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UNION MEMBER COUNTRIES

ECONOMIC POLICY IN THE EUROPEAN UNION MEMBER COUNTRIES

Proceedings of
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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

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

PART 2

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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 II

ECONOMIC DISPARITIES OF CZECH REGIONS

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Abstract
The main aim of article is the study of economic disparities in Czech Regions. We work with annual time series of basic economic variables – wages, GDP, unemployment rate. Special attention we will focus to wages. We work with frequency polygon of wages, with average wage and with quantile measures. We calculate GINI index for each region and we compare the redistribution rate between regions. Data are observed over years 2005-2014. We can analyze the development in time – mainly growth rate and trend. We compare all series for 14 Czech Regions over time for each variable. We show that there are significant differences between regions in all observed variables. Further we show that there is significant correlation between average wage and GDP, too. We use cluster analysis methods to distribution regions into some similar groups. The comparison is provided by basic statistical methods and by cluster analysis. The output will be mainly synoptic tables and graphs.

Keywords
Wage, HDP, Unemployment rate, Cluster analysis. Czech Regions, Disparities

JEL classification
C530, F470.

1   Introduction

This paper deals with comparing selected economic indices in the regions of the Czech Republic. *Average wages, GDP per capita* and *unemployment rate* are selected as suitable indices. The data were collected from 2000 to 2015 (wages), and from 2005 to 2014 (the remaining two indices). The 2015 data for wages was only obtained after the abstract was submitted. In other words, we have three time series at our disposal: one contains 16 observations, and two contain 10 observations each. Our goal is to show that there are regional differences in all three indices. Since we process time series, we are also interested in their trends and growth rates. We will show that a significant correlation exists between the average wages and GDP per capita indices. Even though there are differences between regions, we can divide them into several clusters. Cluster analysis will be used to this end. The cluster analysis will be carried out separately for each index, but also simultaneously for all three indices.

Our attention will particularly be focused on the average wages and their time evolution. The topic has been analyzed in more detail in the works of Malá (2015), Marek (2010, 2013). Older data concerning wages in regions of the Czech Republic was also analyzed by Marek (2013). In order to evaluate wage redistribution in the regions, we will calculate the Gini index. When analyzing wage data, we will take into account all data (from 2000-2015), while for correlations and cluster analysis only from the period of 2005-2015.

The wage data is taken from the Trexima Company's website (www.trexima.cz), the GDP and unemployment-rate data from the website of the Czech Statistical Office (www.czso.cz).

2   Methodology

The analysis is carried out in MS Excel, and the JMP software from the SAS Company. Basic statistical functions and procedures have been employed. From the theoretical point of view, we are within the borders of the descriptive theory of statistics. The trends are calculated with the aid of the "Regression" procedure, contained in the "Add-Ins in Data Analysis" module. We have employed methods for calculating trends directly in charts, not only for the trend values themselves but also for the index of determination, used for evaluating quality of the model as a whole. For determination of

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the value of the Gini index, we fit a 5th-degree polynomial to the data and calculate the corresponding integral (i.e., the area under the polynomial curve). Details of these calculations can be found, e.g., in Gini (1912).

The cluster analysis procedure is implemented with the aid of the JMP software. In all instances, Hierarchical Clustering and Ward Methods have been used – cf. Johnson (1967). The main output of the cluster analysis consists of dendrograms.

The data is time-dependent; hence it may be affected by, e.g., inflation rate. This fact is not reflected in this paper (we work with current prices of each given year). It would be easy to include inflation rate in the calculations, but the overall view on the comparison results would not be changed.

3   Data analysis

We will analyze three macroeconomic variables in the next subsection – wages, GDP and unemployment rate.

3.1   Wages

Let us first have a look at the average wages in individual regions. The data in the chart are sorted top-down (according to 2015), the same as in the explanations. Wages in Prague are much higher than in all remaining regions, followed by the Stredoceský and Jihomoravsky Regions. The last is the Karlovarsky Region.
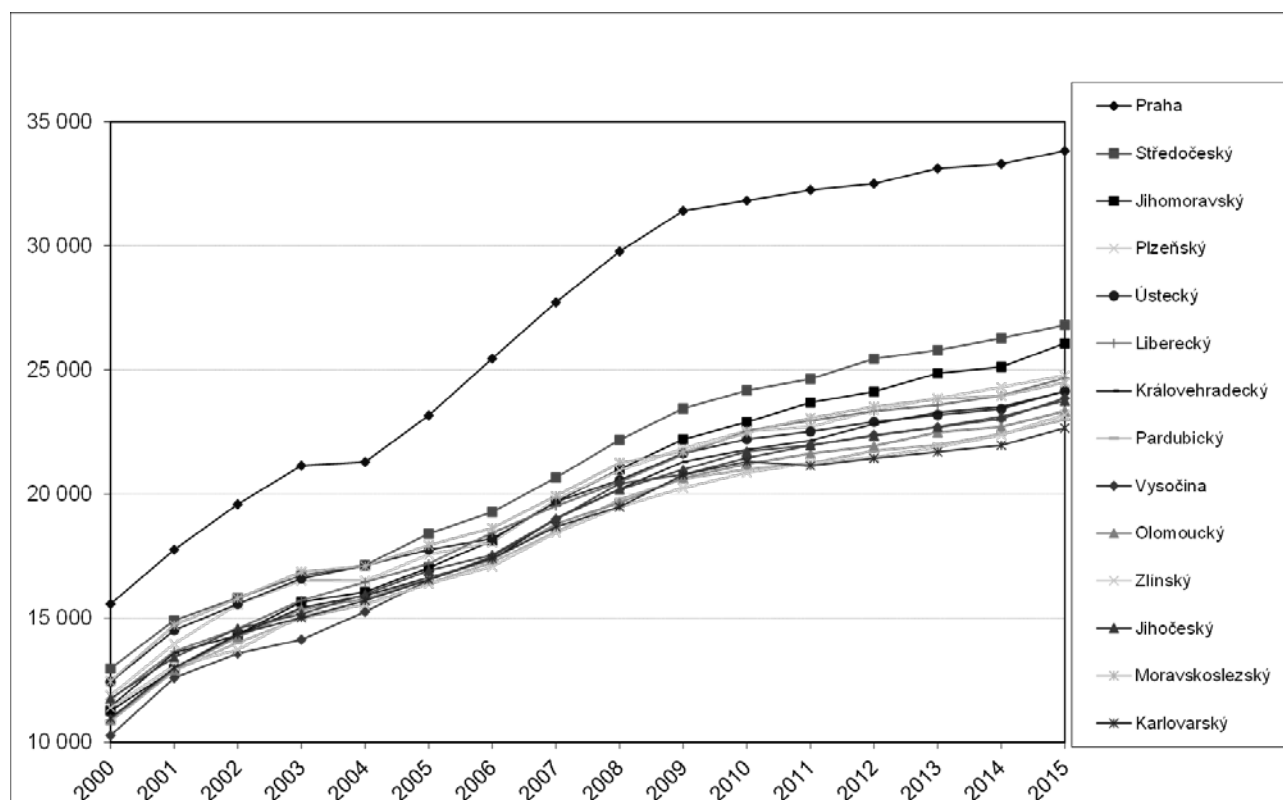
Fig. 1. Average wage in regions (Source: Own elaboration)

The next image shows the same data, but only for Prague (the highest average wages in the last year) and the Karlovarsky Region (the lowest average wages in the last year). These two regions have been selected for the sake of conciseness. The chart also includes the equation for the trend value,

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and for the index of determination. The equations clearly imply that the quadratic trend expresses the time evolution quite well. This is also corroborated by the index of determination, whose value is close to 1. Parabola is the most suitable trend function here. We have predicted one step ahead (i.e., the 2016 values). Our predictions are 34,369 CZK for Prague and 22,524 CZK for the Karlovarsky Region. These predictions are analytic. Due to the faster growth of the GDP and the trade unions' efforts, the actual values can be expected to get even higher.
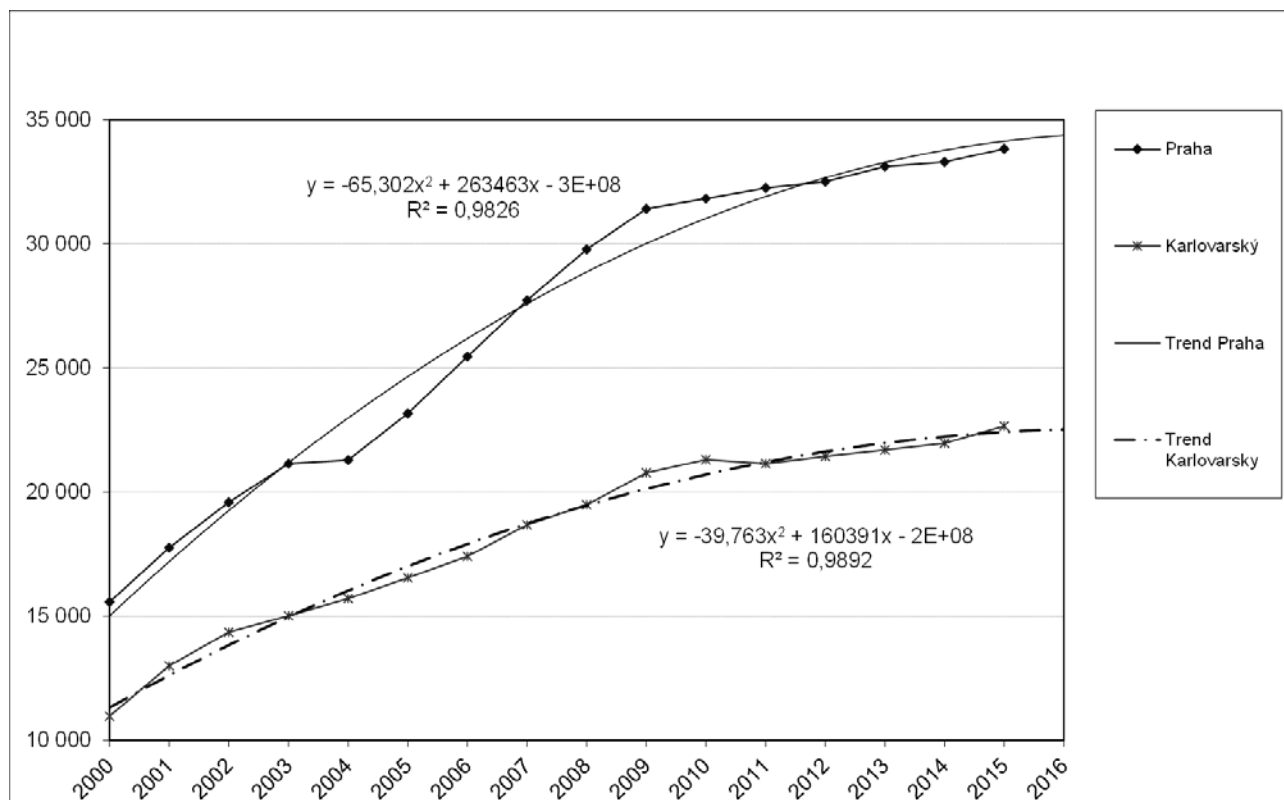
Fig. 2. Average wage in selected regions + trend (Source: Own graph)

Let us have a look at the cluster analysis applied to the wage data over the entire period under assessment.
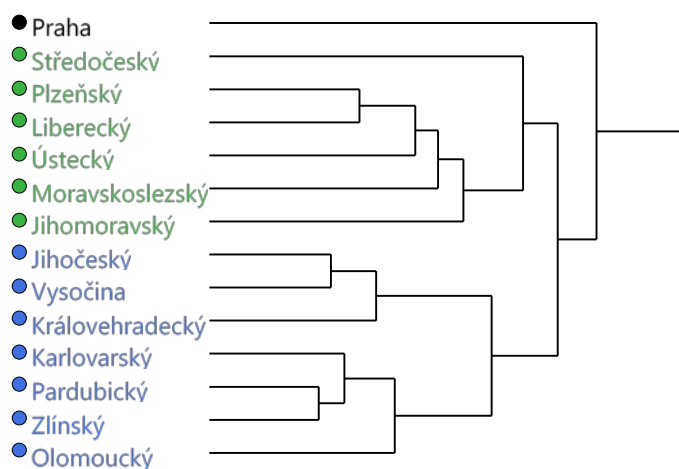
Fig. 3. Dendrogram for wages (Source: Own calculations)

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The dendrogram is in line with our expectations; the clusters comply with Fig. 1. The regions are divided into three clusters. A standalone group is made up by Prague. Another cluster contains six regions, out of which the Jihomoravsky and Stredocesky ones are added as the last two. This again corresponds to Fig. 1. The third cluster contains the remaining seven regions. This cluster can be subdivided into two sub-clusters containing three and four regions.

For the time series of average wages, we have calculated the dynamics as indices in two consecutive years. The results for all years are too extensive; hence we only give the average growth coefficient for the entire 16-year period in Table 1.

Table 1. Growth rate

Region	Average growth rate
Vysočina	1,058
Jihomoravský	1,058
Praha	1,053
Olomoucký	1,052
Pardubický	1,051
Královehradecký	1,051
Liberecký	1,051
Plzeňský	1,050
Středočeský	1,050
Karlovarský	1,050
Zlínský	1,049
Jihočeský	1,048
Moravskoslezský	1,046
Ústecký	1,045

Source: Own calculations.

