.9 | 9.6        | 7.8  | 12.8            | 8.1  | 2.0          | 1.1  | 3.3                        | 1.3  |
| SI | 46.9                  | 48.8 | 32.2                  | 30.8 | 8.2        | 6.3  | 8.3             | 8.0  | 2.1          | 3.4  | 2.4                        | 2.8  |
| SK | 43.7                  | 44.5 | 30.7                  | 30.9 | 8.5        | 9.0  | 10.0            | 9.7  | 3.6          | 3.4  | 3.5                        | 2.5  |
| FI | 38.5                  | 41.4 | 26.4                  | 24.6 | 12.6       | 11.2 | 11.6            | 10.7 | 7.8          | 7.5  | 3.2                        | 4.6  |
| SE | 40.5                  | 43.6 | 26.3                  | 25.5 | 15.2       | 12.2 | 10.3            | 10.5 | 3.8          | 4.2  | 3.8                        | 4.0  |
| UK | 41.8                  | 42.7 | 30.2                  | 30.5 | 7.6        | 6.3  | 10.4            | 10.7 | 2.0          | 2.1  | 8.0                        | 7.9  |

Source: Eurostat.

In 2013 unemployment benefits reached 14.7 per cent in Ireland, but were insignificant in Romania and Poland. Disability benefits reached 17 per cent of social spending in Croatia, for family/children 15.9 per cent in Luxembourg. In all EU countries, expenditure on social protection on housing and social exclusion accounted for the lowest % share.

The form and range of public expenditures also has a significant influence on the amount of public social expenditures, which varies across countries, depending on the share of public sector, tax burden and redistribution (Van Kersbergen and Hemerijck, 2012; Mikušová Meričková and Halásková, 2014; Halásková and Halásek, 2015).

#### 4.2 Level of Income Inequality and Poverty in EU Countries in the Period 2007–2013

Income inequality in EU countries is expressed by means of the Gini coefficient. According to Eurostat (2016c) the Gini coefficient is defined as the relationship of cumulative shares of the population arranged according to the level of equivalised disposable income, to the cumulative share

of the equivalised total disposable income received by them. The value 0 represents equal income for everyone, whilst 100 represents a full income inequality.

Differences can be observed in income inequality in EU countries (Fig. 1). In the course of 2007–2013, Latvia, Lithuania, Portugal, Romania and Bulgaria were among the countries with the highest income inequality, with the Gini coefficient reaching 34. Also Greece, Spain, Italy, Great Britain or Estonia showed a marked income inequality in the period, with the Gini coefficient above the EU28 level (30.5). By contrast, Slovenia, Slovakia, Czech Republic and Sweden were among the countries with the lowest income inequality (the Gini coefficient ranging from 23.6 to 25.0).

In connection with the specific character of social policy and redistribution processes, several EU countries, to the largest extent Romania, Portugal, Netherlands and Poland, demonstrate a decrease in income inequality (the value of the Gini coefficient is lowering), which means that salaries are offset. However, countries such as France, Luxembourg, Hungary, Cyprus, Spain or Denmark increased in their income inequality over the period 2007–2013.

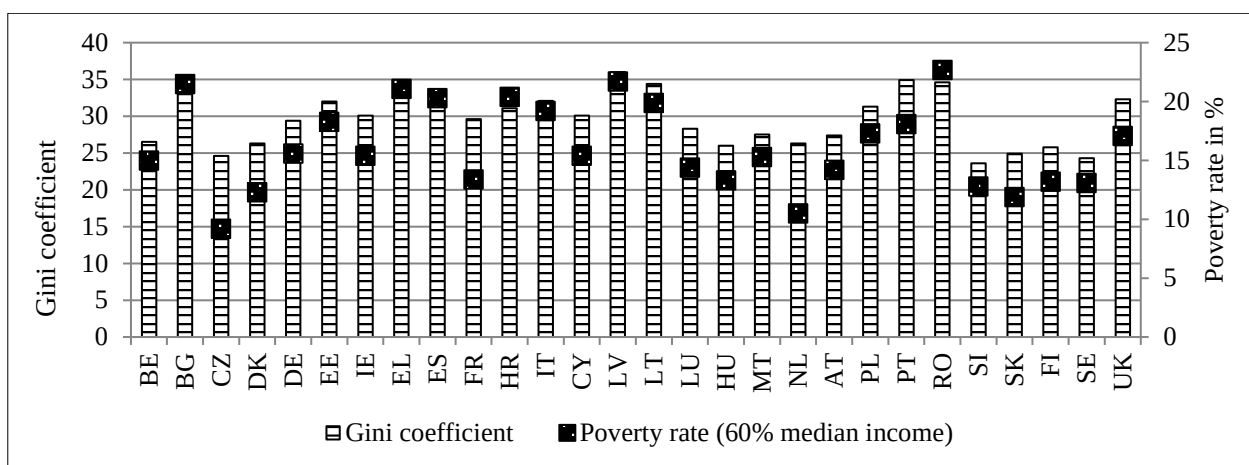


**Fig. 1.** Level of income inequality and poverty in EU countries in period 2007–2013 (Source: Eurostat)

The at-risk-of-poverty rate is the share of people with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60% of the national mean value of equivalised disposable income after social transfers. This indicator does not measure wealth or poverty, but low income in comparison to other residents in that country, which does not necessarily imply a low standard of living (Eurostat, 2016a). Figure 1 demonstrates that in the period 2007–2013 the at-risk-of-poverty rate was the lowest in the Czech Republic, 9.2%, and the Netherlands, 10.5%, and always the highest in Romania 22.7%, Bulgaria 21.5% and Latvia 21.7%.

According to Eurostat (2016d), reduction in the at-risk-of-poverty rate in % is due to social transfers, calculated as the percentage difference between the at-risk-of-poverty rate before and after social transfers. Fig. 2 demonstrates that the highest impact of social transfers on poverty reduction in EU Countries in 2007 was seen in Sweden (61.8%), Denmark (56.8%), Finland (55%) and Hungary (58%). Conversely, countries with the lowest social protection expenditure (Bulgaria, Greece, Spain and Italy) had the lowest effect on poverty reduction (13.7–17.7%). In 2013, Ireland, Denmark and Finland were among the countries with the highest poverty reduction effect (63.4%, 57.2% and 55.3%, respectively), as opposed to Greece and Romania, which observed the lowest poverty reduction effect in 2013.

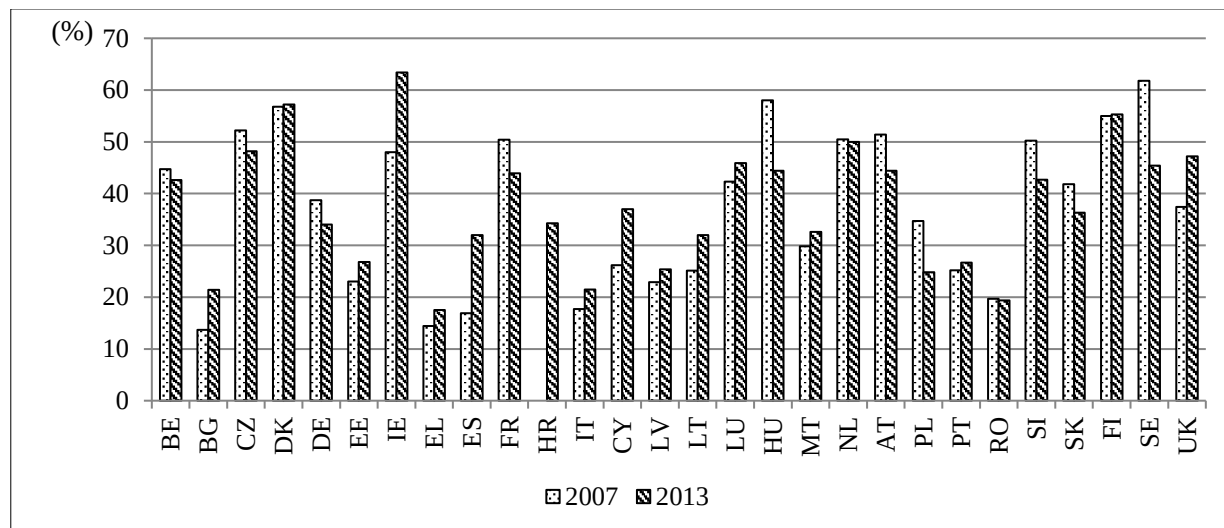


Fig. 2. Impact of social transfers on poverty reduction % in EU countries (Source: Eurostat)

#### 4.3 Correlation between the Extent of Expenditures on Social Protection and Selected socioeconomic Indicators in EU Countries

We focus closely on the impact of social protection transfers on poverty, income inequality and GDP at the aggregate level. In years 2007–2013, the relation between expenditures on social protection and the level of socioeconomic development, assessed by means of the GDP per capita index, the level of division of available incomes, assessed using the Gini coefficient and the at-risk-of-poverty rate (%) in EU countries is assessed.

According to Eurostat (2016b), the volume index of GDP per capita in Purchasing Power Standards (PPS) is expressed in relation to the European Union (EU28) average set to equal 100. If the index of a country exceeds 100, this country's level of GDP per capita is higher than the EU average and vice versa. Basic figures are expressed in PPS, i.e. a common currency that eliminates the differences in price levels between countries allowing reasonable volume comparisons of GDP between countries. There is a wide scope of GDP per capita in the individual EU countries. The highest GDP per capita from the EU countries is reached by Luxembourg, with more than 2.5-fold GDP per capita than the EU28 average, and more than 6-fold higher in comparison to Bulgaria, which is, according to this indicator, the poorest EU country. The Netherlands and Ireland are among the countries whose GDP per capita is by 33% higher than the EU28 average.

A statistically significant, moderate positive correlation ( $p < 0.01$ ) was proved between social protection expenditures as % of GDP and GDP per capita in PPS in EU countries in years 2007–2013 (Fig. 3), with the Pearson correlation coefficient reaching  $r = 0.500$  and the coefficient of determination of  $r^2 = 0.250$ . The removal of the outlier of Luxembourg showed a statistically significant strong positive correlation ( $p < 0.01$ ) between social protection expenditures and GDP per capita for the EU27 countries, with  $r = 0.805$  and  $r^2 = 0.648$ . It therefore applies that the higher social protection expenditures as % GDP are, the higher the value of GDP per capita index, and vice versa. As the coefficient of determination shows, mutual influence accounted for 25% and other factors for 75% influence on expenditures on social protection and GDP per capita in PPS. As regards the EU27 (without Luxembourg), these variables were mutually influenced in 64.8%, and other factors accounted for 35.2%.

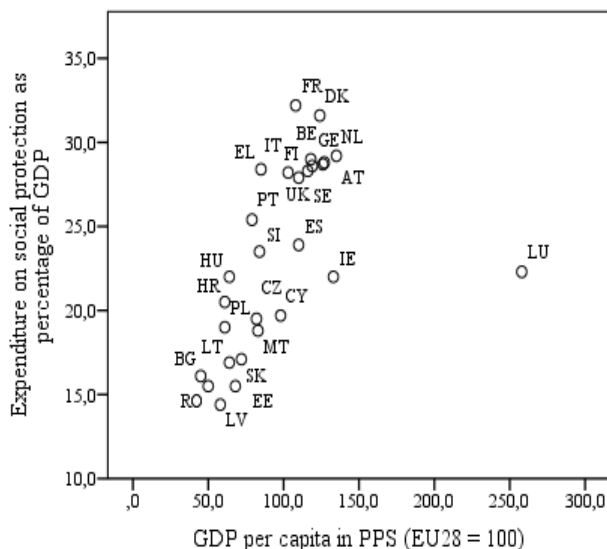


**Fig. 3.** Social protection expenditure and GDP per capita in EU countries, 2007–2013 (Source: authors)

In the course of 2007–2013, a statistically significant weak negative correlation ( $p < 0.05$ ) was proved in EU countries between the range of social protection expenditures and the at-risk-of-poverty rate, with the Pearson correlation coefficient of  $r = -0.407$ , the coefficient of determination of  $r^2 = 0.170$ . It thus applies that the higher social protection expenditures (% GDP) are, the lower the at-risk-of-poverty rate, and vice versa. The coefficient of determination shows that mutual influence between social protection expenditures and the at-risk-of-poverty rate account for mere 17%, whilst other factors for 83%.

Also, a weak negative correlation was proved between social protection expenditures and income inequality assessed by means of the Gini coefficient (Pearson correlation coefficient  $r = -0.359$  and the coefficient of determination  $r^2 = 0.129$ , i.e. 12.9%). It applies that the higher social protection expenditures (% GDP) are, the lower income inequality expressed by use of the Gini coefficient, and vice versa. The coefficient of determination shows that social protection expenditures and the level of income inequality were mutually influenced in 12.9%, whilst other factors accounted for 87.1% (see Fig. 4).

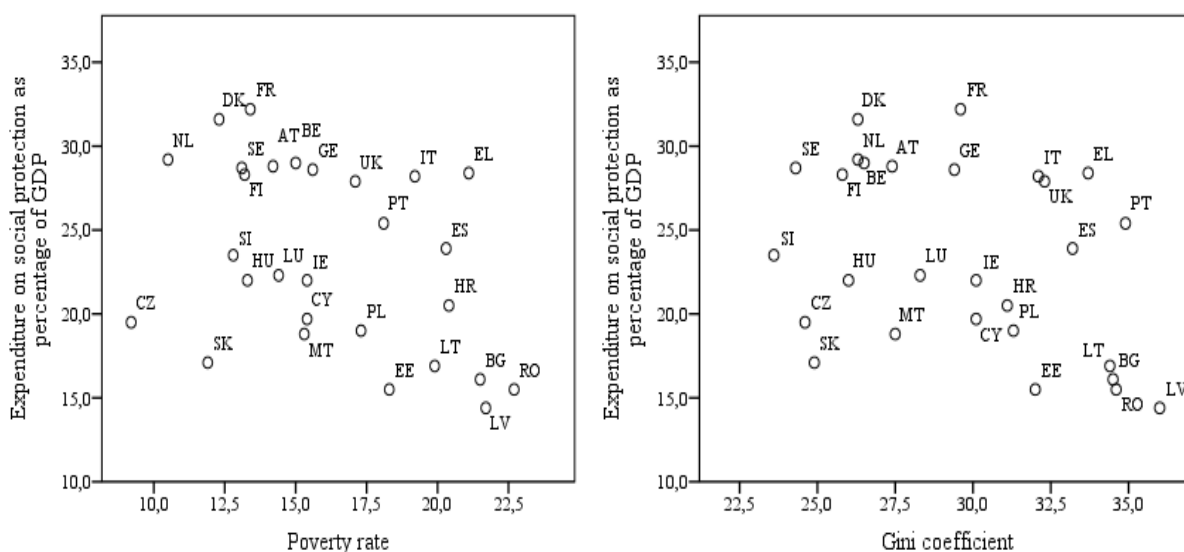


**Fig. 4** Social protection expenditure and poverty rate and income inequality in EU countries, 2007–2013 (Source: authors)

Comprehensive results of the correlation of expenditures on social protection and selected indicators are viewed in Table 2.

**Table 2.** Correlation between expenditures on social protection and selected indicators in EU countries, 2007–2013

|                                                            | Pearson correlation coefficient (r) | Coefficient of determination ( $r^2$ ) |
|------------------------------------------------------------|-------------------------------------|----------------------------------------|
| Expenditures on social protection and GDP per capita       | 0.500                               | 0.250                                  |
| Expenditures on social protection and Poverty rate         | −0.407                              | 0.170                                  |
| Expenditures on social protection and the Gini coefficient | −0.359                              | 0.129                                  |

Source: authors.

At the practical level, redistribution processes and public social expenditures were addressed in works by (Goudswaard and Caminada, 2010; Wang, Caminada and Goudswaard, 2012; Léon, 2012; Kvist, 2013; Wildmannová, 2013), and the issue of social spending in connection with income inequality and poverty was dealt with by (Korpi and Palme, 1998; Pestieau, 2006; Afonso, Schuknecht and Tanzi, 2008; Niehues, 2010; Vandenbroucke and Vleminckx, 2011; Cantillon and Van Mechelen, 2013), while social spending in connection with socioeconomic development by (Mikušová Meričková and Halásková 2014). The issue of income inequality and its impact on economic growth was scrutinised by, among others (Pisu, 2012; Cingano, 2014). Measuring of the economic level of countries from the viewpoint of selected indicators of socio-economic development from a broader perspective is dealt with by Majerová (2012).

## 5 Conclusion

Looking for a compromise between equity and efficiency permeates into economic as well as social policy. The range of redistribution processes is defined by the amount of public expenditures on social protection, with the aim to equalise chances in life and to ensure appropriate welfare. Systems of social protection in EU countries and approaches in tackling social risks differ by the degree of redistributiveness and by its generosity. What is also discussed is the matter of necessity to reduce the extent of social systems in connection with their sustainability.

Along with the extent of redistribution processes defined by the amount of social spending were assessed the impact on socioeconomic development, the level of income inequality and poverty in EU countries in 2007–2013. Denmark, Sweden, Finland (countries with social-democratic model of social protection), and the Netherlands, Belgium and France (corporate model of social protection) have the highest the range of expenditures on social protection in EU for a long time. Conversely, Latvia, Estonia, Romania and Bulgaria are among countries with the lowest expenditures on social protection. The assessment of expenditures on social protection in relation to socioeconomic development, level of income inequality and poverty in EU countries also showed that expenditures on social protection had a positive impact on socioeconomic development assessed by means of the GDP per capita index. By contrast, negative correlation was proved between the extent of social protection expenditures and the level of income inequality, assessed by use of the Gini coefficient and the at-risk-of-poverty rate.

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## PROSPECTS FOR THE PARTICIPATION OF THE CZECH KORUNA IN ERM II

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### **Abstract**

The condition for introduction of the euro, according to the Maastricht convergence criteria, is at least two years participation in the exchange rate mechanism ERM II (exchange rate stability criterion). The participation in ERM II is compatible with certain exchange rate regimes only. The aim of this paper is to find arguments for choosing one of these regimes. The starting point is the current strategy of introduction of the euro in the Czech Republic, expressing concern about the fixing of the exchange rate. Experiences with exchange rate regimes applied with participation in ERM II by the new Member States of the euro area are being evaluated. The fixing of the exchange rate in the regime peg with a band of oscillation of 15% in both directions is the working hypothesis. Criteria of the so-called normal fluctuations margins and so-called severe tension, i.e. developments in foreign exchange reserves and interest rates, are being discussed. The outcome of the research is finding of risks associated with this exchange rate regime.

### **Keywords**

Euro area, Maastricht convergence criteria, ERM II, euro changeover.

### **JEL classification**

F31, F 33, F 36

## **1 Introduction**

The Maastricht convergence criteria also include the exchange rate stability criterion (exchange rate convergence criterion). The basic condition for the fulfilment of this criterion is the participation in ERM II. The participation in ERM II is compatible only with certain exchange rate regimes.

This paper aims to find arguments for the selection of one of these regimes. The starting point is the fact that the participation in ERM II means fixing the exchange rate. However, fixed exchange rate is associated with the risk of speculative attacks on the foreign exchange market. This is also the reason behind the plan to have the Czech koruna involved in ERM II only for a necessary period of time. To achieve this objective, use is made of the analysis of past experience of the new EU Member States that have already joined the euro area, and finding an analogy with a possible strategy on how to involve the Czech koruna in ERM II.

After literature review, the third part of the paper describes the development of the official (government) attitude to the participation in ERM II. The fourth part deals with the possible exchange rate regimes compatible with the participation in ERM II. The fifth part presents arguments for the selection of a specific exchange rate regime for the future participation of the Czech koruna in ERM II, including identification of associated risks.

## **2 Literature review**

Czech Republic's accession to the euro area is studied by a number of authors. The preparation of the introduction of the euro and the impact of this introduction is mainly dealt with by L. Lacina et al., *Studie vlivu zavedení eura (Study of the Impact of the Euro Adoption on the Economy of the Czech Republic, 2008)*. This study follows on from the book by L. Lacina, P. Rozmahel, et al. *Euro: ano/ne (Euro: yes/no?, 2010)*. These publications give an ample attention to the characteristics of ERM II (also challenging its stabilizing role) and hypothetical participation of the Czech koruna in this mechanism. This is mainly associated with the issue of determining the central parity against the euro

and the subsequent irrevocable conversion rate. It does not analyse the issue of choosing the appropriate exchange rate regime.

The book by O. Dědek *Doba eura (The Era of the Euro, 2014)* contains both an analysis of the exchange rate stability criterion and its inconsistency with the desired price stability, and a description of the experience of the new EU Member States with the accession to the euro area, i.e. also with fulfilling the criterion under examination.

A thorough characterization of the ERM II can also be found in M. Helísek et al. *Vstup ČR do eurozóny, ERM II a kurzové konvergenční kritérium (Accession of the Czech Republic to the Euro Area, ERM II and the Exchange Rate Convergence Criterion, 2007)*, including an explanation of the differences between the participation in ERM II and the fulfilment of the exchange rate convergence criterion (discussing, inter alia, the asymmetric fluctuation bands of 2.25% and 15%). The authors also created a simulation of koruna's participation in ERM II. Although they also mention permissible and impermissible exchange rate regimes within the ERM II, they are without any conclusions about the regime suitable for the Czech koruna (despite the fact that the publication was created almost 10 years ago).

The benefits and risks associated with the adoption of the euro are discussed in the book by M. Helísek et al. *Euro v České republice z pohledu ekonomů (The Euro in the Czech Republic from the Perspective of Economists, 2009)*. Except the general evaluation of the Maastricht convergence criteria, i.e. including the exchange rate stability criterion, it pays no special attention to the participation of the Czech koruna in ERM II.

In his book *Jednotná evropská měna. Realizace hospodářské a měnové unie v EU (The Single European Currency. Realization of Economic and Monetary Union in the EU, 2009)*, Z. Sychra marginally mentions the problems of the participation in ERM II before the entry of new EU Member States to the euro zone. He points out to the “potential instability” in the period of participation in ERM II. Similar views can be found in J. Marková in her essay *Strategie vstupu České republiky do kursového mechanismu ERM II (Strategy of the Czech Republic's Entry into ERM II; 2011)*.

The main opponents of introducing the euro in the Czech Republic include P. Mach, who has summed up his arguments in the book *Jak vystoupit z EU (How to Leave the EU, 2. edition 2012)*. A similarly dismissive attitude is presented for example by S. Janáčková, especially in her book *Peripetie české ekonomiky a měny aneb nedejme si vnutit euro (Peripety of the Czech Economy and Currency, or, Let's not Have the Euro Forced on us, 2014)*. Problems that are discussed in this paper, i.e. the participation of the Czech koruna in ERM II, are not dealt with in these publications.

As part of the preparations for the introduction of the euro in the Czech Republic, the official authorities (central bank, ministry of finance and others) have created many technical documents. These are mainly the following:<sup>1</sup>

- *National Euro Changeover Plan for the Czech Republic (2007)*, created by the National Coordination Group of the Ministry of Finance,
- since 2004, *Assessments of the Fulfilment of the Maastricht Convergence Criteria and the Degree of Economic Alignment of the Czech Republic with the Euro Area* have been published annually (Ministry of Finance and the Czech National Bank),
- the evaluation of the real convergence can be found in *Analyses of the Czech Republic's Current Economic Alignment with the Euro Area* (Czech National Bank), which annually follow on from the above mentioned *Assessments*.

These technical documents only mention the obligatory participation of the Czech koruna in ERM II; additionally, the *Assessments* contain an evaluation of the development of CZK/EUR and simulate the participation in ERM II.

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<sup>1</sup> In addition to analytical documents by Czech authorities, the nominal convergence of the Czech economy to the euro area is evaluated in the *European Commission's Convergence Report* and the *ECB's Convergence Report*, published every two years.

### 3 The plans to involve the Czech koruna in ERM II

*Institucionální zajištění zavedení eura v České republice* (Institutional Arrangements for Introduction of the Euro in the Czech Republic; November 2005) has set the “working date” for the introduction of the euro at 1 January 2010. If euro were to be introduced by this date, the Czech koruna would have had to become involved in ERM II by mid-2007. However, on 25. 10. 2006, the Government decided not to seek entry into the ERM II in 2007, which also meant abandoning the original plan to join the euro area in 2010. *The Czech Republic’s Updated Euro Area Accession Strategy* (August 2007) confirmed both the abandoning of the original 2010 deadline, as well as the absence of a specific new date for the scheduled entry into the euro area. According to this strategy (p. 1) “the Czech Republic would stay in ERM II for the minimum possible period.” Since 2006, the *Assessment of the Fulfilment of the Maastricht Convergence Criteria* have every year included the same recommendations to the Government not to set a date for entry to the euro area, which also means not to seek entry into the exchange rate mechanism ERM II.

In general, the preparations for the introduction of the euro have gradually wound down. From April 2011 the so-called “*reduced preparations*” period begins. These preparations consist only e.g. in the monitoring of international experience, informing the public through a website, editing of methodological texts, etc.

The attitude of the Czech Republic towards the participation in ERM II is not unique. Table 1 provides an overview of exchange rate regimes maintained by EU Member States with currency other than the euro. Currently, only the Danish krone participates in ERM II.

**Table 1.** Exchange rate regimes in EU Member States outside the euro area

| Country (currency code) | Exchange rate regime                     | Started in                  |
|-------------------------|------------------------------------------|-----------------------------|
| Sweden (SEK)            | free floating                            | November 1992               |
| Czech Republic (CZK)    | managed floating <sup>1)</sup>           | May 1997                    |
| Poland (PLN)            | free floating                            | April 2000                  |
| Hungary (HUF)           | free floating                            | February 2008 <sup>2)</sup> |
| Romania (RON)           | managed floating <sup>3)</sup>           | February 1992               |
| Bulgaria (BGN)          | currency board against EUR <sup>4)</sup> | July 1997                   |
| Croatia (HRK)           | managed floating                         | October 1993                |
| Denmark (DKK)           | ERM II (peg $\pm$ 2.25%) <sup>5)</sup>   | January 1999                |
| United Kingdom (GBP)    | free floating                            | September 1992              |

Sources: European Commission (2014), Oesterreichische Nationalbank (2007), pp. 22-23, websites of central banks.

Notes:

<sup>1)</sup> On 7 November 2013 the Czech National Bank launched ongoing interventions to prevent appreciation below EUR 1 = CZK 27.

<sup>2)</sup> This regime was preceded (from May 2001) by a floating of  $\pm$  15% with central parity against the euro.

<sup>3)</sup> In July 2005, the Romanian leu (ROL) was replaced by a new leu (RON) in 1:10,000.

<sup>4)</sup> Originally to DEM, then to EUR, EUR 1 = BGN 1.95583.

<sup>5)</sup> The central parity of DKK is EUR 1 = DKK 7.460380

The deadline for the adoption of the euro depends on a decision by political authorities of the EU Member State, naturally only after fulfilling the Maastricht criteria and a positive evaluation by the European Central Bank and the European Commission. In the case of the Czech Republic, these political authorities (new Government since 2014) mention the year 2020. Should these declarations be realised, the Czech koruna should enter into ERM II at the latest by mid-2017.

#### 4 Participation in ERM and ERM II and the exchange rate regime

The euro area countries that adopted the euro on 1. 1. 1999 (i.e. 11 countries<sup>2</sup>) maintained their exchange rate regime within the ERM with a fluctuation band, specifically with a standard band of  $\pm 15\%$  around the central parity mutually against the individual currencies (derived from the ECU parities); in the case of Germany and the Netherlands, it was a narrow band of  $\pm 2.25\%$ . The ERM II mechanism was created in 1999, along with the emergence of the euro. It replaced the European Monetary System, which was established in 1979.

The ECB refers to “a number of the exchange rate strategies” that may be used within ERM II. However, it explicitly states only strategies **incompatible** with ERM II, namely:<sup>3</sup>

- free floating
- managed floating without a mutually agreed central rate,
- crawling peg
- pegs against anchors other than the euro.

Implicitly, only limited options are therefore possible:

- peg against to euro without a fluctuation band,
- peg within ERM II with standard fluctuation band  $\pm 15\%$ ,
- or with a narrow band which must be agreed in advance,
- euro-based currency board.

Table 2 summarizes the exchange rate regimes of currencies in ERM II for countries that have already adopted the euro.

**Table 2.** Exchange rate regimes of currencies in ERM II – countries that have already joined the euro area

| Country<br>(currency code) | Regime<br>before ERM II                          | Regime<br>in<br>ERM II | In ERM II<br>since | In the<br>euro area<br>since |
|----------------------------|--------------------------------------------------|------------------------|--------------------|------------------------------|
| Greece (GRD)               | since March 1998<br>ERM                          | peg<br>$\pm 15\%$      | 1. 1. 1999         | 2001                         |
| Slovenia (SIT)             | since October 1991<br>crawling peg               | peg<br>$\pm 15\%$      | 28. 6. 2004        | 2007                         |
| Cyprus (CYP)               | since January 2001<br>peg $\pm 15\%$             | peg<br>$\pm 15\%$      | 2. 5. 2005         | 2008                         |
| Malta (MTL)                | since August 2002<br>peg to a basket EUR-USD-GBP | peg<br>$\pm 0\%$       | 2. 5. 2005         | 2008                         |
| Slovakia (SKK)             | since October 1998<br>managed floating           | peg<br>$\pm 15\%$      | 28. 11. 2005       | 2009                         |
| Estonia (EEK)              | since June 1992<br>currency board                | currency<br>board      | 28. 6. 2004        | 2011                         |
| Latvia (LVL)               | since February 1994<br>peg $\pm 1\%$             | peg<br>$\pm 1\%$       | 2. 5. 2005         | 2014                         |
| Lithuania (LTL)            | since February 2002<br>currency board            | currency<br>board      | 28. 6. 2004        | 2015                         |

Sources:

European Central Bank, Convergence Report incl. Technical Annex (various years).  
 Oesterreichische Nationalbank (2007), pp. 22-23. European Commission, 2016.

The survey in Tab. 2 will be used to make the following conclusions.

<sup>2</sup> Belgium, Finland, France, Ireland, Italy, Luxembourg, Germany, Netherlands, Portugal, Austria and Spain.

<sup>3</sup> European Central Bank, 2003 (p. 3); however, this opinion practically takes over the Report by the ECOFIN Council (Council of the European Union, 2000, pp. 2-3).

Regarding **the choice of exchange rate regime**, all four regimes were applied (from exchange rate regimes which we considered permissible). The most common regime was peg with a standard fluctuation band of  $\pm 15\%$ .

In terms of **maintaining or changing the exchange rate system**, the countries saw the following developments:

- three countries (Slovenia, Malta and Slovakia) changed the exchange rate regime of their currency upon entering the ERM II,
- the remaining five countries joined ERM II with the previous exchange rate regime (including Greece with its transition from ERM to ERM II). Before joining ERM II, the same exchange rate regime had been maintained for 10 months in Greece, 52 months in Cyprus and the an average of 103 months in the Baltic States.

Regarding **the duration of participation in ERM II**, we distinguish three groups of countries:

- 1) Greece, being an atypical case, unsuccessfully tried to join the euro area in the first wave (from 1999). The Greek drachma had joined the ERM, and therefore it automatically transitioned in 1999 to ERM II, where it remained for 24 months.
- 2) In 2007-2009, two Central European countries (Slovenia and Slovakia) and two Southern European countries (Cyprus and Malta) joined the euro area. These countries preferred the strategy of the shortest possible participation in ERM II, which averaged 33 months.<sup>4</sup>
- 3) The three Baltic States have taken the strategy of the earliest possible entry into the euro area, thus also into the ERM II. The motives were either economic (to prevent high inflation that occurred under their own monetary policy), and partly political (quickly integrate into European institutions). However, after an unsuccessful request by Lithuania, which was rejected in 2006, these countries postponed their entry. As a result, their participation in the ERM II was delayed by more than 8 years (averaging 99 months).

This overview shows that there is not even a hint of a coherent approach to the participation in ERM II. This concerns both the exchange rate regime and any modifications thereof, as well as the duration of the participation in ERM II.

## 5 The duration of the participation and the choice of the exchange rate regime in ERM II for the Czech koruna

Several of the new members of the euro area opted for a strategy of not maintaining the currency in ERM II for longer than absolutely necessary. Also *The Czech Republic's Euro Area Accession Strategy* calls for the **shortest possible duration of the participation in ERM II**. The reason is as follows. “Given that participation in the ERM II [...] does not in itself eliminate the risk of currency turbulence, it is regarded merely as the gateway into the euro area. [...] staying in the ERM II for longer than the minimum required period of two years does not seem desirable” (p. 3). In more detail, this position is elaborated in the study of the Czech National Bank *ERM II and the Exchange-rate Convergence Criterion* (2003): “The ERM II [...] is a fixed exchange rate regime. [...] In a world of massive capital flows [participation in ERM II] may be associated with potential costs as the financial markets “test” the willingness of the authorities to maintain the exchange rate within the fluctuation band” (pp. 5, 6).

The risk of speculative attacks is also pointed out by other authors: “[...] it must be remembered that formal accession to the ERM II, although assumed to result in a higher degree of the exchange rate stability, may cause tensions in the foreign exchange market, being a consequence of speculation and the desire to “test” the authorities by market entities (vide European currency crisis in first half of the nineties).” (Michalczyk, 2011, p. 128)

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<sup>4</sup> This period corresponds to the “technical” parameters of entry into the euro area. Roughly half year before joining, it is necessary to request the EC and the ECB to provide Convergence Reports, which must evaluate the previous two-year period.

Similar concerns about the participation in ERM II can be found e.g. in the articles of several authors in the book by Dyson (ed., 2006):

- “Critics loath the ERM II as a 'soft peg' prone to speculative attacks” (Bönker, p. 163). These attacks are due to destabilized expectations of investors, caused by shifts in monetary policy on the one hand, and fluctuations in currency exchange rates on the other.
- The shortest possible period of participation in ERM II is envisaged not only by the Czech Republic but also by other countries, such as Poland: “The concern in both cases is that financial markets will use participation in the ERM II as an excuse to speculate against their national currencies.” (Jones, p. 99)

In the case of the Czech koruna, maintaining a fixed exchange rate is also threatened by the fact that the central bank must follow its priority objective, i.e. low inflation. This is pointed out by Marková (2011, pp. 29-30):

- Currently, the Czech National Bank implements an inflation targeting strategy. The entry into the ERM II will mean following two objectives – internal and external foreign exchange stability,<sup>5</sup>
- The fixed exchange rate regime (especially in the case of fluctuation band of  $\pm 2.25\%$ ) is more vulnerable to speculative attacks on the currency.

Sychra (2009, p. 260) argues that the risks posed by the participation in ERM II involve crises of the ERM II and a forced withdrawal from this system (he reminds the ERM crisis of the early 1990s and the withdrawal of Great Britain from this mechanism). That would complicate the fulfilment of the exchange rate convergence criterion

Unlike the determination of the duration of the participation in ERM II, *The Czech Republic's Euro Area Accession Strategy* does not include the **choice of exchange rate regime for the participation in ERM II**. When selecting this regime, it is necessary to consider the same concerns that justified the duration of the participation in ERM II. Fixed rate “attracts” speculative attacks. The Czech authorities should therefore choose the “softest” fixed exchange rate option (option allowing the maximum exchange rate fluctuations around the central parity), i.e. **a peg with a standard fluctuation band**.

The Czech koruna is not obliged to apply the “stricter” fixed exchange rate regime, as the Baltic States did. Their choice was motivated by an effort to prevent high inflation that troubled them after gaining political independence.

At first glance, it seems that the peg with a standard fluctuation band allows considerable exchange rate fluctuations and thus easy fulfilment of the exchange rate convergence criterion. However, selecting this exchange rate regime is also associated with the following two risks.

### (1) Normal fluctuations margin

The aforementioned *Policy Position of the Governing Council* (December 2003) mentions the “*standard fluctuation band*” of  $\pm 15\%$ . The interpretation of the exchange rate convergence criterion, however, is not unambiguous. This criterion is formulated as compliance with the “**normal fluctuation margin**” around the central parity against the euro (for at least two years, without any devaluation of the central parity). However, this “normal fluctuation margin” is interpreted by the European Commission asymmetrically – 15% for appreciation and 2.25% for depreciation (for more information see Helísek et al., 2007, pp. 10-12).<sup>6</sup>

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<sup>5</sup> The “systemic inconsistency” of following two monetary policy objectives, i.e. inflation and exchange rate, particularly in countries with a floating rate where the central banks implemented “inflation targeting” (Czech Republic, Hungary, Poland, Romania or Slovakia) is also noted by Dědek, 2014, pp. 147-148. This issue is also thoroughly dealt with by Kučerová in the collective publication by Lacina, Rozmahel et al. (2010, pp. 147-160).

<sup>6</sup> The European Central Bank provides no explicit comments on the range of the fluctuation margin.



It is therefore unclear how the EC would evaluate a currency which would exceed the narrower depreciation band. There has so far been no experience in this respect, because no currency evaluated in ERM II has ever exceeded this band.

Can the Czech koruna be expected to be subject to depreciation pressures? The outlook for the CZK/EUR is shown in Figure 1. Long-term development trend of the CZK/EUR is heading toward appreciation.

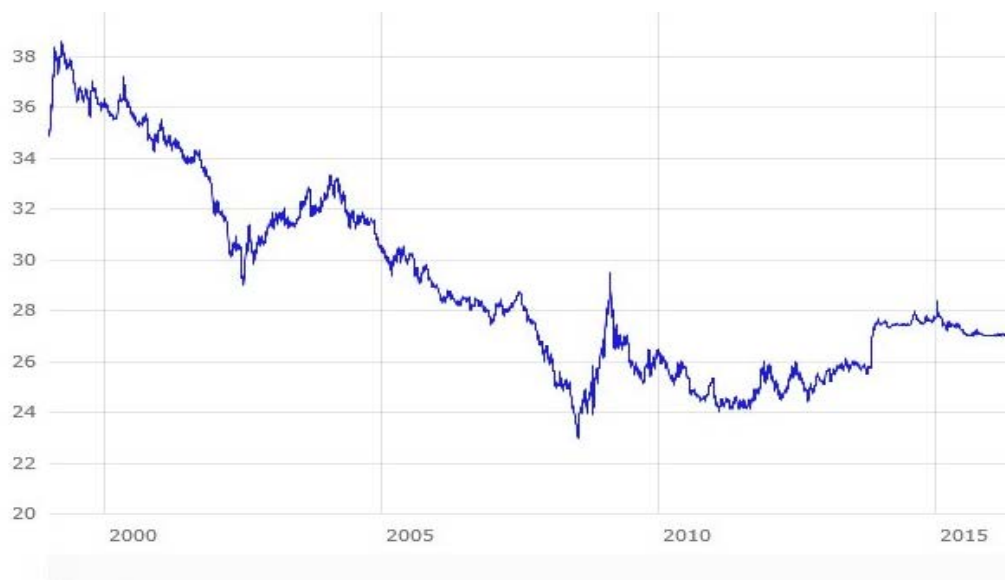


**Fig. 1.** CZK/EUR, daily exchange rates from 4 January 1999 to 21 June 2016 (Source: ECB  
<https://www.ecb.europa.eu/stats/exchange/eurofxref/html/eurofxref-graph-czk.en.html>)

## (2) Severe tension

Another potential risk is the requirement to maintain exchange rate stability “*without severe tension*”. Here, both the European authorities (EC and ECB) agree. This concerns foreign exchange interventions and interest rate differentials against euro area.<sup>7</sup> However it is not specified:

- extent of the interventions and size of the interest rate differentials,
- direction of the “severe tension”, i.e. whether it concerns devaluation or revaluation.

Furthermore, we will carry out the analysis of data (foreign exchange interventions, interest rate differential). However, the fact that the criteria are not clearly defined, does not allow to make clear conclusions about the presence of “severe tension”.

Long-term development of the CZK/EUR has clearly an appreciating trend. Although it was stopped by **foreign exchange interventions** carried out by the CNB since 7 November 2013 to keep the rate above 27 CZK/EUR. After terminating the interventions the appreciation of CZK/EUR is to be expected to continue. If this appreciation exceeds the range of 15% below the central parity, the CNB would again have to intervene to maintain the exchange rate within the ERM II. European authorities could also evaluate further appreciation unfavourably on the grounds that it weakens the competitiveness of Czech exports.

The permissible level of foreign exchange interventions (i.e. criterion to determine whether there has been a “severe tension”) **is not specified in any way**. Let's try to quantify the current (aforementioned) interventions:

- in the period November 2013 – April 2016, the interventions amounted to CZK 790 billion (expressed as the increase in foreign exchange reserves of the CNB), i.e. roughly EUR 1 billion per month,

<sup>7</sup> European Central Bank, 2003, p. 6

- by the end of 2015 the foreign exchange reserves of the CNB stood at CZK 1,600.9 billion,
- in relation to the average monthly volume of imports (goods + services) in 2015, these reserves are equivalent to almost 6 months' value, i.e. almost twice the value usually considered sufficient (three-month import volume).

The considerable extent of foreign exchange interventions (in the case of hypothetical participation of the Czech koruna in ERM II) could be evaluated as the presence of “severe tensions”. **The exchange rate convergence criterion would then not be fulfilled even if the exchange rate does not exceed the fluctuation band.**

The solution may involve revaluation of the central parity. It is a permissible change. Of the new members of the euro area, the following countries did it during their participation in ERM II:

- Greece in January 2000
- Slovakia, even twice (in March 2007 and May 2008).

The increase in the foreign exchange reserves of the Czech National Bank since the launch of interventions in November 2013 is clearly visible in Fig. 2.

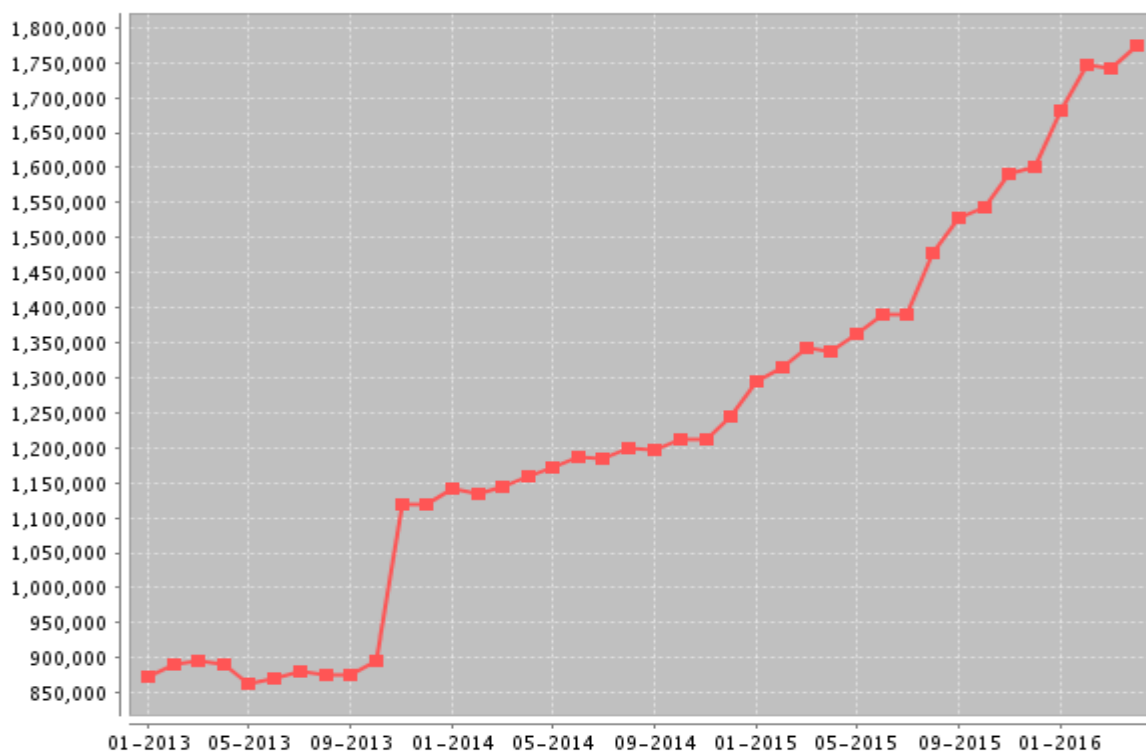


**Fig. 2** Development of the Czech National Bank's foreign exchange reserves, January 2013 - April 2016, at the end of the month, CZK million (Source: ČNB)

[http://www.cnb.cz/cnb/STAT.ARADY\\_PKG.VYSTUP?p\\_sestuid=29428&p\\_uka=2&p\\_strid=ADC&p\\_sort=2&p\\_od=201301&p\\_do=201604&p\\_period=1&p\\_des=50&p\\_format=6&p\\_decsep=,&p\\_lang=CS](http://www.cnb.cz/cnb/STAT.ARADY_PKG.VYSTUP?p_sestuid=29428&p_uka=2&p_strid=ADC&p_sort=2&p_od=201301&p_do=201604&p_period=1&p_des=50&p_format=6&p_decsep=,&p_lang=CS)

To quantify **the interest rate differential** (Table 3) we use the difference 3M PRIBOR and 3M EURIBOR. The observation period is the same as in the case of foreign exchange interventions, i.e. November 2013 - April 2016.

**Table 3.** Interest rate differential: 3M PRIBOR – 3M EURIBOR (averages, % and p.p.)

| Period      | 3M PRIBOR | 3M EURIBOR | Differential |
|-------------|-----------|------------|--------------|
| XI-XII 2013 | 0.39      | 0.25       | 0.14         |
| I-III 2014  | 0.37      | 0.30       | 0.07         |
| IV-VI 2014  | 0.36      | 0.30       | 0.06         |
| VII-IX 2014 | 0.35      | 0.17       | 0.18         |
| X-XII 2014  | 0.35      | 0.08       | 0.26         |
| I-III 2015  | 0.34      | 0.04       | 0.29         |
| IV-VI 2015  | 0.31      | -0.03      | 0.34         |
| VII-IX 2015 | 0.31      | -0.03      | 0.34         |
| X-XII 2015  | 0.29      | -0.09      | 0.38         |
| I-IV 2016   | 0.29      | -0.20      | 0.49         |

Sources:

[http://www.cnb.cz/cnb/STAT.ARADY\\_PKG.VYSTUP?p\\_period=1&p\\_sort=1&p\\_des=50&p\\_sestuid=22643&p\\_uka=3&p\\_strid=AAAF&p\\_od=201311&p\\_do=201604&p\\_lang=CS&p\\_format=3&p\\_decsep=%2](http://www.cnb.cz/cnb/STAT.ARADY_PKG.VYSTUP?p_period=1&p_sort=1&p_des=50&p_sestuid=22643&p_uka=3&p_strid=AAAF&p_od=201311&p_do=201604&p_lang=CS&p_format=3&p_decsep=%2)

<http://www.global-rates.com/interest-rates/euribor/2013.aspx>

Own calculations.

Even at large foreign exchange interventions the interest rate differential was not significant. Therefore, the development of interest rate differential does not indicate (in the case of a hypothetical participation of the Czech koruna in ERM II) “severe tension”.

## 6 Conclusion

The condition for introduction of the euro is at least a two-year participation in the exchange rate mechanism ERM II. Participation in ERM II means to apply some of the fixed exchange rate regimes. The fixed exchange rate is associated with the risk of a currency crisis. This risk affects the strategy of participating in ERM II in two directions:

- remain in ERM II only for the strictly necessary period (it is expressed in *The Czech Republic's Euro Area Accession Strategy*),
- choose the exchange rate regime for the participation in ERM II (this is in *The Strategy* not discussed). The risk of currency crisis is the lowest under peg with standard fluctuation band (other possibilities are peg against the euro without a fluctuation band, peg with a narrow band which must be agreed in advance, euro-based currency board). However, even if this exchange rate regime is chosen, two other risks need to be taken into account.

(1) Unlike in the case of **mere participation** in ERM II (fluctuation band of  $\pm 15\%$ ), according to the European Commission **the exchange rate convergence criterion** is asymmetric (2.25% for depreciation band, 15% for appreciation band). However, the current developments of exchange rate CZK/EUR show that the Czech koruna can be expected not to be subject to depreciative pressures.

(2) It is expected that a long-term appreciation trend of the CZK/EUR will continue even after the end of foreign exchange interventions launched in November 2013. If the exchange rate exceeds the limit of 15% below the central parity, the central bank must take measures to keep the exchange rate within a fluctuation band. These are mainly following two measures. Their use is, however, necessary to consider whether it would not be a manifestation of the so-called “severe tension” (the absence of “severe tension” is a prerequisite for meeting the criterion of a stable exchange rate).

Firstly: the central bank will intervene in the foreign exchange market. Permissible level for such intervention is not quantified. Existing interventions (from November 2013), however, are very high.

These interventions, during participation in ERM II, could be therefore evaluated as “severe tension”. In this case, however, it is permissible to revalue the central parity.

Secondly: there is a significant change in the interest rate differential (the difference between Czech interest rates and interest rates in the euro area). However, its recent development (in the same period, as foreign exchange interventions) does not indicate “severe tension”.

Overall, the risks connected with exchange rate regime peg with standard fluctuation band (during the Czech koruna's participation in ERM II) do not jeopardize the fulfillment of the exchange rate convergence criterion.

## 7 Acknowledgement

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## WHAT AFFECT THE EARNINGS OF THE HOTEL INDUSTRIES IN VISEGRAD GROUP?

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### Abstract

In crisis times within the European Union it is more important to focus the research on another economic integrated units i.e. Visegrad Group. The hotel industry is well known for its importance within each economy. However, the question, what has affected the earnings of the hotel industries in Visegrad Group still remains. Main contribution of current paper is in the comparison of the investigation between the situation in the Czech Republic, Hungary, Poland and Slovakia, as well. The aim of the paper is to estimate whether or not are earnings affected more by relationship with debtors or by relationship with creditors within the hotel industries in selected Visegrad countries. We have used Generalized Method of Moments (GMM) regression method with pooled data of those countries. It is obtained a large data set from AMADEUS statistical database. Even the situation would differentiate due to some economic events as the global financial crisis, we have concluded that the turnover of claims of debtors is crucial in term of the hotels' earnings within the Czech Republic and Slovakia, whereas in Poland it is the liquidity, what is a key factor to maximize earnings of the hotel industry.

### Keywords

Hotel industry, Visegrad group, GMM panel regression, debtors' receivables, creditors' claims.

### JEL classification

D22, D24, D31, D57, D92

## 1 Introduction

In according with the annual report of Creditreform agency, however, the problem of insolvency is the biggest in both Commerce and Services from the key economic sectors across the Europe. These two sectors includes hotels and catering (only when sectoral information was lacking, the relevant figures have been included under the Services).

The aim of the paper is to estimate whether or not are earnings affected more by relationship with debtors or by relationship with creditors within the hotel industries in selected Visegrad countries. Current study also fills the gap within the research of hotel industry among Central Eastern European (CEE) countries. The article contributes to the literature by providing a comparison between hotel industries of V4 (the Czech Republic, Hungary, Poland and Slovakia) from the financial point of view.

The study is structured as follows. Next Section 2 reviews a few literature sources connected with the financial problematic of the hotel industry. Section 3 describes the data as well as used methodology of the GMM modelling. In Section 4 there are highlighted some important findings within the discussion on empirical results. Finally, Section 5 concludes the paper.

## 2 Literature review

According to the results from analysis in Lee (2008), internationalization does not seem to have a significant impact on firm value for U.S. multinational hotel companies when examined alone. However, another important finding of his study is that expanding into Asian countries benefits U.S. multinational hotels while expanding into European countries does not benefit or negatively impacts firm value of U.S. hotels. Strategically, U.S. multinational hotel companies may want to seek more opportunities to expand their foreign operations into Asian countries, or to even less developed

countries, to enhance their firm value, but may want to remain cautious when considering expansion into European countries.

Johnson and Iunius (1999) argued that there was a criticism at a general level that governments do not support tourism policies by providing adequate resources, and levels of infrastructure fall short of international standards, there is undisputable potential in the region and most governments are offering positive incentives for tourism among Visegrad countries. But the situation has changed into the better after the joining to the EU in 2004.

Ineson et al. (2013) conclude in their study, the importance of the Hungarian hotel industry retaining its ethos/culture that focuses strongly on intangible rewards and benefits if it is to continue to promote employee loyalty. They also argue that generally employee retention appears to be costly but this cost needs to be weighed up against the recruitment and training costs of replacement employees. Suitable employees should be encouraged to develop themselves through part-time study for professional or educational qualifications due to them as well.

Several hypotheses related to the impact of privatization, market competition, management tenure and international attractiveness on the cost efficiency of tourist hotels, has been tested in Assaf and Cvelbar (2011). They measure efficiency using the innovative Bayesian frontier methodology. The data involve a sample of Slovenian hotels which operate in a highly dynamic environment. From their results, it is clear that hotel efficiency is positively related to privatization and international attractiveness, and negatively related to longer management tenure. No significant link, on the other hand, is found between market competition and hotel efficiency.

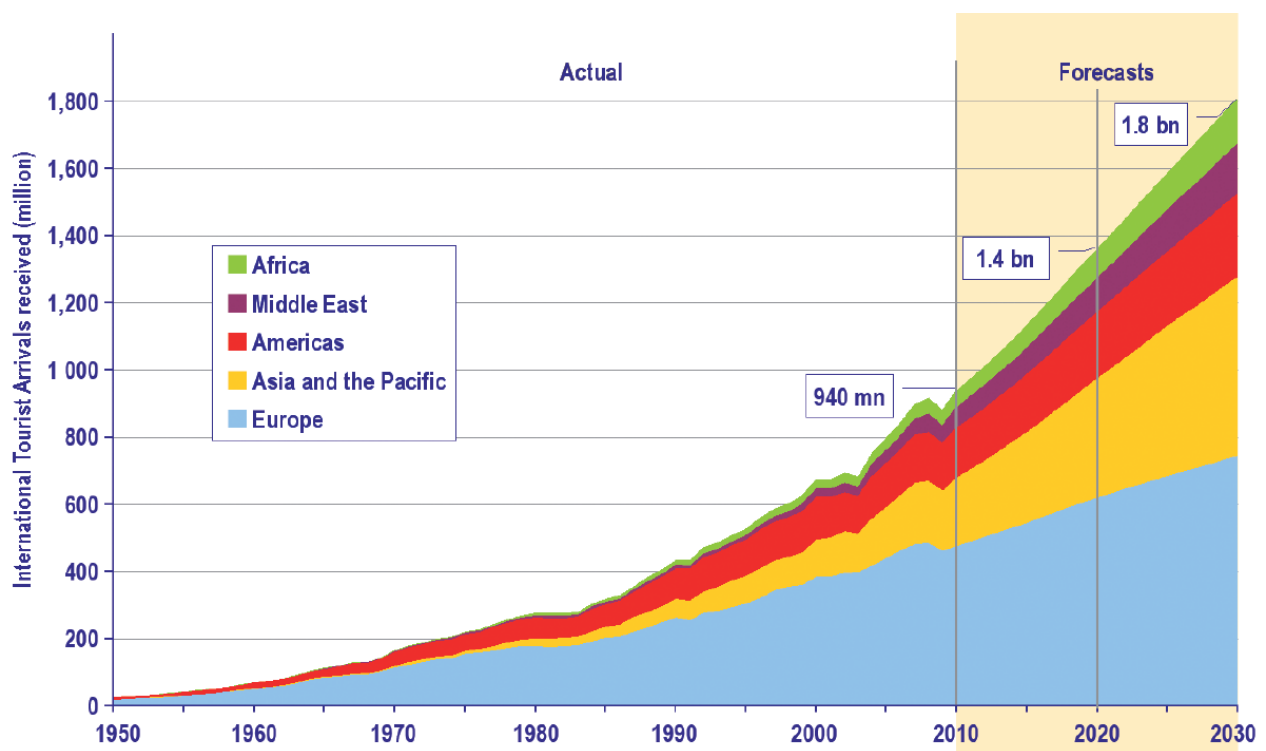


**Fig. 1.** Tourism towards 2030 forecasting  
 Source: UNWTO Tourism Highlights (2015)

In the figure we see Long-term forecasts of UNWTO (2015). According to Tourism Towards 2030, the number of international tourist arrivals worldwide is expected to increase by an average of 3.3% a year over the period 2010 to 2030. Over time, the rate of growth will gradually slow, from 3.8% at the beginning of the period to 2.9% in 2030, but this is on top of growing base numbers. In absolute numbers, international tourist arrivals will increase by some 43 million a year, compared with an average increase of 28 million a year during the period 1995 to 2010. At the projected rate of growth, international tourist arrivals worldwide are expected to reach 1.4 billion by 2020 and 1.8 billion by

the year 2030 (UNWTO, 2015). As their result, Europe (to 41%, from 51%) will experience a further decline in their share of international tourism, mostly because of the slower growth of the comparatively mature destinations in Northern Europe and Western Europe.

**Table 1.** Regional results

|    | International Tourist Arrivals (in thousand) |        |        |        | International Tourism Receipts (in US\$ mil.) |        |        |        |
|----|----------------------------------------------|--------|--------|--------|-----------------------------------------------|--------|--------|--------|
|    | 2010                                         | 2012   | 2013   | 2014   | 2010                                          | 2012   | 2013   | 2014   |
| CZ | 8 629                                        | 10 123 | 10 300 | 10 617 | 7 172                                         | 7 035  | 6 993  | 6 691  |
| HU | 9 510                                        | 10 353 | 10 675 | 12 139 | 5 628                                         | 5 061  | 5 366  | 5 884  |
| PL | 12 470                                       | 14 840 | 15 800 | 16 000 | 9 526                                         | 10 938 | 11 297 | 10 925 |
| SK | 5 415                                        | 6 235  | NA     | NA     | 2 233                                         | 2 299  | 2 556  | 2 578  |

Source: Authors' illustration from UNWTO Tourism Highlights (2015)

Even if Central and Eastern Europe (-5%) was the only sub-region in Europe and the world to suffer a decline in arrivals in 2014, following three consecutive years of strong growth. This was mostly the result of weaker Russian outbound demand as well as a sharp drop in arrivals to Ukraine (-48%) due to the ongoing conflict. On the other hand, Latvia (+20%), Hungary (+14%), Romania (+12%) and Armenia (+11%) posted healthy growth. The sub-region's largest destination, the Russian Federation, reported a 5% increase in arrivals (UNWTO, 2015). Due to the both, the forecast as well as current situation, it is interesting to investigate the problematic of V4 hotel industries.

UNWTO (2016) then argue, even though it is common practice to use volume data such as arrivals for short-term analysis, in the end most stakeholders are more interested in the receipts and expenditure trend. Estimating trends in receipts is a far more complicated exercise than in arrivals for following reasons due to them: (i) On average receipts data lags about two months behind arrival data. Most countries report data on a quarterly basis and typically preliminary data is made available 2-3 months after the end of the period which is being reported. (ii) Trends in receipts data can be heavily distorted by exchange rate fluctuations. (iii) Inflation should be taken into account in order to avoid overestimating growth. (iv) In practice the preliminary data tend to be subject to substantial revisions. (UNWTO, 2016)

Therefore we are using receivables of debtors for hotel industries among selected Visegrad countries, which means the receipts of hotels' clients. Within the expenditure trend we are focusing on the earnings before interests and taxes.

### 3 Data and methodology

The paper has obtained annual data from Amadeus statistical financial database of hotels from Visegrad countries (the Czech Republic, Hungary, Poland and Slovakia) Time series are from 2005 till 2014. In particular it has been used selected variables from hotels' financial statements as their Earnings Before Interest and Taxes (EBIT), Turnover, Debtors and Creditors and Other current assets which includes the cash and cash equivalents (excluded the stock), and current liabilities, all in EUR. Numbers of hotels for each country included in the database are in the parentheses: the Czech Republic (1 484), Hungary(1 881), Poland(4 194), and Slovakia(786). However, in according to the missing data we have been able to use only 905 Czech, 146 Hungarian, 821 Polish and 463 Slovak hotels within cross-sections of our panel estimations.

As the first it has been examined three variables for each country, current liquidity  $L2_{it}$ , turnover of debtors' current receivables  $TRD_{it}$  and turnover of creditors' claims  $TLC_{it}$ , in according to equations (1), (2) and (3):

$$L2_{it} = \frac{\text{current assets}_{it}}{\text{current liabilities}_{it}}, \quad (1)$$



$$TRD_{it} = 365 / \left( \frac{Turnover_{it}}{Debtors_{it}} \right), \quad (2)$$

$$TLC_{it} = 365 / \left( \frac{Turnover_{it}}{Creditors_{it}} \right), \quad (3)$$

where  $L2_{it}$  means current liquidity of hotel  $i$  at time  $t$  in each country,  $current\ assets_{it}$  have excluded the stocks,  $TRD_{it}$  means turnover (in days) of current receivables of debtors (simply  $Debtors_{it}$ ),  $TLC_{it}$  is turnover (in days) of current liabilities of creditors (simply  $Creditors_{it}$ ), finally  $Turnover_{it}$  means total revenues taken from the profit and loss statement of the hotel.

As the main estimation method it is used Generalized Method of Moments (GMM) with orthogonal deviations (not in differences) as in Růčková (2015). Two step GMM model with orthogonal deviations is described through the next equation (4):

$$EBIT_{it} = \beta_1 EBIT_{i(t-1)} + \alpha_{it} + \beta_2 X_{it} + \beta_3 X_{i(t-1)} + \varepsilon_{it}, \quad (4)$$

where endogenous dependent variable  $EBIT_{it}$  means earnings before interest and taxes of hotel  $i$  at time  $t$  within each country, exogenous regressors are lagged  $EBIT_{i(t-1)}$  according to the GMM estimation method, and  $X_{it}$  means  $L2_{it}, TRD_{it}, TLC_{it}$ , as well as its lagged values  $X_{i(t-1)}$ , separately. Symbols  $\alpha_{it}$  and  $\varepsilon_{it}$  are a constant and residuals of the estimation.

**Table 2.** Descriptive statistics

|                | Mean   | Median | Std. Dev. | Obs.   |
|----------------|--------|--------|-----------|--------|
| CZ $EBIT_{it}$ | 25     | 0      | 646       | 7 306  |
| $TRD_{it}$     | 193    | 3      | 10 744    | 6 708  |
| $TLC_{it}$     | 247    | 4      | 60 319    | 6 708  |
| HU $EBIT_{it}$ | 25     | 0      | 435       | 11 456 |
| $TRD_{it}$     | -4 955 | 14     | 211 047   | 1 136  |
| $TLC_{it}$     | 554    | 0      | 39 542    | 9 986  |
| PL $EBIT_{it}$ | 183    | 7      | 1 451     | 6 447  |
| $TRD_{it}$     | 2 058  | 28     | 33 370    | 6 045  |
| $TLC_{it}$     | 1 514  | 23     | 27 177    | 5 976  |
| SK $EBIT_{it}$ | -50    | 0      | 815       | 3 994  |
| $TRD_{it}$     | 316    | 19     | 14 507    | 3 424  |
| $TLC_{it}$     | 3 508  | 35     | 91 933    | 3 424  |

Source: Authors' calculations in EViews 9.5.

#### 4 Discussion on empirical results

We would like to have investigated what affected the earnings of the hotel industries in selected Visegrad Group. Companies' solvency is very important within the earnings of money in all industries. Therefore we have obtained stationary variables (see the Appendix) as hotels' liquidity  $L2_{it}$  and turnover of debtors' receivables  $TRD_{it}$  as well as turnover of creditors' claims  $TLC_{it}$ . The first fact obvious from Table 3 is that all significant coefficients  $\beta$  are very close to zero. However, it is correct because  $EBIT_{it}$  is in thousands of EUR, whereas our turnovers  $TRD_{it}$  and  $TLC_{it}$  are in days and current liquidity is close to 1.5 (please see Table 2 with descriptive statistics).

According to the estimation GMM method with orthogonal deviations (not with differences) it does not matter problem of multicollinearity. Moreover, Akinci et al. (2013) argue that applying a pseudo general-to-specific model reduction method in the application of the GMM estimator avoids multicollinearity problems. The pseudo general model includes the current and first lagged value of

variables  $X_{it}$  as well as  $X_{i(t-1)}$  such as within our estimation. Whether our endogenous  $EBIT_{it}$  is in thousands of EUR, the exogenous ( $L2_{it}$ ,  $TRD_{it}$ ,  $TLC_{it}$ ) are used separately. Because of that we avoid to use data mining. We are using the same kind of variables among all regressors to make it comparable (not only those significant). Recent studies have proved that it is still impossible to check the heteroscedasticity among residuals. On the other hand, Heryán and Tzeremes (2016) are using Sargan-Hansen tests that has to be examined over 0.05 to prove the robustness of GMM estimations. We cannot apply also Arrelano-Bond Serial Correlation tests according to them, because of the fact that we do not use the differences.

In according to our results we argue that our endogenous  $EBIT_{it}$  is affected more by relationship with debtors  $TRD_{it}$  in Czech Republic and Slovakia, whereas in Poland it is the liquidity  $L2_{it}$  what is a key factor for earnings of the hotel industry. According to Sargan-Hansen tests it is not able to argue anything in the case of the Hungarian hotel industry.

**Table 3.** Estimations with hotels' EBIT as our dependent endogenous

| Czech Republic     |                   |                          |                         | Hungary            |                    |                    | Poland                  |                          |                          | Slovakia           |                          |                          |
|--------------------|-------------------|--------------------------|-------------------------|--------------------|--------------------|--------------------|-------------------------|--------------------------|--------------------------|--------------------|--------------------------|--------------------------|
|                    | $L2_{it}$         | $TRD_{it}$               | $TLC_{it}$              | $L2_{it}$          | $TRD_{it}$         | $TLC_{it}$         | $L2_{it}$               | $TRD_{it}$               | $TLC_{it}$               | $L2_{it}$          | $TRD_{it}$               | $TLC_{it}$               |
| $\beta_1$          | .567 <sup>a</sup> | .565 <sup>a</sup>        | .571 <sup>a</sup>       | -.441 <sup>a</sup> | -.445 <sup>a</sup> | -.161 <sup>a</sup> | .283 <sup>a</sup>       | .280 <sup>a</sup>        | .280 <sup>a</sup>        | .310 <sup>a</sup>  | .306 <sup>a</sup>        | .306 <sup>a</sup>        |
| $\beta_2$          | .033              | .000                     | .000 <sup>c</sup>       | -.679              | -.000 <sup>a</sup> | -.001 <sup>a</sup> | -.020 <sup>a</sup>      | .000                     | -.000                    | -.031              | .000                     | -.000 <sup>a</sup>       |
| $\beta_3$          | <b>.063</b>       | <b>-.005<sup>a</sup></b> | <b>.000<sup>b</sup></b> | -.010              | .003 <sup>a</sup>  | .000 <sup>a</sup>  | <b>.076<sup>a</sup></b> | <b>-.001<sup>b</sup></b> | <b>-.003<sup>b</sup></b> | <b>.007</b>        | <b>-.003<sup>a</sup></b> | <b>-.000<sup>a</sup></b> |
| Sargan-Hansen test |                   |                          |                         | Sargan-Hansen test |                    |                    | Sargan-Hansen test      |                          |                          | Sargan-Hansen test |                          |                          |
|                    | .193              | .168                     | .141                    | .000               | .000               | .000               | .060                    | .086                     | .087                     | .120               | .124                     | .145                     |

Note: Symbol <sup>a</sup>, <sup>b</sup> and <sup>c</sup> means statistical significance at 1%, 5% and 10% level.

Source: Authors' calculations in EViews 9.5.

There is no doubt that the minimizing of turnover of debtors' receivables in previous year is profitable for the hotels in the V4. Negative sign of  $\beta_3 TRD_{i(t-1)}$  has been estimated in all estimations within the Czech Republic, Poland and Slovakia in Table 3. It is also logical because when we get our money earlier we can turn them again and make another earnings from those businesses. Whether or not there is a relation between lagged  $TRD_{i(t-1)}$  and its impact on  $\beta_2 TLC_{it}$  as well as whole problem of solvency, on the both we will focusing our future research.

Some entrepreneurs would have thought that the maximizing of turnover of creditors' claims is profitable for their business. However, in the case of the hotel industry we see that  $\beta_3 TLC_{it}$  is significant when it is negative in Poland and Slovakia. The only one positive zero has been estimated within the Czech hotel industry. So, we also conclude that the minimizing of period to pay hotels' claims is better due to their earnings. Ability to pay hotel's debts is called the solvency. Therefore solvent hotels are more profitable.

Significance of current liquidity has been proved only in the Polish hotel industry. However, positive sign of  $\beta_3 L2_{it}$  means that it is really better hold more receivables of debtors due to their good quality. Our argument is also supported by the length of the creditors' loan. In Table 2 we have seen that average in mean of  $TLC_{it}$  is much longer period than turnover of  $TRD_{it}$ .

## 5 Concluding remarks

The aim of the paper was to estimate whether or not are earnings affected more by relationship with debtors or by relationship with creditors within the hotel industries in selected Visegrad countries. Interesting finding was that receivables of debtors and the average period in which they had been paid, the both was more important according to hotels' earnings than claims of creditors and their turnover. We can conclude that for hotels' profitability among the Visegrad Group is important to minimize the length of period when their current assets are paid. It is obvious that this finding means

the suggestion only for the hotels, which are in good financial position, not for these in loss. On the other hand, only in the case of the Polish hotel industry the liquidity of the hotels was crucial in term of their earnings.

In the future research we will definitely pay our attention to the problematic of the hotels' solvency. Our results also indicate that many of those hotels from V4 group could have affected by insolvency which is serious problem nowadays.

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**Table 4.** Panel unit root test for Stationarity: Summary (at levels)

| C Z E C H I A                                          |             |       |       |           |       |       |            |       |       |            |       |       |  |
|--------------------------------------------------------|-------------|-------|-------|-----------|-------|-------|------------|-------|-------|------------|-------|-------|--|
| Method                                                 | $EBIT_{it}$ | Cross | Obs   | $L2_{it}$ | Cross | Obs   | $TRD_{it}$ | Cross | Obs   | $TLC_{it}$ | Cross | Obs   |  |
| Null: Unit root (assumes common unit root process)     |             |       |       |           |       |       |            |       |       |            |       |       |  |
| Levin, Lin & Chu t*                                    | 0.0000      | 896   | 5 575 | 0.0000    | 753   | 4 713 | 0.0000     | 505   | 3 180 | 0.0000     | 510   | 3 209 |  |
| Null: Unit root (assumes individual unit root process) |             |       |       |           |       |       |            |       |       |            |       |       |  |
| Im, Pesaran and Shin W-stat                            | 0.0000      | 806   | 5 305 | 0.0000    | 676   | 4 482 | 0.0000     | 452   | 3 021 | 0.0000     | 454   | 3 041 |  |
| ADF - Fisher Chi-square                                | 0.0000      | 896   | 5 575 | 0.0000    | 752   | 4 710 | 0.0000     | 505   | 3 180 | 0.0000     | 510   | 3 209 |  |
| PP - Fisher Chi-square                                 | 0.0000      | 896   | 5 685 | 0.0000    | 752   | 4 803 | 0.0000     | 505   | 3 246 | 0.0000     | 509   | 3 278 |  |
| H U N G A R Y                                          |             |       |       |           |       |       |            |       |       |            |       |       |  |
| Method                                                 | $EBIT_{it}$ | Cross | Obs   | $L2_{it}$ | Cross | Obs   | $TRD_{it}$ | Cross | Obs   | $TLC_{it}$ | Cross | Obs   |  |
| Null: Unit root (assumes common unit root process)     |             |       |       |           |       |       |            |       |       |            |       |       |  |
| Levin, Lin & Chu t*                                    | 0.0000      | 1 429 | 7 988 | 0.0000    | 112   | 667   | 0.0000     | 117   | 710   | 0.0000     | 148   | 1 015 |  |
| Null: Unit root (assumes individual unit root process) |             |       |       |           |       |       |            |       |       |            |       |       |  |
| Im, Pesaran and Shin W-stat                            | 0.0000      | 1 177 | 7 232 | 0.0000    | 91    | 604   | 0.0000     | 100   | 659   | 0.0000     | 140   | 991   |  |
| ADF - Fisher Chi-square                                | 0.0000      | 1 429 | 7 988 | 0.0000    | 110   | 661   | 0.0000     | 117   | 710   | 0.0000     | 148   | 1 015 |  |
| PP - Fisher Chi-square                                 | 0.0000      | 1 429 | 8 134 | 0.0000    | 110   | 674   | 0.0000     | 117   | 725   | 0.0000     | 146   | 1 028 |  |

Note: Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Source: Authors' calculation in EViews 9.5.

## Appendix:

## POLAND

| Method                                                 | $EBIT_{it}$ | Cross | Obs   | $L2_{it}$ | Cross | Obs   | $TRD_{it}$ | Cross | Obs   | $TLC_{it}$ | Cross | Obs   |
|--------------------------------------------------------|-------------|-------|-------|-----------|-------|-------|------------|-------|-------|------------|-------|-------|
| Null: Unit root (assumes common unit root process)     |             |       |       |           |       |       |            |       |       |            |       |       |
| Levin, Lin & Chu $t^*$                                 | 0.0000      | 772   | 4 234 | 0.0000    | 759   | 4 155 | 0.0000     | 719   | 3 981 | 0.0000     | 687   | 3 862 |
| Null: Unit root (assumes individual unit root process) |             |       |       |           |       |       |            |       |       |            |       |       |
| Im, Pesaran and Shin W-stat                            | 0.0000      | 623   | 3 787 | 0.0000    | 613   | 3 717 | 0.0000     | 587   | 3 585 | 0.0000     | 570   | 3 511 |
| ADF - Fisher Chi-square                                | 0.0000      | 772   | 4 234 | 0.0000    | 759   | 4 155 | 0.0000     | 719   | 3 981 | 0.0000     | 687   | 3 862 |
| PP - Fisher Chi-square                                 | 0.0000      | 772   | 4 304 | 0.0000    | 759   | 4 247 | 0.0000     | 719   | 4 066 | 0.0000     | 687   | 3 933 |

## SLOVAKIA

| Method                                                 | $EBIT_{it}$ | Cross | Obs   | $L2_{it}$ | Cross | Obs   | $TRD_{it}$ | Cross | Obs   | $TLC_{it}$ | Cross | Obs   |
|--------------------------------------------------------|-------------|-------|-------|-----------|-------|-------|------------|-------|-------|------------|-------|-------|
| Null: Unit root (assumes common unit root process)     |             |       |       |           |       |       |            |       |       |            |       |       |
| Levin, Lin & Chu $t^*$                                 | 0.0000      | 477   | 2 962 | 0.0000    | 456   | 2 835 | 0.0000     | 403   | 2 480 | 0.0000     | 412   | 2 525 |
| Null: Unit root (assumes individual unit root process) |             |       |       |           |       |       |            |       |       |            |       |       |
| Im, Pesaran and Shin W-stat                            | 0.0000      | 436   | 2 839 | 0.0000    | 415   | 2 709 | 0.0000     | 366   | 2 369 | 0.0000     | 372   | 2 405 |
| ADF - Fisher Chi-square                                | 0.0000      | 477   | 2 962 | 0.0000    | 453   | 2 823 | 0.0000     | 403   | 2 480 | 0.0000     | 412   | 2 525 |
| PP - Fisher Chi-square                                 | 0.0000      | 477   | 3 005 | 0.0000    | 453   | 2 870 | 0.0000     | 403   | 2 521 | 0.0000     | 412   | 2 562 |

Note: Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.  
 Source: Authors' calculation in EVIEWS 9.5.

## GREEK ECONOMIC CRISIS – IS THE EXCHANGE RATE DEVALUATION THE LAST WAY OUT OF IT?

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### Abstract

Greek economic misery lasts almost one decade. During this period the economy shrunk to nearly half their size. In 2015, the intensive tensions between new Syriza-led government in Greece and European authorities led to liquidity crisis and introduction of capital controls. As a result, the speculations over Greek's exit from Eurozone and the return of own national currency intensified. In the theory, the devaluation might support aggregated demand through a reduction of foreign trade deficit if the Marshall-Lerner condition holds. With respect to huge imbalances in the Greece economy, the potential devaluation of (re)new(ed) national currency would have to be enormous to restore the economic balance. Unfortunately, the empirical evidence shows less convincing results, especially in the case of developing countries that were hit by crisis. Since the troubles of Greek economy have not been solved yet, the potential external devaluation of (re)new(ed) national currency is still considered to be a theoretical alternative to the internal devaluation applied through fiscal austerity. This paper has an ambition to test the relationship between exchange rate devaluation and economic growth of Greece.

### Keywords

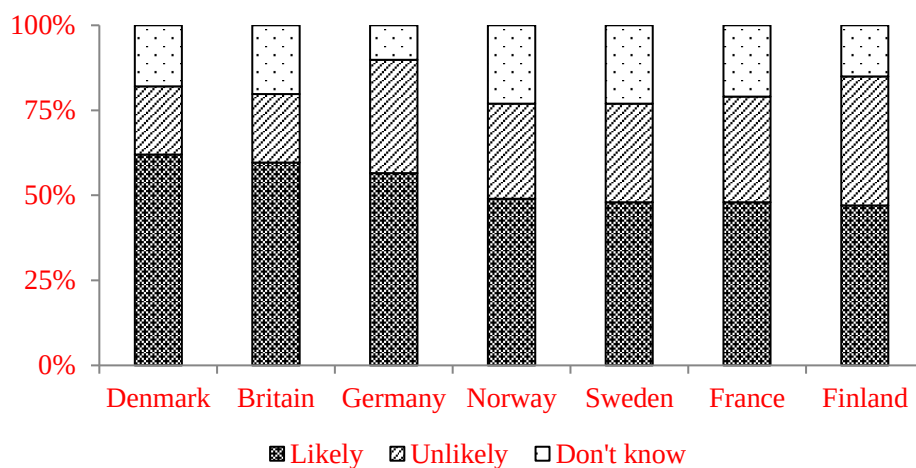
parallel currency, exchange rate devaluation, internal devaluation, Greece.

### JEL classification

E120, F310, F340, F410, G010

## 1 Introduction

In August 2015 after many months of intensive negotiations and increasing nervousness of the financial markets Greece signed the EUR 86bn financial support under the third bailout programme from the creditors for three years. Before this long-awaited agreement was reached and by the time patience of creditors was running low, possibility of Greek exit from the Euro Area and introduction of “new devalued drachma” were (again) heatedly discussed topics not only in the media but also among the economists. For example M. Feldstein already 6 years ago said that the Greek leave of absence from the Euro Area would be preferable before exit (Feldstein, 2010). N. Roubini warned about massive contagion if Greece left the Euro Area (Roubini, 2011). Moreover, also population of some European countries (mostly Denmark, the United Kingdom and Germany) expected Grexit to occur last year, as shown in Fig. 1.



Source: YouGov

**Fig. 1: Probability of Greece leaving EU**

Headlines and covers of international newspapers were overwhelmed with rather unusual Greek referendum, in which the Greek population voted on accepting or rejecting the third bailout conditions offered from the international creditors (in July 2015). This referendum (nicknamed Greferendum) got also into spotlight of the financial markets, which by that time suffered from extremely high market volatility, increased market fear, European stocks tumbled and euro depreciated. On July 5th 2015 all eyes were pinned down on exit poll results, which suggested victory of “NO” camp. Official results confirmed that every single region in Greece voted overwhelmingly “OXI” (no in Greek language) in referendum, which was for the Greek people the first state referendum since 1974. Clear “no” to proposed creditor’s demands increased probability of Greece leaving Euro Area above 50%. Nonetheless, after the Greek Minister of Finance stood down negotiations with creditors resumed, in few months situation around Greece calmed down also on the financial markets. However, the issue of Greek indebtedness is far from being solved and questions like “Will Greece exit from the Euro Area?” and/or “How much should new drachma devalue?” might pop up again. In mid-2015 answer to the latter question differed significantly as some economists suggested (nominal) devaluation of reintroduced drachma from 30 % to almost 60 % in order to restore the Greek competitiveness. According to Mariolis (2013) new drachma should devalue by approximately 60% in order to recover the Greek economy. Additionally, Katsinos and Mariolis (2012) find that drachma devaluation about 50% would not directly or indirectly evoke large inflationary pressures and might even help restore the Greek competitiveness by almost 40%.

This paper aims to contribute to the discussion on appropriateness of external devaluation in Greece as a part of debt reduction policy by investigating the relationship between the exchange rate devaluation and the Greek output. Furthermore, it describes option of parallel currency and currency devaluation costs and benefits in comparison with the internal devaluation measures, which Greece has agreed to undergo after signing the third bailout.

## 2 Currency devaluation as a boost for real economy

Domestic currency devaluation as channel to support real economic growth is a well-known principle in economic theory. Short description of famous Mundell-Fleming model shall provide intuition behind the transmission mechanism through which devaluation of domestic currency can support domestic economic growth. Mundell-Fleming model for open economy incorporates balance of

payments analysis into standard IS-LM model and under Mundell's view it assumes perfect capital mobility. Mundell-Fleming model suggests that (if Lerner condition is satisfied then) exchange rate devaluation is output expansionary as weaker domestic currency helps improve trade balance. Improvement in foreign sector increases domestic output and employment. This effect of currency devaluation is not so straightforward in the short-run. However in medium-term, currency devaluation increases foreign demand and decreases domestic demand for foreign goods and thus improves foreign trade balance as net exports increase.

Empirical evidence on direct transmission from exchange rate adjustments into real economy is not as persuasive as theoretical models suggest and it has been subject to interest of the economists since 1980. Edwards (1986) finds some contractionary evidence of exchange rate depreciation on the GDP in the short run in the developing countries. Bahmani-Oskooee and Miteza (2006) find that for the OECD countries effect of currency devaluation on economic output depends on the model specification. However, for the non-OECD countries is devaluation output contractionary. Effect of currency adjustments on economic output has been also subject to verification on the Greek data. Upadhyaya, Mixon and Bhandari (2004) investigated the exchange rate adjustments using a simple error correction model on the Greek and Cyprus panel data ranging from 1969 to 1998. The authors come to conclusion that exchange rate devaluation is output expansionary in the short run and neutral in medium term. Similar economic model is developed by Alawin, Sawaie, Al-Omar and Al-Hamdi (2013) who investigate effect of real exchange rate adjustment on the Jordan GDP and come to conclusion that real effective exchange rate depreciation results in increase in economic activity. Similarly Bahmani-Oskooee and Miteza (2006) empirically verified impact of exchange rate adjustment on economic output on 42 countries (including Greece in the OECD group of countries). Also Asif, Shah, Zaman and Rashid (2011), who empirically tested output-currency relation for the Pakistan economy, find positive impact of currency devaluation on economic output both in short and long run.

### 3 Effect of the exchange rate devaluation on economic growth

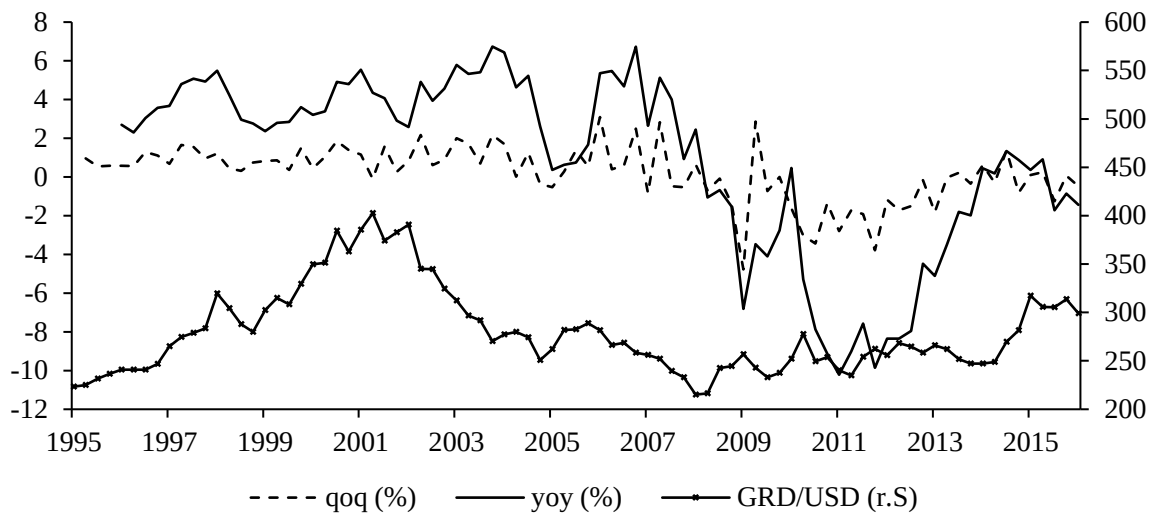
Relatively large body of literature with various estimation methods has been advocated to investigation of the relationship between exchange rate and economic output. Investigated model follows-up Upadhyaya, Mixon and Bhandari (2004) and estimated regression takes form:

$$\log GDP_t = \log RER_t + \log M_t + \log G_t + \log RER_{-1} + \log RER_{-2} + e_t \quad (1)$$

where  $RER_t$  is real exchange rate,  $M_t$  is M3 money supply,  $G_t$  are government expenditures in real term and  $GDP_t$  is real output (chained linked volumes seasonally adjusted). Lagged values attempt to measure effect of exchange rate change on output in medium and long run. From 2001Q1 to 2016Q1 the nominal exchange rate is recalculated to drachma vs. dollar using conversion value 340.75 drachmas per one euro. Real exchange rate is calculated using PPP conversion factor for unit of drachma per dollar. Data range from 1995Q1 to 2016Q1.

Theoretically, negative and statistically significant coefficient at  $RER_t$  suggests contractionary effect of exchange rate devaluation. Conversely, if coefficient at  $RER_t$  is positive, exchange rate devaluation is supportive for domestic economic activity. Statistical insignificance suggests that impact of exchange rate change is neutral to GDP growth.





Source: Macrobond

**Fig.1: Greek GDP growth**

Before regression estimation the data stationarity was tested using Augmented Dickey Fuller and Phillips-Perron unit root tests. The unit root tests are reported in Tab 1. Augmented Dickey Fuller tests show that each series is stationary at first difference except M3 and GDP series, which are stationary at second difference. Phillips-Perron tests indicate that each time series is stationary at first differences. Differences in individual unit root tests are considerable challenge, which may jeopardize reliability of estimated results. Johansen's cointegration test (see Table 2) suggests 4 cointegration vectors and null hypothesis of no cointegration being rejected in all four cases.

**Table 1: Unit root tests**

| Variable | ADF             |              |            | PP              |              |
|----------|-----------------|--------------|------------|-----------------|--------------|
|          | 1995q1<br>Level | 2016q1<br>FD | SD         | 1995q1<br>Level | 2016q1<br>FD |
| log M3   | -2.267555       | -1.753678    | -11.12502* | -3.273085*      | -6.182045*   |
| log GDP  | -1.939401       | -1.936003    | -12.45020* | -1.700918       | -6.820823*   |
| log GRD  | -1.896366       | -8.772741*   |            | -1.982993       | -8.771992*   |
| log RGRD | -1.276657       | -8.679605*   |            | -1.487906       | -8.716440*   |
| log G    | -1.684614       | -9.858852*   |            | -1.684613       | -9.828593*   |

stationary at \*5% level

Source: Macrobond, Eviews 7, author's calculations

**Table 2: Johansen cointegration test**

| Series: log GDP log RGRD log M3 log G        |            |                    |                        |         |
|----------------------------------------------|------------|--------------------|------------------------|---------|
| Unrestricted Cointegration Rank Test (Trace) |            |                    |                        |         |
| Hypothesized<br>No. of CE(s)                 | Eigenvalue | Trace<br>Statistic | 0.05<br>Critical Value | Prob.** |
| None *                                       | 0.270381   | 59.73559           | 47.85613               | 0.0026  |
| At most 1 *                                  | 0.171364   | 33.88648           | 29.79707               | 0.0160  |
| At most 2 *                                  | 0.129976   | 18.47260           | 15.49471               | 0.0173  |
| At most 3 *                                  | 0.082444   | 7.055383           | 3.841466               | 0.0079  |

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

Source: Macrobond, EvIEWS 7, author's calculations

Variables in regression (1) are transformed into first differences such that:

$$\Delta \log GDP_t = \text{constant} + \beta_1 \Delta \log RER_t + \beta_2 \Delta \log M_t + \beta_3 \Delta \log G_t + \beta_4 \Delta \log RER_{-1} + \beta_5 \Delta \log RER_{-2} + \beta_6 AR_{-1} + e_t \quad (2)$$

Results of estimated  $\beta_i$  coefficients are reported in Tab. 3 and suggest that real exchange devaluation is output neutral as coefficients at REER are statistically insignificant. We use also different measure of real exchange rate, where nominal exchange rate is transformed using weights of CPI indices for the US and Greek price levels.<sup>1</sup> Obtained results (see Tab. 4) are very similar to results with real exchange rate calculated using PPP conversion. However, as abovementioned disputable issue of stationarity may argue against the reliability of these results. Moreover, adjusted  $R^2$  in both estimations point to rather small model reliability and thus possibly more relevant variables should be added to model.

<sup>1</sup> CPI converted real exchange rate time series is stationary on first difference. In Johansen cointegration test we obtain results which conclusions are completely in line with the results of the Johansen test when using real exchange rate with the PPP conversion.

**Table 3: Regression estimates - PPP conversion**

|              | Estimated coefficient | Standard error | 5% stat. significance |
|--------------|-----------------------|----------------|-----------------------|
| $\beta_1$    | -0.032657             | 0.029812       | 0.2769                |
| $\beta_2$    | 0.096370              | 0.048153       | 0.0490                |
| $\beta_3$    | 0.133005              | 0.060717       | 0.0316                |
| $\beta_4$    | -0.002886             | 0.030946       | 0.9260                |
| $\beta_5$    | -0.041093             | 0.030534       | 0.1825                |
| $\beta_6$    | 0.214479              | 0.117724       | 0.0725                |
| $R^2 = 0.25$ | $Adj. R^2 = 0.19$     | $DW = 2.14$    |                       |

Source: Macrobond, Eviews 7, author's calculations

**Tab.4: Regression estimates - CPI conversion**

|              | Estimated coefficient | Standard error | 5% stat. significance |
|--------------|-----------------------|----------------|-----------------------|
| $\beta_1$    | -0.024997             | 0.029738       | 0.4033                |
| $\beta_2$    | 0.091549              | 0.048868       | 0.0650                |
| $\beta_3$    | 0.129282              | 0.061075       | 0.0376                |
| $\beta_4$    | 0.003732              | 0.030736       | 0.9037                |
| $\beta_5$    | -0.035359             | 0.031478       | 0.2650                |
| $\beta_6$    | 0.231821              | 0.118005       | 0.0532                |
| $R^2 = 0.25$ | $Adj. R^2 = 0.18$     | $DW = 2.16$    |                       |

Source: Macrobond, Eviews 7, author's calculations

Even though empirical investigation did not confirm expansionary effect of exchange rate devaluation on economic output, it does not necessary imply that abandoning euro and reintroduction of devalued drachma would not reflect in Greek output growth. First, estimated regression may be challenged for disputable stationarity issue and low reliability of overall model. Second, time range 1995q1 to 2016q1 includes several important breaking points for the Greek economy (for example euro adoption, effect of Olympic games, financial crisis in 2008, European economic crisis in 2011-2012 and adoption of bailout programmes), which might have significant and possibly disruptive impact on analyzed time series and thus bias the results. For example the IOBE study about Impact of the 2004 Olympic Games on the Greek economy (2015) suggests significant impact of Olympic Games on the Greek GDP. According to this study the Olympic Games would lower Greek GDP by 2.5% and employment by 44 thousand jobs in year 2004. Similarly, Kasimati and Dawson (2009) find evidence that the Olympic games boosted Greek economy, especially preparation phase and the year of Olympic games have relatively strong impact. Furthermore, in 2008 financial crisis hit Europe, especially economies on periphery. In 2008 the Greek GDP growth plummeted below zero and it fail to rebound until year 2014. From 2008 to 2013 the Greek economy lost almost 30 % of its momentum. However Greece as a member of the Euro Area could not react to fast worsening economic conditions (e.g. fast deepening fiscal deficits, rising unemployment and worsening trade balance among others) by weakening its domestic currency.

Statistical tests for breaking points suggest that Greek GDP has several breaking points (see Tab. 5). Surprisingly, Chow test suggests that financial crisis in 2008 does not disrupt the Greek GDP time series but euro adoption, the Olympic Games and European economic debt crisis do. Reasonably, GDP could be divided into sub-periods for respective breaking points. However, in our case estimated sub-periods would be very short for any reliable results.

**Table 5: Chow breaking point tests**

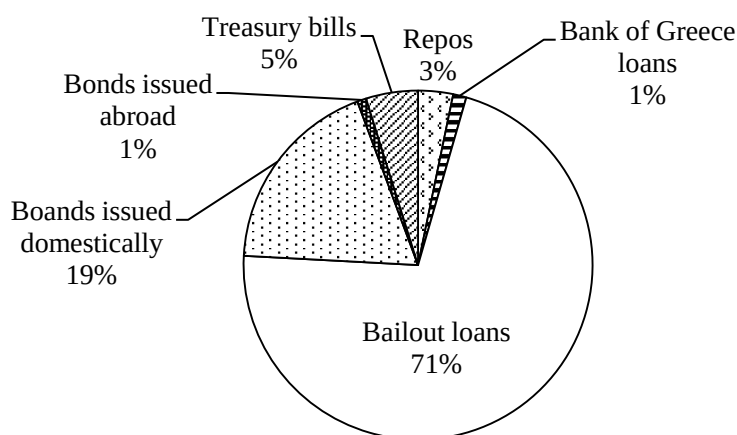
H0: no breaks at specified breakpoints

| Sample 1995q1:2016q1      | Prob. F | Prob. Chi-square |
|---------------------------|---------|------------------|
| Euro adoption (2001q1)    | 0.00    | 0.00             |
| Olympic Games (2004q1)    | 0.00    | 0.00             |
| Financial crisis (2008q3) | 0.6799  | 0.6753           |
| Economic crisis (2011q1)  | 0.0172  | 0.0156           |
| Economic crisis (2012q4)  | 0.0099  | 0.0089           |

Source: EvIEWS 7, author's calculations

#### 4 Parallel, own or common currency as solution to Greek misery?

Greece has been mounting its debt to astronomic highs for several years. In consequence to rising debt and deepening fiscal deficit rating agencies pushed Greece credit ratings down and in 2011 Standard and Poors downgraded Greece credit rating such that it became the only country in the world with the lowest credit rating. In 2016 Greek indebtedness reached astronomic size of approx. EUR322bn (cca 180 % GDP) and it ranked Greece (after Japan) as the second most indebted developed country in the world. Bailout loans from the international creditors create almost  $\frac{3}{4}$  of overall Greek debt and Germany, France and Italy are its biggest lending creditors.



Source: Greek Finance Ministry, Bloomberg

**Fig. 3: Structure of Greece debt (mil. EUR)**

Considering the little euro reserves Greece owns, bank liquidity available mostly under ELA programme supervision, capital restrictions and Greek economy (again) falling into recession, ability of the Greek government to repay its debt and regular obligations (pensions, wages) in near future is

very limited. Safe-line to this problem could be temporary introduction of parallel currency as it would not necessarily imply automatic exit of Greece from the Euro Area. Discussion about parallel currency for Greece became very vivid after Greek nation voted 61:39 for rejection of creditor demands in referendum. Theoretically, Greece could introduce parallel currency in a form of “IOU” or some securitization on future tax revenues, which in any case would serve primary for sustained payments for public sector. Debt obligations or “I owe you” or “IOUs” are almost equivalent to zero coupon bonds with fixed maturity issued by government and in the official currency. In advance government could agree with private sector at which value IOUs would be acceptable thus to agree on discount of these notes. Discount would reflect Greek credit and currency risk against euro (the official currency). In past California introduced IOUs when it faced sharp budget shortage driven by drop in revenues and did not want to give up dollar. In 2001 Argentina Provinces also issued IOUs. While California repaid its IOUs, Argentina IOUs were first step towards abandoning peso/dollar peg. At this time Greece is far from being in California’s shoes and it is more likely that parallel currency would be for Greece smooth transition from the euro.

Rather more radical option than parallel currency is reintroduction of own domestic currency “new drachma”, which would very likely devalue by at least tenths of percent after introduction. Possible exit of Greece from the European currency bloc would probably trigger line of negative reactions for the European economies. European bonds would most likely see immediate spike in risk premia. Investors would largely sell off euro against dollar and European stocks would plummet down. Sudden currency devaluation could trigger abrupt rise in consumer prices in Greece. Looking back to history sudden currency devaluation resulted in inflation spike of 82 % in South Korea and almost 130 % in Russia within two years after. (However, few years later it declined to almost pre-devaluation levels.) Worsened sentiment in Europe and confidence in euro would possibly cause capital shifts towards safe heaven economies and massive capital outflow from the European markets. Consequent decline in foreign direct investments would weigh heavy on trade balances and current accounts. Rating agencies would very likely dampen outlook and credit ratings further to junk territory, Greece could possibly face default and its economy likely face contraction. Furthermore, political instability and anti-EU sentiment would be strengthened. Conversely in an attempt to save common currency Euro Area member might be pushed to stronger economic integration. As the Greek economy would likely fall fast deeper into recession, effort of the Greek government to implement any reforms (which Greek economy desperately needs) would be set aside.

Greece has decided to keep the common currency and rather accept reforms (proposed by the creditors), which should significantly affect health of the Greek economy. Appropriate mix of measures focused not only on demand and but rather on supply side of the economy shall help restore the market imbalances faster. Internal devaluation measures are primarily focused on pushing down the wages of workers and simultaneously increase productivity of workers as labor costs decline and labor competitiveness increases. Higher competitiveness attracts foreign investors and consequently stronger investment inflow will support economic growth in the medium term. However, internal devaluation should be accompanied also by deflationary measures (e.g. higher taxes, lower government expenditures). Deflationary policies correspond to restrictive fiscal policy and thus result in decline of aggregate demand. As argued in Horská, Milucká and Marek (2015) Greece decided to implement wide range of measures including tax increases, wage and benefits cuts, pension reforms and privatisation. However, effectiveness of these measures is incomparable to similar measures which were adopted for example by the Latvian government. There is not one particular reason why the Greek measures have not borne as much fruit (so far) as the Latvian. Possible explanation could be instability of the Greek government (6 government changes from 2008 to mid-2015), declining confidence of the Greek people towards their ruling government or unwillingness of the Greek parliament to implement any radical reforms.

Especially sensitive appears to be tax issues. Despite the tax reforms, which were included already in previous adjustment programme for Greece, effectivity of tax enforcement remains very

low. Similarly to Spain and Italy Greece belongs to the European countries with the VAT revenue ratio (36,3 % in 2014) significantly below the European average (48,1 % in 2014) and its VAT policy gap (50,8 % in 2013) and VAT compliance gap (35 % between 2009 and 2011) are high (European Commission, 2015).

As it appears implementation of internal devaluation and deflationary policy mix is a long run process for Greece. Government inability to introduce radical (even though painful) reforms makes it for the Greek pensioners (who suffer under continuously changing reforms the most) very difficult. Cut in allowances, benefits and extra pension salaries markedly affected their lives. However, as argued in Horska, Milucka and Marek (2015) the Greek pension system is well above the European standards. Speed of implementation and commitment of the government to the reforms are keys for successful reforms, which will bring the economy back to path of economic prosperity. Unfortunately, the Greek government lacks both these features. Surprisingly, the new Minister of Finance seems to be less radical in its opinions compared to its predecessor Y. Varoufakis and thus easily negotiates planned reforms with the international creditors.

## 5 Conclusion

This paper aims to contribute to the discussion on appropriateness of external devaluation in Greece as a part of debt reduction policy by investigating the relationship between the exchange rate devaluation and the Greek output. The paper also describes option of parallel currency and currency devaluation costs and benefits in comparison with the internal devaluation measures, which Greece has agreed to undergo after signing the third bailout.

Unfortunately, the investigated model follows-up Upadhyaya, Mixon and Bhandari (2004) did not confirm positive effect of exchange rate devaluation on economic output. However, it is too early to make final conclusion that reintroduction of devalued drachma would not have pro-growth effect. Disputable stationarity of input data and several important breaking points that were identified might be a cause of low reliability of this regression model and possibly any other. To divide the data series into sub-periods for respective breaking points is not viable since they are very short for any reliable results.

The uncertainty surrounding the effect of reintroducing domestic currency including the risk of contagion effect on the European financial markets is a strong argument against such radical solution as the abandoning of euro represents. The next option is the parallel currency that would anyway represent for Greece a smooth transition from the euro as was the case of Argentina that IOUs were first step towards abandoning peso/dollar peg in late 2001. For the time being, Greece has decided to keep the common currency and rather accept reforms. The reforms that have power to restore the Greek economy to health should be focused more and more on supply side. Their mission is to boost the labour and capital productivity and enhance competitiveness of Greek economy, to ensure the sustainability of public finance not only by public expenditure cuts but rather through increasing tax enforcement, privatization revenues, and to support higher effectiveness of local businesses.

The further logical step would be test of alternative models that might discover the positive impact of currency devaluation on Greek economic output or that confirm our skepticisms incurred by the here presented research outcomes.

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## EU EMISSIONS TRADING SYSTEM: A PROMISING WAY TO SIGNIFICANTLY REDUCE GHG EMISSIONS? A CASE STUDY OF THE CZECH REPUBLIC

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### **Abstract:**

Ongoing climate change and the necessity to combat global warming by the reduction of greenhouse gas emissions resulted in the creation of one of the world's biggest emission trading system – the EU Emissions Trading System – that represents a ‘flagship’ of EU efforts to reduce greenhouse gas emissions in a cost-effective way. Nevertheless, despite the several fundamental changes in its functioning and proved decrease in total emissions, it is still subjected to a certain criticism. This paper aims to describe briefly the EU Emissions Trading System and its evolution and to analyse how it is implemented in the Czech Republic in which the system represents rather controversial issue causing many questions. The Czech Republic gradually reduces its GHG emissions, but is, due to its strong industrial orientation, still among the ten biggest European polluters. It is necessary to take measures to reduce more emissions towards the successful fulfilment of its commitment within the EU energy and climate targets.

### **Keywords:**

Carbon Market, Czech Republic, Emission Trading System, European Union, EU Emissions Trading Scheme (EU ETS), GHG Emissions.

### **JEL classification:**

F18, H23, O57, Q56.

## **1 Introduction**

In 2010, the global anthropogenic greenhouse gas (GHG) emissions have recorded a significant increase of 35 percent from 1990 (EPA, 2014a). There are six most important gases responsible for it. Among the most abundant greenhouse gas emitted by human activities is Carbon dioxide (CO<sub>2</sub>) that accounts for the largest share (around three-quarters) of global GHG emissions and that almost doubled since 1990 (EPA, 2014a). Energy-related CO<sub>2</sub> emissions, particularly those derived from fuel combustion in power and heat generation and transport were the main drivers of this significant growth in global GHG emissions and in CO<sub>2</sub> emissions itself. The second most prevalent greenhouse gas is Methane (CH<sub>4</sub>) that as well recorded remarkable increase (according to the EPA, 2014a it was 9 percent). Nitrous Oxide (N<sub>2</sub>O) and so called Fluorinated gases (also known as F-gases) that include Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur Hexafluoride (SF<sub>6</sub>) contribute a small amount to the overall emissions, but nonetheless belongs among the most important greenhouse gases. Greenhouse gases and mainly CO<sub>2</sub> emissions are considered to be a major cause of global warming resulting in increasing Earth's average surface temperature that for its adverse impacts actually represent one of the most serious global threat. (EPA, 2014a; IEA, 2015; Teng et al., 2014).

These alarming findings employ over the years many scientists, scholars, policymakers, international bodies etc. and they all try to search for ways to mitigate global climate change. There are several measures to lower GHG emissions and they all have certain costs and some of them are hardly achievable. Obviously, the most effective way to reduce GHG emissions is to reduce fossil fuel consumption (EPA, 2014b). But there are also other and less ‘harmful’ strategies as improving energy efficiency or energy conservation. Energy efficiency consists in using less energy to get the same level of energy services or maintaining the same level of energy service while using less energy (e.g. improvement of the insulation of buildings, using of more fuel-efficient vehicles or using



of more efficient electrical appliances). Energy conservation consists in reducing personal energy use or use of vehicles. The other possible way to cut emissions is to switch to another fuel that can be done through transition to renewable sources and using the lower-carbon fuels. In the recent years, the potential of clean technologies, for example clean coal technologies as Carbon Capture and Storage (CCS) technologies, is discussed in order to do not refrain from use of fossil fuels in power and heat generation, industrial processes and other stationary sources of CO<sub>2</sub> while keeping the level of pollution at low and acceptable levels. However, the issue of these clean technologies raises many questions and estimated costs of these technologies remain rather high because of on-going costly research. However, GHG emissions reduction can be also supported by taxation in form of environmental taxes or subsidies, for example, for innovations. Another measure recently applied in many economies is market regulation through emissions trading that establishes a certain amount of tradable allowances at certain price of the greenhouse gas emission unit and thus creates incentives for producers and consumers that invests in new technologies, processes and product to reduce emissions. The system is referred as ‘cap and trade’ and the first emissions allowance trading program of this kind was firstly applied in 1990 in the US in connection with regulations of exceeded levels of SO<sub>2</sub> emissions that dates back to the seventies (Burtraw and Szambelan, 2009). Along with the SO<sub>2</sub>, the NO<sub>x</sub> emissions have raised concerns about the environmental impacts and the creation of the SO<sub>2</sub> trading market was then followed by the design of the trading market for NO<sub>x</sub>.

In response to these global challenges, the international cooperation was a logical step to the deeper collaboration between states that culminated in the creation of the common framework for combating global warming by reduction of GHG emissions. This framework is well known as the Kyoto Protocol that entered into force in 2005 and that extends the United Nations Framework Convention on Climate Change (UNFCCC) from 1992. Within the Kyoto Protocol and its amendment from 2012 (the Doha Amendment) that revised the existing targets for a second commitment period, the participating parties have committed themselves to reduce their GHG emissions by at least 5% in the first in the first commitment period and by at least 18% in the second. Recently, the Paris Agreement that should even accelerates and intensifies the efforts of parties in order to ensure sustainable low-carbon future is in a process of ratification.

The Kyoto Protocol, inspired by successful US experience with emission permits (Damro, C. and Luaces-Méndez, 2003), bases on emissions trading system that provides three market-based mechanisms at international level that help to stimulate green investments and help parties to meet Kyoto targets in cost-effective way. Two of those mechanisms – Joint Implementation and Clean Development Mechanism – consist in earning of saleable trading units by countries according to the conditions defined in the Kyoto Protocol (for more details see the UNFCCC, 2016) and that can be counted towards meeting its Kyoto target. The third mechanisms – International Emissions Trading – has created a new tradable commodity – carbon – and ‘carbon market’ where the emissions permits over the country’s targets can be spared or sold. Nowadays, the number of emission trading systems in the world is growing. The biggest emission trading is the EU Emissions Trading Scheme/System (EU ETS), but there are also national or sub-national subsystems, for instance, in the above mentioned US and then in the UK, Switzerland, Korea, or Japan (see more at Carbon Market Data, 2016).

The emissions trading as one of the possible ways to tackle climate change and its implementation in the EU and particularly in the Czech Republic plays a key role in this paper that aims to describe the EU ETS and to analyse how it is implemented in the Czech Republic.

## **2 EU Emissions Trading System, its evolution and functioning**

The European Union promotes global action against climate change through several channels – through the UNFCCC and other international forums, through bilateral relations with third countries, through the financial help granted to the developing countries to support them in their efforts to mitigate climate change, and through other policies and initiatives at both EU and international level.

At the EU level, the ambitious energy and climate change strategy has been set up. The Union aims through this coherent long-term strategy to achieve a low-carbon economy, secure and competitive economy up to 2050. In respect to this strategy, three commitment periods with individual goals for each have been defined (2020, 2030 and 2050). For the current period that goes in the line with the Kyoto Protocol, the EU has committed itself to reach so-called 20-20-20<sup>1</sup> targets and in terms of GHG emissions reduction it has bound itself to cut GHG emission by an average of 20% below the 1990 level until 2020. Next strategies assume even more ambitious aims and those are to reduce GHG emissions by 2030 by 40 percent compared to the 1990 level and up to 95% in 2050.

To fulfil these very aspiring goals, the EU uses two main policy tools – the EU emissions Trading System and the Effort Sharing Decisions (ESD). While the EU ETS presents the ‘flagship’ of EU efforts to reduce greenhouse gas (GHG) emissions in a cost-effective way and is applied on the ETS sectors (described below), the ESD is applied on non-ETS sectors as transport, buildings, agriculture or waste. Nonetheless, the paper is devoted to the leading instrument of this policy – the EU ETS – that has been inspired by the Kyoto Protocol and actually constitutes the biggest international emissions trading system in the world.

The EU ETS was introduced in 2005 and it works on the ‘cap and trade’ principle. The ‘cap’ represents overall GHG emissions expressed in the certain amount of allowances (each emission right corresponds to 1 tonne of CO<sub>2</sub> equivalent, abbreviated tCO<sub>2</sub>eq) available in the whole system that is determined to decrease over time to allow to all system participants gradually adjust to meeting the aspiring emissions targets. Each year, a certain amount of allowances is given to certain companies for free and the rest is sold or auctioned (for more details see Consolidated version of Directive 2003/87/EC, EUR-Lex, 2014). Subsequently, at the end of each year, the participants are required to give back allowances for each emitted tonne of CO<sub>2</sub>eq during the year. If company is not able to cover all emitted emissions by its owned allowances, it is exposed to penalty for non-compliance. In this case, it must take measures to reduce its emissions or it can obtain more allowance on the market through auctions or it can buy allowances from other system participants. If the company has a surplus of allowances, it can reversely sell allowances to other participants to gain revenue or it can hedge them against anticipated future shortfalls. This represents the ‘trade’ principle.

The EU is responsible just for emissions in the scope of covered sectors under the ETS and emission reduction in the non-ETS sectors are in the hands of Member States. The system works on the base of annual procedure of monitoring, reporting and verification (MRV) of all 31 participating countries (the EU plus Iceland, Lichtenstein and Norway) whose more than 12,000 heavy energy-using installations as power stations and industrial plants and aircraft operations are all together responsible for around 50% of total GHG emissions (European Commission, 2016a). Given that not all GHG can be measured, accurately reported and verified, the EU ETS covers only CO<sub>2</sub> emissions from power and heat generation, energy-intensive industry sectors and commercial aviation; N<sub>2</sub>O emissions from production of nitric, adipic, glyoxal and glyoxalic acids; and PFCs from aluminium production. Companies operating in these sectors are obliged to participate in the system (for more details and information about limits under which the entities can be excluded from the system see categories of activities that are listed in Annex I of Consolidated Directive 2003/87/EC, EUR-Lex, 2014).

Since its introduction, the system has undergone numerous changes over the years and many of those changes were caused by the lessons learned from experience.

The Phase I (2005-2007) was three years trial period of ‘learning by doing’ and preparation for the second phase. The system at this time covered 27 countries and only nine categories. The cap for

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<sup>1</sup> 20-20-20 targets consists of three core objectives: (1) to reduce EU GHG emissions by at least 20% of 1990 levels; (2) to cut the energy consumption by 20% of projected 2020 levels by improving energy efficiency; and (3) to increase the use of renewable sources by raising the share of EU energy consumption produced from renewables to 20%

emissions was set up at 2,058 million tCO<sub>2</sub>eq. Leading changes in the second trading period (2008-2012) were mainly the changes in the number of countries included in the EU ETS given by the expanding on above-mentioned three countries of European Economic Area; the sector coverage that has newly included aviation sector. The cap for this period amounted 1,859 million tCO<sub>2</sub>eq. The current Phase III (2013-2020) significantly differs from Phase I and II and brought many new features that have significantly changed the scope of the EU ETS from its geographical coverage through inclusion of new sectors and gases to change of the overall cap. First of all, the number of countries under the ETS has grown to 31 due to Croatia's accession to the EU. The most significant changes regarding to the changes in the scheme are following. National caps were replaced by a single EU-wide cap on emissions. Auctioning has become to be a default method for allowances allocations. The number of covered sectors has broadened up to twenty-eight categories and the number of covered gases expanded on N<sub>2</sub>O and PFCs. The emission cap has changed for this period was set at 2,084 million allowances with linear reduction of 1.74% by each year that corresponds to the 38 million allowances a year (European Commission, 2016a). For this phase, up to 300 million allowances are set aside in the New Entrants Reserve to fund the deployment of innovative renewable energy technologies and CCS through the so-called NER 300 programme (European Commission, 2016a).

The following, fourth trading phase will begin in 2021 (until 2030) and it already assumes substantial revisions of the Phase III in order to fasten the pace of the emissions reduction (for more details see European Commission, 2016b).

### 3 Implementation of the EU ETS in the Czech Republic

Within the Kyoto Protocol, the Czech Republic has committed itself to reduce its emissions by 8% of the base year (1990) in the first commitment period and for the second commitment, within the EU and in line with the EU's own target jointly by the 20%. The Czech Republic gradually reduces its GHG emissions and despite the fact that in 2014 the country has emitted 63.45% of emissions emitted in 1990, it is still among the biggest European polluters<sup>2</sup>.

In 2015, there were 347 stationary installations in the Czech Republic that are equivalent to 3.0% of all EU ETS stationary installations and 5 aviation operators that corresponds to 0.6% of all EU ETS aviation operators (see table 1).

**Table 1.** Verified emissions and number of entities covered under the EU ETS in 2015

| Category                           | Tonnes of CO <sub>2</sub> eq |               | Number of entities |               |
|------------------------------------|------------------------------|---------------|--------------------|---------------|
|                                    | CR                           | All countries | CR                 | All countries |
| 10 Aviation                        | 430,429                      |               | 5                  | 806           |
| 20-99 All stationary installations | 66,629,736                   | 56,998,815    | 348                | 11,570        |
|                                    |                              | 1             |                    |               |
| 20 Combustion of fuels             | 53,279,240                   | 800,372,934   | 220                | 6,986         |
|                                    |                              | 1             |                    |               |
| 21-99 All industrial installations | 13,350,496                   | 225,416,574   | 127                | 4,584         |
|                                    |                              | 574,956,360   |                    |               |

Source: EEA (2016a).

According to the calculations based on Eurostat data (2016) for total GHG emission in the CR in 2014 and the data on EU ETS from the EEA (2016a), the share of EU ETS verified emissions (all installations) reaches around 50% in total GHG emissions of the Czech Republic. Fig. 1 shows the number of Czech entities involved in the EU ETS in 2015 and the quantities of their produced

<sup>2</sup> In 2014, the Czech Republic produced 126.7 million tCO<sub>2</sub>eq that ranked the country as the 8<sup>th</sup> most polluting country in Europe after Germany (924.77 mtCO<sub>2</sub>eq), UK (556.65 mtCO<sub>2</sub>eq), France (475.40 mtCO<sub>2</sub>eq), Italy (428.05 mtCO<sub>2</sub>eq), Poland (382.01 mtCO<sub>2</sub>eq), Spain (342.70 mtCO<sub>2</sub>eq), Netherlands (197.98 mtCO<sub>2</sub>eq) (Eurostat, 2016)

emissions according to the activity they operate in. Not surprisingly, the biggest share of GHG emissions is produced by 220 stationary installations that fall under the category of combustion of fuels (power stations and other combustion plants). The other significant polluters are, albeit with much lower-produced emissions in comparison to combustion of fuels, producers of pig iron or steel (13 entities) and cement (5 entities). After these entities under the combustion of fuel category, the manufactures of ceramics (37) and glass (20) represents the largest groups in terms of number of entities, but their emissions barely reach 2% of all verified emissions in the CR.

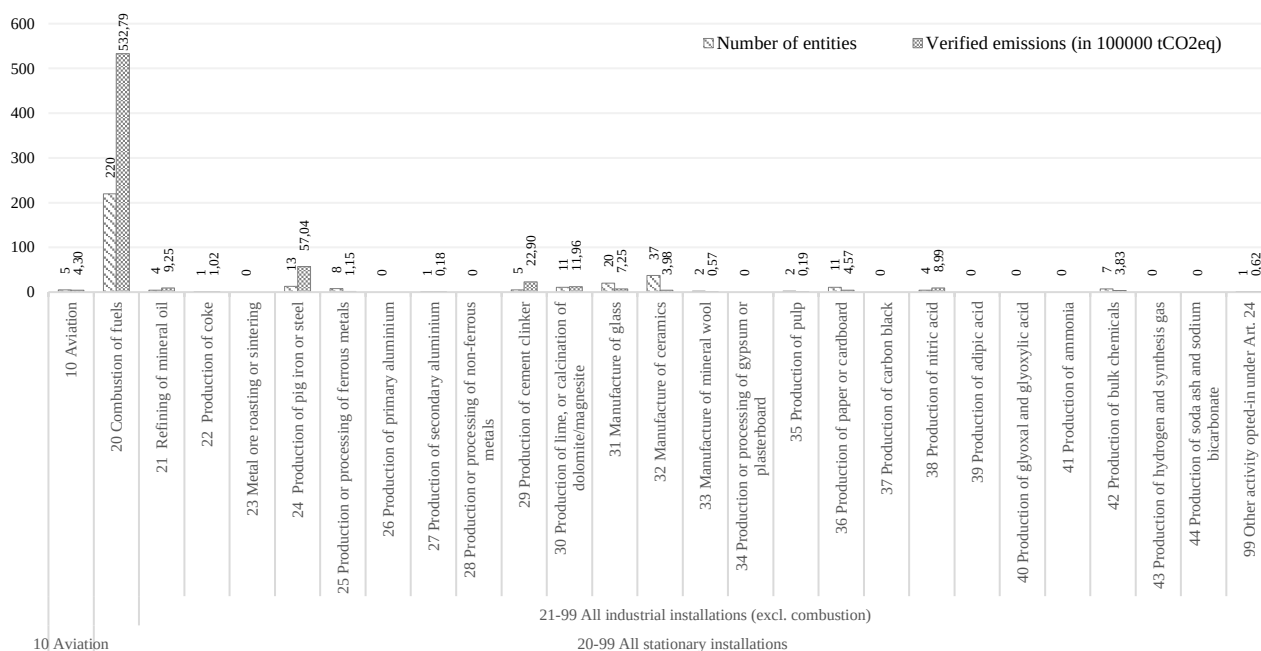


**Fig. 1.** Number of entities and amount of emissions by activity in the Czech Republic in 2015  
 (Source: EEA, 2016a, own proceedings)

As it is mentioned above, all the companies under the EU ETS suppose to cover their emission by freely given, sold or auctioned allowances or they have to take measures to cut their emissions. The quantity of total allocated allowances in the period between 2005-2015 at Czech emission trading market and their composition as well as verified emissions are reflected in Fig. 2. As given by the consolidate version of Directive 2003/87/EC (EUR-Lex, 2014), total allocated allowances consist of freely allocated allowances (FAA) that are allowances received free of charge, auctioned or sold allowances and correction to FAA. This division firstly appeared in the third phase of EU ETS and that is the reason why the Fig. 2 does not capture data for FAA for modernisation of electricity generation and from the new entrants reserve before 2013. Since there were no corrections to FAA in whole studied period, the figure shows only freely allocated allowances and allowances that were auctioned or sold by other countries in the system. In studied period, the total allocated EU allowances (EUA) in the Czech Republic amounted in average 4.1% of all the EUA under the EU ETS and in case of freely allocated allowances it was 4.6%. Specific data concerning the amount of emissions for each year are recorded in the Fig. 2 that among others shows a downward trend in the total amount of allowances. A significant drop in the amount of allowances between 2013-2014 was given by the decision of back-loading allowances due to large surplus of emissions allowances and noticeable drop their prices caused by high international credits import and by the aftermath of the economic crisis (Löfgren et al., 2015).

In 2012, the first auctions appears in reaction to the Commission's proposal of 'early auctions' of a share of EU ETS phase 3 allowances by holding auctions beginning in 2012 (see Löfgren et al., 2015).

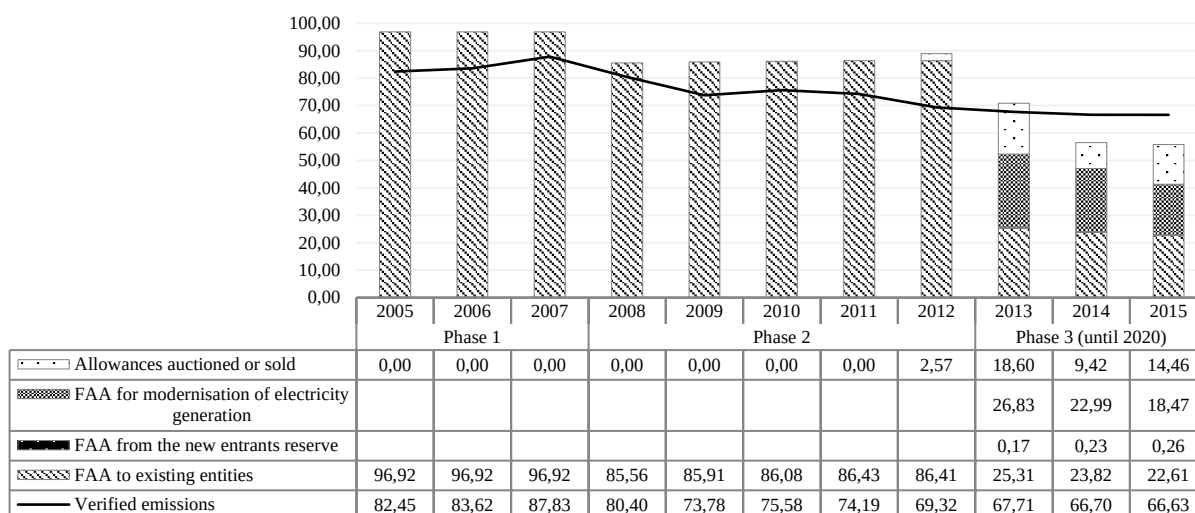


**Fig. 2.** Total allocated allowances and verified emissions for all stationary installations between 2005-2015 in million CO<sub>2</sub>eq (Source: EEA, 2016a, own proceedings)

The fifteen Czech entities that held the highest number of emissions allowances in 2015 are captured in the Fig. 3. They all together produced more than half of emissions among all EU allowance holders in the Czech Republic. The dominant position at the Czech carbon market has undoubtedly the energy company ČEZ, a.s. that operates on energy market in all the processes related to the generating and distributing electricity and heat, from extracting of the natural resources to their trading. In the past, mainly in ETS Phase I a II, the ČEZ company was in the most favourable position of all Czech ETS participants and company's generous number of freely allocated allowances exceeded noticeably its emissions what resulted in substantial surpluses that allowed to ČEZ to gain from the system and turn into company profit (Sandbag and CDE, 2011). In the Phase III it is no longer the case. In 2015, the ČEZ held 28.4% of all allowances allocated in the Czech Republic and the amount of its verified emissions reached 33.9%. Nevertheless, this was not only the case of the ČEZ company and many other companies, for instance Sokolovská Uhelná or ArcelorMittal, could also benefit from very optimistic and generous system in the previous Phases. Since the companies provide only very little information (if any) on how they use extra freely received allowances, it is hard to assume their allowance reserves and how they will be in the future. However, there are considerable concerns of a tightening of limits in the next Phase beginning in 2021 that should annually reduce the number of allowances of 2.2% by each year.

Among the other major players on the market is above-mentioned world's largest steelmaker ArcelorMittal Ostrava, a.s. that has become the dominant holder of allocated emissions per facilities mainly due to the acquisition with Vysoké Pece Ostrava (Chmelík and Zámyslický, 2007) and subsequent acquisition with Arcelor, or the biggest Czech steelmaking company Třinecké železářny. Both companies have more free allowances than their verified emissions. This results in criticism for subsidies to the steel and metal industry and creates doubts about favouring certain sectors.

Despite the fact that within the third emissions trading phase the power sector do not longer obtain any free allowances for electricity generation and they have to buy them, a proportion of allowances has been earmarked for modernization of the power sector and given to those power companies that are eligible for it according to the Article 10c of consolidated version of Directive 2003/87/EC (EUR-Lex, 2014). As it is shown in Fig. 2 and Fig. 3, the CR is eligible for temporary derogation from full auctioning for their power sector and transitional free allocations for modernisation of the power sector amounts to almost one-third of all FAA (see Fig. 2).

Over the years, the largest source of CO<sub>2</sub> emissions in the Czech Republic represents two brown coal power plants of ČEZ company – Počerady and Tušimice II, followed by heating and combined cycle power plant Vřesová of Sokolovská uhelná company.

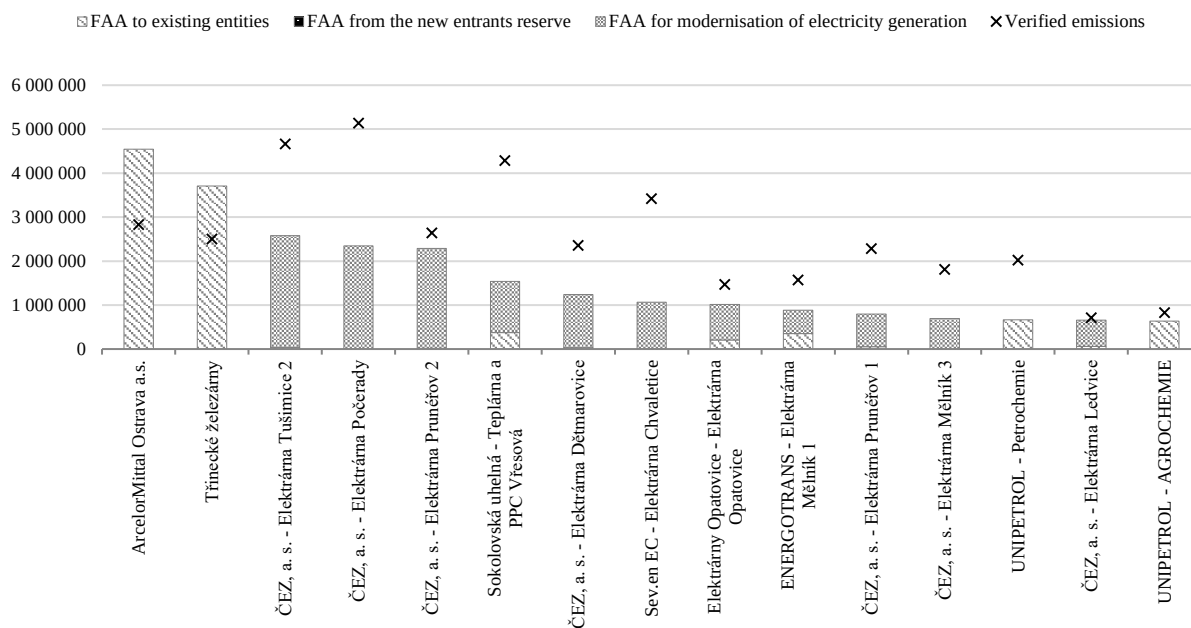


**Fig. 3.** Selected 15 entities that held the highest amount of allowances in the Czech Republic in 2015 (Source: European Commissions, 2016c, own proceedings)

#### 4 Conclusion

The US successful story with the SO<sub>2</sub> or NO<sub>x</sub> emission allowance trading programs has put in evidence that a price on emission unit and trading can work. This is also evidenced by the slight decrease in emissions in EU emission trading system. Nevertheless, despite several revisions that the system has undergone, it still faces a certain criticism and further revisions are needed.

The Czech Republic is a part of the EU ETS since its introduction and over the time, the system represents rather controversial issue causing many questions despite the fact that the country is one of these that generously benefit from the system. However, the system has appeared as unfair due to its free allocation allowances that seems to be a generous ‘subsidy’ for certain industries while threatening the competitiveness of others and thus evokes doubts related to the efficiency of the system as a whole. Despite the significant changes given by the revisions of previous phases, the following Phase 4 already assumes other substantial changes.

The current prices of EU allowances are under 8 €/tCO<sub>2</sub> that is far from the originally estimated 25-30 €/tCO<sub>2</sub>. Current system of freely allocated allowances should motivate companies to invest in measures to reduce emission in order to avoid future shortfalls of allowances. Projected future increase in carbon prices and decrease in allocated allowances together with new free allocation rules raises concerns for heavy and energy-intensive industries all over Europe (Fleishman Hillard, 2015). These industries have a strong tradition in the Czech Republic. Obviously, the rising carbon prices result in fears about the future of Czech heavy industry and ‘carbon leakage’ that refers to the situation when the high carbon price may occur in transfer of production to other country that has laxer emission constraints. The carbon leakage concerns more developing countries and the transfer of production to these countries may result in emission reductions in countries under the EU ETS, but it does not solve the problem of climate change and brings spillover effects. However, according to the Branger et al. (2016), the higher carbon that would not exceed 30 €/tCO<sub>2</sub> would not induce an increase in net imports and the carbon leakage does not present a serious threat. In any case, in order to reduce carbon leakage risk, the EU proposed better-targeted carbon leakage

rules for EU ETS Phase 4. Among others, the investment in deployment of low-carbon innovations and energy sector modernisation should intensify through newly introduced funds.

Notwithstanding the Czech Republic gradually reduces its GHG emissions, the country is, due to its strong industrial orientation, still among the ten biggest European polluters. It is necessary to take measures to reduce more emissions towards the successful fulfilment of its commitment within the EU energy and climate targets as it is set up in the EU energy strategy and to begin to use the EU ETS cost-effective way and not as a subsidiary program that results in companies' profit.

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## THE PREDICTION OF ECONOMIC ACTIVITY GROWTH BY SOVEREIGN BOND SPREADS IN SCANDINAVIA

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### Abstract

The steepness of the bond yield curve should be an excellent indicator of a possible future economic activity. A rise in the short rate tends to flatten the yield curve as well as to slow down real growth the near term. The relationship between the spread and future GDP activity was proved already before. One question remains – which spread is the best for the future prediction? Is it the spread between sovereign 10-year bonds and 3-month bonds or 30-year and 1-year or 10-year and 1-year sovereign bonds? This paper aims to analyse which spread is the most suitable for predicting of future economic growth in Scandinavia (Denmark, Finland, Norway and Sweden) between the years 2000 and 2016. The natural and probably the most popular measure of economic growth is GDP growth, taken quarterly. We have found out that the best predictive spreads in Denmark, Finland, Norway and Sweden are the spreads of 5-year and 3-month, 15-year and 1-year and 30-year and 3-month government bond yields which is in contradiction with the theory. These findings might be beneficial for investors and provide further evidence of the potential usefulness of the yield curve spreads as indicators of the future economic activity.

### Keywords

Bonds, Slope, Spread, Yield Curve

### JEL classification

E43, E44, E47, G01

## 1 Introduction

The financial turmoil during 2007-2009 affected the euro area financial sector in ways that differ considerably across market segments and countries. A consequence was a temporary reduction of market activity within national borders. The impact was felt most strongly in the money markets, and relatively less in bond activities. However, economic growth stopped and still many countries are not able to follow Maastricht Convergence Criteria.

On one hand, the integrated financial markets and the common currency may help protect the countries from the negative impacts of a financial crisis, because the countries are part of a large, stable economic unit. On the other hand – financial instability may spread easily from country to country, since barriers to the capital movements have been reduced.

Many market observers carefully track the yield curve's shape, which is typically upward sloping and convex. However when the yield curve becomes flat or slopes downward (the spread between sovereign 10-year and 3-month bond is negative) it may signal GDP decrease (recession). The spread of 10-year and 3-month government bond is widely used and it is the most common measurement of the yield spread.

The yield curve simply plots the yield of the bond against its time to maturity. The yield curve – specifically the spread between long term and short term interest rates is a valuable forecasting tool. It is simple to use and significantly outperform other financial and macroeconomic indicators in predicting recessions four quarters ahead.

Widespread use of the yield curve makes assessing its accuracy a worthwhile exercise for economists. But policymakers, too, need an accurate and timely predictor of future economic growth.

With sophisticated macroeconometric models and highly paid professional forecasters, is there any place for a simple indicator like the yield curve? Aside from the knowledge gained about the curve itself, there are several reasons to answer that question affirmatively. Simple predictions may serve as a check on more complex models, perhaps highlighting when assumptions or relationships need rethinking. Agreement between predictions increases confidence in the results, while

disagreement signals the need for a second look. A simple, popular indicator also provides some insight into market sentiment. Of course, it's always a good idea to check whether the expensive and complicated forecasts actually do perform better. After first reviewing some basics about the yield curve and the reasons it might predict future growth, we look at the actual relationship.

This paper builds on a wide range of previous researches, but differs in some ways. Berk and van BERGEIJK (2001) examined 12 euro-area countries over the period of 1970-1998 and found that the term spread contains only limited information about future output growth. Their work is based on the previous theoretical researches of Estrella and Hardouvelis (1991), Estrella and Mishkin (1996). There was proven the evidence that the slope of the yield curve and the future GDP activity are related together. However it is necessary to say that this rule was true until the end of 20<sup>th</sup> century and it mostly disappeared at the beginning of 21<sup>st</sup> century and appeared again during the financial crisis (from 2008) and later on (De Pace, 2011; Giacomini and Rossi, 2006; Chinn and Kucko, 2010; Wright, 2006; Chauvet and Potter, 2005). Most of the studies are focused on the relationship of the yield curve and GDP activity of the United States of America. All the authors used as a spread, which was analysed in their works, the spread of 10-year and 3-month government bonds. This relationship was proved to be the best in the past (Estrella and Hardouvelis, 1991; Estrella and Mishkin, 1996).

This paper aims to analyse which spread is the most suitable for predicting of future economic growth in Denmark, Finland, Norway and Sweden between the years 2000 and the first quarter of 2016 and if this relationship has changed after the financial crisis.

The possible spreads are as follows: 30-year and 1-year, 15-year and 1-year, 10-year and 1-year, 5-year and 1-year, 30-year and 3-month, 15-year and 3-month, 10-years and 3-month and finally 5-year and 3-month. Of course there are other possibilities, but it is very hard to get a different data for a chosen time period.

Despite various researches, there is not any comprehensive theory that would prove the correlation between the yield spread and economic development of the country yet. Often we come across the statements that have only theoretical basis without generally valid empirical evidence. Economic models are largely based on the argument that the yield curve tends to be flatter in the situation of the tight monetary policy and the economic slowdown typically occurs with a slight time lag.

Almost perfect tool containing the relevant future data provides the yield spread of government bonds. The simplest interpretation of the yield spread is through monetary policy of the country. Based on this criterion - relatively low spread reflects the restrictive and tight monetary policy and vice versa - high spread reflects loose monetary policy. We can find the theoretical justification for using of the spread in expectations hypothesis. It assumes that long term rate of return is the average of the current and expected future short term yields. The investor's decision to invest in short term or long term asset is completely irrelevant (Mishkin, 1990).

Dependence of the yield spread and GDP can be derived from their connection to the monetary policy of the state. As bond yields react to monetary policy as well as monetary policy is able to respond to the output of the economy, the yield curve assumes overlapping of policy measures and responses. The yield curve had the ability to reflect future production either directly or indirectly. Indirectly it comes to predicting of the future interest rate and the future monetary policy. It may also reflect the future production directly because of the 10-year yields may depend on estimates of the output of the economy in 10-years.

A question arises – how many months, quarters, years of future economic activity can be predicted by the yield spread? Based on the study of Bonser-Neal and Morley (1997) as well as Chinn and Kucko (2010) spread has the greatest ability in predicting one-year horizon (four quarters ahead).

## 2 Methodology and data

There are many ways of using the yield curve to predict the future real activity. One common method uses inversions (when short term rates are higher than long term rates) as recession indicators.

Obtaining predictions from the yield curve requires a lot of preliminary work. There is the principle which needs to be held: keep the process as simple as possible.

A yield curve may be flat, up-sloping, down-sloping or humped. The standard solution uses a spread (difference between two rates). The problem is to choose the spread between the right terms. The most used spread is between 10-year and 3-month bonds. The problem is that there are rarely bonds which mature exactly in 10 years (or 3 months). In that case the best solution is to use the yield curve, which shows the yield of each maturity. Creating and calculating of the yield curve is a rather difficult task because there are many ways how to do it and every country uses a different model of construction.

The yield curves are constructed by Bloomberg, therefore the data for spreads were gained from Bloomberg. For the spreads 30-year and 1-year, 15-year and 1-year, 10-year and 1-year, 5-year and 1-year, 30-year and 3-month, 15-year and 3-month, 10-year and 3-month and finally 5-year and 3-month government bond rates were chosen. Quarterly data were used for the spreads because the data of the economic activity growth are taken on quarterly basis as well. The data of real GDP growth can be found at Eurostat, OECD statistics or Bloomberg. The data of real GDP obtained and used in this paper are from OECD statistics.

The selected countries are Denmark, Finland, Norway and Sweden.

There is no recent previous research in European Union which would prove or reject the hypothesis that the spread between 10-year and 3-month government bonds is the best for predicting of the future economic growth.

## 2.1 Model specification

As a measure of real growth four-quarter percent change in real GDP was used (thus the percent change of the quarter against the last year's same quarter was calculated, e.g. the change from 1Q2004 and 1Q2003 real GDP was used). GDP is standard measure of aggregate economic activity and the four-quarter horizon answers the frequently asked question – what happens the next year?

The sample period starts from 1Q2000 and ends on 1Q2016. This time range covers the period before financial crisis, period of financial crisis and period after financial crisis. The basic model is designed to predict real GDP growth/decrease four quarters into the future based on the current yield spread (Bonser-Neal and Morley, 1997).

This was accomplished by running of a series of regressions using real GDP activity and the different spreads lagged four quarters (the interest rate spread used for 3Q2001 is actually from 3Q2000).

The last step is to find out which bond spread is the best for which country and to prove the hypothesis that the spread between 10-year and 3-month is the best one.

To generate the GDP predictions with the different spread the regression using the whole sample was run, and later on two divided samples of real GDP and spreads of each selected country were run (the sample is divided in 4Q2007/1Q2008, because this period preceded financial crisis and should show some changes in prediction of the yield curve spread). Time series data structure and ordinary least squares (OLS) method was used. All calculations were carried out in Gretl software.

The coefficients  $\alpha$  and  $\beta$  were estimated for each country:

$$\text{Real GDP}_{t+4} = \alpha + \beta * \text{spread}_t + \varepsilon_t \quad (1)$$

Where:

Real GDP<sub>t+4</sub> is a prediction of the future real GDP in time t + 4 quarters

spread<sub>t</sub> is spread between 10-year and 3-month state bonds in time t

$\varepsilon_t$  is a white noise

### 3 Results and discussion

The tests of normality were carried out. For the evaluation of the normality test is probably the easiest to observe the results from graph of the assumed normal distribution in comparison to the actual distribution of residues and analyse p-values of Chi-square test. We test the hypothesis H0: Residuals are normally distributed, against the hypothesis H1: Residuals are not normally distributed, the significance level of  $\alpha$  was chosen as 0.01. If the p-value is greater than  $\alpha$  then we cannot reject the H0, therefore the residuals are normally distributed. The test contributed that the data have normal distribution.

For the testing of heteroscedasticity we chose the White's test. We test the hypothesis H0: Constant variances of residuals – homoscedasticity, against H1: Heteroscedasticity. The significance level of  $\alpha$  was chosen as 0.01. If the p-value is greater than  $\alpha$  then we cannot reject H0, therefore it contributes homoscedasticity.

Does the yield curve accurately predict the future GDP?

First we can look at the data. Figure 1 shows the growth of real GDP and the lagged spread (4 quarters) between 10-year and 3-month bond yields in Sweden, Figure 2 shows the GDP activity and lagged spread (4 quarters) in Finland (similar figures can be constructed for the rest of the countries, these two are for example). A decline in the growth or real GDP is usually preceded by a decrease in the yield spread and narrowing yield spread often signals a decrease in real GDP growth. A negative spread usually precedes recessions, but not always. It is clearly visible that the dependency between real GDP and lagged spread is more visible from the year 2008 than before.

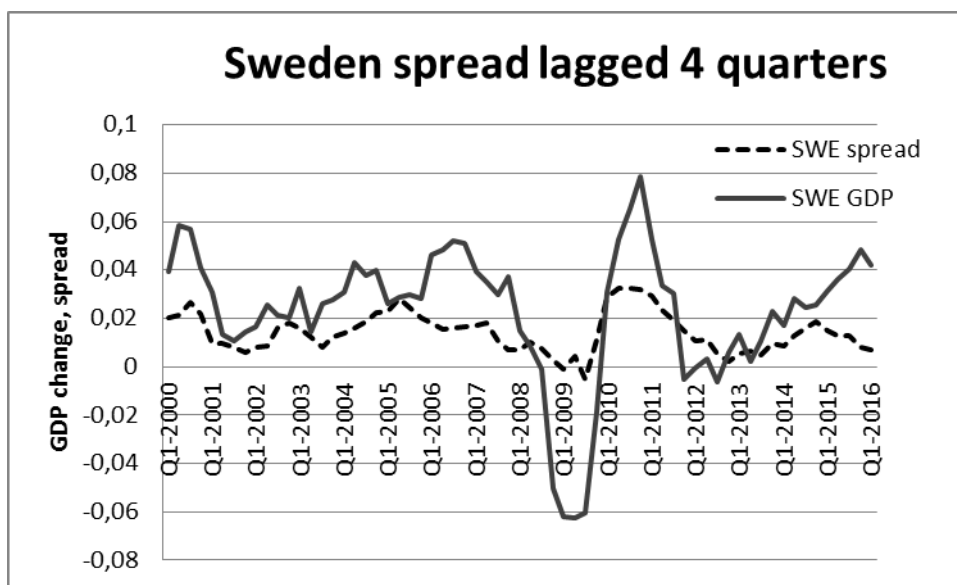


**Fig. 1.** Real GDP growth and spread in Sweden (spread 10year – 3month) (Source: author's own drawing)

When we constructed a scatterplots with each point representing a particular combination of real GDP growth and the lagged yield spread of Sweden and Finland, it showed that the relationship between the two variables is mostly positive. It means that positive real GDP growth is associated with a positive lagged yield spread and vice versa. Plotting the data gives a strong impression that the yield spread predicts future real activity.

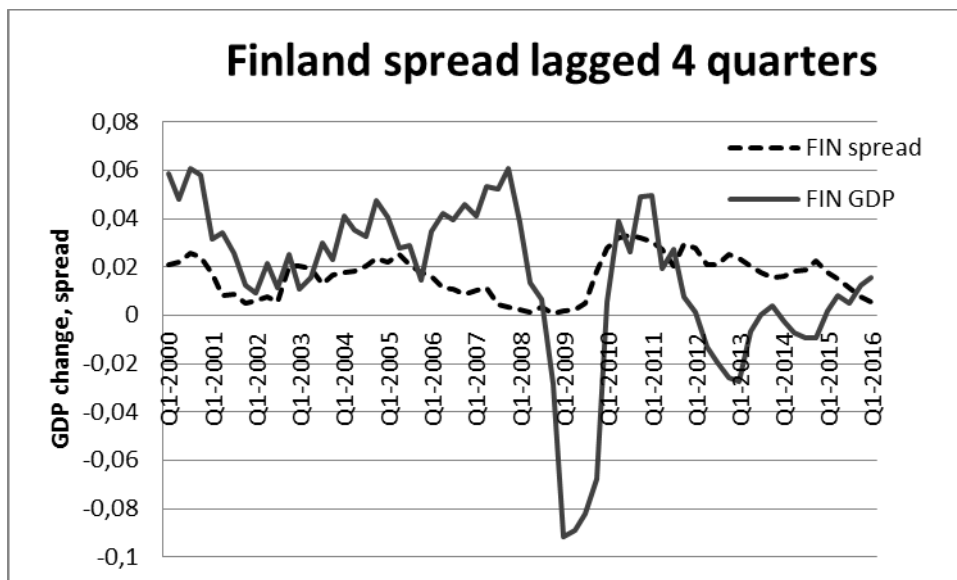


**Fig. 2.** Real GDP growth and spread in Finland (spread 10year – 3month) (Source: author’s own drawing)

The recession that began in 2009 was preceded by many quarters of decreasing spread and at the end the spread was very close to zero and negative.

### 3.1 Results of regressions – whole sample

The whole sample of dataset contains the real GDP from 1Q2000 to 1Q2016. A regression of the whole sample was run and we got the results as it is possible to see in Table 1.

The best spread in this case is a spread of 5-year and 3-month yields (Denmark and Finland). The best spread in Sweden was spread of 15-year and 3-month government bond yields. We should not take into consideration the spread of Norway because the model is not statistically significant.

We can say that models for Denmark, Finland and Sweden are statistically significant, because the p-values are under 1% (\*\*\*), however the  $R^2$  are quite low except of  $R^2$  of Sweden (51,04%). The model for Norway cannot be used as predictive due to high p-value.

**Table 1** Results of all countries and whole sample from OLS regression

| 1Q00 – 1Q16     | Constant    | Spread   | P - value     | $R^2$    |
|-----------------|-------------|----------|---------------|----------|
| Denmark (5Y-3M) | -0.00422208 | 1.72451  | 5.41e-05 ***  | 0.229493 |
| Finland (5Y-3M) | -0.00134007 | 1.93888  | 0.0070 ***    | 0.109849 |
| Norway (5Y-1Y)  | 0.0158536   | 0.410824 | 0.1428        | 0.033781 |
| Sweden (15Y-3M) | -0.0131040  | 2.27113  | 2.34e-011 *** | 0.510470 |

Source: author’s own calculations

The  $R^2$  coefficients (coefficients of determination) show us how many percent of the sample can be explained by these models.

For example we can say that future real GDP of Sweden will be:

$$\text{Real GDP}_{\text{Sweden } t+4} = -0.0131040 + 2.27113 * \text{spread}_{\text{Sweden } t}$$

By this model we can predict future real gross domestic product of Sweden four quarters ahead.

We can test the hypothesis that the behaviour of the spread and gross domestic product has changed during the financial crisis, therefore the sample was divided into two samples in order to prove this hypothesis.

### 3.2 Results of regressions – divided samples

The research continued as follows – the whole sample was divided into two samples. The first one is from 1Q2000 to 4Q2007, the second one is from 1Q2008 to 1Q2016 in order to show if there is any change of behaviour and dependency between the variables before or after the financial crisis.

Regressions of the first sample and the second sample were run. The results for the time span of 1Q2000 – 4Q2007 (first sample) are possible to see in Table 2, the results for the period of 1Q2008 – 1Q2016 (second sample) are in Table 3.

In the first period we cannot judge which spread is the best because in every country we have got different results (Denmark 30-year and 3-month, Sweden 5-year and 3-month).

**Table 2** Results of all countries and sample from 1Q2000 to 4Q2007

| 1Q00 – 4Q07      | Constant   | Spread   | P - value  | R <sup>2</sup> |
|------------------|------------|----------|------------|----------------|
| Denmark (30Y-3M) | 0.00638529 | 0.750337 | 0.0070 *** | 0.218712       |
| Finland (5Y-3M)  | 0.0299919  | 0.542139 | 0.3483     | 0.029379       |
| Norway (30Y-1Y)  | 0.0230864  | 0.283330 | 0.05639    | 0.1906         |
| Sweden (5Y-3M)   | 0.0183819  | 1.31592  | 0.0038 *** | 0.247049       |

Source: author's own calculations

We can say that models for Denmark and Sweden are statistically significant, because the p-values are under 1% (\*\*\*). R<sup>2</sup> are lower than in the time period of whole sample – 1Q2000 – 1Q2016. The models designed for Finland and Norway cannot be used as predictive models due to high p-values.

In the second period the best results were gained for spreads mentioned in the Table 3 – 15-year and 1-year (Norway and Sweden), 5-year and 1-year (Finland) and 30-year and 3-month (Denmark). We can say that in this case the best spread is a spread of 15-year and 1-year because it appears twice in this table.

All models are statistically significant. R<sup>2</sup> are higher than in the previous time span, which is interesting. This change in prediction possibility may be caused by different behaviour of financial markets after the financial crisis (after year 2008). The results show that the models have much higher explanatory power after the year 2007.

**Table 3** Results of all countries and sample from 1Q2008 to 1Q2016

| 1Q08 – 1Q16      | Constant    | Spread   | P - value    | R <sup>2</sup> |
|------------------|-------------|----------|--------------|----------------|
| Denmark (30Y-3M) | -0.0356153  | 1.86919  | 5.63e-06 *** | 0.490841       |
| Finland (5Y-1Y)  | -0.0268160  | 3.31934  | 0.0059 ***   | 0.219886       |
| Norway (15Y-1Y)  | 2.11222e-05 | 0.560557 | 0.0644 *     | 0.106043       |
| Sweden (15Y-1Y)  | -0.0280498  | 3.00666  | 3.11e-08 *** | 0.633261       |

Source: author's own calculations

At the end we can summarize the new theoretical finding according to which spread is the best for predicting of the future GDP growth. We proved that in these selected countries the best spread is the spread of 5-year and 3-month government bonds (we have added all results together and this spread showed up three times in total). The second best spread is the spread of 15-year and 1-year and 30-year and 3-month yields (totally twice in our calculations). The results showed that dividing of the sample made a difference between pre-crisis and after-crisis period and it showed the different relationship of spreads and the models. The finding that the best spread is spread of 5-year and 3-month eventually 15-year and 1-year or 30-year and 3-month is in contradiction with the theoretical background when almost everybody who predicts the future GDP growth uses a spread of 10-year and 3-month yields of government bonds. This was found out on data of United States of America (from 1970 to 2000). We must say that to collect data of 10-year and 3-month government bonds is

the easiest possible way, when we want to use them for calculations, because they are all published in Bloomberg database, however to get data for 20-year, 6-month and 1-month yields is almost impossible in demanded time period and a good quality (there are many blind values from 1Q2000 to 1Q2016).

#### 4 Conclusion

The 10-year and 3-month spread has substantial predictive power and should provide good forecast of real growth four quarters into the future (this was proved in USA). We showed that after the year 2000 the best predictive spreads in Denmark, Finland, Norway and Sweden are the spreads of 5-year and 3-month, 15-year and 1-year and 30-year and 3-month government bond yields. The results presented above confirm that these spreads have a significant predictive power for real GDP growth and the behaviour of the models changed during and after the financial crisis. The results show that the dividing of the sample made a difference in use of the best predictive spreads.

The simple yield curve growth forecast should not serve as a replacement for the predictions of companies, which deal with predicting of many economic indicators, it however does provide enough information to serve as a useful check on the more sophisticated forecasts.

Future research could be extended to a wider examination of the best spreads in more countries around the world and especially in the European Union. It would be interesting to see if there is the rule which would prove the hypothesis that the spread of 10-year and 3-month bond yields is the best for predicting future GDP growth in the countries of the European Union.

#### 5 Acknowledgement

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## GAINING KNOWLEDGE THROUGH THE MIGRATION OF SLOVAK MIGRANTS – MOTIVES, BENEFITS, AND RISKS OF THEIR MIGRATION

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### Abstract:

This paper explores knowledge that stems from international movements of Slovak migrants. The current research neglects this aspect of migration in the Slovak context. However, it is argued here that insightful understandings of this issue are vital to a more holistic appreciation of migration. As such, this study fills the gap in our current knowledge, contributing by providing a piece of puzzle to the fascinating, but complex reality of human movement across borders. Specifically, the paper seeks to shed light on gains and risks stemming from this movement. This research employs the theory of tacit knowledge developed by Blackler, who identified 4 classes of knowledge: embrained, embodied, encultured and embedded. The paper uses qualitative thematic analysis of in-depth interviews. They illuminate how tacit knowledge gained by the experience of migration facilitates the decisions of migrants' to never return to their home country. This is because the fulfilment, both personal and professional, is firmly associated with the tacit knowledge and the country which provided the knowledge.