Surprisingly, the fastest growth of the wages has been occurring in the Vysocina and Jihomoravsky Regions (5.8%); Prague is the third (5.3%); and the Ustecky Region is the last (4.5%).

The Gini index values for individual regions have been calculated.

Table 2. Gini index - geomean

Region	Average index
Praha	0,298
Jihomoravský	0,249
Středočeský	0,244
Ústecký	0,241
Jihočeský	0,238
Moravskoslezský	0,235
Zlínský	0,234
Karlovarský	0,234
Pardubický	0,234
Vysočina	0,233
Liberecký	0,230
Plzeňský	0,230
Královehradecký	0,228
Olomoucký	0,228

Source: Own calculations.

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Due to the high volume of data, we only show the mean value (geomean) in Table 2. The highest value is achieved in Prague (the highest degree of re-distribution, the highest differences in wages). The Prague value is close to that of the Gini index in West European countries except for Scandinavia, where this index has traditionally had low values. The lowest values of the index are observed in the Kralovehradecky and Olomoucky Regions (the lowest degree of re-distribution, the lowest differences in wages).

3.2 GDP

Another index we focus on is the GDP per capita. Data from the Czech Statistical Office is used (www.czso.cz). The situation in individual regions will again be displayed graphically. In this instance, only data from the period of 2005-2014 is at our disposal.
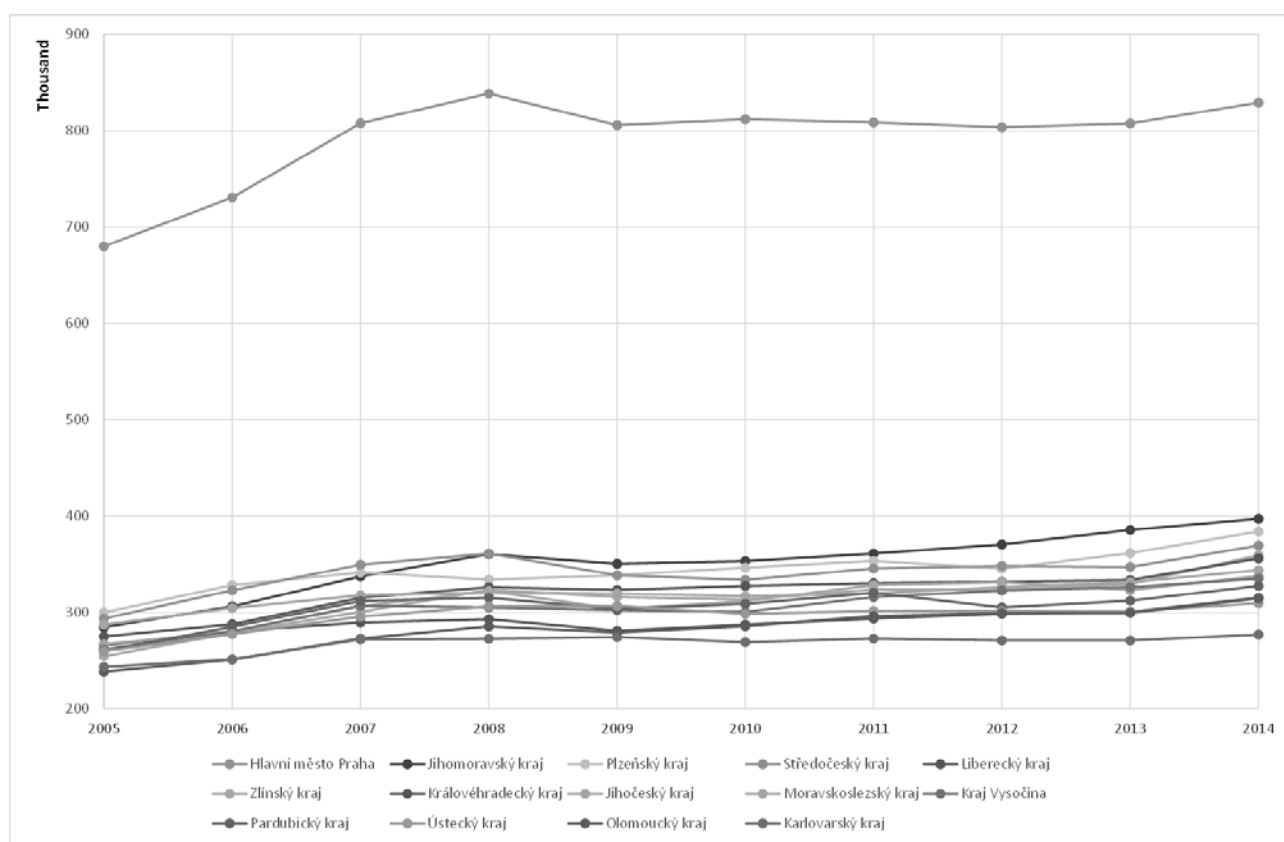
Fig. 4. GDP per habita (Source: CZSO, Own graph)

Prague is again a standalone unit. Other top-down regions (according to 2014) are the Jihomoravsky and Plzensky Regions, and the Karlovarsky Region is the last.

Let us have a look at the outcome of the cluster analysis. A standalone group is again made up by Prague. Another cluster consists of three regions; all three of them were also contained in the second cluster of the wage clustering. The third cluster is the most numerous, containing all seven regions from the third cluster of the wage clustering. This third cluster can again be subdivided into two sub-clusters.

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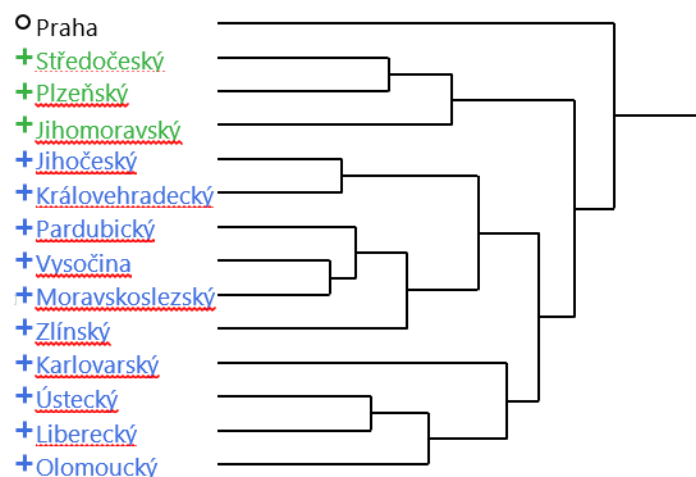
Fig. 5. Dendrogram for GDP (Source: Own calculations)

3.3   Unemployment rate

Another index we have chosen for consideration is general unemployment rate by regions – annual average. The data again comes from a public database of the Czech Statistical Office (www.czso.cz). We process data from the period of 2005-2014. The charts look as follows.
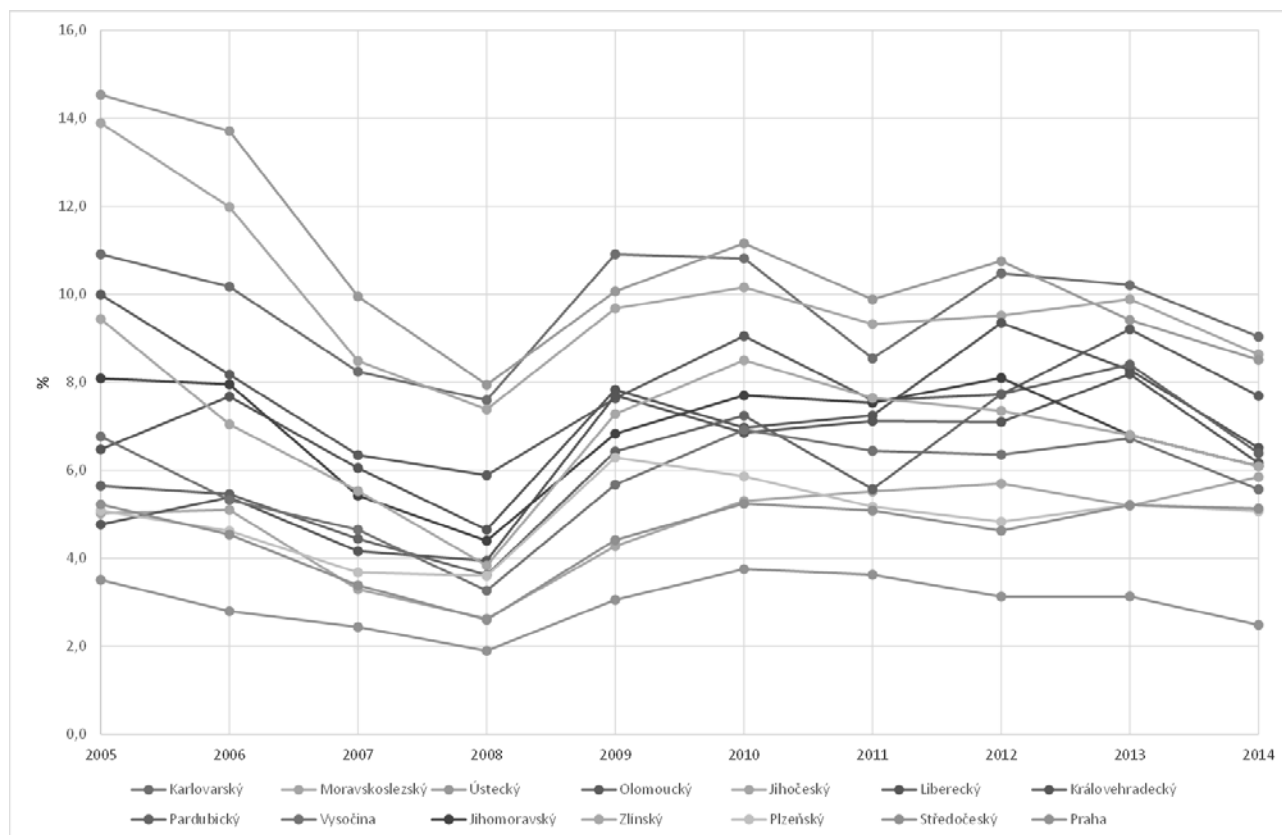
Fig. 6. General unemployment rate by regions - measure unit: % (Source: CZSO, Own graph)

The markedly lowest unemployment rate (according to 2014) occurs in Prague, followed by the Moravskoslezsky and Plzensky Regions. The unemployment rate values increase to the worst case of the Karlovarsky Region. The resulting ordering corresponds to those achieved for wages and GDP.

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The cluster analysis has identified the first cluster containing Prague and three more regions. The second cluster consists of seven regions, and the third one of just three regions with the highest values of the unemployment rate. In other words, half of the regions are similar to each other regarding unemployment. On the other hand, let us realize that we are evaluating an entire period of ten years. As we can see in Fig. 6, if we carried out the cluster analysis according to the last year, there would again be three clusters, but with different contents. Prague would make up a standalone cluster again.
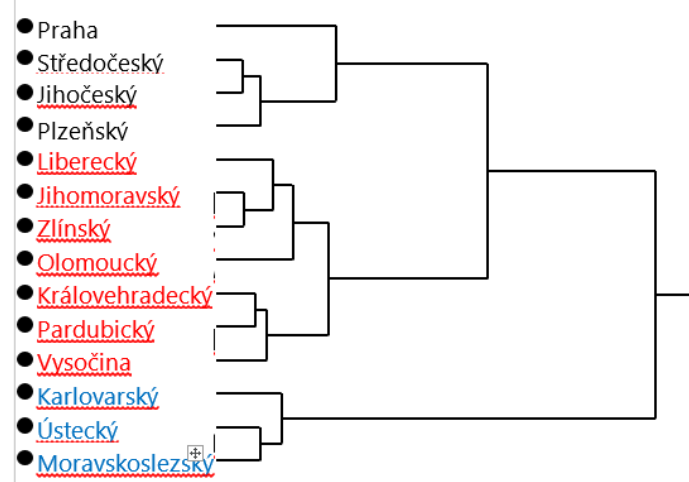
Fig. 7. Dendrogram for unemployment rate (Source: Own calculations)

4   Relationships between indicators

Let us first have a look at correlations between the three indices under consideration. We have to determine correlation coefficients between three time series here. We restrict ourselves to calculating the correlation coefficient at a fixed time t. No time lag in the time-series correlations is to be expected because we deal with annual time series. For comparability, we must restrict the period under assessment to that of 2005-2014.

Let us first determine the correlation coefficient values for Prague indices. The correlation matrix is

Table 3. Correlation matrix

	GDP	Wages	Unempl
GDP	1		
Wages	0.843	1	
Unempl	-0.369	0.047	1

Source: Own calculations.

It is clear at first sight that the variables *Wages* and *Unempl* are linearly independent. However, we will test significance of all three coefficients. Fisher's Z-Transformation will be used for testing significance of these correlation coefficients. The null hypothesis is

$$H_0 : \rho = 0$$
$$H_1 : \rho \neq 0$$

(1)

where ρ is the correlation coefficient to be tested. Under the validity of the null hypothesis, the test statistics

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$$U = \frac{\sqrt{n-3}}{2} \ln \frac{1+r}{1-r} \qquad (2)$$

has normal distribution. Here r is the sample correlation coefficient, and n is the number of observations. The underlying theory can be found in Anděl (1978).

The usual significance level of $\alpha = 0.05$. is used. Only the correlation coefficient between the variables *Wages* and *GDP* (test statistics $U = 3.89$) is significantly different from zero. In the remaining instances the null hypothesis cannot be rejected, hence the significance of the correlation coefficient has not been confirmed (based on the test statistics $U = 0.15$ and $U = 1.22$).

The same test has been applied to all regions with exactly the same results. We can therefore observe that only the coefficient between the variables *Wages* and *GDP* is significant, and this observation holds for all regions. This result partly corresponds to the outcome of the cluster analysis.

Let us re-consider the cluster analysis. We again cluster the regions, but according to all three variables this time. The dendrogram is
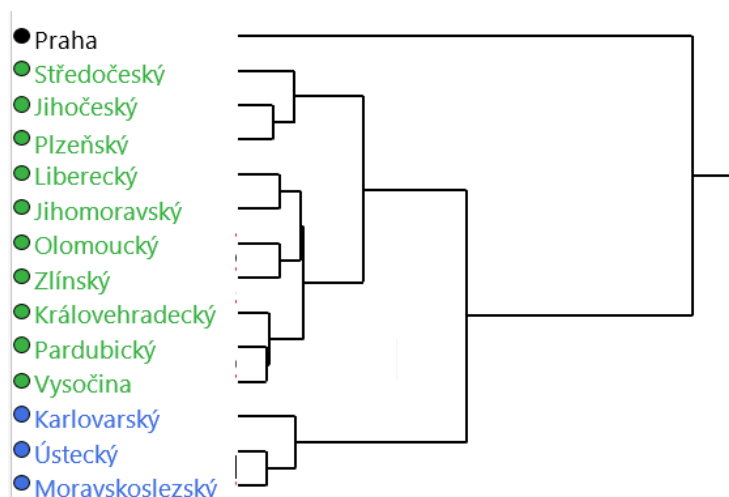
Fig. 8. Dendrogram over all indicators (Source: Own calculations)

The outcome of the cluster analysis is in line with our expectations. A standalone group is made up by Prague. The 10 additional regions show similarities with respect to all three indices. In the second cluster we can identify two or three sub-clusters. There are three regions in the third cluster. The Karlovarsky Region falls into the third cluster in all previous instances of the cluster analysis, while the Ustecky and Moravskoslezsky Regions fall into the same cluster in two out of three cases.

5   Conclusion

The results of our analyses confirm our expectations. Prague is truly exceptional: its results are far from those of the other regions in all respects. It is a "state within a state". The wages and GDP per capita are markedly higher there, and the unemployment rate is by far the lowest. It is certainly unnecessary to analyze in detail reasons for this special position of the capital city. The Stredocesky Region ranks very well in all considered indicators as well. There may be several reasons for that. The main role may be the fact that many inhabitants of the Stredocesky Region commute to work in Prague. Another factor may be the presence of two big car factories in the region, which has a major influence on all three indices under consideration. The Karlovarsky Region is the worst in our comparisons for the values of all three indices.

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We have divided regions into clusters with the aid of cluster analysis, whether according to individual indices or according to all three of them simultaneously. The resulting clusters mutually correspond, being very similar or identical in all instances. In more numerous clusters (the second and third ones) we can identify sub-clusters, which help us recognize how close individual regions are to each other. This is also clear from the matrix of distances, also provided in result of our analyses. We are not able to include all our results due to space limitations.

Regarding the correlation analysis, we have confirmed (based on calculations and tests) a significant correlation value between the wages and GDP per capita, other correlation coefficients between the indices are not significantly different from zero. This dependency could be utilized for creation of new models or (e.g., using factor analysis) for reducing the number of variables from two to one, and subsequently working with the identified factors. As a matter of fact, this will be the subject of our future work.

6   Acknowledgement

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SERVICES MARKETING AS A WAY OF ENSURING THE SMALL AND MEDIUM ENTERPRISES COMPETITIVENESS IN EU

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Abstract
This article aims to highlight the importance of the competitiveness of SMEs in the European Union. The attention is focused on the marketing tools use of SMEs in the area of services business. The theoretical part of the paper determinates the basic problem area as services marketing. The main objective of this paper was to characterize the marketing behaviour of small and medium enterprises in the services market within the elements of the marketing mix 4P with emphasis on ensuring their own competitiveness. The primary marketing research using the method of questioning was realized to ensure adequate data. 192 companies were involved in marketing survey, 66 % of micro companies up to 10 employees, 23 % of small companies up to 50 employees and 11 % of medium-sized companies up to 250 employees. Only 22 % of companies consider the change of product offerings in order to increase their competitiveness. The vast majority of surveyed companies (73 %) don´t consider price changes of services and 78 % of companies don´t consider distribution strategy changes to improve the competiveness of their business. Micro, small and medium-sized companies extensively use the brand (company name), logo in communication with customers to differentiate from the competition.

Keywords
Competiveness, EU, Services marketing, Small and medium-sized enterprises.

JEL classification
M31

1   Introduction

Small and medium-sized companies operate against the strengthening of monopolistic tendencies in the period of globalization tendencies, which leads to the entrance of multinational corporations and chains. Small and medium-sized companies are originators of innumerable small innovations and adaptations to changing consumer needs. Moreover, they can engage in marginal areas of the market that are not interesting for larger companies. (Veber et al. 2006, p. 21-22) Small and medium-sized companies represent an important part of every developed economy and they are important for society especially in terms of employment and economic outputs. As a whole, small and medium-sized companies in the Czech Republic represent more than 1 million economical subjects, it means 99.84 % of all businesses and they employ nearly 60 % of employees. Their share in exports is about 51 % and share in imports is 56 %. The small and medium-sized companies sector is a major driver of business, growth, innovation and competitiveness and it is also a major employer. (Small and medium business, online). Within the European Union, the total number of small and medium-sized companies is about 21 million, these businesses employ about 33 million people and they are an essential source of entrepreneurial spirit and innovation, which are crucial for European companies competitiveness. The European Union policy aims to ensure that the policies and actions are friendly to small and medium-sized companies in order to perceive Europe as the attractive place for start-ups and entrepreneurship. (Small and medium-sized companies, online).

Small and medium-sized companies in the European Union are considered as the basis of national economies, especially for several reasons. These companies are flexible and able to adapt themselves to market conditions and requirements, while they contribute significantly to the creation of new jobs. Small and medium-sized companies encourage and develop a competitive environment and act as an element of economic balance. (Šebestová 2007, p. 3) Some small and medium-sized companies are very competitive in the international markets. It was the crucial change for most of them when the Czech Republic has become the part of European Union. Small and medium-sized companies have been forced to adapt production and services to customers´ needs, then to cooperate with research

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companies, to improve business management and to operate their business on more and more international markets. Therefore the strategic marketing is extremely important to focus on key developing factors of medium-sized companies (innovation capability, growth potential and integration in international economic cooperation). According to Chládková (2010) there is confrontation with market imperfections. SMEs frequently have difficulties in obtaining capital or credit, particularly in the early start–up phase. Their limited resources may also restrict access to new technology or innovation. It is therefore necessary to monitor the development of SMEs in individual EU countries and highlighting their problems and mainly to their importance.

Small and medium-sized companies often realize their business activities in the area of services. Although services are generally included in the tertiary sector, statistical data show that they are an important part of the economy in many countries – thanks to a share of GDP and employment share. In the Czech Republic, the importance of services continues to grow, but this economy is below the average of EU country or the world's developed countries. (Veber et al., 2008, p. 18) In 2014, the number of economically active small and medium-sized companies in services increased (366 569 active subjects). In 2014, these companies employed 351 000 employees. (Development report of small and medium-sized companies and its support in 2014, online).

The sector of small and medium-sized enterprises cannot be ignored in the market economy of the Czech Republic, on the contrary it is possible to achieve a higher national economic performance through properly targeted support of this sector. This support does not have to be financial, it involves mainly legislative conditions and thereby creating a stable business environment as an essential condition of competitiveness in the European and global scale. (Hamplová and Provazníková, 2014)

This paper focuses on the actual situation of the small and medium enterprises. It tries to answer the question: What strategic marketing actions (marketing mix tools – 4Ps) are used by small and medium companies to intensify their own competitive advantage in terms of services in EU? The small and medium enterprises will certainly be the crucial part of Czech economy in the future and EU. It is obvious that great attention will be devoted to the problems of small and medium-sized companies in terms of services.

2 The importance and position of services marketing in the business of small and medium-sized enterprises (SMEs) to European Union

European Union represents political puzzle. On one hand it has been enormously successful. EU governments and institutions have transformed it from a common market of six countries into an integrated union of 27 with a population close to 500 million. It is the world´s largest trading bloc, accounting for over 20 per cent of global trade with a combined economy considerably larger than of the United States. It has its own currency and fledgling foreign policy. (Bomberg, Peterson and Corbett, 2012). Over 99 per cent of enterprises in non-primary sector are small and medium-sized enterprises in EU. Two-thirds of all enterprise sector jobs are in SMEs. Very small firms (under 10 employees) provide one-third of all jobs. Across the EU policies are being developed at regional, national and transnational government level that see SMEs as the only positive way of creating employment and generating increased local growth for the community. (Harris and McDonald, 2004, p.3) There is no agreement on how best to understand EU. It has many of the typical features of an intergovernmental organization, in that membership of the EU is voluntary, the balance of sovereignty lies with the member states, decision making is consultative and procedures used to direct the work of the EU are based on consent rather than compulsion. At the same time, it also has some qualities of a state. It has internationally recognized external borders, there is an EU system of law to which all member states are subject, it has administrative institutions with authority that impacts the lives of Europeans. (McCormick, 2014)

There are particular problems and challenges in managing services related to their characteristics. Service organizations have adopted an approach called "McDonaldization" to address problems when increasing attention being given to efficiency and technology. (Pirrie and Mudie, 2006, p. 1).

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McDonaldization is the term invented by George Ritzer to describe a sociological phenomenon that is happening in our society. In essence, McDonaldization is the process of rationalization, albiet taken to extreme levels. But it turns out that over-rationalizing a process in this manner has an unexpected side effect. It's called irrationality. In a sociological context that simply means that a rationalized system may result in events or outcomes that were neither anticipated or desired, and in fact, may not be so good. According to Ritzer (2015) the four main dimensions of McDonaldization are: 1) Efficiency - The optimum method of completing a task. The rational determination of the best mode of production. Individuality is not allowed. 2) Calculability - Assessment of outcomes based on quantifiable rather than subjective criteria. In other words, quantity over quality. 3) Predictability - The production process is organized to guarantee uniformity of product and standardized outcomes. All shopping malls begin to look the same and all highway exits have the same assortment of businesses. 4) Control - The substitution of more predictable non-human labour for human labour, either through automation or the deskilling of the work force.

In most industrialized economies, expenditure on services is rapidly growing. There are some reasons for growth. The advances in technology have led to more sophisticated products that require more design, production and maintenance services. Growth per capita income has given rise to a greater percentage being spent on luxuries such as restaurant meals, overseas holidays and weekend hotel breaks, all of which are service intensive. Greater discretionary income also fuels the demand for financial services such as investment trusts and personal pensions. A trend towards outsourcing means that manufacturers are buying services that are outside the firm´s core expertise (such as distribution, warehousing, and catering). Deregulation has increased the level of competition in certain service industries (e.g. telecommunications, television, airlines), resulting in expansion. (Jobber, 2010, p. 822)

Rao (2011, p. 5) defines the services as intangible activities performed by persons, machines, or both for creating value perceptions among customers. The quality of services results in perception and value assessment of customers. According to Dibb and Simkin (2004, p. 234) a service is an intangible product involving a deed, performance or effort that cannot be stored or physically possessed. Services have the following distinguishing characteristics in comparison with physical product. These characteristics are: intangibility, inseparability, variability, perishability and impossibility to be owned (Vaštíková, 2014, p. 16-20). Intangibility is the most characteristic attribute of services and from this one the other attributes are deduced. Pure service is not possible to assess by any physical sense. Inseparability means that producer of service and customer have to meet each other in place and time so advantage which customer gets by providing the service, could be realized. Being variable is related especially with quality standard of service. Being intangible leads up to the fact that services can´t be stored, sold again or returned. For specific moment they are lost, destroyed. Marketing consequence is an effort to match demand with supply, it means producer capacity with real purchase potential of supposed service market. This goes to considerable flexibility of service prices. Impossibility to own services is related with its characteristics – being intangible and possibility to be destroyed. Dahringer (1991) indicates different distinctive aspects of services as intangibility, expiry or perish ability, real time distribution, relative and subjective quality dimension, fluctuating nature, variability, heterogeneity and inseparability.

Marketing activity is normally structured around the "4Ps" – product, price, promotion and place. However, the distinctive characteristics of services require the addition of three more Ps – people, physical evidence and process. In services marketing, tactical tools are the marketing mix variables in expanded form. (Bhattacharjee, 2006, p. 117) According to Fisk, Grove and John (2013, p. 24) people refer to all persons, whether customers or worker, who are involved in the service production. Physical evidence means the service environment and other tangible aspects. The process of service assembly refers to the producers and the flow of activities that contribute to the delivery of the service. According to Nwankwo and Gbadamosi (2011, p. 21) marketing in small and medium-sized companies make use of the 4Ps + C (price, place, promotion and product + consumer) model.

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This model is a variation of the 7Ps services marketing model. The major benefit of the 7Ps framework is that it leads to a superior service orientation. In the case of small and medium-sized companies this service orientation is captured in the C of the 4Ps + C model, which represents customer management.