### Keywords:

Migration in Europe, tacit knowledge of migration, Advantage and Risk of Migration

### JEL classification:

D81, J69

## 1 Introduction

Migration is currently found a social-economic phenomenon, and it is subject to multiple theoretical and empirical studies. The international migration research became intensive during the past two decades. King (2008) calls the specified period the *age of migration*. The migration intensity increased due to various agreements on people movement, transportation progress, advanced information technologies, falling political-administrative barriers, and inevitably the demographic development in the individual regions of the world as well. The intensified globalization processes highlight the need to research international migration, which is increasingly found the basic civilization challenge of the 21<sup>st</sup> century.

During the past decade, the Slovaks' migration was primarily affected by Slovakia's entry to the European Union. Right after joining the EU, Slovakia was one of the countries with high migration rates caused by search for work. The Slovak citizens' migration “significantly contributed to the balance between supply and demand on the labour market as the mechanism, which offsets economic fluctuations on the EU's labour markets” (CELSI, 2016). In 2012, 120,000 Slovaks worked abroad. Per the Central European Labour Studies Institute - CELSI (2016): “Research indicates that the outflow of immigrants significantly contributed to the decreasing unemployment in Slovakia. Unemployed people clearly migrated to search for work more often than those who had their jobs. The labour force outflow from Slovakia's economically weaker regions was more significant.” The fact that the EU's migration policy was not applied uniformly resulted into migration flows proceeding to countries with the highest standard of living, for example, to destinations like Great Britain, Germany, and France. The non-uniform mobility of migrants was also affected by every country's different migration policies, and it also affected their labour markets.

The goal of this article is to examine the obtained knowledge through international migration of Slovak migrants who might enrich both the international and Slovak labour markets. It is also important to learn about their migration motives, including the benefits and risks resulting from their migration. The article is based on multiple migration theories and theory of tacit knowledge classification per Blackler (1995). To obtain specific knowledge gained by the immigrants during their migration, we decided to use qualitative research, specifically semi-controlled interviews

conducted directly with the migrants. Our qualitative analysis was based on data obtained through controlled semi-structured interviews. Our interviews were completed face-to-face and electronically through Skype. Our research sample included 23 Slovak migrants whose stay abroad lasted at least 6 months and who currently still live and study abroad. We identified knowledge, which the immigrants are aware of. They obtained it abroad and daily use it in their current lives or its usefulness is very critical for them on a daily basis.

We selected our research sample members through the Snowball method. Thanks to this method, we were able to also identify various connections and understand the importance of migrants' relationships, how interconnected they are, and how they operate in their daily lives. Applying triangulation to our research sample, we were better able to assign specific types of knowledge to specific groups of respondents, and this also helped us during their analysis. The goal of this article as to answer questions, which are not currently sufficiently researched, and to identify the real feelings of the Slovak migrants who decided to live abroad.

## 2 Theoretical Motives

### 2.1 Classification of Terms Associated with Migration

IOM (2014) defines migration as the “movement of a person or group of persons from one geographical unit to another through administrative or political border in order to get permanently or temporarily settled at a location, which is different from the person's origin location.” Per the UN's recommendation for international migration statistics of 1988, the term international migrant was defined as follows: “*Migrant* is defined as every person who changes the country of his common<sup>1</sup> residence. OECD defines the migrant similarly. The migrant is an adventurous person with high tolerance to migration risks.

The most frequent reason of migration is quality of life in another country. This goal is often associated with the migrant's work and wage (labour migration). That is why migration is researched from multiple perspectives – based on the migrants' motives, institutional impacts, decision-making freedom, etc. Migration is often defined from the geographical perspective, i.e. correct definition of the migrant's direction of movement during his migration, i.e. emigration and immigration. Infostat (Jurčová, 2005) defines *emigration* as “leaving a particular territorial unit<sup>2</sup>. “Contrary to that, *immigration* is defined as “moving into a specific territorial unit.” While defining migration direction, it is important to identify the country of origin, transit country, or final destination. The fact is that every country currently fulfils all these three roles (Koser, 2007). It is caused by people's free movement among countries that much more frequent than in the past.

From the time perspective, there are more types of migration. The most basic division includes short-term migration (from 3 to 11 months), long-term migration (over 12 months), and permanent migration that is often associated with gaining one's citizenship in his new host country (Onufrák, 2010).

Up to now, we described migration through the impacts of economic factors. However, social factors (social migration) are important as well. According to Sjaastad (1962) and also Štefančík (2010: 66), the socio-cultural *pull* factors also play a critical role in the international migration process. The social pull factors include good social and medical support and good conditions for the education of children and youth. Regarding the cultural ones, one may mention language similarity, religious beliefs, or other close cultural patterns of behaviour. According to Haug (2000: 31), “besides economic variables, other factors contribute to one's decision to leave his country of origin. They

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<sup>1</sup> Country of common residence – country in which the person has his residence and where he usually spends his free time (Jurčová, 2007).

<sup>2</sup> In this work, a territorial unit means a country (state).

include one's phase of life; however, especially his age and position in the family cycle, socio-economic factors like education, income, employment, or social networks and family relationships.

During migration flows from less developed countries to developed ones frequently occurs so-called brain drain. Brain drain is currently considered a part of the free movement of labour, during which knowledge and technologies get exchanged. Brain drain identifies with permanent migration, and it eventually positively impacts mainly the final destination (Docquier et al. 2007). On the other hand, if these migrants ever decide to return back, they may positively impact their country of origin. Koser (2007) called this type of movement brain circulation. Brain circulation most frequently occurs in the developing countries whose labour market for qualified people is still developing. Baláž (2010) dealt with migration from the human capital transfer perspective. He says that economically developed countries support brain circulation or possibly brain gain.

## 2.2 Migration Theories

The first migration theories were created by so-called neoclassical economists who find search for work the main motive behind migration (Todaro, 1980). Massey (1993), one of the neoclassicism representatives, concludes that the neoclassical theory focuses on income differences (especially wage differences), employment conditions in destination countries, and costs associated with migration. International migration spreads due to the geographical differences in work supply and demand (labour migration).

The neoclassical economists view migration from two perspectives, i.e. their micro and macro perspectives. The macro perspective of neoclassical theories focuses on total migration flows. It presumes that migration is only affected by incomes and employment. One of the basic positions of the neoclassical macro theory is that people migrate from lower income countries to higher income countries. Based on these assumptions, elimination of income differences should stop migrants' movement in search for work and no migration will take place (Massey, 1993).

The neoclassical theories at the micro level are very similar to the macro theories. The only difference is that they examine migration from the individual's perspective. One of the specific types of neoclassical theories is the *human capital theory* (Chiswick, 1978; Sjaastad, 1962). This theory says that migrants selecting their destination country are primarily influenced by their human capital, which they have (education, experiences, skills, knowledge of languages, and work habits from the migrant's country of origin). We tend to agree with the positions of Lianos (2001) and Diaz-McConnell (2008) who comment on the migrant's goals. The migrant's goal is to utilize his knowledge and capabilities as best as possible to maximize his gain from migration. The migrant adjusts his decisions to this, while one of the most important decisions is his decision on his destination country selection. The migrant will select such a target country in which he will be able to apply his human capital as best as possible. However, during one's selection of regions, it is necessary to expect different final destination selections. The reason of different selections is the migrant's qualification. Qualified migrants will rather select a country in which they will be able to apply their education. Poorly qualified ones will rather select a country with a greater demand for less qualified labour force (agriculture, civil engineering, or other services). This opinion is in conflict with the neoclassical theories because migrants do not proceed to countries with highest wages, but to countries in which they will be able to apply their education and experiences. The representatives of micro-neoclassical theories believe that migration is conceptualized through the form of investment into human capital. People proceed to countries in which they may utilize their capabilities as best possible, increasing their income; however, simultaneously incurring particular costs (e.g. travel costs, work search costs, foreign language learning costs, costs of learning new customs and new capabilities on the labour market). According to Massey (1993), their primary assumption rests in the fact that the following applies to individual human capital: if the probability of its rewarding or improving in particular areas (education, experiences, job preparation, language experiences, etc.) increases, its probability of

employment in its target country increases as well. Resultantly, the probability of migration increases as well. Another assumption is that migrants' individual qualities, social conditions or technologies with lower migration costs increase one's net benefits of migration, and even the probability of migration movement increases.

The representatives of so-called new economics of labour migration – acronym NELM) offer their slightly different position on migration. The migration theories usually do not focus on individuals, but households. We find the positions of the NELM representatives more realistic because they examine migration from multiple perspectives.

Another critical migration theory is the *theory of pull-push factors*. One of the founders was German geographer Ernest George Ravenstein (1876). The theory is based on the *push* principle (push, move) and the *pull* principle. It derives from the assumed imbalance of socio-economic factors among countries. The *push* factors include: unfavourable economic conditions in the home country, low standard of living, ethnic problems, violent conflicts, political discrimination, growing population density, etc. On the other hand, there are plenty of other acting factors that pull the emigrant to his target country. The *pull* factors include: higher wages, higher standard of living, new employment perspectives, other migrants' positive experiences, sense of greater personal and political freedom, or possibly the relative proximity of one's intended destination. Nevertheless, the fact still is that the individual factors act differently in the individual countries" (Massey, 1993).

Another theory dealing with labour migration is the *dual labour market theory*. It is based on Pior's (1979) thought, which says that international migration is constantly affected by labour migrants' requirements. As a result of government interventions, the labour market is divided into the primary and secondary markets. The primary market features highly qualified and qualified workers whose work is associated with high wages, good working conditions, and advancement possibilities. The secondary market features low-qualified workers whose wages are low, and their working conditions are not as stable as of the primary market workers.

Migration is also examined differently by the *network theory*. Its primary representative is Immanuel Wallerstein (2004). It is based on social connections among migrants, and it creates so-called social network. Social networks created among migrants and non-migrants increase the probability of migration.

### 2.3 Classification of Tacit Knowledge

During his migration, every migrant obtains particular types of knowledge associated with cultures, economy, politics, and social environment of his new country. This so-called *tacit knowledge* significantly complements the immigrant's human capital. The migrant may utilize his tacit knowledge after his return to his home country. Tacit knowledge may eventually become also very beneficial for the given country, and this knowledge sharing may be called tacit knowledge transfer.

The term “tacit knowledge” comes from English. Multiple authors defined and classified tacit knowledge. Tacit knowledge was most dealt with by Polányi (1958). Polányi's known claim, which characterizes tacit knowledge, is as follows: “We know more than we can say” (Perraton, Tarrant, 2007: 354).

The classification of tacit knowledge was dealt with by other authors as well, for example, Ludvall and Johnson (1994) and Boisot (1998). In our work, we utilized the division per Blackler (1995). He believes that tacit knowledge cannot be directly measured, and they may only be obtained through qualitative research. He divides tacit knowledge into:

- *Embrained* (conceptually) – individual, explicit knowledge, abstract or theoretical knowledge, which is permanent. It depends on one's conceptual and cognitive capabilities. This knowledge is often mentioned as “personal brain setting”.
- *Embodied* (knowledge simultaneously stored in one's body and head) – partially explicit, connected knowledge, which supports physical perceptual and sensory information. They form the basis for problem solving and activity learning.

- *Encultured* (cultural knowledge) – it reflects one’s rate of adaptation to his country’s cultural and social conditions, including the level of socialization and social understanding to the foreign country. This type of knowledge helps migrants merge with culturally different social structures, adapt behavioural norms, and cultural habits of the given country.
- *Embedded* (embedded knowledge) – this knowledge is anchored together with other knowledge. Embedded knowledge generates interest in various knowledge systems, cultures, and labour groups. (Williams, Baláž, 2008). This type of knowledge is often associated with so-called *procedural knowledge*, which determines the sequence of various procedures during reaching one’s goal; however, they cannot be codified.

Tacit knowledge is also found knowledge, which cannot be codified. Codified knowledge is anchored in signs and symbols (e.g. books, manuals). *Embrained* and *embodied* knowledge is a part of human qualities. And *encultured* and *embedded* knowledge depends on the culture and environment in which people live.

Per authors Baláž and Williams (2008: 55), tacit knowledge is generated through one’s direct personal experiences. Every person carries them. This knowledge does not have to be associated only with people, but also with countries or other countries’ cultures.

### 3 Work Methodology

The majority of migration theories deal with migration factors. Fewer theories deal with specific knowledge, which enriched migrants during their migration. This type of knowledge may only be identified through qualitative research, in our case, through interviews with the respondents. Induction is usually used during qualitative analysis. Inductive approaches are primarily based on data. Collected data is analysed, connected, and explained through various theories (Corbin, Strauss, 2008). The method, which we collected for qualitative analysis data collection, (primary data) was the *Snowball* method. Per Coleman (1958-1959) and Goodman (1961), the *Snowball* method is primarily used during the collection of data in a non-measurable population.

We completed personal (*face-to-face*) interviews. Controlled interviews feature their controlled direction of questions. Interviews provide better conditions for thinking over the given issue and also getting the respondent’s feedback on the way of using his information. (Saunders, 2012: 378). The controlled interview featured 22 basic questions. The interview featured both open-ended and close-ended questions. The questions design made sure they were based on the theories mentioned in the very beginning of this article. While answering their open-ended questions, the respondents described their new knowledge and migration benefits. The controlled interview lasted about 60 to 75 minutes on average. Anonymity was maintained during the interviews.

The respondents were Slovak Republic’s citizens whose stay abroad lasted at least 6 months. The sample featured 23 respondents, 6 males and 17 females. 16 respondents were single, 6 married, 1 respondent divorced, and 6 of them already had their own children. The average respondents’ age was 32 years. 6 respondents had high-school education, 17 were college graduates, while 4 of them completed the third university level. The males’ occupations were like information technician, electrician, physician, and scientific worker. Regarding the females, they were scientific workers, administrative workers, and au-pairs. Our sample also included 3 students who studied languages at their universities. The respondents selected various countries. The biggest number of respondents selected the Great Britain (9 respondents), while the next destination was Germany (7 respondents), United States of America (4 respondents), and Columbia (2 respondents). In the other destinations like Spain, France, Netherlands, Austria, and Ireland, there we had always one respondent.

He controlled interviews feature a controlled direction of research questions. The interviews provide better conditions for thinking about the given issue and also getting the respondents’ feedback. (Saunders, 2012: 378). The interviews feature open-ended and close-ended questions.

Open-ended questions allow the respondent to express himself on a given issue more broadly. Probing questions are used as supplemental questions. Closed-ended questions are often used as introductory questions during interviews (Saunders, 2012: 391-392). During the first interview section, we strove to obtain the respondents' personal information (age, marital status, work position, completed type of education, permanent residence, and location).

Qualitative research is very often analysed through triangulation of respondents and data validation. Triangulation is marked as “combination of two or more different research strategies during one's research of identical empirical unit” (Denzin 1989). The validation method aligns the respondents' responses with the work's research question.

We were inspired by Silverman (2000) who argues that qualitative analysis is a process with the following four steps: interviews, field notes, texts, and transcripts. We used coding to distinguish categories during our analysis. First of all, our interviews were transcribed into texts and then coded per our defined categories. Information processed in this way served as the basis for our analysis.

#### **4 Qualitative Analysis Results**

The goal of our qualitative research was, first of all, to identify the reasons of the migration of the Slovak migrants who decided to live permanently abroad. We wished to understand their reasons and feelings, why they decided in this way, including the benefits and risks they faced and face. The most important thing was to also identify their tacit knowledge, which they obtained and use in their everyday lives abroad.

The majority of respondents decided to live abroad due to their bad work experiences in Slovakia. The most frequently specified reasons included their employers' poor morale. They particularly disliked corruption, and they felt poorly financially awarded. They found their conditions in Slovakia unfavourable. They saw their new beginnings in migration, wishing to live better lives than in Slovakia. The respondents mentioned multiple positive expectations associated with their migration. We may find them their motivation to migrate. Their reasons usually concerned their work. For example, there were reasons like better paid work, higher specification in the field, career advancement, better financial income, and better job prospects. The other reasons included their desire to learn about another country and its culture, receive a prestigious title abroad, and better standard of living. Some respondents found their migration adventure and a way of meeting their life dream to live in their dream country.

Eventually, migration brought something else than expected to every respondent. Each of them faced problems he had to cope with; however, thanks to them, he gained new knowledge and capabilities. The respondents usually agreed that their trust in themselves and courage to face problems without quitting helped them a lot. They also got helped by their families and knowledge, capabilities, and skills gained at their Slovak schools. They were open to new things and empathic to people they met in their new world. They were ready to search for solutions offered to them by their new situation in a country in which they decided to live and exist. Multiple respondents appreciated that they did not sense any corruption and nepotism like in Slovakia. Instead, they were able to advance on a new labour market, getting a particular satisfaction and trust in themselves.

The respondents mentioned more benefits than disadvantages or risks faced in a foreign country. According to them, the risk primarily rested in the uncertainty, which accompanied them during travelling and their first days abroad. The greatest disadvantage was their limited time spent with their families and friends in Slovakia. The respondent who travelled to Columbia also faced a risk of potential attack and greater chances of catching diseases, which are not that frequent in Europe. The specified benefits included more functional economic, social, and political systems, learning languages, better financial income, career advancement possibility, better labour market outlooks, and higher standard of living.

When asked whether they feel different from the Slovaks currently living in Slovakia, all the respondents answered positively. The respondents feel changed by their migration. The majority of

them stated that they understand life better, gained a lot of knowledge and experiences, including tacit knowledge. They learned to be more open and communicative abroad; they started to trust more to themselves, and became more independent. The respondents talking about most frequently gained knowledge mentioned their knowledge of languages. The students' primary motivation was to improve their language skills and obtain education at foreign universities. All the respondents found work, and they are currently financially independent. Two respondents are currently unemployed; however, their confidence in their specific countries' systems is strong enough, and they believe that they will find work within a short time.

Newly gained knowledge and specific life experiences change everybody. The respondents also realize that during their migration, they mainly gained their knowledge of languages and improved their communication skills. People working at higher positions learned how to improve their strategic planning skills. Respondents who work manually learned to work more systematically. Based on this knowledge, the respondents' confidence increased, and their lives became adequately richer.

## 5 Conclusion

The positive expectations specified by the respondents as their motivation to migrate were always partially fulfilled. All the respondents experienced various problems; however, they jointly did not give up on their goals and fought for their existence. They were driven by their desire to live better lives, but definitely also their desire to obtain new knowledge. Living abroad gradually changed the respondents. While living in foreign countries, they began thinking differently, and their life values changed as well. However, none of them forgot that they come from Slovakia. We may find the Slovaks' identity quite strong. During their time abroad, the respondents maintain their relationships with their families and friends and 2-3-times a year they return to Slovakia. Some respondents, mainly the women who do not have children yet, plan to return to Slovakia. They wish their children to grow in the same environment as they did. The students from our sample were not decided yet, but they favoured the option of staying abroad. They expect better career advancement abroad.

The most frequent types of tacit knowledge gained and used by the respondents in their daily lives is cultural (*encultured*) knowledge. It primarily includes their language and communication knowledge. This type of knowledge is definitely associated with their learning of new cultures. It is also associated with gastronomical knowledge, which deepens understanding among people from different cultures and countries. The Slovak migrants also gained their embedded knowledge, specifically procedural types of knowledge. The respondents learned specific work procedures, which they find more effective and quicker. They learned to plan better and to think more strategically. Since their general knowledge expanded and they have more experiences, they know how to become more successful. Their self-confidence is higher, and they do not easily quit. Their lives abroad taught them to find solutions in every situation.

Although migration itself reduces the rate of unemployment in Slovakia, its greatest risk is brain drain, i.e. also deteriorating demographic development in Slovakia. People who stayed abroad currently represent Slovakia's human capital, which Slovakia voluntarily lost. We call this brain drain. However, from the general life perception perspective, one should perceive the knowledge transfer positively since this knowledge gets transferred from place to place through people (brain circulation). However, the positive aspect is that the Slovak migrants stay Slovaks in their hearts, and their tacit knowledge gained abroad during their migration or before in Slovakia helps them enrich other cultures. Resultantly, the worldwide human capital becomes richer.

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## EMPLOYMENT IN SHADOW ECONOMY IN THE CZECH REPUBLIC: ESTIMATION USING THE LABOUR APPROACH

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### Abstract

The main aim of this paper is to empirically estimate amount of employed persons in the shadow economy. In the literature, there exist a few methods to estimate the size of the shadow economy. The labour approach method, used in estimating the size of employment in the shadow economy in Czech Republic in this paper, assumes that the official rate of labour participation (activity rate) is constant, any change being considered to be due to activities from shadow economy. The results revealed the inverse relationship between activity rates and employment in the shadow economy, as was expected. If the rate of activity increases, employment in the shadow economy decreases. The lowest activity rates were detected from 2008 to 2011. In the same period was the amount of the employment in the shadow economy highest. Specifically there was activity rate around 58,5 % with 267 thousand persons employed in the shadow economy in 2008. By 2011, the activity rate fell to 58,3 % with 291 thousand persons employed in the shadow economy.

### Keywords

Shadow economy, Activity rate, Labour approach, Employment, Methods

### JEL classification

E26, K42, O17

## 1 Introduction

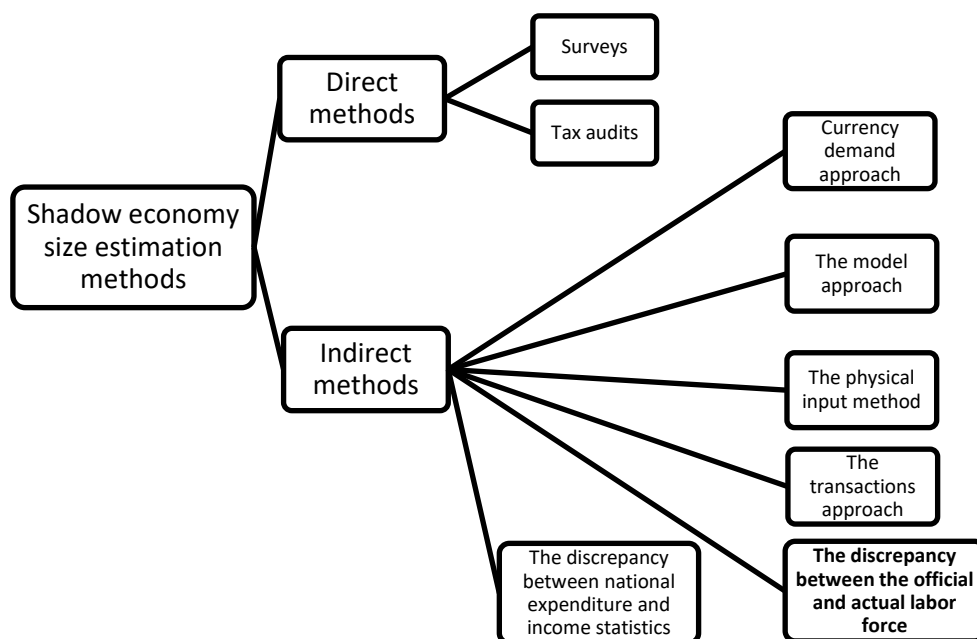
In the literature, there exist a few methods to estimate the size of the shadow economy. Various authors approach to the issue of the shadow economy size estimation differently. Some methods are considered more accurate than others. To successfully meet the estimate of the shadow economy size, it is necessary to describe the various methods. Choose the right method is quite a complex task. Some methods to estimate the shadow economy size are better suited to estimate the magnitude of the shadow economy within market economies and some within the transition countries. Capture or accurately measure the size of the shadow economy is very difficult. This fact is not surprising. As is clear from the very definition of the shadow economy, this social and economic phenomenon includes activities that should be hidden from capture by national authorities. In this paper the aim is to deal with that part of the shadow economy that is embodied in the labour market activities. Thus the labour approach alone represents method that is used to study the phenomena. Furthermore the attention is restricted only to Czech Republic. Before and during analysed period from 1995 to 2014 the country moved through the period of transition from a centrally planned economy to a market oriented economy and also through a period of adjustment to European Union membership. The attention is focused to estimate the development path of the employment in the shadow economy in Czech Republic in recent years.

## 2 Measuring the size of the shadow economy - Methods available

Available methods used to estimate the size of the shadow economy can be divided into two main groups. The first group are the direct methods and the second group are indirect methods. Direct methods are trying for direct revelation of economic agents operating in the "shadow", rather than indirect signs of the shadow economy. Among the direct methods belong surveys and tax audits. Both of these categories belong among the so-called "Micro approaches" to estimate the size of the shadow

economy (Eilat, Zinnes, 2000). Indirect methods are often referred as the so-called "Indicator approaches" because their character is mostly macroeconomic and methods also utilize the various economic and other indicators that provide information about the development of the shadow economy size over time. Currently, there exist five indicator approaches, but next are discussed. Indirect methods are unlike direct methods focusing on tracking traces left by unofficial economy activities in the official economy (Schneider, Enste, 2000).

Diagram 1: Classification of methods to estimate the size of the shadow economy



Source: Schneider and Buehn (2013), own processing diagram

The labour approach to estimate the employment in the shadow economy belongs among the indirect methods. This method was chosen to estimate the size of the shadow economy (in terms of employment in the shadow economy) in the Czech Republic in this paper.

### 3 The labour approach

One of the macroeconomic indicators used to estimate the size of the shadow economy are the differences in official (registered) use of labour. The decline in labour force participation in the official economy (official labour market) is considered to be an indicator of increased activity in the shadow economy, provided that the total labour force participation is constant, *ceteris paribus* (Öğünç, Yilmaz, 2000).

Is expected to an increasing number of shadow economy activities (increasing employment in the shadow economy), if the ratio of people employed in the official economy to the population decreases and the ratio of labour force to population remains constant. The important fact is that the final analysis of this method serves only to estimate the employment in the shadow economy (in other words “undeclared work”) (Eilat, Zinnes, 2000). As was stated above the decline in labour force participation in the official economy can be seen as an indicator of the increase in activity in the shadow economy.

The labour approach was first suggested by Contini (1981) for the conditions of Italy. Contini noted that the official rate of labour force participation in the labour market since the late 50s substantially diminished. In contrast, unofficial surveys indicated that the estimated rate of labor force participation is much higher than the officially registered rate. Production achieved using unregistered labor force was therefore not recognized in official estimates of national income. So if there is a shift of labor force participation from the official into the unofficial sector by any reason, we talk about undeclared work. Labour approach advantages are availability of data on rates and the simple calculation, but the disadvantage can be the fact that the data for population are in some countries collected for instance every ten years when the census is taken so that we can only make estimates for the years between two censuses. Besides, using the method can reveal the number of unemployed who work in shadow economy, but the number of those employed in both shadow and official economy remains unknown. The reduction of the rate can indicate the retreat of population from official and participation in shadow economy (Svec, 2009).

The weakness of this method lies also in the existence of other factors that causes changes in the rate of labor force participation in the official sector (large structural changes associated with an increase in unemployment, an increase in poverty, etc.). *“One of the main disadvantages is the fact that the initial value of shadow employment is always zero. The assumption is not realistic, but the method algorithm itself gives such value. The method was more important for the 90-ies, but today other methods are more credible”* (Svec, 2009). Moreover, people can work in both parts of the economy. Many activities are carried out in some companies that are involved in both official and unofficial activities. These are rather small or medium-sized businesses that may employ staff, both on the basis of a proper contract, as well as without proper contract (undeclared work). Therefore, if all employees are regarded as officially employed, there is a significant underestimation of the size of the shadow economy. Therefore, such estimates may be regarded as weak indicators of the shadow economy size. The main drawback is also the assumption of a constant overall labour force participation in the labor market. The main problem of this method remains the fact that in the final consequence serves only to estimate the portion of the shadow economy called undeclared work (Eilat, Zines, 2000). However the use of (not only labour approach) available methods is accompanied by a number of disadvantages it should be noted that despite the weaknesses of these methods and their weak assumptions the methods mentioned above are the only existing tools that allow for estimation of the size of the shadow economy. After assessing the suitability of the methods a labor market perspective approach was chosen for estimating the size of the shadow economy in the empirical section of this article. Crnković-Pozaić (1997) distinguishes between two forms of labor approach. The first form of the method is based on historical activity rates and the other on labor force surveys. In this paper a first form based on activity rates calculation was used.

Crnković-Pozaić (1997) states, that the activity rate can be defined as a ratio of persons who either are or wish to be economically active to all persons of working-age:

$$\text{activity rate} = \frac{\text{the employed} + \text{the unemployed}}{\text{persons of working age}} \quad (1)$$

$$\text{labour force (total labour supply, total working population,} \\ \text{defacto economically active population)} = \text{the employed} + \text{the unemployed} \quad (2)$$

$$\text{alternative definition: activity rate} = \frac{\text{the employed} + \text{the unemployed}}{\text{total population}} \quad (3)$$

### 3.1 Labour approach based on activity rates

The algorithm for estimating the number of employed person in shadow economy consists of several steps. The main steps are (Svec, 2009), (Crnković-Pozaić, 1997):

- 1) Data on the employed and unemployed (for certain time periods) should be obtained from the Czech Statistical Office and de facto active population calculated according to the formula (2).
- 2) Activity rate is to be calculated using the formula (1) or (3).
- 3) Zero activity rate is defined according to the formula (1) or (3), in the process of which initial data of the given time series are used. Hypothetically active population for the time period  $t$  is equal to the product of multiplication of the zero activity rate and total population in year  $t$ .
- 4) After the values from step 1), 2) and 3) have been calculated, it is possible to calculate the value of the employed in unofficial economy according to the formula (4).

$$\text{share of employed in the unofficial economy} = \frac{\text{hypothetically active} - \text{de facto active}}{\text{de facto active}} \quad (4)$$

Davidescu and Strat (2015) states that the labour approach method, used in estimating the size of employment in the shadow economy, assumes that the official rate of labour participation (activity rate) is constant, any change being considered to be due to activities (increasing or decreasing) from shadow sector. Based on statistical data, it is calculated the actual and hypothetical active population, comparing actual activity rates with hypothetical ones (expected). The hypothetical activity rates are based on hypothetical activity rate of the reference period (when it is assumed that there is not informal activity. As hypothetical activity rate of reference period has been selected the value of actual activity rate in 1995. “The difference between actual and hypothetical activity rates is assumed to be an indicator for the size of the employed persons in shadow economy” (Davidescu, Strat, 2015).

### 3.2 Data

The size of the employment in the shadow economy is calculated using annual administrative data for period from 1995 to 2014. The data about total population in the age over 15 years, total employed persons, total unemployed persons and de facto active population were drawn from Czech Statistical office employment and unemployment databases.

### 3.3 Results

Now it is important to repeat, that the labour approach method, used in estimating the size of employment in the shadow economy is based on the fact that the official rate of labour participation (activity rate) is constant, any change being considered to be due to activities (increasing or decreasing) from shadow sector. Based on the data obtained the hypothetically active population and actual active population were first detected. Then the actual and hypothetical activity rates were calculated and compared.

“The hypothetical activity rates are based on hypothetical activity rate of the reference period (when it is assumed that there is not shadow activity)” (Davidescu, 2014). As reference period has been established the year 1995 (first year of the dataset). The difference between actual and hypothetical activity rates or in other words difference between actual active population and hypothetically active population is assumed to be an indication for the magnitude of employed persons in shadow economy. The table 1 below shows the results of values calculations of important labour approach indicators (activity rates, hypothetically active population and total unofficial employment).

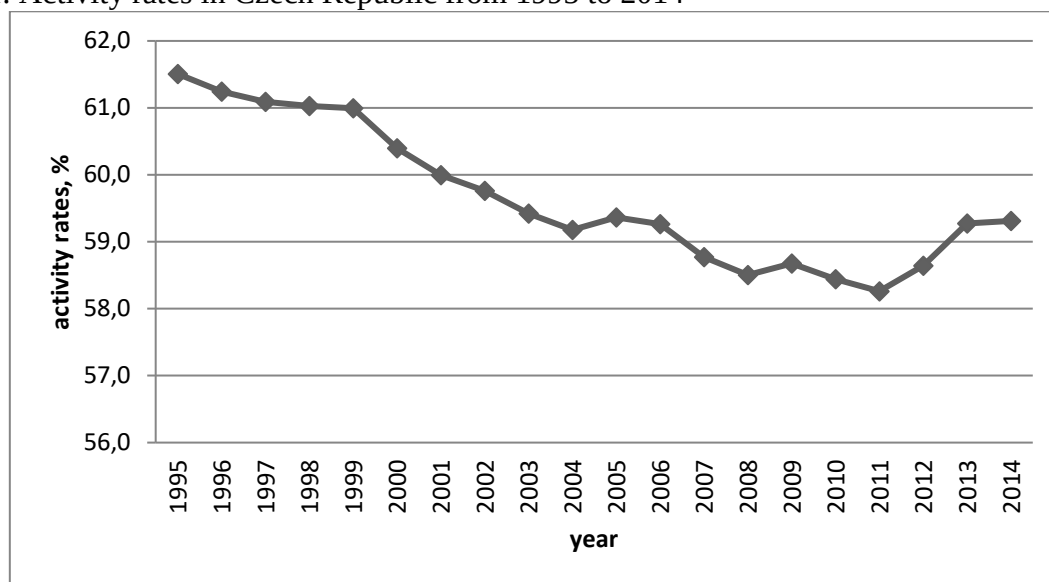
Table 1 Data about Total population, Employed and Unemployed for Czech Republic from 1995 to 2016 (Administrative data)

|                                     | 1995   | 1996   | 1997   | 1998   | 1999   | 2000   | 2001   | 2002   | 2003   | 2004   |
|-------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Total population (15+ years)</b> | 8406,4 | 8447,5 | 8487,0 | 8523,2 | 8555,3 | 8586,4 | 8577,4 | 8599,1 | 8636,9 | 8673,3 |
| <b>total employed</b>               | 4962,6 | 4972,0 | 4936,5 | 4865,7 | 4764,1 | 4731,6 | 4727,7 | 4764,9 | 4733,2 | 4706,6 |
| <b>total unemployed</b>             | 208,1  | 201,5  | 248,3  | 335,7  | 454,1  | 454,5  | 418,3  | 374,1  | 399,1  | 425,9  |
| <b>de facto active population</b>   | 5170,6 | 5173,5 | 5184,8 | 5201,5 | 5218,2 | 5186,1 | 5146,0 | 5139,1 | 5132,3 | 5132,5 |
| <b>activity rate, %</b>             | 61,5   | 61,2   | 61,1   | 61,0   | 61,0   | 60,4   | 60,0   | 59,8   | 59,4   | 59,2   |
| <b>hypothetically active pop.</b>   | 5170,6 | 5195,9 | 5220,2 | 5242,5 | 5262,2 | 5281,3 | 5275,8 | 5289,2 | 5312,4 | 5334,8 |
| <b>total unofficial employment</b>  | 0,0    | 22,4   | 35,3   | 41,0   | 44,0   | 95,2   | 129,8  | 150,1  | 180,1  | 202,3  |
| <b>unofficial employment, %</b>     | 0,0    | 0,3    | 0,4    | 0,5    | 0,5    | 1,1    | 1,5    | 1,7    | 2,1    | 2,3    |
|                                     | 2005   | 2006   | 2007   | 2008   | 2009   | 2010   | 2011   | 2012   | 2013   | 2014   |
| <b>Total population (15+ years)</b> | 8716,0 | 8773,4 | 8845,0 | 8943,8 | 9009,3 | 9015,4 | 8964,7 | 8964,6 | 8951,5 | 8932,6 |
| <b>total employed</b>               | 4764,0 | 4828,1 | 4922,0 | 5002,5 | 4934,3 | 4885,2 | 4872,4 | 4890,1 | 4937,1 | 4974,3 |
| <b>total unemployed</b>             | 410,2  | 371,3  | 276,3  | 229,8  | 352,2  | 383,7  | 350,6  | 366,9  | 368,9  | 323,6  |
| <b>de facto active population</b>   | 5174,2 | 5199,4 | 5198,3 | 5232,3 | 5286,5 | 5268,9 | 5223,0 | 5256,9 | 5306,0 | 5297,9 |
| <b>activity rate, %</b>             | 59,4   | 59,3   | 58,8   | 58,5   | 58,7   | 58,4   | 58,3   | 58,6   | 59,3   | 59,3   |
| <b>hypothetically active pop.</b>   | 5361,0 | 5396,3 | 5440,4 | 5501,1 | 5541,5 | 5545,2 | 5514,0 | 5513,9 | 5505,9 | 5494,3 |
| <b>total unofficial employment</b>  | 186,9  | 197,0  | 242,1  | 268,8  | 255,0  | 276,3  | 291,0  | 257,0  | 199,8  | 196,4  |
| <b>unofficial employment, %</b>     | 2,1    | 2,2    | 2,7    | 3,0    | 2,8    | 3,1    | 3,2    | 2,9    | 2,2    | 2,2    |

Source: Author, based on data form the Czech Statistical Office (CZSO). For the period 1995-2014, own calculations

In Figure 1 the activity rates in the Czech Republic in the reporting period are captured.

Figure 1: Activity rates in Czech Republic from 1995 to 2014

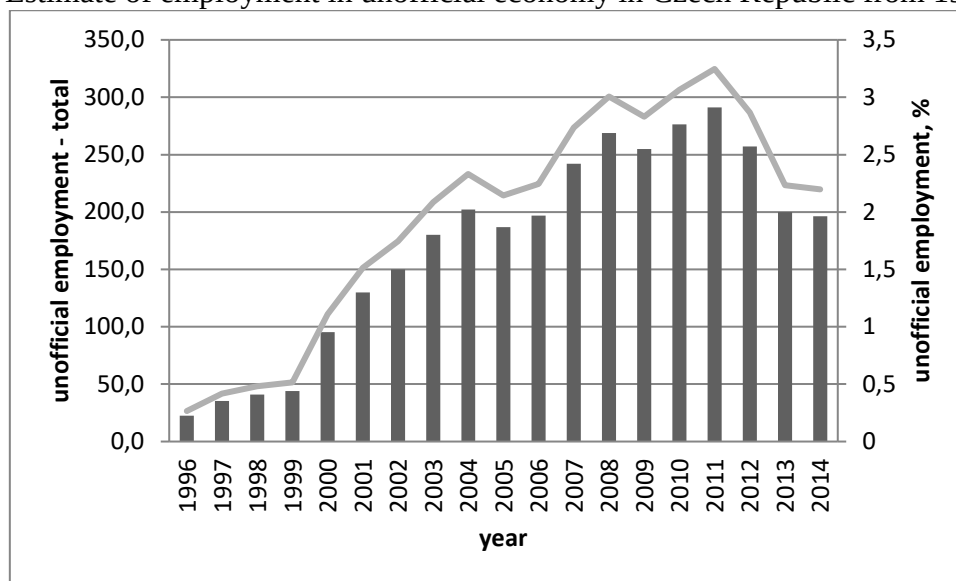


Source: Author, based on data form the Czech Statistical Office (CZSO). For the period 1995-2016

The results point to a downward trend in activity rates from 1995 to 2011. Looking at Figure 2, it is clear that there is an inverse relationship between activity rates and employment in the shadow economy calculated. From 1995 to 2011 there has been a decline in rates of activity and at the same time, the growth of persons employed in the shadow economy. Since 2012, activity rates begin to grow and therefore can be assumed that there is a decrease of employed persons in the shadow economy. The value of activity rates vary between the highest value around 61,5 % in 1995 (when

the employment in shadow economy is assumed to be zero) and lowest value 58,3 % in 2011. But we have to take into account the fact that it is not possible to assume that everyone who leaves official labour force moves to the shadow economy. It is important to keep in mind that part of these persons wants to be inactive. Thus finally the empirical results as a shadow economy size indicator are to be regarded only as an approximation, taking into account the fact that using this method the size of shadow economy is usually underestimated. Rather as was stated above results can be used as indicator of employment in shadow economy.

Figure 2: Estimate of employment in unofficial economy in Czech Republic from 1996 to 2014



Source: Author, based on data form the Czech Statistical Office (CZSO). For the period 1995-2016

From the results obtained from calculations and captured in figure 2 it is possible to see that highest magnitude of the employed persons in the shadow economy was from 2008 to 2011. Specifically there were almost 267 thousand persons employed in the shadow economy in 2008. In 2011, this figure rose even to 291 thousand persons employed in the shadow economy which accounted for 3,2 % of total population at age over 15.

#### 4 Conclusion

The main aim of this paper was to empirically estimate the magnitude of the employed persons in the shadow economy in Czech Republic from 1995 to 2014, when the country moved through the period of transition from a centrally planned economy to a market oriented economy and also through a period of adjustment to European Union membership. Methodological framework consisted of labour approach method, which ranks among the indirect method to estimate the size of the shadow economy (rather only part of the shadow economy called undeclared work). The magnitude of the employed persons in the shadow economy was calculated using administrative data about employment and unemployment available from Czech Statistical Office database. The results revealed the inverse or in other words negative relationship between activity rates and employment in the shadow economy, as was expected. If the rate of activity increases, employment in the shadow economy decreases. The lowest activity rates were detected from 2008 to 2011. In the same period was the magnitude of the employment in the shadow economy highest. Specifically there was activity rate around 58,5 % with 267 thousands persons employed in the shadow economy in 2008. By 2011, the activity rate fell to 58,3 % with 291 thousand persons employed in the shadow economy. At this point it is necessary to bear in mind the fact that the method is confronted with many challenges. These challenges were

described earlier in this paper (see section 3). Estimating the share of the labour force employed in the shadow economy, using the selected method is considered due to the many limitations of the method very problematic. It is possible certainly assume that this calculated level of those who works in the shadow economy in the Czech Republic is undervalued. On the other hand, the method is despite its weaknesses still used for estimating employment in the shadow economy in various countries. The advantage of labour approach method is easy access to necessary data and simple calculations in the method. The benefit of the method is to provide an approximation of the development of employment in the shadow economy. The results may be beneficial to the expert scientific community and the public as well as policy-makers of the European Union and may stimulate further research on this very important, but on the other side no to much researched issue of the shadow economy.

## 5 Acknowledgement

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## POLITICAL BUSINESS CYCLES IN THE OECD COUNTRIES: AN INITIAL ANALYSIS

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### Abstract

Economists of public choice theory state that incumbent politicians tend to use government resources for pre-electoral manipulations. Incumbent politicians have incentives to influence some of the macroeconomic variables (e.g. GDP growth) because they desire to appear competent before the elections. This phenomenon is called the political business cycle. The aim of this paper is to find out if there is a political business cycle in the OECD countries. We take into account our previous research on the political budget cycle and we enlarge our analysis. The dynamic panel linear regression model is used in this article and 34 OECD members are investigated over the period 1995 – 2014. One important result emerges: there is a political business cycle in the OECD countries. An average GDP growth increases regularly about 0.5 percentage points in the time of general elections in these countries.

### Keywords

Elections, Government Performance, Business Cycle, Political Business Cycle, Public Choice Theory

### JEL classification

D72, E32, E62, H11

## 1 Introduction

Economists of public choice theory state that incumbent politicians tend to use government resources for pre-electoral manipulations. Incumbent politicians have incentives to influence some of the macroeconomic variables (e.g. GDP growth) because they desire to appear competent before the elections. This phenomenon is called the political business cycle. Formerly, a comprehensive theory of political business cycle was designed by Nordhaus (1975), but roots of this theory are much older.

Relationship between political events and a business cycle was already described by J. A. Schumpeter in his famous *Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process*. Schumpeter (1939) stated that the evolution of the business cycle is influenced by external political events in certain cases. For example, wars between 1795 – 1815 were apparently such events and the figure of Napoleon can be considered as a typical external factor. This factor was so important that we have to ask whether we think properly if we distinguish the process of the economic evolution *sui generis*, which is only occasionally disturbed by political events. It is very interesting that the process of industrial innovations, which started in 1793 in Great Britain, coincides with the declaration of the war against France. We could argue that the mechanisms of the business cycle reach the peak of a prosperity without external factors if we did not know the facts mentioned above.

The external political factors were clearly considered as important components of the business cycles by Schumpeter (1939), however his interpretation was still very far from the modern theory of the political business cycle. Another step was taken by Michał Kalecki. Kalecki (1943) described a theory of “the regime of the political business cycle” which is closely connected with the modern theory of the political business cycle. We can consider him as an immediate predecessor of this theory, even if his assumptions were somewhat different.

Kalecki (1943) stated that there is a pressure from businessmen to the government to support private investments (or at least to start public investments) during the economic downturn. Then, if the government tries to keep its investments and to achieve a full employment during the economic boom, there will be a strong opposition from these social strata. Capitalists do not want a full employment because if the employment is high, worker's requirements could “get out of hand”. A social position of the businessmen would be threatened because of an increasing self-confidence and class consciousness of workers. Therefore, there will be a strong pressure from the business spheres to cut government expenditures and budget deficits. The resulting cycles are an artificial restoring of the position of the nineteenth century capitalism, Kalecki (1943) adds.

Feivel (1974) agree with Kalecki, however states that Kalecki's theory could be modified and reworked. A government is, according to Feivel (1974), very sensitive to election process. For example, the government is elected due its program which consists of anti-inflation measures and it starts to realize the anti-inflationary (or deflationary) policy just before the elections. With increasing inflation and when the next elections come closer, the government “is forced” to change its policy towards to a fiscal expansion. The pressure of the forthcoming elections very often forces the governments to act in certain way (e.g. fiscal expansion) or to solve short term problems. This behavior can induce very high social costs.

Feivel (1974) turned his attention from businessmen to the government and clearly described the mechanism of the political business cycle. Nordhaus (1975) followed up on his work and introduced a formal model of the political business cycle.

Nordhaus (1975) model will be presented in the next section (section 2), afterwards we will present some previous empirical results (section 3). Our empirical model of the political business cycle, methodology and basic results will be described in the section 4 and robustness analysis will be performed in the section 5. The last section concludes the obtained results (section 6).

The aim of this paper is to find out if there is a political business cycle in the OECD countries. We take into account our previous research on the political budget cycle (especially Janků, 2016) and we enlarge our analysis. The dynamic panel linear regression model is used in this article and 34 OECD members are investigated over the period 1995 – 2014. One important result emerges: there is a political business cycle in the OECD countries. An average GDP growth increases regularly about 0.5 percentage points in the time of general elections in these countries.

## 2 The model of the political business cycle

Nordhaus (1975) described a simple model of public intertemporal choice where decisions are made within a political framework. This model solved the problem of government choice between inflation and unemployment because conventional macro-economic wisdom is that there is a trade-off between rate of inflation and the level of employment and output (Phillips curve).

Nordhaus (1975) assumed that households prefer low unemployment rates and a low and stable price growth. Households are rational in their preferences, but they are ignorant of the macro-economic trade-off. Therefore, they do not know how well or badly policy makers are doing relative to objective possibilities and only rely on past experience in their political decisions.

Briefly, the macroeconomic system is defined as:

$$\pi_t = f(u_t) + \lambda v_t, \quad (1)$$

$$\dot{v}_t = \gamma(\pi_t + v_t), \quad (2)$$

where  $\pi_t$  is the rate of change of prices,  $u_t$  is unemployment rate,  $v_t$  is expected rate of inflation and  $\dot{v}_t$  is the change of expected rate of inflation per unit of time. It is assumed that unemployment is control or policy variable of the economic system (1) and (2) which the policymakers can set at any level they wish. The important question is what the level of unemployment (or output) will be under different conditions (e.g. in the election years), and how this compares with the optimal choice.

Furthermore, Nordhaus (1975) suggested the economy is composed of a large number of individuals. Individuals are assumed to have well-behaved ordinal preference orderings over economic variables,  $z = (z_1, z_2, \dots, z_m)$ :

$$z_1 = -\pi; \quad z_2 = -u; \quad z_3, \dots, z_m. \quad (3)$$

Eventually, he presents the preference ordering of the  $i$ th individual by the real-valued function,  $U^i = U^i(z)$ .  $U^i$  is assumed to be quasi-concave (i.e. diminishing marginal rate of substitution) and indexed such that  $U^i$  is positive and an increasing function of the  $z$ 's.

Election occur at points  $(0, 1, 2, \dots)$ , and that economic variables  $z_t$  refer to the suitable weighted average value of  $z$  over the period from  $t - 1$  to  $t$ . At time  $t$ , each voter compares the economic performance of incumbents during the last electoral period  $z_t$  with the own subjective standard for performance  $\hat{z}_t$ . If the incumbent was able to do better than the standard, the individuals vote for the incumbent; otherwise the incumbent votes for the opposition (challenger).

The role of incumbent is thus clear. Incumbent is assumed to be interested only in election outcomes – he wants to win the elections. It is assumed he knows the voters preferences about  $z$ 's perfectly, and therefore chooses economic policies (especially through the monetary policy instruments) during its incumbency which maximize its popularity at the next elections. The incumbent performs short-term policy choice about macroeconomic variables and anticipates that voters have a decaying memory of past events (they do not take simple averages of economic variables over the last electoral period)<sup>2</sup>. Finally, according to Nordhaus (1975), the typical cycle will run as follows: immediately after an election year the new incumbent will raise the unemployment (or will decrease the outcome) to a relatively high level in attempt to reduce inflation. As the next elections approach, the unemployment rate will be lowered to the "purely myopic point" (the unemployment rate will be lowest in the time of the elections).

As a result, we have a testable prediction for our paper: if the elections occurs, there will be a higher growth rate of the output than in the non-elections years. We will not deal with the level of unemployment or the rate of inflation for now. We will present some former empirical results before the actual analysis takes place.

### 3 Literature review

The attention which was devoted to the political business cycle models in the late seventies is quite well illustrated by works of Nordhaus (1975), Lindbeck (1976), Hibbs (1977), MacRae (1977) or Tufte (1978). These models worked with the assumption that the incumbent is able to manipulate economic outcome (primarily through the monetary policy), including real economic variables such as the GDP growth or the rate of unemployment. Moreover, there was another assumption that the effort of the incumbent to manipulate an economic outcome has to have a practically immediate impact on the economy and this impact has to be relatively precisely aimed (e.g. on the election years). Both assumptions are very controversial today, even for public choice scholars. The former assumption is questioned by the rational expectation hypothesis (or MREH, macro rational expectation hypothesis, see Muth, 1961), the second is questioned by theories of different types of policy lags that occur when monetary (or fiscal) authority takes action in attempt to influence the economic output. Of course, there is another one empirical shortcoming, a monetary policy is often independent now and it does not care about elections and election outcome. Former models of the PBC are obviously historically conditioned. Despite these theoretical weaknesses there is a certain empirical evidence for the political business cycle, especially in the 1970s and 1980s.

<sup>1</sup>  $z_3, \dots, z_m$  are other economic variables.

<sup>2</sup> What is vastly important is that there is a big difference between such political and clearly economic "weighting", see Nordhaus (1975) for details.

The empirical analysis of Nordhaus (1975) discovered statistically significant political budget cycles in the 1947 – 1972 in the USA, Germany and New Zealand (less serious in France and Sweden). For example, there were statistically significant decreases in the rate of unemployment in 5 cases of voting years out of 5 (and postelection increases in the rate of unemployment in 4 cases out of 5).

Hibbs (1977) tested the post-war changes in macroeconomic variables in the capitalist democracies and concentrated on the effect of alternation between left wing parties and right wing parties. He found a combination of lower unemployment rates and higher inflation rates in the countries where left-wing governments dominated (and vice versa). Moreover, using the ARMA model and quarterly data from 1948 – 1975, he found out that the difference in unemployment rates between Democrat and Republican governments was almost 2.36 percentage points. These fluctuations were explained by trade-off between inflation and unemployment (c.f. Nordhaus, 1975). Contrary to Nordhaus, Hibbs (1977) considered political business cycles as ideologically conditioned (i.e. political parties are ideological not opportunistic). So called partisan cycles was also investigated by Alesina and Roubini (1992), Alesina (1987, 1989) and by others. We will deal, however, only with opportunistic cycles in this article.

Practically no significant evidence of opportunistic cycles in macroeconomic variables was found out by McCallum (1978) in the USA (quarterly data, 1948 – 1974), Paldam (1979) in the 17 OECD countries (annual data, 1948 – 1975), Golden and Poterba (1980) in the USA (quarterly data, 1953 – 1978) or Williams (1990) again in the USA (1953 – 1984). These studies were often built on the basis of rational expectation theory and they described rather the manipulations with fiscal and monetary instruments than the manipulations with real economic variables.

On the other hand, some newer studies on political business cycles confirm the existence of the PBC. We can mention Potrafke (2012), Grier (2008) or Klein (1996) particularly. For example, Grier (2008) detected former non-rational<sup>3</sup> opportunistic cycles in the USA over the period 1961 – 2004. The author controlled multiple lags of interest rate changes, inflation, money growth, energy prices, lagged output growth, government spending or temporary partisan effects and claimed that the timing of elections exerts a significant influence on quarterly real GDP growth.

## 4 Empirical evidence

In this section, we present empirical evidence on how elections affect the real output growth in the developed economies (in the OECD countries) in order to examine the possibility of the existence of the political business cycle. We first discuss data, empirical model and estimation issues. We then present our main results on PBC.

### 4.1 Data

Our panel includes annual data from 34 developed countries for the 1995 – 2014 period. We use an unbalanced cross-country time-series dataset.

Data on output growth (real GDP growth), gross domestic product (current prices) and gross capital formation (current prices) come from the OECD statistics – Economic Outlook No 98 - November 2015. Data on population growth (annual, %) and gross enrolment ratio (tertiary, %)<sup>4</sup> are extracted from the World Bank statistics and database.

Most important for our analysis, a political dummy variable is introduced to reflect the impact of elections. Election dates are taken from the Database of Political Institutions 2015 (DPI2015), provided by the World Bank (Cruz, Keefer and Scartascini, 2016).

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<sup>3</sup> Former opportunistic or partisan cycles with the assumption of adaptive expectations of voters are often called “non-rational models” and models with rational expectations are called “rational models”.

<sup>4</sup> Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown (in this case tertiary education), see World Bank (2016).

## 4.2 Econometric specification

The basic model to test the political business cycle has been designed by Nordhaus (1975) formerly. We will use dynamic panel data model to test the predictions of the traditional political business cycle theory which has been used, for example, by Potrafke (2012). However, we propose some modifications in this model and we use extended neoclassical model based on Mankiw, Romer and Weil (1992) and Barro (1996) for this purpose. Our empirical model has the following form:

$$growth_{it} = \alpha growth_{it-1} + \beta X'_{it} + \gamma ele_{it} + \mu_i + \varepsilon_{it}, \quad (4)$$

where the dependent variable  $growth_{it}$  denotes the yearly real GDP growth rate in country  $i$  and year  $t$ ,  $X'_{it}$  is a row vector of three exogenous economic control variables,  $ele_{it}$  is a dummy electoral variable,  $\mu_i$  are unobserved country-specific effects and  $\varepsilon_{it}$  is an error term.

The vector  $X'_{it}$  is based on Mankiw, Romer and Weil (1992) and Barro (1996), i.e. on the extended neoclassical model, while the variables can be considered as standard growth variables:

$$X'_{it} = \{cap_{it}, pop_{it}, hum_{it}\}, \quad (5)$$

where  $cap_{it}$  is a capital accumulation approximated by an indicator of gross capital formation to the GDP (in %, positive sign is expected),  $pop_{it}$  is an annual population growth rate (in %, negative sign is expected),  $hum_{it}$  is indicator of human capital which is approximated by gross enrolment ratio to the tertiary level of education (in %, positive sign is expected).

The electoral variable  $ele_{it}$  codes the year the executive is elected. It equals 1 in the years of legislative election, and 0 in all other years. The variable  $ele_{it}$  is a key variable for the evaluation of politically induced cycle.

Finally, let us note at the end of this section that Mankiw, Romer and Weil (1992) model is one of the most widely used models as it widens the basic neoclassical growth model by human capital. We have used this methodological approach in some of our previous studies (e.g. Macek, 2014 or Macek, 2015). This approach seems to be the most relevant to our current analysis.

## 4.3 Methodology

Assuming that the unobserved country-specific effects are equal across countries, that error term is not serially correlated and that the explanatory variables are strictly exogenous, the model (4) can be estimated with Ordinary Least Squares (OLS). It is almost certain that the unobserved country-specific effects are different across countries. Consequently, the simple Ordinary Least Square estimator is biased. Most empirical studies have employed the Fixed Effects (FE) in order to allow for cross-country differences. However, the dynamic panel data model is used in this article (the inclusion of lagged dependent variable). Hence, there is another source of bias because the vector of lagged dependent variable is correlated with the vector of error term. The potential estimation bias is of order  $1/T$ , where  $T$  is the length of the panel (the number of periods) (see Nickell, 1981; Kiviet, 1995).

This problem is enlarged if the number of individuals  $i$  is large, while the number of periods  $T$  is quite small (note, that the bias becomes smaller as the length of the panel increases to infinity  $T \rightarrow \infty$ ). Since the number of periods is relatively small ( $T = 20$ ) in this panel and it is lower than the number of cross-sections ( $i = 34$ ), the generalized method of moments (GMM) is employed. For the panel data, this method uses the Arellano-Bond estimator (Arellano and Bond, 1991).

The Arellano-Bond estimator transforms all regressors by differencing (first differencing, FD), and uses the GMM with the instrumental variables (IV).<sup>5</sup> We also use a forward orthogonal deviations (FOD) transformation proposed by Arellano and Bover (1995). This transformation method can

<sup>5</sup> The instruments used in GMM regression are lagged levels of the dependent variable (they are generated for each period). The electoral dummy and the strictly exogenous covariates are instrumented by themselves.

provide more precise results if unbalanced panel data are examined (i.e. our case) and it is preferred by some authors (see Hayakawa, 2009, for example).

The consistency of the GMM estimator depends on the validity of instruments. Thus, we perform Hansen (1982) test for over-identifying restrictions, which is based on Sargan (1958) test.

We performed tests of stationarity of dependent and independent variables before estimating the parameters of our model. We used tests indicating unit root process in the panel data – Levin, Lin and Chu (2002) test presupposing common unit root process. In this case, the null hypothesis,  $H_0$ , is a common unit root process for all the cross-sections units. Moreover, we employed Im, Pesaran and Shin (2003) test and both of Fischer tests (ADF, PP, according to Maddala and Wu, 1999). They presuppose an individual unit root process. In this case, the null hypothesis,  $H_0$ , is an individual unit root process for each cross-section unit.

The variable  $hum_{it}$  was found to be nonstationary. We transformed this variable as growth rate (first difference of its logarithm) for this reason. Thus, we have obtained a new variable  $hum(gr)_{it}$ .

#### 4.4 Results

The results of regression analysis are included in the Table 1. There are regression coefficients and t-statistics (in the parentheses) for our model with GDP growth as dependent variable in the second and third column. The coefficients on the lagged dependent variable and the other control variables have expected signs. There is an extra row reporting the Hansen test for over-identifying restrictions. Both tests have expected  $p$ -values (in the square brackets). Thus, we do not reject the null hypothesis: that instruments are uncorrelated with residuals. Our models are dynamically stable (see the second row) as well.

**Table 1.** Political business cycle in the OECD countries, 1995 – 2014, FD GMM, FOD GMM

|             | FD GMM            | FOD GMM           |
|-------------|-------------------|-------------------|
| X/Y         | growth            | growth            |
| growth (-1) | 0.129*** (5.983)  | 0.236*** (16.335) |
| cap         | 0.514*** (11.095) | 0.252*** (6.266)  |
| pop         | -0.977** (-2.155) | -0.742* (-1.726)  |
| hum(gr)     | 12.836*** (7.111) | 12.155*** (5.635) |
| ele         | 0.645*** (6.563)  | 0.560*** (4.869)  |
| Hansen test | 31.122 [0.360]    | 27.974 [0.519]    |
| No. observ. | 503               | 503               |

Source: own calculations, Eviews 8

Let us start with the second column (FD GMM regression). We can see that if the GDP growth will increase by 1 p.p. in the previous period ( $growth_{it-1}$ ), then current GDP growth will increase by 0.129 percentage points. Furthermore, we can observe that if the capital accumulation  $cap_{it}$  will increase by 1 p.p., then GDP growth will increase by 0.514 p.p. For these variables, a positive relation is expected. If the annual population growth  $pop_{it}$  will increase by 1 p.p., then GDP growth will decrease by almost 1 p.p. as well (negative sign was expected). Additionally, if the gross enrolment ratio growth rate (tertiary education)  $hum_{it}$  will increase by unit, then GDP growth will increase by 0,128 percentage points (which implies a positive relation). All of these variables are statistically significant. Very similar results were obtained by FOD GMM regression and it is not necessary to comment them.

What is most important, there are statistically significant and positive coefficients on the dummy variable  $ele_{it}$  (in both, FD GMM and FOD GMM regressions). The coefficient on electoral dummy indicates that if the election year will occur, GDP growth will increase by 0.645 p.p. in the former case (FD GMM) and by 0.560 p.p. in the second. According to the theory of the political-business

cycle, an output growth should be higher in the election years than in the non-election years. It seems that our results are consistent with this hypothesis quite well. Now, the question is which estimator gives us more precise estimates of regression coefficients (especially the coefficient of the dummy electoral variable).

## 5 Robustness analysis

In the first part of this section we will present a relatively intuitive test of robustness of our estimators. It is based on the comparison of biased OLS and FE estimates. In the second part of this section it will be shown that the PBC is the matter of election years only and it does not play a role in the pre-election and post-election periods.

### 5.1 Which estimator is better?

We can estimate our model (4) using the “classical” OLS estimator and ignore a panel character of the data. It was noted in the section 4.3 that there is a problem with the unobserved heterogeneity of individual unit (cross-sections) in this case. The lagged dependent variable  $y_{i,t-1}$  is endogenous to the individual effects  $\mu_i$ , which are part of the residual term (because  $v_{it} = \mu_i + \varepsilon_{it}$ ).<sup>6</sup> In that case, the estimated regression coefficients are inconsistent and biased. It can be shown that the lagged dependent variable is positively correlated with residual term and its regression coefficient is upward biased (it inflates the coefficient for lagged dependent variable by attributing predictive power to it that belongs to the fixed effect). *We should expect the true estimate to be lower.*

We can solve this problem by using fixed effects (FE) which take into account a panel nature of the data and hidden heterogeneity of individual units. We stated in the methodological part that estimator suffers from “Nickell bias”, especially in the cases when the number of periods is quite small. Purging out the individual effects does not eliminate dynamic panel bias, this procedure essentially makes every observation of transformed variable  $y_{i,t-1}$  automatically endogenous to the errors. The lagged dependent variable will be endogenous ( $\bar{y}_i$  is correlated with  $\bar{v}_i$ ) if we use within transformation<sup>7</sup> to purge out the individual effects. A resulting correlation makes estimated coefficient of the lagged dependent variable to be biased. Nickell (1981) states that coefficient on the  $y_{i,t-1}$  will be downward biased. *Therefore, we should expect the true estimate to be higher.*

Baltagi (2005) or Baum (2013) claim that reasonable estimates of lagged dependent variable  $y_{i,t-1}$  should therefore lie between these FE and OLS estimates. The interval between FE and OLS can serve as a useful diagnostic test.

There are regression parameters of lagged dependent variables and dummy electoral variables in the Table 2. There are OLS, FE, FD GMM and FOD GMM estimators in that table. We can see that the coefficient of the lagged dependent variable of the FOD GMM regression lies between FE and OLS coefficients of that variable, whereas the FD GMM coefficient do not.

**Table 2.** FD GMM, FOD GMM, OLS and FE estimators of the lagged dependent variable, 1995 – 2014<sup>8</sup>

|             | FD GMM           | FOD GMM           | OLS              | FE               |
|-------------|------------------|-------------------|------------------|------------------|
| X/Y         | growth           | growth            | growth           | growth           |
| growth (-1) | 0.129*** (5.983) | 0.236*** (16.335) | 0.351*** (5.570) | 0.212*** (2.910) |
| Ele         | 0.645*** (6.563) | 0.560*** (4.869)  | 0.552*** (3.032) | 0.532*** (2.959) |
| Hansen test | 31.122 [0.360]   | 27.974 [0.519]    | -                | -                |

<sup>6</sup> In doing so, by definition, the term  $y_{i,t-1}$  must be correlated with  $y_{i,t}$ , while it is explained by  $\mu_i$ .

<sup>7</sup> See section 4.4 for details.

<sup>8</sup> For the sake of clarity, there are only variables  $growth_{it-1}$  and  $ele_{it}$  displayed. Complete results are available upon request. Note: \*Significant at the 10 percent confidence level, \*\*significant at the 5 percent confidence level, \*\*\*significant at the 1 percent confidence level.

|             |     |     |     |     |
|-------------|-----|-----|-----|-----|
| No. observ. | 503 | 503 | 510 | 510 |
|-------------|-----|-----|-----|-----|

Source: own calculations, Eviews 8

Moreover, we can observe that our results and notions about the existence of the PBC in our sample hold, irrespective of the estimation technique (even if the coefficients are slightly quantitatively different in some cases, see  $ele_{it}$ ).

In any case, if we have to decide which of the results is more relevant, we have to choose the FOD GMM regression, because the regression coefficients seems to be more precisely estimated in this case (see discussion above). For this reason we work with FOD GMM regression since now.

## 5.2 Examination of the pre-election and post-election periods

There is another important question which arises from our main analysis. Are, in fact, the resulting higher GDP growth rates only the matter of election years? Are we sure that these macroeconomic patterns do not arise in the nonelection years? Therefore, we will test the possibility of the PBC in the pre-election and post-election periods. From the econometric point of view, the problem is simple. We can test our model (3) same as above, but we have to replace the dummy variable  $ele_{it}$  by lagged and leading dummy variables  $ele_{it-1}$  (for the post-election period) and  $ele_{it+1}$  (for the pre-election period).

Table 3 shows the obtained results. We can observe that there is no regular movement in the GDP growth (in average) in the pre-election period. The coefficient on the electoral dummy is statistically insignificant and very low as well. On the other hand, there is a regular movement in the GDP growth (in average), if we focus on post-election period. Unlike the election years, the GDP growth is lower (see a negative coefficient on electoral dummy) in the post-election years than in the non-election years (in average). Is it a serious problem for our analysis? In fact, it was not unexpected and this result perfectly complements our previous results (in section 4.4). According to the theory of the PBC, incumbent “creates” the PBC in such a way that there is a higher output growth in the election period, but a lower output growth in the post-election period. The lower output growth in the post-election period is the result of the post-election (fiscal or monetary) restriction – it was noted in the section 2 that “immediately after an election year the new incumbent will rise unemployment (or will decrease outcome) to relatively high level in an attempt to reduce inflation”. Thus, our results are quite compatible with the Nordhaus (1975) model.



**Table 3.** PBCs in the pre-election and post-election periods, 1995 – 2014, FOD GMM

|                  | pre-election       | post-election      |
|------------------|--------------------|--------------------|
| X/Y              | growth             | growth             |
| growth (-1)      | 0.237*** (18.373)  | 0.237*** (17.926)  |
| cap              | 0.283*** (15.333)  | 0.280*** (14.645)  |
| pop              | -0.393*** (-2.658) | -0.599* (-2.092)   |
| hum(gr)          | 10.821*** (10.069) | 11.192*** (9.631)  |
| ele(+1), ele(-1) | -0.009 (-0.452)    | -0.221*** (-3.562) |
| Hansen test      | 31.832 [0.327]     | 31.974 [0.321]     |
| No. observ.      | 503                | 501                |

Source: own calculations, Eviews 8

## 6 Conclusions

We will sum up and discuss our results in this section, while we will describe some important consequences of our basic findings. We will mention some general problems and weaknesses of the analysis of the PBCs as well.

At first, it is necessary to note that there is a political business cycle in the OECD countries as a whole. We can observe that output growth (growth of the real GDP) is regularly higher (in average) by 0.560 percentage points (according to the FOD GMM regression) in the election years than in non-election years in our sample. It is not easy to challenge this essential result. The coefficients on electoral dummy variable are highly statistically significant, regardless of the estimation methods. The result is indirectly confirmed by regressions in the pre-election and in the post-election years. We can observe that there is not such a cycle in the pre-election years, but there is an apparent “contra-cycle” in the post-election years (a GDP growth is lower about 0.221 percentage points in average). These results are fully complementary with the former theory of the political business cycle by Nordhaus (1975).

There is no doubt that we are confronted with some problems if we look at our analysis in more detail. Both in reality and in theory a number of empirical and conceptual objections can be raised. First, it was noted in the section 2 that Nordhaus (1975) assumed that incumbent can control a monetary policy. This assumption is in the conflict with the current reality in the developed countries, where central banks are often highly independent. However, Drazen (2002) claims that fiscal policy can create a political pressure on the central bank for higher monetary expansion in the election years. Nominally independent central banks could accommodate the fiscal policy pressure in order to prevent sharp movements in interest rates. This induces an electoral cycle in monetary policy even though the central bank is independent and has no electoral motives *per se*. Thus, an electoral cycle in fiscal policy may be intensified by the political monetary cycle.

A second obvious problem is the question of voters’ naivety and myopia. Basic models assume that voters are relatively unsophisticated and they are not able to form precise expectations of inflation and to assess government performance. If we admit that voters form rational expectations and they know that the economy in the election years can be used in the way to gain their votes then the political business cycle disappears. If their expectations of inflation take the possibility of an election-year monetary expansion into account, then the monetary expansion would be nullified.<sup>9</sup> However, Nordhaus (1989) claims that voters have less than perfect information about the causes of economic fluctuations and perceive higher economic output as indicating incumbent competence. Empirical

<sup>9</sup> For that reason, a second phase of the literature on the PBC started to dominate after the rational expectations revolution of the 70s. See Rogoff and Sibert (1988) and Rogoff (1990) for the evidence of rational opportunistic models and Alesina (1987) for rational partisan theory.

evidence on the former PBC thus can be consistent with the rational expectations theory, because the incumbent can win votes if the voters appreciate “good times” under the imperfect information.

Our study does not pretend to be comprehensive in this respect, and it is not able to answer the question of how the political business cycle arose in the examined countries. Nevertheless, we know from some of our previous studies (e.g. Janků, 2016) that there are certain movements in the fiscal policy instruments in the election years in the examined sample. Let us remind some conclusions. We have found out that government expenditures were higher by 0.116 per cent of the GDP in the election years (in average) in the 1995 – 2012 periods.<sup>10</sup> Further, we have observed that a budget deficit was higher by 0.172 % of the GDP in the election years and we have found out a statistically significant fiscal restriction in the post-election years as well. It seems to be consistent with current findings about political business cycle. For example, we can consider electoral fiscal expansions which lead to the higher output growth at this stage. Arguably, we can think about multiplier effects of these fiscal expansions as well (the relatively lower fiscal expansion leads to the relatively higher output growth). On the other hand, we must not forget about lags and delays in the fiscal policy process and surely we must not forget about fiscal crowding out effects. Eventually, we have to consider the probability of an accommodation role of the monetary policy. These questions are clearly beyond the scope of this article and we are going to consider them in the further research.

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<sup>10</sup> Let us add that the detected fiscal expansion (i.e. a political budget cycle) in the election years was not very large if we examined the OECD countries as a whole. However, there was a serious political budget cycle in the subsample of countries with the low level of the credibility and the transparency of the fiscal institutions.

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## STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH IN VISEGRAD GROUP COUNTRIES

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### Abstract

The relationship between stock market development and economic growth is in the centre of economists' attention for decades. However, the results differ among studies. Also only limited literature investigates the relation for Visegrad group (V4) countries. Therefore the aim of this paper is to find out if there is a relationship between stock market development and economic growth within the V4 countries, and if so, the nature of the relationship is investigated. Co-integration tests and vector error correction models are employed for identification of relations between stock market development and economic growth. These findings can be beneficial for policy makers, authorities, researchers and also they can contribute to the economic theory.

### Keywords

Causality, Cointegration, Economic growth, Stock market development, Visegrad countries, Vector error correction model.

### JEL classification

C22, G15, O16.

## 1 Introduction

One can find quite an extend debate on the relationship between the financial system, its development and economic growth. There are the authors who hold the view that the financial development leads to economic growth, e. g. see Bahegot (1873), Hicks (1969), Schumpeter (1911), King and Levine (1993) or Levine (2005) or the opposite point of view that economic growth leads finance, e. g. see Ribson (1952) or Kindleberger (1978). Also a number of studies including Patrick (1966), Luintel and Khan (1999) or Calderón and Liu (2003) come to a conclusion that the relationship between financial development and economic growth is mutually causal. The extend literature was published on this subject, but to our knowledge not many studies investigate the relation in the Visegrad group (V4) countries.

Since the financial system is a complex system, it is very difficult to evaluate the impact of financial development on economic growth in a comprehensive way which would cover all parts of the financial system. In this study, we focus on the relationship between stock market development and economic growth on the case of V4 countries. Therefore the aim of this paper is to find out if there is a relationship between stock market development and economic growth within the V4 countries, and if so, the nature of the relationship is investigated.

The rest of the paper is organized as follows. The next section presents methodological issues. Data used in the research part of the paper are described in the section three. The results are presented and discussed in the section four. The last section concludes with the main results obtained.

## 2 Model

The existence of cointegration between variables is investigated. The variables are co-integrated if they have a common stochastic trend, see Granger (1988) and Engle and Granger (1987). To check the stochastic non-stationarity of the data, the unit root is required. The Augment Dickey-Fuller (1981) unit root test (ADF) is therefore employed.

Consequently, a Johansen (1988) and Johansen and Juselius (1990) procedure is conducted for finding the common trend in the multivariate time series, which is based on the vector autoregressive (VAR) model:

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + Bx_t + \varepsilon_t \quad (1)$$

where  $y_t$  is a  $k$ -vector of non-stationary  $I(1)$  variables,  $x_t$  is a  $d$ -vector of deterministic variables, and  $\varepsilon_t$  is a vector of innovations. If the variables of  $I(1)$  are cointegrated, it means that a linear function of these variables is  $I(0)$ .

The appropriate lag length for the co-integration test (order of VAR) is determined by Schwarz Bayesian criterion (BIC) and Hannan-Quinn criterion (HQC).

In first difference error correction the model is specified as follows:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + Bx_t + \varepsilon_t, \text{ where: } \Pi = \sum_{i=1}^p A_i - I \text{ and } \Gamma_i = -\sum_{j=i+1}^p A_j \quad (2)$$

The null hypothesis of no co-integration is rejected, if the rank of the coefficient matrix is at least 1. Johansen and Juselius (1990) developed two test statistics to determine the number of co-integrating vectors (the rank of the matrix) namely the trace statistic and the maximum eigenvalue statistic, which are computed for the null hypothesis as:

$$LR_{tr}(r|k) = -T \sum_{i=r+1}^k \log(1 - \lambda_i) \quad (3)$$

$$LR_{\max}(r|r+1) = -T \log(1 - \lambda_{r+1}) = LR_{tr}(r|k) - LR_{tr}(r+1|k) \quad (4)$$

Trace statistic tests the null hypothesis of  $r$  co-integrating relations against the alternative of  $n$  co-integrating relations, where  $n$  is the number of variables in the system for  $r = 0, 1, 2, \dots, n-1$ . The maximum eigenvalue statistics tests the null hypothesis of  $r$  co-integrating relations against the alternative of  $r+1$  co-integrating relations for  $r = 0, 1, 2, \dots, n-1$ . In some cases trace and maximum eigenvalue statistics may yield different results.