Intuitively, it makes sense to suggest that improving service quality will increase customer satisfaction, leading to higher sales and profits. Indeed, it has been shown that companies that are rated higher on service quality perform better in terms of market share growth and profitability. A service quality strategy, therefore, specifies a level of performance for each product attribute relative to the target market´s perception of quality and value. Not every product needs to have superior performance on every attribute. In fact, few customers will pay for products that offer "the best of everything". Higher quality usually means higher costs, due to better engineering, superior materials, or a more highly trained workforce. A quality service for many people is one that excels on those few dimensions that are important to them, and is merely adequate on others. In this instance, they will give up some benefits for a lower price.

The core subject as the services marketing field has developed – services quality – also has stimulated interest in relationship marketing. The object of improving service quality, after all, is to engender customer loyalty. A natural extension of the strong interest in service quality is growing interest in relationship marketing. Effective relationship marketing should help a company to capitalize on its investment in service improvement. (Berry, 1995) To implement a service quality strategy, marketers set performance level targets for attributes in alignment with customer wants and needs. Then, every activity of the firm, from research and development to customer service, is aligned to deliver those objectives. QFD (quality function deployment) is a method some companies use to translate customer needs into product and quality requirements. Process tools like Six Sigma use statistical analysis to continually reduce manufacturing defects. Firms compliant with ISO 9000 and ISO 9001 standards follow a strict set of rules governing internal processes from record keeping to annual reviews. A well-thought-out and well-executed product quality strategy will reduce costs, improve customer satisfaction, reduce customer defection, increase sales, and improve profitability. (Levens, 2012)

3   Evaluation of small and medium-sized companies marketing activities in the services sector

Services are currently the subject of several research projects which are aimed at finding and identifying a service strategy that will contribute to a long-term competitiveness of small and medium-sized companies. Within the project CZ.1.07/2.3.00/20.0016 "Through the targeted research in the area of small and middle-sized companies to reaching competitive knowledge economy" the primary marketing research was conducted regarding the small and medium-sized companies in the area of services. The goal of marketing research was to determine whether the companies use strategic options presented in the form of the essential elements of the services marketing mix to ensure their competitiveness. Descriptive primary market research was carried out by a questionnaire survey conducted among selected companies located in the Czech Republic and the Slovak Republic. The crucial selection aspect was the operation in the services market and company size by number of employees up to 250. 192 small and medium-sized companies took part in marketing research.

Four descriptive hypotheses were determined for the purpose of marketing research. Hypotheses were connected with the implementation of marketing strategies and specific behaviour of small and medium-sized companies in the services market. H1 - Within the product policy more than 50 % of small and medium-sized companies expand the range of products (services) to increase their competitiveness. H2 – The change in pricing strategy in order to increase competitiveness is crucial, whether it is a micro company, medium-sized or small company. H3 – More than 40 % of small and medium-sized companies use indirect distribution channels. H4 - More than 20 % of small and medium-sized companies communicate with their current and prospective customers via the social networks.

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Descriptive hypotheses were evaluated with descriptive statistics (absolute and relative frequency of responses). The chi-square test was used to assess the dependence of the selected services marketing tools and the size of the companies. The chi-square test aims at comparing the actual frequencies within each category of a nominal variable against its expected frequency. According to Israel (2008) the six steps of the Chi-square test procedure were implemented: 1) Null and alternative hypotheses formulation. The null hypothesis is that there is no difference in the proportion of respondents in the different categories of the variable while the alternative hypothesis has the opposite meaning. 2) Data converting into a tabular form. 3) The expected frequencies for each of the categories finding out. 4) Chi-square value finding out by applying the formula of

$$x^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$$

(1)

5) The critical chi-square value finding out for 0,05 level of significance. 6) The decision making by comparing the calculated and critical chi-square value.

Mulačová et al. (2013, p. 47) states that the decisive criterion for division of companies is the number employees, annual turnover, annual balance sheet total and independence. According to these recommendations of the Commission of the European Union no. 96/280/EC three categories of businesses can be distinguished: 1) micro-company - employing less than 10 employees and annual turnover or annual balance sheet total do not exceed EUR 2 million; 2) small company – employing less than 50 employees and annual turnover or annual balance sheet total do not exceed EUR 10 million; 3) medium-sized companies - employing less than 250 employees and an annual turnover does not exceed EUR 50 million, and balance sheet total does not exceed EUR 43 million.

There were micro companies (66 %), small companies (23 %) and medium-sized companies (11 %) included in the sample of marketing research. The micro companies dominate. This size of companies is typical for business in the area of accommodation and restaurant services according to NACE division. There were especially companies located in the Moravian-Silesian region (77 %) in the marketing research sample. 62 % of companies provide services only within the village (town), but 34 % of companies operate in all state and 15 % of companies export their services. It could be stated that the size of the company associate with area of its business. The period of company existence in the market was the next examined variable. The company existence over the period of 5 years (76 % of companies) prevails, followed to 5 years (19 % companies) and 5 % of new companies with the period of existence shorter than one year. Small and medium-sized companies have generally better stability in the market than micro companies. Table 1 and Fig. 1 represent the business area of the company and the time of company existence in the market according to size.

Table 1. Business area of the company according to size

The size of company	Business area (%)		
	Local	Nationwide	International
Micro	79,83	44,62	28,57
Small	15,97	40,00	25,00
Medium-sized	4,20	15,38	46,43
Total	61,98	33,85	14,58

Source: own.

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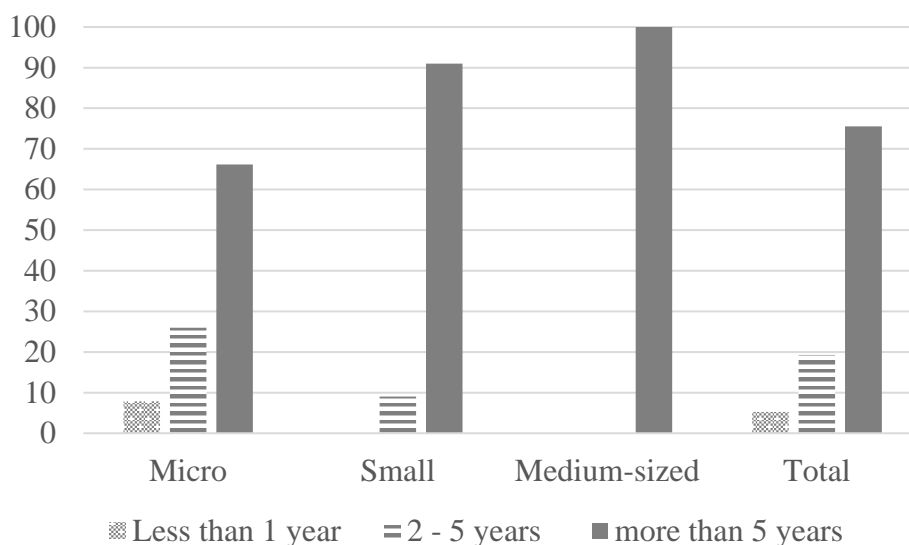
Fig. 1. The time of company existence in the market according to size (Source: own)

Small and medium-sized companies providing services know and monitor the performance of their competitors. Companies providing services in total are generally extremely flexible in cases of *product strategy* change to ensure their competitiveness. It is obvious that the size of company plays in the selection of product strategy an important role in order to ensure competeveness (the result of testing the two variables independence is p-value = 0.045632698).

In total 67 % of companies would extend their range of products (services). The market development strategy, then the strategy of product development dominate according to Ansoff growth matrix. On the other hand it could be rational to limit services supply (10 % companies). This strategy is typical especially of micro companies because it could ensure better quality of services. Mainly medium-sized companies consider an extension of their service offering. More than a third of small companies intend not to change the offer. *H1 hypothesis is confirmed*, since, in the framework of product policy more than 67 % of small and medium-sized companies in order to increase their competitiveness, expand their product range. Matušínská et al. (2014) states that most small and medium-sized companies export services mainly to the Slovak Republic, Poland, Germany, Austria and Russia. The number of export markets has a declining effect during the existence of small and medium-sized companies (57 %). The biggest reasons for the entrance of small and medium-sized companies the foreign markets include especially proximity to foreign markets (55 %), the size of foreign markets (54 %) and higher utilization of own capacities and expanding range of products (43 %). The most important competitive advantage in foreign markets include the adaptation of products to the needs and expectations of customers (50 %) and high-quality products and services (47 %). 58 % of the surveyed companies intend to enter the new markets within 3-5 years.

In terms of *pricing strategy* 73 % of companies do not consider to change the prices in order to improve their competeveness. 18 % companies are ready to increase the prices and only 9 % of companies would accept the price reduction. It is obvious that size of company plays in selecting pricing strategies decisive role (the result of testing the two variables independence is p-value = 0.125039808). On the basis of this statement *hypothesis H2 is rejected* because it is not demonstrated the interdependence between the size of company and strategic goals in terms of prices. Small companies (39 %) tend the most to price changes. The vast majority of companies do not intend to take advantage of changing their current pricing strategies to gain competitive advantage.

There is the extreme use of direct distribution channels (94 %) in *distribution strategies* of small and medium-sized companies. Indirect distribution channels are only used by 15 % companies. It is obvious that in some cases the companies use two types of distribution channels at the same time.

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Hypothesis H3 is rejected because indirect distribution channels are not used by more than 40 % of small and medium-sized companies, but only by 15 % of companies. In order to increase the competitiveness 78 % of companies do not consider any change in their distribution policy. Companies of different number of employees have similar opinion to this issue. 24 % of medium-sized companies would decide to reduce the margin (rewards) to intermediaries. The size of the company when considering changes in distribution strategy is not critical (the result of testing the two variables independence is p-value = 0.699105082).

The area of *marketing communication* was next monitored area of our investigation. The basic marketing communication tool of small and medium-sized companies are websites (77 %). Only 21 % of companies do not have any presentation on Internet, this fact is typical especially of micro companies. The use of brand, company name or logo is an important element of differentiation from competitors (64 % of companies), which is especially important in services. The price discounts as the tool of sales promotion are the second most used tool in marketing communication. 35 % of companies (especially micro companies) communicate with their customers on social networks. The size of the company does not influence the selection of tools in marketing communications (the result of testing the two variables independence is p-value = 0.438637075). *H4 hypothesis is confirmed,* since more than 20 % of the companies communicate with their current and prospective customers via social networks.

Marketing research implementation of small and medium-sized companies could be the method of providing competitive services improvement. 60 % of all companies implement this type of investigation. 53 % micro companies, 70 % small companies and 76 % medium-sized companies realize marketing research in their practice. 60 % of companies perform the monitoring of customer complaints and their timely resolution of pre-prepared patterns (Crisis plan preparation). Thus we can see the need to increase the knowledge of company managers in marketing skills, because without statistically evaluated information about customers, it is not possible to plan effectively and execute strategic marketing measures.

4   Conclusion

The small and medium-sized companies participate considerably in business community all over the world. Some small and medium-sized companies are very competitive, but for most of them the Czech Republic membership in EU has meant significant change. They are forced to focus consistently on customer requirements, establish cooperation with the research and development sector and develop export activities. The main objective of this paper was to characterize specific behaviour of small and medium-sized companies in services market with the intention to ensure their own competitiveness.

192 companies participated in primary marketing survey, 66 % of micro companies up to 10 employees, 23 % of small companies up to 50 employees and 11 % of medium-sized companies up to 250 employees. The vast majority of companies (76 %) operates in the market for more than 5 years. Only 22 % of companies do not consider the change of product offerings in order to increase their competitiveness. This percentage is the highest among small companies (36 %). The vast majority of companies (73 %) do not consider price changes of services. 9 % of companies intend to decrease the price and 18 % of companies to increase the prices. Disproportionate low cost services could indicate the lower quality of product - service. 78 % of companies do not consider changes of distribution strategy. Micro companies and medium-sized companies reported only a change of existing distributor. 79 % of companies have set up their websites, including micro companies (71 %). Company name and logo in communication with customers is the most frequently used communication tool in all types of surveyed companies. An important finding is that 35 % of companies communicate with customers via social networks. Based on the statistical test of dependencies (the chi-square test) between company size and business decisions regarding product, pricing, distribution and marketing communication strategy, it could be said that there was only

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confirmation of differentiated approach to product strategy in companies with different number of employees.

The European Union is rich, diverse market with a vibrant and varied cultural heritage. The bulk of Europeans have high incomes and like their cultural differences to be recognized. Those who recognise this have a good chance of developing a successful marketing strategy to meet their needs.

Acknowledgement

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SHORT PERIOD MORTALITY SHIFT AND ITS EFFECT TO COHORT MORTALITY

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Abstract

For cohort life table information about mortality for 100 years is needed. As is known Czech Republic and many other regions have problem with this assumption because of some short time periods with weak or no information about mortality patterns in detailed structure. On the other hand information about cohort mortality is very important for many institutions as pension funds, government and others. How to solve problem with this periods with poor information about mortality patterns is the aim of the paper. We would like to quantify impact of short time over- or undervalued mortality (as effect of war or other crises) to total mortality of cohort. Different impact is expected as different period of the lifetime of the cohort is affected by the period with different mortality patterns. This is very important for regions where those periods were in history and where cohort life tables are not constructed yet because of this problem.

Keywords

Mortality patterns, Cohort, Life expectancy, Life table.

JEL classification

J11, I13, C53.

1   Introduction

It is almost 350 years when E. Halley described basic model which we call Life tables now (Pavlik at al., 1986). From that time many other researchers developed this model and tried to use it for many reasons. Mortality patterns and their development became very important for the whole society and now we can find application of life tables in many areas as insurance companies use mortality tables to evaluate their products and governments use it to apply when they realize some kind of pension system.

As the main goal at first was to describe mortality patterns of the population as a whole, now we can find many applications to different subgroups or subpopulation. The goal is the same but there is no general model for the whole population and we have to apply and modify the model in some other areas. Zimmermann at al. (2014) used different mortality model for education groups to estimate difference in present value of retirement pensions for each education groups. Fiala, Langhamrova (2014) applied mortality forecast to evaluate ability and stability of the social system in the Czech Republic from the view of revenues and expenditures.

Application of the life tables is much wider, because mortality is not connected with population of man only, but we can find many useful applications of mortality models in other disciplines also. Krejci (2013) describes models of aging of machinery and equipment in education as aspect of modernity. The model was developed by Krejci and Mazouch (2015) and applied in agriculture in estimation of age of machinery and equipment in the Czech agriculture (Krejci at al., 2015).

Types of the life tables depend on the data we use. We can construct life table from the newest data available – usually for one year and we use information about number of events and exposed population – those type of life tables we call transversal life tables (Pavlik at al., 1986). Transversal life table combine information "what happened" in that current year to all population – through all ages, through all cohorts and analyses current health (and mortality) condition in the population in particular year (or another period).

The other type of data is longitudinal data. It is possible to follow one cohort (usually defined as population born in one year or longer period) but this is very demanding to data and to construct the whole life tables (from birth to the highest ages) we need data about complete cohort – extinct cohort (Pavlik at al., 1986). But cohort models are very important as one of the other source of information

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of mortality patterns (Mazouch, 2012).Time needed to die out one cohort is more than one hundred years and this problem causes that cohort life tables are available in some countries only. Other possibility is to construct incomplete model as Hulikova Tesarkova and Mazouch (2013) who described basic cohort mortality analysis at higher ages (over 60) on cohorts born in 1890-1910 in the Czech Republic and compared results with France.

As cohort life tables are valuable for the analysis of mortality in many ways we have to find possibilities how to solve the problem with the data. It is known that in history of any country there are periods with weak or absolutely no information about population or events in general. For life tables we need data distributed not only by sex but by age also and this kind of detail is usually missed. Information about numbers of deaths in general is available only. Example of this kind of data we can find in Kučera (1994) where situation of the Czech Republic during the period of the Second World War is described but the numbers of population and concrete numbers of events distributed by age is missing.

Aim of this paper is to evaluate influence of any period of higher (or lower) level of mortality to basic indicator – Life expectancy at birth. As we know that there are no cohort life tables for the Czech Republic as the example of application we can use some transversal tables and we can assume that those are based on some cohort data. Effect of temporary increase of mortality level is measured on four different population (four different models of mortality). Total effect of the change of the life expectancy is measured.

2 Data

As was mention in Introduction cohort life tables for the Czech Republic are not available yet. Also using of cohort life tables from some other country could lead to some confused conclusion because of period effect in the data (cohort could live in some temporary unstable period). To reduce this effect four different period life tables are used to demonstrate four possible scenarios of four different cohorts. Model of period life table is useful and is based on the same assumption as construction of the cohort life tables (for more details see Pavlík at al., 1986).

On the Fig. 1 all four modelled cohorts are presented, two are from year 1937 and two from year 2000, for males and females separately. It is clear that there are differences among all four hypothetical cohorts, the lowest life expectancy at birth have males in year 1937, it is about 56,7 years only, for females in 1937 it is more than 60, 5 and for year 2000 for males and females it is more than 70 (71,65 for males and 78,35 for females). Results are in Table 1.

Table 1. Life expectancy at birth for males and females, 1937 and 2000, Czech Republic (years)

1937		2000	
Females	Males	Females	Males
60,57	56,70	78,35	71,65

Source: CZSO, 2016a.

From the Fig. 1 we can see huge decline of infant mortality and also changing distribution of the death age. Whole distribution is shifting to right in time and is sharper (parameter of kurtosis is changing). This process is called rectangularization (for more details see Hulikova Tesarkova, 2012). As mortality patterns vary in time Czech Statistical Office applies smoothing methods of Gompertz-Makeham for higher ages correspond to CZSO, 2016b.

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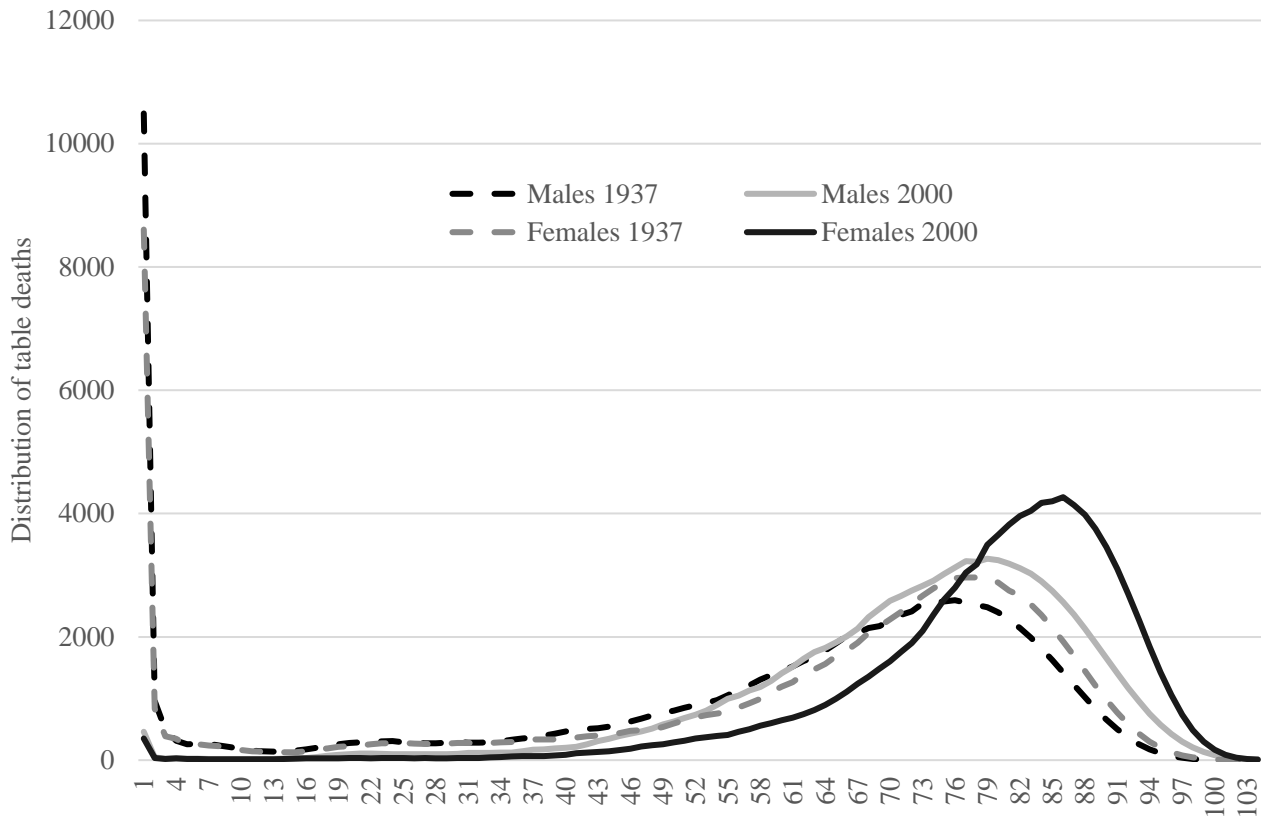
Fig. 1. Distribution of table deaths for different life tables (males and females 1937 and 2000), (Source: CZSO, 2016a)

3   Methodology

As basic source to construct life tables specific mortality rates are used. According to formula 1 data about number of deaths at age *x* and number of exposed population at age *x* are needed.

$$m_{x,t} = \frac{D_{x,t}}{P_{x,t}}, \tag{1}$$

where $m_{x,t}$ is the mortality rate at age *x* and in year *t*, $D_{x,t}$ is number of deaths at age *x* in year *t* and $P_{x,t}$ is the exposed population at age *x* and in year *t*.

Each hypothetical cohort was divided to fifteen age groups by five years. The first starts at age 10 and covers ages from 10 to 14 (up to 15. birthdays), the second is for age 15-19, the third from 20 to 24 etc. The last group is 80-84. Younger ages (bellow 10) and old ages (85 and older) were not mentioned in our analysis. For younger ages the mortality is very low – except infant mortality (see fig. 1) and for older ages when mortality rate is high the number of deaths decline (the population is small) and effect of mortality level change is negligible.

For each defined age group we assume temporally increase of the mortality.

$$m_x^* = m_x \cdot a, \tag{2}$$

where m_x^* is the temporally changed mortality rate for age *x*, m_x is the real (from life tables) mortality rate at age *x* and *a* is the coefficient of the mortality change.

To demonstrate the impact of the mortality change to overall mortality of the cohort, we assumed that cohort would have one period with mortality level 1.5 times higher than regular level or 2.0 times higher. In the other age groups the mortality is not changed.

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This could demonstrate impact of periods as war or some similar problematic periods when population is under worse mortality condition and cohorts are affected by this period in different ages. This situation could be illustrated in Fig. 2, where for five cohort different periods of their life are affected by period with doubled mortality level. Before and after those periods the mortality is regular and we want to measure the effect of this temporary change only. This situation could be for example during the World war when cohort born 1920 was at the beginning of the World War II 19 years old and 25 at the end, cohort 1925 was 14 at the beginning and 20 at the end and so on. One period affected different cohorts in different periods of their lives.

As has been mentioned above the main indicator where the impact would be measured would be the life expectancy at birth (regular values are in Table 1).
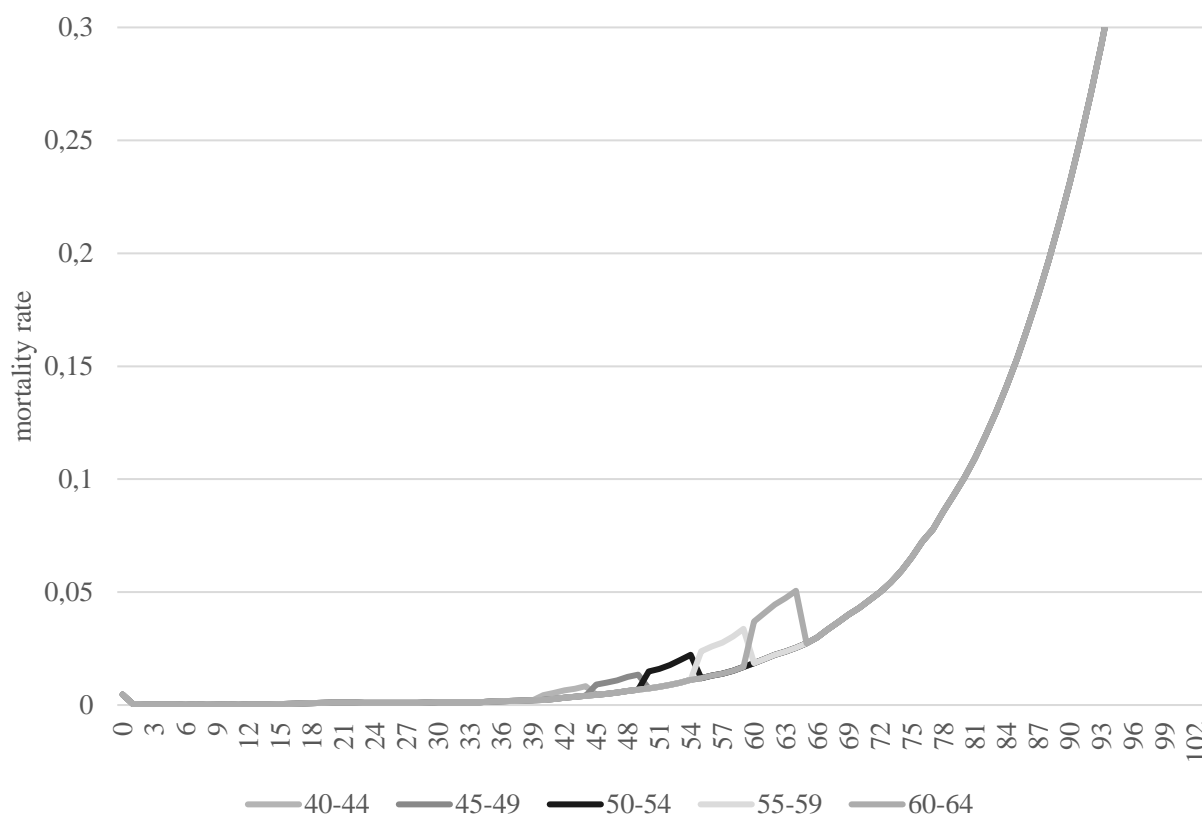
Fig. 2. Temporary increase of the mortality rate of 100 % for different age groups - illustration (Source: own calculation)

4 Results

Results show that impact of the temporary increase of the mortality level to overall life expectancy (at birth) is very small. Results vary among analysed hypothetical cohorts but also in them and the impact depends on the age when the cohort is affected. To compare our results with Fig. 1 (distribution of deaths) we can find that the biggest influence have age groups with the highest number of deaths.