Cointegration indicates the existence of causality between two variables, however, it fails to show us the direction of the causal relationship. But if cointegration exists between variables, a causal relation in at least one direction must exist (see Granger, 1988), hence vector error correction model can be employed for identification of the direction of the relationship. Therefore the next step is to identify the causality between the variables and the vector error correction model can have the following form:

$$\Delta x_t = \sum_{i=1}^{p-1} \beta_i \Delta x_{t-i} + \sum_{i=1}^{p-1} \alpha_i \Delta y_{t-i} + \lambda_1 EC1_{t-1} \varepsilon_{1t} \quad (5)$$

$$\Delta y_t = \sum_{i=1}^{p-1} M_i \Delta x_{t-i} + \sum_{i=1}^{p-1} N_i \Delta y_{t-i} + \lambda_2 EC2_{t-1} \varepsilon_{2t} \quad (6)$$

where  $\beta_i$ ,  $\alpha_i$ ,  $M_i$  and  $N_i$  are the short-run coefficients,  $EC1$  and  $EC2$  are error correction terms and  $\varepsilon_{1t}$  and  $\varepsilon_{2t}$  are residuals in the formulas. The first error correction term  $EC1_{t-1}$  and  $EC2_{t-1}$  represent the lagged value of residuals that is derived from the cointegrating regression of  $x$  on  $y$  or  $y$  on  $x$ .

The significance of the coefficient  $\lambda$  indicates long-run relationship from the explanatory variable to the dependent variable and shows how quickly variable(s) re-converge to the long-run relationship after a deviation. Therefore  $H_0: \lambda_1 = 0$  and  $\lambda_2 = 0$  are tested. Also short run causal effects are studied by using a Wald test (Chi-square test statistic:  $\chi^2$ ) for the significance of the lagged explanatory variables.

If cointegrating relation between variables does not exist, Granger causality tests are employed. Granger causality means only correlation between present value of one variable and past values of other variables (Brooks, 2008).

The standard Granger causality model for two variables can be represented as:

$$Y_t = \sum_{i=1}^p \alpha y_i Y_{t-i} + \sum_{i=1}^p \alpha x_i X_{t-i} + \varepsilon_t \quad (7)$$

$$X_t = \sum_{i=1}^{\rho} \beta x_i X_{t-1} + \sum_{i=1}^{\rho} \beta y_i Y_{t-1} + \varepsilon_t \quad (8)$$

where  $Y_t$  and  $X_t$  are stationary time series,  $\varepsilon_t$  is uncorrelated white noise,  $\alpha x_i$  and  $\beta x_i$  are coefficients chosen to minimize  $\sigma^2$ ,  $\rho$  is finite and shorter than the given time series (it can equal infinity but in practice, it is finite due to the length of the available data).

The null hypothesis “*X does not Granger cause Y*” (equation 1) or “*Y does not Granger cause X*” (equation 2) is rejected if the coefficients  $\alpha x_i$  and  $\beta y_i$  are jointly significant.

In our research, Granger causality test tries to find if share prices “Granger-cause” economic growth (past values of share prices improve the prediction of economic growth), and vice versa if economic growth do “Granger-cause” share prices (past values of economic growth improve the prediction of share prices).

### 3 Data

We obtained our dataset (GDP and share prices) from OECD database on quarterly basis from 2004 when all V4 countries entered the EU to the first quarter of 2016 (last available data). GDP was obtained in constant prices (reference year 2010, expenditure approach) in US dollars.

Share prices represent stock market indices. In previous research, the market capitalization as a proportion of GDP, number of listed companies, value of shares traded as a percentage of GDP, value of shares trades as a percentage of market capitalization are used as proxy variables of stock market development.

Also monetary aggregates are used as a possible proxy of financial development, e. g. see Kar et al. (2011). Similarly to Harvey (1989), Liu and Sinclair (2008), Humpe and Macmillan (2009), the main composite stock indices of each national stock exchange markets are applied as proxies of stock market development in our study, since we believe that it reflects all aspects of functional market economy.

All data were converted into natural logarithmic form to gain more constant variance. The descriptive statistics of used variables is reported in Table 1. The probabilities of Jarque-Bera test statistics are equal to zero in cases marked with star in the table; hence the normality is rejected in these cases.

**Table 1.** Descriptive statistics of used variables (natural logs)

| Variable | Mean   | Median | Max    | Min   | Std. dev | Skew.  | Kurtosis | J.-B. stat. |
|----------|--------|--------|--------|-------|----------|--------|----------|-------------|
| GDP_CZ   |        |        |        | 12.35 |          |        |          | 14.799*     |
|          | 12.538 | 12.560 | 12.636 | 1     | 0.069    | -1.267 | 3.910    |             |
| GDP_HU   |        |        |        | 12.23 |          |        |          |             |
|          | 12.311 | 12.309 | 12.376 | 5     | 0.035    | 0.020  | 2.122    | 1.579       |
| GDP_PL   |        |        |        | 13.31 |          |        |          |             |
|          | 13.554 | 13.564 | 13.744 | 0     | 0.132    | -0.413 | 1.972    | 3.549       |
| GDP_SK   |        |        |        | 11.47 |          |        |          |             |
|          | 11.759 | 11.804 | 11.932 | 7     | 0.126    | -0.854 | 2.630    | 6.240*      |
| SP_CZ    | 4.557  | 4.470  | 5.052  | 4.145 | 0.236    | 0.492  | 2.408    | 2.694       |
| SP_HU    | 4.443  | 4.441  | 4.824  | 3.808 | 0.229    | -1.009 | 3.668    | 9.230*      |
| SP_PL    | 4.568  | 4.625  | 4.975  | 3.980 | 0.269    | -0.766 | 2.609    | 5.110*      |
| SP_SK    | 4.818  | 4.702  | 5.330  | 4.357 | 0.328    | 0.261  | 1.475    | 5.306*      |

Source: Author's calculations in Eviews.

Note: \* denotes that the normality is rejected at significance level 10 %.

Since the studied variables should be integrated of order one  $I(1)$ , the ADF (Augment Dickey-Fuller) unit root tests were performed to investigate the order of integration. The results of the ADF unit root tests are reported in Table 2.

The results of ADF tests suggest that at first differences data are stationary and therefore of order one  $I(1)$  and suitable for testing the existence of cointegration between variables.

**Table 2.** Augment Dickey-Fuller Unit Root Test Statistics (of natural logs)

| Variable | Level   |                |          | First differences |                |           |
|----------|---------|----------------|----------|-------------------|----------------|-----------|
|          | t-Stat. | Critical value | Prob.    | t-Stat.           | Critical value | Prob.     |
| GDP_CZ   | -3.0526 | -3.5085        | 0.1295   | -3.2819           | -3.5085        | 0.0818*   |
| GDP_HU   | -2.3045 | -3.5085        | 0.4233   | -3.7352           | -3.5085        | 0.0295**  |
| GDP_PL   | -0.9173 | -3.5064        | 0.9455   | -6.0981           | -3.5085        | 0.0000*** |
| GDP_SK   | -2.0145 | -3.5085        | 0.5787   | -7.0030           | -3.5085        | 0.0000*** |
| SP_CZ    | -2.6005 | -2.9252        | 0.1000   | -4.7051           | -2.9252        | 0.0004*** |
| SP_HU    | -3.5777 | -2.9252        | 0.0106** | -4.4744           | -2.9252        | 0.0008*** |
| SP_PL    | -3.0699 | -3.5085        | 0.1253   | -3.8270           | -3.5085        | 0.0237**  |
| SP_SK    | -2.2385 | -2.2952        | 0.1959   | -3.0932           | -2.9252        | 0.0339**  |

Source: Author's calculations in Eviews.

Note: \* denotes statistical significance at 10 %, \*\* 5 % and \*\*\* 1 % level.

## 4 Results

This section is divided into two parts for clear arrangement. The results of cointegration tests are represented in the first part. The existence of cointegration between the variables is the prerequisite for the further study of relationship. If the cointegration is found, the nature of the relationship between GDP and stock prices is studied with the use of vector error correction model in the second section.

### 4.1 Cointegration

The Johansen cointegration rank tests were separately employed for all Visegrad group countries. The results of these tests are presented in Table 3 and Table 4. Both statistics – trace statistic and max-eigen statistic were evaluated.

The first hypothesis that there is none cointegrating equation between variables was rejected in all countries, since the value of trace statistic was higher than the critical values for trace statistic and max-eigen value statistic (not reported here). These results point to the existence of the one-way long-run relationship between economic growth and stock market development in V4 countries during the observed period. The detailed results are provided in Table 3.

**Table 3.** Results of Johansen cointegration rank tests – null hypothesis: none cointegrating equation

| Hypothesized number cointegrating equations: None |                 |          |                     |          |
|---------------------------------------------------|-----------------|----------|---------------------|----------|
| Country                                           | Trace statistic | Prob.    | Max-Eigen statistic | Prob.    |
| CZ                                                | 17.3546         | 0.0259** | 16.5946             | 0.0210** |
| HU                                                | 14.7401         | 0.0647*  | 12.6815             | 0.0876*  |
| PL                                                | 22.3395         | 0.0040** | 16.0276             | 0.0261** |
| SK                                                | 16.7359         | 0.0324** | 12.6579             | 0.0883*  |

Source: Author's calculations in Eviews.

Note: \* denotes statistical significance at 10 %, \*\* 5 % level.

Consequently, the following null hypothesis is tested (it can be tested only if the previous null hypothesis was rejected). The null hypothesis that there is at most one cointegrating equation was rejected for Poland and the Slovak Republic, however these results are a bit misleading since before



two variables cannot exist two cointegrating equations. That can be e. g. a consequence of structural breaks in data. These results are presented in Table 4.

**Table 4.** Results of Johansen cointegration rank tests – null hypothesis: at most cointegrating equation

| Hypothesized number cointegrating equations: At most 1 |                 |          |                     |          |
|--------------------------------------------------------|-----------------|----------|---------------------|----------|
| Country                                                | Trace statistic | Prob.    | Max-Eigen statistic | Prob.    |
| CZ                                                     | 0.7599          | 0.3833   | 0.7599              | 0.3833   |
| HU                                                     | 2.0586          | 0.1514   | 2.0586              | 0.1514   |
| PL                                                     | 6.3119          | 0.0120** | 3.8415              | 0.0120** |
| SK                                                     | 4.0780          | 0.0434** | 4.0780              | 0.0434** |

Source: Author's calculations in Eviews.

Note: \* denotes statistical significance at 10 %, \*\* 5 % level.

Because of the inconsistent results of cointegration for Poland and the Slovak Republic, the VECM cannot be employed for these countries, therefore these models are conducted only for the Czech Republic and Hungary. Only Granger causality tests are used in case of the Slovak Republic and Poland.

## 4.2 Vector error correction models

Since cointegrating relationship between share prices and GDP was explored in the Czech Republic and Hungary, the vector error correction model can be employed for a better specification of the relationship – long-run and short-run causality. The use of VECM model can reveal if economic growth causes stock market development or vice versa. The results of employed models are provided in Table 4 separately for each country. The results can be interpreted in the following way.

**Table 4.** Results of vector error correction models

|             | CZ        | HU        |
|-------------|-----------|-----------|
| $\lambda_1$ | -0.15284  | -0.28868  |
| t-stat.     | -4.09642  | -3.36509  |
| Prob.       | 0.00020*  | 0.00170*  |
| $\chi^2_1$  | 0.08681   | 0.83850   |
| Prob.       | 0.76827   | 0.35983   |
| $\lambda_2$ | -0.02085  | 0.00085   |
| t-stat.     | -1.36146  | 0.06529   |
| Prob.       | 0.18099   | 0.94827   |
| $\chi^2_2$  | 5.01530   | 4.83515   |
| Prob.       | 0.02512** | 0.02789** |

Source: Author's calculations in Eviews.

Note: Lag length was specified according to the Schwartz information criterion. \* denotes statistical significance at 1% level and \*\* at 5% level.

## Czech Republic

When analysing the relationship between economic growth and stock market development in the Czech Republic, the results show that economic growth causes stock market development in the long-

run, since  $\lambda_1$  is negative and statistically significant at 1% level (the probability is lower than 1 %). The short-run causality was not proved because Chi-square test statistic  $\chi^2_1$  was not statistically significant.

When assessing the opposite relationship, no evidence on the long-run relationship between stock market development and economic growth was found and therefore stock market development does not have a long-run causality on economic growth. However, the Chi-square test statistic  $\chi^2_2$  is statistically significant which shows that there is the short-run causality coming from stock market development to economic growth.

## Hungary

The results for Hungary can be interpreted in the same way as the results for the Czech Republic. Economic growth in Hungary has a long-run causality on stock prices and not vice versa. And also there is a short-run causality from stock market development to economic growth and not from economic growth to stock market development in the short-run.

### 4.3 Granger causality tests

Granger causality test are employed for Poland and the Slovak Republic to explore if past values of share prices improve the prediction of economic growth or vice versa. The results of conducted tests are provided in Table 5.

**Table 5.** Results of Granger causality tests

| Country | Null hypothesis                                     | F-Statistic | Prob.    |
|---------|-----------------------------------------------------|-------------|----------|
| PL      | Share prices does not Granger cause economic growth | 4.3174      | 0.0101** |
|         | Economic growth does not Granger cause share prices | 1.8720      | 0.1503   |
| SK      | Share prices does not Granger cause economic growth | 0.9535      | 0.3969   |
|         | Economic growth does not Granger cause share prices | 2.7890      | 0.0729*  |

Source: Author's calculations in Eviews.

Note: \* denotes statistical significance at 10 %, \*\* 5 % level.

## Poland

When assessing the results of Granger causality test for Poland, the first null hypothesis that “share prices does not Granger cause economic growth” can be rejected since the probability is statistically significant at 5% level. Therefore past values of share prices can improve the prediction of economic growth. The second null hypothesis cannot be rejected.

## Slovak Republic

The situation differs for the Slovak Republic. The first null hypothesis cannot be rejected, however the second null hypothesis can, meaning that economic growth does Granger cause share price or in other words, past values of economic growth can improve the prediction of share prices. Therefore different

## 5 Conclusion

The aim of the contribution was to find out if there is a relationship between stock market development and economic growth within the V4 countries, and if so, the nature of the relationship is investigated. The existence of the long-run relationship was investigated with the use of cointegration approach and was confirmed only for the Czech Republic and Hungary.

However, cointegration itself fails to show us the direction of the causal relationship. The nature of the relationship was treated consequently, since cointegration exists between variables, a causal relation in at least one direction must exist (see Granger, 1988). Vector error correction models were employed for identification of the direction of the relationship to specify if the causality comes from stock market development to economic growth or vice versa in the long-run or in the short-run. The long-run causal relationship between economic growth and stock market development was evidenced. These results are in the accordance with Ribson (1952) or Kindleberger (1978) in general, however they did not use any econometric methods for further evaluation that allowed us to observe the nature of the relationship between variables.

Since cointegration was not identified for Poland and the Slovak Republic, Granger causality test were used for these countries to specify the relationship. The results differ, while in Poland past values of share prices improve the prediction of economic growth, in the Slovak Republic past values of economic growth improve the prediction of share prices.

These findings can be useful for policy makers, authorities, researchers and also they can contribute to the economic theory. In the following research, long time period can be considered as well as a larger variety of stock market development indicators can be used to shed more light on the examined relation.

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## SUPPLY DRIVEN LENDING ACTIVITIES IN THE EU: EVIDENCE FROM INSTRUMENTAL VARIABLES

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### Abstract

European countries, typical bank-based countries, are more reliant on bank credits and bank intermediation of savings, than the rest of the world. The objective of the paper is to identify link between bank lending activity, macroeconomic shocks and banking controls, with a special emphasize on the quality of bank asset. Using instrumental variables approach is quite unique in the field of monetary economics because endogeneity of all variables is generally agreed. Our intuition is based on a linear supply and demand framework where the quality of banking asset, as the instrument, is correlated with supply rather than demand shocks. The microeconomic data are provided by the Bankscope database; macroeconomic shocks are drawn from Eurostat on-line databases. We conclude that the level of impaired loans and loan-rate spread had an impact on bank loan activities in the post-crisis period (after 2008).

### Keywords

Credit Crunch, Instrumental Variables, Interest Rate Spread

### JEL classification

E58, G21, G28

## 1 Introduction

The financial crisis of 2007 and 2008 influenced lenders and borrowers through different channels. In particular, liquidity conditions, output decline and loan-rate spread were of different intensity in different EU countries. We focus on the financial banking conditions and loan-rate spread in this paper because it can either transmit macroeconomic shocks to the domestic economy or insulate it from them.

The consequences of the crises in the European Union contributed to the rising fear that capital needs and funding pressures faced by European banks may increase the pressure to deleverage in this region. The quantification of this transmission is one of the most important topics of the recent financial crisis, especially in the context of changes in bank regulatory framework. Consequently, European economies are more reliant on bank credit and bank intermediation of savings (bank-based economies) than the United States (market-based economy). In European economies, banking institutions and financial markets are considered to be the most important source of liquidity.

We assume that the different effects of liquidity changes on credit flows are given by individual risks of concrete banks. A well-capitalised bank or a bank with an access to additional sources of capital should be able to accommodate possible funding liquidity shocks without reducing its assets and lending activity. However, the banks actively manage their assets in order to maintain a constant capital ratio. If so, such a loss would result in a reduction in the level of assets with the required reduction equal to the size of the capital loss scaled up by the inverse of its capital/leverage ratio.

The advantage of our data set is that we can use a comparatively long time dimension after the financial crisis (2000 to 2013). We follow the recent empirical studies of Kapounek (2015) and Kapounek and Kučerová (2015) who employed Bayesian Model Averaging approach to identify the probability of selected demand and supply factors, to be included in the model of the bank lending activities. The objective of the paper is to identify link between bank lending activity, macroeconomic shocks and banking controls, with a special emphasize on the quality of bank asset. In this paper, we focus on loan-rate spread and use banking controls as instruments to deal with possible endogeneity biases. The main focus will be put on the impact of asset quality which is the main supply driven

factor of the bank lending activities in the European Union. Additionally, we also differentiate effects before and after the year 2007. Finally, we assume that the instrumental variables approach identifies possible credit crunch effect in the EU countries.

The remainder of the paper is organised as follows. The Section 2 contains the literature review. An overview of methods and data is provided in Section 3 where the empirical model is introduced and variables defined. Section 4 presents the results of the econometric model. Section 5 brings concluding remarks.

## 2 Literature Review

The effect of changes in the level of bank capital on the banks' lending activity is a key determinant of the linkage between financial conditions and real economic activity. Berrospide and Edge (2010) apply a number of different methods and panel datasets to examine how bank capital influences the extension of a bank credit. Their empirical results show modest effects of capital shortfalls and capital ratios on loan growth. They find that more important roles of other factors, such as economic activity and increased perception of riskiness by banks, should be studied. The empirical analysis of 16 emerging European countries was provided by Popov and Udell (2012). They analyse the sensitivity of credit supply to banks' financial conditions and find that a decline in banking equity, Tier 1, capital and losses on financial assets reduced the credit flows to the firms during the crisis.

Interest rate spreads can be influenced by a variety of determinants. Ho and Saunders (1981) developed an influential theoretical model of the determination of interest rate spreads; they argue that spreads are determined by the degree of risk aversion of a bank management, market structure of the banking sector, the size of bank transactions and the variance of money market interest rates. In a different study, Allen (1988) states that interest rate spreads are determined by the risk premium and the monopoly power of a bank. Were and Wambua (2014) mention other factors having an impact on spread, e.g. regulation, efficiency of banks, liquidity of banks and last but not least, economic factors. However, as Entrop et al. (2015) postulate, banks increase loan interest rates/fees and decrease deposit interest rates/fees according to the size of the maturity gap (as a result of the maturity structure of an individual bank), i.e. banks holding long-term loans in their balances increase loan interest rates/fees and decrease deposit interest rates/fees to compensate for the risk.

The tightening of the conditions required to obtain a banking credit increases the danger of the liquidity squeeze causing a credit crunch. A popular view seems to be that this decline in investment activities is driven by a credit crunch through a financial accelerator effect (e.g. Bernanke et al., 1996; Fidrmuc et al., 2010 or Korinek, 2011). Several studies investigate different determinants of credit sources availability. Geršl and Jakubík (2009) or Memmel, Schmieder and Stein (2007) analyse the models of bank financing and its effects on credit risk of the banks and credit availability.

However, the key question from a policy perspective is whether the slowdown in credit flows is driven by the supply of (credit crunch hypothesis) or the demand for credit. A credit crunch generally involves a reduction in the availability of credit independent of a rise in the official interest rates (Bijapur, 2010). Therefore, the solution might be aimed at changes in prudential policy (national regulatory framework of the banking system). If the slowdown in credit flows is mostly driven by credit demand and economic activity, then fiscal and monetary policy interactions aimed at expanding aggregate demand might be an effective instrument. Arestis (2011) suggests that recent development in theoretical economy (New Consensus in Macroeconomics) upgrades the role of monetary policy; the fiscal policy is effective policy only if it is properly coordinated with monetary policy.

The emphasis of past work has been mostly focused on empirical methods to identify the factors and their effects on the slowdown of credit flows. Tong and Wei (2011) propose a methodology to identify the effects of capital flows on liquidity constraints and the role of the composition of pre-crisis capital inflows in the liquidity crunch. Calvo et al. (2006) show that the recovery from financial crisis tends to take place without a recovery in credit. They apply a partial equilibrium model and

identify how much of the decline in credit is indeed due to a credit crunch and how much is driven by a reduction in the demand for credit.

### 3 Data

To provide a detailed insight into the bank lending activity determinants we employ panel data regression model using microeconomic data. The basic regression includes time effects  $\theta_t$  and bank fixed effects  $\mu_i$ , which can cover a large part of heterogeneity between the banks and changes in time. The dependent variable *loans* represents the share of gross loans provided by banks to their total assets for a bank  $i$  in time  $t$ :

$$\ln loans_{it} = \sum_{s=1}^S \beta_s \ln shocks_{ct}^s + \beta_b spread_{it} + \mu_i + \theta_t + \varepsilon_{it}, \quad (1)$$

where *spread* represents loan rate spread of bank  $i$  in time  $t$ , variable *shocks* represents a selected macroeconomic shock  $s$  for a country  $c$ . We apply OLS robust estimator to estimate robust standard errors  $\varepsilon_{it}$ . Additionally, we differentiate between the pre-crisis and post-crisis periods to emphasize a widening loan-rate spread and an easing of monetary policy after the year 2007.

Second, we assume that the identified shocks can have impact on both, the credit demand of firms and the supply of funding provided by banks. From a theoretical point of view, the positive shock to the supply of bank credit is observed as an increase in loans and a decline in loan rates. Conversely, positive credit demand shock caused by firms' investment activity is observed as increase in bank credit growth and an increase in loan rates. After the financial crisis, the most of EU central banks decreased their reference interest rates and provide liquidity to banks buying specific assets. It generally caused reduction of banks' interest expenses. However, the most of European banks didn't change loan rates equiproportionately. The reason for the increase of net interest margin is excessive credit risk-taking followed by capital requirements tightening. Therefore, we use loan-rate spread as a proxy of changes in loan rates and focus on the semi-elasticity of loan demand which became negative and larger after the crisis. Thus, the OLS estimate of the coefficient on prices will be a mixture of the slopes of the demand curve and the supply curve. In this sense, we follow empirical concept introduced by Bassett et al. (2014) and use selected banking controls as an instrument in a regression of loan quantities on loan prices represented by loan-rate spreads.

Thus, using an OLS estimator we regress loan amounts on the corresponding loan-rate spread and indicate the semi-elasticity of loan demand. Subsequently, we use bank-specific changes in quality of assets as instrument for loan-rate spread and compare the estimated coefficient. We assume that the large difference between the coefficients, especially decrease, shows that the adjusted changes in the asset quality capture shifts in loan supply. At the second step we employ 2SLS estimator and consider a model:

$$\ln loans_{it} = \sum_{s=1}^S \beta_s \ln shocks_{ct}^s + \beta_b spread_{it} + \beta_z \ln assetq_{it} + \mu_i + \theta_t + u_{it}, \quad (2)$$

where the loan-rate spread is associated with the errors in the model (1), *assetq<sub>it</sub>* represents a quality of asset in a bank  $i$ , as an exogenous instrumental variable, which is not correlated with  $u_{it}$ . To test exogeneity of the instrument we apply Hansen test for testing over-identifying restrictions (Hansen, 1982).

Our dataset covers yearly data within the period 2000–2013 and includes 5176 commercial banks in EU28 (provided by the Bureau van Dijk – Bankscope database). Outliers were identified by banking controls (equity and assets) and removed between the 1% and 99% percentile. The data (except interest rates) were transformed using logs. The logarithmic transformation is generally used to eliminate skewness from the data. From the economic point of view, we have to eliminate huge differences in levels.

We use year specific effects (denoted as Time dummies) for the period 2008-2013 in order to capture the period of financial and economic crisis.

Macroeconomic shocks include several economic activity indicators (*GDP*, *Investments* using gross capital formation, *Consumption*, *Unemployment*), market liquidity in the interbank markets expressed by the level of financial assets of national central banks (*CB financial assets*), inflation rate measured by the Harmonised Index of Consumer Prices (*HICP*). The macroeconomic shocks and central bank assets were obtained from the online Eurostat database (Eurostat, 2015). The indicators of macroeconomic shocks represent the demand driven factors (i.e. the demand for bank loans) while the indicators of central bank activity and interest rate spread represent the supply driven factors (i.e. the supply of bank loans) to be able to distinguish between the demand and supply shocks.

*Loan-rate spread* is calculated as a difference between interest income to gross loans (of individual banks) and money market interest rates. The higher the level of the spread is, the more the individual banks' interest rates diverge from the market interest rate. In other words, the rising spread could represent the rising market risk and as such it could help identify a possible credit crunch. In this case, the supply of bank loans is mainly driven by commercial banks and not by the demand factors. Therefore, we do not use the traditional definition of the interest spread as a difference between the interest rates charged for borrowers and the interest rate paid to lenders but we follow the study of Allen (1988) where the spreads are influenced by the risk premium; in case of risk neutrality, spreads are at a minimum level while in case of increased risk, banks try to compensate for the uncertainty.

Banking controls are represented by one variable. The ratio of *Impaired loans to gross loans* can be used as a measure of asset quality or problem loans because there is an evidence of a probable loss event (in case of a principal and/or interest rate) which is not in accordance with the contractual terms.

#### 4 Results

Table 1. presents the results of three models that vary according to variables representing macroeconomic shocks (*GDP*, *Investments* and *Consumption*, *Unemployment*). As already mentioned above, we use several indicators of macroeconomics shocks which we employ subsequently in models (1), (2) and (3). In all three models, the indicators *Loan-rate spread*, *CB financial assets* and *HICP* are also used.

According to our first results, not all indicators of macroeconomics shocks are significant at standard levels in all models; *Investments* and *Consumption* proved to have no impact on the lending activities of banks in the sample; they are not significant in model (2). Moreover, the use of these indicators limit the significance of other variables in model (2) (*CB financial assets* and *HICP*). Positive impact of *GDP* (in model (1)) as well as negative impact of *Unemployment* (in model (3)) confirms the theoretical background that demand factors have an impact on the lending activities of banks. *HICP* has a significant and positive effect on the dependent variable. However, the impact on the dependent variable and the significance of this variable rises when we use *Unemployment* as the indicator of macroeconomic shock (model (3)).

The variable *Loan-rate spread* proves to be significant too with a negative impact on bank lending activities. When the spread increases, the interest rates for borrowers set by an individual bank diverges from the average money market interest rate in the country. It could be interpreted as a signal of a possible credit crunch in a situation when the bank increases a risk premium (as a part of the bank's interest rate) because of a rising perceived risk in the economy. As such, it could limit the supply of loans to borrowers.

In all three models, the variables *CB financial assets* are significant and influence the level of bank loans positively. In other words, the higher the level of central bank financial assets, the higher the level of bank loans. This result can be interpreted in a way that the policy of quantitative easing leading to the purchases of securities from banks done by central banks could positively influence banks in their lending activities.



**Table 1.** Macroeconomic shocks, 2000-2013

| Dependent variable: Gross loans to total assets (ln), 2000-2013 |                      |                      |                      |
|-----------------------------------------------------------------|----------------------|----------------------|----------------------|
| Independent variables                                           | (1)                  | (2)                  | (3)                  |
| Loan-rate spread                                                | -0.002***<br>(0.000) | -0.002***<br>(0.000) | -0.002***<br>(0.000) |
| CB financial assets (ln)                                        | 0.098***<br>(0.034)  | 0.065*<br>(0.035)    | 0.136***<br>(0.035)  |
| HICP (ln)                                                       | 0.484*<br>(0.293)    | 0.630*<br>(0.349)    | 1.110***<br>(0.308)  |
| GDP (ln)                                                        | 1.114***<br>(0.238)  |                      |                      |
| Investments (ln)                                                |                      | 0.042<br>(0.198)     |                      |
| Consumption (ln)                                                |                      | 0.841<br>(0.564)     |                      |
| Unemployment (ln)                                               |                      |                      | -0.137***<br>(0.037) |
| Constant                                                        | -3.706**<br>(1.490)  | -3.230**<br>(1.585)  | -1.062<br>(1.342)    |
| Year-specific dummies                                           | YES                  | YES                  | YES                  |
| Number of Obs.                                                  | 21,062               | 21,062               | 21,070               |
| Number of Banks                                                 | 2,576                | 2,576                | 2,577                |
| R-squared                                                       | 0.027                | 0.026                | 0.026                |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Own calculations.

In the second step, in order to distinguish between the behaviour of banks before and after the crisis, we divide the analysed time period 2000-2013 into two sub periods – before the crisis (2000-2007) and after the crisis (2008-2013); results are presented in Table 2. According to our results, the impact of the *Loan-rate spread* is apparently more significant in the period before the crisis than after the crisis. As far as macroeconomic shocks are concerned, the variable *GDP* still has a significant and positive impact on the dependent variable in both periods while *Consumption* proves to be significant only in the period after the crisis. Therefore, it should be stated that demand driven factors represented by these variables play a greater role in the post-crisis period. On the other hand, the activity of central bank (*CB financial assets*) is not significant in any of these two models.

**Table 2.** Macroeconomic shocks, 2000-2007, 2008-2013

| Dependent variable: Gross loans to total assets (ln) |                      |                      |                      |                      |                      |                      |
|------------------------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Independent variables                                | 2000–2007            |                      |                      | 2008–2013            |                      |                      |
|                                                      | (1)                  | (2)                  | (3)                  | (4)                  | (5)                  | (6)                  |
| Loan-rate spread                                     | -0.263***<br>(0.079) | -0.259***<br>(0.080) | -0.262***<br>(0.079) | -0.002***<br>(0.000) | -0.002***<br>(0.000) | -0.002***<br>(0.000) |
| CB financial assets (ln)                             | 0.075<br>(0.080)     | 0.058<br>(0.085)     | 0.025<br>(0.072)     | 0.040<br>(0.039)     | 0.036<br>(0.037)     | 0.015<br>(0.038)     |
| HICP (ln)                                            | 0.385<br>(0.835)     | 1.040<br>(0.723)     | 1.661**<br>(0.743)   | 0.668<br>(0.728)     | 1.146<br>(0.756)     | 0.919<br>(0.795)     |

|                       |                     |                   |                   |                    |                    |                   |
|-----------------------|---------------------|-------------------|-------------------|--------------------|--------------------|-------------------|
| GDP (ln)              | 1.179***<br>(0.363) |                   |                   | 1.114**<br>(0.495) |                    |                   |
| Investments (ln)      |                     | 0.513<br>(0.333)  |                   |                    | -0.244<br>(0.214)  |                   |
| Consumption (ln)      |                     | -0.369<br>(0.735) |                   |                    | 1.608**<br>(0.709) |                   |
| Unemployment (ln)     |                     |                   | -0.154<br>(0.118) |                    |                    | -0.065<br>(0.043) |
| Constant              | -3.417<br>(2.744)   | -1.623<br>(3.386) | -2.980<br>(3.677) | -4.629<br>(4.998)  | -8.093<br>(5.296)  | -0.254<br>(3.735) |
| Year-specific dummies | YES                 | YES               | YES               | YES                | YES                | YES               |
| Number of Obs.        | 12,225              | 12,225            | 12,233            | 8,837              | 8,837              | 8,837             |
| Number of Banks       | 2,072               | 2,072             | 2,073             | 2,312              | 2,312              | 2,312             |
| R-squared             | 0.054               | 0.054             | 0.051             | 0.013              | 0.013              | 0.011             |

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Own calculations.

Next, we try to identify main determinants influencing the *Loan-rate spread*. Therefore, we use 2SLS model with instrumental variables and compare the results of the OLS model presented in Table 2. with the results of the 2SLS model (see Table 3.). We use one banking control – the *Share of impaired loans* – and other variables from the previous models. The upper part of Table 3. presents the results of the first-stage regression with the dependent variable *Loan-rate spread*. The variable *Share of impaired loans* has a significant and positive effect on *Loan-rate spread* in the second time period; i.e. banks started to take this variable into account only after the crisis and projected the increased level of risk into the level of individual interest rates. In other words, banks with a higher level of impaired loans try to compensate for the increased risk which leads to the increased level of spread. Again, both *GDP* and *Consumption* are significant in the post-crisis period.

As a final step, we use 2SLS model with the instrumental variable (IV) *Share of impaired loans* and instrumented variable *Loan-rate spread* (lower part of Table 3.). When we compare the results from the first-stage regression and the 2SLS regression, it is apparent that the impact of *Loan-rate spread* on bank lending activities is much higher when using the 2SLS estimation with IV. Therefore, the level of impaired loans has a substantial effect of the behaviour of banks in the post-crisis period. Moreover, the activity of central banks (using the CB financial assets variable) is also worth mentioning; it has a significant and positive impact on bank loans. Both these variables could be considered as supply driven factors. On the other hand, demand driven factors are not significant in this case. In this context, we can conclude that only supply driven factors play a role in the process of providing bank loans in the post-crisis period.

However, robustness of our results is limited because Sargan-Hansen test (Hansen J statistic) rejects the validity of over-identifying restrictions. Therefore we cannot assume that the quality of asset is an exogenous instrument.

**Table 3.** Macroeconomic shocks and instrumental variables

| First-stage regression, dependent variable: Loan-rate spread |                  |                  |                  |                    |                    |                    |
|--------------------------------------------------------------|------------------|------------------|------------------|--------------------|--------------------|--------------------|
| Independent variables                                        | 2000–2007        |                  |                  | 2008–2013          |                    |                    |
|                                                              | (1)              | (2)              | (3)              | (4)                | (5)                | (6)                |
| Share of impaired loans (ln)                                 | 0.005<br>(0.009) | 0.006<br>(0.009) | 0.004<br>(0.010) | 0.001**<br>(0.000) | 0.001**<br>(0.000) | 0.001**<br>(0.000) |
| CB financial assets (ln)                                     | -0.141           | -0.121           | -0.121           | 0.001              | 0.001              | 0.001              |

|                                                                                   |           |          |          |           |           |           |
|-----------------------------------------------------------------------------------|-----------|----------|----------|-----------|-----------|-----------|
|                                                                                   | (0.117)   | (0.101)  | (0.102)  | (0.000)   | (0.000)   | (0.000)   |
| HICP (ln)                                                                         | 0.804     | 1.042    | 0.364    | -0.006    | -0.004    | -0.005    |
|                                                                                   | (0.708)   | (0.948)  | (0.360)  | (0.016)   | (0.014)   | (0.016)   |
| GDP (ln)                                                                          | -0.494    |          |          | 0.006*    |           |           |
|                                                                                   | (0.442)   |          |          | (0.003)   |           |           |
| Investments (ln)                                                                  |           | -0.068   |          |           | 0.000     |           |
|                                                                                   |           | (0.109)  |          |           | (0.003)   |           |
| Consumption (ln)                                                                  |           | -0.445   |          |           | 0.009     |           |
|                                                                                   |           | (0.531)  |          |           | (0.009)   |           |
| Unemployment (ln)                                                                 |           |          | 0.159    |           |           | -0.003*** |
|                                                                                   |           |          | (0.145)  |           |           | (0.001)   |
| IV (2SLS) estimation, dependent variable: Gross loans to total assets (ln)        |           |          |          |           |           |           |
| Instrument: Share of impaired loans (ln), instrumented variable: Loan-rate spread |           |          |          |           |           |           |
|                                                                                   | 2000–2007 |          |          | 2008–2013 |           |           |
| Independent variables                                                             | (1)       | (2)      | (3)      | (4)       | (5)       | (6)       |
| Loan-rate spread                                                                  | -1.988    | -1.117   | -2.966   | -127.876* | -123.780* | -126.154* |
|                                                                                   | (12.896)  | (11.094) | (16.726) | (68.096)  | (66.296)  | (65.124)  |
| CB financial assets (ln)                                                          | -0.017    | 0.079    | -0.160   | 0.101*    | 0.101*    | 0.092     |
|                                                                                   | (1.845)   | (1.346)  | (2.048)  | (0.060)   | (0.060)   | (0.058)   |
| HICP (ln)                                                                         | 0.294     | -1.016   | 1.226    | -1.083    | -0.663    | -0.970    |
|                                                                                   | (11.442)  | (12.267) | (6.803)  | (2.240)   | (1.836)   | (2.161)   |
| GDP (ln)                                                                          | 0.522     |          |          | 0.746     |           |           |
|                                                                                   | (6.901)   |          |          | (0.555)   |           |           |
| Investments (ln)                                                                  |           | 0.393    |          |           | -0.118    |           |
|                                                                                   |           | (0.997)  |          |           | (0.366)   |           |
| Consumption (ln)                                                                  |           | 0.423    |          |           | 1.371     |           |
|                                                                                   |           | (4.871)  |          |           | (1.356)   |           |
| Unemployment (ln)                                                                 |           |          | 0.127    |           |           | -0.188    |
|                                                                                   |           |          | (2.825)  |           |           | (0.159)   |
| Year-specific dummies                                                             | YES       | YES      | YES      | YES       | YES       | YES       |
| Number of Obs.                                                                    | 332       | 332      | 336      | 1,687     | 1,687     | 1,687     |
| Number of Banks                                                                   | 108       | 108      | 109      | 417       | 417       | 417       |
| Hansen J statistic                                                                | 0,000     | 0,000    | 0,000    | 0,000     | 0,000     | 0,000     |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Own calculations.

## 5 Conclusion

The objective of the paper is to identify link between bank lending activity, macroeconomic shocks and banking controls, with a special emphasize on the quality of bank asset. The main focus was put on the impact of loan-rate spread, the quality of loans and the activity of central banks, which are supply driven factors of the bank lending activities in the EU. We also examined the demand driven factors, such as GDP, investments and consumption and unemployment.

First, we analysed these factors in the whole time period (2000-2013). We found that macroeconomic shocks (GDP, consumption and unemployment rate) and loan-rate spread had a significant impact on bank lending activities of the EU countries within the analysed time period. Moreover, central bank financial assets played an important role in the process of bank lending activities, i.e. central banks supported the lending activity of banking institutions by purchases of securities in order to increase the liquidity in interbank markets.

Second, we divided the analysed time period into two sub-periods (2000-2007 and 2008-2013) to differentiate between the effect of selected variables on bank loans before and after the financial crisis. We found that the impact of interest rate spreads demand driven factors (GDP and Consumption) on loans had been significant in the post-crisis period. However, we also identified that the activity of central banks had not played an important role in any of these sub periods.

Third, we found main determinants having an effect on the interest rate spread: the share of impaired loans was the most important variable positively influencing the level of loan-rate spread of individual banks (positive effect) in the post-crisis period. Then, we estimated 2SLS model with an instrumental variable (share of impaired loans) and compared the results from the first-stage regression and the 2SLS regression. We found that the coefficient of interest rate spread had largely decrease in the 2SLS model. Therefore, the level of impaired loans has a substantial effect of the behaviour of banks in the post-crisis period. Moreover, the activity of central banks (using the CB financial assets variable) is also worth mentioning; it had a significant and positive impact on bank loans. Both these variables could be considered as supply driven factors. On the other hand, demand driven factors were not significant in this case. In this context, we can conclude that only supply side factors played a role in the process of providing bank loans in the post-crisis period in the European Union countries.

## 6 Acknowledgement

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## REGIONAL LABOUR MARKET DISPARITIES IN THE SLOVAK REPUBLIC

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### Abstract:

The theme of regional policy and regional development is one of the topics that are coming to the forefront in present time. This is mainly due to the fact that in the Slovak Republic there are visible large regional disparities in different parts of the territory. The largest regional differences are visible especially by comparing west / northwest and east / southeast parts of Slovakia. The aim of the paper is to analyse and evaluate the regional disparities of labour market in the Slovak Republic. We study regional differences and its interconnection with labour market indicators. We integrate each Slovak territory according to various labour market indicators into developed or problematic regions. We look at differentiation not only in geographic terms but also in terms of time. We find which regional disparities have a tendency to persist, increase or equalize (divergence or convergence theory). For analysing and evaluating of regional disparities we apply methods of multi-criteria evaluation.

### Keywords:

labor market, regional policy, regional disparities, methods of multi-criteria evaluation.

### JEL classification:

R12, R11, E24

## 1 Introduction

Of the currently often discussed topics is the topic of regional policy and regional development. It mainly relates to the fact that the Slovak Republic features quite significant regional differences in its individual territorial sections.

The most significant disparities within the country may be observed at the level of regions, counties, municipal regions, and in city versus village comparisons. The Slovak Republic mainly features visible disparities when one compares its North-Western and South-Eastern regions. The worst indicators are featured by the Southern region of the Central Slovakia and Slovakia's North-Eastern regions (Džupinová et al., 2008). Even the national strategy of regional development of the Slovak Republic highlights the Western-Eastern and Northern-Southern gradients. “These gradients of social-economic development feature their significant economic centre formed by the Bratislava region and its neighbouring regions. Economic prosperity and directed investments increasingly deepen the differences between this area and the economic periphery, which includes the Eastern Slovakia and Southern Slovakia.” (Ministry of Agriculture and Rural Development of the Slovak Republic, 2010). Matlovič and Matlovičová (2011) also confirmed the assumption about the Slovak Republic's polarization into its developed West/North-West and stagnant South-East /East.

The goal of this article is to analyse and evaluate the regional labour market differences applicable to the Slovak Republic's individual regions. We will examine the regional disparities and their links to the labour market indicators. We will assign the individual regions of Slovakia to the developed regions and problematic regions per the available labour market indicators. We will also analyse the differentiation not only from the geographical perspective, but from the time perspective as well. We will find out which regional disparities tend to persist, grow or adjust (divergent or convergent theories).

## 2 Theoretical Framework of the Given Topic

Disparities may be defined as “differences, inequalities of signs, phenomena or processes whose identification and comparison are regionally meaningful (in terms of learning, economy, social and psychological aspects, etc.)” (Kutscherauer et al., 2010).

The regional disparities compare the individual regions; therefore, we may define them as “difference or disparity of signs, phenomena or processes with clear territorial locations that exist within at least two entities of the territorial structure” (Hučka, Kutscherauer, Tománek, 2008). These are differences in the level of social-economic development of regions that may be identified and compared. They result from the different conditions of factors that impact regional development in various ways.

The term regional disparity may be also seen as a “structured condition based on a system of elements, links and relationships, which cumulates (non-) favourable phenomena affecting the development of a specific area in a given zone” (Rajčáková, Švecová, 2012).

Gajdoš, P. (In Matlovič, Matlovičová, Klamár, 2008) claims that regional disparities are the “product of multiple acting factors, depend on the quality and development potentials, including different positions at which the individual regions started their transformation processes.” It is a consequence of regional development when regional development may under specific historical conditions feature non-uniform development of regions. This causes multiple differences: social, economic, cultural, infrastructural, differences in life conditions, standards of living, etc. They may lead to regional polarization (of quantitative and qualitative character)” (Gajdoš, in Výrostková, 2010). Disparity means breach of balanced regional development, breach of the conditions and assumptions of sustainable development (Maier et al., 2012).

Concept theories explain in various ways the regional development and highlight various causes of regional differences. The individual conceptual approaches feature various positions on regional policy, and they differ in their recommendations on regional policy measures and tools to be used to solve regional differences. There are currently multiple theories explaining regional growth and development. According to Buček, Reháč, and Tvrdoň (2010), theories are most often divided into two categories: (1) Convergent theories (regional balance theories) – economy features a mechanism, which secures natural tendency to equalize social-economic disparities among regions (it finds existing disparities temporary) and (2) divergent theories (regional imbalance theory – disparities in regional development levels are the natural result of economy functioning, i.e. they tend to continue or increase.

### **3 Labour Market Indicators for the Analysis**

In the Slovak Republic, there are two official methodical approaches to labour market indicator measuring. The first one is identified by the Statistical Office (ŠO SR), which processes data through company statistics and labour force survey (LFS). The LFS methodology specifies the individual indicators in line with the international definitions and recommendations of ILO and Eurostat. Data is identified continually every quarter, based on stratified systematic selection. The sample features about 10.250 flats, i.e. about 0.6% of all the permanently occupied flats. Every household is included in the selection set for five consecutive quarters, and then they are removed and replaced by other ones. The other indicator is identified by the Central Office of Labour, Social Affairs and Family (COLSAF), which uses data from the employment applicant registry.

The biggest problem was the data availability at the local level of statistical territorial units. Since the Statistical Office only processes data up to the NUTS3 level – regions, our primary source of data was the information on the individual labour market indicators of the website of the Central Office of labour, Social Affairs and Family. This data is also available at the local LAU 1 level - counties. We wished to see how the regional disparities changed with time; therefore, we had to find data which is available on a long-term basis. The analysis eventually included this data: registered unemployment rate, number of job vacancies per the number of registered job applicants, percentages of some groups of disadvantaged job applicants (specifically, long-term registered job applicants (registered for more than 12 months), graduates, job applicants over 50).

### 3.1 Registered Unemployment Rate

The registered unemployment rate is the most important labour market indicator. It represents the share of available job applicants versus economically active population. Therefore, it provides us with information on how many job applicants from the economically active population may start working right after they are offered available jobs.

Per the Central Office of labour, Social Affairs and Family, the Slovak Republic's registered unemployment rate as of 30 April, 2016 reached the best values in the counties of the Western and North-Western Slovakia. The worst values were reached in the Eastern and South-Eastern Slovakia (Fig. 1 left). The highest unemployment rate values (up to 26.43%) were identified in the Rimavská Sobota county. Unemployment rates exceeding 20% were also identified in the Kežmarok (specifically 22.08%), Revúca (21.32%), and Rožňava (20.05%) counties. On the other hand, the lowest levels of registered unemployment rates were identified in Bratislava (Bratislava V – 4.15%, Bratislava I – 4.16%, Bratislava IV – 4.90%, Bratislava III – 4.93%, Bratislava II – 4.94%), and in the Galanta (4.04%), Piešťany (4.69%), Púchov (4.75%), and Trnava (4.88%) counties.

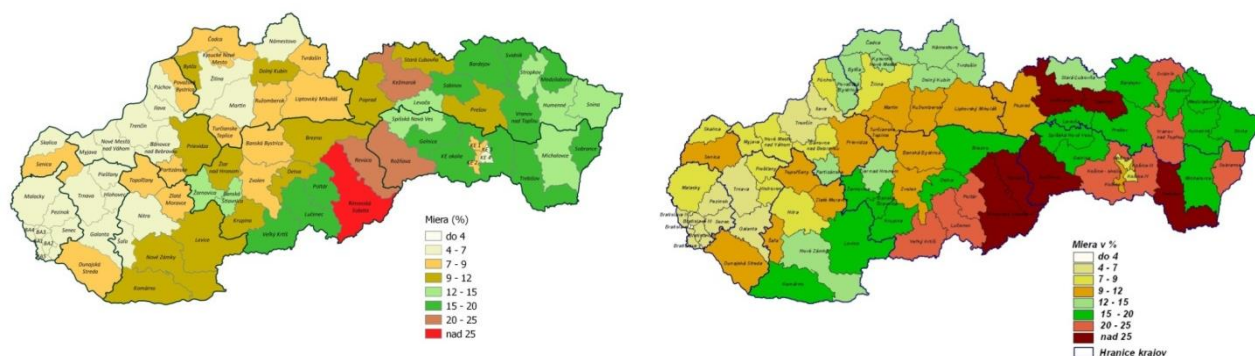


**Fig. 1** Registered unemployment rate as of 30 April, 2016 (left) and 30 April, 2011 (right)

(Source: COLSAF)

In April 2016, compared to April 2011, the registered unemployment rate decreases in the majority of the Slovak Republic's regions (Fig. 1 and Tab. 1). The greatest change was obvious in the Banská Bystrica region (decrease by up to 5.27 percentage points) and in the Košice region (by 4.70 percentage points). During this period, the registered unemployment rate only increased in four counties, specifically in Bratislava IV (increase by 0.84 percentage points), Bratislava III (by 0.81 percentage points), Bratislava I (by 0.73 percentage points), and in Bratislava II (by 0.16 percentage points). On the other hand, the greatest decrease was noted in the Trebišov (decrease by 9.10 percentage points), Krupina (by 8.94 percentage points), Revúca (by 8.89 percentage points), and Rožňava (by 8.10 percentage points) counties. In 19 counties the decreases exceeded 5 percentage points and 2 percentage points in up to 62 counties.



Tab. 1 Registered unemployment rates in the individual regions of the Slovak Republic

| Territory              | Registered Unemployment Rate (in %) |            | Change |
|------------------------|-------------------------------------|------------|--------|
|                        | April 2011                          | April 2016 |        |
| Bratislava Region      | 4.97                                | 4.83       | -0.14  |
| Trnava Region          | 8.26                                | 5.88       | -2.38  |
| Trenčín Region         | 9.31                                | 6.85       | -2.46  |
| Nitra Region           | 12.27                               | 8.55       | -3.72  |
| Žilina Region          | 11.35                               | 7.53       | -3.82  |
| Banská Bystrica Region | 19.26                               | 13.99      | -5.27  |
| Prešov Region          | 18.47                               | 14.49      | -3.98  |
| Košice Region          | 17.93                               | 13.23      | -4.70  |
| Slovak Republic        | 12.94                               | 9.64       | -3.30  |

Source: Author's own data

### 3.2 Available Job Positions

Available job position is a newly created, untaken, or freed job position in connection with the employer takes active steps to find a suitable candidate outside of his enterprise, being ready to take additional steps to fill the available position (Statistical Office, 2016). As of the end of April 2016, there were 20,144 available job positions in the Slovak Republic. Since the Slovak Republic's counties are not homogeneous, the analysis included a number of available job positions converted per the number of registered job applicants in the individual regions. There were approximately 6.5 available job positions per a 100 job applicants in Slovakia. In other words, there were 15.4 job applicants per 1 available job position.

The biggest numbers of available job positions per a 100 job applicants were in the counties of the Western and North-Western Slovakia. The smallest numbers were identified in the Eastern and South-Eastern Slovakia (Fig. 2 left). Only in one county, specifically in Bratislava I, there the number of available positions exceeded the number of registered job applicants. In this county, there were up to 128.74 available positions per a 100 job applicants. The biggest numbers of available job positions per a 100 job applicants were also identified in the Bratislava IV county (specifically 75.04 available job positions), Bratislava III county (60.43 available job positions), and Galanta county (59.21 available job positions). On the other hand, the smallest number, not even one available job position per a 100 job applicants, was identified in the Snina county (specifically 0.70 available job positions), Gelnica county (0.71 available job positions), and Sabinov county (0.86 available job positions).

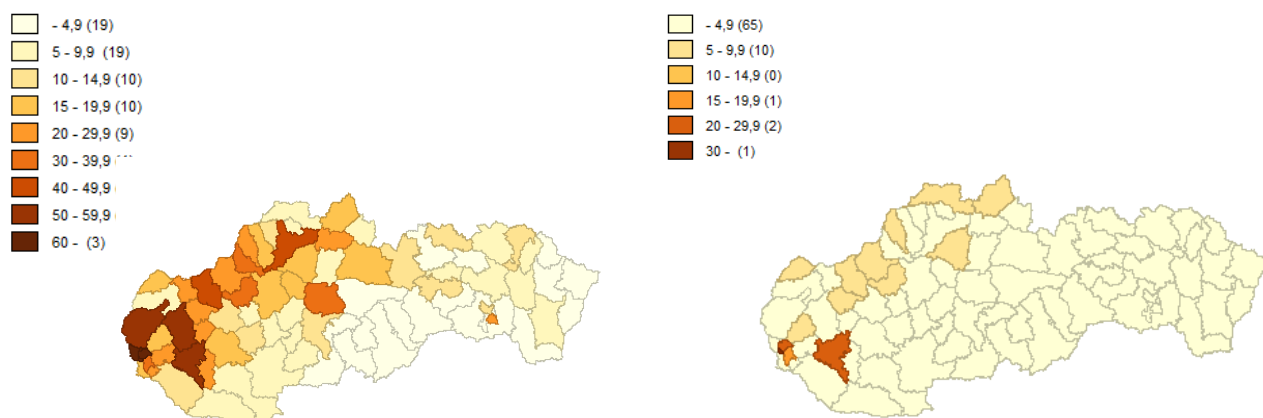


**Fig. 2** Number of available job positions per a 100 job applicants as of 30 April, 2016 (left) and of 30 April, 2011 (right)  
 (Source: Own data)

In April 2016, compared to April 2011, in every county of the Slovak Republic, there the number of available job positions per a 100 job applicants increased (Fig. 2 and tab. 2). The biggest increase was observed in the Bratislava region (increase by 37.32 available job positions per a 100 job applicants). On the other hand, the smallest increase was observed in the Prešov region (increase by only 4.64), Košice region (by 5.20), and the Banská Bystrica region (by 6.21). The number of available job positions primarily increased in the Bratislava I county (increase by 97.35 available job positions per a 100 job applicants), Bratislava IV county (by 72.99), and Malacky county (by 52.79). A very small difference was registered in the Medzilaborce (increase only by 0.05), Gelnica (0.22), Sabinov (0.40), and Snina counties (0.58). Up to 26 counties only featured increases by up to 5 available job positions per a 100 job applicants, in 48 counties 10 available job positions, and only 18 counties reported increases by more than 20 available job positions.

**Tab. 2** Number of available job positions per a 100 job applicants in the Slovak Republic's individual regions

| Territory              | Available jobs per 100 job applicants |            | Change |
|------------------------|---------------------------------------|------------|--------|
|                        | April 2011                            | April 2016 |        |
| Bratislava Region      | 8.63                                  | 45.95      | +37.32 |
| Trnava Region          | 6.52                                  | 26.54      | +20.02 |
| Trenčín Region         | 3.00                                  | 23.65      | +20.65 |
| Nitra Region           | 2.33                                  | 10.85      | +8.52  |
| Žilina Region          | 2.87                                  | 18.17      | +15.30 |
| Banská Bystrica Region | 1.02                                  | 7.23       | +6.21  |
| Prešov Region          | 1.49                                  | 6.13       | +4.64  |
| Košice Region          | 0.62                                  | 5.82       | +5.20  |
| Slovak Republic        | 2.31                                  | 12.92      | +10.61 |

Source: Own data.

### 3.3 Disadvantaged Job Applicants

Disadvantaged job applicants represent a risk group of citizens. They are people with the worst labour market integration rates. Data is available; therefore, let us have a look at some groups of

disadvantaged job applicants, specifically at graduates, job applicants over 50, and long-term registered job applicants (over 12 months). We converted the given indicators and included them into our analysis as the percentage share of the given disadvantaged group of job applicants per the total number of job applicants.

Fig. 3 shows the percentage share of graduates. In April 2016, the biggest number of converted graduates was in the Tvrdošín (10.33%), Námestovo (9.23%), and Senec (7.52%) counties. On the other hand, their smallest numbers were identified in the counties of the Southern Slovakia (least in the Rimavská Sobota - 2.37%, Revúca - 2.83%, and Poltár counties - 2.98%). In 2016, compared to 2011, the share of graduates decreased in every county. The biggest difference was in the Čadca (decrease by 5.42 percentage points), Trenčín (by 5.18 percentage points), and Bratislava IV counties (by 5.09 percentage points). A very small difference was identified in the Senec (decrease only by 0.15 percentage points), Levoča (by 0.16 percentage points), and Kysucké Nové Mesto counties (by 0.23 percentage points). Up to 29 counties of Slovakia reported decreases of graduates within 2 percentage points, in 55 counties within 3 percentage points, and only in 8 counties the decrease exceeded 4 percentage points.

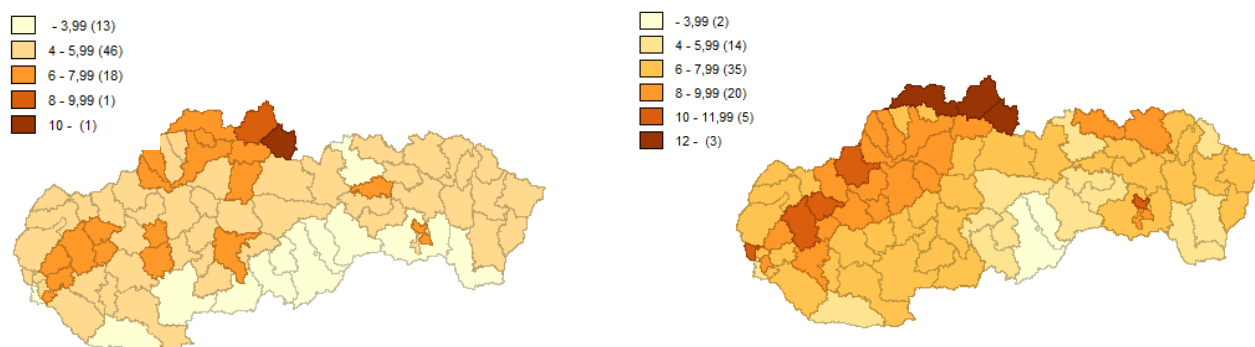


**Fig. 3** Percentage share of graduates as of 30 April, 2016 (left) and 30 April, 2011 (right)

(Source: Own data)

The percentage share of job applicants over 50 is depicted in Fig. 4. The biggest numbers of converted job applicants over 50 were in the Bratislava I (specifically 36.33%), Považská Bystrica (32.88%), and Bratislava V counties (32.11%). On the other hand, their smallest numbers were identified in the Kežmarok (18.91%), Gelnica (20.30%), Sabinov (20.64%), and Stará Ľubovňa counties (20.84%). Only one county, Bratislava V, experienced a slight decrease (exactly by 0.53 percentage points) of its share of job applicants over 50 in April 2016, compared to April 2011. The other counties reported increased shares of this group of disadvantaged job applicants. The biggest increase was observed in the Hlohovec (increase by 8.67 percentage points), Košice I (by 8.07 percentage points), and Košice II counties (by 7.86 percentage points). Up to 23 counties observed increases of the shares of job applicants over 50 within 3 percentage points, 57 counties within 5 percentage points, and 11 counties reported increases over 6 percentage points.

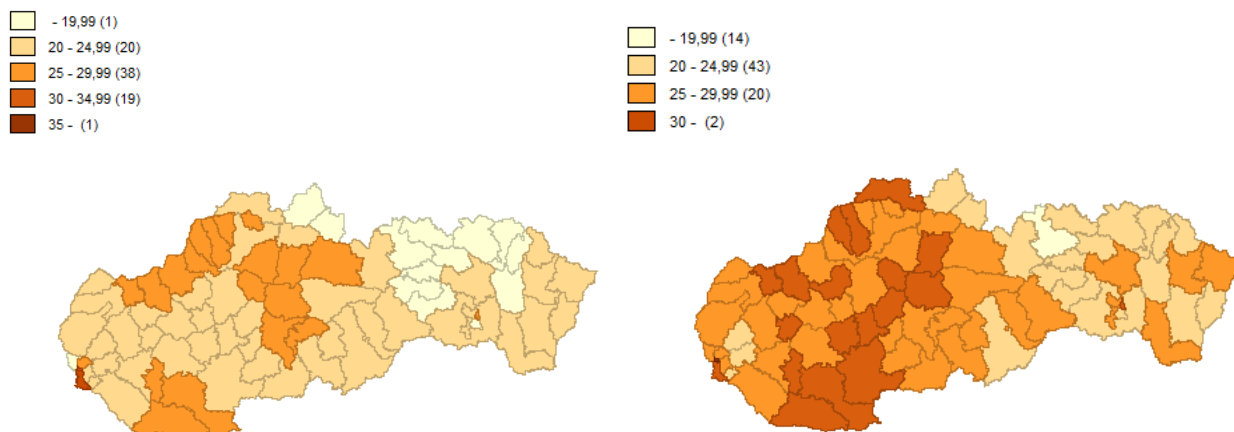


**Fig. 4** Percentage share of job applicants over 50 as of 30 April, 2016 (left) and 30 April, 2011 (right)  
 (Source: Own data)

The last analysed group of disadvantaged job applicants, specifically long-term registered job applicants, is in Fig. 5. The biggest share of long-term registered job applicants was, as in April 2016, in the Rimavská Sobota (up to 70.72%), Rožňava (66.68%), Trebišov (65.98%), and Poltár counties (64.86%). On the other hand, their lowest shares were observed in the Trnava (24.67%), Senec (26.40%), and Galanta counties (26.81%). In 2016, compared to 2011, the share of long-term registered job applicants decreased in 21 counties. The biggest decrease was in the Martin (decrease by 10.14 percentage points), Revúca (8.85 percentage points), and Skalica counties (8.55 percentage points). The biggest increase was registered in all the Bratislava counties (specifically Bratislava III - increase by 16.88 percentage points, Bratislava IV - by 16.28 percentage points, Bratislava V – by 14.48 percentage points, Bratislava I – by 13.07 percentage points, and Bratislava II – by 12.48 percentage points). In 9 counties, there the share of long-term registered job applicants increased by more than 10 percentage points.

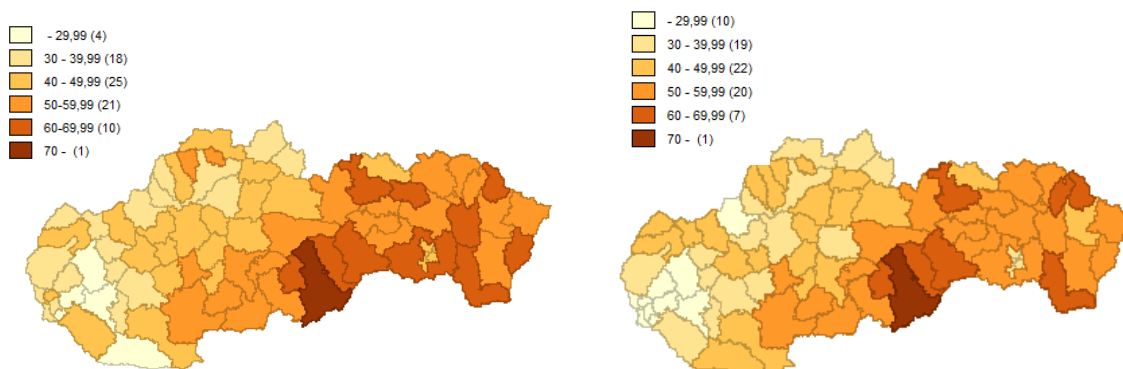


**Fig. 5** Percentage share of long-term unemployed job applicants as of 30 April, 2016 (left) and 30 April, 2011 (right)  
 (Source: Own data)

The following table 3 shows the shares of the individual disadvantaged job applicants in April 2011 and 2016 and their changes in the counties and the whole Slovak Republic.

Tab. 3 Share of disadvantaged job applicants in the individual regions of the Slovak Republic

| Territory              | Graduates  |            | Change | Over 50 years |            | Change | Long-term registered |            | Change |
|------------------------|------------|------------|--------|---------------|------------|--------|----------------------|------------|--------|
|                        | April 2011 | April 2016 |        | April 2011    | April 2016 |        | April 2011           | April 2016 |        |
| Bratislava Region      | 7.78       | 5.00       | -2.78  | 24.82         | 27.66      | +2.84  | 25.17                | 36.13      | +10.96 |
| Trnava Region          | 8.72       | 5.54       | -3.18  | 23.49         | 27.44      | +3.95  | 35.32                | 35.26      | -0.06  |
| Trenčín Region         | 9.06       | 5.63       | -3.43  | 25.23         | 29.71      | +4.48  | 38.68                | 43.02      | +4.34  |
| Nitra Region           | 6.91       | 4.61       | -2.30  | 25.37         | 30.35      | +4.98  | 44.62                | 49.21      | +4.59  |
| Žilina Region          | 9.52       | 6.54       | -2.98  | 24.25         | 28.47      | +4.22  | 39.74                | 42.64      | +2.90  |
| Banská Bystrica Region | 5.41       | 3.77       | -1.64  | 23.08         | 27.43      | +4.35  | 58.46                | 58.29      | -0.17  |
| Prešov Region          | 6.99       | 4.91       | -2.08  | 19.24         | 22.79      | +3.55  | 54.85                | 57.28      | +2.43  |
| Košice Region          | 6.06       | 4.28       | -1.78  | 20.61         | 24.94      | +4.33  | 54.68                | 58.87      | +4.19  |
| Slovak Republic        | 7.13       | 4.82       | -2.31  | 22.5          | 26.54      | +4.04  | 48.50                | 51.70      | +3.20  |

Source: Own data

#### 4 Work Methodology

There are currently a lot of statistical methods we may use to identify regional disparities. It is not clearly specified which statistical tools are to be used to evaluate these disparities. Even Kutscherauer et. al (2008) warns that the issue of regional disparities still does not feature any sufficiently developed theoretical frame or specified systemic and methodological frame. He also highlights the fact that we are missing tools and mechanisms for quantification, mutual comparisons, and evaluations of regional disparities. The selection of method, way of measuring regional disparities, depends on multiple factors, especially on one's goal, examined indicators, available data, etc.

In our article, we based our measuring and evaluation of regional labour market disparities on statistical comparison (in previous section 3.1 – 3.3) and the criterion evaluation method – scoring method. The multi-criteria methods are used when we wish to compare any objects through multiple indicators. The goal of this evaluation is the “transformation and synthesis of various indicators into one – integral indicator (resulting characteristics), comprehensively showing the levels of the individual objects in their examined set” (Stankovičová, Vojtková, 2007).

Based on the scoring method, we replace unequal values of the individual indicators with scores. First of all, we find an object for every indicator, which has the best value, and we assign 100 points to this object. Regarding the other objects, we assign them 0 to 100 points, based on what percentage of the best indicator value they represent:

- During indicator maximization:

$$b_{ij} = \frac{x_{ij}}{x_{max,j}} * 100 \quad (1)$$

- During indicator minimization:

$$b_{ij} = \frac{x_{min,j}}{x_{i,j}} * 100 \quad (2)$$

Where  $x_{ij}$  - Value of the  $j$ -th indicator in the  $i$ -th object,  
 $x_{maj,j}$  - Highest value of the  $j$ -th indicator,  
 $x_{min,j}$  - Lowest value of the  $j$ -th indicator,  
 $b_{ij}$  - Number of points for the  $i$ -th object for the  $j$ -th indicator.

Then, we calculate the integral indicator as the weighed arithmetic average of the number of points  $b_{ij}$  for the individual indicators. The resulting order is determined in such a way that the highest integral indicator value object is the best per all the indicators. The benefit of this method rests in the fact that it is able to evaluate objects more sensitively, and when we assign numbers of points we also consider quantitative object disparities in relation to the individual indicators (Stankovičová, Vojtková, 2007).

## 5 Multi-Criteria Evaluation of the Regional Labour market Disparities

Fig. 6 shows the resulting integral indicators for every region of the Slovak Republic. In April 2016, the best score was mainly achieved by Slovakia's Western counties. The highest scores were reached by the Bratislava I (score 75), Galanta (70.06), Trnava (65.72), Bratislava IV (64.74), Bratislava V (62.67), Bratislava III (62.64), Malacky (61.67), and Senec counties (60.88). Worst results were achieved by four counties of the Eastern Slovakia - specifically Snina (37.18), Sobrance (38.10), Humenné (39.11), Medzilaborce (39.11), and four counties of the Central Slovakia – specifically Žarnovica (38.90), Detva (39.21), Ružomberok (39.51), and Krupina (39.70).

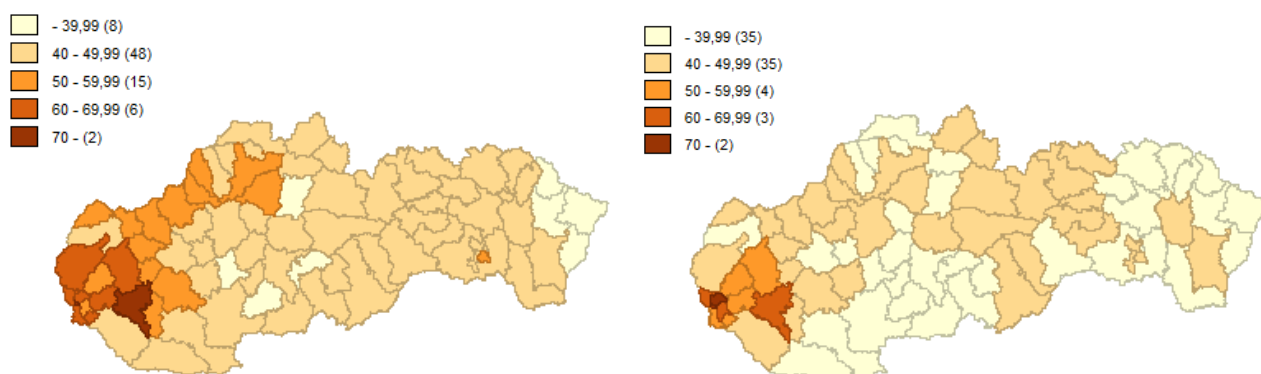


**Fig. 6** Multi-criteria evaluation of regional disparities as of 30 April, 2016 (left) and 30 April, 2011 (right)  
 (Source: Own data)

In April 2016, compared to April 2011, the biggest score increase was registered in the Trnava (increase by 15.69), Myjava (12.96), Martin (12.91), Malacky (12.69), and Piešťany counties (12.66). Up to ten counties reported increases by more than 10 points and 24 counties by more than 5 points. However, eight counties reduced their scores, specifically decreases were registered in the Bratislava III (decrease by 7.70), Bratislava II (by 4.96), Bratislava I (by 4.07), Vranov nad Topľou (by 2.95), Spišská Nová Ves (by 2.29), Levoča (by 1.19), Revúca (by 0.36), and Snina counties (by 0.29).

Tab. 4 Multi-criteria evaluation in the individual regions of the Slovak Republic

| Territory              | Average point rating |            | Change |
|------------------------|----------------------|------------|--------|
|                        | April 2011           | April 2016 |        |
| Bratislava Region      | 61.53                | 62.79      | +1.26  |
| Trnava Region          | 48.29                | 56.99      | +8.70  |
| Trenčín Region         | 41.76                | 50.35      | +8.59  |
| Nitra Region           | 40.45                | 45.03      | +4.58  |
| Žilina Region          | 39.52                | 45.51      | +5.99  |
| Banská Bystrica Region | 39.16                | 42.12      | +2.96  |
| Prešov Region          | 40.08                | 41.61      | +1.53  |
| Košice Region          | 41.11                | 43.16      | +2.05  |
| Slovak Republic        | 43.12                | 47.26      | +4.14  |

Source: Own data.

## 6 Conclusion

The goal of the article was to analyse and evaluate the regional labour market disparities in the individual counties of the Slovak Republic. The biggest problem was the availability of data at the local level. The Slovak Republic uses its two official methodical approaches to the measuring of labour market indicators; however, the county level is only monitored by the Central Office of labour, Social Affairs and Family. It bases its calculations on data from the job applicant register; therefore, the data is limited.

During our analyses, we reached multiple conclusions. Our obtained results match the results of other authors who deal with analyses of the regional labour market disparities in the Slovak Republic. Our research indicated that the labour market features significant regional disparities. The registered unemployment level reaches the best values in the counties of the Western and North-Western Slovakia and the worst ones in the Eastern and South-Eastern Slovakia. The biggest number of jobs per a 100 job applicants is in the counties of the Western and North-Western Slovakia. The smallest number of these jobs is in the Eastern and South-Eastern Slovakia. Disadvantaged applicants who represent a risk group are deployed in various ways. The share of graduates is smallest in the Southern Slovakia. The number of job applicants over 50 is smallest in the Eastern Slovakia and the share of long-term registered job applicants is smallest in the Western and North-Western Slovakia. During our multi-criteria evaluation, we compared the counties through all the available labour market indicators and found out that the best values are achieved by the counties of the Western and North-Western Slovakia.

The rate of registered long-term unemployment significantly decreases in the majority of counties (In April 2016, compared to April 2011, it decreased in the Slovak Republic by 3.3 percentage points). However, there are still significant regional disparities if one compares the Western/North-Western Slovakia with the Eastern/South-Eastern Slovakia. The number of available job positions per 100 job applicants increases in every county. The regional disparities increased with this indicator. The disadvantaged job applicants changed in various ways. The number of graduates in every county decreased, the number of job applicants over 50 increased in almost every county, and the number of long-term registered job applicants increased in the majority of counties. During our multi-criteria evaluation, almost every counties of the Slovak Republic improved their scores. Significant regional disparities still persist.

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## DEPENDENCE OF THE EFFECTIVE TAXATION ON THE CORPORATE INCOME TAX RATE IN THE EUROPEAN UNION

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### Abstract

Corporate income tax rates are variable around the world due to different view of governments and countries on corporate taxation. Some of them prefer a lower corporate tax rates for possibility of greater economic production and try to attract foreign investors to conduct business in these countries. On the contrary, others favour a higher corporate tax rates to make important source of tax revenues, which can subsidize government spending and programs for the nation's citizens. Corporate taxes are taxes against profits earned by businesses during a given taxable period, but corporate income tax rate is not objective way of comparison of tax burden on the grounds of different rules for setting corporate tax base and its amount, which are caused by individual tax legislations in the particular countries. For more accurate representation of a taxpayer's tax liability is used effective corporate tax rate, which include not only the statutory tax rate on corporate income but also other aspects of tax systems determining the total amount of effectively paid taxes. The aim of this article is to examine the dependence of the effective taxation on the corporate income tax rate on using regression analysis and to evaluate the effective corporate taxation using effective average tax rate. Most of changes in the effective corporate taxation is caused by a change in the statutory tax rate (more than 98 %). An increase in the statutory corporate tax rate by 1 % results an increase in the effective average tax rate on average by 0.78 %.

### Keywords

Corporation, Tax Rate, Effective Taxation, Worldwide Regions, European Union.

### JEL classification

G30, H25, H71, K34

## 1 Introduction

According to the comparison of legal entities income tax, decreasing tax burden for firms has been showed unambiguously in the last decade. However, apart from that, economic behaviour of companies, in connection with positioning their capital abroad, reacts on comparability of tax conditions in single countries.

Due to the corporate taxation a lot of companies moved from countries with high rates to low-cost tax destinations. A gradual decline in the income tax of corporations has occurred in Europe over the past decades. This fact affected behaviour of advanced economies, which were forced to increase or at least maintain competitiveness of their country in the fight for foreign investors with the adjacent Central European or East European countries. In this respect, the efforts to maintain significant domestic companies on its territory and prevent from their leave to more favourable destinations in terms of tax and to the countries with cheap labour force, which include also the East European countries, has become the strategy of the West European countries. On the contrary, the East European countries attempted to attract these foreign companies to conduct business in these countries.

The aim of this paper is to examine the dependence of the effective taxation on the corporate income tax rate on using regression analysis and to evaluate the effective corporate taxation using effective average tax rate. Equation of selective regression function presents an approximation of the entered values where the coefficients are determined by the method of least squares, so that the sum of squared deviations of the original values from obtained model would be minimum. The  $R^2$  index expresses the degree of reliability of the calculated estimate of the development.

## 2 Corporate taxation in the world

Tax systems are dependent on a number of factors, which affect in mutual circumstances fulfilment of the basic principles and functions of taxes (Smith, 2007). As Kubátová (2010) claims, there has not been a lot of changes in requirements for a good tax system and individual taxes since the Adam Smith's time. The good tax system cannot simultaneously fulfil all requirements as they are in conflict with each other (Vančurová and Láchová, 2016). The structure as well as amount of taxes is primarily subject to economic factors, such as the economic growth, inflation rate, the extent of engagement of the economy in the international trade, sector and geographic structure as well as the workforce structure. The sector structure in connection with the extent of concentration of the economy, i.e. the proportion of corporations.

According to Šíroký et al. (2008), appropriate adjustment of corporate tax rate may stimulate businesses for more economic activity. The government's choices of the corporate tax rate and public investment are interdependent (Gomes and Pouget, 2008). It is important to note that the proportion of corporate tax incomes in the total incomes from taxes grew until 2008 in spite of a fall in the statutory tax rates of legal persons, which was caused by tax competition. This fact was a result of extension of tax bases, progress of corporate business and other factors. However, this trend has changed as a result of the economic crisis.

Corporate tax rates vary significantly between worldwide regions (Table 1). North America's average corporate income tax rate of 33.3 percent is the highest among all regions during the whole period. Europe has the lowest average tax rate at 20.5 percent in 2016, 3 percentage points below the worldwide average of 23.6 percent.

**Table 1.** Regional average corporate tax rates

| Region        | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---------------|------|------|------|------|------|------|------|------|------|------|------|
| Africa        | 30.8 | 30.6 | 28.7 | 28.8 | 28.4 | 28.6 | 29.2 | 28.3 | 27.9 | 27.9 | 27.5 |
| America       | 30.0 | 29.3 | 28.8 | 28.8 | 28.3 | 29.3 | 28.7 | 28.4 | 28.0 | 27.4 | 27.9 |
| Asia          | 29.0 | 28.5 | 28.0 | 25.7 | 24.0 | 23.1 | 22.9 | 22.5 | 21.9 | 22.6 | 22.0 |
| Europe        | 23.7 | 23.0 | 22.0 | 21.6 | 21.5 | 20.8 | 20.4 | 20.6 | 19.7 | 20.1 | 20.5 |
| Oceania       | 30.6 | 30.2 | 29.6 | 29.2 | 29.0 | 28.6 | 28.6 | 27.0 | 27.0 | 27.0 | 26.0 |
| North America | 38.1 | 38.1 | 36.8 | 36.5 | 35.5 | 34.0 | 33.0 | 33.0 | 33.3 | 33.3 | 33.3 |
| Latin America | 29.7 | 28.3 | 28.0 | 28.0 | 27.5 | 28.8 | 28.3 | 28.0 | 27.5 | 26.9 | 27.3 |
| EU            | 24.8 | 24.0 | 23.2 | 23.1 | 22.9 | 22.7 | 22.5 | 22.8 | 21.3 | 22.3 | 22.9 |
| OECD          | 27.7 | 27.0 | 26.0 | 25.6 | 25.7 | 25.4 | 25.2 | 25.3 | 24.1 | 24.9 | 24.9 |
| Global        | 27.5 | 27.0 | 26.1 | 25.4 | 24.7 | 24.5 | 24.4 | 23.7 | 23.6 | 23.9 | 23.6 |

Source: KPMG.

The highest corporate tax rate among the 138 countries surveyed was the United Arab Emirates, which has a rate of 55 percent (Table 2). The United States has the second highest corporate income tax rate along with St. Marteen, which has a rate of 34.5 percent, contribute to the fact that the highest rate is in North America as mentioned above.

**Table 2.** Fifteen highest corporate tax rates in the world in 2016

| Country              | Tax rate | Region        |
|----------------------|----------|---------------|
| United Arab Emirates | 55.0     | Asia          |
| United States        | 40.0     | North America |
| Argentina            | 35.0     | Latin America |
| Malta                | 35.0     | Europa        |
| Zambia               | 35.0     | Africa        |
| India                | 34.6     | Asia          |
| St Maarten           | 34.5     | North America |
| Brazil               | 34.0     | Latin America |
| Belgium              | 34.0     | Europa        |
| France               | 33.3     | Europa        |
| Japan                | 32.3     | Asia          |
| Mozambique           | 32.0     | Africa        |
| Namibia              | 32.0     | Africa        |
| Pakistan             | 32.0     | Asia          |
| Italy                | 31.4     | Europa        |

Source: author by KPMG.

Every region in the world except for Oceania is represented in the top fifteen countries. Four of the top fifteen countries are in Asia and in Europa, three of the top fifteen countries are in Africa, and two are in both North and Latin America.

Among countries with corporate income taxes, Montenegro has the lowest corporate tax rate at 9 percent (Table 3). Three countries have tax rates of 10 percent, all of them small nations in Europe (Bosnia and Herzegovina, Bulgaria and Gibraltar). The only major industrialized nation among the bottom 15 countries is Ireland, which is known for its low 12.5 percent rate.

**Table 3.** Fifteen lowest corporate tax rates in the world in 2016  
 (Excluding countries without corporate income tax)

| Country                | Tax rate | Region |
|------------------------|----------|--------|
| Kuwait                 | 15.0     | Asia   |
| Latvia                 | 15.0     | Europa |
| Lithuania              | 15.0     | Europa |
| Mauritius              | 15.0     | Africa |
| Serbia                 | 15.0     | Europa |
| Sri Lanka              | 15.0     | Asia   |
| Cyprus                 | 12.5     | Europa |
| Ireland                | 12.5     | Europa |
| Liechtenstein          | 12.5     | Europa |
| Macau                  | 12.0     | Asia   |
| Oman                   | 12.0     | Asia   |
| Bosnia and Herzegovina | 10.0     | Europa |
| Bulgaria               | 10.0     | Europa |
| Gibraltar              | 10.0     | Europa |
| Montenegro             | 9.0      | Europa |

Source: author by KPMG.

### 3 Corporate taxation in the European Union

The enlargement of the European Union and the globalisation process also substantially affect taxation systems and fiscal policy in the individual countries (Reodano, 2007). In the sphere of direct taxes the important external factor is the tax competition between single countries and that is also in the frame of the expanded European Union (Baldwin and Krugman, 2004). It depends on historical development of each country, and also on economic, political, and, last but not least, philosophical opinions, how the structure and content of the tax system will be influenced. It is important for the state to pursue a favourable tax policy to ensure support to all taxpayers and thus to ensure competitiveness of the state and development of the society.

#### 3.1 Statutory taxation

In 1995 the European Union was consisted of 15 Member States and their average tax rate on corporate income in this period was 38 %. In the context of EU enlargement the tendency to reduce the statutory corporate tax rate (SCTR) of existing countries intensified. However, despite the considerable efforts the old Member States (EU-15) were failed to reduce the difference in the statutory rates in both groups. New Member States (NMS) have become attractive for multinational companies due to favourable corporate rates.

The following figure shows the identical trend of reduction of statutory rates of corporate taxes, while the fall in NMS-13 is a bit greater (from 31.5 % in 1995 to 18.5 % in 2015) than in EU-15, the fall in the average rate was not that dramatic (from 38 % in 1993 to 26.5 % in 2015).

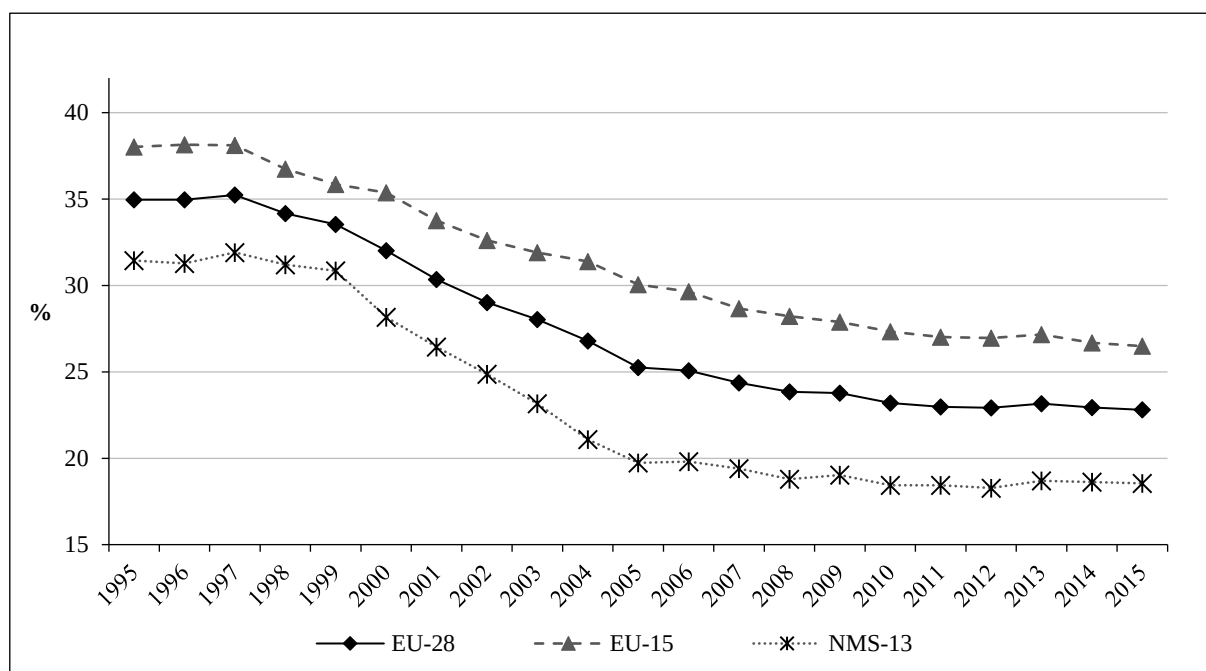


**Fig. 1.** Development of the statutory corporate tax rate in the EU (Source: EUROSTAT + author's calculation)

The highest SCTR among 28 EU Member States is in France (38 %) including the temporary surcharge (contribution exceptionnelle) for very large companies. As mentioned above, Bulgaria (the New Member State) has the lowest statutory tax rate for corporations at 10 percent. Among countries with low SCTR, Cyprus and Ireland have the second lowest rates. In Cyprus the public corporate bodies were subject to higher 25% rate (2003-2008). The 5 % surcharge levied on all companies (including public bodies) with taxable income exceeding EUR 1.7 million in 2003 and 2004 is not included. In 2013, under the macro-financial adjustment programme and prior to the first

disbursement of assistance, the corporate income tax rate was increased to 12.5 %. Until 2003, Ireland applied a 10% SCTR to qualifying manufacturing and services companies.

The Czech Republic is, with the rate of 19 %, below the EU average rate which is just under 22 %. The corporate tax rates at the same level of 19 % is in Poland. The same rate was in neighbouring Slovakia but it has proceeded the opposite direction than most of the EU countries and has increased this rate by 4 percentage points to 23 % in 2013 (Kozelský and Jedlička, 2013). Last year they reduced the rate by 1 percentage point together with the introduction of a minimum (lump sum) tax, whose value vary with turnover (EUR 480 for not VAT registered companies, EUR 960 if small VAT registered companies and EUR 2880 if annual turnover above EUR 500 000).

### 3.2 Effective taxation

Different rules for setting corporate tax base and its amount, which are caused by individual tax legislations in the particular countries, are a substantial limitation for an objective comparison of tax burden for companies by SCTR in those countries. Therefore economists had to come up with a new measure for effective taxation of corporations. This issue has extensively dealt with by Barrios, Nicodème and Fuentes (2014).

There exist three methods of determination of effective tax rates. These methods are coined as methods of backward macroeconomic view, backward microeconomic view and forward microeconomic view (Blechová, 2014). Nicodème (2002) claims, using the micro backward-looking approach to compute effective tax rates there could be some concerns regarding domestic tax discrimination since some sectors and sizes enjoy significantly more favourable tax burdens.

The instrument which removes the imperfect information capability of the statutory tax rates is the implicit tax rate (ITR). It takes into account the tax base and the method (if any) by which the systems of corporate and personal income taxes are integrated. The ITR on corporate income is generally lower than the statutory corporate tax rate (Table 4).

**Table 4.** Comparison of statutory and implicit corporate rates in the selected EU countries in 2012

| Country        | SCTR | ITR-COR | Difference |
|----------------|------|---------|------------|
| Belgium        | 34.0 | 20.0    | -14.0      |
| Czech Republic | 19.0 | 21.4    | 2.4        |
| Estonia        | 21.0 | 6.2     | -14.8      |
| Ireland        | 12.5 | 6.0     | -6.5       |
| Spain          | 30.0 | 17.8    | -12.2      |
| France         | 36.1 | 28.1    | -8.0       |
| Italy          | 31.4 | 25.9    | -5.5       |
| Cyprus         | 10.0 | 28.6    | 18.6       |
| Latvia         | 15.0 | 6.4     | -8.6       |
| Lithuania      | 15.0 | 4.1     | -10.9      |
| Hungary        | 20.6 | 10.6    | -10.0      |
| Netherlands    | 25.0 | 6.8     | -18.2      |
| Austria        | 25.0 | 23.9    | -1.1       |
| Poland         | 19.0 | 13.0    | -6.0       |
| Portugal       | 31.5 | 20.9    | -10.6      |
| Slovenia       | 18.0 | 15.2    | -2.8       |
| Slovakia       | 19.0 | 18.2    | -0.8       |
| Finland        | 24.5 | 17.5    | -7.0       |
| Sweden         | 26.3 | 21.9    | -4.4       |
| United Kingdom | 24.0 | 20.8    | -3.2       |

Source: author by EUROSTAT.

This can be explained by the fact that the ITR incorporates the effect of reduced rates (e.g. for certain assets, sectors or small profits), tax deductions affecting the base and the effects of tax planning by corporations in order to minimise their tax payments. It is, however, possible that the ITR on corporate income exceeds the statutory corporate tax rate. This may depend, for instance, on the payment by corporation of taxes referring to profits earned earlier, or on taxes paid on capital gains.

For comparison, companies can also use the effective average tax rate (EATR), which is in principle the relevant rate for analysing discrete investment choices (Devereux and Griffith, 2003), such as where to locate. The EATR is a measure of the present value of taxes paid expressed as a proportion of the net present value of the income stream excluding the initial cost of the investment (Elschner and Vanborren, 2009).

Figure 2 shows the development of the effective average tax rates in the European Union between 2000 and 2014 and the similar difference in EU-15 and NMS-13.

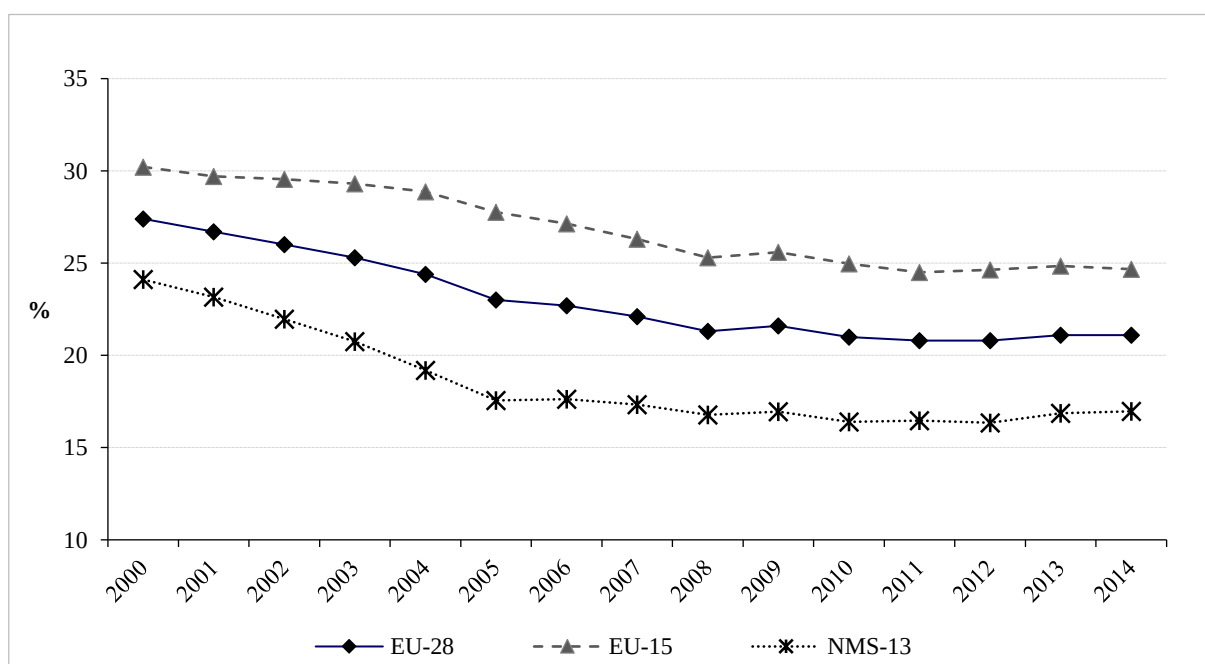


**Fig. 2.** Development of the effective average tax rate in the EU (Source: EUROSTAT + author's calculation)

In 2014 the lowest EATR was in Bulgaria (9 %). The biggest decrease of this rate occurred in this country, namely by 19.1 percentage points from 28.1 % in 2000. The significant decrease of the rate is also apparent in the Czech Republic from 23.6 % in 2000 to 16.7 % in 2014. There were only two countries, where the EATR increased in 2014 compared to 2000. At the beginning of the researched period Ireland had the lowest rate (9.4 %), which increased to 14.4 %. The second country as for increasing EART was France, which amounted the highest rate (39.4 %) in 2014.

#### 4 Results

As already mentioned, the effective average tax rate is the appropriate criterion to compare the effective taxation of corporate income. The dependence of EATR on statutory corporate tax rate was examined by simple linear regression. The equation of the regression function has the form:

$$\hat{y} = b_0 + b_1x \quad (1)$$

where:  $b_0, b_1$  - selective (empirical) regression parameters,  
 $x$  - statutory tax rate on corporate income (independent variable),  
 $\hat{y}$  - effective tax rate on corporate income (dependent variable),

The figure 3 shows that the 98.5 % of EATR changes are explained by changing of statutory tax rate. The regression line was estimated using the least squares method, from which it can be deduced that an increase in the statutory corporate tax rate by 1 % results an increase in the effective average tax rate on average by 0.78 %.

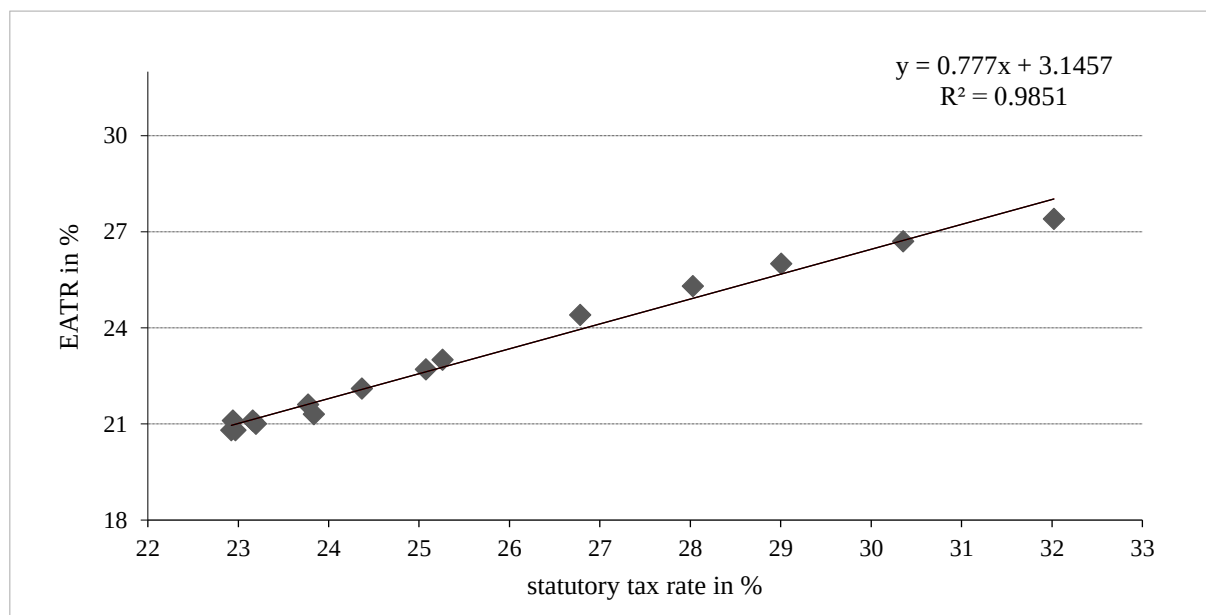


**Fig. 3.** Effective average tax rate depending on statutory tax rate in EU-28 (Source: author's analysis)

To verify whether the regress model is indeed suitable for the data, first there were tested the individual parameters using the t-test. The statistical significance of the whole model was then verified using the F-test.

**Table 5.** Test of significance of regression parameters

| Parameter           | Estimate    | Standard Error | T Value     | Prob. Level |
|---------------------|-------------|----------------|-------------|-------------|
| Intercept ( $b_0$ ) | 3.145699581 | 0.682990436    | 4.605773987 | 0.000492501 |
| Slope ( $b_1$ )     | 0.776959879 | 0.026533633    | 29.2820768  | 2.96335E-13 |

Source: author's analysis.

Based on the results in tables 5 and 6, it is clear, that statistically the both parameters (intercept and slope) are not significant. The regression model is suitable and can be used for the data.

**Table 6.** Test of the suitability of the regression model

| ANOVA | Df | Sum of Squares | Mean Square | F - Ratio Prob. | Level       |
|-------|----|----------------|-------------|-----------------|-------------|
| Model | 1  | 74.80977826    | 74.80977826 | 857.4400214     | 2.96335E-13 |
| Error | 13 | 1.134221745    | 0.087247827 |                 |             |
| Total | 14 | 75.944         |             |                 |             |

Source: author's analysis.

## 5 Conclusion

The gradual fall, including the income tax of legal persons (corporations) has been reflected across the European Union in the long term, but not in all countries. Therefore, differences between corporate tax rates have arisen when the lowest rate is in Bulgaria at the level of 10 % following by Cyprus and mentioned Ireland, both with 12.5% SCTR. On the other hand, the group of countries with the highest rates over 30 % includes Malta, France and Belgium. It is important to note that the proportion of corporate tax incomes in the total incomes from taxes grew until 2008 in spite of a fall in the statutory tax rates of legal persons, which was caused by tax competition. This fact was a result of extension of tax bases, progress of corporate business and other factors. However, this trend has changed as a result of the economic crisis.

The statutory income tax rates include not only basic tax rates, but also temporary or permanent additional taxes and reliefs. The Belgian basic corporate tax (33 %) is increased by 3% surcharge. In Luxembourg there is not only 7% surcharge but also the local rate in the amount of an additional 6.75 %. The additional local rates are used more in Hungary, Italy, France, Spain and Germany. Development of statutory corporate tax rates in individual countries is carefully observed because their amounts are really important in corporate decision-making about the allocation of investment. The investment takes place in one period and generates a return in the next period. It is assumed throughout that the tax system is expected to remain unchanged over the life of the investment. The impact of taxation depends on a number of features of the tax system, including the statutory tax rate, capital allowances, the treatment of foreign source income, wealth taxes paid by the company, as well as possibly the treatment at the corporate and personal level of dividends paid by the company, and wealth and capital gains taxes at the personal level. The comparison of SCTR has been becoming the most commonly applied for their simplicity and easy availability of data.

The effective corporate tax rate could prove to be a convenient comparative value for comparison of corporate taxation. This rate does not include only the amount of the statutory tax rate on corporate income but also other aspects of tax systems determining the total amount of effectively paid taxes. The forward-looking effective tax rates offer a convenient theoretical framework for summarising at a broad level the interaction of tax rules relating to capital investment. It should be noted that the indicator should be interpreted with caution, taking into account the assumptions related to the hypothetical investment as well as to the modelling detail of the tax systems.

Implicit corporate tax rate also appears to be an appropriate measure of comparison of effective corporate taxation. This tax rate takes into account not just the amount of the statutory tax rates from corporations' rates but also other aspects of taxation systems determining the total amount of effectively paid taxes. The implicit tax rate on corporate income did not change significantly in the Czech Republic in the years 2000 - 2012 and fluctuated around 21.5 % in 2012. In 2000 it was the lowest ITR on corporate income (24.5 %) of all Visegrad group countries when the highest implicit taxation was reached by corporations in Slovakia (40.2 %). In the neighbouring countries there was a gradual reduction of the implicit rate to below the level of implicit taxation in the Czech Republic (in Hungary from the rate of 34 % in 2000 to the rate of 10.6 % in 2012).

This paper determines the effect of changes in statutory tax rates on effective taxation of EU corporations using an elementary research method linear regression. It was found that changes in the average effective tax rate of the EU are mainly due to the change of statutory tax rate. Based on these results, it would be considered statutory tax rate as an appropriate benchmark for comparison of corporate tax burden. The question is, what results would have been achieved in individual countries, where in recent years the statutory tax rate remained almost the same. Potential investors should thus take into consideration not only particular tax rates, but also other non-tax factors that affect the entrepreneur activity.



## 6 Acknowledgement

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## THE ROLE OF FISCAL POLICY IN AFFECTING INCOME INEQUALITY

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### Abstract

The aim of this paper is to discuss the role of fiscal policy in affecting income inequality. Many authors consider its role irreplaceable in this process, but it is really so? Over recent decades income inequality has increased in many advanced and not only European countries. Why, when fiscal policy and its tools - taxation and public expenditure are powerful instruments of public authority which could affect the changes in disposal income and wealth? To demonstrate the trends in income inequality and the impact of fiscal policy in European countries selected from 34 OECD members in the period 2000 - 2013 we use Gini coefficient before and after taxation and transfers. To demonstrate the impact of fiscal policy on different income groups we use the sample of V4 plus countries.

### Keywords

Fiscal policy, Income Inequality, Tax, Expenditure.

### JEL classification

D31, D63, H20.

## 1 Introduction

Economist all over the world suggest that since 1980 income inequality has been increasing in many advanced economies and this phenomenon was one of the main causes of the international financial crisis in 2007/2008 and consequential "great recession". It is not only the problem of income inequality but distribution of wealth general and this period of inequality has been labeled as the "great inequality" (Atkinson, 2015; Foster and Yates, 2014). Galbraith (2012) suggest that *"inequality was the heart of the financial crisis. The crisis was about the terms of credit between the wealthy and everyone else, as medited by mortgage companies, banks, ratings agencies, investment banks, government sponsored enterprises, and the derivates markets."*

Ways to measure income inequality are numerous; mostly Gini coefficient is used. It is probably the best-known index used for this purpose. According to OECD (2015) the Gini coefficient is based on the comparison of cumulative proportions of the population against cumulative proportions of income they receive. It ranges between 0 in the case of perfect equality and 1 in the case of perfect inequality. Income is defined as household disposable income in a particular year. It consists of earnings, self-employment and capital income and public cash transfers; income taxes and social security contributions paid by households are deducted. The income of the household is attributed to each of its members, with an adjustment to reflect differences in needs for households of different sizes. OECD also publishes Gini coefficient without impact of transfers and taxes and differences between these two indicators could demonstrate the impact of fiscal policy in affecting income inequality.

The most important source for disposable income of households are wages mostly. And just at this indicator the substantial decline has been noticed. Relevant statistics on wages (ILO, 2015; OECD, 2015) report that in the Great Britain in 2014 real wages were 10 percent below their 2008 level, in Germany wages were still 2.4 percent below their 2008 level. In the OECD (2015) countries distribution of income has more polarised. This is due to the fact that the incomes of the richest 10% of the population grew much faster than the incomes of the poorest 10%. According to Galbraith (2012) the declining wage and rising profit share were compounded by the increasing concentration of earnings at the top, especially in financial sector. For example in Great Britain, there has been a sharp rise in income differential between many employees in the financial sector and average incomes

across the whole economy (Turner, 2010). According to OECD statistics most countries report a rise in income inequality.

Thanks to this the role of fiscal policy is discussed more often than ever before.

## **2 Causes and consequences of income inequality increasing**

There are many factors which caused increasing income inequality. Some of them are crucial:

- globalization,
- increases in labor force participation by low-skilled workers,
- technological progress and change,
- changing social norms,
- immigration,
- economic freedom.

According to Krugman (2008) through cheap low-skill imports and outsourcing globalization and international capital mobility has exerted downward pressure on the wages of low-skilled workers and increases unemployment of these workers.

Technological change has increased demand for high-skilled workers and decreased demand for lowly educated workers (Garicano and Rossi-Hansberg, 2005; Jaumotte, Lall and Papageorgiou, 2013).

Social norms are changing. The society is more willing to accept income inequality than ever before. The existence of supersalaries of supermanagers are perceived as normal. The importance of high-income couples and single-parent households has been growing (Piketty and Saez, 2006; Kaplan and Rauh, 2010).

Due to immigration real wages of domestic workers decline, because the share labor force willing to work for lower wages increases (Partridge, Rickman and Levernier, 1996; Peri, 2007; Orrenius and Zavodny, 2007).

Institutional and regulatory reforms, which favouring economic freedom, could increase competition in product and factor markets and decrease the bargaining power of labor, which could increase income inequality due to the redistribution benefiting the rich (Carter, 2006; Apergis, Dincer and Payne, 2014).

There are some other factors which should be mentioned, for example widening inter-regional inequality within economies. Another factors are institutional changes and political shocks, which to a large extent can be viewed as endogenous to the inequality and development process itself (Piketty, 2014).

When we talk about consequences of inequality, we have to discern between inequality of outcomes, which is measured by income, wealth or expenditures) and inequality of opportunities, which can persist across generation and it is attributed to differences in circumstances, that people could not control (gender, ethnicity, family background, lack of access to education). From this type of inequality arises inequality of outcomes. High and sustained level of inequality could entail large social costs, lead to corruption, nepotism and misallocation.

According to a number of authors, income inequality and its changes affect, inter alia, economic growth. The relationship between these variables was studied by e.g. Kuznets (1955). Although it might seem that income inequality will have negative effect on economic growth (e.g. Alesina and Rodrik, 1994; Owen and Weil 1998; Keefer and Knack, 2002). Inequality can discourage investment and fuel economic, financial and political instability (see Acemoglu, 2011). Extremely high inequality may damage trust and social cohesion which could lead to lower investment and financial instability (Bardhan, 2005).

### 3 Role of fiscal policy

The economic policy in general is a government policy, which contains specific rules and individual measures through which the government manages, controls and regulates national economy of each country. Fiscal policy is one part of it and its aim is to establish macroeconomic stability (through stabilization), optimal economic growth (pro-growth policy) and solve social problems (through redistribution of incomes).

Fiscal policy is the primary tool for government to affect income inequality. It can act directly or indirectly. Directly in a short and medium term both tax and spending policies can alter the distribution of income in advanced economies. For illustration this impact we use Gini coefficient before tax and transfer and Gini coefficient after tax and transfer.

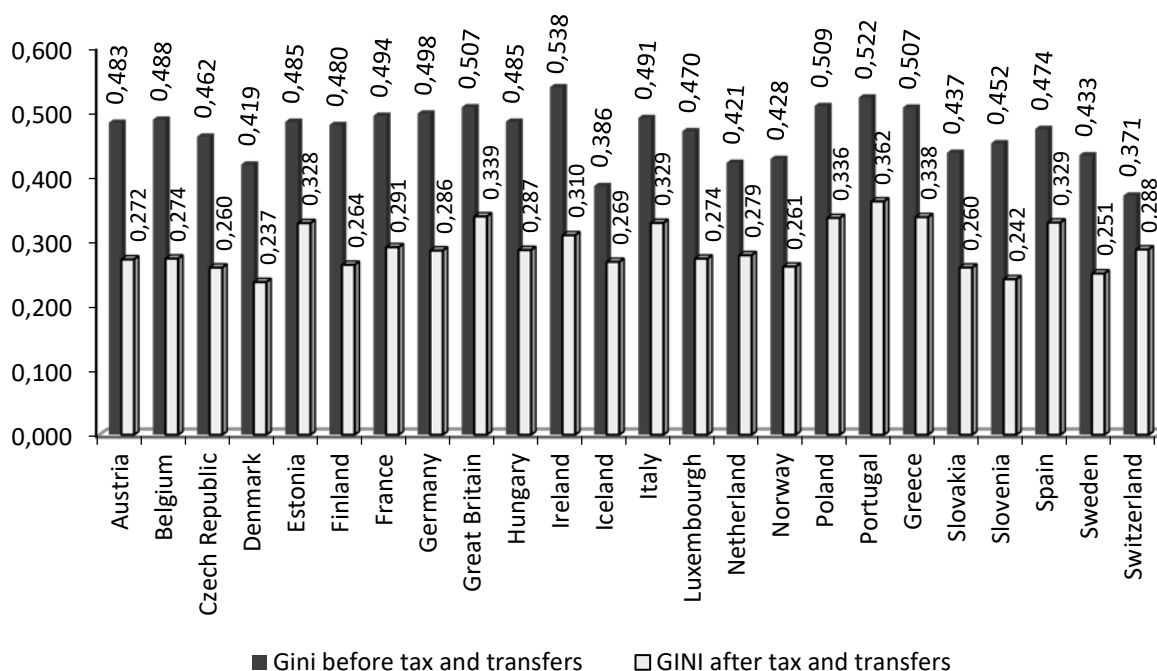


**Fig. 1.** The average Gini coefficient values in selected European countries (2000–2013) (Source: OECD)

As we can see in Fig. 1, in all selected European countries, the impact of fiscal policy decrease the value of Gini coefficient, what means, that income inequality is lower. Most of redistributive impact of fiscal policy is achieved through the expenditures of the budget (on average redistribution through public cash transfers is twice larger than through taxes), especially the parts which is known as non-means- tested transfers (public pension and universal child benefits) (OECD, 2010). The largest redistribution on the tax side is achieved by income taxes. In some economies, the redistribution achieved through income taxes was even higher than for transfers. It was due to the fact, that most economies used progressive tax- benefit system in the past. Reforms since the mid-1990s have reduced social benefits, but also progressive income tax rates, especially at higher income levels (OECD, 2010). In the absence of policy changes, the absolute distributive impact of fiscal policy would have been higher then over the second decade.

It could be interesting to compare impact of fiscal policy on different income groups. For this purpose we used group of working age population (18-65) in Table 1. and the group of retirement age population above 65 years in Table 2. We selected V4 plus countries (Austria, Czech Republic, Poland, Slovakia and Slovenia, there was no data for Hungary) in the period of 2004-2013. As you can see the income inequality is much higher in the first group of working people and the impact of fiscal policy is much stronger.

**Table1.** Gini coefficient for working age population: 18-65 in V4 plus countries (2004-2013)

|                | Gini   | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  |
|----------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Austria        | before | 0.409 | 0.410 | 0.422 | 0.424 | 0.427 | 0.440 | 0.431 | 0.429 | 0.427 | 0.426 |
|                | after  | 0.268 | 0.258 | 0.264 | 0.282 | 0.281 | 0.285 | 0.279 | 0.283 | 0.276 | 0.281 |
| Czech Republic | before | 0.414 | 0.406 | 0.402 | 0.389 | 0.381 | 0.385 | 0.388 | 0.393 | 0.389 | 0.387 |
|                | after  | 0.267 | 0.258 | 0.257 | 0.252 | 0.256 | 0.253 | 0.258 | 0.258 | 0.256 | 0.259 |
| Hungary        | before | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA    |
|                | after  | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA    |
| Poland         | before | NA    | 0.489 | 0.463 | 0.449 | 0.431 | 0.427 | 0.428 | 0.423 | 0.425 | 0.423 |
|                | after  | NA    | 0.334 | 0.322 | 0.320 | 0.310 | 0.306 | 0.309 | 0.304 | 0.303 | 0.304 |
| Slovakia       | before | 0.413 | 0.404 | 0.372 | 0.363 | 0.361 | 0.383 | 0.379 | 0.364 | 0.362 | 0.372 |
|                | after  | 0.265 | 0.282 | 0.247 | 0.241 | 0.253 | 0.264 | 0.260 | 0.258 | 0.248 | 0.270 |
| Slovenia       | before | 0.401 | 0.394 | 0.391 | 0.379 | 0.370 | 0.395 | 0.397 | 0.407 | 0.415 | 0.417 |
|                | after  | 0.238 | 0.236 | 0.234 | 0.235 | 0.229 | 0.243 | 0.242 | 0.245 | 0.248 | 0.255 |

Source: OECD.

Reasons we can find in a fact, that redistributive policy affects much more working population (through income taxes and transfers - households receive more in transfers when they have children). Opposite to this, as we can see in Table 2, income inequality in group of retirement age population above 65 is not so high and the impact of fiscal policy is weaker.

**Table 2.** Gini coefficient for retirement age population above 65 years in V4 plus countries (2004-2013)

|                | Gini   | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012   | 2013  |
|----------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| Austria        | before | 0.332 | 0.299 | 0.318 | 0.324 | 0.312 | 0.331 | 0.322 | 0.318 | 0.310  | 0.313 |
|                | after  | 0.288 | 0.263 | 0.275 | 0.286 | 0.268 | 0.285 | 0.280 | 0.277 | 0.268  | 0.275 |
| Czech Republic | before | 0.229 | 0.222 | 0.215 | 0.221 | 0.220 | 0.226 | 0.225 | 0.216 | 0.221  | 0.212 |
|                | after  | 0.194 | 0.190 | 0.186 | 0.191 | 0.192 | 0.199 | 0.201 | 0.194 | 0.1999 | 0.190 |
| Hungary        | before | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA     | NA    |
|                | after  | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA    | NA     | NA    |
| Poland         | before | NA    | 0.273 | 0.263 | 0.273 | 0.274 | 0.280 | 0.276 | 0.271 | 0.263  | 0.266 |
|                | after  | NA    | 0.255 | 0.245 | 0.254 | 0.257 | 0.263 | 0.262 | 0.256 | 0.249  | 0.253 |
| Slovakia       | before | 0.228 | 0.273 | 0.231 | 0.237 | 0.235 | 0.205 | 0.246 | 0.220 | 0.209  | 0.220 |
|                | after  | 0.203 | 0.254 | 0.206 | 0.209 | 0.210 | 0.190 | 0.227 | 0.202 | 0.195  | 0.197 |
| Slovenia       | before | 0.302 | 0.300 | 0.296 | 0.300 | 0.299 | 0.292 | 0.293 | 0.285 | 0.285  | 0.284 |
|                | after  | 0.262 | 0.255 | 0.256 | 0.260 | 0.260 | 0.259 | 0.260 | 0.253 | 0.257  | 0.258 |

Source: OECD.

There are differences among the countries. The lowest income inequality in this type of population is in Czech Republic and the peak values are achieved in Austria. This could be caused by different pension systems. In Czech Republic generation of today's pensioners is depended on public pension (which erase the relative differences in wages), but in Austria, there the system consists of public pension and private savings, so the differences reflect the revenues which people had in working age. Also in this case the fiscal policy is successful when decreasing income inequality.

Another important tool to affect inequality is raising minimum wage and its indexation to inflation. Financial regulation is a further important and relevant part of policy as well as the removing of subsidies for the "too-big-to-fail" financial institutions. This could help to remove one of the main contributory factors to the surge in wealth at the top of income distribution. According to Piketty (2014) the imposition of a progressive global tax on capital is a very important tool in affecting income and wealth inequality. The largest fortunes should be taxed more heavily and all types of assets should be included. Piketty (2014) also argues that a global tax on capital can impose effective regulation on the financial and banking system, which should help to avoid crisis.

Better access of lower-income groups to higher education and health services could minimize the costs for income redistribution. These in-kind transfers are found to decrease the Gini coefficient by 5.8 percentage points (3.6 health and 2.2 education) in five European countries (Belgium, Germany, Greece, Italy and the United Kingdom (see Paulus, Sutherland and Tsakloglou, 2009)).

The last area where could fiscal policy affect income inequality is labor market, concretely unemployment. Increasing unemployment tends to widen wage inequality because low-wage workers are hit harder as employers high-skilled.

#### 4 Conclusion

In this paper we have discussed role of fiscal policy in affecting income inequality, which was one of the main causes of the international financial crisis in 2007/2008 and consequential "great recession". There are vast range of causes of this phenomenon increasing, so we concentrated just at the crucial and we presented some of income inequality consequences.

Fiscal policy could affect income inequality in two ways. First directly through redistribution via tax and expenditure policies, which should be designed carefully. In advanced economies fiscal policy has played a significant role in reducing income inequality, especially on the expenditure side but also through progressive income taxation. It appears that the decrease in efficiency in this area was due to reforms since the mid-1990s which have reduced social benefits, but also progressive income tax rates, especially at higher income levels. Some studies confirms that during decades from the mid-1980s to the mid-2000, fiscal policy offset less than half of the increase. Without economic policy changes in progressive taxation absolute distributive impact of fiscal policy would have been stronger. This is due to the fact that progressive tax and benefit system tends to redistributive income even more when market inequality rises. It is necessary to take into account that overall redistributive impact of fiscal policy is influenced by the distribution of indirect taxes and in-kind transfers and the impact of tax and expenditure policies on redistribution should be evaluated jointly.

In indirect affecting it is also important that policy-makers should be concerned on reducing unemployment, e.g. through technological changes in a way that increase the employability of workers (funding of scientific research) or more secure legal framework for trade unions. Farther it is proposed the introduction of a national pay and social policy under aegis of government institutions, trade unions and other social partners and establishing a substantially higher statutory minimum wage.

A special part of fiscal policy is fiscal consolidation, which could lead to a short-run reduction in output and employment. These factors are associated with wage decline.

So policy-makers know their potentials because there is not a space to initiate new relevant economic policies to affect income inequality. The only one recommendation is to mix the tools carefully due to demand and condition of every country's economy.

#### 5 Acknowledgement

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## INDUSTRY 4.0: WILL THE CONCEPT AFFECT THE WORLD OF WORK?

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### Abstract

The term “Industry 4.0” was first introduced in Germany in 2011. It refers to digitising industrial production. The concept outlines the vision of a smart factory, which is characterised by the complete networking of all production processes: real time control via ITC and the increased use of robots, which control themselves, are developments that should contribute to greater productivity and efficiency. The concept of Industry 4.0 is shaping the digital discourse in the Czech Republic as well. The first step was the release of the National Initiative: Industry 4.0 by the Czech Ministry of Trade and Industry in 2015. We are now at the beginning of a fundamental debate that is still presenting more questions than offering answers. The aim of this paper is to discuss the issue: Industry 4.0 and its consequences for the world of work, which is undergoing a major process of change. If widespread predictions are correct, the digitisation of production can mean the extinction for millions of jobs. Innovations may seem grandiose, but they can also be destructive, rendering entire professions obsolete.

### Keywords

Industry 4.0, cyber-physical systems, world of work, employment

**JEL classification:** O14, J20, J39, J60

## 1 Introduction

The term “Industry 4.0” was first introduced by the German Industry-Science Research Alliance in 2011 (Bullinger et al., 2013). Industry 4.0 is the vision of increasing digitisation of production. The concept describes how the Internet of Things, Data and Services<sup>1</sup> will change production, logistics and work processes in the future (Kagermann et al., 2014). The changes brought about by networking based on the Internet of Things, Data and Services have a greater impact than for industrial production alone because they affect not only our economies, but also the world of work and social life as a whole.

Industry 4.0 is more a vision than a reality, but it is already prepared to change not only industry, but also world of work. The concept of Industry 4.0 is now shaping the digital discourse in Europe. The paper is focused on two key questions, which guide this paper:

- What is Industry 4.0?
- What does this mean for the world of work?

## 2 What is Industry 4.0?

Industry 4.0 or the Fourth Industrial Revolution, is the current trend of automation, cybernation and data exchange in manufacturing technologies<sup>2</sup>. It is based on the Internet of Things, Data and Services and creates what is called a “smart factory”: Within the modular structured smart factories, cyber-physical systems (hereafter “CPS”) monitor physical processes, create a virtual copy of the physical

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<sup>1</sup> The concept Industry 4.0 involves many elements of the industrial value chain and it is based on the Internet of Things, Data and Services, sometimes called the Internet of Everything.

<sup>2</sup> Although Industry 4.0 is currently a top priority for many companies, research institutions and universities, a generally accepted understanding of the term does not exist. As a result, discussing the topic on an academic level is difficult.

world and make decentralized decisions (Herman et al., 2014). Cyber-physical systems communicate and cooperate with each other and with humans in real time via the Internet of Things. Services are offered and used by participants of the value chain via the Internet of Services (Platform Industrie 4.0, 2015).

In the context of the Fourth Industrial Revolution researchers and industry representatives also discuss about a new organisation and steering of the entire value chain, which is increasingly becoming aligned with individual customer demands. The value chain covers the entire lifecycle of a product, from the initial idea through the task of developing and manufacturing it to successive customer delivery as well as the product's recycling. Growing digitisation brings us to the “second machine age” (Brynjolfsson and McAfee, 2014). This is due to the fact that data forms the material of this Fourth Industrial Revolution.

Fourth Industrial Revolution is based on CPS. Comparison with the previous levels of industry, see table 1.

**Table 1** Industrial revolutions one to four: the level of complexity

|                                  | Level of complexity                                                | Time period               |
|----------------------------------|--------------------------------------------------------------------|---------------------------|
| The First Industrial Revolution  | mechanical production facilities using water and steam power       | end of 19th century       |
| The Second Industrial Revolution | diversified mass production using electric energy                  | beginning of 20th century |
| The Third Industrial Revolution  | further automation of production through use of electronics and IT | beginning of 1970s        |
| The Fourth Industrial Revolution | on the basis of cyber-physical systems                             | nowadays                  |

Source: Spath et al., 2013

The concept Industry 4.0 is based on networking. Large amounts of data (big data) is generated as a virtual copy of the physical world. Whoever can access this limitless data treasure, will benefit, above all from flexibility and efficiency. Industry 4.0 could become a result of this ongoing digitisation in which everything along the value creation chain is networked and all of the relevant information can be independently and directly exchanged between the individual chain links. Linking people, objects and systems will lead to dynamic, real-time-optimised and self-organising, cross-company value added networks that can be optimised according to different criteria, for example cost, availability and resource consumption (Platform Industrie 4.0, 2015). List of the Industry 4.0 drivers and their consequences, see table 2.

**Table 2** Industry 4.0 drivers and their consequences

| Industry 4.0 drivers                 | Industry 4.0 consequences                                    |
|--------------------------------------|--------------------------------------------------------------|
| More automation                      | Networking                                                   |
| Decentralised control                | Smart objects                                                |
| New business models                  | Sensors & actuators                                          |
| More data                            | Big data                                                     |
| Delimitation of work                 | Powerful processors, low-cost mass storage, embedded systems |
| Accelerated value creation processes | Human-machine collaboration                                  |
| Flexibility                          |                                                              |
| Personalised customer wishes         |                                                              |
| More efficient resource usage        |                                                              |
| On-off production                    |                                                              |

Source: Ganz, 2013

In the future, the objects could communicate with each other directly and independently. They consult one another about what should happen to them next. This means that objects will become machine-readable. Thus, products will be able to express many things. Sensors and actuators will ensure that the data from scanners and computers can be distributed and processed directly. The Internet of Things and Services is the result and it promises to merge the physical and the virtual world into CPS (Plattform Industry 4.0, 2015).

The guiding theme of the future developments outlined above seems to be: “anything that can be digitised will be digitised” and accordingly, the scenario of the future developments is ambitious. Researchers and industry representatives emphasize the opportunities of the concept Industry 4.0: Real-time networking of industrial processes makes production cheaper, sustainable and efficient and digital networking allows the direct involvement of customer demands. The IT and TC sectors will be the first to see the benefits. Creators and providers of software solutions for big data analysis, networking and digitisation can most likely look forward to increases in orders. Many more industries, however, will probably be deeply impacted by Industry 4.0 developments: machine and facility engineering, electrical equipment manufacturers, the chemical industry, car makers and their suppliers, but also the logistics industry as well as agriculture.

In a study for the industry association BITKOM (Ganz, 2014) estimated productivity gains in Germany of around €78 billion in six sectors over a period of ten years. A yearly sectoral average of 1.7 per cent could be achieved as additional gross added value (see table 3).

Table 3 Opportunities for growth in Germany with Industry 4.0 (purely relative observation of the potential Industry 4.0 for the six selected sectors)

| Economic sectors                                            | Gross added value<br>in billions of euros |          | Potential from<br>Industry 4.0 | Annual<br>increase | Increase<br>in billions of euros |
|-------------------------------------------------------------|-------------------------------------------|----------|--------------------------------|--------------------|----------------------------------|
|                                                             | 2014                                      | 2015     | 2014 – 2025                    | 2014 - 2015        | 2014 – 2015                      |
| Chemical industry                                           | 40,08                                     | 52,10    | 30%                            | 2,21%              | 12,02                            |
| Motor vehicles and<br>automotive parts                      | 74,00                                     | 88,80    | 20%                            | 1,53%              | 14,80                            |
| Machinery and facility<br>engineering                       | 76,79                                     | 99,83    | 30%                            | 2,21%              | 23,04                            |
| Electrical equipment                                        | 40,72                                     | 52,35    | 30%                            | 2,21%              | 12,08                            |
| Agriculture and forestry                                    | 18,55                                     | 21,33    | 15%                            | 1,17%              | 2,78                             |
| Information and<br>communication<br>technology              | 93,65                                     | 107,70   | 15%                            | 1,17%              | 14,05                            |
| Joint potential of the 6<br>selected branches               | 343,34                                    | 422,11   | 23%                            | 1,74%              | 78,77                            |
| Exemplary extrapolation<br>for the total German<br>economy* | 2326,61*                                  | 5593,03* | 11,5%*                         | 1,27%*             | 267,45*                          |

\*The total includes the potential for Industry 4.0 for the six selected sectors as well as the projection for the remaining sectors the assumption that the six sectors amount to 50% of gross added value.

Source: Spath, 2013

The issue of the Industry 4.0 has been analysed and is driven from a technical standpoint. People, however, remain an integral part of a decentralised and self-organised Industry 4.0. Labour and the workplace will change in many areas. Tasks will become more complex and the value creation networks more dynamic. This requires a high degree of labour market flexibility.

### **3 Changes in the area of world of work: The Third Industrial Revolution and its consequences for the world of work**

Pressure to increase labour market flexibility in the rapidly changing environment in which innovation and the rapid changes in production programs were started, begun in the 70's., when the Third Industrial Revolution was launched, see table. 1. Rapidly applied scientific inventions and findings helped labour-saving technologies to enter the work process and replace manual workers.

It is possible to ask a question how to define the term flexibility of the labour market, but it is difficult to find an unambiguous answer. The definition of the term might be found in many publications, e.g. A. Nešporová and S. Cazes: *The conception flexibility of labour market is so complicated as its ideological interpretations. Flexibility in wider sense of the word means adaptability in contrast with rigidity.*” (Nešporová and Cazes, 2003). Flexibility of the labour market means ability to adapt to changes in the commodity and services market, but its growth is often connected with the loss of employees' securities and the loss of stable work places in the labour market. Since the 70's we can see a decline in the importance of traditional occupational relations and an increase of diversities, individualization and uncertainty of work relations.

Flexibility and uncertainty of the labour market are reflected in the conception of the dual labour market which was accepted in the 70's of the last century, similarly like a conception, which was originally worked out by American economists Piore, Doeringer (Piore and Doeringer, 1971). They divide the labour market into primary and secondary:

- Workplaces created in *the primary sector of the labour market* distinguish themselves by high protection of workplaces, possibilities of a future carrier development and good working conditions. They provide high wages, extra bonuses, status, possibility of trainings and bigger chances in the labour market in the case of a job loss. It concerns workplaces set up in compliance with implementing more a more demanding technologies which are connected with the pressure on maximal use of highly specialised and qualified workforce.
- Workplaces created in *the secondary sector of the labour market* are not secured, have worse working conditions, lower work and legal protection of employees, poorer wage prospects, low possibility of personal development and also repetitive and long-term unemployment. In the secondary labour market there are mainly disadvantaged groups of inhabitants such as low skilled workers, handicapped people, mothers with children and the like.

Other circumstances of changes in job descriptions are formal changes of the work which are reflected in a growth of in secured contracts of employment. Share of employees in nonstandard workload such as forward and short term contracts, employing people by job agencies, work conditioned by trade licence and other atypical forms of employment is rising. Unemployment and job insecurities in the labour market have become a part of social and economic reality of Europe together with developing disadvantaged groups of population in the labour market. These are characterised by the experience with repetitive or long-term unemployment. They do not have an access to a better job.

### **4 Changes in the area of world of work: The Fourth Industrial Revolution and its consequences for the world of work**

What is meant by the concept Industry 4.0 for the world of work? There is no definitive answer to this question at the moment. The estimates are uncertain and differ. At least one finding has already prevailed. Contrary to the discussions of the 1970s and 1980s, today it is no longer about human versus machine. Rather, most of the scenarios revolve around a more complex relationship between humans and machines (Kurz, 2014):

- The **automation scenario**: systems direct humans. Monitoring and control tasks are taken over by technology. It prepares and distributes information in real time. Employees respond

to the needs of cyber-physical systems and take on primarily executive tasks. The abilities of lesser skilled workers are thereby devalued.

- The **hybrid scenario**: monitoring and control tasks are performed via cooperative and interactive technologies, networked objects and people. The demands on employees increase because they have to be considerably more flexible.
- The **specialisation scenario**: people use systems. CPS is a tool to support decision-making. The dominant role of the qualified workers is maintained (see figure 4).

**Table 4 Qualification requirements for Industry 4.0**

| Automation scenario                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• CPS directs employee</li> <li>• Monitoring and control technology</li> <li>• Highly qualified personnel for installation, modification and maintenance of the CPS*</li> </ul>     |
| Specialisation scenario                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>• Employ directs CPS*</li> <li>• CPS support decisions</li> <li>• Skilled personal retain dominant role</li> <li>• More information, organisational, mechatronic content</li> </ul> |

Source: Ganz, 2014

Digitisation and Industry 4.0 will change work in the future. Automation will enable ever smaller series production labour will nevertheless continue to be an important part of production. The concept Industry 4.0 means, however, much more than networking of all things. The future includes intelligent data acquisition, storage and distribution by objects and people. Traditional production-line workers' and knowledge workers' tasks will amalgamate to an ever greater degree (Spath, 2013). As a result, many labour processes will be carried out more efficiently and effectively in the future. The processes will also provide a variety of new assistance systems. This means that administration processes will be further automated as well. A variety of options will open up to certain labour groups (especially the highly qualified) to design their own working life, both in terms of where and when they do their jobs as well as the nature of the activity and access to the task at hand. A polarisation of employment thus assumed to be on the horizon in which *certain jobs with mid-level skill requirements and wages will be the first to be made redundant as the consequence of Industry 4.0.*

Frey and Osborne forecast that *half of all the jobs in the US labour market could feel the effects.* (Frey and Osborne, 2013). Accordingly, vocations at the lower and upper ends of the qualification spectrum that are less automatable and more experience- and interaction-based professions would gain in relevance. This is also where we can expect to see completely new fields arise (Picot and Neuburger 2014). Furthermore, due to increased outsourcing, the droves of “click workers” and “cloud labourers” *who are poorly paid and less socially secure as freelancers will most likely grow.*

## 5 Future of Work

The world of work is undergoing a major process of change. The main force of transforming it is onward march of technology. The robots are coming and if the forecasts are correct, it can mean the extinction for millions of jobs. Innovations may seem grandiose, but they can also be destructive, rendering entire professions obsolete even as they boost productivity and convenience.

If widespread predictions are correct, automation in the workplace is set to increase at an unprecedented rate. There's going to be a huge change, comparable to the industrial revolution.

Many areas of manual work are being affected. Robots in factories and warehouses are becoming more mobile, versatile and affordable. It's not just manual labour that's ripe for automation: white-collar jobs are also at risk as software becomes more sophisticated. Data analysis work in areas such as advertising and finance is being outsourced to computers.

One issue that will loom ever larger as the incidence of automation increases, is income and social inequality. Automation is fundamentally the substitution of capital for labour. The problem is that the people who already have the capital are the ones who will benefit most, because they are the ones who will invest in the new automation. In other words, the rich will get richer and the rest will suffer. The Internationale Labour Organization (hereafter: “ILO”) needs to respond to the future of the work ongoing changes in order to be able to advance its mandate for social justice. Therefore, the ILO has launched a four - year initiative at fostering discussion on the future of work named The Future of Work Centenary Initiative (ILO, 2016):

- In 2016 all ILO members States were invited to undertake national "future of work" dialogues structured around four “centenary conversations”:
  - Work and society
  - Decent jobs for all
  - The organization of work and production
  - The governance of work
- In 2017 a High Level Global Commission on the Future of Work will be established. Its purpose will be to examine the output from the national dialogues and other input it may consider necessary. The Commission will publish a report and recommendations in the course of 2018.
- In the first half of 2019, all member States will be invited to organize events to mark the ILO's centenary and to discuss the Commission's report. The culmination of the "Future of Work" initiative will be the 2019 International Labour Conference, with the possible adoption of a Centenary Declaration.

## **6 The Czech National Initiative of the Industry 4.0**

The Ministry of Industry and Trade of the Czech Republic, released the National Initiative 4.0 Industry (MPO, 2015) in September 2015, which follows the concept of German Industry 4.0. Czech initiative is a challenge to launch a debate on the possible impacts of the introduction of the 4.0 Industry in Czech economic environment. The aim of this initiative is to encourage the creation of a suitable economic environment in which the Czech industry will respond to the challenges of new industry trends. It is expected that many jobs will disappear and new ones will emerge in the future on the Czech labor market. An important element will therefore be the creation of lifelong learning.

Technological progress is driven by research and development (hereafter R & D). Paul Romer's model for endogenous growth provides theoretical explanation: the greater the proportion of an economy's labour force involved in research sectors, the stronger that economy's growth. Since its inception, many innovation analyses and innovation-policy approaches have been following this principle all over the world. The formula is then: more is better. That means one can invest as much as possible in research and development and supposedly sit back and watch the positive effects on production and the blossoming market (Romer, 1994). Importance and position of R & D is in the Czech Republic slightly below the EU average: the share of expenditure on R & D was 2% of GDP over the period 2012-2014, the average expenditure on R & D in the EU was 2.5% of GDP. But in the developed European countries (Sweden, Great Britain, Denmark), these expenses amounted to 3% of GDP. The share of employees in R & D per 1,000 employees was 13 employees in the Czech Republic, in developed European countries amounted to 20 employees per 1,000 in the years 2012-2014 (ČSÚ, 2015).

## 7 Conclusion

In the future, companies will network their equipment, storage systems, resources, employees, supplier and partner companies and their customers via cyber-physical systems. There is enormous potential behind Industry 4.0: individual customer demands can be taken into account and even one-off, tailored production may become profitable; production will become faster and more flexible; this reduces the resource usage and improves productivity. Employee productivity may also greatly improve. Flexible work options could allow for better work-life balance in terms of both time and location. A variety of options will open up to certain labour groups (especially the highly qualified) to design their own working life, both in terms of where and when they do their jobs as well as the nature of the activity and access to the task.

The result of Industry 4.0 will be in the future, that many labour processes will be carried out more efficiently and effectively by cyber-physical systems. The processes will also provide a variety of new assistance systems. This means that administration processes will be further automated as well. A polarisation of employment thus assumed that certain employees will be made redundant as the consequence of Industry 4.0.

One issue that will loom ever larger as the incidence of automation increases, is income and social inequality. Automation is fundamentally the substitution of capital for labour. The problem is that the people who already have the capital are the ones who will benefit most, because they are the ones who will invest in the new automation. In other words, the rich will get richer.

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But Industry 4.0 still has to prove its benefit to society. Only when the developments within and around Industry 4.0 result in social added value, when new technologies, regulations, services and organisations establish themselves in the society and when these social practices prove to be “better for people”, will we have recognised and put the potential for Industry 4.0 to work.

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## **SOCIAL, HEALTH AND OTHER SERVICES FOR HOMELESS PEOPLE**

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### **Abstract:**

The solution to the social phenomenon of homelessness requires a complex approach and coordinated solution. The paper deals with main causes of social aspects of homelessness. It primarily pays attention to the current determined status of health care, social and other services for homeless people and defines the community planning of social services as a tool of the development and sustainability of all services provided to homeless people. The aim of the paper is to assess the functionality of the current system, specify main issues and propose tools which might lead to improvements in care for homeless people, alternatively specify the possibility of maintaining the existing ones.

### **Keywords:**

Homelessness, homeless person, social services, health services, community planning, social service providers, comprehensive care.

### **JEL classification:**

**J11, J26.**

## **1 Introduction**

The issue of homelessness began to acquire intensity in the Czech Republic after 1989. The transition to capitalism has triggered serious social consequences, which have resulted in the growth of the number of people without home; a phenomenon, which practically has not existed in the Czech Republic for 40 years. Currently, the number of people without shelter is estimated at 68 500 and the number of potential homeless people at 100 000. Gradually, this problem has been dealt with by domestic authors in a number of pieces of work (especially O. Matoušek, T. Průdková, P. Novotný, I. Hradecký, D. Cvrček, K. Janoušková and others), who find their inspiration in the abundant foreign literature. The issue is coming to the fore in a range of official documents, which are trying to suggest at least partial solutions. In this respect the Concept of Preventing and Tackling Homelessness in the Czech Republic by 2020 (MoLSA) is substantial; it does not only describe the current status, but then again it particularly proposes specific objectives and measures in a number of areas to help stop the rise in homelessness and contribute progressively to its reduction. Moreover, the Concept of Social Housing in the Czech Republic (MoLSA 2015) is an extremely important document, which is used to elaborate the Social Housing Act. The solution to the problem of homelessness requires a comprehensive approach and a coordinated solution to the provision of basic social, health and other services for these individuals.

## **2 Typology of homelessness**

For the specific needs different classifications can be applied to the phenomena related to homelessness. The most commonly listed are the following criteria for the categorisation of homelessness. Hradecký (2007)

According to the perception of the homeless by the public: an overt– hidden – potential form;

- According to the duration: – short-term – medium-term – long-term – episodic – multi-generational;

- According to the causes: material – relationship – personality – institutional effects;
- According to the geographic origin: local – interstate – EU nationals – other foreigners;
- According to the legal status: legal – illegal migrants;
- According to the marital status: lonely people – childless couples – people with children;
- According to the personal characteristics: gender, age, health status, national and ethnic origin etc.;
- According to the current life situation: ETHOS.

## 2.1 Categorisation according to the perception of homelessness

The positive of this easiest typology lies in its clarity. There are three basic forms:

**a) Overt homelessness:** people are characterized by the fact that they live on the streets, in parks, stations, trams etc. In the cooler months they seek public dormitories, they sleep under a bridge, in the sewers, the caves, the illegally occupied lands and houses. This group is the most visible, its perception by the public is negative and homeless people are often just identified with this group.

**b) Hidden homelessness:** these people do not seek public services, they are not registered anywhere. They do not have their own home, however, they look for legal or illegal accommodation e.g. in the shelters, public hostels. People who are before leaving the institutions, especially the children's homes, medical facilities or prisons, are classified here, as well as those who, after their discharge, do not have a place to go back to.

**c) Potential homelessness:** this group includes people who still live in a flat, their housing, however, is at risk due to inappropriate or insecure housing conditions (and even some of them might not realize this). A fast growing group of the homeless in the future can be ranked among this group, – migrants, immigrants and asylum seekers.

## 2.2 Categorisation according to the duration of homelessness

This breakdown is convenient for direct social work. We are dealing here in particular with

- a) short-term homelessness: the duration from 6 months to one year is considered;
- b) medium-term homelessness: it is possible to define it by the period of three to five years;
- c) long-term homelessness: longer than 5 years.

According to the duration, it is necessary to choose adequate tools of social work, since the most effective help is for short term homelessness. If a person finds himself/herself in this situation for a longer period, then he/she loses his/her health, work, and other habits and his/her return to normal life is already very difficult. In some cases, homelessness is starting to become generational in nature, as it appears in the second and in the third generation.

## 2.3 Categorisation by causes

At this point the causes are gaining ground, which have led to homelessness. Typically, this is simultaneously a concurrence of these causes. In particular, we are dealing here with

- a) material factors
  - uncertain or poor housing, a loss of job, debts (due to a non-repayment the initial small debt will grow to such a height that a homeless has no chance of repaying it, thus motivation to engage in the work process is lost, since earnings will go to the repayment of these debts);
- b) relationship factors
  - here it is, in particular, about the disintegration of the family, divorce, domestic violence, etc.;
- c) personal factors

- mental retardation (prior to 1989, such persons were commonly provided with health facilities), physical illness, alcohol abuse, drug addiction, etc.;
- d) institutional factors
  - in particular leaving the children's home after reaching the legal age is very essential. In the Czech Republic a large number of children are placed in institutional care, who often are not able to integrate into society and in great numbers they are ranked among the homeless. Discharge from a prison or health facility is also important for the emergence of homelessness.

## **2.4 Categorisation according to the life situation or their housing situation**

FEANTSA developed and adopted a typology of homelessness and exclusion from housing, referred to as ETHOS in the years 2004-2007. Is based on the principle that the concept of home is explicit in three areas, and its absence may lead to homelessness. Having a home can be understood as adequate housing that the person and his/her family exclusively use (natural area), as having a space for his/her own privacy with the possibility of social relationships (social area) as well as having a legal reason for use (legal areas). The four forms of exclusion from housing result from the above:

- a) without a roof;
- b) without a flat;
- c) uncertain housing;
- d) unsatisfactory housing.

## **3 Services for homeless people**

The goal of all services for homeless people is their support in integrating them back into society; in addition, that is not possible without housing and employment sustainability. To achieve this goal, the cooperation of all interested participants is necessary, including homeless people themselves.

The basic division of services for homeless people can be described, in accordance with the name of the paper, as the social, health and other services being closely linked. The system of social services can generally be regarded as a basic and necessary assistance to homeless people.

### **3.1 Social services for homeless people**

Social services are defined by Act No. 108/2006 Coll. on social services, as amended (hereinafter referred to as the Social Services Act), as an activity or set of activities providing assistance and support to persons for the purpose of social inclusion or the prevention of social exclusion. Social services can also be described as services that are provided to socially disadvantaged people, in order to improve their quality of life, or as much as possible to integrate them into society. Social services, therefore, take into account the user of these services, the person and his/her family, the groups to which they belong, or the interests of the wider community. Matoušek (2011).

With regard to the care of homeless people there is an important classification of social services into social services consulting, social care and social prevention.

Social prevention services respond primarily to the needs of homeless people (low-threshold daily centers, reception centers, shelters, halfway houses and outreach programs), as well as other services that are not primarily intended for homeless people, however, their meaning lies in the prevention of social exclusion (e.g., social rehabilitation, contact centers).

The first service, homeless people encounter, is the basic and professional social consulting. It is provided free of charge through social workers of municipalities with extended powers, the Labour

Office of the Czech Republic and NGOs (registered providers of social services). This is a service that is for the homeless of vital importance and in particular the social worker's moral prerequisites are crucial here. At this early stage we can greatly affect whether a person without a home will have or will not have an interest in dealing with his/her unfavourable social situation.

All of the above social services for homeless people are very significant; moreover, very important is social fieldwork, too, whose goal is to search for homeless people in their natural environment and consequently effectively to motivate them towards a change in lifestyle.

### **3.2 Health services for homeless people**

The effect on the provision of health services to homeless people is a contradiction, which concerns on the one hand the law on health care and on the other hand, the obligation to pay the insurance premiums. Although homeless people do not refund premiums, they still remain insured persons and are legally entitled to the insurance law for policyholders. Despite all the problems of our rule of law, obviously, it protects the right of all persons to basic health care (Šupková 2007).

Health status of homeless people is due to their way of life usually far worse than the majority of the population. They most commonly suffer from skin diseases, diseases of upper respiratory tract, moreover, dangerous communicable diseases occur with them. The occurrence of different types of addiction and mental illness are very common, which are often the cause of homelessness. Researches show for homeless people a higher morbidity rate and higher incidence of premature death.

From the above description of the rights of homeless people follows that they are entitled to basic health services. The practice, however, is different. Homeless people, if they can ensure the doctor at all with regard to their lifestyles, face quite often doctors' subsequent refusal, who often state the non-payment of health insurance as a reason.

### **3.3 Other services for homeless people**

Other accompanying services for homeless people include mainly services related to the provision of financial support, employment intermediation services and legal services.

In connection with these services the vital role is played by the Labour Office of the Czech Republic, which decides on the benefits of state social support, benefits of assistance in material need and intermediated employment. In addition to non-profit organizations, free legal services are ensured to homeless people by municipalities. Providers of registered social services have a decisive role in the field of information intermediation on the rights and entitlements of homeless people.

#### **a) Services related to providing financial support**

In the context of Art. No.30 of the Charter of Fundamental Rights and Freedoms, where it is, *inter alia*, stipulated that any person who is in material need has the right to such assistance being necessary for the provision of basic living conditions; in general, homeless people can be considered as persons in material need. An integral part of the system of assistance in material need is social work with clients. In the framework of social work some of the tasks are, in addition to the Labour Office, also exercised by the municipal authorities, which are closer to the citizens and thus they can respond more effectively within the framework of social work to their problems.

Allowance for living from benefits of assistance in material need is often the only source of financial support to homeless people, in addition only if they are at least registered as job seekers. Supplement for housing is reached only by the part of the homeless, who are provided housing. Most often these are commercial lodges. The Labour Office of the Czech Republic can give homeless

people an extraordinary immediate assistance, which is earmarked to pay the security deposit related to the sublease form of housing up to a maximum of three monthly subleases. Homeless people usually do not reach this benefit of assistance in material need since they do not have a regular income from employment secured. A similar situation applies to the allowance for housing from the benefits of state social support, which is intended only for the lessee or the owner of the object intended for housing. Homeless people are neither tenants nor owners of the specified object.

#### **b) Employment intermediation services**

Ensuring the long-term employment for homeless people is very complicated. Public opinion and social mood reflect the employers' approach, and who show no interest in homeless people. Labour offices of the Czech Republic have the two institutes in mediating employment available, which can help homeless people to get a job and learn the work habits. Specifically, we are dealing here with community service work and socially purposeful jobs.

Getting a job on the open labour market is for people without home almost unavailable, especially with regard to their capabilities and individual skills. The system of employment intermediation generally does not take into account the fact that the majority of homeless people are in execution proceedings and so, in most of their cases, it is not worth getting the job. In fact, the paid wage or salary after deductions (executions) may be even lower than the amount of non-insurance social benefits.

In this area, nonprofit organizations replace the function of the state through a variety of projects thus ensuring homeless people one-time jobs along with instructing them to gain work habits in the form of social rehabilitation.

#### **c) Employment intermediation services**

Free legal services are another important follow-up service from the perspective of homeless people, which, as mentioned above, are mainly provided by non-profit organizations and municipalities. These services are chiefly directed to the debt problems, the solutions to executions and assistance in debt discharge. Additionally, they often refer to assistance in exercising the rights, legitimate interests as well as in providing personal affairs.

At present, we cannot do without services of non-profit organizations (registered providers of social services). Their role is essential in the provision of social, health and other services to homeless people. In practice, it is often the case that they replace the activities of state institutions and medical facilities with the aim of providing help to homeless people.

### **4 How to carry out comprehensive social, health, and other services for homeless people?**

In the Czech Republic the Consensual Conference on Homelessness in the Czech Republic took place on 26 and 27 November at the premises of the Chamber of Deputies of the Parliament of the Czech Republic. This Conference came to the following conclusions in the field of social services:

Besides active interventions, a comprehensive approach to addressing the issue of people in a situation of the absence of home implies also help and treatment interventions. It is a set of health and social services tailored to the individual needs. It is obvious that a group of homeless people is diverse. What follows from this is that the general and the standard solutions often bypass the effect and prove inefficient, thus leading to often-welcome-skepticism regarding the possibility of a solution.

System solutions often fail since they are not bound to individual work with humans. If there is no coordination of the system and the individual measures, the inefficient exploitation of the potential of existing or newly created services takes place. In the current situation, it is namely about:

- complementing the network of health and social services,

- strengthening the capacities of existing participants dealing with the problems of people without home,
- creating new services that do not yet exist, or are completely exceptional and operated unsystematically,
- the interconnectedness of all services in the system.

Some types of desired services for this group are practically missing. These involve, for example, outpatient care, inpatient medical care, psychiatric care and follow-up care. The existing health care system is rather based on the principles of universal access, however, homeless people are in fact at a disadvantage in that access. There is a lack of tools and capacity for the performance of low-threshold acute inpatient care and follow-up medical care for homeless people. The situation is similar in the area of social services, in particular consultancy, low-threshold sheltered housing, etc.

An important issue is also the availability of even the most common medical instruments, which typically require financial participation. A key principle is a comprehensive and individualized solution focused on the specific case, combining different types of social and health services. Their efficiency is increased, if they are provided to clients in their environment, i.e., through fieldwork and have a great level of assertiveness. Consequently, they can better intervene and establish a relationship with them, in order to support the motivation to use the service, with the aim of social inclusion. Multidisciplinarity of the services is also important in the coordinated negotiation related to the use of follow-up services, for instance, during hospitalization or other institutional stay.

Care about the mental state of homeless people deserves a separate attention, which is often the main cause of their situation. In this specific area there is an appropriate involvement of the planned Centers of Mental Health, in accordance with the Strategy of the Psychiatric Care Reform.

Finally, they include services providing access to employment. Specifically, the existing procedures of non-profit organizations have shown that there are real possibilities to arrange, besides other active services, a job for homeless people, too. It is a path that starts with the participative activities, which may be mistaken for leisure ones (e.g. a theatre). It is, however, an important part of building an authentic self-image and self-value of the participating people. This helps in further steps towards the job search. An important role in this process, is made up by the service of the individual placement on the labour market (IPS).

This practice may be extended, once the prerequisites have been created. Similarly, it is necessary to adapt the capacity of the asylum facility for homeless people to the current needs. This requires on the one hand an increase in the range of sources and a change of the principles of financing: the municipalities providing services should be given the opportunity to obtain the adequate public resources.

Last but not least it is necessary to develop a monitoring system of the extent and the impact of the phenomenon of homelessness in the Czech Republic, as well as the extent of forms and effects of the measures with which this phenomenon is dealt by.

## 5 Conclusion

An optimal adjustment of social, health and other services for homeless people has long been the topic of many discussions of both professional circles and the public. When setting this comprehensive care, we must remember that the social services system has been defined and structured by the Social Services Act since 2007, and contains the logical framework of social services in the area of social prevention.

The purpose of these services is to provide homeless people who do not want or for various reasons cannot deal with their situation, basic assistance such as food, clothing, hygiene and bed. Motivated clients are offered the social and practical support for their integration into mainstream society. Yet this is only one pillar of services, which by its nature cannot replace the services and assistance in the

field of health and others. With regard to the specifics of homeless people these areas have not been systematically addressed in the long term. The fundamental problem of a comprehensive system of care for the homeless remains the fact that the currently set service ignores the necessary continuity and interaction.

The current system of services is systemic only to a minimum extent. For the most part there is a lack of political will to tackle the issue effectively, particularly at the municipal level. In practice, it is indeed possible to create several separate systems of services for homeless people, however, they must be based on mutual relations. The individual components of an effective system should focus primarily on social prevention, then the possibilities of providing basic assistance, and on the tools supporting motivation to improve the situation and consequently the program measures upon returning to normal society. A very important issue closely related to that return to a normal society is accessible social or training housing for homeless people, which is currently not addressed. An important role should be played by the Social Housing Act, which is being prepared (unfortunately its submission is constantly delayed).