Table 2 represents increase of the mortality of 50 % and we can find that the highest difference is for cohort with mortality patterns as males in 2000 and at age 65-69, the difference between mortality without increase and with increase in this age group is -0,69 year. Life expectancy at birth is more than 70 and this difference is less than 1 % in this indicator.

For cohorts with higher mortality for all age groups – illustrated as mortality in 1937, the effect is higher because the number of deaths is higher for all age groups except the oldest ones. The difference

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is only slightly higher then 0.5 year. For age groups with really low mortality (as the youngest age groups with mortality from the year 2000) the impact of increase of mortality level is negligible.

Table 2. Difference between regular life expectancy and modelled life expectancy with temporary increase of mortality in selected age groups, coefficient of increase $a = 1.5$

Age group	1937		2000	
	Females	Males	Females	Males
10-14	-0.19	-0.19	-0.03	-0.03
15-19	-0.24	-0.28	-0.05	-0.09
20-24	-0.31	-0.33	-0.05	-0.13
25-29	-0.29	-0.28	-0.04	-0.11
30-34	-0.27	-0.27	-0.05	-0.12
35-39	-0.29	-0.32	-0.08	-0.16
40-44	-0.30	-0.36	-0.12	-0.24
45-49	-0.33	-0.42	-0.19	-0.35
50-54	-0.39	-0.46	-0.25	-0.46
55-59	-0.44	-0.52	-0.32	-0.56
60-64	-0.52	-0.54	-0.39	-0.65
65-69	-0.55	-0.53	-0.51	-0.69
70-74	-0.53	-0.46	-0.60	-0.65
75-79	-0.43	-0.34	-0.66	-0.55
80-84	-0.25	-0.19	-0.57	-0.37

Source: CZSO, 2016a, own calculation.

If the increase of the mortality level for selected age groups would be 100 % ($a = 2.0$) the impact is higher. Distribution of differences is the same, the highest difference is for males, year 2000 and age group 65-69 but the difference is higher -1.33 years. For cohorts 1937 and both males and females the differences are slightly higher than 1 year. Results are in Table 3.

Table 3. Difference between regular life expectancy and modelled life expectancy with temporary increase of mortality in selected age groups, coefficient of increase $a = 2.0$

Age group	1937		2000	
	Females	Males	Females	Males
10-14	-0.37	-0.39	-0.06	-0.07
15-19	-0.49	-0.56	-0.10	-0.18
20-24	-0.62	-0.66	-0.09	-0.26
25-29	-0.57	-0.56	-0.08	-0.22
30-34	-0.54	-0.53	-0.10	-0.24
35-39	-0.57	-0.63	-0.15	-0.31
40-44	-0.59	-0.72	-0.25	-0.47
45-49	-0.66	-0.83	-0.38	-0.69
50-54	-0.77	-0.91	-0.51	-0.91
55-59	-0.88	-1.02	-0.64	-1.11
60-64	-1.01	-1.06	-0.78	-1.28
65-69	-1.06	-1.02	-1.00	-1.33
70-74	-1.01	-0.87	-1.18	-1.25
75-79	-0.78	-0.62	-1.26	-1.03
80-84	-0.44	-0.32	-1.06	-0.67

Source: CZSO, 2016a, own calculation.

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5   Conclusion

Aim of this paper was to evaluate influence of any period of higher (or lower) level of mortality to basic indicator – Life expectancy at birth. As the modelled cohort we analysed four different mortality patterns and in each of this model we estimated influence of mortality increase in different age groups (and for different intensity of increase). The results show that differences are not big, surprisingly are small when increase of mortality of 50 % causes only 1% decline of life expectancy at birth.

To discuss our results we have to mention what situation are suitable for this type of analysis. As example we can discuss our results with period of the Second World War. It is known (from Kucera, 1994) that during the WW II the mortality patterns changed but we have very poor information about the real influence of the war. To help measure the influence we can estimate the regular development of the mortality in this period without war by some model bridging years between 1938 and 1945 (the method could be less or more sophisticated but that is not our goal to discuss way how to bridge this period). When we once have estimated data of the period with assumption of no war we can apply our methodology.

From Kucera (1994), pp 48 we know that for Czech lands (area of the Czech Republic) there are no complete data at all. We know about Czech population in Protektorat Bohmen und Mohren but only number of events and we have very weak information about exposed population. That is why we are not able to apply common way of construction of life tables. From the other sources we know that some war lost in population are not recorded in general (Jewish who were killed in concentration camps, prisoners killed in prisons, victims of crimes etc.). The only information we have is about total number of victims with very poor information about the distribution by gender and age.

But this information we can use to estimate how high was increase of the mortality during the war and we can estimate the influence to life expectancy at birth to all cohorts which were living during the War. During the War Kučera (1994) estimates that around 120 thousand people were killed or died as a result of war. This number divided to the period of the war means that in average 20 thousand of people died over the regular mortality per year.

Those numbers do not mean that deaths were distributed randomly but in some cases there was no gender or age selection. On the other hand in some cases some parts of population were exposed to mortality more (as babies and old people were not fighting on the streets). For example there was around two thousands of young people killed during the end of the war (Kucera, 1994). From this perspective the number of deaths which are over the regular mortality for sure seems that for some cohorts the mortality doubled (number of deaths is two time higher than "regular" number of deaths) in this time and the effect to cohort life expectancy at birth is weaker than someone could expect.

There is also high effect of the level of "regular" mortality. As four different hypothetical population were compared, the remarkable effect can be observed in period with higher mortality only (and it is clear because coefficient of increase in relative expression has different impact in absolute values). For some cohort with higher mortality in all periods as were cohorts from 1937 the effect is higher for younger age groups also. For cohorts with better mortality patterns in younger age (for example up to 40) as cohorts from 2000 are the effect of doubled mortality is remarkable in higher ages only. Hypothetical increase of absolute number of deaths (as was mention above in the example of year 1945) has the same impact to all compared cohorts and detailed results can be discussed in future projects.

Future research should focus to estimate at least fragments of information about distribution of deaths during wars and try to estimate level of increase of mortality caused by war and to estimate impact to the cohort indicators with knowledge of the effect of increase of mortality to cohort life expectancy.

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6   Acknowledgement

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USE OF INTEGRATED DEA APPROACH TO EFFICIENCY EVALUATION AT REGIONAL LEVEL: COMPARISON OF CENTRAL EUROPEAN COUNTRIES

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Abstract
Europe's competitiveness depends on a multiplicity of actions that can optimise the potentials within its regions which are increasingly becoming the drivers of the economy. All regions possess development opportunities – however, use these options enough and hence the competitiveness of European regions must be efficient enough. The paper deals with an application of Data Envelopment Analysis (DEA) method to multi-criteria efficiency evaluation in NUTS 2 regions in the Visegrad Four countries (V4) in comparison with selected advanced European Union countries – Austria and Germany, which are also important trade what is important for V4 competitiveness. The aim of the paper is to analyse a degree of efficiency achieved in individual NUTS 2 region that is perceived as a reflection of competitive potential level in the reference period 2000–2013. Measuring the efficiency of evaluated NUTS 2 regions is processed by selected DEA models – basic CCR and BCC models and advanced SBM, FDH and FRH models. When applying DEA method, selected indicators forming the Regional Competitiveness Index (RCI) are used.

Keywords
Competitiveness, DEA efficiency, model BCC/CCR/FDH/FRH/SBM, NUTS 2 region.

JEL classification
C67, C82, O33, Y10.

1   Introduction

Over the past half century, the European Union (EU) has been successful in securing high and rising living standards for their citizens. Due to recent financial and economic crisis, the EU is going through one of the most difficult periods since its establishment, with multiple challenges facing the region's policy-makers (Dvoroková, 2014). EU is a heterogeneous unit with significant disparities between its Member States and especially their regions. The support of cohesion and balanced development together with increasing level of EU competitiveness belong to the temporary EU's key development objectives. The process of European integration is thus guided by striving for two different objectives: to foster economic competitiveness and to reduce territorial differences (Molle, 2007). Although the EU is one of the most developed world integration with high living standards, there exist economic, social and territorial disparities having a negative impact on the balanced development across Member States and their regions, and thus weaken EU's performance in a global context. In relation to competitiveness objective, performance and efficiency are complementary objectives, which determine the long-term development of countries and regions. An asset for Europe is its rich regional diversity which represents a unique set of potentials and challenges calling for a corresponding targeted policy mix. This regional diversity represented by specific territorial endowment is also possible to consider as a competitive advantage of each region (Poledníková, 2014).

Motivation of this paper is based on mutual relationship between two significant themes presented by performance and competitiveness in the context of regional economy. The aim of the paper is to measure, evaluate and compare efficiency level of NUTS 2 regions within the group of Visegrad Four (V4), i.e. Czech Republic, Hungary, Poland and Slovakia, in comparison with NUTS 2 region of Austria and Germany by application of Data Envelopment Analysis (DEA) models in the reference period 2000–2013. The performance analysis is used for evaluating regional development quality and potential (with respect to the regional factors endowment). Application of DEA method is based on assumption that efficiency of evaluated regions can be seen as the source of regional competitiveness, resp. competitive potential, as it also proposed by Skokan and Staníčková (2011); Staníčková and Melecký (2012, 2015).

2   Importance of efficiency for competitiveness – mutual relationship

Measurement, analysis and evaluation of productivity changes, efficiency and competitiveness are controversial topics acquire great interest among researchers; see e.g. Camanho and Dyson (2006); Khan and Soverall (2007) or Fojtíková (2011). Competitiveness remains a concept that can be understood in different ways and levels despite widespread acceptance of its importance. The concept of competitiveness is distinguished at different levels – microeconomic, macroeconomic and regional; see e.g. Krugman (1994). Competitiveness is monitored characteristic of national economies which is increasingly appearing in evaluating their performance and prosperity, welfare and living standards. The need for a theoretical definition of competitiveness at macroeconomic level emerged with the development of globalization process in the world economy as a result of increased competition between countries. Nowadays, in the global economy regions are increasingly becoming the drivers of the economy and generally one of the most striking features of regional economies is the presence of clusters (Porter, 2003). Current economic fundamentals are threatened by shifting of production activities to places with better conditions. Competitiveness is affected by the regionalization of public policy because of shifting of decision-making and coordination of activities at regional level. Interest has grown in the regional foundations of national competitiveness, and with developing new forms of regionally based policy interventions to help improve competitiveness of every region and hence the national economy as a whole (Halásková and Halásková, 2014).

Territories need highly performing units in order to meet their goals, to deliver the products and services they specialized in, and finally to achieve competitive advantage. Low performance and not achieving the goals might be experienced as dissatisfying or even as a failure. Differences in performance across territories are seen by government as important policy targets. For a number of years, government objectives have been set not only in terms of improving national productivity performance against other countries but also in creating conditions to allow less productive countries to reduce the 'gap' between themselves and the most productive ones. Comparative analysis of performance in public sector is thus starting point for studying the role of efficiency, effectiveness and productivity regarding economic governance of resources utilization by public management for achieving medium/long-term objectives of economic recovery and sustainable development of national economies (Mandl, Dierx and Ilzkovitz, 2008; Kovářová, 2015).

The concept of competitiveness is thus usually linked to productivity. Increasing productivity is generally considered to be the only sustainable way of improving living standards in the long term = the main aim of competitiveness' concept. According to the Institute for Management and Development (IMD), competitiveness measures 'how a nation manages the totality of its resources and competencies to increase the prosperity of its people' (IMD, 2012, p. 502). This understanding of competitiveness and interpretation is thus closely linked with understanding of efficiency and effectiveness, see Figure 1.
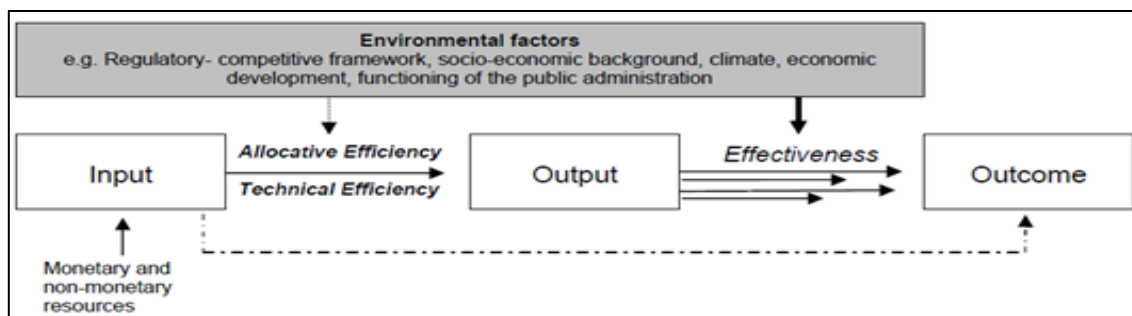
Fig. 1. Relationship between Efficiency and Effectiveness (Source: Mandl, Dierx and Ilzkovitz, 2008)

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3   Measuring of regional efficiency by DEA method – empirical background

With respect to facts mentioned above, the initial hypothesis of analysis is determined. The hypothesis is based on the assumption that *regions achieving best results in efficiency scores are selected NUTS 2 regions in old EU Member States and these regions have the best using of their competitive advantages and therefore the greatest growth potential*. Following efficiency analysis therefore applied to 83 EU NUTS 2 regions within the group of V4 and comparison with regions of advanced EU countries – Austria and Germany.