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## IMPLEMENTATION OF SMALL BUSINESS ACT REGARDING A SECOND CHANCE POLICY FOR EUROPEAN SMES - THE CASE OF POLAND

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### Abstract

The EU has been focused on the institutional and economic problems, especially after the recent global economic crisis and while the EU single market seems to become less and less popular. Only since 2010, the internal market project has been again recognized as one of the main interest of the European Commission. The Small Business Act (SBA) (as the main programme of simplifying the business environment conditions) has also been reconsidered in the context of delivering the positive effects of economic integration. The aim of this paper is the assessment of the implementation of the SBA in the context of a second chance policy implementation in the European countries, including in particular Polish insolvency procedures. This study will attempt to answer the following questions: Is the implementation process of the SBA principle concerning a second chance policy effective in the EU Member States? Is the Polish insolvency law align with the SBA strategy?

### Keywords

Small Business Act principles, a second chance policy, insolvency law.

### JEL classification

L53, O52

## 1 Introduction

The EU internal market provides entrepreneurs with the positive impact of economic integration. The factors conditioning the single market constitute specific business environment for enterprises (SMEs in particular), which on one hand ensures the possibility of competition within the global market, but on the other hand presents risks associated with competitive pressure and with the need to adapt to the Community legal and administrative requirements. However, recent years show that the internal market is still unpopular, because of the Community's focus on institutional issues, counteracting adverse effects of the economic crisis and pursuing efforts to maintain the stability of the Eurozone. A significant change came after 2010, when it was stressed that the activities undertaken only in the macroeconomic environment of the monetary union and political changes failed to provide enterprises with long-term growth and positive impact of economic integration, thereby increasing the added value and creating higher competitiveness of member states (Kuczevska, Stefaniak-Kopoboru, 2013; Stefaniak-Kopoboru, Kuczevska, 2013; Kuczevska, 2014; Kuczevska, Stefaniak-Kopoboru, 2016).

Since 2008, the activities of Community and national (including Polish) institutions in the area of establishing business-friendly environment have grown significantly. The Small Business Act (SBA) has become the key programme to support the enterprise policy implementation. In 2010-2012 only, the EU's Member States implemented a total of almost 2,400 policy measures to support SMEs, i.e. an average of 800 measures per year, and almost 90 measures per country (European Commission, 2013). A leading role in promoting entrepreneurship is played by the new approach to business failure and insolvency, as defined in Commission Recommendation of 12 March 2014 (European Commission, 2014). The objective of this recommendation is to ensure that viable enterprises in financial difficulties, wherever they are located in the Union, have access to national insolvency

frameworks which enable them to restructure at an early stage with a view to preventing their insolvency and guarantying the second chance.

The aim of the paper is the assessment of the implementation of the SBA in the context of a second chance policy implementation in the European countries, including in particular Polish insolvency procedures. This study will attempt to answer the following questions: Is the implementation process of the SBA principle concerning a second chance policy effective in the EU Member States? Is the Polish insolvency law align with the SBA strategy? The tasks of this paper are the following: analysis of the main principles of SBA, implementation of the SBA according to a second chance policy implementation process across countries (using the Eurostat database) and finally the analysis of a new Polish insolvency law in the context of the SBA requirements.

## **2 The EU enterprise policy and Small Business Act implementation**

The European enterprise policy is one the EU national policies and needs to fully recognise the SMEs diversity and fully respect the principle of subsidiarity. It means the high level of cooperation between the EU institutions and the Member States concerning the best practices' exchange. These practices are included in the key, strategic European documents as European Charter for Small Business (Komisja Europejska, 2004) – signed and approved by the European Council in Feira in 2000 and Small Business Act (European Commission, 2008) – signed in 2008 as the continuation of European Charter for Small Business. The aims of SBA are: improving the overall policy approach to entrepreneurship, irreversibly anchoring the “Think Small First” principle in policy-making from regulation to public service and promoting SMEs' growth by helping them tackle the remaining problems which hamper their development (European Commission, 2008, p.3). The SBA programme includes the three strategic policy areas which ensure effective implementation of the Act both on the European and national levels (European Commission, 2008):

1. a set of 10 principles essential to bring added value at EU level and improve the legal and administrative environment: second chance, responsive administration, think small first, state aid and public procurement, access to finance, entrepreneurship, single market, skills and innovations, environment and internationalisation;
2. a set of new legislative proposals: General Block Exemption Regulation on State Aids (GBER), regulation providing for a Statute for a European Private Company (SPE) and Directive on reduced VAT rates;
3. A set of new policy measures which implement 10 principles according to the needs of SMEs. Think Small First principle is implemented by SME Test through the following actions (European Commission, 2016):
  1. Consultation with the SME representatives and their stakeholders;
  2. Assessments of the potential economic, social and environmental consequences of proposed options for actions;
  3. Impact assessment of the proposed legislation – cons pros of SMEs;
  4. Taking the measures to alleviate the consequences of the new legislation.

To ensure the higher transparency of the EU legislation procedures, the European Commission implemented the two-way process involving feedback from the public consultation to guarantee an appropriate quality of the EU law. Stakeholders deliver their proposals using two platforms: Lighten the Load – an updated tool for citizens to provide ideas to the European Commission and REFIT Platform – a forum for review of existing legislation by high level experts from society (European Commission, 2016). The Regulatory Security Board plays the key function in the law-making process. It was established on the 1<sup>st</sup> of July 2015 to provide a central quality control and support function for the European Commission impact assessment and evaluation work. The Board

examines opinions on all draft impact assessments and "fitness checks" of existing legislation (European Commission, 2015) (Fig. 1).

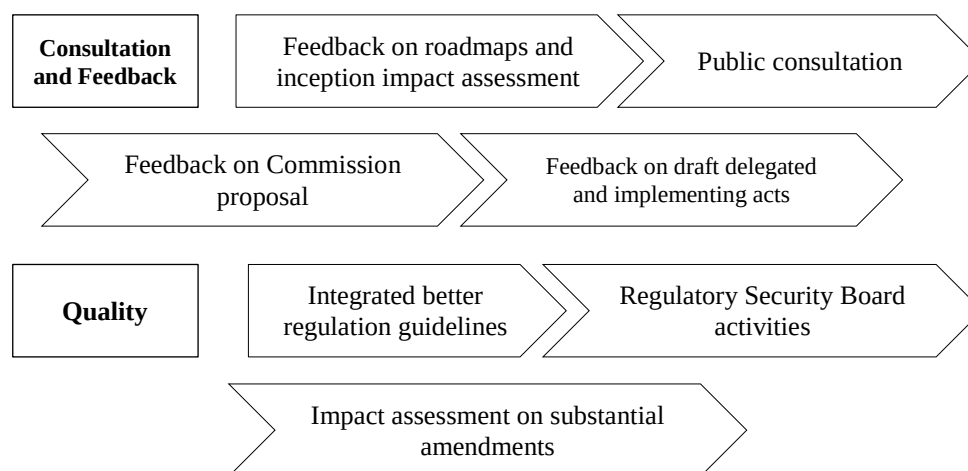


**Fig. 1.** Better regulation agenda. Enhancing the transparency of the EU law-making (Source: based on European Commission, 2016)

Based on the better regulation agenda, the two steps of the EU law-making are defined: the initial phase (the key role of the European Commission) and the relevant phase (public consultation and stakeholders feedback; the key role of the Regulatory Security Board) (Fig. 2).

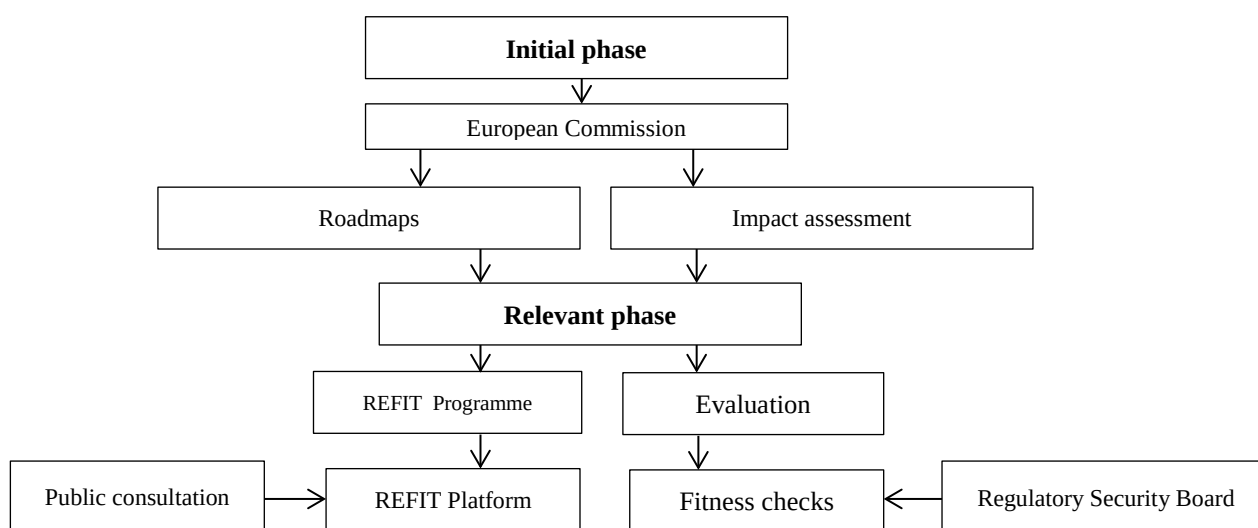


**Fig. 2.** Phases of the EU law-making in the context of *Think Small First* principle and *SME Test* (Source: self-study)

### 3 The second chance principle implementation among the EU Member States

A comprehensive regulatory framework governing the issues of insolvent entrepreneurs has a pivotal role in the functioning of bankruptcy institution. The quality of the law and its efficiency is crucial when it comes to adopting insolvency practices in the economy. Properly set targets in the insolvency procedure, responsive to the needs of the economy, can facilitate business activities, guaranteeing an immediate return of production means in case of underperformance on one hand, and favouring actions aimed at debt restructuring or corporate restructuring on the other. The effectiveness of law is a research area closely linked to American legal realism, whereas in some

Member States (including Poland) the effectiveness of law is still not a subject of an in-depth reflection, detailed analysis or cross-disciplinary research. An efficient legal system must work under specific social and economic conditions. Law remains a dead letter if it is not properly applied. Thus, representatives of American legal realism draw a distinction between “law in books” and “law in action” (Dworkin, 1998). The lack of efficiency of legal institutions causes the legislation to lose its importance. The need for cross-disciplinary research is mainly caused due to the need for entrepreneurship. Empirical studies on institutions in the economy blend with the institutional economics and are crucial when it comes to emphasize the importance of institutional and political factors for the economic growth (Coase 1937, Demsetz 1997, Godłów-Legiędź 2005, Hodgson 2004, North 1990, Ostrom 1990, Ratajczak 1994, Rudolf 2005, Stankiewicz 2012, Williamson 1998, Ząbkowicz 2003). The effectiveness of the coordination of economic policies, favoring the efficient allocation of resources, is directly dependent on the legal system, which is addressed to both active and passive market participants (in the broad sense of that term). It not only must serve the role of the guarantor of the certainty of the transactions, but is also required to stimulate entrepreneurship – in order to make Europe the most competitive economy in the world.

The European Commission aimed the permanent monitoring and assessment of the SBA’s principles implementation using cross-countries and cross-principle approaches. A set of indicators measuring effectiveness of implementation of each SBA’s principle has been both recognised and agreed (more about indicators: European Commission, 2016A). The average results of measuring the principles compared across countries deliver an opportunity for identification the strengths and weaknesses of SBA implementation among all Member States. Of course, this analysis does not constitute a comprehensive assessment of country policies. Some other relevant in-depth studies concerning the policy actions and regulations should contribute the effective assessment process but due to the scope of analysis the quantity measures may become the first step of the overall research. The second chance principle contents four indicators (European Commission, 2016B):

- Fear of Failure Rate – percentage of 18-64 population with positive perceived opportunities who indicate that fear of failure would prevent them from setting up a business;
- Degree of support for allowing for a second chance – share of responders who strongly agree and agree with the opinion that “people who have started their own business and have failed should be given a second chance (Flash Eurobarometer on Entrepreneurship);
- Costs to resolve insolvency (% of debtor’s estate) – the costs of the proceedings is recorded as a percentage of the value of the debtor’s estate. The cost is calculated on the basis of the survey responses and includes court fees and government levies; fees of insolvency administration, auctioneers and lawyers; and all the other fees and costs;
- Time to resolve insolvency – it measures the time needed by creditors to recover their credit and is recorded in calendar years.

An analysis of implementation process of the second chance principle among the Member States has been conducted using the European Commission database. The EU countries were split into four quartiles. Some countries were excluded from the analysis - in case of some indicators e.g. Malta, Bulgaria, Cyprus and Portugal - because of the lack of data. Due to the definition of the indicators describing the second chance principle implementation, only in case of the second indicator (degree of support for allowing for a second chance), the country located in the first quartile represents the best result. In case of the rest of the indicators, the best results are achieved by these countries, which are located in the fourth quartile (Fig. 3, Fig. 4).

Analysing the results achieved by the EU Member States concerning the second chance principle implementation (Table 1), it can be observed that some countries could be classified as “second chance friendly”. There are: Finland, Ireland, Netherlands, United Kingdom, Spain and Sweden. These countries were located in the quartiles letting them reach only pros or in case of Spain and Sweden only one minus. Countries which are located on the opposite side proved as “second chance

unfriendly” were also observed. These are: Hungary, Malta, Italy, Croatia, Estonia, Poland, Slovakia and Lithuania. These countries were located in the quartiles letting them reach only or mostly cons.

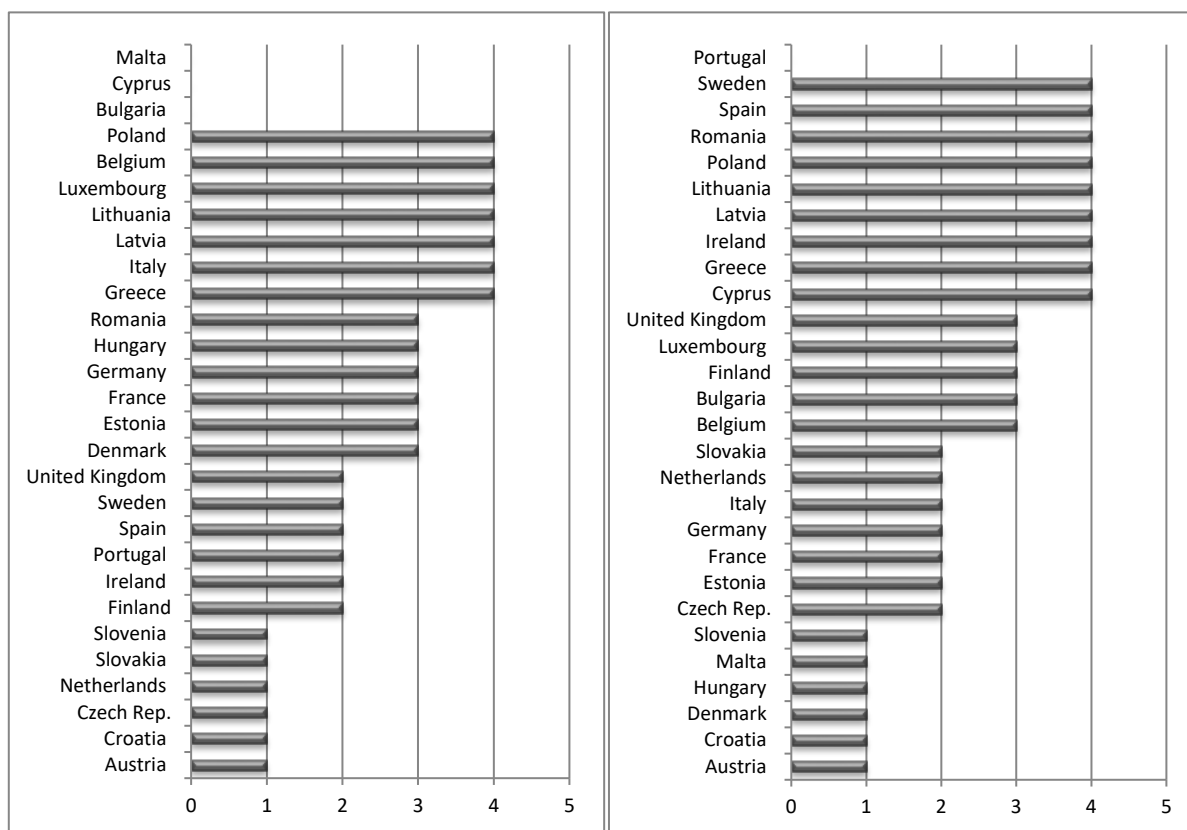


**Fig. 3.** Fear of failure rate and degree of support for allowing for a second chance among the EU Member States  
 (Source: own calculation based on European Commission SBA database)

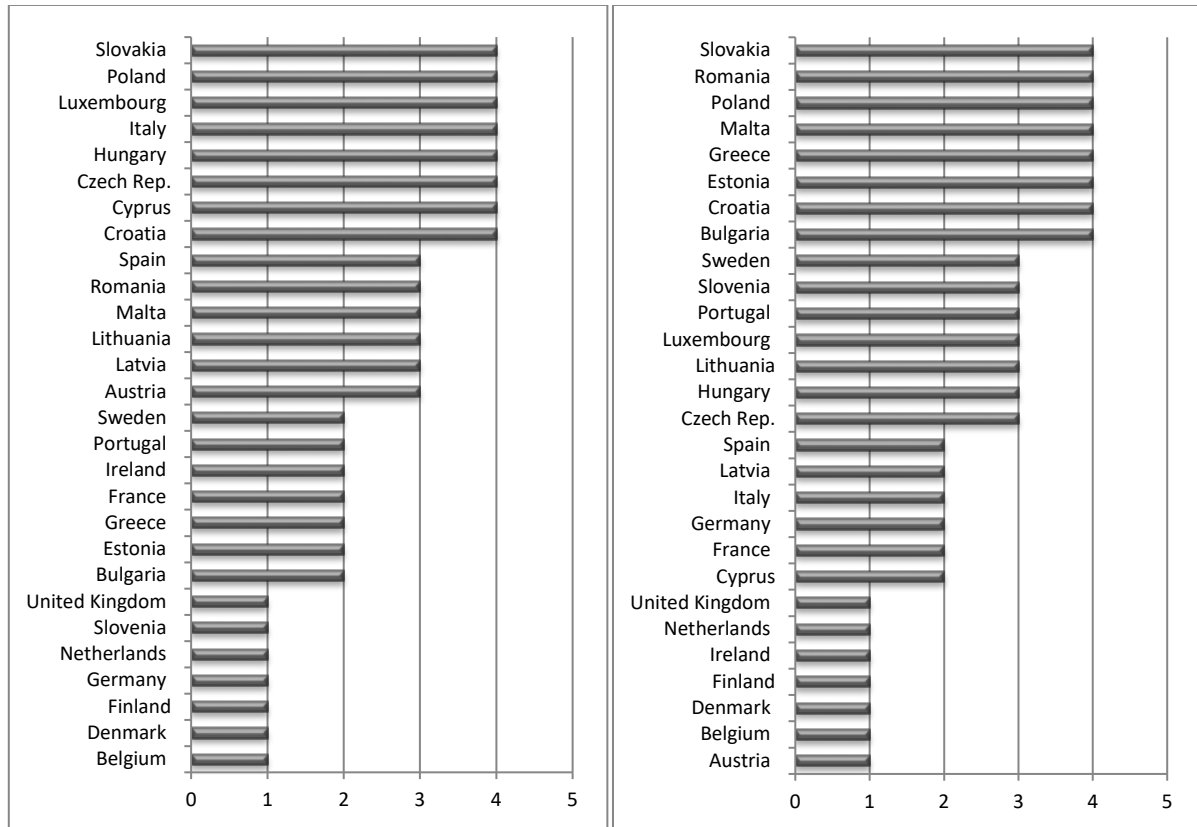


**Fig. 4.** Cost to resolve insolvency and time to resolve insolvency among the EU Member States (Source: own calculation based on European Commission SBA database)

**Table 1.** Implementation of the second chance principle – strengths and weaknesses of the EU Member States

|             | Fear of Failure Rate | Degree of support for allowing for a second chance | Cost to resolve insolvency | Time to resolve insolvency |
|-------------|----------------------|----------------------------------------------------|----------------------------|----------------------------|
| Austria     | ++                   | --                                                 | -                          | ++                         |
| Belgium     | --                   | +                                                  | ++                         | --                         |
| Bulgaria    | :                    | +                                                  | +                          | --                         |
| Croatia     | ++                   | --                                                 | --                         | --                         |
| Cyprus      | :                    | ++                                                 | --                         | +                          |
| Czech Rep.  | ++                   | -                                                  | --                         | -                          |
| Denmark     | -                    | --                                                 | ++                         | ++                         |
| Estonia     | -                    | -                                                  | +                          | --                         |
| Greece      | --                   | ++                                                 | +                          | --                         |
| Finland     | +                    | +                                                  | ++                         | ++                         |
| France      | -                    | -                                                  | +                          | +                          |
| Germany     | -                    | -                                                  | ++                         | +                          |
| Hungary     | -                    | --                                                 | --                         | -                          |
| Ireland     | +                    | ++                                                 | +                          | ++                         |
| Italy       | --                   | -                                                  | --                         | +                          |
| Latvia      | --                   | ++                                                 | -                          | +                          |
| Lithuania   | --                   | ++                                                 | -                          | -                          |
| Luxembourg  | --                   | +                                                  | --                         | -                          |
| Malta       | :                    | --                                                 | -                          | --                         |
| Netherlands | ++                   | -                                                  | ++                         | ++                         |

|          |    |    |    |    |
|----------|----|----|----|----|
| Poland   | -- | ++ | -- | -- |
| Portugal | +  | :  | +  | -  |
| Romania  | -  | ++ | -  | -- |
| Slovakia | ++ | -  | -- | -- |
| Slovenia | ++ | -- | ++ | -  |
| Spain    | +  | ++ | -  | +  |
| Sweden   | +  | ++ | +  | -  |
| UK       | +  | +  | ++ | ++ |

Degree of support for allowing for a second chance: 1q – two cons, 2q – minus, 3q – plus, 4q – two pros

Rest of the indicators: 1q – two pros, 2q – plus, 3q – minus, 4q – two cons

The best countries – marked in dark grey; the weakest countries – marked in light grey

Source: Own calculation based on European Commission SBA database.

Summarising the different research approaches presented above, it should be concluded that the quantitative analysis of the second chance principle implementation process must be complemented by other relevant in-depth studies concerning the policy actions and law regulations. The deep analysis of the insolvency and restructuring law should be carried out. Nevertheless, the results gathered from the analysis deliver proofs, that the implementation process of the second chance principle is not always efficient and it does not attain the same level of efficiency in each EU Member States.

#### 4 Assessment of the second chance principle implementation in Poland

Analysing the implementation process of the SBA principles in Poland compared to the average result of the EU Member States, it can be observed that Poland moderates a modest progress toward achieving the SBA results. The highest level of the SBA principles implementation relates to: reasonable administration and simplification of company registration and licensing procedures, access to finance and state aid and public procurement. The largest gap to the average EU results relates to: second chance principle, skills and innovation, single market and internationalisation (Fig. 5).

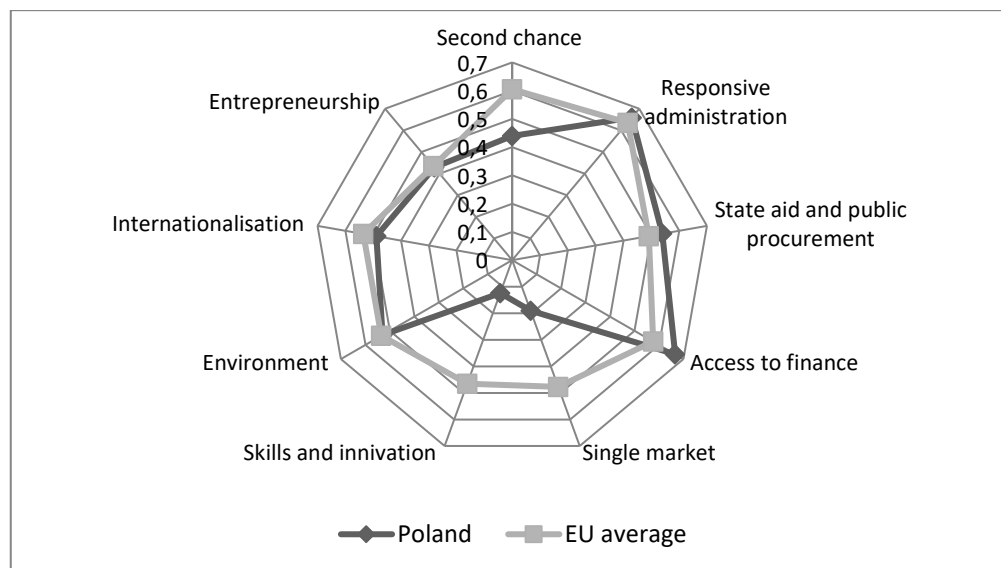


**Fig. 5.** Implementation of the SBA principles in Poland v. EU average (Source: own calculation based on European Commission SBA database)

Comparing Poland with the best Member State regarding the SBA principles implementation – Ireland, it can be observed that all Polish indicators are below the results reached by Ireland. On the other hand, comparing Poland with the weakest country on the SBA principles implementation – Italy, it still demonstrates the three indicators below the Italian results. It delivers proofs that Poland moderates the modest progress toward achieving the SBA assumptions (Fig. 6) (Kuczevska 2016).

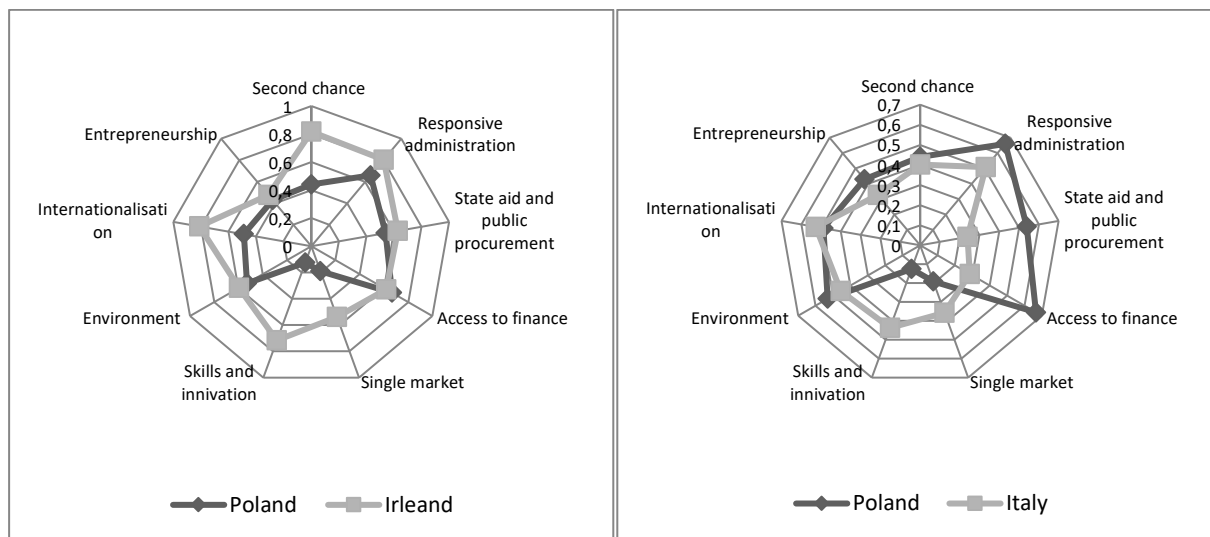


**Fig. 6.** Comparison of Poland with the best and the weakest countries (Poland v. Ireland and Poland v. Italy) (Source: own calculation based on European Commission SBA database)

The poor results concerning the second chance principle implementation in Poland are indicated in the comparisons with the best EU Member States: Finland and Ireland (Fig. 7).

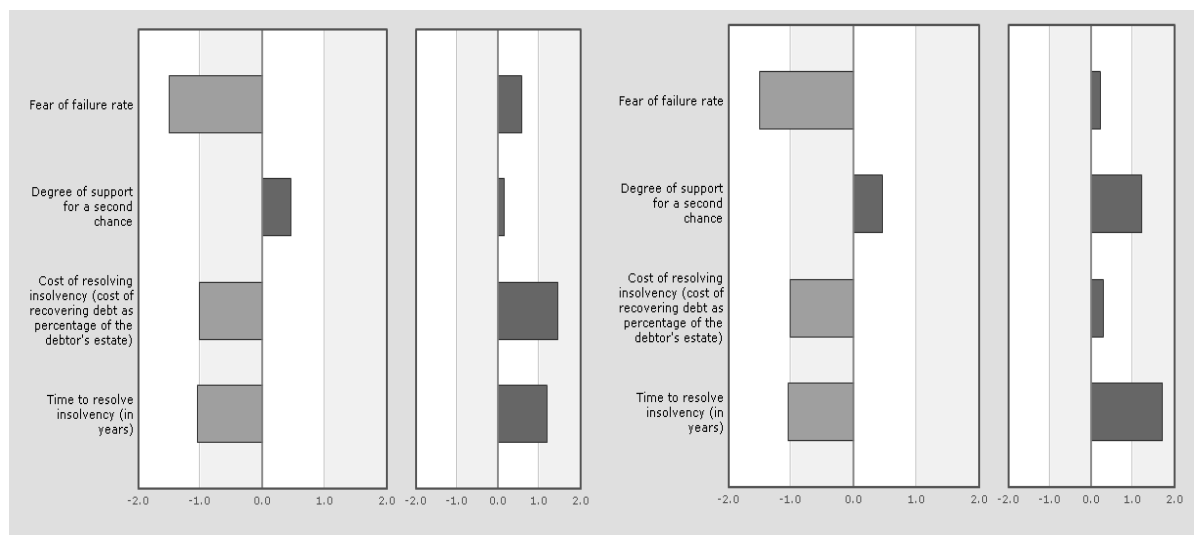


**Fig. 7.** Comparison of Poland with the best countries concerning the second chance implementation; Poland v. Finland and Poland v. Ireland (Source: European Commission SBA database)

Previous studies on bankruptcy law in Poland, carried out within the grant 2013/09/B/HS4/03605, have so far indicated, that the current bankruptcy law model is no longer able to fulfil its key mission, which is debt collection. The rate of compensation of creditors after a liquidation procedure has been completed is found to be marginal (17.5 percent). The costs of bankruptcy proceedings exceed 40 percent of the bankrupt entity's assets, and the average length of bankruptcy proceedings, starting from the date of filing for bankruptcy is 2 years. Bankruptcy law does not eliminate unprofitable



businesses, thereby it does not fulfil its preventive function, i.e. to prevent further insolvencies. Bankruptcy proceedings also fail to fulfil their debt-repayment function.

Meanwhile, on 9 June 2015, the President of Poland signed the Act “Restructuring Law” (Prawo restrukturyzacyjne). It totally changes the approach towards entrepreneurs that have got into financial difficulties. The act introduces four different restructuring procedures (including one rehabilitative), and alters the definition of entrepreneur’s bankruptcy. The aim of restructuring procedures is to avoid the bankruptcy, enabling the restructuring through a composition with creditors, and in case of a rehabilitative procedure – also through corrective actions, in order to protect equitable interests of creditors. The new regulation implies the return to the solutions of the interwar period (separate rules for bankruptcy and restructuring proceedings). The change in bankruptcy law model was not proceeded with examination for its impact on entrepreneurship. The aim of the previous bankruptcy model was to compensate creditors (Gurgul, 2006). As the explanatory material to the draft of the Bankruptcy and Restructuring Act of 28 February 2003 (Journal of Laws No. 60, item 535, as amended) states: „It is in our common social interest to avoid such ‘bankruptcy sequences’. Therefore each insolvency should lead, as soon as possible, to judicial bankruptcy proceedings, allowing creditors to obtain immediate compensation”.

Four types of restructuring proceedings are assumed (Banasik, Morawska, 2016):

1. proceeding to approve the arrangement
2. fast track to the arrangement proceedings
3. arrangement proceedings
4. reorganization proceedings

The first two forms of the proceedings will be allowed only when the sum of claims in question with the right to voting on the arrangement will not exceed 15% of the sum of the claims with the right to vote on the arrangement. The definition of the cap level of disputable claims at 15% arises from the necessity to make sure that in every situation the decision on the conclusion of the arrangement is made by the majority of the creditors. When for the arrangement to be concluded the law requires the approval of creditors holding at least 2/3 of the sum of the claims of the creditors voting then when one leaves out all creditors holding claims in question voting in favor of the arrangement (15% maximum) results in the decision taken by at least over 51% of the sum of claims of the creditors voting. This procedure foresees a simplified procedure to take the register of claims. The proceedings of the approval of the arrangement will be conducted by the debtor with the participation of the supervisor of the arrangement. The role of the court will be limited to issuing a decision on the approval of the arrangement accepted by the creditors by way of independent collection of votes by the debtor. The arrangement proceedings will be allowed if the sum of the claims in question with the right to vote over the arrangement will exceed 15% of the total of claims with the right to vote over the arrangement. However the reorganization proceedings assume, besides the conclusion of the arrangement, further actions aiming to restructure the business enterprise of a debtor by way of the complete or partial delivery of the recovery plan in the course of the proceedings with the possibility to use tools to reduce the employment or to renounce mutual agreements.

Research (the grant 2013/09/B/HS4/03605) shows that entrepreneurs – debtors are not willing to take the creditor-friendly restructuring path. Implementing a debtor-friendly bankruptcy law model with various restructuring options will not ensure any efficiency of new regulations. There is a lack of experienced ‘restructuring advisors’ in Poland. The existing curators, who became ‘restructuring advisors’ on 1 January 2016, have the necessary experience to conduct liquidation, not restructuring proceedings. Neither the bankruptcy courts are prepared for the process of restructuring enterprises. Currently, the existing restructuring proceedings and their numerous variations may slow down the process of re-allocation of production means, thereby raising the exit barriers for businesses.

Analyzing the new insolvency and restructuring procedure, it is worth emphasizing that the Polish insolvency law is fully aligned with the SBA principles, but unfortunately due to the organizational

and institutional problems in Polish courts, it probably would not help the Polish SMEs to get the real second chance.

## 5 Conclusion

Generally, the implementation process of the SBA principles is not similar in the European Member States. It depends on the benchmark (analysis within one principle or across all principles; within selected groups of countries or across all EU Member States). Classification of the best and the weakest countries depends on the research approach. In this study, the EU countries were split into four quartiles. Due to the definition of the indicators describing the second chance principle implementation, only in case of the second indicator (degree of support for allowing for a second chance), the country located in the first quartile represents the best result. In case of the rest of the indicators, the best results are achieved by these countries, which are located in the fourth quartile. Then, the identification of the strengths and weaknesses was carried out. Analysing the results achieved by the EU Member States concerning the second chance principle implementation, it can be observed that some countries could be classified as “second chance friendly” (Finland, Ireland, Netherlands, United Kingdom, Spain and Sweden) and some as “second chance unfriendly” (Hungary, Malta, Italy, Croatia, Estonia, Poland, Slovakia and Lithuania). There is also a gap between the best (Ireland, Netherlands, Finland) and weakest countries (Hungary, Slovakia, Poland, Greece). It should be noted, that the quantitative analysis of the average results within the principles does not constitute a comprehensive assessment of country policies. Some other relevant in-depth studies concerning the policy actions and regulations should contribute the effective assessment process.

Regulations that constitute boundary conditions, in the field of closing insolvent businesses in particular, must take into account the specific conditions of Polish economy – among others the relatively high rate of microbusinesses. Besides, regulations should not constitute a legal framework that is less advantageous in comparison with other states – in order to ensure the proper functioning of the internal market and to prevent “forum shopping”, a practice consisting in moving assets (or even whole insolvency proceedings) to another state for the purposes of a more favourable legal position.

However, it is necessary to avoid copying solutions known from other states. The law must be designed with a local view, based on the practical experience, knowledge and experimenting. Otherwise this would be the case for skin-deep regulations.

The effectiveness of bankruptcy law reforms requires simplifying and streamlining the regulatory environment, as well as framing the regulatory policy, in such a sensitive for entrepreneurship area, in the context of evidence-based policy making. Implementation of certain regulations in Poland, which ensure effective, stable and transparent institutional and legal environment for entrepreneurship is one of the most important factors in enhancing competitiveness of our economy. Moreover, it is fully aligned with the SBA principles.

The optimum model of bankruptcy proceedings shall be compatible with market requirements and the level of institutional development of a state. In order to avoid dysfunctionality of regulations in the area of bankruptcy, legal and economic aims must meet. By establishing boundary conditions, the state shall ensure the economic purposes of insolvency, namely a swift re-allocation of production means or even maintaining the business. However, the bankruptcy model, and above all its functions, must be adapted to the level of institutional development of the state, in order to meet the socio-economic needs and common commercial and contractual practices.

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## **PARTNERSHIP MANAGEMENT IN POLISH-CZECH MICRO-PROJECTS IN EUROREGION BESKIDY**

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### **Abstract**

The aim of the paper is to define the conditions shaping the sustainable and efficient cross-border partnerships between Polish and Czech partners in the Euroregion Beskidy. Proper management of cross-border partnerships in micro-projects is of key importance for maintaining the stability of cooperation, as well as for effective, long-term use of European funds for the development of the borderlands. The paper ends with recommendations for the authorities of Euroregion Beskidy, on a possible modification of the application process for the beneficiaries of European Union funds and project management procedures as well as their control their stability processes, to ensure greater efficiency of cross-border partnerships.

### **Keywords**

Borderlands, Cross-border partnership, Micro-project, Euroregion

### **JEL classification**

F5, F53, F59, R5, R58

## **1 Introduction**

Cross-border cooperation, as a category of territorial cooperation, plays an increasingly important role in building economic and social cohesion of the European Community. High dynamic of European integration processes and progressive euro-regionalization, mobilizes local communities to take initiatives to overcome common difficulties, as well as the synergistic use of the potential of border regions.

Currently, most of these activities are carried out within the framework of the so-called cross-border projects, including micro-projects implemented in the Euroregions, with obligatory participation of at least two partners from neighbouring countries. The intent of such projects is not only a common border problem solving, but also achieving a stable cross-border effect, expressing, inter alia, in the continuation and further development of the partnership.

The aim of the paper is to define the conditions shaping the sustainable and efficient cross-border partnerships between Polish and Czech partners in the Euroregion Beskidy. The paper ends with recommendations for the authorities of Euroregion Beskidy, on a possible modification of the application process for the beneficiaries of European Union (EU) funds and project management procedures as well as their control their stability processes, to ensure greater efficiency of cross-border partnerships.

This topic is particularly relevant due to the onset of a new EU 2014-2020 perspective. This involves continued use of EU funds for cross-border projects, which should be characterized by high efficiency and foster the construction of knowledge-based economy in the borderland areas.

## **2 Cross-border cooperation in Euroregion Beskidy**

One of the most important trends in the European integration process is to achieve a so-called Europe of homelands, based on autonomous and democratic co-existence of economically and socially independent regions using their potential and available resources in an effective way. The processes of European integration and regionalization also run on the plane of cross-border cooperation. A special form of cross-border cooperation is euroregionalisation, involving local and regional communities on the borders of two or more countries. The essence of euroregionalisation

is the realization by local communities of common interests, over the borders, as well as understanding of the need to solve problems in the institutionalized dimension. Cross-border cooperation takes on the characteristics of Euro-regionalisation when solid, institutional forms of cooperation are introduced, through the creation of, among others, associations. Euroregional cooperation can be developed on the basis of:

- a self-government system, as a result of initiatives taken by local communities and their local governments,
- an administration and self-government system, created with the participation of regional and/or central or local government (Głabicka, Grewiński, 2003).

Euroregionalisation is the highest degree of institutionalization of cross-border cooperation structures, and its consequence is the emergence of euroregions.

The name derives from the oldest cross-border cooperation initiative Euroregion, created in 1958 on the Dutch-German border. The euroregion is a region located on the fringes of two or more States, which existence is based on a formalized cross-border cooperation, on the common objectives of governments and other institutions and entities operating on its territory (Malendowski, Ratajczak, 2000). Another definition emphasizes the geographical specificity of the euroregion, including cross-border parts of two or more countries that want to work together and coordinate the activities of local communities. Euroregion can also be characterized as a form of institutionalized cooperation of the border regions of different countries, taking place in full respect of national borders and laws in force in the territories of the countries participating in the creation of the euroregion (Małecka, 2004). The euroregion is also the organization established to coordinate the cooperation in a specific area by the parties of euro-regional agreement, and accepted by the European Union, which may financially support its activities (Jastrzębska, 2008). According to the definition in the Convention of Madrid, the aim of the Euroregion is the implementation of cross-border cooperation, treated as jointly taken measures to strengthen and foster neighbourly relations between territorial communities or authorities of two or more Contracting Parties, as well as the conclusion of agreements and arrangements necessary for the adoption of implementation of such plans (Greta, 2003).

Polish-Czech-Slovak Euroregion Beskidy is one of the youngest euroregions operating within Polish borders. This is an area, that its scope includes ([www.euroregion-beskidy](http://www.euroregion-beskidy.pl), 2014):

- Polish part: 3 088 km<sup>2</sup> area (frontier part of the Silesia province and Małopolska province including the following counties: Bielsko, Pszczyna, Sucha Beskidzka, Żywiec, Wadowice, Myślenice, Oświęcim and Bielsko-Biala - city borough); Population: 729 000 people,
- Czech part: area 972 km<sup>2</sup> (municipalities around the city of Frydek-Místek); population of 161 000 people,
- Slovak part: area 2 083 km<sup>2</sup> (the area of Žilina province); population of 295 500 people.

Euroregion Beskidy is based on the, so-called, self-government model of institutionalisation of previous cross-border cooperation, initiated on either side, by the following associations: Polish Association "Region Beskidy" based in Bielsko-Biala, Slovak Association: Združenie "Región Beskydy" based in Žilina, and Czech Association: Sdružení "Region Beskydy" in Frýdek-Místek ([www.stat.gov.pl](http://www.stat.gov.pl), 2014). The condition for membership in the structures of the Euroregion is joining the local government's associations on each side of the border.

According to the Statute of Euroregion Beskidy ([www.euroregion-beskidy](http://www.euroregion-beskidy.pl), 2014), the strategic purpose of its existence is to undertake joint activities for a balanced and sustainable development of the region and the approximation of its inhabitants and institutions at all borders of the parties. This objective is implemented in the following fields:

- the exchange of experience and information on the development of the region and the labour market,
- spatial planning and construction,

- solving common problems in the field of transport, communication, communications and telecommunications, ecology and the environment,
  - the development of economy, trade, industry, and small and medium-sized enterprises,
    - development of tourism, passenger traffic together with consideration of improving the conditions of tourism in the border area,
    - taking care of the common cultural heritage,
    - higher education and education,
    - taking care of the security of citizens, mutual co-operation of rescue services in the Euroregion.
- Cross-border cooperation in Euroregion Beskidy is implemented:

1. As a direct partnership i.e. bilateral agreements between local authorities, universities, NGOs, educational or cultural institutions, and through a partnership between associations, occurring at each national side of the Euroregion (i.e. the Association Region Beskidy in Bielsko-Biała, Združenie Región Beskydy in Žilina and Sdružení Region Beskydy in Frýdek-Místek),
2. As an indirect partnership – of the members of the associations belonging to the Euroregions, working together on the borders through them.

Regardless of the above-described forms of partnership, a bilateral cooperation between various entities of cross-border market should develop in the area of Euroregions, among others (Szromnik, 2010):

- municipal enterprises, local government entities,
- companies and groups of companies,
- various non-governmental organizations: associations, clubs, foundations, etc.
- clusters and thematic cooperation networks,
- informal groups,
- residents.

Cross-border cooperation should also take into account the relationships with counterparties outside the border area, which include tourists, investors, migrants, public authorities, other partner regions, international organizations, vendors and consumers of commercial and social products / services, offered by the region.

### **3. Conditions of the implementation of Czech-Polish micro-projects in Euroregion Beskidy**

Entities operating in Euroregion Beskidy, that is part of Polish-Czech borderlands, in 2004-2013 were eligible to benefit from the support under the Operational Programme for Cross-Border Cooperation Czech Republic-Poland 2007-2013 ([www.cz-pl.eu](http://www.cz-pl.eu), 2014), which will also continue in the new perspective of the European Union 2014-2020. The total budget of the Programme for the period 2007-2013 amounted to 258187.5 thousand Euro, including the contribution from the European Regional Development Fund of 219459,4 Euro. Currently, calls for applications have been completed in the 2007-2013 perspective, but the implementation of contracted projects is still going on.

This programme was available mainly for Polish and Czech local governments at all levels, as well as for non-governmental organizations, some entities of the public administration, as well as universities, schools and other eligible entities. The main objective of the Programme is to support the social and economic development of Polish-Czech border area by strengthening its competitiveness and cohesion, and promoting the partnership cooperation between its inhabitants.

Funding for the development of cooperation in the Polish-Czech border areas for example in the period 2007-2013 covered the following areas:

1. Strengthening communication accessibility, environmental protection, prevention of risks.
2. Improving the business environment and tourism.
3. Supporting the cooperation of local communities.

Certain funds were also allocated for the so-called Technical assistance.

Selected activities in the framework of the Operational Programme for Cross-Border Cooperation Czech Republic-Poland 2007-2013 are managed by the Euroregions, including Euroregion Beskidy. It is about the area of support 3.3. Micro-projects, where the above-mentioned groups of applicants are offered the possibility to obtain funding for the implementation of cross-border projects with a lower value, in the context of simplified procedures.

According to the Guidelines for Applicants of the Micro-projects Fund in Euroregion Beskidy, Field of support 3.3 of the Operational Programme for Cross-Border Cooperation Czech Republic-Poland 2007-2013 - These funds aim to support the area of Euroregion Beskidy in the field of:

- mitigating the peripheral character of these areas and actions to improve the quality of life and building collaborative systems on both sides of the border,
- promoting the further development of the economic potential of border regions by strengthening existing structures, increasing the competitiveness of Polish and Czech entities and the development of the entire economy on both sides of the border, above all, through the use of tourism potential (Dołzbłasz, Raczyk, 2010).

The Fund is dedicated to the implementation of smaller “people-to-people” type of projects, which are based on the local / regional needs, and have a cross-border influence.

At the area of Euroregion Beskidy, like at the entire southern Polish border, particularly large share of projects in the field of tourism was recorded during current call for applications, including in the creation of common services for the tourism industry and other investments in tourism.

The Lead Partner in the Programme in Euroregion Beskidy is Sdružení Region Beskydy based in Frýdek-Místek, and the Partner is the Association "Region Beskidy" based in Bielsko-Biała. Available funds from the European Regional Development Fund in 2007-2013 for the Polish side amounted to 2355869 euro, and for the Czech side - 850000 euro.

Applicants could apply for a minimum support of 2,000 Euro, and the maximum - 30,000 Euro. The total eligible costs of the project were allowed up to 60 000 Euro. Both Czech and Polish beneficiaries were able to count on up to 85% from the European Regional Development Fund, additionally Polish beneficiaries obtained an additional 10% of co-financing from the state budget and brought in their own contribution in the amount of 5%, while Czech beneficiaries were required to bring to the Project 15% of their own contribution.

All submitted projects had to meet the eligibility criteria for the:

- entities eligible to apply for funding;
- projects for which the funding may have been granted;
- types of expenses that may have been included at determining the value of financing.

Maximum project duration was 18 months, and their very wide range was fully described in the aforementioned Guidelines for Applicants.

The projects were submitted in the contests, announced periodically on the Polish and Czech side of the Euroregion Beskidy. The scope of application documentation and the required attachments were a result of, inter alia, the type of project applying for funding. The application process took place largely via electronic generator applications, which greatly facilitated the work on the joint Polish-Czech application.

The competition mode did not guarantee the applicants that they will acquire funding. After the evaluation of the applications, which was formal and substantive, ranking lists of projects were generated, but the final selection of projects funded was approved by the Euroregional Steering Committee of the Euroregion Beskidy / Beskydy, that was gathering after each call for applications. It happened that when applying for a grant, the applicants had to repeatedly submit the request for next contests.

Applicants of the projects selected for funding, were required to sign a contract for the support granted, and then to implement the project in accordance with the contents of the application, in a cross-border partnership, which will be described in detail later in this work.

Key aspects of the implementation of Polish-Czech micro-projects were as follows:



1. The projects were carried out on a refund basis, i.e. the applicants were to incur the cost of their own funds, and then, after the settlement of the project were receiving the reimbursement of expenses up to the amount of the grant.

2. All activities in the projects were to generate a, so-called, cross-border effect, i.e. beneficial, lasting results on both sides of the border.

3. The projects had to be provided with financial and institutional sustainability, i.e. the Parties had to ensure the conditions to keep the results of the Project and the continuation of cross-border cooperation even, after funding from the European Union has ended.

4. During the inspection after the project was implemented the efficiency of the activities taken during the implementation of the project was subjected to quantitative and qualitative evaluation. Not only the eligibility of costs and the manner of implementation of the Project were verified, but also the tangible effects of the projects (e.g., the circulation of publications, number of completed events, trainings, conferences, etc., the amount of purchased equipment, the length of reconstructed roads), measurable (e.g., number of participants in joint Polish-Czech activities) and intangible (qualitative) i.e. the impact of the project on the achievement of goals of the Micro-projects Fund and the whole Operational Programme for Cross-Border Cooperation Czech Republic-Poland 2007-2013, were evaluated as well.

#### **4. Partnership management in cross-border micro-projects**

As part of the Operational Programme for Cross-Border Cooperation Czech Republic-Poland 2007-2013, one of the basic conditions for support was to provide an adequate standard of cross-border cooperation by the applicants in the project. Depending on how the foreign partner was included in the preparation and implementation of the project, it was possible to apply for the implementation of the three following types of projects (www.euroregion-beskidy, 2014):

1. Joint projects: a common objective and target group on both sides of the border, the steps / action planning and implementation, and their expenses are divided between the partners on both sides of the border, each of the partners is responsible for the proper implementation of its activities / operations; preparation and implementation on both sides of the border is always parallel or refers directly to one another in an agreed manner, the budgets of both parts of the project are complementary.

2. Mirror projects: preparation and implementation on opposite sides of the border need not take place at the same time as projects of one of the partners is based on the results of the second project partner on the opposite side of the border, both applications must, however, contain a clear reference, and demonstrate mutual complementarity.

3. Individual projects: wholly or predominantly carried out at only one side of the border. However, these projects should also include a clear cross-border impact and the role of the foreign partner in the preparation and implementation of the project.

Applicants filed projects individually or in a consortium with local partner institutions. It is the responsibility of each applicant to have one or more foreign partners. All entities involved in the project have to meet the eligibility criteria as to the type and area of activity. Foreign partner of the micro-project applicant could be one an entity:

- from Czech Republic, from the following regions: Moravian-Silesian, Olomouc, Pardubice, Hradec Králové and Liberec
- from Poland, from Lower Silesia, Opole and Silesia Voivodeship.

One of the key attachments to the application is a statement on the partnership, the shape of which resulted from the particular type of project, but it always reflected the effect of the following standards of the partnership:

- the Partners jointly prepared the project and the grant application,
- the Partners know their role in the project,

- the Partners will be responsible, active and implement the actions in specific deadlines, for which they have committed in the application,
- the Partners know the conditions for the use of support and maintaining the sustainability of the project.

In turn, the contents of the application form had to have a description of the role of the foreign partner in all aspects of the project, which was also subject to assessment at the stage of the procedure of applying for funds.

The quoted above guidelines for applicants do not contain a precise definition of partnership in a qualitative sense, specifying only the basic formal requirements to be met, in terms of legal form and business area of the partner, and the extent of substantive or financial involvement in the cross-border project. It can be argued that these assumptions exhaust the scope of the general definition of partnership that can be defined as the cooperation of institutions, entities and persons, usually concerning the implementation of common social, economic and environmental goals, based on the agreement of interested parties, that serves to optimize the use of available resources, tools and cooperation mechanisms (Baker, 1993).

Partnership, as a form of group work, generates three key effects for its participants (Furmankiewicz, Forýš, 1996):

- synergy (when the group achieves better results than the most efficient individual unit),
- scale (when the increase in the size of the group increases the results of its operations greater than the sum of the individual effects would be),
- critical mass (when the group achieves a minimum level of certain resources, such as skills, knowledge, financial resources, etc., necessary to launch the operation).

In case of partnership, we are dealing with a kind of a short-term evolution of cooperative interaction, through a long-term cooperation, to the most advanced partnership. It is therefore possible to make both short-term joint actions without building a solid relationship between the participants, as well as a long-term cooperation, the shape of which depends on the current interests and arrangements between partners (Howaniec, Kurowska-Pysz, 2014). Such an advanced and lasting cooperation, should be one of the objectives of the micro-projects in the Czech-Polish Euroregion Beskidy.

From the perspective of the experience gained from participation in the implementation of many of these projects, the author states that partnership management in cross-border micro-projects is not an easy undertaking, but it plays a key role in the subsequent implementation of the project, the maintenance of its results and the development of cross-border cooperation in the borderlands. However, it turns out that as far as the management of cross-border partnership is usually well implemented at the planning stage, because the partners are obliged to meet the specific requirements for applying for EU funds in this regard – at later stages of cooperation, these standards are no longer always met.

Planning is the most important function of management (Stoner, Freeman, Gilbert, 2001). A key character of planning also refers to project management processes (Szczepańska-Woszczyzna, 2014), i.e. unique undertakings on an increasing scale, made with the constant pursuit of rational (efficient) management of limited resources and under the pressure of time, taking into account the efficiency of the project team (Szot-Gabryś, 2011). Good implementation of each project requires, above all, professional management, primarily understood as a process of controlling mutually interdependent processes (Wiatrak, 2008), with the use of knowledge, experience, tools, methods and techniques to achieve the objectives in the allotted time (Matusiak, 2008). The success of the project largely depends on the attitude, commitment and professionalism of the staff responsible for its planning and implementation. Projects are undertakings that, as a rule, are not implemented by one person but by a group of people, that are in relation to each other in a variety of relationships: partnership, subordination, cooperation, subcontracting, etc. Proper selection of the project team decides, to a large extent, on further course of the project and its effects. Each person brings his individual

approach to the team, specific experience, skills, knowledge, personality and talent (Pawlak, 2006). Teamwork is one of the most effective forms of problem solving. In cross-border micro-projects, teamwork, partnership between project personnel fulfils two roles:

1. Represents a goal by itself, since cross-border integration of neighbouring communities, mobilization for joint problem-solving and achieving goals underlies the use of European Union structural funds for the development of borderlands;
2. Enables efficient and effective implementation of the project, particularly in view of the fact that projects of this type are carried out on both sides of the border or, by the assumption, they interact with customers on both sides of the border.

Described roles of cross-border partnership in the projects also refer to the two levels of cooperation:

1. Immediate, direct cooperation, occurs between representatives of both institutional partners, jointly participating in a cross-border project management (coordination, project control, promotion of the project, implementation of activities) at all stages.
2. More formal, less intensive contacts occur between institutional partners (the applicant and the foreign partner), usually they boil down to initiating a joint project (signing of the letter of intent, a declaration of cooperation), to formalize cooperation (the signing of the project agreement), participation in key activities in the project (events, conferences, completion of infrastructure investments, etc.), the settlement of the management team on the implementation of a cross-border project (approving the final report).

The analysis of the above factors that are affecting the implementation of cross-border micro-projects, however, points to a contradiction. In accordance with the objectives of spending EU structural funds for the development of borderlands, cross-border projects which, by their nature, are projects with a pre-set period of implementation, should lead to a sustainable and developing cross-border partnerships, which will significantly go beyond the horizon of the implementation of these projects. In terms of this discrepancy, the solution is a condition for safeguarding the sustainability of projects, that was described above and made mandatory in the cross-border projects, referring also to project partnerships.

The concept of partnership management in cross-border projects, with regard to the various functions of project management and the barriers and stimulators of partnership development, has been presented in Table 1.

**Table 1.** Partnership management in terms of stages of managing a joint cross-border project with a funding from the European Union

| <b>PROJECT INITIATION</b>   |                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                          | Identification of partners that meet the requirements of the competition from the micro-projects fund.                                                                                                                                                                                                                                                                                                    |
| 2.                          | The diagnosis of the needs and expectations of the partners, assessment of demand for the partnership.                                                                                                                                                                                                                                                                                                    |
| 3.                          | The diagnosis of organizational and financial capacity of the partners for participation in the project.                                                                                                                                                                                                                                                                                                  |
| 4.                          | Signing a letter of intent on cooperation.                                                                                                                                                                                                                                                                                                                                                                |
| <b>PLANNING THE PROJECT</b> |                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1.                          | Joint determination of: the purpose and scope of the project schedule, critical path and budget, how to manage the design and structure of the project, the required effects: outputs and outcomes, sustainability of the project, the degree of involvement of partners in the implementation of the project, the procedures for communication between partners, the financial structure of the project. |
| 2.                          | Development of application documentation – preparation of required descriptions and attachments for the application by the partners, including the declaration of partnership.                                                                                                                                                                                                                            |
| 3.                          | Joint submission of the application.                                                                                                                                                                                                                                                                                                                                                                      |
| 4.                          | Getting a positive decision on financing the project.                                                                                                                                                                                                                                                                                                                                                     |
| 5.                          | Signing the grant agreement.                                                                                                                                                                                                                                                                                                                                                                              |

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#### ORGANIZATION OF THE PROJECT

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1. Clarification of the project implementation conditions, following the decision on co-financing: a common update of the aims of the project, including both the budget and schedule and cooperation agreement (if required).
  2. Preparation of the project for implementation:
    - establishment of a project team on both sides of the border,
    - a detailed division of tasks between the partners,
    - selection of outside contractors of the project on both sides of the border,
    - gathering other resources to implement the project e.g., information,
    - development of a quality management system in the project.
- 

#### IMPLEMENTATION OF THE PROJECT

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1. Management of the activities and contracts in the project:
    - Coordination and mutual participation in the activities undertaken by the partners on both sides of the border,
    - Joint information and publicity in the project,
    - A common documentation of project activities for reporting and project settlement (delivery-acceptance protocols, photographic documentation).
  2. Managing communication between the partners in the project:
    - Managing the work of the project team on both sides of the border,
    - Ensuring constant communication between partners (working meetings, phone calls, e-mail).
  3. Risk and project quality management:
    - Joint monitoring of the budget, timing and progress of the project,
    - A common risk analysis and joint taking of preventive actions,
    - Joint assessment of project objectives (quantitative, qualitative) from the perspective of the expectations and needs of each partner.
- 

#### COMPLETION OF THE PROJECT

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1. Settlement of the project:
    - Settlement of payments in the project on both sides of the border,
    - Gathering the documentation of the project from both partners,
    - Preparation of a joint report on the implementation of the project,
    - Joint participation in monitoring of the implementation of the project.
  2. Evaluation of the effectiveness of the project
    - Evaluation of the project – a comparison of achieved results with the assumptions resulting from the plan,
    - Qualitative assessment of the activities carried out on both sides of the border.
- 

#### ENSURING THE SUSTAINABILITY OF THE PARTNERSHIP AFTER THE END OF THE PROJECT

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1. Revision of the partnership in relation to the diagnosis of current needs and expectations of partners, evaluation of the need for partnership in the context of the requirements of sustainability of the project.
  2. Determination of the real possibilities of participation (organizational and financial) in collaboration by either party - in more extensive partnerships - the possible development of a strategy of partnership.
  3. Signing the agreement on permanent cooperation.
- 

Source: own.

As shown in Table 1, the management of partnership in cross-border projects should be continued in the full term of their implementation starting at the initialization phase of the joint venture, up to sustainability phase. Guidelines for the beneficiaries of cross-border projects, however, expressly refer only to the obligation to maintain the long-term effects of the projects for a period of at least five years starting from the end of actual implementation of the projects – for those parts of the projects in which it is possible from a technical and legal point of view. Although these requirements apply only to the results of cooperation, it is difficult to imagine maintaining the efficiency of cross-border project after its completion, without simultaneously maintaining and even developing cross-border partnerships. Therefore it can be concluded that maintaining of all the other requirements of the procedures for the use of EU funds for the implementation of Polish-Czech micro-projects, solid partnership, developed in parallel with the process of managing joint project, is key the factor of its implementation, which significantly affects the effectiveness of a long-term project. This results from two, already mentioned in another context, conditions:

1. Cross-border partnership is an inherent attribute of Polish-Czech micro-projects, as the plane of integration of neighbouring communities, and in this context shall be subject to quality assessment from the point of view of the efficiency of expenditure from the Micro-projects

Fund in Euroregion Beskidy, Field of support 3.3 of the Operational Programme for Cross-Border Cooperation Czech Republic-Poland 2007-2013.

2. Continuation of cross-border partnership, in case of the projects co-financed from the aforementioned programme, after their completion, is the only natural path to maintain the results of the projects, the beneficiaries of which, are also held accountable for in the horizon of 5 years.

Partnership management in cross-border micro-projects is a multi-step process of building links across borders, despite many obstacles and limitations that accompany this type of cooperation. Unfortunately, many cross-border partnerships at the end of joint projects goes to a state of “hibernation”, waiting for another chance to acquire common funds. To limit the number of such cases, and reduce the number of projects carried out in a random, ill partnership, it would be recommended for the institutions to carry out an in-depth analysis of existing cooperation between partners and its efficiency, which certainly can be considered as one of the important determinants of the effectiveness and sustainability of further joint cross-border projects (Kurowska-Pysz, 2016).

## 5. Conclusions

Managing a cross-border partnership in the micro-projects implemented on the Czech-Polish border is a process still encounters many barriers. Their source may be, inter alia, a high degree of complexity of the application procedure, and relatively high competition among applicants, but also in many cases, lack of knowledge of potential partners about the essence of this type of cooperation, and lack of ability to build long-lasting cross-border contacts, and awareness of the real need to make this type of partnership. Although the use of the Micro-projects Fund in Euroregion Beskidy in the framework of the Operational Programme for Cross-Border Cooperation Czech Republic-Poland 2007-2013, has a requirement to prove that project partners have started to cooperate with each other, often during the preparation or implementation phase of the project, it comes to an asymmetric gap, whereby the motivation to work, the actions and associated benefits outweigh one of the parties.

In order to ensure the sustainability and efficiency of cross-border partnerships in Polish-Czech micro-projects in Euroregion Beskidy, which is one of the priorities of spending of EU funds for this purpose, one has to:

- educate potential project applicants in terms of establishment of partnership and managing partnership in the course of the implementation of cross-border projects and after their completion,
- modify the assessment of applications, taking into account, to a greater extent, the quality and duration of current cross-border cooperation between the partners, while at the same time not closing the paths to resources for those applicants who have just started cooperate,
- modify the guidelines for the beneficiaries of cross-border micro-projects to the extent that the requirement of proving the sustainability will not only be to prove the maintenance of project results for a period of five years, but also to document further development of partnership and other joint activities, already carried out without the involvement of European funds.

The latter condition is essential for a genuine commitment to achieve the objectives of the engagement of EU funds in the development of the borderlands. These funds are, in fact, to be only an instrument to support cross-border integration, rather than justify its undertaking.

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## TRANSPARENCY OF LOBBYING: A THEORETICAL APPROACH

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### Abstract

The positive benefits of transparent lobbying are investigated, as they may contribute to the democratic environment and the efficient allocation of public funds. This premise is based on the hypothesis that adequate consultation of changes and new legislation with stakeholders has the potential to contribute to the improvement of the decision-making process (and its legitimacy) on the management of public funds. This overcomes some major challenges relating to the regulator and the regulated (asymmetric information, moral hazard, and professional lack of knowledge of the regulator). A higher quality of public administration, in turn, reduces corruption and leads to greater transparency in decision-making, including lobbying. Or vice versa, non-transparent lobbying can lead to illegal practices of influence, corruption, and its economic implications. The aim of this article is to study the links among government, lobbyists, businesses, and citizens in terms of information flows and to design a preliminary model of such links and identify possible consequences.

### Keywords

Transparency, Lobbying, Information, Stakeholders, Regulation

### JEL classification

D72, D73, D82, D85

## 1 Introduction

The actual decision-making process of economic policy needs both the qualitative knowledge of economic theory, focusing on the economic causes and factors supporting the operation of markets, as well as the knowledge of other, mainly political, factors that could influence both the subject's behavior and the final shape of policies and markets, particularly in relation to the dominant reality of the redistribution process and process of democratization. In this context transparency of decision-making plays a crucial role. Transparency for the purpose of the paper is defined as the “increased flow of timely and reliable economic, social and political information, which is accessible to all relevant stakeholders” (Vishwanath and Kaufmann, 1999; Bellver and Kaufmann, 2005). Transparency may help in ensuring that the benefits of growth are redistributed and not captured by the elite. Transparency is important because it increases efficiency in the allocation of resources. In democratic societies, the access to information and transparency can also be considered as a human right (Bellver and Kaufmann, 2005). Furthermore, beyond the human rights and the market efficiency arguments, transparency is also critical for human development as it provides incentives for redistribution and inclusiveness. It is important too to stress the relation between transparency and institutional quality.

The positive benefits of transparent lobbying are investigated, as they may contribute to the democratic environment and the efficient allocation of public funds. This premise is based on the hypothesis that adequate consultation of changes and new legislation with stakeholders has the potential to contribute to the improvement of the decision-making process (and its legitimacy) on the management of public funds. This overcomes some major challenges relating to the regulator and the regulated (asymmetric information, moral hazard, and professional lack of knowledge of the regulator). A higher quality of public administration, in turn, reduces corruption and leads to greater transparency in decision-making, including lobbying. Or vice versa, non-transparent lobbying can

lead to illegal practices of influence, corruption, and its economic implications (i.e. inefficiencies in public administration, rent seeking, diverting money from public budgets, low participation of countries in globalization processes, lower economic growth, etc.). Economic institutions as well as the balance of political forces in society are considered to be endogenous, because they are chosen within the society. When selecting them, conflict of interests between different groups and individuals can be expected. Thus, there is a danger that institutions can develop to the benefit of stronger groups and at the expense of others. A transparent environment where groups negotiate and transparency in the promotion of diverse interests – transparent lobbying – can significantly reduce this risk.

The aim of this article is to study the links among government, lobbyists, businesses, and citizens in terms of information flows and to design a preliminary model of such links and identify possible consequences.

The basic method used in the article is description and explanation of the main links used for potential lobbying interaction in term of influence decision making process.

The paper is organized as follows: the second part will provide the theoretical background and summary of the current state of knowledge of research issue. Third part will introduce the model of information flows (links) among stakeholders. Finally the discussion and conclusion of the paper will be carried out as a part four.

## **2 The theoretical background and summary of the current state of knowledge**

During the last two decades, non-mainstream theories have started to appear in economics – especially the approaches of the New Institutional Economics and all of its forms and offsets, the approach of Public Choice Theory, the New Political Economics, etc. These deal also with the application of economic theory in the analysis of “non-market” decision-making, studying the development and influence of political systems on the development of society, denominating interests, and seeking the mechanisms of their promotion. The New Institutional Economics studies the causes of the different development of countries with the same starting conditions, using historical and comparative approaches, and also tries to incorporate sometimes marginalized approaches and perspectives that are out of the mainstream economic theory. It is also interested in the structure of economic organizations and institutional settings, as well as in the question of how this structure influences the behavior of people, the allocation of resources, and their equilibrium. As depicted above, in all these theories the interests are the essential category – in models of representation, in the theory of agency, in the theory of principal-agent, in models of bureaucracy – in an effort to explain the motives for practical economic policy and finally also for the operation of the markets

The deeper analysis of interests and the description of subjects and methods of interest promoting (advocating) and desirable goal reaching, leads to an independent perspective in this area – the theory of interest groups. Revealing the importance of the role of interest groups in the decision-making processes leads back to the need to be interested in social science disciplines and their interactions, especially political science, sociology, economics, and law. From the social science point of view, the emergence, promotion, function, and consequences of the special interests is mostly approached by the interdisciplinary political sociology which deals with the analysis of interrelations between the structures of society and political institutions. In this context, it is necessary to mention that information is a basic means of exchange in negotiations, it is a commodity traded between politicians and voters under special conditions influenced by individual interests and their promotion. The effort to influence decision-making resulted not only in the rise of interest groups, but also in the use of a variety of practices, from which the legitimate and the legal ones are generally called “lobbying”. For a deeper understanding of the behavior of interest groups and the lobbying role, which is often viewed only as an activity that focuses on influencing decisions, it is possible and necessary to use the basic theoretical concepts supporting the social sciences, which can guide the understanding and grasp of this phenomenon. Among the most important theoretical knowledge can be included institutional economics (Williamson, 1998; Alston, Eggertson, 1996; Machonin, Mlčoch, Sojka, 2000; Amable,



2004; Mlčoch, 2005; Voigt, 2008), the agency theory (Jensen, Meckling, 1976; Rees, 1985; Stiglitz, 1987; Eisenhardt, 1989) theory of bureaucracy (Weber, 1998); Merton, 1968; Gouldner, 1964; Niskanen, 1971; Wilson, 1991), the theory of stakeholders /actors and new forms of governance (Jachtenfuchs, Kohler-Koch 2004; Sørensen, Torfing 2007), theory of regulation (Stigler, 1971; Peltzman, 1976; Levine, Forrence, 1990; Moss, Balleisen 2009), the theory of representation of interests (Olson, 1971; Brokl, 1997; Grossman, Helpman, 2002; Goehring 2002), public choice theory which developed quite a comprehensive analytic apparatus providing a rigorous explanation of corruption and its effects on the efficiency of the rule of law (Buchanan, Tullock 1965; Michell, Munger 1991, Mueller, 1989). Blumkin and Gradstein (2002) apply the principal-agent framework to policy decision-making whereby the ruling government is viewed as an agent whose actions are only imperfectly monitored by the public. They find that the ruling government tends to be the more corruptible, the less transparent the decision-making process. Lack of transparency magnifies the moral hazard problem in the interaction between the electorate and the ruler, making the control of the latter more difficult. More open and democratic political system brings less possibility for corruption. Economic models of interest groups and lobbying are based on the economic theory of politics, more concretely on the assumption that voters maximize the utility and political parties (the government) maximize electoral votes. Economic models describing the influence of interest groups are trying to answer two basic questions: In which way do interest groups influence policy in democratic systems? And how should the government support or control this effect? Scholars focus on describing the mechanisms by means of which the rational behavior of individuals is aggregated by various institutional actions to irrational and undesirable political outcomes. Olson's economic model (1965, 1971) implies the conclusion that powerful organized groups restrict economic growth and stifle the political and economic system. The Chicago School shows organized interests and lobbying as an influence on policy in the context of the principal - agent problem. The role of interest groups in shaping the relationship P-A in non-market decision-making can act as a factor explaining the specific economic policies as a result of successful lobbying. Stigler (1971), Barro (1973), Posner (1974) and Peltzman (1976) focused on regulation. They have identified the cause of the demand for regulation itself within regulated industry. The state is here perceived as a supplier of regulation (such as fixed prices, entry restrictions, subsidies, suppression substitutes and vice versa support complementary goods). In exchange for these high-value services, regulated industries may offer legislators contributions to their election campaign, promise them the support of voters and a highly profitable future career. The resulting exchange is usually not outwardly apparent.

### 3 Model of information flows among stakeholders – preliminary stage

The following chapter deals with the use of some of the latest findings in economic theory to describe the behaviour of individual economic entities in the lobbying process and to create a preliminary model whose theoretical construct will be verified in an experiment in the next steps of the research. As the following diagram (fig. 1) shows, the state, businesses and citizens are considered to be basic entities in economics.

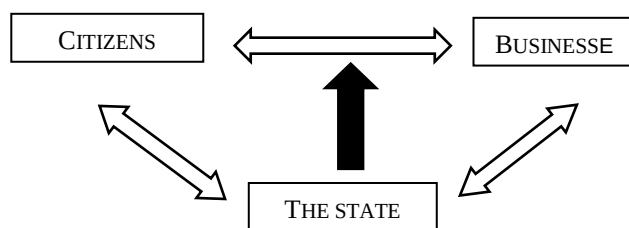


**Fig. 1** Schematic illustration of connections in economics: basic model (Source. Own construction)

Based on the connections shown in the diagram, the following relationships can be described. Between businesses and citizens it is a simple model of purely economic markets (Gregor 2005, p. 21) where market relationships work. Citizens act as consumers, businesses as manufacturers and citizens as employees (or as owners of factors of production) and companies as employers (or lessees of factors of production). The added relationships with politics (solid arrow), which can be refined to economic policy, are an expression of relationships with the government in the field of non-market decision making - the field of political market operations. Peacock (1992, cit. by Gregor 2005) characterises political markets as follows:

1. A primarily political market. A market between politicians and citizens. Trading with public policies or with competing political agendas during elections.
2. A market of administrative measures. A market between policies and bureaucracy.
3. A market of executive policies. A market between executive policies and groups affected by a policy. Any executive measure changing the position of a given group forms a commodity.

Put more simply it can be said that, as indeed the above list shows, the basic tradable good on political markets is information. Here information acts as goods which serve entities to promote their own interests. The promotion of interests and the information market are therefore the basic factors which are to be the subject of study and discussion in the following considerations.

### 3.1 Analysis of Connections between Entities

In relation to the focus of the research on specific entities connected with lobbying, the simple abovementioned system of relationships is supplemented by other connections such as agents of mutual communication fig. 2.

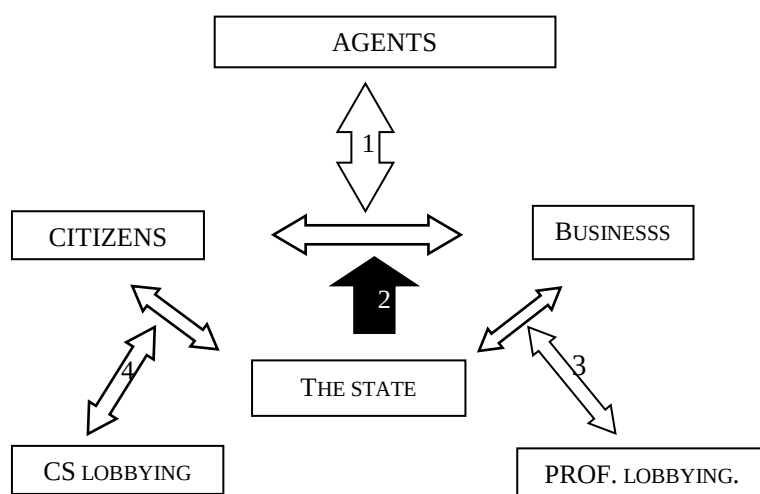


**Fig. 2** Analysis of connections with the inclusion of agents – extended model (Source: own construction)

The extended model (fig. 2) is enhanced by the following relationships. The first is a mediating activity (arrow 1) acting on standard markets between businesses and citizens. State interventions

into the natural market mechanism are more complex (arrow 2). Such interventions, mostly characterised as non-market decision making, may have a dual nature - regulation or liberalisation. Arrow 3 points to relationships which arise during decision making which includes the trading of information in which a special kind of interest groups, professional lobbying organisations (PROF lobbying), participates. On the one hand their role is perceived positively in the sense that they are able to fill in a gap in information for decision making, while on the other hand (negatively) it must be observed that they pursue their own interests (or the interests of those who finance their activities). Arrow 4, which affects relationships between citizens and the state (CS lobbying) has the same nature as with professional lobbying organisations. A complicating factor is the fact that citizens are not only voters, but at the same time, to a large extent, employees of the state. Box 1 summarises the connections described above.