The efficiency analysis starts from building database of indicators that are part of *Regional Competitiveness Index* (CCI). The aim of this approach is to develop a rigorous method to benchmark regional competitiveness and to identify the key factors which drive the low competitiveness performance of some regions. Eleven pillars may be grouped according to the different dimensions (*input* versus *output aspects*) of regional competitiveness they describe. The terms '*inputs*' and '*outputs*' are meant to classify pillars into those which describe driving forces of competitiveness, also in terms of long-term potentiality, and those which are direct or indirect outcomes of a competitive society and economy; for more details see e.g. Annoni and Kozovska (2010). From this point of view, *methodology of RCI seems to be suitable for measuring regional competitiveness by DEA approach.*

In this paper, database analysis consists of *26 selected indicators* – 13 of inputs and 13 outputs. The reference period started from 2000 to 2010. We do not use all indicators included in RCI because all indicators were not available for the whole period in regional level. The pillars and used indicators are listed in Table 1 and the preferred source has been the *European Statistical Office*.

Table 1. Indicators for Data Envelopment Analysis

Indicators of Inputs	Indicators of Outputs
Total Intramural R&D Expenditure, Labour Productivity per Person Employed, Gross Fixed Capital Formation, Motorway Transport - Length of Motorways, Railway Transport - Length of Tracks, Hospital Beds, Road Fatalities, Total Public Expenditure at Education, Participants in Education, Collective Tourist Accommodation Establishments, Tourism Intensity, Crude Death Rate, Victims in Road Accident.	Gross Domestic Product, Disposable Income, Human Resources in Science and Technology, Patent Applications to the European Patent Office, Employment in technology and knowledge-intensive sectors, Employment Rate (15 to 64 years), Employment Rate (55 to 64 years), Unemployment Rate (15 to 64 years), Unemployment Rate of Young (15 to 24 years), Long-Term Unemployment, Compensation of Employees, Venture Capital, Gross Value Added in Sophisticated Sectors.

Source: Own elaboration, 2016.

Since the method of Data Envelopment Analysis was first introduced by A. Charnes, W.W. Cooper and E. Rhodes in 1978, researchers in a number of fields have quickly recognized that it is an excellent and easily used methodology for modelling operational processes for performance evaluations. This has been accompanied by other developments. DEA is based on simple *Farrell model* for measuring the efficiency of units with one input and one output, which has been found out in 1957. Farrell model has been initially expanded in 1978 by *A. Charnes*, *W.W. Cooper* and *E. Rhodes* (CCR model) and later modified in 1984 by *R. A. Banker*, *A. Charnes* and *W. W. Cooper* (BCC model). DEA methods also include advanced additive models, such as *Slack-Based Model* (SBM) performed by *K. Tone* in 2002 or *Free Disposal Hull* (FDH) and *Free Replicability Hull* (FRH) models that have been firstly formulated in 1984 by *D. Deprins*, *D. Simar* and *H. Tulkens*.

DEA presents a mathematical approach for providing a relative efficiency assessment and evaluating performance of a set of peer entities called Decision Making Units (DMUs) which are mutually comparable – using the same inputs, producing the same outputs, but their performances are

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different and definition of a DMU is generic and flexible. Based on this approach, it is possible to determine if DMU are efficient or inefficient by the size and quantity of consumed resources by the produced outputs (Cook and Zhu, 2008). The efficiency score of DMU in the presence of multiple input and output factors is defined by the following equation (1) (Zhu, 2012):

$$efficiency = \frac{weighted\ sum\ of\ outputs}{weighted\ sum\ of\ inputs}. \tag{1}$$

For calculations of economic efficiency of NUTS 2 regions, ten selected DEA models with multiple inputs and outputs are used: *CCR input oriented model assuming constant returns to scale (CRS), CCR output oriented model assuming CRS, BCC input oriented model assuming variable returns to scale (VRS), BCC output oriented model assuming VRS, SBM additive model not-focusing on input and output assuming CRS, SBM additive model not-focusing on input and output assuming VRS, FDH input oriented model, FDH output oriented model, FRH input oriented model, FRH output oriented model.*

Basic DEA models, *primary CCR input/output oriented models* (with multiple inputs and outputs), assuming constant returns to scale (CRS). In 1984, Banker, Charnes and Cooper suggested a modification of CCR model, which considers variable returns to scale (VRS) (decreasing, increasing or constant) – *BCC input/output oriented models* (with multiple inputs and outputs). VRS enable better identify more efficient units. The assumption of VRS provides a more realistic expression of economic reality and factual relations, events and activities existing in regions.

CCR and BCC models evaluate the efficiency of units (in our case regions) for any number of inputs and outputs. The *coefficient of efficiency* is the ratio between the weighted sum of outputs and the weighted sum of inputs. Each country selects input and output weights that maximize their *efficiency score*. In *DEA models aimed at inputs* the efficiency coefficient of efficient countries (located on the efficient frontier package) always equals 1, while the efficiency coefficient of inefficient countries is less than 1. In *DEA models aimed at outputs* the efficiency coefficient of efficient regions (located on the efficient frontier package) always equals 1, but the efficiency coefficient of inefficient regions is greater than 1. DEA also allows for computing the necessary improvements required in the inefficient region's inputs and outputs to make it more efficient.

CCR and BCC models are *radial*, which means that they contain radial variables θ_q (for models aimed at inputs) and φ_q (for models aimed at outputs). These variables indicate the required level of reduction in all inputs (θ_q) and the rate of increase of all outputs (φ_q) to achieve efficiency. However, *CCR and BCC models must focus on the distinction between inputs and outputs.* SBM additive models measure directly the effectiveness of using additional variables (s^+ and s^-). *In formulation of SBM additive models is not necessary to distinguish between a focus on inputs and outputs.* As mentioned above, in CCR and BCC models, the efficiency coefficient of efficient units always equals 1, while the efficiency coefficient of inefficient units is less/greater than 1. *In SBM models, the efficiency coefficient of efficient units always equals 0, because it is the sum of additional variables for inputs and outputs (s^+ and s^-), which express the distance from the efficient frontier.* The sum of additional variables for inputs and outputs is lower, evaluated unit (in our case regions) is closer to the efficient frontier package and thus has a higher degree of efficiency, and otherwise.

Basic DEA models compare inputs and outputs of evaluated units (country, region) with a linear (convex) combination of inputs and outputs of other units. This unit is not in most cases assessed to really existing unit, but to a kind of virtual unit, which is a combination of inputs and outputs of existing units. The basic idea of FDH model, firstly formulated by *Deprins, Simar* and *Tulkens* in 1984, is unconvexity of set of production possibilities. This means that evaluated unit can be only relatively compared towards really existing units. For comparison with CCR and BCC models, it should be added that limits of efficiency rate are similar to these models, and it depends on model orientation on inputs or outputs. Rate of efficiency, obtained by FDH models, is generally higher than in CCR and BCC models. This is due to the possibility that a production unit is dominated not only by specific production units of set of units (in the case of CCR and BCC models), as well as convex

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combinations of these units. A simple extension of FDH model is FRH model, which unlike FDH model, allows evaluated unit compares with multiplied combinations of other units.

Assuming 83 NUTS 2 regions within evaluated EU countries, each with m inputs and r outputs, the *relatively efficiency score* of a tested region q is obtained by solving equations (2) - (10) (Zhu, 2012).

CCR input oriented model (with multiple inputs and outputs), assuming constant returns to scale (CRS), can be defined by following equation (2):

$$\max \ z = \sum_{i}^{r} u_i y_{iq}, \tag{2}$$

on conditions:

$$\sum_{i}^{r} u_i y_{ik} \leq \sum_{j}^{m} v_j x_{jk}, k = 1, 2, ..., n,$$

$$\sum_{j}^{m} v_j x_{jq} = 1,$$

$$u_i \geq \varepsilon, i = 1, 2, ..., r,$$
$$v_j \geq \varepsilon, j = 1, 2, ..., m.$$

where z is the coefficient of efficiency of unit U_q; u_i weights assigned to the i-th output; v_j weights assigned to j-th input; ε represent a infinitesimal constant; x_{jk} is value of j-th input of unit U_k; x_{jq} is value of j-th input of unit U_q; y_{ik} is value of i-th output of unit U_k; y_{iq} is value of i-th output of unit U_q; m represent inputs; r represent outputs. Variables have the same meaning in equations (3) - (5).

For *CCR output oriented model* (with multiple inputs and outputs), assuming constant returns to scale (CRS), we use following equation (3):

$$\min \ g = \sum_{j}^{m} v_j x_{jq}, \tag{3}$$

on conditions:

$$\sum_{i}^{r} u_i y_{ik} \leq \sum_{j}^{m} v_j x_{jk}, k = 1, 2, ..., n,$$

$$\sum_{i}^{r} u_i y_{iq} = 1,$$

$$u_i \geq \varepsilon, i = 1, 2, ..., r,$$
$$v_j \geq \varepsilon, j = 1, 2, ..., m,$$

where g is the coefficient of efficiency of unit U_q. All of the variables in equation (3) have the same meaning as in equation (2).

BCC input oriented model (with multiple inputs and outputs), assuming variable returns to scale (VRS), can be defined by following equation (4):

$$\max \ z = \sum_{i}^{r} u_i y_{iq} + \mu, \tag{4}$$

on conditions:

$$\sum_{i}^{r} u_i y_{iq} + \mu \leq \sum_{j}^{m} v_j x_{jk}, k = 1, 2, ... n,$$

$$\sum_{j}^{m} v_j x_{jq} = 1,$$

$$u_i \geq \varepsilon, i = 1, 2, ..., r,$$
$$v_j \geq \varepsilon, j = 1, 2, ..., m,$$

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where μ is dual variable associated with convexity condition $e^T\lambda = 1$. All of the variables in equation (4) have the same meaning as in equation (2).

For *BCC output oriented model* (with multiple inputs and outputs), assuming variable returns to scale (VRS), we use following equation (5):

$$\min \ g = \sum_{i}^{m} v_j x_{jq} + v, \tag{5}$$

on conditions:

$$\sum_{i}^{r} u_i y_{ik} \leq \sum_{j}^{m} v_j x_{jk} + v, k = 1, 2, ..., n,$$

$$\sum_{i}^{r} u_i y_q = 1,$$

$$u_i \geq \varepsilon, i = 1, 2, ..., r,$$
$$v_j \geq \varepsilon, j = 1, 2, ..., m,$$
$$v - \text{arbitrary},$$

where v is dual variable associated with convexity condition $e^T\lambda = 1$. All of the variables in equation (5) have the same meaning as in equation (2).

For *SBM additive models* not-focusing on input and output (with multiple inputs and outputs), the following equation is used (6):

$$\max \ z = \left(e^T s^+ + e^T s^-\right), \tag{6}$$

on conditions:

$$\mathbf{X}\lambda + \mathbf{s}^- = \mathbf{x_q},$$

$$\mathbf{Y}\lambda - \mathbf{s}^+ = \mathbf{y_q},$$

$$e^T\lambda \leq = \geq 1,$$

$$\lambda, \mathbf{s}^+, \mathbf{s}^- \geq 0,$$

where z is the coefficient of efficiency of unit U_q; s^+, and s^- are vectors of additional variables for inputs and outputs; λ represent vector of weights assigned to individual units, $\lambda \geq 0$, $\lambda = (\lambda_1, \lambda_2, ..., \lambda_n)$; $e^T\lambda$ is convexity condition according to the nature of returns to scale, ie. for CRS $e^T \lambda = $ arbitrary, for VRS $e^T \lambda = 1$; x_q means value of input of unit U_q; y_q means value of output of unit U_q.

For *FDH input oriented model* (with multiple inputs and outputs), the following equation (7), where θ is required rate of input reduction to achieving the efficient frontier, all of other variables in equation (7) have the same meaning as in equation (2) and (6):

$$\min \ z = \theta - \varepsilon\left(e^T s^+ + e^T s^-\right), \tag{7}$$

on conditions:

$$\mathbf{X}\lambda + \mathbf{s}^- = \theta\mathbf{x_q},$$

$$\mathbf{Y}\lambda - \mathbf{s}^+ = \mathbf{y_q},$$

$$e^T\lambda = 1,$$

$$\mathbf{s}^+, \mathbf{s}^- \geq 0,$$

$$\lambda - \text{binary}.$$

For *FDH output oriented model* (with multiple inputs and outputs), we use following equation (8):

$$\max \ g = \phi_q + \varepsilon\left(e^T s^+ + e^T s^-\right), \tag{8}$$

on conditions:

$$\mathbf{X}\lambda + \mathbf{s}^- = \mathbf{x_q},$$

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$$\mathbf{Y}\lambda - \mathbf{s}^+ = \phi_q \mathbf{y_q},$$

$$\mathbf{e}^{\mathbf{T}}\lambda = 1,$$

$$\mathbf{s}^+, \mathbf{s}^- \geq 0,$$

$$\lambda - \text{binary},$$

where g is the coefficient of efficiency of unit U_q, φ is required rate of input increase to achieving the efficient frontier. Variables in equation (8) have the same meaning as in equation (2) and (6).