#### THE STATE

- **is a bureaucratic institution and determines rules – legislation for the economy**
- has power and with it the possibility to provide, but also to impose services
- on markets – regulates or liberalises. Attempts to resolve actual or suspected market failures
- **in non-market decision making – mandatorily obtains (statistics), or buys information for decision making.**

#### LOBBYISTS

##### a) economic interests

- they are interested in selling information and "in addition" somewhat in promoting the interests of "lessees"
- **they are hired and paid to promote the interests of companies – they seek rent from the state**
- **they attempt to influence decision making - they fulfil the assignments of companies and implement rent**
- **their activities may be restricted – regulated**

##### b) non-economic (ideological) interests – see CITIZENS – CS interest groups

#### COMPANIES

- they hire factors of production, implement production on markets and create job positions
- they are subject to the rules of the state
- **they may strive for market dominance and to take care of their own reputation**
- **they lease lobbying for promoting and financing their interests – see economic lobbying**

#### CITIZENS

- they lease factors of production and purchase goods
- they are not only consumers, but also voters. To a large extent they are employed by the state.
- they influence (determine?) government decision making – the electoral cycle
- **between elections they may influence the decision making of: the interest group of a civil society; their activities may be restricted – regulated**

Box 1. Lobbying – a description of stakeholders' activities - general diagram (Source: own construction)

Box 1 provides a list of possible activities, which is still too general. The selected activities must focus on those where an exchange occurs, provision or receipt of information - see bold print.

### 3.2 Construction of Relationship Model as a Basic Starting Point

The formulation of the basic starting point of a relationship model (fig. 3) is based on a simple scheme - *interests - the decision maker - the outcomes*.

The state, in this case the decision-making body, is a bureaucratic institution and determines the rules (1). It makes decisions based on information drawn from its own sources (knowledge of officials and politicians and state institutions which supply information) or obtain it from a public non-government sector - public (2a) and from the private sector – business (2a). Information arising from an interaction between lobbying and the state (2b) presents a situation where companies hire professional lobbyists or establish professional lobbying (3) and civil companies establish (4) interest groups who attempt to influence the decision making of the state and therefore the formation of rules through its activities – lobbying.

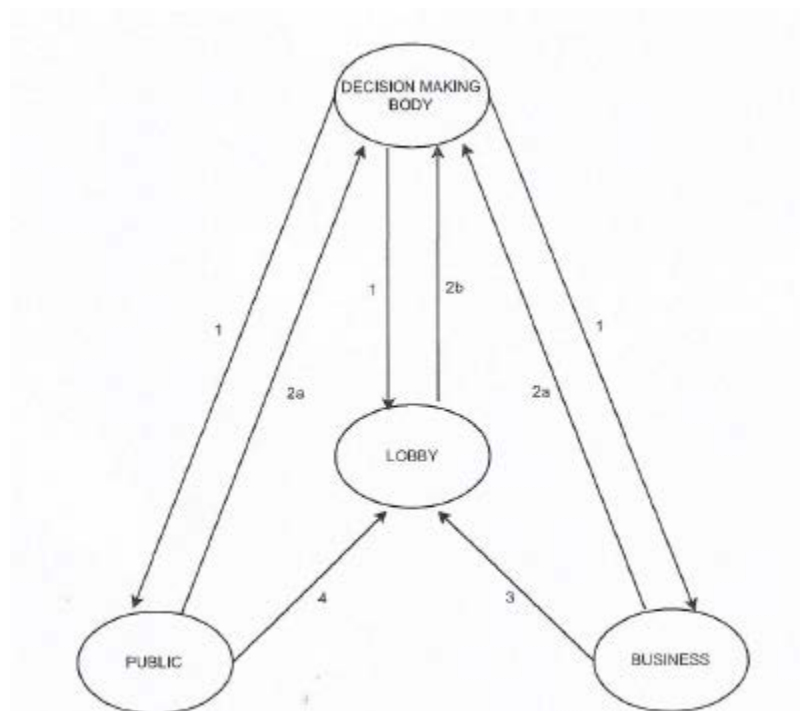


**Fig. 3** Basic model of links – preliminary stage (Source: own construction)

Based on the above it is possible to formulate three hypothetical situations, the first of which is further divided into two basic variants:

### **1. Non-existence of lobbying (relationships between the government, public and businesses are not institutionalised)**

a) The government makes decisions itself, relying on its own source of information, and on the knowledge of its officials and elected representatives ("the quality of the bureaucratic apparatus"). The results are low costs of the decision-making process, but high insecurity of actors resulting not from reasons of information asymmetry (IA), this does not exist in this hypothetical situation, but from the high probability of incompetent or bad decision making (\*) leading to high inefficiency.

b) The government makes decisions itself, relying on its own source of information and attempts to obtain information from the public and businesses (maximisation of information). The results are high costs of obtaining information, long delays and the inability to prevent information asymmetry. Although this situation may lead to more competent decision making, it is highly inefficient in terms of input costs.

### **2. Lobbying exists – relationships are partially institutionalised, however are not transparent**

a) The government makes decisions based on the benefits offered by lobbying, lobbying tries to gain rent from the government and there is high asymmetry of information, an adverse selection and

moral hazard. Although the costs of obtaining information are lower than in situations 1a and 2b, the result leads to social inefficiency and the creation of a corrupt environment.

b) The government also attempts to obtain information from other entities (the public and businesses) - the entire process however, is very costly, see 1b.

**3. Lobbying exists – relationships are institutionalised and transparent.** In order to reach this situation, costs for implementing and enforcing rules are invested, however, the government does not have to "search around" for information in order to make its decision. There is competition between interests. All stakeholders have equal access leading to a reduction in information asymmetry and uncertainty of the actors. The result is competent decision making based on social consensus (the rule of compensation may increase costs), which as a rule brings greater social effectiveness and economic efficiency.

Table 1 summarises the described hypothetical situations and their possible consequences.

**Table 1.** No lobby, non-transparent lobby, transparent lobby and its consequences

| Options               | Source of information                                                                                     | Rules formal/informal | Costs                                                 | Uncertainty of actors as a consequence of IA | Failure of the state                      |
|-----------------------|-----------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------|----------------------------------------------|-------------------------------------------|
| No lobby              | own                                                                                                       | x                     | none                                                  | high*                                        | ineffective (uninformed) decision         |
|                       | own + obtained at random from the public and businesses (outsiders)                                       | no/yes                | high for obtaining info (bureaucracy),                | medium                                       | time delays, excessive bureaucracy        |
| Non-transparent lobby | own + lobbying - selectively (insiders)                                                                   | no/yes                | for obtaining info, rent seeking                      | high                                         | social inefficiency, space for corruption |
|                       | own + lobbying selectively (insiders) + random tracing of info from the public and businesses (outsiders) | no/yes                | high for obtaining info (bureaucracy),                | medium                                       | time delays, excessive bureaucracy        |
| Transparent lobby     | own + lobbying (equal access for all stakeholders) everyone can become an insider                         | yes/yes               | costs of implementing and enforcing rules, incentives | low                                          | risk of exaggerated regulation            |

(Source: own construction)

#### 4 Discussion and Conclusion

At the very least the following questions present themselves. Do any mechanisms ensuring "socially preferable" equilibrium exist? Is it at all possible to describe such equilibrium?

The state is a bureaucratic institution, determines the rules of the game and in non-market decision making obtains information, partially from its own sources and partially from other stakeholders. The opportunity thereby presents itself for stakeholders to influence the government's decision making and bureaucratic apparatus. The entire process can be carried out without transparency and without rules, where companies use lobbying to seek rent from the state as a consequence of high information

asymmetry. This situation also brings a high level of uncertainty to all stakeholders, as insiders can become outsiders at virtually any time. If decision-makers wished to behave responsibly in this situation, they would have to trace the necessary information themselves – an attempt at perfect awareness. Although this could increase the quality of a decision, such a decision would likely be accompanied by high additional costs and time demands for obtaining such information and the risk of an adverse selection can certainly not be ruled out. In the transparent environment in which effective rules are established, the risk of information asymmetry (as well as the costs associated with additional rent) and uncertainty are reduced. Transparency of lobbying (see Laboutková, Vymětal, 2016) reflects the level of disclosure, accuracy and comprehensibility of information. This however creates high costs for the implementation of rules (institutions), which lead to transparency as well as costs associated with the implementation of incentives for agents, which lead them to the maximisation of the principal's interest rather than their own (principal – agent problem – see Moe, 1984). A further benefit of reducing space for seeking additional rent from the state could be an attempt by companies to pursue market dominance in the form of building a "good name", i.e. accepting the principles of transparency (openness, accuracy or truthfulness, and comprehensibility) and ethical behaviour, which corresponds to the concept of corporate social responsibility. A possible risk however, is an overregulated society and therefore paradoxically the suppression of natural competitiveness and citizen's initiative.

The questions outlined above and the partial conclusions present a solid base for further research which focuses in particular on the method of regulating lobbying in connection with requirements for the transparency of decision-making processes with the impacts on democratisation, for establishing favourable conditions for market information (whether a market solution or a solution approaching the market does not appear more effective) and for defining a "socially preferable" balance.

## 5 Acknowledgement

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## EVALUATION OF PREPAREDNESS OF SELECTED CENTRAL AND EASTERN EUROPEAN COUNTRIES FOR JOINING THE EURO ZONE ACCORDING TO THE MAASTRICHT CRITERIA

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### Abstract:

The contribution deals with the matter of construction and use of multi-criterial indexes when analysing and evaluating the convergence process of the economies of the EU member states to the Euro Zone economy. The actual joining the Euro Zone is conditioned by five requirements – Maastricht convergence criteria. Even though fulfilment of the specified five conditions for introduction of the common euro currency does not definitely guarantee achievement of homogeneity of the selected economy with the Euro Zone economy, they play an important part when deciding whether to accept a certain state in the Euro Zone or not. The constructed Maastricht criteria fulfilment index thus includes the economic indicators which were defined by the Maastricht treaty for evaluation of preparedness of a country for introduction of the common euro currency. The constructed index is subsequently used to evaluate the degree of convergence of the Czech Republic, Bulgaria, Poland, Hungary, Romania, Croatia, Slovenia and Slovakia to the Euro Zone.

### Keywords:

European Union, Euro Zone, convergence, Maastricht criteria, Maastricht criteria fulfilment index, multi-criterial index

### JEL classification:

F15, F45

## 1 Introduction

Similar to integration in the unified EU internal market, a high degree of convergence of the economy of a country joining the Euro Zone and introducing the common euro currency to the economy of this integration group is an important precondition in order to minimise the risk of occurrence of asymmetric shocks and resulting negative impacts, both on the particular country and on the Euro Zone. The authors of the project of common European currency realised this when they implemented the criteria conditioning introduction of the common euro currency in the Maastricht treaty. The actual joining the Euro Zone is therefore connected with fulfilment of five requirements, so-called Maastricht convergence criteria. Although the nature and definition of these criteria can be questioned and their fulfilment is not a guarantee for achievement of homogeneity of a selected economy with the Euro Zone economy, they play an important part when deciding about acceptance or non-acceptance of a particular state in the zone with the common euro currency.

The current European Union has 28 member states and nineteen of them introduced the common euro currency. Two from the remaining nine countries have negotiated an exception from the obligation of an EU member state to aim towards the euro introduction – Great Britain and Denmark. The other seven states, which include Sweden and the Central and Eastern European countries (the Czech Republic, Poland, Hungary, Bulgaria, Romania and Croatia), undertook to join the Euro Zone when entering the European Union. It has not happened yet in their cases due to various reasons. Croatia has been an EU member state for a very short time, Romania and Bulgaria are two least developed economies of the EU and the remaining states have a highly reserved attitude to introduction of the common euro currency and after the crisis through which the Euro Zone went in connection with the impending bankruptcy of Greece, the attractiveness of the common European currency for these states dropped even lower.

Nevertheless, these facts are not a reason to discontinue evaluation of the ability and preparedness of these countries for introduction of the common currency. It is performed not only by the European Central Bank within the scope of its regular Convergence reports but also by the

national institutions in the individual member states. As an example we can mention a joint document of the Ministry of Finance of the Czech Republic and the Czech National Bank called “Assessment of the Fulfilment of the Maastricht Convergence Criteria and Degree of Economic Alignment of the Czech Republic with the Euro Area”. The aim of this contribution is not to replace the specified document but to evaluate preparedness of selected countries from Central and Eastern Europe (the Czech Republic, Poland, Hungary, Bulgaria, Romania and Croatia) for introduction of the common euro currency in a longer period of time (2004-2015) and compare this development with the development of Slovakia and Slovenia, i.e. the countries which have been a member of the Euro Zone for several years. From the analysis it will thus be possible to make also a conclusion to what degree the membership in the Euro Zone contributes to the higher success rate of a particular country in the convergence process and fulfilment of the Maastricht criteria.

When evaluating preparedness of a country for introduction of the common euro currency it is monitored whether the particular country fulfils the criterion or not. However, this assessment has certain drawbacks. Mainly it does not take into consideration the fact that some convergence criteria, such as fiscal criteria, are not compared with a strictly determined criterial value when evaluating the ability of a state to join the Euro Zone. If it was the case, there would be currently significantly fewer countries in the Euro Zone than the current nineteen members. At the same time, it also does not take into account the differences between the analysed states in the respect that it does not differentiate a state which exceeds the determined criterion only slightly or which approximates the criterial value from a state which is far from the particular criterion. It is also connected with another drawback of the above specified evaluation which does not enable considering and detailed analysis or comparison of gradual improvements of the individual countries in fulfilment of the Maastricht criteria, or their approximation to these criteria (Lebiedzík, 2006).

Due to the above specified reasons, an index was constructed which eliminates the described drawbacks at least partially and on the basis of its values it is possible to make relevant conclusions, not only as regards the success rate of the countries in fulfilment of the individual convergence criteria but mainly as regards their progress in this direction, i.e. convergence to or divergence from the criterial values. It is called the Maastricht criteria fulfilment index (Lebiedzík, 2006).

## 2 Theoretical foundations

Besides harmonisation of legal regulations of a country with articles 130 and 131 of the Treaty on the Functioning of the European Union (hereinafter referred to as the Treaty) and the Statutes of the European System of Central Banks and the European Central Bank (ECB), joining of the Euro Zone by a particular EU member state is also preconditioned by achievement of a high degree of sustainable convergence (the Ministry of Finance of the Czech Republic and the Czech National Bank, 2015).

The degree of sustainable convergence is evaluated according to the Maastricht convergence criteria specified in article 140 of the Treaty and in more detail in the Protocol No 13 to Treaty on the European Union and Treaty on Functioning of the European Union concerning the convergence criteria. The criteria are commonly divided into two wider categories – monetary criteria and fiscal criteria. The monetary criteria include:

- The criterion of price stability of a member state which determines that the inflation rate in the member state minimum one year before the date of its joining the EMU must not exceed the inflation rate in three EU member states with the lowest inflation rate more than 1.5 %.
- The criterion of long-term price convergence which means that the nominal long-term interest rates can be maximum 2 % higher than the average of three countries with the lowest inflation rate.

- The criterion of exchange rate and participation in the exchange rate mechanism (ERM II) which determines a condition that minimum two years before joining the monetary union, the exchange rate must be within the fluctuation band of the European Currency System and the particular states have not had to depreciate their currency compared to the currency of another member state.

The fiscal criteria include:

- The criterion of government budget deficit when the deficit may not be higher than 3 % of the GDP level in market prices, except the cases when:
  - The specified limit is exceeded exceptionally and temporarily and the proportion is close to 3 %.
  - The given proportion by which it exceeds the specified limit decreased significantly or kept decreasing to the level close to 3 %.
- The criterion of gross public debt when the proportion of the total public indebtedness in GDP may not exceed 60 % GDP, except cases when the particular country manages to decrease this proportion at an acceptable rate and sufficiently and approximate the defined limit of 60 %.

Comparative economics and analysis works mainly with partial indicators of the economy state and development in the individual countries within the scope of the global economy. The unified methodology of their construction enables international comparability, at least for the countries complying with the given methodology of the individual indicators. However, this way of comparison is quite limited and many institutions, such as the World Bank, OECD and Fraser Institute but also many commercial banks, construct their own alternative comprehensive indicators including many partial indicators. These are then used to evaluate and compare not only the achieved economic level or performance but also the economic convergence.

As an example it is possible to mention the DCEI convergence indicator (Deka Converging Europe Indicator) published by DGZ Deka Bank which was constructed in order to evaluate the degree of convergence of the economies of the former candidate countries for joining the EU with the European Union economy. It included 14 partial indicators many of which do not allow unambiguous measurement and therefore significant degree of subjectivism of this index can be pointed out. Concretely they included the following indicators: economic level, unemployment rate, interest rate, exchange rate, deficit of public finances, public debt, foreign debt, proportion of the public sector in GDP creation, proportion of the trade with EU, proportion of agriculture in GDP creation, procedure during the introduction of the *acquis*, the amount of irrecoverable claims and indicators evaluating the economic policy and financial system.

Construction and evaluation of multi-criterial indicators was also performed by the economists and economic institutions in the Czech Republic. Nachtigal and Tomšík (2002) used the concept of a magic n-angle geometric shape for evaluation of the achieved degree of convergence of the selected country to the European Union. The above authors disaggregated a magic quadrangle into a magic twenty-four-angle shape. Then they used it to analyse the degree of convergence of the economy of the selected countries to the economy of the European Union and using the quotients of the areas of the twenty-four-angle shapes of a particular country and the European Union they quantify the achieved procedure of convergence in the individual countries.

In 2003 the analytics of the Investment research division of ČSOB created so-called ČSOB Distance Index and published it in *Ekonomický měsíčník* (May 2003) which is published by this bank. Using the specified index, the Investment research division of ČSOB measures the degree of convergence of the Czech economy to the economy of the European Economic and Monetary Union. When selecting the indicators to include in the index, the authors started with existence of

Maastricht criteria and as they specify “... they ignored all the indicators the inclusion of which would be too complicated for their needs as regards acquisition, processing, quality or interpretability of the necessary data”. (ČSOB, 2003, p. 7). The ČSOB distance index thus includes 8 indicators. They are the real GDP growth rate, proportion of the government budget balance in GDP, unemployment rate, inflation rate measured by means of the consumer price index, proportion of the current account of balance of payments in GDP, yield of five-year government bonds, three-month loan rate in the interbank market (PRIBOR 3M) and normalised standard deviation of EUR/CZK exchange rate. We can agree with the index authors that the given indicators “... reflect the economic cycle development, achieved degree of internal and external economic balance, degree of social tension or use of capacities, currency stability and money scarcity in the economy”. (ČSOB, 2003, p. 7)

In accordance with the principles of construction of the above specified selected multi-criterial convergence indicators, in chapter 4 of this article the Maastricht criteria fulfilment index was constructed using a method of a fictitious unit definition. This method is based on creation of a criterial object (e.g. a fictitious country or in our case a criterial value for the given Maastricht criterion) to which the maximum or minimum values existing in the group of the compared countries will be allocated for the individual indicators. Depending on the purpose for which the particular index is prepared using this method, it is also possible to choose other values of the indicators allocated to the criterial object. However, it is important to have the analysis of all the countries in the evaluated group made in relation to the defined criterial object. The values of the individual indicator for an “i” country are then understood as coordinates of one point in the Euclidean space and the selected indicators of the criterial country (object) as coordinates of another point in the same space. Using the below specified formula we can calculate the average distance of these two points which is also the value of the constructed index. On the basis of the values calculated in this way we can compare which country from the analyzed group achieves a better or worse result. However, this method could also be modified in such a way that we would not compare the differences between two indicators but their quotients.

### **3 Evaluation of the Maastricht convergence criteria fulfilment**

#### **3.1 Fiscal criteria**

The public finance state criterion is only fulfilled when both of the components of the fiscal criterion are met - i.e. the government budget deficit is below 3 % GDP and the debt in the sector of government institutions is below 60 % GDP. The situation in the analysed countries in this area is summed up below in tables 1 and 1 a 2.

The budget stability of the specified economies in 2004-2015 was influenced mainly by the financial and economic crisis which hit all of them alike. In 2009 and 2010 none of these eight states achieved fulfilment of the criterion value for the public finance deficit. Except in Bulgaria and the Czech Republic, this state continued in 2011. A similar situation is in this group of countries also in 2012, only with the difference that the Czech Republic, which showed the budget deficit of 4 % GDP in that year, was replaced by Hungary with the deficit of 2.3 % GDP. The above specified shows that all the countries have some experience with the decisions of the Council of the EU about an excessive deficit, currently the deadline for its remedy is coming to its end in Croatia, in Slovenia this measure was cancelled by the decision of the Council dated 17 June 2016.

Slovenia is the country which had the highest proportion of the government budget deficit in GDP in the monitored period - it was in 2013 at the amount of 15 %. The development of this particular indicator in Slovenia documents the fact that the Slovenian economy was affected by the economic crisis more significantly than other economies. The Slovenian economy went through a double slump in the recession which continued until 2014. Slovenia was struggling against the excessive macro-economic imbalance which threatened seriously its investments and was reflected

in significant problems of the Slovenian banking system which was fundamentally redeveloped financially from the public resources in 2013.

**Tab. 1.** Government budget deficit in GDP (in %) in selected EU member states in 2004-2015

| Country          | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>Bulgaria</b>  | 1.8  | 1    | 1.8  | 1.1  | 1.6  | -4.1 | -3.2 | -2   | -0,6 | -0.8 | -5.8 | -2.1 |
| <b>Czech R.</b>  | -2.7 | -3.1 | -2.3 | -0.7 | -2.1 | -5.5 | -4.4 | -2.7 | -4   | -1.3 | -1.9 | -0.4 |
| <b>Croatia</b>   | -5   | -3.7 | -3.2 | -2.4 | -2.7 | -5.8 | -5.9 | -7.8 | -5.3 | -5.4 | -5.6 | -3.2 |
| <b>Hungary</b>   | -6.4 | -7.8 | -9.3 | -5.1 | -3.6 | -4.6 | -4.5 | -5.5 | -2.3 | -2.5 | -2.5 | -2   |
| <b>Poland</b>    | -5.2 | -4   | -3.6 | -1.9 | -3.6 | -7.3 | -7.5 | -4.9 | -3.7 | -4   | -3.3 | -2.6 |
| <b>Romania</b>   | -1.2 | -1.2 | -2.2 | -2.9 | -5.6 | -9.1 | -6.9 | -5.4 | -3.2 | -2.2 | -1.4 | -0.7 |
| <b>Slovenia</b>  | -2   | -1.3 | -1.2 | -0.1 | -1.4 | -5.9 | -5.6 | -6.6 | -4.1 | -15  | -5   | -2.9 |
| <b>Slovakia</b>  | -2.3 | -2.9 | -3.6 | -1.9 | -2.3 | -7.9 | -7.5 | -4.1 | -4.2 | -2.6 | -2.8 | -3   |
| <b>criterion</b> | -3   | -3   | -3   | -3   | -3   | -3   | -3   | -3   | -3   | -3   | -3   | -3   |

Source: Eurostat

The countries which have been least successful in the long term in fulfilment of the criterion of government budgets are Croatia, Poland and Hungary, on the other hand a very good situation in this respect is in both Balkan states – Bulgaria and Romania, and Bulgaria is a country which did not meet this criterion only in the years of crisis in 2009 and 2010. If we disregard this period, the Czech Republic also either fulfilled this criterion or approximated it significantly. A bit worse situation is in the Slovak economy which had problems with an excessive deficit during majority of its membership in the Euro Zone.

The development of the government budget deficit in the individual countries has a direct impact on their indebtedness. The table 2 shows that from the specified group of countries, the Maastricht convergence criterion is not currently fulfilled by three states – Croatia, Slovenia and Hungary. The highest indebtedness of the economy is seen in Croatia and Slovenia where the proportion of the public indebtedness in GDP exceeds 80 %. As regards indebtedness, both these neighbouring countries went through a similar development when their debt started to grow significantly in connection with the financial and economic crisis in 2009 and this continued until 2014. Apart from the quite high government budget deficits, another cause of the negative development of the given indicator is also a long-term significant decrease or stagnation of their economies. As regards the third specified country, Hungary, there has been a recent decrease of public indebtedness, mainly with regard to the economic recovery in Hungary.

**Tab. 2.** Public debt balance in GDP (v %) in selected EU member states in 2004-2015

| Country          | 2004      | 2005      | 2006      | 2007      | 2008      | 2009      | 2010      | 2011      | 2012      | 2013      | 2014      | 2015      |
|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Bulgaria</b>  | 35.8      | 26.6      | 20.9      | 16.2      | 13        | 13.7      | 15.5      | 15.3      | 17.6      | 18        | 27        | 26.7      |
| <b>Czech R.</b>  | 28.5      | 28        | 27.9      | 27.8      | 28.7      | 34.1      | 38.2      | 39.9      | 44.7      | 45.2      | 42.7      | 41.1      |
| <b>Croatia</b>   | 39.8      | 40.7      | 38.3      | 37.1      | 38.9      | 48        | 57        | 63.7      | 69.2      | 80.8      | 85.1      | 86.7      |
| <b>Hungary</b>   | 58.5      | 60.5      | 64.7      | 65.6      | 71.6      | 78        | 80.6      | 80.8      | 78.3      | 76.8      | 76.2      | 75.3      |
| <b>Poland</b>    | 45.3      | 46.7      | 47.1      | 44.2      | 46.6      | 49.8      | 53.3      | 54.4      | 54        | 55.9      | 50.4      | 51.3      |
| <b>Romania</b>   | 18.6      | 15.7      | 12.3      | 12.7      | 13.2      | 23.2      | 29.9      | 34.2      | 37.4      | 38        | 39.9      | 38.4      |
| <b>Slovenia</b>  | 26.8      | 26.3      | 26        | 22.7      | 21.6      | 34.5      | 38.2      | 46.4      | 53.7      | 70.8      | 80.8      | 83.2      |
| <b>Slovakia</b>  | 40.6      | 33.9      | 30.8      | 29.9      | 28.2      | 36        | 40.8      | 43.3      | 51.9      | 54.6      | 53.5      | 52.9      |
| <b>criterion</b> | <b>60</b> | <b>60</b> | <b>60</b> | <b>60</b> | <b>60</b> | <b>60</b> | <b>60</b> | <b>60</b> | <b>60</b> | <b>60</b> | <b>60</b> | <b>60</b> |

Source: Eurostat

The other economies fulfilled the public indebtedness criterion without any bigger problems during the whole monitored period, and the countries with the lowest indebtedness are Bulgaria and Romania. Despite similar development of the public debt between 2004 and 2015 in these countries, there is a difference between the initial debt value in 2004 and final debt value in 2015. Whilst in Bulgaria, in 2015 the proportion of the public debt and GDP is lower than it was in 2004, in

Romania it is the other way round. In both countries, the public debt has increased significantly since 2008. The reason is again the same in both countries – a decrease of the growth rate of their economies which was significantly higher there than in other countries until then. Moreover, the economic policy of Bulgaria was influenced by a very restrictive fiscal policy which has continued de facto in a certain form until nowadays.

The Czech Republic and Slovakia are two other countries which have gone through a similar development as regards gross public indebtedness. Until 2013 the proportion of their public debt in GDP was growing by 14 to 17 per cent to see a slight decrease in the past two years, also thanks to the regained economic growth and higher budget income. It is also the reason why the indicator is lower in the Czech Republic compared to Slovakia by 12 percent.

### 3.2 Monetary criteria

Monetary criteria are fulfilled by a selected country if it meets the conditions of price stability, long-term interest rates convergence and it participates in the Exchange rate mechanism II (ERM II). The development of the specified indicators in the individual states is shown in tables 3 to 5.

When looking at the past 12 years we can see that the average inflation rate measured by HICP was volatile in all the analysed countries but the degree of volatility was different and it reflected mainly the development of the commodity prices, applied price measures and macro-economical environment. In majority of the assessed countries, the inflation volatility was contributed to also by the exchange rate development and monetary policy conditions. The highest inflation volatility is in Bulgaria and Romania and the lowest in Croatia, the Czech Republic and Slovenia.

However, generally it applies to all the countries that until 2008 the inflation rate was higher than in the period after this year. It was a period of quite fast economic growth which was connected with the growth of aggregate demand and price levels. Since 2009, when the economic activity decreased as well as the prices of world commodities, this fact was reflected in the decrease of the inflation rate in most countries. Another significant decrease of the inflation rate in the analyzed countries occurs after 2013 when some countries achieve their lowest in history. It happens despite the fact that there is a recovery in the economic growth, except Croatia which was struggling with the GDP decrease until 2014. The rapid process of disinflation was caused to a significant degree by the oil price drop.

**Tab. 3.** Inflation rate development (in %) in selected EU member states in 2004-2015

| Country          | 2004       | 2005       | 2006       | 2007     | 2008       | 2009       | 2010     | 2011       | 2012       | 2013       | 2014       | 2015       |
|------------------|------------|------------|------------|----------|------------|------------|----------|------------|------------|------------|------------|------------|
| <b>Bulgaria</b>  | 6.1        | 6          | 7.4        | 7.6      | 12         | 2.5        | 3        | 3.4        | 2.4        | 0.4        | -1.6       | -1.1       |
| <b>Czech R.</b>  | 2.6        | 1.6        | 2.1        | 2.9      | 6.3        | 0.6        | 1.2      | 2.2        | 3.5        | 1.4        | 0.4        | 0.3        |
| <b>Croatia</b>   | 2.1        | 3          | 3.3        | 2.7      | 5.8        | 2.2        | 1.1      | 2.2        | 3.4        | 2.3        | 0.2        | -0.3       |
| <b>Hungary</b>   | 6.8        | 3.5        | 4          | 7.9      | 6          | 4          | 4.7      | 3.9        | 5.7        | 1.7        | 0          | 0.1        |
| <b>Poland</b>    | 3.6        | 2.2        | 1.3        | 2.6      | 4.2        | 4          | 2.6      | 3.9        | 3.7        | 0.8        | 0.1        | -0.7       |
| <b>Romania</b>   | 11.9       | 9.1        | 6.6        | 4.9      | 7.9        | 5.6        | 6.1      | 5.8        | 3.4        | 3.2        | 1.4        | -0.4       |
| <b>Slovenia</b>  | 3.7        | 2.5        | 2.5        | 3.8      | 5.5        | 0.9        | 2.1      | 2.1        | 2.8        | 1.9        | 0.4        | -0.8       |
| <b>Slovakia</b>  | 7.5        | 2.8        | 4.3        | 1.9      | 3.9        | 0.9        | 0.7      | 4.1        | 3.7        | 1.5        | -0.1       | -0.3       |
| <b>criterion</b> | <b>2.4</b> | <b>2.6</b> | <b>2.8</b> | <b>3</b> | <b>3.2</b> | <b>0.6</b> | <b>1</b> | <b>3.1</b> | <b>3.1</b> | <b>2.7</b> | <b>1.7</b> | <b>0.5</b> |

Source: Eurostat

The specified development contributed to the fact that in the past three years the price stability criterion has been fulfilled by all the analyzed countries. An exception is Romania in 2012 when the criterial value was exceeded by half a percent. The country which fulfils the price stability criterion most frequently in the monitored period is the Czech Republic (8 times), then Slovenia (7 times) and Poland (6 times), on the contrary Hungary has the biggest space for improvement in this respect.

The second best fulfilled Maastricht convergence criterion by the selected countries is an interest rate criterion. Except Hungary and Romania, all the countries basically fulfilled the specified criterion in the long term. It was also the case during the economic crisis and the connected growing investment risks when there is an increase of long-term interest rates in all the economies. The reason of the higher long-term interest rates in Hungary were continuing worries of the economic imbalance, in Romania it was the fear of occurrence of fiscal deficits and a deficit of the current account of the balance of payment.

**Tab. 4.** Long-term interest rate development (in %) in selected EU member states in 2004-2015

| Country          | 2004       | 2005     | 2006       | 2007       | 2008       | 2009       | 2010       | 2011       | 2012       | 2013       | 2014       | 2015     |
|------------------|------------|----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
| <b>Bulgaria</b>  | 5.4        | 3.9      | 4.2        | 4.5        | 5.4        | 7.2        | 6.0        | 5.4        | 4.5        | 3.5        | 3.4        | 2.5      |
| <b>Czech R.</b>  | 4.8        | 3.5      | 3.8        | 4.3        | 4.6        | 4.8        | 3.9        | 3.7        | 2.8        | 2.1        | 1.6        | 0.6      |
| <b>Croatia</b>   |            | 4.4      | 4.4        | 4.9        | 6.0        | 7.8        | 6.3        | 6.5        | 6.1        | 4.7        | 4.1        | 3.6      |
| <b>Hungary</b>   | 8.2        | 6.6      | 7.1        | 6.7        | 8.2        | 9.1        | 7.3        | 7.6        | 7.9        | 5.9        | 4.8        | 3.4      |
| <b>Poland</b>    | 6.9        | 5.2      | 5.2        | 5.5        | 6.1        | 6.1        | 5.8        | 6.0        | 5.0        | 4.0        | 3.5        | 2.7      |
| <b>Romania</b>   |            | 7.0      | 7.2        | 7.1        | 7.7        | 9.7        | 7.3        | 7.3        | 6.7        | 5.4        | 4.5        | 3.5      |
| <b>Slovenia</b>  | 4.7        | 3.8      | 3.9        | 4.5        | 4.6        | 4.4        | 3.8        | 5.0        | 5.8        | 5.8        | 3.3        | 1.7      |
| <b>Slovakia</b>  | 5.0        | 3.5      | 4.4        | 4.5        | 4.7        | 4.7        | 3.9        | 4.5        | 4.6        | 3.2        | 2.1        | 0.9      |
| <b>criterion</b> | <b>6.7</b> | <b>6</b> | <b>6.2</b> | <b>6.6</b> | <b>6.4</b> | <b>6.5</b> | <b>6.4</b> | <b>7.7</b> | <b>6.5</b> | <b>5.1</b> | <b>4.9</b> | <b>5</b> |

Source: Eurostat

The last of the Maastricht criteria is membership of the country in the ERM II system and fulfilment of its rules. It is not currently possible to assess the formal fulfilment of this criterion in most of the analyzed countries. This criterion is fulfilled by the Euro Zone member states – Slovenia and Slovakia. The other countries are not part of the mentioned system. However, the countries have different exchange rate systems. The Bulgarian currency lev is connected to euro in fixed exchange rate, Croatian kuna and Romanian leu are traded in the flexible exchange rate regime using controlled floating rate to euro. Polish zloty, Hungarian forint and Czech koruna are traded in the flexible exchange rate regime. However, in November 2013 the Czech National Bank intervened in the foreign exchange market to weaken koruna. Despite this intervention, Czech koruna would fulfil the fluctuation band determined within the ERM II system.

**Tab. 5.** Development of the national currency exchange rate to euro in selected EU member states in 2004-2015

| Country         | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Bulgaria</b> | 1.953 | 1.956 | 1.956 | 1.956 | 1.956 | 1.956 | 1.956 | 1.956 | 1.956 | 1.956 | 1.956 | 1.956 |
| <b>Czech R.</b> | 31.89 | 29.78 | 28.34 | 27.77 | 24.95 | 26.44 | 25.28 | 24.59 | 25.15 | 25.98 | 27.54 | 27.28 |
| <b>Croatia</b>  | 7.497 | 7.401 | 7.325 | 7.338 | 7.224 | 7.340 | 7.289 | 7.439 | 7.522 | 7.579 | 7.634 | 7.614 |
| <b>Hungary</b>  | 251.7 | 248.1 | 264.3 | 251.4 | 251.5 | 280.3 | 275.5 | 279.4 | 289.3 | 296.9 | 308.7 | 310.0 |
| <b>Poland</b>   | 4.527 | 4.023 | 3.896 | 3.784 | 3.512 | 4.328 | 3.995 | 4.121 | 4.185 | 4.198 | 4.184 | 4.184 |
| <b>Romania</b>  | 4.051 | 3.621 | 3.526 | 3.335 | 3.683 | 4.240 | 4.212 | 4.239 | 4.459 | 4.419 | 4.444 | 4.445 |

Source: Eurostat

The development of exchange rates of the individual currencies in the analyzed countries is recorded table 5. The table shows that the analyzed countries do not have bigger problems with keeping the currency within the oscillation band as required by the convergence criteria. Here it depends mostly on the adequate determination of the average exchange rate of euro to the currencies in these countries after joining ERM II. Experience of most of the countries with joining this exchange rate mechanism showed that the central parity was determined in immediate proximity of the market exchange rate. If a relatively weaker central parity than the market exchange rate was determined, there could be a problem with possible further appreciation of the particular currency. It might imply the necessity of depreciative interventions at the edge of the exchange rate band which are in the area of requirements for currency stability criteria or

requirements for the central parity change. If the central currency parity was overvalued significantly compared to the market exchange rate, there would be a risk of a relatively fast appreciation toward the central parity and the connected danger of negative impacts on the external economic stability, or there could be problems with fulfilment of the exchange rate criterion.

With regard to the above specified, for the needs of further analysis we will assume that all the countries fulfil the currency stability criterion.

**Tab. 6.** Fulfilment of Maastricht criteria by selected EU member states in 2004-2015

| Country  | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Bulgaria | 4    | 4    | 4    | 4    | 4    | 2    | 3    | 4    | 5    | 5    | 4    | 5    |
| Czech R. | 4    | 4    | 5    | 5    | 4    | 4    | 3    | 5    | 3    | 5    | 5    | 5    |
| Croatia  | 2    | 3    | 3    | 5    | 4    | 2    | 3    | 3    | 2    | 3    | 3    | 3    |
| Hungary  | 2    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 2    | 3    | 4    | 4    |
| Poland   | 2    | 4    | 4    | 5    | 3    | 3    | 3    | 3    | 3    | 4    | 4    | 5    |
| Romania  | 3    | 3    | 3    | 3    | 2    | 2    | 2    | 3    | 2    | 3    | 5    | 5    |
| Slovenia | 4    | 5    | 5    | 4    | 4    | 3    | 3    | 4    | 4    | 2    | 3    | 4    |
| Slovakia | 4    | 4    | 3    | 5    | 4    | 3    | 4    | 3    | 3    | 5    | 5    | 5    |

Source: Eurostat, own calculation

Table 6 evaluates fulfilment of the Maastricht convergence criteria of the selected Central and Eastern European countries in the individual years of the monitored period. It shows that as regards the number of the fulfilled Maastricht criteria, from the specified eight countries of Central and Eastern Europe, the most successful are currently the Czech Republic and Slovakia when they have been able to fulfil all the convergence criteria in the past three years regardless the fact whether they are part of the ERM2 system. Also Bulgaria and Romania have very good results in this area when Romania have been successful in fulfilment of the specified criteria in past two years and Bulgaria even fulfilled three out of the past four years. Last country which fulfilled the convergence criteria in 2015 is Poland. The country which has been worst prepared for joining the Euro Zone as regards the Maastricht criteria in the long-term respect is Hungary and also the country which joined the EU last – Croatia. Also Slovenia has to do quite a lot in this area despite its nine-year membership in the Euro Zone.

#### 4 Construction of the Maastricht convergence criteria fulfilment index

As the actual name of the index suggests, its construction is based mainly on the system of the Maastricht convergence criteria. They include the above specified and assessed fiscal and monetary criteria for joining the Euro Zone.

The set of the indicators used is quite heterogeneous as regards their measuring and construction, which means that the indicators are not easily convertible to a common basis. Preparation of the Maastricht criteria fulfilment index is therefore based on the method of definition of a fictitious unit for the individual indicators and the distance of the given indicators of the individual states from the defined fictitious object is determined (Lebiedzik, 2006). The criterial fictitious object is defined strictly in accordance with the above specified Maastricht criteria:

- The criterial inflation rate ( $p_{mk}$ ) in the particular year is identical with the inflation criterion calculated according to its definition in the Maastricht criteria.
- The criterial interest rate ( $i_{l,mk}$ ) in the particular year is identical with the interest criterion calculated according to its definition in the Maastricht criteria.
- The proportion of the government budget balance in GDP equals -3 % ( $bb_{mk} = -3 \%$ ).
- The proportion of the gross public debt in GDP equals 60 % ( $gd_{mk} = 60 \%$ ).



- The last indicator included in the convergence index is the currency rate, or more exactly the currency rate development stability which is seen within the intentions of the Maastricht criteria. If a particular state fulfils the determined criterion concerning the exchange rate in the particular year, this will be evaluated in the convergence index with the criterial value ( $\Delta E_{-2}$ ) of 100 %, on the contrary if the criterion is not fulfilled, the country will be allocated the  $\Delta E_{-2}$  of 0 %. We have to emphasize that fulfilment of this criterion is based on the exchange rate development and its fluctuation, not on membership or non-membership of a particular country in the exchange rate mechanism (ERM2).

Another problem which has to be solved in connection with preparation of this index is the question of the weight of the individual indicators in this index. With regard to the fact that the Maastricht criteria fulfilment index aims to evaluate whether a particular country fulfils the Maastricht criteria and to what degree and with regard to the fact that a particular country should fulfil all the criteria as condition of joining the Euro Zone without any exceptions, all the indicators have been allocated the same weight.

On the basis of these assumptions, the Maastricht criteria fulfilment index for an "i" country in the particular year was expressed mathematically as follows:

$$IMK_i = [0,2(p_{mk} / p_i)] + [0,2(i_{mk} / i_i)] + [0,2(bb_{mk} / bb_i)] + [0,2(gd_{mk} / gd_i)] + [0,2\Delta E_{-2}] \quad (1)$$

The weights as well as the other parameters in the specified formula are selected in such a way that if a particular state fulfils exactly all the defined criterial values of all the indicators, the convergence index value will equal one, which is also its maximum value. It means that if a criterion of an individual indicator is fulfilled, the value of 0.2 is automatically placed in the square brackets relevant to the particular indicator. The calculated index thus considers proportionally the better or worse result achieved by the selected state in the particular indicator while it applies that the lower value the index of fulfilment of Maastricht criteria achieves, the more away the indicators included in this index are from their criterial values determined by the Maastricht Treaty. Generally, the MCI (Maastricht Criteria Index) may acquire the values from the interval  $<0;1>$ .

Generally we can thus say that the constructed index sums up the values of the individual indicators which could not be added up in their original expression into a characteristic which is a dimensionless figure. On the basis of the convergence index values calculated for the particular countries it is possible to assess fulfilment of the pre-set criterial values of the individual indicators by the analyzed countries.

## 5 Evaluation of development of the Maastricht convergence criteria fulfilment index

One of the countries which had the biggest ambitions before joining the EU to introduce the common currency was Hungary. However, Hungary is a state whose average index value as regards fulfilment of Maastricht criteria is in 2004-2015 the lowest from the whole group of the analyzed EU member states from Central and Eastern Europe when the average MCI value in this period is 0.81. As you can see in this table, the cause of this unfavourable result is long-term unfavourable development of the relevant indicators of the Hungarian economy (period 2004-2012) when the index of fulfilment of Maastricht criteria was constantly under the level of 0.83. In those years, Hungary fulfilled one or two criteria only. The situation changes in 2013 when the Hungarian government managed to decrease the government budget deficit and inflation rate and in 2014 even the long-term interest rate levelled out under the reference value. In the past two years the specified index is 0.96 which classifies the Hungarian economy among the economies which are better

prepared for introduction of the common European currency. It is even in a better situation than Slovenia which has been a member of the Euro Zone since 2007.

**Tab. 7.** MCI development in selected EU member states in 2004-2015

| Country         | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | average     |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|-------------|
| <b>Bulgaria</b> | 0.88 | 0.89 | 0.88 | 0.88 | 0.85 | 0.77 | 0.85 | 0.98 | 1.00 | 1.00 | 0.90 | 1.00 | <b>0.91</b> |
| <b>Czech R.</b> | 0.98 | 0.99 | 1.00 | 1.00 | 0.90 | 0.91 | 0.90 | 1.00 | 0.93 | 1.00 | 1.00 | 1.00 | <b>0.97</b> |
| <b>Croatia</b>  | 0.52 | 0.94 | 0.96 | 1.00 | 0.91 | 0.72 | 0.88 | 0.87 | 0.87 | 0.86 | 0.85 | 0.93 | <b>0.86</b> |
| <b>Hungary</b>  | 0.73 | 0.81 | 0.76 | 0.77 | 0.80 | 0.66 | 0.70 | 0.82 | 0.83 | 0.93 | 0.96 | 0.96 | <b>0.81</b> |
| <b>Poland</b>   | 0.84 | 0.95 | 0.97 | 1.00 | 0.92 | 0.71 | 0.76 | 0.88 | 0.93 | 0.95 | 0.98 | 1.00 | <b>0.91</b> |
| <b>Romania</b>  | 0.64 | 0.83 | 0.86 | 0.91 | 0.75 | 0.62 | 0.69 | 0.82 | 0.96 | 0.96 | 1.00 | 1.00 | <b>0.84</b> |
| <b>Slovenia</b> | 0.93 | 1.00 | 1.00 | 0.96 | 0.92 | 0.84 | 0.80 | 0.89 | 0.95 | 0.79 | 0.87 | 0.94 | <b>0.91</b> |
| <b>Slovakia</b> | 0.86 | 0.99 | 0.90 | 1.00 | 0.96 | 0.81 | 0.88 | 0.90 | 0.91 | 1.00 | 1.00 | 1.00 | <b>0.93</b> |

Source: Eurostat, own calculation

On the contrary, one of the countries which achieve the highest average MCI values in the analyzed period is the Czech Republic, which is a country which has had rather a reserved and careful approach to introduction of the common euro currency for a long time. The average MCI value in 2004 - 2015 is 0.97 and in the monitored period the MCI value did not drop below 0.9. The index development shows that fulfilment of the Maastricht criteria was influenced negatively by the economic crisis in 2009 and 2010. The biggest problem in the Czech Republic was with fulfilment of the budget deficit criterion. The Czech Republic is also a country which has been able to fulfil the Maastricht convergence criteria most frequently from all the analyzed countries in past 12 years (6 times), including Slovenia (6 times) and Slovakia (4 times) where the common currency has already been introduced.

Very good MCI values are achieved by Poland (0.91) but also the poorest member state of the European Union – Bulgaria, especially in the past 5 years. The conditions for joining the Euro Zone have recently been fulfilled by the Bulgarian economy significantly better than for example in the above mentioned Slovenia. Considerably worse MCI values in the monitored period are achieved by Croatia (0.86) and Romania (0.84). It is possible to say that apart from the public debt and exchange rate stability, these countries have had significant reserves as regards fulfilment the other convergence criteria during the whole period, except the years 2014 and 2015 in case of Romania, where there is a significant improvement and MCI of this country achieve the value of 1.

As we have already mentioned, the analysis also includes the economies which have been members of the Euro Zone for several years – i.e. the Slovak and Slovenian economies. Their example and the MCI index development shows very well that in both cases fulfilment of the Maastricht criteria was given mainly by the political decision and the connected applied economic and political measures with the aim to fulfil these criteria within a certain period of time rather than the realistic abilities of these economies to fulfil these criteria in the long term. However, it is also true that fulfilment of the Maastricht criteria decreased after the common currency had been introduced. This confirms that the determined Maastricht convergence criteria in relation to the membership in the euro Zone are seen rather purpose-made and they are not generally accepted as indicators of the fiscal and monetary stability in these countries. This conclusion is confirmed mainly by the development in Slovenia.

## 6 Conclusion

The aim of this contribution was to evaluate preparedness of selected Central and Eastern European countries (Czech Republic, Poland, Hungary, Bulgaria, Romania and Croatia) for introduction of the common euro currency in the period from 2004 to 2015 with application of the Maastricht criteria. The development in the specified countries is compared to the development in Slovakia and Slovenia, which have been members of the Euro Zone for several years.

The evaluation was implemented also using the constructed multi-criterial Maastricht criteria fulfilment index. Application of this index enabled making conclusion not only as regards the degree of convergence of the Czech economy with the Euro Zone economy but also the course and pace of the convergence process in the period between 2004 and 2015. Thus we also verified the possible application of the constructed multi-criterial index, including its information capability, in a macro-economic and comparative analysis.

The analysis showed that membership in the Euro Zone does not contribute significantly to the degree of the convergence process of a particular country to the Euro Zone, at least when this degree is evaluated using the Maastricht convergence criteria. From the point of view of the specified criteria, the highest degree of convergence to the Euro Zone economy was shown by the Czech economy followed by the Slovak economy. Surprisingly, Bulgaria is also evaluated very well and as regards the success rate in fulfilment of the Maastricht criteria in the long term it is comparable with Poland or Slovenia. With quite a big distance they are followed by the three remaining countries – i.e. Romania, Croatia but also Hungary which has been the worst in fulfilment of the Maastricht criteria in the past 12 years.

It is clear that the opinions of various experts concerning the application and information capability of multi-criterial indicators when evaluating economic convergence differ and will differ. The same applies also to the opinions concerning the way of construction of the individual indexes (both those specified above and the ones constructed by other authors) and selection of the economic indicators included in them. In any case we can agree that multi-criterial indicators offer a more comprehensive and flexible picture of mutual differences when evaluating the individual indicators.

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## EUROPEAN (MIS)RECONCILIATION OF RULES AGAINST MISLEADING COMMERCIAL PRACTICES – THE LAST DECADE’S CRUSADE OF THE COMMISSION AND CJ EU

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### Abstract

One decade has passed since the adoption of the Unfair Commercial Practices Directive 2005/29/EC, which rejects providing misleading information about the nature and main characteristics of a product, such as the indication of the geographical or commercial origin. Such data is covered by both the law against unfair competition and intellectual property law, on the EU, as well as national, level. The EU has a clear desire to harmonize these laws in order to support European integration and increase the level of consumer protection and fair competition. The Commission issued, in regard to it, a Communication and Report and the CJ EU has developed a strong case law. However, these outcomes attempting to overcome the dramatic differences between the EU approach, and national approaches from the common law or continental law families, are academically underexplored and practically underestimated. The critical, comparative and holistic study of the last decade’s crusade of the Commission and CJ EU under the single internal market flag in battle against misleading commercial practices, which constitute unfair competition and/or a violation of the intellectual property, offers amazing and unexpected perspectives on economic policies in the EU and the EU itself.

### Keywords

Confusing marketing, Misleading commercial practices, Harmonization, Intellectual property.

### JEL classification

K 29, L 15, L 59, M 38, O 34.

## 1 Introduction

Modern European integration is inherently linked to the concept of the famous four freedoms of movement and the single internal market. The top internal pro-integration European tandem (Burley, 1993), the European Commission and the Court of Justice of the EU (“CJ EU”), vigorously and eagerly support instruments promoting the appropriate competition on the single internal market. Despite the omnipresent blurred distinction between historical truth and reality (Chirita, 2014), it seems indisputable that the leitmotif of this consistent and often even persistent endeavor is the intimate belief that the appropriate competition encourages businesses to offer consumers goods and services on the best terms, to be more effective and efficient, to engage in the innovation process and to try to reduce prices and increase quality (MacGregor, 2014). European organs and authorities, especially the European Commission, are well aware that healthy competition needs to be protected on both levels, i.e. against abusive monopoly and collusion practices as well as against unfair competition practices. Interestingly, both levels were covered by the original foundation treaties and the seeds of EU unfair competition law were closely related to the prohibition (Chirita, 2014). Currently, EU primary law, the Treaty on EU (“TEU”) and Treaty on the functioning of EU (“TFEU”), and secondary law, cover explicitly both levels and the CJ EU does not miss any opportunity to make the application and enforcement to be effective and efficient.

Over ten years ago, the European Commission detected a significant issue related to the European need to deal with the unfair competition aspect, namely it identified that the laws of EU member states *relating to unfair commercial practices show a marked difference which can generate*

*appreciable distortions of competition and obstacles to the smooth functioning of the internal market... These disparities cause uncertainty as to which national rules apply to unfair commercial practices harming consumers' economic interest and create many barriers affecting business and consumers.* This concern became the foundation of a new European Directive, Unfair Commercial Practices Directive 2005/29/EC (“UCPD”) and was explicitly incorporated in its Preamble. Commercial practices, such as marketing and advertising, play a fundamental role in a market economy (Trzaskowski, 2011b). Thus, the scope of the UCPD covers also misleading commercial practices and so operates along with other Directives, like those dealing specifically with misleading and comparative advertising, labeling, etc., and fully fits in the strategy issued by the European Commission as the Com (2010) 2020 Communication Europe 2020 – A strategy for smart, sustainable, and inclusive growth (“Europe 2020 Strategy”) (European Commission, 2010). Since the UCPD is a full harmonization directive and its transposition period expired in 2007, the EU and EU member states should have in 2016 fully reconciled rules against misleading commercial practices, including those against confusing marketing and other misleading practices abusing intellectual property (“IP”), and their interpretation and application should be smooth and clear-cut. However, a closer scrutiny offers a different picture. The European Commission and CJ EU have consistently demonstrated their adherence to the legal maxim *Fiat justitia et pereat mundus* in the sense that the justice in the form of the integration must be achieved at basically any cost ... perhaps even if the old world should perish. And now, this European integration tandem is struggling, the interaction of the (un)fair competition and IP does not seem to be as easy to be harmonized as it looked *prima facie*. An overview of judgments of the CJ EU and of academic literature from the common law and continental law universe, a pilot field search and a case study suggest that the crusade of the European Commission and CJ EU in the name of the full harmonization of these rules is rather a Calvary Way of Sorrows and e.g. the average-consumer-test is one of the stations of the cross.

## 2 Methods

It cannot be overstated that the *raison d'être* for science is to reach a deeper understanding through the development of theory and theoretical concepts (Schmidt and Hunter, 2014). The inherent exogenous pre-conditions for a valuable academic contribution are dual – to locate appropriate information sources and to explore them while using appropriate methods. The assessment of the level of reconciliation of rules against misleading practices, especially against misleading marketing and other misleading practices abusing IP, requires working with the very wording of these rules as well as with their interpretation by the European Commission and application by the CJ EU. This legal framework and case-law data has to be completed by the primary sources, such as field observation and case studies, and by the secondary sources, such as multidisciplinary literature from both the common law and continental law universe.

The inter-disciplinary nature of the topic mixing economic, legal and IT features and the focus on a myriad of heterogeneous data, predominantly generated by secondary sources, implies that the methodology has to cover both deductive and inductive aspects of critical legal thinking (Matejka, 2013), since legal science is argumentative and not axiomatic (Knapp, 1995). This finding, processing and critical comparative glossing offers a pathway to assessment, or at least an assessment suggestion, provided that such research and argumentation are rational, founded, ethical and both scientifically modest (Knapp, 2003) as well as scientifically courageous and honest (Matejka, 2013). Typically, the quantitative approach and the qualitative approach are distinguished, but there is not a real dichotomy and contradiction between them and their juxtaposing should be overplayed (Silverman, 2013), instead the open-minded and holistic Meta-Analysis should be employed vis-à-vis data generated by primary sources as well as by legislation, official legislation interpretation, case-law, legal science and academic texts. Inasmuch as Meta-Analysis is an analysis of analysis', it is a highly relevant alternative to the glossing of legislation and casual, narrative discussions of research studies (Glass, 1976) and it is the instrument par excellence for a multi- and cross-disciplinary topic able to be

impacted by the legal tradition and family environment. Indeed, methods for synthesizing and integrating sources and data need to be improved and treated with a high respect of surrounding conditions and circumstances, especially in the case of judicature (Schmidt and Hunter, 2014).

The first hypothesis of this article is that, despite the massive EU effort, especially by the European Commission and CJ EU, to reconcile rules against misleading practices via UCPD and related Communications, Guidelines, and even the case law of CJ EU, many discrepancies and differences exist and even newly emerge (H1). The second hypothesis of this article is that these divergences are due, among other reasons, to a different conceptual understanding of unfair competition law, and especially rules dealing with the overlap of (un)fair commercial practices linked to the (ab)use of IP law within the common law and continental law traditions (H2).

### 3 Results and Discussion

UCPD was adopted in 2005 for two principal goals – to increase and protect consumer confidence, and to make it easier for businesses, especially SMEs, to do cross-border transactions and trade. The transposition period for its implementation in the EU member states law expired in 2007. Thus, the UCPD is another piece of the single internal market mosaic of the EU, i.e. the single internal market should not only exist, but as well be a forum for fair business, profitable for honest traders and consumers. UCPD translates this in its official purpose in Art.1 by using the expression “*to contribute to the proper functioning of the internal market and achieve a high level of consumer protection by approximating the laws ... of Member States on unfair commercial practices harming consumers’ economic interests.*” The unfair commercial practices prohibited by UCPD are misleading commercial practices and aggressive commercial practices. This article focuses on the first mentioned, the misleading commercial practices and more concretely on the misleading actions and omission with impact in the IP sphere, which typically fit in the category of confusing marketing, packaging and labelling. Annex I of UCPD, the Report and Communication of the European Commission and case law of the CJ EU attempt to provide a clear and consistent interpretation and application of these provisions. However their deeper study along with the thorough examination of academic literature completed by the field search and observation offers a more colourful picture. Are we going *ad astra per aspera*, to the stars through difficulties, or not? Do not we have *feci quod potui, faciant meliora potentes*, I have done what I could, let those who can do better .... after all, the European integration Odyssey can be puzzling and unpredictable.

#### 3.1 Wording of UCPD on misleading commercial practices involving confusing marketing

UCPD includes in Art. 4 the so called Internal Market clause generating the full harmonization effect and prohibiting EU member states to deviate (EC, 2013b), i.e. no EU member state can adopt stricter rules than in UCPD and this even if such a stricter rule would benefit consumer protection (*C-261/07 and C-299/07 Total Belgium*). UCPD prohibits in Art. 5 unfair commercial practices, which include misleading commercial practices defined in Art. 6 and Art.7. The definition of Art. 6 targets seven categories of misleading actions and the definition of Art. 7 targets misleading omissions. It is important to understand that only one of these seven categories deals with the price, i.e. misleading information about price, and to consider as well others in these categories, namely the second one provided under the letter b). Thus, *A commercial practice shall be regarded as misleading if it contains false information and is therefore untruthful .... likely to deceive the average consumer, even if the information is factually correct in relation to .... b) the main characteristic of the product....fitness for purpose, usage, quantity, specification, geographical or commercial origin ...* The interaction with the IP law is here manifest and is further reinforced by Art.7 proclaiming as a misleading omission any omission of *material information that the average consumer needs*. Annex I of UCPD includes a list of commercial practices which are in all circumstances considered unfair.

The 2<sup>nd</sup> item on this list is *Displaying a trust mark, quality mark or equivalent without having obtained the necessary authorisation* and the 13<sup>th</sup> item on the list is *Promoting a product similar to a product made by a particular manufacturer in such a manner as to deliberately mislead the consumer into believing that the product is made by that same manufacturer when it is not*. Already a *prima facie* study shows that these definitions are pretty open and general. It is correct that UCPD includes a general prohibition under certain conditions and offers a black list of always bad and unfair practices. It is logical that even the black list is not totally casuistic and a certain abstraction is used. Considering the consequences and punishment, it is obvious that UCPD needs interpretation instruments as well as application case law....

### 3.2 Interpretation of UCPD regarding misleading commercial practices, especially confusing marketing, by the European Commission

After a rather longer period, 8 years after its adoption and 6 years after transposition, the European Commission presented on March 14<sup>th</sup> 2013 two important interpretation instruments regarding UCPD. The first one was the Communication from the Commission On the Application of the UCPD (“Communication”) (EC, 2013a), which underlines that the UCPD was adopted *to help consumers benefit from the Internal Market by removing regulatory barriers, deriving from divergent national rules, which discouraged firms from selling and undermined consumers' trust in buying across the EU. The Directive constitutes the main general body of EU legislation regulating misleading advertising and other unfair practices in business-to-consumer transactions. It has a broad scope of application, applying to all business-to-consumer transactions ("B2C") and in all sectors. It applies not only at the advertising or marketing stage of a transaction but also...during and after a commercial transaction in relation to a product. The Directive provides for a high level of consumer protection in all sectors* (EC, 2013a). These strong words are backed up by data showing that the consumer expenditure accounts for 56% of EU GD and that consumers shopping online have 16 times more products from which to choose. Interestingly, only one half of Europeans take advantage of this and the European Commission seems slightly concerned about that, especially in the light of Europe 2020 Strategy. These concerns are promptly undermined by the statement, that the *First experience of the Directive's implementation shows that it has considerably improved consumer protection in and across the Member States, while better protecting legitimate businesses from competitors who do not play by the rules. The benefits of the Directive mainly stem from two of its specific features, namely, its horizontal "safety net" character and its combination of principle-based rules with a "Black List" of specific prohibitions of certain unfair practices* (EC, 2013a). The optimistic and laudatory tenor of the Communication is allegedly backed by evidence and it is illustrative to comparatively present and critically gloss and comment on it. Table 1 gives an overview and indicates that there are big clouds coming in this sunny picture and they are caused exactly by behavior which was supposed to be eliminated by the UCPD. Europeans shop more online and logically are more inclined to consider cross-border trading. At the same time, they become more exposed to unfair competition and the advertising is getting more misleading.

**Table 1.** Title of the table

| Cross border trading in EU by consumers        | 2006 | 2012 |
|------------------------------------------------|------|------|
| Cross border trading in EU                     | 33%  | 52%  |
| Consumers' awareness about info on it          | 24%  | 39%  |
| Consumers' willingness to spend more on it     | 13%  | 18%  |
| Consumers exposed to unsolicited advertisement | 61%  | 69%  |
| Consumers exposed to misleading advertisement  | 42%  | 46%  |

Source: Prepared by Authors based on data indicated by the EC, 2012.

Since the 1<sup>st</sup> interpretation instrument seems to be rather self-absorbed and short on providing practical guidance and instructions, attention should be focused rather on the 2<sup>nd</sup> interpretation instrument, the First Report from the Commission on the application UCPD (“Report”) (EC, 2013b). For the purpose of the Report, a number of questionnaires and surveys were completed and the generated data was presented with comments. Firstly, the Report admits that the transposition of the Directive was not smooth, the majority of EU member states did not meet the 2007 deadline, even several actions by the European Commission were launched before the CJEU and judgments against Spain and Luxembourg issued. Secondly, the Report officially pointed to two other instruments assisting with the interpretation of UCPD launched by the European Commission – the UCPD Guidance and UCPD Legal Database. Thirdly, the Report explicitly deals with certain misleading actions covered by Art. 6 of UCPD and states that *the feedback from the consultation shows that Member States have so far not encountered specific problems in applying Article 6. The most frequently reported practices mentioned by respondents to the consultation involve untruthful information on the main characteristics and/or on the price of the product or service offered for sale in the areas of internet and telecommunication services (e.g. broadband speed), financial services ..., tourism ..., air transport and e-commerce.* Very interestingly, thereafter, the Report becomes very specific about one extremely hot IP law issue – passing off and other misrepresentation techniques parasitizing on IP assets and portfolio. Namely, the Report mentions the *copycat* techniques, especially *copycat packaging*, which means *designing the packaging of a product (or its ‘trade dress’ or ‘get-up’) to give it the general ‘look and feel’ of a competing well-known brand. Copycat packaging is distinct from counterfeiting as normally it does not involve copying trademarks. The problem has affected countries where the remedies against unfair competition appear not to be satisfactory and competitors regard the UCPD as a possible tool for starting legal action. The Commission services have already addressed this issue in the 2009 Guidance document. The Commission will support stronger enforcement action on this matter whenever the practices at issue mislead consumers* (EC, 2014b). Well, since the UCPD does not harmonize enforcement systems and the Guidance has no formal binding status (Trzaskowski, 2011b), the European Commission needs to work with EU member states and they all should engage in a common effort. Since each EU member state has a different national legal regime to fight against misleading commercial practices with a public and private enforcement element, the reconciliation of these rules and of their interpretation seems almost like mission impossible.

At the same time, it would be unwise to underestimate the drive and determination of the European Commission and the updated version of the Guidance shows that e.g. the European Commission knows very well about *copycat* hide-and-seek games of certain European businesses and traders and has a vision about what to do with that, or better to say against that. Art. 2.4.4. of Guidance is crystal clear about confusing marketing. *The Directive prevents traders from providing false information ...Under the Directive, a commercial practice will also be regarded as misleading if it involves any marketing of a product, including comparative advertising, which creates confusion with any products, trademarks, trade names or other distinguishing marks of a competitor and, as a result, distorts the economic behavior of the average consumer. A practice which raises issues of compatibility with the above provisions of Article 6 of the Directive is “copycat packaging”. ...The risk posed by copycat packaging is consumer confusion, and, consequently, the distortion of their commercial behavior. Consumer deception takes a number of forms and each is explained in more detail below: outright confusion, deception over origin and deception over equivalence or quality - again, the consumer recognizes the copycat is different but believes, due to the similar packaging, that the quality is the same or closer to what they would have assumed if the packaging were different* (EC, 2015).

It is beyond the scope of this article to analyze in more depth provisions of UCPD Communication, Report, Guidance and Legal Database about misleading commercial practices. Instead, the already discussed interpretative approach and suggestions of the European Commission regarding misleading



practices, especially misleading marketing in the form of *copycat* abuse should be confronted by the application practice of the CJ EU, i.e. its case law on it.

### 3.3 Application – Case law by CJ EU on misleading commercial practices, especially confusing marketing

The ultimate expert, judge and decision maker about the misleading commercial practices according to the UCPD is the second member of the famous internal European integration tandem, the CJ EU. One decade of the UCPD brought a number of issues and cases litigated up to the last resort and there is a myriad of judgments by the CJ EU about the UCPD as such (see above) and about misleading commercial practices. However, the following overview of these cases perhaps provides more questions than answers and it seems that the case law in this field is not sufficiently established, yet certain application trends can be located.

*C-59/12 BKK v. Zentrale* provides a clear information about the large and broad reach regarding subjects covered by the ban of misleading commercial practices. It states that *it must be held that, for the purpose of applying the Unfair Commercial Practices Directive, the terms ‘business’ and ‘trader’ have an identical meaning and legal significance. Moreover, ‘trader’ is the most frequently used in the provisions of that directive.. .... Directive 2005/29/EC ..., must be interpreted to the effect that a public law body charged with a task of public interest, such as the management of a statutory health insurance fund, falls within the persons covered by the directive.* Hence misleading commercial practices, including confusing marketing and *copycat* techniques are prohibited vis-à-vis basically everybody able to do so or reach such an effect.

*C-421/12 EC v. Belgium* continued this trend and after confirming that the UCPD *has affected a complete harmonisation of the rules concerning unfair commercial practices, the national measures at issue must therefore be assessed solely in the light of the provisions of that directive and not of Article 28 TFEU*, it confirmed the very large and broad pool of subjects. Namely,, *by excluding members of a profession and dentists and physiotherapists from the scope of the Law of 14 July 1991, transposing in national law Directive 2005/29; .... the Kingdom of Belgium has failed to fulfill its obligations under Articles 2(b) and (d), 3 and 4 of Directive 2005/29.* Hence regardless of the public or private law nature, regardless the business type activities, regardless of the dichotomy between trade and businessman, the UCPD needs to applied, indeed!

*C-544/13 and 545/13 Abcur AB* added to the subjective reach as well the mandate of the uniform interpretation across the EU and the direct reference to the teleological approach. The wording used included: *According to the Court’s settled case-law, the need for a uniform application of EU law and the principle of equality requires the terms of a provision of EU law which makes no express reference to the law of the Member States for the purpose of determining its meaning and scope normally to be given an independent and uniform interpretation throughout the European Union; that interpretation must take into account not only its wording but also its context and the objectives pursued by the rules of which it is part.* Even, it added, that the UCPD is characterised by a particularly wide scope *ratione materiae* which extends to any commercial practice directly connected with the promotion, sale or supply of a product to consumers. Even more interestingly, *C-544/13 and 545/13 Abcur AB* passed the Rubicon and made an attempt to address the application of the UCPD in the context of confusing marketing by stating that *a commercial practice is to be regarded as misleading if, in its factual context, taking account of all its features and circumstances and the limitations of the communication medium, it omits material information that the average consumer needs, according to the context, to take an informed transactional decision and thereby causes or is likely to cause the average consumer to take a transactional decision that he would not have taken otherwise. Information requirements established by EU law in relation to commercial communication including advertising or marketing, a non-exhaustive list of which is contained in Annex II, are, in accordance with Article 7(5) of Directive 2005/29, to be regarded as material.*

The unified trend on the super reach of UCPD and drive to apply in an as identical as possible manner across the EU is further visible in the cloth shop case *C-288/10 Wamo* and e-commerce case *C-13/15 Cdiscount SA*, etc. However, we do not have such a solid case law regarding confusing marketing or misleading commercial practices as such. At the same time, there are several cases providing at least a hint about future applications. One of these cases is *C388/15 Nemzeti v. UPC*, which punishes behaviour leading to the confusion of one single consumer, i.e. confusing marketing and other commercial misleading practices are rejected by the CJ EU even if only one single consumer victim exists. The wording of the CJ EU is self-explanatory, i.e. *the communication, by a professional to a consumer, of erroneous information, such as that at issue in the main proceedings, must be classified as a ‘misleading commercial practice’, within the meaning of that directive, even though that information concerned only one single consumer*. Indeed, the CJ EU can hardly be charged by a lack of determination to apply the UCPD against each and every potential trespasser and despite an extremely narrow pool of direct victims and damages impossible to be established.

Recently, the CJ EU finally got a chance to deal with a *copycat* case, or more precisely a quasi-*copycat* cat. In *C-195/14 Bundesverband v. Teekanne* the CJ EU took advantage of the synergy effect of the Directive 2000/13/EC and other directives and opted for a honest and truthful labelling in the largest sense, *precluding the labelling of a foodstuff and methods used for the labelling from giving the impression, by means of the appearance, description or pictorial representation of a particular ingredient, that that ingredient is present, even though it is not in fact present and this is apparent solely from the list of ingredients on the foodstuff’s packaging*.

Well, the will and preferences of the CJ EU are visible, as well as the co-ordinated effort of the European Commission. This may lead to a semi-conclusion that the complete reconciliation of rules against misleading commercial practices, especially confusing marketing is a mere question of a few years. However, the study of this field of law and its perception and application in EU member states, as provided by academic literature as well as survey and field search, provides a dramatically different picture. Perhaps more and more already existing and hidden clouds are appearing. Perhaps, the European integration led from above does not work here that much and a switch to a bottom-up approach should be considered ...

### **3.4 Understanding, interpretation and application in EU member states – a thousand and one perspectives on misleading commercial practices**

Despite massive efforts of the European Commission and the CJ EU and of UCPD and other directives, the understanding, interpretation and application of the law of unfair competition in the EU member states remain far from unified, even harmonized. European academic literature seems hesitant and contradictory even regarding the very fundamentals, i.e. conceptual perceptions and classification of the law of unfair competition. Certain authors are deeply convinced that the law of unfair competition covers all rules about the functioning of the free market as a whole and their purpose is to ensure that both free and fair competition is maintained (Kamperman Sanders, 2013). Other authors strictly distinguish between the antimonopoly/antitrust law and law of unfair competition. This distinction seems natural to many, but not all, continental law experts used to distinguishing between the public law and private law, since traditionally the antimonopoly/antitrust law belongs to the public law and the law of unfair competition belongs to the private law. However, it is even suggested that, for common law lawyers, the unfair competition does not belong to traditional competition policy (Chirita, 2014). Hence, even the continental law and common law dichotomy does not fully explain these conceptual divergences which lead to a rather unsettled EU approach to the unfair competition.

Differences between European experts such as national lawyers and economists regarding the approach to the unfair competition are to a certain extent mirrored by politicians. The negotiation process between EU member states, their representatives and their “EU delegates” and internal

representatives of the EU has always involved a certain degree of political influence and confrontation of cultural differences and preferences and has always led to a fustian compromise. These compromises are results of legal and other reconciliations and they often do not fully match. In other words, many interesting and insightful ideas and propositions regarding EU rules against unfair competition were polished, in order to reach a mutually acceptable compromise, to the extent that their true meaning or *raison d'être* vanished (Chirita, 2014), the result is “*Neither fish nor fowl*”...but it becomes foul, in many instances. Hence even if some legal conceptual understanding existed, the political reasons led to modifications of original drafts and resulted in such a wording of EU legislation, backed up by CJ EU case law, that the original drafters often can hardly interpret it.

The European Commission was, at least partially, aware of these issues and problems and pragmatically attempted to do what it has been always doing, i.e. to find a sustainable compromise supporting the European integration. The resulting UCPD was prepared exactly in this manner and despite the proclaimed best intentions of the EU and EU representatives, immediately received showers of criticism, which continue to rain down until today. These objections target concepts, such as the full harmonization or the average-consumer test, as well as practical details.

Sadly, it seems that UCPD is not only in conflict with national unfair competition attitudes, but even with big EU strategies solemnly proclaimed, such as the Europe 2020 Strategy. For example, the UCPD adopts a tradition of applying an average-consumer-test, which, in the light of the low-cost e-platforms, such as Internet Websites and social media, utilised for viral marketing, is likely to lead to lawful deception of a large amount of European consumers (Trzaskowski, 2011a). This is confirmed by available data, such as the last line in Table 1. As a matter of fact, even regarding other aspects and circumstances of confusing marketing, the average-consumer-test seems to be a heel of Achilles, perhaps one of many heels of Achilles of the UCPD interpretation and application and the CJ EU push for the “*Homo Economicus*” is subject to a massive criticism from outside ... and even partially from inside (Trzaskowski, 2011b). Interestingly, the European Commission appeared first slightly more open minded and even gently inclined to depart from the CJ EU stubborn vision and the CJ EU followed by leaving, especially in the IP law cases, the national court to decide about the existence of consumer misleading, e.g. whether the use of a trademark or its imitation or certain reference to it is misleading or not (Trzaskowski, 2011b), see *C-201/96 Gut Springenheide* or *C-313/94 Elli Graffione*. Even the CJ EU seems to be open to expert's opinions!

In the light of the above mentioned it can be concluded that the first hypothesis about remaining and newly emerging discrepancies and differences in the understanding, interpretation and application of rules against misleading commercial practices is not only clearly confirmed by available statistical data and existing academic literature, but even indirectly admitted by the strongest proponents of the full and complete reconciled harmonization, the European Commission and CJ EU (H1). The statistics as well as the case studies of the average-consumer-test and other confusing marketing issues are self-explanatory. The second hypothesis that these divergences are due, among other reasons, to a different conceptual understanding of unfair competition law, and especially rules dealing with the overlap of (un)fair commercial practices linked to the (ab)use of IP law, so typical for the confusing marketing, within the common law and continental law traditions seems on its way to being confirmed (H2). These differences can be clearly traced to different national understandings and approaches to misleading commercial practices. Surprisingly, the dichotomy between the common law universe and continental universe does not seem to directly lead to these differences. It can be speculated that the impact of this dichotomy is undermined by the eternal EU drive to compromise. An old saying suggests that *A bad settlement is better than a judgement*, but a new wisdom in the context of the EU rules against misleading commercial practices advocates *to cut the Gordian knot*. The equation is extremely simple – one single internal market should follow and enforce one single internal concept and approach to misleading commercial practices, and this concept and approach should not only be a result of a bottom-up approach and many national consultations, but even more importantly it must be coherent and not self-contradictory. The recent

Brexit referendum proves that overlooking the national *vox populi* and underestimating criticism even on the floor of the European Parliament is inherently and generally wrong and indicates that the single internal concept and approach, even with respect to the unfair competition and IP, cannot be just made up by Brussels, and by all means not by Brussels bureaucrats. Great Britain's long history of independency, sovereignty, and democracy, as opposed to almost all other countries in the EU, meant that the British would not long settle for being EU myrmidons.

For years, European politicians, lawyers, economists, sociologists and other experts quarrelled, quarrel and will quarrel about the rules against misleading commercial practices. However, the EU cannot afford to drag itself into it. Jean-Claude Juncker correctly pointed out that the EU is at the intersection, but whether he really picked the right direction is highly questionable, especially considering his past performance, see again the post-Brexit reactions. It is common wisdom that if somebody is at an intersection, then he or she should seriously consider all presented and legitimate concerns, arguments and particularities, make an educated decision, clearly and convincingly explain it, pick one direction and go for it, and not to vainly attempt to reconcile opposite directions while trying to sneak in as the main factor the “integration at any cost” will of Brussels bureaucrats. If the person is not ready to make such an educated decision and/or to resist the “integration at any cost” drive, then perhaps he should not place himself at such an intersection, i.e. the full harmonization of something so far even not partially reconciled looks like a mission impossible and we can ask, one more time regarding the EU integration, *Quo vadis?*

#### 4 Conclusion

The suggestion that, despite the decade of an alleged full harmonization by the UCPD, the state of law regarding misleading commercial practices, especially confusing marketing, has not become much clearer (Trzaskowski, 2011b) appears well founded and even the European Commission and CJ EU reluctantly admit that, at least regarding certain aspects, the story of full harmonization and of reconciled interpretation and application has flaws. Certainly, there are many reasons for such a derisory status and one of these reasons is the different conceptual understanding of unfair competition law. The academic literature, CJ EU case law as well as a mere field observation suggests that these differences are even more obvious if the much more harmonized, if not directly unified, IP law enters in the picture, see copycat cases. The critical perception of EU attempts regarding the copyright and its interaction with commercial practices, such as the Proposal for a Regulation on ensuring the cross-border portability of online content services in the internal market, or the Directive on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online use in the internal market (2014/26/EU), is self-explanatory. Nevertheless, more study and research is needed to bring more light in this arena and to assess the impact of the IP law, the common law v. continental law dichotomy, the eternal EU compromising, etc. If the EU is serious about its Europe 2020 Strategy and proclamations related to UCPD and genuinely wants to reconcile rules against misleading commercial practices, then such studies and research needs to be completed and be thoroughly considered by the European Commission and CJ EU. Consistent *Gone with wind* can mean *Going too fast in the wrong direction*, perhaps leading to further Brexit scenarios, and if the EU wants to have smart, sustainable and inclusive growth and be a world leader, then a strong, responsible, informed and decisive leadership is a must!

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## TRANSITION FROM HYBRID REGIME TO DEMOCRACY AND ECONOMIC PERFORMANCE: CASE STUDIES OF CROATIA AND SERBIA

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### Abstract

The main aim of the paper is to explore whether the transition from hybrid regime to democracy is associated with higher economic performance in the context of post-socialist area. The paper is focused on two Balkan countries, namely Croatia and Serbia, which executed the change of the political regime at the turn of the 21st century. Recently developed Synthetic Control Method is used as the basic instrument, since this method enables comparison of real and counterfactual (synthetic) economic performance during the periods before (1991 to 1999/2000) and after (2000/2001 to 2014) the change of regime. Similar countries are necessary for computing of counterfactual values, therefore the paper uses countries classified as hybrid regimes for most of the observed period according to several independent sources. The findings indicate Croatian transition to democracy, which happened after the fall of the Tudjman regime, led to higher economic performance, whereas in the case of Serbia, the transition has not been successful.

### Keywords

Synthetic control method, democratic transition, economic performance, Croatia, Serbia.

### JEL classification

E02, O43, O57, P16

## 1 Introduction

Samuel Huntington used term “Third Way Democracy” for the period between mid-1970s and the end of 1990s in which democratization process was underway all around the world (Latin America, South-east Asia, European post-socialist area). In the European post-socialist area the process led to establishing of liberal democracies (the Visegrad group, Baltic States, Slovenia) on one hand and hybrid (most Balkan states and part of the post-soviet republics) and authoritarian (Azerbaijan, Belarus, Kazakhstan, Russia, Turkmenistan and Uzbekistan) regimes on the other hand. The hybrid regimes are the main topic of the conference contributions.

The paper defines hybrid regimes as “*nondemocratic and non-authoritarian regimes*” (e.g., Gilbert and Mohseni, 2011) or in the case of post-socialist hybrid regimes finds them in countries which “*are caught in grey zone between democracy and autocracy*” (Linde and Ekman, 2010). The theme of hybrid regimes has come up in empirical literature since the 1970s, but the main expansion has been arriving since 1990s. Colier and Levitsky (1997) summarised previous research and offered possibilities for development of the topic. For newer pivotal contributions, using their own approaches, one can consider Carothers (2002), Levitsky and Way (2002), Merkel (2004), Schedler (2002). The approaches were applied by Diamond (2002), Gilbert and Mohseni (2011), Linde and Ekman (2010) and Morlino (2009). Carothers (2002) calls hybrid regimes as “*Regimes in gray zone*” which means there is limited political space for opposition parties and for independent civil society, lack of political participation and very low levels of public confidence in state institutions, but on the other hand there are regular elections and “democratic” constitutions. Merkel (2004) offers similar view. Liberal (embedded) democracy includes five characteristics: democratic elections, participation in political rights, civil rights, horizontal accountability and the effective governmental power of the elected representatives. If at least one is not fulfilled, Merkel uses the term “*Defective democracy*” in which one can distinguish four types: the “*Exclusive, Enclave, Illiberal and Delegative democracy*”. According to Schedler (2002) in hybrid regimes law does not rule but if elections are held, he speaks of the “*Electoral democracy*” (there is “minimalist conception of democracy”) and “*Electoral*

*authoritarianism*” (there is not even “minimalist conception of democracy). The term “*Electoral authoritarianism*” was criticized as a different expression for authoritarian regime. For that reason, Levitsky and Way (2002) replaces the term with “*Competitive authoritarianism*”. For “*Competitive authoritarianism*” one can also use the word “*pseudo-democracy*”, because it is neither democracy (the minimal concept of democracy is not fulfilled) nor autocracy (the political opposition can participate in elections and in legislative process to a limited extent, there is partial judicial independence and free media can exist).

The hybrid regimes are characterized by long-term system instability which lead to transition to liberal democracy (mid-1990s Bulgaria and Romania, at the turn of the 21st century Croatia and Serbia<sup>1</sup>) or to autocracy (mid-1990s Belarus, after 2000 Russia). Simultaneously there are countries (Albania, Armenia, Georgia, Kyrgyzstan, Moldova and Ukraine) in which revolutions or significant changes in government structure did not lead to changeover of hybrid regime. The paper is one of several intended case studies which will be focused on economic consequences of occurrence of hybrid regime in the context of post-socialist area. In the paper, Croatia is selected as the successful case of the transition from hybrid regime (Tudjman’s era between 1990/1991 to 1999) to liberal democracy (2000 to 2014) and EU membership (2013). In Serbia the transition to liberal democracy happened, but compared to Croatia the process was much slower and furthermore the economic transformation has fallen behind political changes.

After declaration of Croatian independence in 1992, the civil war ensued for three years. During the civil war, Franjo Tudjman consolidated political power and was ruling until his death in December 1999. His style of reign (as mentioned in e.g. Hloušek a Kopeček, 2003; Hloušek, 2008; Týfa, 2008) was associated with populism, social demagoguery, clientelism, corruption and international isolation, which are the typical attributes for most of hybrid or authoritarian regimes. If we look at the aforementioned political science approaches, the Tudjman’s Croatia was evaluated as “*competitive authoritarianism*” (Levitsky and Way, 2002), “*illiberal democracy*” (Vejvoda, 2000; Merkel, 2004) and “*illiberal hybrid regime*” (Gilbert and Mohseni, 2011). Týfa (2008) applied the approach of Levitsky and Way (2002) and summarized the main characteristics of Tudjman’s regime. There are “free and unfair elections” (political pluralism on the one hand and electoral fraud and underrepresented ethnic minorities in parliament on the other hand, limited access of political opposition to media, using nationalism as quasi-ideology, unrestrained leadership and relatively high level of mobilization in society).

Slobodan Milošević came to power in Serbia in 1986. Owing to participation in “anti-bureaucratic revolution” and using direct contact with the masses he strengthened the position and was ruling until the “Bulldozer revolution” in October 2000. Milošević died in Hague during trial at ICTY (International Criminal Tribunal for the former Yugoslavia). For more detailed description of the Milošević’s era, see Balík a Stojarová (2005), Cabada (2008) and Pavlović (2004). The evaluation of the Milošević regime is more complicated, since the regime had many attributes in common with authoritarian regimes (e.g., features of sultanism). Despite that most authors describe the regime as hybrid, namely “*competitive authoritarianism*” (Levitsky and Way, 2002; Pavlović, 2004), “*illiberal hybrid regime*” (Gilbert and Mohseni, 2011), “*competitive mobilisation authoritarian regime*” (Balík and Stojarová, 2005) and “*illiberal democracy*” (Zakaria, 1997). In comparison with Tudjman regime, the individual characteristics are very similar, but there are a few differences, e.g. quasi ideology (Croatia) versus reformed democratic socialism and ethno-nationalism (Serbia) and also Milošević had higher influence on industry, justice or politics than Tudjman. For more details, compare Týfa (2008) with Balík and Stojarová (2005). The two paragraphs outline evaluations of the Tudjman’s Croatia and the Milošević’s Serbia from perspectives of political science. Political and economic development after the fall of the Tudjman and Milošević regime is described in the chapter “Results”.

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<sup>1</sup> In the paper the term Serbia is employed for the whole period (1991 to 2014), but contemporary Serbian state was officially called the Federal Republic of Yugoslavia (1992 to 2003) and the State Union of Serbia and Montenegro (2003 to 2006).

As the basic instrument, the Synthetic Control Method (SCM) is used. SCM was developed by Abadie and Gardeazabal (2003) and subsequently was expanded by Abadie et al. (2010; 2015). The method is relatively new and has been using more frequently in case studies, since it enables the identification of the causal impact of certain significant events or interventions on some outputs. From perspective of the political/institutional economy one can consider the other main contributions: Fowler (2013), Gong and Rao (2014), Grier and Maynard (2016), Montalvo (2011) and Nannicini and Ricciuti (2010).<sup>2</sup>

As for motivation to write the paper, there are two pivotal contributions using the SCM, Grier and Maynard (2016) and Nannicini and Ricciuti (2010). Grier and Maynard (2016) investigate the hypothesis of how Venezuela would likely operate if Hugo Chavez had not been elected to the Venezuelan Presidency in 1998. Their findings indicate that Chavez's leadership harmed the economic performance and concurrently the reduced infant mortality and poverty and rising life expectancy cannot be unequivocally attributed to his governance. Nannicini and Ricciuti (2010) dealt with economic consequences of abandoning democracy in 14 countries between 1967 and 1994 and identified that autocratic transition had positive (South Korea, Panama, and Uruguay), negative (Chile, Peru, Uganda, Nigeria in 1984, and Gambia), and insignificant (Greece, Philippines, Pakistan, Nigeria in 1966, Sierra Leone, and Lesotho) effect on economic growth. In consideration of the papers, one can see the analogy with analysing of the impact of the Tadjman and the Milošević regime on economic performance. Unfortunately, the analysis is not possible, because the SCM requires data before the observed period which are not available. For the reason, the main scope is aimed at democratic transition from hybrid regime in Croatia and Serbia at the turn of the 21st century, which means the comparison of economic performance before and after the regime change.

The main aim of the paper is to explore whether democratic transition leads to higher economic performance in the context of European post-socialist countries. The methods of the Control Synthetic Method, used proxies and a sample of the observed countries are described in Methods. Results and discussion includes trend and gap analyses within the CSM. Conclusions summarize the major findings.

## 2 Methods

Before using the SCM, three steps are necessary: to select suitable a time period with intervention (event) year, to choose a sample of countries and to compile proxies for prediction. The paper is focused on the period between 1991 and 2014. The period is divided into two parts, the Tadjman's and the Milošević's era (1991–1999/2000)<sup>3</sup> and the period of liberal democracy (2000/2001 – 2014). For intervention years, one can consider 1999, when Franjo Tadjman died (Croatia), and 2000, when the “Bulldozer revolution” happened (Serbia).

The selected countries are used for computation of synthetic Croatia and Serbia. The computation has a precondition that the chosen economies have similar economic and institutional attitudes and subsequently the intervention (transition from hybrid regime to democracy) did not happen during the observed period. As was said, the unequivocal definition of hybrid regime does not exist, therefore the paper uses three empirical articles (Gilbert and Mohseni, 2011; Linde and Ekman, 2010; Morlino,

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<sup>2</sup> The papers describe: the effects of compulsory voting on voter turnout (Fowler, 2013), the effect of persisting political instability on economic growth in the long term in Fiji (Gong and Rao, 2014), the influence of terrorist attacks on elections (Montalvo, 2011) and on economic level of Basque country (Abadie and Gardeazabal, 2003), the economic consequences of tobacco control program implementation in California (Abadie et al. 2010) and the impact of German reunification on West German economy (Abadie et al. 2015).

<sup>3</sup> In general, the first free elections in 1990 are reckoned as beginning of Tadjman's reign. In consideration of availability of data, the paper deals with the period after 1991. The analogous method is picket for Serbia. The development is also monitored since 1991, although Milosevic's era began by him being elected as Secretary of the League of Communists of Serbia in 1986.



2009) and two indexes (Freedom in World of Freedom House<sup>4</sup>; Polity IV project of Marshall et al., 2014<sup>5</sup>) for determination on a sample of countries. Out of the two concepts, the empirical literature prefers Freedom in World, see Linde and Ekman (2011). One can consider as hybrid regimes the states which were classified as hybrid regimes in at least four out of five aforementioned sources for the most of the observed period. The selected sample of countries comprises 18 economies all over the world: Albania, Armenia, Bosnia and Herzegovina, Colombia, Gabon, Georgia, Guatemala, Jordan, Kyrgyzstan, Macedonia, Malaysia, Moldova, Morocco, Russia, Singapore, Sri Lanka, Turkey and Ukraine.<sup>6</sup> The paper does not use only post-socialist countries, because in the case of Croatia there is not sufficient amount of convenient economies with hybrid regime and concurrently with similar to economic level.

In third step, the proxies for prediction are selected, see below table 1. As the dependant variable, GDP per capita (constant prices 2011, international dollar, PPP), is employed. As predictors the standard indicators determining economic performance in regression or SCM are used, see Gong and Rao (2014), Grier and Maynard (2016), Montalvo (2011) and Nannicini and Ricciuti (2010). There are input factors: labour (Population), physical (Gross fixed capital formation) and human (Gross enrolment secondary and tertiary ratio) capital, and the individual characteristics of economy, integration into international trade (trade to GDP), economic structure (Agriculture, Industry and Services added value to GDP), demographic structure (Urban population) and attraction for foreign investors (net inflows of FDI to GDP).

**Table 1.** List of variables

| Variable                                     | Unit             | Source           |
|----------------------------------------------|------------------|------------------|
| GDP per capita, PPP, constant 2011           | international \$ |                  |
| Population                                   | total            |                  |
| Gross fixed capital formation                | % of GDP         |                  |
| Gross enrolment ratio, secondary, both sexes | %                |                  |
| Gross enrolment ratio, tertiary, both sexes  | %                | World Bank Group |
| Agriculture, value added                     | % of GDP         |                  |
| Industry, value added                        | % of GDP         |                  |
| Service, value added                         | % of GDP         |                  |
| Urban population                             | % of total       |                  |
| FDI, net inflows                             | % of GDP         |                  |

Source: Author

Given the sample of countries and predictors, one can compute “synthetic Croatia/Serbia” using formula which is based on weighted mean (Gong and Rao, 2014):

$$Y_1^* = Y_0 W^* \quad (1)$$

<sup>4</sup> Freedom in the World comprises two parts, Political Rights (10 indicators) and Civil Liberties (15 indicators). The range is from 1 (the best level) to 7 (the worst level). The resulting score is an arithmetic mean that divides countries into three groups, Free (1 to 3), Partly Free (3.5 to 5) and Not Free (5.5 to 7). One can consider “Partly Free” to hybrid regimes.

<sup>5</sup> The proxy combines two indicators, the Institutionalised Democracy (DEMOC) and the Institutionalised Autocracy (AUTOC). The value is computed by subtracting the AUTOC score from the DEMOC score. The concept divides countries into six groups, Full Democracy (10), Democracy (6 to 9), Open Anocracy (1 to 5), Close Anocracy (-5 to 0), Autocracy (-10 to -6) and Failed States (without value). One can consider “Open and Close Anocracy” to hybrid regimes.

<sup>6</sup> This was formed by three additional criteria: the economic level (Middle and High income countries according to the World Bank), the population of at least five hundred thousand and the availability of data.

$$W^* = \arg \min_w \{(X_1 - X_0 W)' V (X_1 - X_0 W)\} \quad (2)$$

where  $Y_1^*$  is real GDP per capita for Croatia/Serbia during the period,  $Y_0$  is the matrix of variables for countries in donor pool,  $W^*$  represents the weight of the individual countries in synthetic Croatia/Serbia,  $X_1$  represents the characteristics determining economic performance of Croatia/Serbia during the Tudjman/Milošević regime,  $X_0$  is the matrix of variables for countries in donor pool and  $V$  is a symmetric positive semi-definite matrix, the nonnegative elements of which reflect the relative importance of those characteristics. In more details, Abadie and Gardeazabal (2003) and Abadie et al. (2010; 2015).

### 3 Results and discussion

Computation of weight of the individual economies is the first step. For both countries five comparing states has been selected, Guatemala, Jordan, Macedonia, Russia and Singapore in case of Croatia and Armenia, Colombia, Guatemala, Kyrgyzstan and Russia for Serbia. The selections are based on two preconditions: the similarity of given characteristic and the observed economy (in general unit) among chosen countries (units) according to economic level (in general the basic criterion). Croatia has average GDP per capita about sixteen thousand international dollars (PPP, constant 2011), whereas Russia (17,000) and Singapore (56,000) on the one hand and Macedonia (9,500), Jordan (9,000) and Guatemala (6,500) on the other hand. The lack of suitable countries for comparison to Croatia is the main limitation of the paper. The selected states are more convenient for Serbia (average GDP per capita about 10,000), since there are not such big differences between the chosen economies, Russia (17,000), Colombia (9,500), Guatemala (6,500), Armenia (4,500) and Kyrgyzstan (2,500). The synthetic Croatia is a weighted mean, where Guatemala (70%), Singapore (16%) and Macedonia (10%) have the main significance. In case of Serbia, there are Russia (41%), Guatemala (34%) and Armenia (24%).

**Table 2.** Weights for each control country in the donor pool

| Croatia           |         | Serbia            |         |
|-------------------|---------|-------------------|---------|
| Control countries | Weights | Control countries | Weights |
| Guatemala         | 0.703   | Armenia           | 0.245   |
| Jordan            | 0.019   | Colombia          | 0.001   |
| Macedonia         | 0.101   | Guatemala         | 0.343   |
| Russia            | 0.018   | Kyrgyzstan        | 0.001   |
| Singapore         | 0.159   | Russia            | 0.41    |

Source: Author

The following graph shows development of real Croatian/Serbian economy (continuous line) and synthetic (counterfactual) Croatia/Serbia (dashed line), if the fall of the both regimes did not happen. The vertical line highlights the intervention year, 1999 (Croatia) and 2000 (Serbia). If we focus on real development, then one can see decline in economic level during war conflicts (civil wars between 1992 and 1995, Kosovo War in 1998/1999). After the fall of the Tudjman and the Milošević regimes, both countries achieved significantly higher economic performance, but for real interpretation, comparison with synthetic values is more important. The Croatian economy has been achieving better results than synthetic Croatia, which means the transition to liberal democracy lead to higher performance of Croatian economy. On the other hand, Serbian economy has been lagging behind the synthetic values, which confirms that the democratic transition did not cause Serbia to achieve significantly higher performance, given that the slower reforms and transformation processes had not

been finished yet. Moreover, Croatia had better preconditions, because some of the reforms had been already instituted under Tudjman’s reign. The findings are demonstrated using several examples. The Croatian economy returned to the level before the breakup of Yugoslavia in 1996/1997 whereas Serbia did in 2007/2008 (World Bank Group). If we look at economic transformation (EBRD), significant progress in large scale transformation happened in mid-1990s (Croatia) and in 2005 (Serbia). Similarly, functional regulations in the area of competition policy were implemented in mid-1990s (Croatia) and in 2007 (Serbia). In general, Croatia is considered a market economy, whilst Serbia has still remained a transitional economy (Mádr and Kouba, 2016).

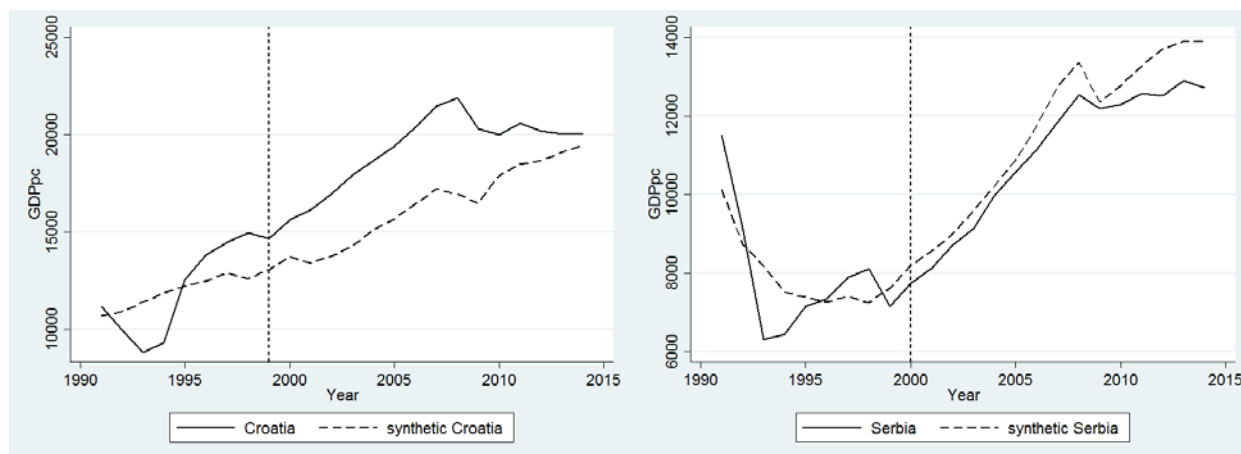


**Fig. 1.** Per capita GDP trends, Croatia vs. Synthetic Croatia and Serbia vs. Synthetic Serbia (Source: World Bank Group)

The previous results are supplemented by gap analysis which enables the economic consequences of the democratic transition to be quantified. The gap analysis is based on the evaluation of differences between real Croatia/Serbia and the synthetic Croatia/Serbia. Particularly the conflicts in the former Yugoslavia led to a significant slump of about two thousand dollars per capita against the synthetic performance. Subsequent renewal was underway till the end of the Tudjman and the Milošević era. After the fall of the regimes one can see the difference in developments of Croatia and Serbia. Well both countries grew but in case of Croatia there is a positive trend in rising gap against synthetic Croatia until the recent global crisis, whereas Serbian real output has been undervalued in relation to counterfactual performance for the entire period. If we compare the pre- and post-regime period, the Tudjman’s Croatia did better by about 170 dollars per capita than synthetic Croatia, whereas Croatia as a liberal democracy has been doing better by about 2800 dollars per capita on average. To sum up, democratic transition from hybrid regime has had significant positive effect on economic performance which has been manifesting in classification of Croatia as a High income country. In Serbia the situation is different. It has been lagging behind the synthetic performance in spite of a nearly 4% economic growth in the 2000–2014 period and still has been roaming in Upper middle income countries. It is true that the current Serbian economy has had higher output, but the transition has not been successful. For the pivotal factors of the Serbian failure compared with Croatia, one can consider the political instability (the assassination of premier Zoran Djindjic in 2003, persisting long-term minority governments, the frequency of parliamentary elections, a strong influence of Serbian Radical Party), slow reforms in the whole area, ambiguous attitude to integration into European union, larger share of corruption and nepotism and worse level of rule of law and property rights. For more details, see Mádr and Kouba (2013).

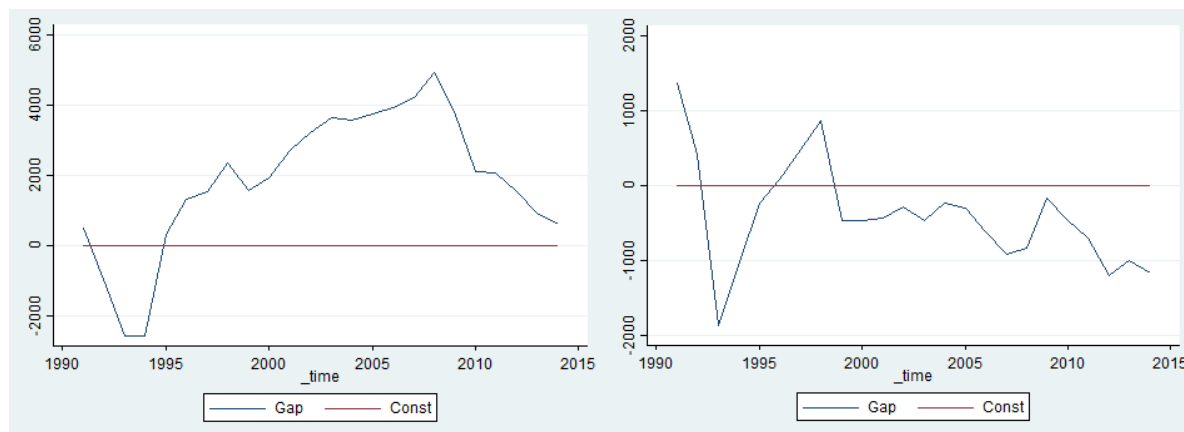


**Fig. 2.** Per capita GDP gap, Croatia vs. Synthetic Croatia and Serbia vs. Synthetic Serbia (Source: World Bank Group)

#### 4 Conclusion

The paper is aimed at countries which were evaluated as hybrid regimes from the perspective of political science. The conference contribution tries to answer the question what there are the economic consequences of existence of such a political arrangement and the potential of its transition to either a liberal democracy or an autocracy. The paper has the form of a case study, in which two Balkan states are compared, namely Croatia and Serbia. Both countries underwent war conflicts, international isolation and occurrence of hybrid regimes in the 1990s and subsequent transition to a liberal democracy at the beginning of the 21<sup>st</sup> century. As the basic instrument, the recently developed Synthetic Control Method (SCM) is employed. The method is based on comparison of real economic performance with synthetic (counterfactual) outputs. The synthetic values are a weighted mean of the selected economies in which the intervention (event) did not happen. Owing to the lack of suitable post-socialist countries for computation of the synthetic Croatia, the sample of countries includes 18 states with hybrid regime around the world. As predictors of economic performance, the standard economic proxies are used. The findings indicate that in case of Croatia the transition to liberal democracy led to a significantly higher economic output, not only relative to Tudjman's era (GDP per capita 19,000 international dollars to 12,000), but also against the synthetic output (in average 2,800 dollars higher economic level). On the contrary in case of Serbia, the transition has not been unequivocally successful: on one hand we can consider Serbia to be a liberal democracy, but on the other hand the economic transformation is still in progress. The failure of Serbia in contrast to Croatia is attributed to worse initial preconditions (during Tudjman's reign some reforms were executed, Milošević had higher negative impact on Serbian economy and society, state of cronyism and nepotism was worse in Serbia) and by negative asymptotes which were persisting almost the whole observed period, e.g., political instability (assassination of premier Zoran Djindjic in 2003, long-term persisting minority governments, frequency of parliamentary elections, strong influence of Serbian Radical Party), slow reforms in all area, ambiguous attitude to integration into European union, larger share of corruption and nepotism and worse level of rule of law and property rights.

The paper is author's first contribution on the theme which will be expanded in other case studies of hybrid regimes (Albania, Armenia, Bosnia and Herzegovina, Georgia, Kyrgyzstan, Macedonia, Moldova, Russia and Ukraine) and their transition in consequences of the Colour revolutions (the Rose revolution in Georgia, the Orange revolution in Ukraine, the Tulip revolution in Kyrgyzstan, the Grape revolution in Moldova).

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## THE INFLUENCE OF TAX FAIRNESS ON TAX EVASION IN DEVELOPED COUNTRIES

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### Abstract

Tax avoidance and evasion have been widely discussed among economists and politicians in the Czech Republic in recent years. The debate has resulted in introduction of Electronic Evidence of Sales, effective since 2016. However, the tax evasion may be decreased also by other, and probably more effective tools. The aim of this paper is to determine how tax fairness manifests itself in the society of developed countries. The basic hypothesis of this study argues that if the tax burden is relatively high and perceived as unfair by the society, it will cause a higher rate of tax evasion, and vice versa. The hypothesis is confirmed on the basis of a dynamic panel data analysis for OECD countries in 2003-2012. We conclude that national governments should try to increase the fairness, even while preserving higher rate of taxation, which means that they should try to change the perception of taxation by the public, e.g. by explaining them why the system is set in a way it is, but also should they try to remove the elements of tax system that are not in accordance with the fairness principle applied.

### Keywords

Tax Fairness, Tax Avoidance, Tax Evasion, Shadow Economy.

### JEL classification

H21, H26, H30

## 1 Introduction

The primary purpose of the existence of the taxation is to provide sufficient revenue for the state budget, from which it would be possible to finance the provision of public goods to the population. Taxation is also a tool that can be used to support socially desirable level of equality based on the principles of solidarity and fairness. The tax system should preferably be set so as to minimize the administrative costs of taxation and so that taxpayers are not motivated to tax avoidance or even illegal tax evasion. Thus, it is essential that the tax burden in a society is not perceived as excessive, unfair, or disproportionate quantity and quality of services provided by the state.

The Czech Republic is a member of many international organizations, which include the Organization for Economic Co-operation and Development (OECD) that gathers the most advanced countries in the world. This organization has a transnational character and is endowed with no competences from its members. Yet it is quite successful in application of one of the oldest of its policies, namely tax policy, through the issuance of expert reports, recommendations and studies in this area. The aim of the OECD tax policy is mainly setting the tax systems of member countries so as to promote consumption, investment and other activities of taxpayers that support economic growth and thus also growth of living standards and welfare of the whole society in member countries. One of the instruments which should lead to the achievement of that objective, according to the OECD, is reducing the tax burden, mainly through direct taxes which have the most significant effect on the behavior of taxpayers. However, the tax burden does not mean only the taxation rate, but also other important aspects that create one's perception of the taxation. If it is perceived as unfair, it is much more likely to cause the changes in the behavior of economic agents. Thus tax fairness is indisputably a topic for economic research.

Tax avoidance and evasion have been widely discussed among economists and politicians in the Czech Republic in recent years. The debate has resulted in introduction of Electronic Evidence of

Sales, effective since 2016. On one hand, there is a very good experience from other similar countries, on the other hand, it brings additional costs that may have devastating effects on SMEs, especially in case of bad internet coverage of their workshops.

In our previous papers, we have shown how tax certainty is important for the perception of tax burden. In this paper, we want to show that no repressive measures could be needed in case of people's perception of taxation as fair. Thus the aim of this paper is to determine how tax fairness manifests itself in the society of developed countries. The basic hypothesis of this study is based on the above and argues that if the tax burden is relatively high and perceived as unfair by the society, it will cause a higher rate of tax evasion, and vice versa. At first, literature overview is presented, followed by the explanation of tax fairness measurement. Then the methodology and data for further analysis are described. The paper continues with the estimation of the influence of tax fairness on tax evasion, and is completed by the conclusion and suggestions for tax policy in developed countries, which also includes the Czech Republic.

## **2 Tax fairness in the literature**

Tax fairness is, together with efficiency, revenue and adequacy, among the basic tax principles, which should form the basis of a good tax system, ever since the school of classical political economy. This should be complemented by fiscal neutrality, which is understood in terms of non-distortionary stimulus from the tax system. Also, Smith's tax cannons have kept general validity (Smith, 1958). In accordance with the current approach, it is possible to accept tax principles outlined in the study entitled Institute on Taxation and Economic Policy (ITEP, 2011), or also in Romano (2002), Morse and Williams (2012), or Brokelind (2014). In addition to the above principles, this involves an emphasis on the principle of a simple tax system in terms of the number of tax exemptions, or the principle of transferability of the tax burden on the residents of other states who use public goods.

The concept of fairness as such is a very debated and ambiguous issue, which is subject to many controversies in both the historical and the contemporary context. The key studies to be mentioned in this context include e.g. Gaisbauer et al. (2015), which deals with the philosophical concept of taxation. It primarily focuses on the fairness of the very existence of taxation. However, it also deals with a fair tax system design and fairness in the case of individual types of taxes. It deals with property taxes, excise taxes and income taxes and examines whether and for what reasons some of these taxes should be preferred. The categorization consisting in two basic approaches (see e.g. Van Herwaarden and Dekam, 1983 on the one hand, and Beck, 1983 on the other) can be regarded as established. The first one is the benefit principle, which can be rather seen as liberal and not extensively applied, particularly in Europe. The second is the ability-to-pay principle, which is more common and more acceptable, especially for left-wing governments.

Fair taxes can be regarded as those which are based on the benefit principle in terms of the utility from the consumption of public goods. This principle of tax fairness is based on an assumption that a situation can be regarded as fair if, for a given agent, a higher consumption of public goods is subject to higher taxation. It is mainly critical to determine the share of consumption of public goods in terms of the characteristics of features such as non-excludability and indivisibility and the related free-rider problem (see e.g. Carpenter, 2007). It is also quite difficult to determine whether there is a higher consumption of public goods among high-income groups, also with regard to ensuring some, primarily public, goods in the form of private goods (see e.g. Cherchye, De Rock and Platino, 2013). The benefit principle is closely linked to the concept of social welfare and utility. Kaplow (1995) deals with the utilitarian approach to taxation and maintains that tax systems are mostly built on anti-utilitarianism, which is justified by the fact that utilitarian approach is not sufficiently egalitarian and can disrupt horizontal equity. Kaplow notes, however, that this justification is totally incorrect, at least in the case of economic policy authorities, who believe in the Pareto principle, the observance of which is contrary to all rules ensuring tax fairness.



The other concept of fairness is based on the idea that a tax system can be considered fair if it is based on the ability-to-pay principle and it is fair if the level of taxation for individual actors is determined by their ability to pay. According to this principle, the basic criterion of tax fairness is that each citizen should have equal opportunities to achieve self-realization, i.e. to maximize their potential (Repetti, 2008). It is also essential that everyone have equal access to democracy, i.e. to voting. If the tax system is designed so that it will respect these two criteria, then it will lead not only to fairness, but also to greater efficiency. These principles are then better reflected by a tax system based on progressive revenue taxes rather than a system based on excise taxes. Sugin (2010) criticized, to some extent, the ability-to-pay principle, primarily because he believes that fairness and the related equal opportunities can also be achieved by operation of institutions other than tax institutions and believes that the necessity to apply the ability-to-pay principle is determined by the wealth of society and its degree of inequality.

In addition to the above categorization, it is very important to mention other determinants of tax fairness. The perception of tax fairness appears to be the key factor. As well as in other areas, such as the perception of corruption or tax uncertainty, it seems important to relativize the actual tax fairness and its perception. Cornelissen, Himmler and Koenig (2013) provide an overview of literature showing that when people are aware of unfairness or the violation of any rules, it has a direct effect on their behavior in the area where the unfairness occurs. In the area of taxation, entities restrict activities where they feel lack of tax fairness, and increase optimization or tax evasion. The authors' own research then demonstrates how unfairness in the taxation of labor significantly reduces work effort. A fairer tax system in this sense could then have a positive impact on tax efficiency.

Similar studies examining the perception of tax fairness typically use different questionnaire surveys to obtain primary data, which are further processed using simple statistical methods. These studies include e.g. Wenzel (2002), Liebig and Mau (2005), Rawlings (2003), or Eichfelder and Kegels (2014), to name a more recent study.

Koenig and Wagener (2013) postulate that if labor is taxed more than capital, it leads to people feeling that it is unfair, which undermines the usually applied principle that capital should not be taxed at least in small open economies. If this perception of unfairness is high, it leads to higher capital taxes, lower labor taxes and lower endogenous government spending. Cuccia and Carnes (2001) describe the effects of the complexity of the tax system and the perception of tax fairness. A tax measure is perceived as unfair if it is complex in comparison with another measure which is not complex and still brings certain advantages to someone.

Tax system efficiency can, in a broader sense, be seen as a comprehensive term encompassing primarily economic impacts of individual taxes. In particular, efficient taxes are those that are neutral and do not lead to distortionary or substitution effect, excessive tax burden or other significant direct or indirect administrative costs. The issue of taxation costs is discussed e.g. by Cornelissen, Himmler and Koenig (2013), or Ulph (2014). The aforementioned will then be reflected in the adequacy of taxes and sufficient tax revenue. From an economic perspective, efficient taxes then do not interfere with the performance of the economy, economic growth and living standards. In the context of the social contract theory, the need to collect taxes is not at the expense of reduced efficiency and living standards.

### **3 Tax fairness measurement**

Possibilities of tax fairness measurement are described in detail in Kotlán and Machová (2015). According to that study, the approximation of tax fairness based on the ability-to-pay principle should use an indicator, which is calculated as the absolute value of the percentage decline in the Gini coefficient through taxation, which best reflects the progressivity of the tax system in the case of households:

$$APP_{it} = \left| \frac{G_{it} - G_{it-1}}{G_{it}} 100 \right|, \quad (1)$$

where  $APP_{it}$  is tax fairness according to ability-to-pay principle in country  $i$ , time  $t$ , and  $G$  is the Gini coefficient. Therefore the higher the indicator, the more household incomes are redistributed through taxes, i.e. the more the ability-to-pay principle is applied and the fairer taxation is from this perspective.

The approximation of the benefit principle then uses the indicator of the ratio of corporate tax rate to collective service spending:

$$BP_{it} = \frac{CTQ_{it}}{\sum_j CS_{itj}}, \quad (2)$$

where  $BP_{it}$  is tax fairness according to benefit principle in country  $i$ , time  $t$ ,  $CS_{itj}$  is an amount of certain type  $j$  of government spending on collective services, and  $CTQ_{it}$  is corporate tax quota. Again, the higher the ratio, the more the benefit principle is applied and the fairer the tax system is in this regard.

#### 4 Methodology and data

As already stated within the Introduction, the basic hypothesis of this paper argues that if the tax burden is relatively high and perceived as unfair by the society, it will cause a higher rate of tax evasion. To confirm, or disprove the hypothesis, Generalised Method of Moments (GMM) was used to estimate dynamic panel data models, where the extent of tax evasion ( $TE$ ) was dependent variable, and tax fairness ( $TF$ ) and tax rate ( $TQ$ ) were independent variables. Concretely, Arellano-Bond estimator was applied (see Arellano and Bond, 1991). As instruments, lagged values of dependent variable were used. The validity of the instruments was tested using the standard Sargan test at the 5% significance level (as indicated by J-statistic). Prospective stochastic instability proved by Im, Pesaran and Shin (2003) stationarity test was eliminated using the first differences of the variables where the stationarity was already proved. Using a robust estimator in calculating the covariance matrices ensured that the results of standard deviations of parameters and hypothesis tests were correct with regard to a possible occurrence of autocorrelation and heteroscedasticity.

Tax evasion was standardly approximated by the extent of shadow economy according to Schneider and Buehn (2012), or Schneider (2014) who use a multicriteria indicator covering cash demand, number of working hours, GDP, and other factors. The Schneider-Buehn indicator is the most recognized nowadays. The authors also point out that the extent of shadow economy is a consequence of taxation, and thus it is suitable as a tax evasion proxy.

Tax rate was alternatively approximated by common tax quota, i.e. tax-to-GDP ratio, and statutory tax rates. Tax fairness was alternatively approximated by the measure for APP and BP according to Kotlán and Machová (2015).

All the data was taken from the databases of OECD, the World Bank, and cited papers.

In the analysis, four different models were estimated, using various alternatives of the proxies.

#### 5 Results

The results of the analysis are presented in the tables below. In all cases, lagged value of tax evasion was included. The results show positive (in mathematic sense) influence, meaning that there is an inertia of tax evasion. Concerning the tax fairness, in all models, if the tax system is fairer, the tax evasion declines, regardless the tax fairness principle applied. The hypothesis regarding the tax equity is thus confirmed and the result can undoubtedly be considered as proven and quite robust. Other results already differ depending on the estimated model.

**Table 1.** Results of the model including taxation of individuals, tax quota, OECD 2003-2012

| Dependent variable          | Tax evasion |             |         |       |
|-----------------------------|-------------|-------------|---------|-------|
| Variable                    | Coeff.      | Stand. Dev. | t-stat. | Prob. |
| Lagged value of tax evasion | 0.18        | 0.03        | 5.37    | 0.00  |
| Tax fairness - individuals  | -14.25      | 1.31        | -10.85  | 0.00  |
| Personal income tax quota   | -0.17       | 0.06        | -2.70   | 0.01  |
| SSC – employees             | 1.40        | 0.10        | 13.55   | 0.00  |
| Consumption tax quota       | -0.46       | 0.06        | -7.66   | 0.00  |
| Property tax quota          | 0.33        | 0.21        | 1.58    | 0.12  |

*Source: Own calculation*

Table 1 applies to individuals, their tax burden expressed as the tax quota for the tax on personal income and tax fairness based on the ability-to-pay principle. The model also included the tax burden through property and excise taxes on individuals that suitably completed the model in which the influence of taxation on individuals was investigated. Finally, the model included the tax burden through social security contributions (SSC) paid by employees. Assuming no corporate income tax and SSC paid by employers, then, while a higher tax burden through personal income tax and consumption leads surprisingly to lower tax evasion, the tax burden through property taxation and social security contributions increases tax evasion.

**Table 2.** Results of the model including taxation of corporations, tax quota, OECD 2003-2012

| Dependent variable          | Tax evasion |             |         |       |
|-----------------------------|-------------|-------------|---------|-------|
| Variable                    | Coeff.      | Stand. Dev. | t-stat. | Prob. |
| Lagged value of tax evasion | 0.22        | 0.02        | 9.63    | 0.00  |
| Tax fairness – corporations | -0.43       | 0.15        | -2.85   | 0.00  |
| Corporate income tax quota  | -0.54       | 0.17        | -3.09   | 0.00  |
| SSC – employers             | -0.20       | 0.15        | -1.37   | 0.17  |
| Consumption tax quota       | 0.15        | 0.05        | 3.09    | 0.00  |
| Property tax quota          | 0.46        | 0.13        | 3.47    | 0.00  |

*Source: Own calculation*

In the model not considering the tax burden on individuals, the situation is somewhat different, see the table 2. Corporate taxation is expressed as a quota for corporate income tax and corporation tax fairness by using the above indicator based on the benefit principle. In this "corporate" model, a higher tax burden results in a higher rate of tax evasion in the case of taxes on consumption and property. At this point, there is naturally reflected that even the consumption tax burden affects individuals, corporations pay the tax.

Based on the estimated models, it is not possible to unambiguously confirm or disprove the hypothesis concerning the tax burden. Firstly, it can be a methodical shortcoming associated with tax quota. The tax quota itself may reflect tax evasion within the meaning of Laffer curve, and thus the results may be biased. Whether this is indeed the case, it would be necessary to further investigate the relationship between tax rates and tax revenues.

The second explanation can be seen in the fact that a country characterized by high tax quota may be a country with high efficiency in tax collection, or also with lower tax evasion. High tax quota, i.e. high tax revenue may also be used to finance a larger volume of government spending, and if they are used effectively, it can actually lead to less tax evasion due to the fact that tax payers are satisfied by the level and quality of the public services. This, however, confirms again that the non-economic aspects of the tax burden may be more significant with regard to the effects on the behaviour of taxpayers.

To at least partially remove the shortcomings of the tax quota (although others naturally arise), the analysis was similarly performed again using the indicators of the tax burden in the form of statutory tax rates. Such an analysis should at least partly confirm the effect of economic and regulatory factors, as in the case of taxes on income of individuals, the rate adjusted by the OECD was used. The rate relates to unmarried and childless person after counting all the possible tax allowances and credits. In the case of corporations, standard statutory tax rate was used.

In following two models, tax fairness was approximated by the relevant indicator, and the tax rate of income tax were used as independent variables. From a methodological point of view, it would not be correct to include other tax variables expressed by the tax quota. With regard to the availability of data, in case of other types of taxes, tax rates cannot be used.

**Table 3.** Results of the model including taxation of individuals, tax rate, OECD 2003-2012

| Dependent variable          | Tax evasion |             |         |       |
|-----------------------------|-------------|-------------|---------|-------|
| Variable                    | Coeff.      | Stand. Dev. | t-stat. | Prob. |
| Lagged value of tax evasion | 0.26        | 0.02        | 11.17   | 0.00  |
| Tax fairness - individuals  | -13.89      | 1.58        | -8.80   | 0.00  |
| Personal income tax rate    | -0.46       | 0.03        | -14.33  | 0.00  |

*Source: Own calculation*

The results presented in tables 3 and 4 are interesting, but not surprising. Concerning the individuals, the results of previous analysis were confirmed. Neither increasing tax rate leads to greater tax evasion. Substantial is tax fairness that influences negatively in mathematic sense, but positively in fact, the tax evasion.

In case of the corporations, the situation is different. Here, increasing income tax rate increases the rate of tax evasion. Corporations are also influenced by the tax fairness reflected in the quantity and quality of public goods. If the tax quota increases for reasons other than higher tax rates, then the amount of resources to provide public goods is higher, and the increase is considered fair. But when it is caused by higher tax rate, the corporations will apply tax optimization in a larger extent probably, which is more possible and easier for them than in case of individuals.

**Table 3.** Results of the model including taxation of corporations, tax rate, OECD 2003-2012

| Dependent variable          | Tax evasion |             |         |       |
|-----------------------------|-------------|-------------|---------|-------|
| Variable                    | Coeff.      | Stand. Dev. | t-stat. | Prob. |
| Lagged value of tax evasion | 0.18        | 0.02        | 8.27    | 0.00  |
| Tax fairness – corporations | -0.83       | 0.03        | -28.19  | 0.00  |
| Corporate income tax rate   | 0.22        | 0.01        | 26.43   | 0.00  |

*Source: Own calculation*

Finally, it can also be noted that the tax quota seem not to be very suitable approximator of the tax burden, especially in the case of corporate taxes.

## 6 Conclusion

All developed countries face the problem of tax avoidance or evasion in a greater or lesser extent. However, there are a lot of ways to fight this problem, including the Electronic Evidence of Sales – the way adopted by the Czech Republic.

In this paper, we showed that tax fairness influences the tax evasion in a large extent in developed countries, and larger than the rate of the taxation. National governments should – in accordance with the economic theory presented in the literature review - try to increase the fairness, even while preserving higher rate of taxation, which means that they should try to change the perception of

taxation by the public, e.g. by explaining them why the system is set in a way it is, but also should they try to remove the elements of tax system that are not in accordance with the fairness principle applied.

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## DISPARITIES IN HUMAN DEVELOPMENT INDEX IN THE COUNTRIES OF VISEGRAD GROUP PLUS

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### Abstract

The economic level of countries is mostly measured with the macroeconomic aggregates such as the Gross National Product or the Gross National Income per capita. They reflect the creation of added value, but not include social, political, cultural or environmental aspects. It was therefore necessary to set up and use alternatives for measuring ongoing economic development. One of that alternatives, created on national level, is the Human Development Index. However, this index does not express the differences in regions of countries. The aim of the paper is, according to construction of a modified Human Development Index, find out the existence or absence of regional disparities in the field of human development. These observations were done in the regions of the countries that are the members of the Visegrad Group Plus in the years 2004 to 2013. The regions at the NUTS II level, and regional modified index called the NUTS Human Development Index (NHDI) were chosen. One assumption was chosen for the aim of this paper: an inside disparity of regions does not exist – all of them in every country are on the same or very similar level. This hypothesis, based on a statistical verification, has not been confirmed.

### Keywords

Disparities, Health, Knowledge, Regional Human Development Index (NHDI), Standard of living, Visegrad Group Plus.

### JEL classification

O31, O52.

## 1 Introduction

The gross national (domestic) product and the gross national income are mostly used for determination of the economic level, or the rate of economic development. Although they are the most widely used indicator to measure economy's state of affairs (Stiglitz et al., 2009, Van der Berg, 2009) they include neither the informal economy, nor social, political, cultural and environmental aspects of development. It was therefore necessary to create a new indicator, when the best-known and most used is an index called the Human Development Index (Todaro and Smith, 2011).

The Human Development Index (HDI), which has been used by the United Nations since 1990, clearly brings a different perspective on development issues and should be better able to emphasize the effect of other than just economic factors of country's economy. The basis of the HDI index is a greater explanatory power, which is to follow economic development or sustainable development in general. This index is able to explain better, how two or more countries with the same level of income per capita can end up with different human development outcomes (Jamal and Khan, 2007). The measurement of human development through the HDI is an alternative to the GDP/GNI per capita as a measure of human well-being in the last thirty years.

The HDI is considered in modern theories of endogenous economic growth to be the most complex indicator (Mikušová Meričková and Halásková, 2014). HDI is primary used on national level, but it does not express the differences inside of economy (Majerova and Nevima, 2016).

Based on it, we decided to analyse this issue for countries of the Visegrad Group Plus (hereafter V4+) at the NUTS II level. This group includes the Visegrad Group countries (Czech Republic, Hungary, Poland and Slovakia), Slovenia and Austria, which were included to this group on the ground of the Regional Partnership Agreement from 2001. There are 46 regions on the NUTS II level

– eight in the Czech Republic, seven in Hungary, sixteen in Poland, nine in Austria, four in Slovakia and two in Slovenia. We have constructed the modified Human Development Index, NHDI, (see Majerova, 2016) and find out the existence or absence of disparities inside of regions. We expect (it is our hypothesis) that the influence of the EU membership on decreasing regional disparities among regions in each economy will be shown as far as the development of the NHDI is concerned.

## **2 Methodological Approach**

HDI is primarily nation level indicator, estimated for the country as a whole (Basu and Basu, 2005), but due to its general nature it cannot be applied by all economies in general. Therefore, many countries have introduced their own modified indexes in order to reflect their local circumstances better (more in Pagliani, 2010, or in Gaye and Jha, 2010).

The differences in regions of countries are not expressed in this index as well. However, the regional disparities exist both in developing and developed countries and they influence regional development. For example Peinanndo and Céspedes (2004) concluded that according to regional inequalities, expressed by the modified HDI, „two Spains“ exist, divided by an invisible line that separates the North and the South. Uneven development and growing regional disparities between East and West exist in Poland (Tridico, 2007). Significant degree of regional asymmetries are showed in Portugal, according the research on the level of NUTS III made by Silva and Lopes (2012) there. Regional disparities with declining tendency existed in India (Dholakia, 2003, or Dholakia, 2009), on other side, there has been a growing tendency of them in Iran according to Noorbakhsh (2002) and Pourmohammadi et al. (2014). Bartha and Gubik (2014) claim that GDP per capita, quality of life or healthy life expectation to be inside potential of economic development.

According Nijkamp and Abreu (2009), there is the north-west/south-east division in the European regions and such vast differences in regional development among them would weaken social cohesion in Europe.

## **3 Methodological Background**

Human development has two forms, which should be in balance, the formation of human capabilities in terms of improving health, increasing knowledge and skills to meet human need and their own skills and competences, free time, job security, cultural, social and political events. Basically, human development is clearly and directly dependent on income. It is therefore necessary to examine other variables that point out the potential of a country much better as well as the options currently appear in human development (Majerova, 2012).

### **3.1 Methodology of Human Development Index**

The Human Development Index (HDI) is a summary measure of achievements in key dimensions of human development: a long and healthy life, an access to knowledge and a decent standard of living (UNDP, 2015). These three dimensions have four parts - health and standard of living has one part each and education has two parts, as shown in Table 1.

HDI index calculation required the values in the range from 0 (the lowest level of human development) to 1 (the highest human development), and therefore they were determined for each dimension of the minimum and maximum values (more in Anand and Sen, 1994) based on historical evidence.

The overall HDI index was previously calculated as the arithmetic average of all indices. This method allowed for there to be a substitution between different dimensions, i.e. low values in one dimension can be compensated by high values of another one. Since 2010, the calculations have been performed using the geometric mean, which eliminates the above substitution and ensures that a percent decline in life expectancy has the same weight as a percent decline in the index or index of education and standard of living, as shown in (1)



$$HDI = \sqrt[3]{LE \cdot ED \cdot SL} \quad (1)$$

### 3.2 Creation of NUTS Human Development Index and Testing of Disparities

The same principle of HDI creating for the national level was adopted for the purpose of this paper – the health dimension, knowledge dimension and dimension of a living standard. However, the components of each dimension, had to be modified because of the lack of data at the regional NUTS II level. Data were used from a regional database of Eurostat (Eurostat, 2016) and the construction of the HDI of V4+ regions (NHDI) was as follows:

1. **Health** with the value of life expectancy at birth that represents, according to Eurostat, the mean number of years that a new-born child can expect to live if subjected throughout his life, to the current mortality conditions. The life expectancy at birth classically reflects the level of health and quality of life and measures the qualitative aspects of living a healthy life. It correlates positively with human development – the higher the healthy life expectancy of region, the more developed it is.
2. **Knowledge**, which includes two components:
  - a. Tertiary educated people in the age of 25-64, where the indicator is defined as a percentage of population aged 25-64 who have successfully completed tertiary studies (e.g. university, higher technical institution, etc.). The share of tertiary educated people in productive age on the population in this age group is connected with the ability of people (and regions) to reflect the needs of knowledge of economy and to contribute to it and human development.
  - b. Lifelong learning in the form of participation rate in education and training covers participation in formal and non-formal education and training for the age group of 25-64 are presented. Lifelong learning, in the form of participation in education and training, encompasses all learning activities undertaken throughout life (after the end of initial education) with the aim of improving knowledge, skills and competences, within personal, civic, social or employment-related perspectives. Due to lifelong learning people extend their possibilities for increasing their incomes.
3. **Standard of living**, measured through GDP per capita in PPS. The implementation of this indicator was influenced by the opinion of Sen (1999), who considered the income (product) as a primarily mean to achieve human development. The GDP per capita reflects the economic level better than its absolute value. The indicator is measured by an artificial European currency unit, the purchasing power standard (PPS). Theoretically, one PPS can buy the same amount of goods and services in each country. However, price differences across countries and regions mean that different amounts of national currency units are needed for the same goods and services.

The above indicators were chosen because of their availability, and also because of their greatest explanatory power in relation to human development. Comparison of both approaches (HDI and NHDI) is shown in the Table 1.

**Tab. 1.** Comparison of HDI and NHDHI Components

| HDI                     |                                              |                           | NHDHI                                                                         |                          |
|-------------------------|----------------------------------------------|---------------------------|-------------------------------------------------------------------------------|--------------------------|
| Component               | Calculation/Index                            | Dimension                 | Indicators                                                                    | Index                    |
| Health (LE)             | Life expectancy at birth <20;85>             | Health (LEB)              | Life expectancy at birth (years)                                              | Life expectancy index    |
| Education (ED)          | Expected years of schooling <0;18>           | Knowledge (K)             | Tertiary education (% of population in 25-64 years)                           | Tertiary education index |
|                         | Mean years of schooling <0;15>               |                           | Participation rate in education and training (% of population in 25-64 years) | Lifelong learning index  |
| Standard of living (SL) | GNI per capita (in USD/PPP 2011) <100;75000> | Standard of living (GDPc) | GDP per capita (in PPS)                                                       | GDP index                |

Note: To determine the minima, the worst results of individual indexes from all region of EU have been chosen, while the best ones for the maxima were chosen.

Source: authors.

The calculation of the total index corresponds to the new HDI approach and it is calculated as the geometric mean of all the above indices, as shown in (2)

$$NHDHI = \sqrt[3]{LEB \cdot K \cdot GDPc} \quad (2)$$

As mentioned, we supposed non existing internal disparities in the regions of each country. Regarding the statistical significance of the model as a whole, a zero ( $H_0$ ) and alternative ( $H_1$ ) hypothesis were established and then test these hypotheses at the significance level  $\alpha = 0.05$ :

$H_0$ : Differences of values are equal to zero – disparities do not exist.

$H_1$ : Differences of values are not equal to zero – disparities exist.

These hypotheses were tested using a two-sample t-test assuming unequal variances. Values of Index NHDHI of all regions in the years 2005-2013 were compared to the average values of the country in that years.

#### 4 Results of Measurement

As mentioned above, three indices for the calculation of the NHDHI were used – the life expectancy index, the education index and the GDP index. The values of indices were converted into the NHDHI using a geometric mean. The values of NHDHI of every NUTS II of V4+ countries for monitored years 2005-2013 are presented in Appendix.

The regions reached low levels of the NHDHI (below 0.550) in average, with some exceptions related to the regions with capitals (except Poland and Hungary) and certain regions in Austria, as shown in Table 2. The medium human development amounted regions, in which the capital city is situated, and regions of Salzburg, Tyrol and Vorarlberg, mainly due to the high value of the GDP index.

If we focus on the NHDHI in individual economies, we find out that the value of this index is similar in all regions of Austria - between the best and the worst value of the indices there is a difference of 34%, while in Hungary the difference between the best and the worst result is 87 percent. It is caused by a very low value of the NHDHI in the Észak-Magyarország region (0.051) where the life expectation at birth component is approaching the minimum values according Table 1.

This differences were statistically proved with above mentioned t-test. We compared the NHDHI values of every region in monitored period with the average value of them (the average value of the country). The level of significance is compared with the P-value, see Table 2. Thus, if P-value is

lower than the level of significance, we reject null hypothesis, alternative hypothesis is valid and we can claim that disparities between regions exist.

**Tab. 2.** Average and P-Values of NHDl in years 2004-2013

| Region              | V       | $\bar{x}$ | P-value |
|---------------------|---------|-----------|---------|
| Praha               | 0.0003  | 0.6107    | 1.3E-16 |
| Strední Cechy       | 0.0008  | 0.3142    | 0.0179  |
| Jihozápad           | 0.0003  | 0.3230    | 0.0264  |
| Severozápad         | 0.0002  | 0.2167    | 3.9E-13 |
| Severovýchod        | 0.0004  | 0.3176    | 0.0081  |
| Jihovýchod          | 0.0001  | 0.3649    | 0.0005  |
| Strední Morava      | 0.0001  | 0.3070    | 2.1E-05 |
| Moravskoslezsko     | 0.0003  | 0.2771    | 9.3E-08 |
| Közép-Magyarország  | 0.0004  | 0.3883    | 2.2E-14 |
| Közép-Dunántúl      | 0.0004  | 0.1779    | 0.5928  |
| Nyugat-Dunántúl     | 0.0004  | 0.2132    | 0.0051  |
| Dél-Dunántúl        | 0.0004  | 0.1491    | 0.0017  |
| Észak-Magyarország  | 0.0015  | 0.0648    | 6.6E-07 |
| Észak-Alföld        | 0.0002  | 0.1301    | 5.2E-06 |
| Dél-Alföld          | 0.0003  | 0.1562    | 0.0063  |
| Lódzkie             | 0.0008  | 0.1882    | 1.8E-05 |
| Mazowieckie         | 0.0010  | 0.3556    | 8.8E-07 |
| Malopolskie         | 0.0002  | 0.3207    | 6.3E-09 |
| Slaskie             | 0.0004  | 0.2557    | 0.9199  |
| Lubelskie           | 0.0003  | 0.2153    | 5.5E-05 |
| Podkarpackie        | 0.0001  | 0.2298    | 0.0002  |
| Swietokrzyskie      | 0.0003  | 0.2408    | 0.0523  |
| Podlaskie           | 0.0001  | 0.2383    | 0.0089  |
| Wielkopolskie       | 0.0002  | 0.2692    | 0.0246  |
| Zachodniopomorskie  | 0.0014  | 0.1872    | 0.0002  |
| Lubuskie            | 0.0003  | 0.2375    | 0.0238  |
| Dolnoslaskie        | 0.0004  | 0.3179    | 1.3E-06 |
| Opolskie            | 0.0004  | 0.2718    | 0.0476  |
| Kujawsko-Pomorskie  | 0.0001  | 0.2402    | 0.0151  |
| Warminsko-Mazurskie | 0.0002  | 0.2156    | 3.5E-06 |
| Pomorskie           | 0.0003  | 0.2945    | 7.6E-05 |
| Burgenland (AT)     | 0.0008  | 0.4720    | 6.4E-06 |
| Niederösterreich    | 0.0004  | 0.5047    | 0.0002  |
| Wien                | 0.0006  | 0.6012    | 6.7E-06 |
| Kärnten             | 0.0003  | 0.5096    | 0.0004  |
| Steiermark          | 0.0004  | 0.5463    | 0.8715  |
| Oberösterreich      | 0.0005  | 0.5410    | 0.6840  |
| Salzburg            | 0.0002  | 0.5705    | 0.0032  |
| Tirol               | 0.0004  | 0.5653    | 0.0285  |
| Vorarlberg          | 0.0004  | 0.5936    | 1.7E-05 |
| Bratislavský kraj   | 0.0009  | 0.5154    | 4.1E-11 |
| Západné Slovensko   | 7.1E-05 | 0.2115    | 1.7E-09 |
| Stredné Slovensko   | 0.0002  | 0.2047    | 7.7E-09 |
| Východné Slovensko  | 5.7E-05 | 0.1682    | 2.5E-12 |
| Vzhodna Slovenija   | 0.0012  | 0.4077    | 1.2E-05 |
| Zahodna Slovenija   | 0.0010  | 0.5935    | 6.9E-06 |

Note: V – variances,  $\bar{x}$  – averages  
 Source: own calculation

As can be seen in the Table 2 above, the null hypothesis of none regional disparity of human development has not been confirmed in 42 regions, four regions - one Hungarian, one Polish and two Austrian confirmed the null hypothesis. The results thus show that our hypothesis about the absence of disparities has not been confirmed, since 91 percent of the V4 + regions showed the disparities, based on statistical testing.

The existence of disparities is also demonstrated by the following Figure 1, the construction of which were used the data from Table 2 - the average value ( $\bar{x}$ ). Not only disparities between regions in different economies can be traced in the graphic expression - the greatest degree of variation exhibit regions of Hungary (without taking into account the Czech, Slovak and Slovenian capital regions), but disparities between countries V4 + as well.

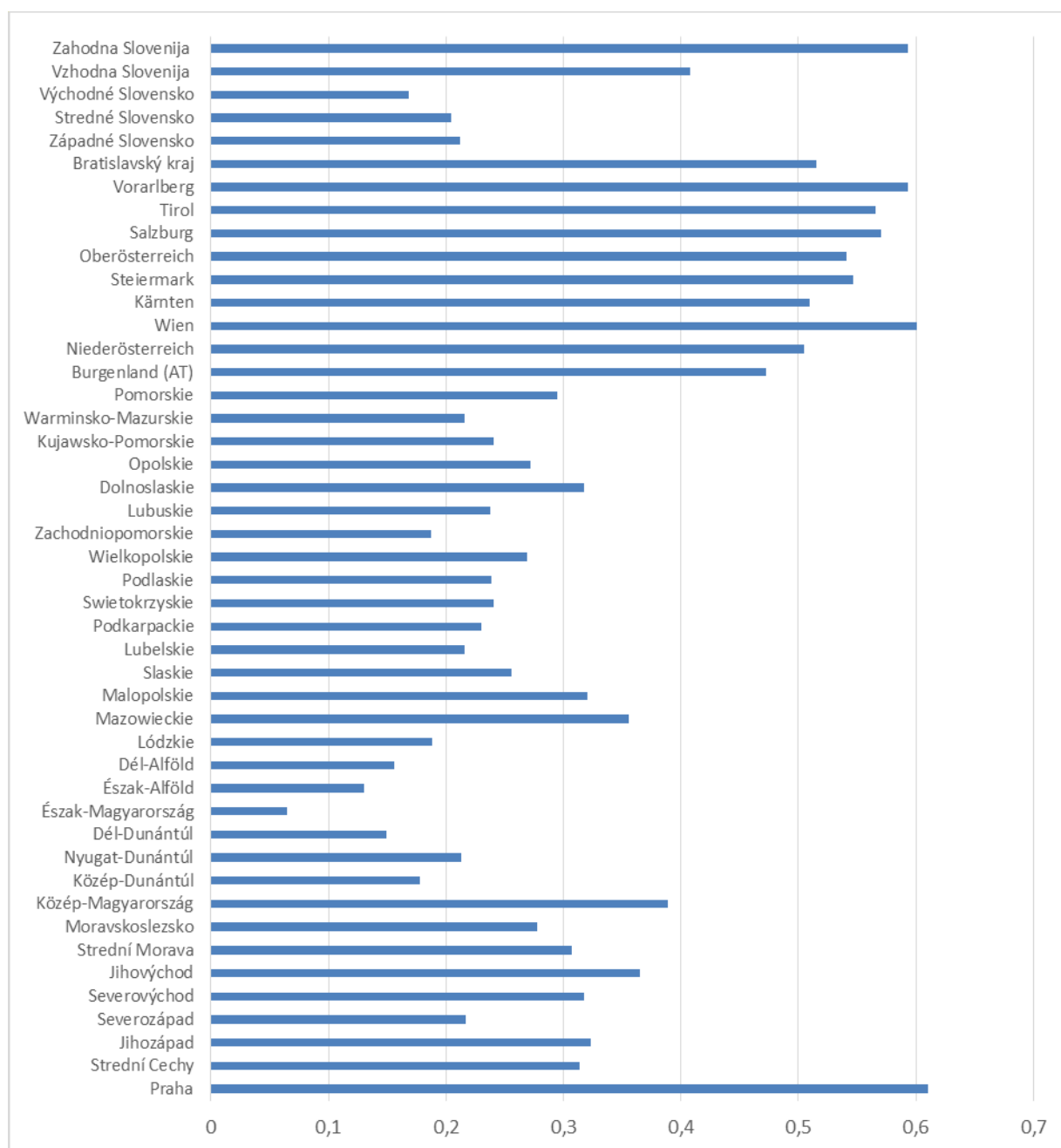


**Fig. 1.** Disparities among Regions of V4+ Countries (Source: author).

## 5 Conclusion

The Human Development Index has been used since 1990 and it is used to compare differences between economies in the field of human development. However, it does not express the disparities among regions of these economies. The paper's aim was confirm the set hypothesis about absence of regional disparities in the field of human development. We constructed the modified Human Development Index (NHDI) for the countries known as Visegrad Group Plus at the NUTS II in the years 2004-2013.

We modified the data used for assessment of NHDI for the purpose of our paper, but methodology remained the same. We used three components - the health dimension (life expectancy at birth), the knowledge dimension (tertiary educated people and participation rate in education and training) and the dimension of living standard (GDP per capita in PPS) and the final index was calculated as the geometric mean of the above three dimensions.

The results of the created index show that 42 from 46 regions in the monitored countries have regional asymmetries. The results thus not confirm our hypothesis about the absence of disparities, since 91 percent of the V4 + regions showed the disparities.

## 6 Acknowledgement

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## Appendix

### NHDI in Regions of V4+ in the Years 2004-2013

| Region             | 2004   | 2005   | 2006   | 2007   | 2008   | 2009   | 210    | 2011   | 2012   | 2013   |
|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Praha              | 0.6031 | 0.6018 | 0.5958 | 0.6103 | 0.6303 | 0.6327 | 0.6198 | 0.6394 | 0.5986 | 0.5755 |
| Střední Čechy      | 0.2823 | 0.2806 | 0.2785 | 0.2940 | 0.3307 | 0.3210 | 0.3176 | 0.3537 | 0.3502 | 0.3330 |
| Jihozápad          | 0.3090 | 0.3044 | 0.2971 | 0.3190 | 0.3253 | 0.3252 | 0.3077 | 0.3477 | 0.3550 | 0.3393 |
| Severozápad        | 0.2107 | 0.2038 | 0.1955 | 0.1960 | 0.2235 | 0.2187 | 0.2238 | 0.2449 | 0.2367 | 0.2136 |
| Severovýchod       | 0.2877 | 0.3135 | 0.2987 | 0.3034 | 0.3153 | 0.3112 | 0.3117 | 0.3375 | 0.3470 | 0.3499 |
| Jihovýchod         | 0.3624 | 0.3684 | 0.3496 | 0.3589 | 0.3712 | 0.3676 | 0.3490 | 0.3666 | 0.3773 | 0.3780 |
| Střední Morava     | 0.2998 | 0.3100 | 0.3069 | 0.3091 | 0.3241 | 0.2847 | 0.3119 | 0.3220 | 0.3145 | 0.2868 |
| Moravskoslezsko    | 0.2592 | 0.2720 | 0.2565 | 0.2664 | 0.2637 | 0.2769 | 0.2710 | 0.3023 | 0.3085 | 0.2947 |
| Közép-Magyarország | 0.4151 | 0.4200 | 0.3914 | 0.3912 | 0.3926 | 0.4045 | 0.3862 | 0.3634 | 0.3593 | 0.3598 |
| Közép-Dunántúl     | 0.2137 | 0.2118 | 0.1775 | 0.1751 | 0.1805 | 0.1564 | 0.1782 | 0.1602 | 0.1640 | 0.1610 |
| Nyugat-Dunántúl    | 0.2542 | 0.2414 | 0.2203 | 0.2076 | 0.2138 | 0.2202 | 0.2043 | 0.2007 | 0.1884 | 0.1814 |
| Dél-Dunántúl       | 0.1800 | 0.1907 | 0.1463 | 0.1296 | 0.1464 | 0.1396 | 0.1490 | 0.1454 | 0.1361 | 0.1275 |
| Észak-Magyarország | 0.1137 | 0.1322 | 0.0765 | 0.0262 | 0.0662 | 0.0262 | 0.0953 | 0.0221 | 0.0429 | 0.0465 |
| Észak-Alföld       | 0.1530 | 0.1520 | 0.1343 | 0.1091 | 0.1145 | 0.1252 | 0.1341 | 0.1214 | 0.1252 | 0.1326 |
| Dél-Alföld         | 0.1836 | 0.1838 | 0.1681 | 0.1488 | 0.1570 | 0.1508 | 0.1601 | 0.1322 | 0.1376 | 0.1401 |
| Lódzkie            | 0.2289 | 0.2410 | 0.1901 | 0.1687 | 0.1692 | 0.1750 | 0.1976 | 0.1693 | 0.1501 | 0.1921 |
| Mazowieckie        | 0.3621 | 0.4105 | 0.3276 | 0.3483 | 0.3383 | 0.3491 | 0.3573 | 0.3277 | 0.3222 | 0.4133 |
| Malopolskie        | 0.3444 | 0.2995 | 0.3244 | 0.3118 | 0.3044 | 0.3367 | 0.3399 | 0.3168 | 0.3175 | 0.3118 |
| Slaskie            | 0.2940 | 0.2874 | 0.2579 | 0.2538 | 0.2395 | 0.2499 | 0.2631 | 0.2302 | 0.2273 | 0.2540 |
| Lubelskie          | 0.2391 | 0.2410 | 0.2093 | 0.2090 | 0.1830 | 0.2050 | 0.2123 | 0.2015 | 0.2144 | 0.2389 |
| Podkarpackie       | 0.2462 | 0.2336 | 0.2293 | 0.2362 | 0.2129 | 0.2286 | 0.2358 | 0.2176 | 0.2131 | 0.2446 |
| Swietokrzyskie     | 0.2787 | 0.2503 | 0.2321 | 0.2390 | 0.2277 | 0.2570 | 0.2420 | 0.2218 | 0.2243 | 0.2353 |
| Podlaskie          | 0.2542 | 0.2580 | 0.2158 | 0.2318 | 0.2239 | 0.2350 | 0.2476 | 0.2430 | 0.2354 | 0.2386 |
| Wielkopolskie      | 0.2924 | 0.2904 | 0.2647 | 0.2676 | 0.2594 | 0.2681 | 0.2676 | 0.2518 | 0.2536 | 0.2765 |
| Zachodniopomorskie | 0.1925 | 0.2711 | 0.1753 | 0.1790 | 0.1693 | 0.1681 | 0.1773 | 0.1558 | 0.1498 | 0.2337 |
| Lubuskie           | 0.2564 | 0.2558 | 0.2378 | 0.2365 | 0.2246 | 0.2356 | 0.2637 | 0.2264 | 0.2371 | 0.2007 |
| Dolnoslaskie       | 0.3127 | 0.3063 | 0.3185 | 0.3152 | 0.2914 | 0.3246 | 0.3569 | 0.3378 | 0.3323 | 0.2834 |
| Opolskie           | 0.2869 | 0.2555 | 0.2676 | 0.2792 | 0.2640 | 0.3000 | 0.2925 | 0.2823 | 0.2647 | 0.2258 |
| Kujawsko-Pomorskie | 0.2584 | 0.2493 | 0.2375 | 0.2208 | 0.2262 | 0.2433 | 0.2510 | 0.2467 | 0.2421 | 0.2264 |
| Warminsko-         |        |        |        |        |        |        |        |        |        |        |
| Mazurskie          | 0.2267 | 0.2209 | 0.2110 | 0.2090 | 0.2043 | 0.2233 | 0.2379 | 0.2186 | 0.2190 | 0.1848 |
| Pomorskie          | 0.2780 | 0.3105 | 0.2756 | 0.2722 | 0.2688 | 0.3129 | 0.3189 | 0.2953 | 0.2950 | 0.3176 |
| Burgenland (AT)    | 0.4783 | 0.4479 | 0.4832 | 0.4942 | 0.4789 | 0.5133 | 0.4817 | 0.4766 | 0.4614 | 0.4046 |
| Niederösterreich   | 0.4989 | 0.5419 | 0.5141 | 0.5157 | 0.5127 | 0.5093 | 0.5064 | 0.4945 | 0.4968 | 0.4566 |
| Wien               | 0.5774 | 0.6525 | 0.5997 | 0.6152 | 0.6154 | 0.6154 | 0.5837 | 0.5704 | 0.5781 | 0.6042 |
| Kärnten            | 0.5199 | 0.5407 | 0.5076 | 0.5331 | 0.5204 | 0.5120 | 0.5006 | 0.4919 | 0.4878 | 0.4820 |
| Steiermark         | 0.5448 | 0.5581 | 0.5544 | 0.5693 | 0.5408 | 0.5632 | 0.5395 | 0.5425 | 0.5546 | 0.4959 |
| Oberösterreich     | 0.5294 | 0.5705 | 0.5482 | 0.5553 | 0.5728 | 0.5510 | 0.5376 | 0.5180 | 0.5334 | 0.4943 |
| Salzburg           | 0.5620 | 0.6036 | 0.5548 | 0.5635 | 0.5900 | 0.5846 | 0.5625 | 0.5555 | 0.5654 | 0.5630 |
| Tirol              | 0.5599 | 0.5790 | 0.5718 | 0.5780 | 0.5755 | 0.6037 | 0.5637 | 0.5400 | 0.5411 | 0.5407 |
| Vorarlberg         | 0.5827 | 0.5983 | 0.5920 | 0.6052 | 0.6037 | 0.6278 | 0.5912 | 0.5902 | 0.5966 | 0.5483 |
| Bratislavský kraj  | 0.5253 | 0.5574 | 0.5303 | 0.5534 | 0.5265 | 0.4492 | 0.4955 | 0.5159 | 0.5067 | 0.4934 |
| Západné Slovensko  | 0.2179 | 0.2306 | 0.2099 | 0.2144 | 0.2056 | 0.2015 | 0.2094 | 0.2152 | 0.2060 | 0.2048 |
| Stredné Slovensko  | 0.2267 | 0.2384 | 0.2039 | 0.1903 | 0.1957 | 0.1958 | 0.2132 | 0.2028 | 0.1904 | 0.1898 |
| Východné Slovensko | 0.1756 | 0.1767 | 0.1587 | 0.1606 | 0.1698 | 0.1648 | 0.1748 | 0.1782 | 0.1612 | 0.1620 |
| Vzhodna Slovenija  | 0.4308 | 0.3740 | 0.4238 | 0.4327 | 0.4279 | 0.4313 | 0.4269 | 0.4073 | 0.4023 | 0.3204 |
| Zahodna Slovenija  | 0.5974 | 0.5790 | 0.6201 | 0.6217 | 0.6159 | 0.6224 | 0.5994 | 0.5910 | 0.5734 | 0.5149 |

Source: own calculation.