For *FRH input oriented model* (with multiple inputs and outputs), the following equation (9), where θ is required rate of input reduction to achieving the efficient frontier, all of other variables in equation (9) have the same meaning as in equation (2) and (6):

$$\min \ z = \theta - \varepsilon \left(\mathbf{e}^{\mathbf{T}}\mathbf{s}^+ + \mathbf{e}^{\mathbf{T}}\mathbf{s}^- \right), \tag{9}$$

on conditions:

$$\mathbf{X}\lambda + \mathbf{s}^- = \theta \mathbf{x_q},$$

$$\mathbf{Y}\lambda - \mathbf{s}^+ = \mathbf{y_q},$$

$$\mathbf{s}^+, \mathbf{s}^- \geq 0,$$

$$\lambda \geq 0,$$

$$\lambda - \text{integer}.$$

For *FRH output oriented model* (with multiple inputs and outputs), the following equation (10), where all of the variables in equation (8) have the same meaning as in equation (2), (6) and (8).

$$\max \ g = \phi_q + \varepsilon \left(\mathbf{e}^{\mathbf{T}}\mathbf{s}^+ + \mathbf{e}^{\mathbf{T}}\mathbf{s}^- \right), \tag{10}$$

on conditions:

$$\mathbf{X}\lambda + \mathbf{s}^- = \mathbf{x_q},$$

$$\mathbf{Y}\lambda - \mathbf{s}^+ = \phi_q \mathbf{y_q},$$

$$\mathbf{s}^+, \mathbf{s}^- \geq 0,$$

$$\lambda \geq 0,$$

$$\lambda - \text{integer}.$$

For solution of DEA models stated above, software tools based on solving linear programming problems, e.g. *Solver in MS Excel*, such as the *DEA Frontier* is used in this paper.

4   Evaluation of regional efficiency in V4 countries, Austria and Germany by DEA models

The initial assumption that ´*areas achieving best results in efficiency are areas best at converting inputs into outputs and therefore having the greatest performance and productive potential*´ was partly confirmed by analysis as shown in following evaluation. The best results are traditionally achieved by economically powerful regions (in most cases) which were *efficient* during the whole referred period, so the resulting efficiency index is equal to 1 in CCR, BCC, FDH and FRH models or sum of values of additional variables is equal to 0 in SBM models. This means that the outputs achieved were greater than those incurred inputs. *Efficient* V4, Austria and Germany NUTS 2 regions are mentioned by dark grey colour and bold font in Table 1 in appendix. Group of efficient regions includes the regions of the capital cities of the Czech Republic (*Prague*), Slovakia (*Bratislava Region*), Poland (*Warszawa*), Austria (*Wien*) and Germany (*Berlin*). The socio-economic situation of these regions is significant different from other regions, this fact confirms the combination of the regions to one homogeneous group. This homogenous group of efficient regions includes the regions of capital city *Prague*, *Bratislava Region*, *Wien* and *Berlin*, and the capital cities have separated from other regions, this confirms the persistent disparities between metropolitan areas and the rest of regions. There are also other cohesion regions in the Czech Republic – *CZ01 (Prague)* and *CZ02*

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(Central Bohemia). In Poland, the one effective province is region *PL12 (Mazowieckie).* In Slovakia there is an effective region *SK01 (Bratislava Region).* In Austria, we have found out three effective regions – *AT13 (Wien), AT21 (Kärnten)* and *AT33 (Tirol).* In Germany, the group of effective regions confirm of *DE11 (Stuttgart), DE12 (Karlsruhe), DE30 (Berlin), DE50 (Bremen), DE60 (Hamburg), DE71 (Darmstadt), DE80 (Mecklenburg-Vorpommern), DE92 (Hannover), DEA1 (Düsseldorf), DEA2 (Köln), DED2 (Dresden)* and *DEF0* (*Schleswig-Holstein*). The best final position is thus reached by performance of regions with agglomerations of major cities and regions in their surroundings, and big industry cities. These regions, in the frame of hypothesis, could be regions with the best competitive potential and perspective to further development. analysis at regional level also showed that *in Hungary we find no region* classified as an effective during the reference period.

To the group of effective regions, it is possible include also regions which were not *efficient* during the whole referred period, but the resulting efficiency index was equal to 1 in CCR, BCC, FDH and FRH models or sum of values of additional variables is equal to 0 in SBM model in several years in the reference period. These regions are *DE22 (Niederbayern)* in Germany and *AT11 (Burgenland)* in Austria. These regions are mentioned by light grey colour and italics font in Table 1 in appendix.

The efficient regions are followed by a group of regions which are *slightly inefficient.* These regions do not achieved efficiency equal to 1 in CCR, BCC, FDH and FRH models or low sum of values of additional variables in *SBM* models, but their efficiency indices reached consistently highly effective values close during the referred period (coloured by light grey colour in Table 1 in appendix). There are NUTS 2 regions in Poland *PL43 (Lubuskie)* and *PL52 (Opolskie),* in Austria *AT22 (Steiermark)* at *32 (Salzburg).* In Germany, *DE13 (Freiburg), DE14 (Tübingen), DE21 (Oberbayern), DE23 (Oberpfalz), DE24 (Oberfranken), DE25 (Mittelfranken), DE26 (Unterfranken), DE91 (Braunschweig), DE93 (Lüneburg), DE94 (Weser-Ems), DEA3 (Münster), DEA4 (Detmold)* and *DEA5 (Arnsberg)* belong to the group of slightly efficient regions.

Other regions are classified as *ineffective* in CCR, BCC, FDH, FRH and SBM models, i.e. these regions are considered as non-competitive. *Most inefficient* regions are highlighted by ultra-light grey colour and italics font in Table 2. There is the least efficient NUTS 2 region in Poland, there are the least efficient NUTS 2 provinces *PL21 (Malopolskie), PL31 (Lubelskie)* and *PL32 (Podkarpackie).*

Table 1 in appendix also shows position of individual V4, Austria and NUTS 2 regions within selected models in terms of the order of achieved average values of coefficients of efficiency (CE) in CCR, BCC, FDH and FRH models, or sum of values of additional variables in SBM models, over the period 2000–2010. The overall evaluation of individual V4 regions shows that the best results, in terms of efficiency in all used DEA models, have reached effective regions. *These regions:* in the Czech Republic *CZ01 (Prague)* and *CZ02 (Central Bohemia),* in Poland *PL12 (Mazowieckie),* in Slovakia *SK01 (Bratislava Region),* in Austria, *AT13 (Wien), AT21 (Kärnten)* and *AT33 (Tirol)* and in Germany *DE11 (Stuttgart), DE12 (Karlsruhe), DE30 (Berlin), DE50 (Bremen), DE60 (Hamburg), DE71 (Darmstadt), DE80 (Mecklenburg-Vorpommern), DE92 (Hannover), DEA1 (Düsseldorf), DEA2 (Köln), DED2 (Dresden)* and *DEF0* (*Schleswig-Holstein*); *have thus ranked first positions* among all evaluated regions during reference period. In *second place, there* is German region *DE22 (Niederbayern).* In *third place* was Austrian region *AT11 (Burgenland).*

Table 1 in appendix shows also position of regions that have placed in last places in overall ranking. These regions have achieved the worst results in terms of efficiency scores in all used DEA models. At *53th place,* thus the third worst place in final order is placed polish region *PL21 (Malopolskie).* At *54th place* is again polish region *PL31 (Lubelskie).* The *least efficient region* (placed at *55th place*) is polish region *PL32 (Podkarpackie).*

The best results in the Czech Republic have reached following regions: *CZ01 (Prague)* and *CZ02 (Central Bohemia).* The worst results and also last position, in the Czech Republic has been reached by region *CZ04 (Northwest).* In Hungary, the best results and also first position, region *HU31 (Észak-Magyarország-Northern Hungary)* has reached. The worst results and also last position, in Hungary has reached region *HU33 (Dél-Alföld- Southern Great Plain).* The best results and also first position,

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in Poland has reached region *PL12 (Mazowieckie).* The worst results and also last position, in Poland has reached region *PL32 (Podkarpackie).* In Slovakia, the best results and also first position, region *SK01 (Bratislava Region)* has reached. The worst results and also last position, in Slovakia has reached region *SK04 (East Slovakia).* In Austria, the best results and also first positions have reached regions *AT13 (Wien)*, *AT21 (Kärnten)* and *AT33 (Tirol).* The worst results and also last position, region *AT12 (Niederösterreich)* has reached in Austria. The best results and also first positions have reached regions *DE11 (Stuttgart), DE12 (Karlsruhe), DE30 (Berlin), DE50 (Bremen), DE60 (Hamburg), DE71 (Darmstadt), DE80 (Mecklenburg-Vorpommern), DE92 (Hannover), DEA1 (Düsseldorf), DEA2 (Köln), DED2 (Dresden)* and *DEF0 (Schleswig-Holstein*) in Germany. The worst results and also last position, region *DED3 (Leipzig)* has reached in Germany.

5   Conclusion

A European dimension is becoming essential for effective development of smaller or larger NUTS 2 regions. Geographic, demographic and cultural heterogeneity of the EU brings also differences in socio-economic position of Member States, and especially their regions. Different results in economic performance and living standards of the population indicate the status of the competitiveness of country and its regions. Each territory should know were lying its competitive advantages and advantages and try to strengthen its advantages and reduce its disadvantages, i.e. key factors of competitiveness. Among the important driving forces influencing future territorial development are demographic development, economic integration, transport, energy, agriculture and rural development, climate change, further EU enlargements and territorial governance. Current attention is focused on soft factors such as human, cultural and socio-institutional capital (Klímová, 2014).

The aim of this paper was to present efficiency evaluation of V4 countries, Austria and Germany, and their NUTS 2 regions in the reference period 2000–2013, through specific multi-criteria approach. The analysis evaluated the degree of relevance of ten selected DEA models for measuring regional efficiency. DEA have generated relatively *comparable results*, throughout reference period and models. The initial assumption has been *confirmed* through empirical analysis at regional level. At regional level, NUTS 2 regions with capital cities (*Prague*, *Warszawa, Bratislava*, *Wien* and *Berlin*) have had significant and different socio-economic position from the other regions in reference period. Therefore, these regions have tended to be naturally grouped into one homogeneous group of efficient regions that has separated from the other regions. At the end of reference period can be monitored the increasing of the similarity (reducing the disparities) of less and more developed regions within level of efficiency. Development in regions of V4 countries has a trend towards regions of Austria and Germany. Despite of this fact, the significant disparities has persisted between the regions in V4 countries compared to Austria and Germany regions, between regions of capital cities and high and less developed regions in all evaluated countries.

Based on DEA analysis has been found out that in evaluated regions there is a *distinct gap* between economic and social standards, so *differences still remain*. Regarding the findings and the analysis each country and region can decide whether it had a level of efficiency and productivity trend increase during the time period, or not. By having this information and dividing efficiency and subsequent productivity into its elements, the basic trend in efficiency level and productivity trend whether it be increase or decrease is observed. According to DEA models, it is necessary to note that in all evaluated regions was mostly achieved noticeable efficiency and productivity increases and thus performance strengthening during reference period. Most regions experienced decline in their performance (outputs decline as a result of declines in inputs) as a result of economic crisis. The crisis has underscored importance of competitiveness, supporting economic environment to enable economies to better absorb shocks and ensure solid performance going into the future.

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Appendix

Table 1. Comparison of Efficiency Results in selected DEA Models: CCR, BCC, FDH, FRH and SBM for NUTS 2 regions in V4, Austria and Germany

Region	DEA MODELS										Absolute Rank of Region**
	CCR IO	CCR OO	BCC IO	BCC OO	SBM CRS	SBM VRS	FDH IO	FDH OO	FRH IO	FRH OO	
	CE*	CE*	CE*	CE*	CE*	CE*	CE*	CE*	CE*	CE*	
CZ01	1.000	1.000	1.000	1.000	0	0	1.000	1.000	1.000	1.000	1.
CZ02	1.000	1.000	1.000	1.000	0	0	1.000	1.000	1.000	1.000	1.
CZ03	0,850	1.224	0.889	1.263	17,180	16,193	0,850	1.244	0.853	1.236	27.
CZ04	0.571	1.705	0.829	1.575	37,810	30,654	0.671	1.625	0.929	1.545	42.
CZ05	0.867	1.201	0.908	1.248	16,299	16,011	0.867	1.299	0.978	1.218	26.
CZ06	0.696	1.713	0.735	1.665	25,406	18,260	0.756	1.653	0.835	1.545	35.
CZ07	0.864	1.190	0.914	1.246	16,129	11,233	0.898	1.247	0.964	1.203	22.
CZ08	0.760	1.249	0.928	1.209	20,742	15,720	0.860	1.214	0.978	1.187	31.
HU10	0.841	1.148	0.889	1.127	18,090	17,360	0.866	1.137	0.892	1.118	28.
HU21	0.756	1.254	0.858	1.231	31,366	27,356	0.765	1.242	0.873	1.221	38.
HU22	0.814	1.181	0.865	1.186	19,022	17,176	0.834	1.175	0.875	1.148	30.
HU23	0.666	1.334	0.769	1.301	45,971	31,696	0.701	1.329	0.882	1.267	44.
HU31	0.820	1.176	0.996	1.072	19,759	11,121	0.868	1.157	0.998	1.059	24.
HU32	0.642	1.477	0.976	1.082	24,746	18,349	0.673	1.435	0.984	1.077	34.
HU33	0.611	1.550	0.911	1.361	45,753	39,540	0.634	1.527	0.923	1.299	45.
PL11	0.544	1.690	0.885	1.689	123,986	112,113	0.664	1.668	0.891	1.623	51.
PL12	1.000	1.000	1.000	1.000	0	0	1.000	1.000	1.000	1.000	1.
PL21	*0.489*	*1.827*	*0.853*	*1.894*	*139,856*	*120,728*	*0.591*	*1.856*	*0.889*	*1.826*	*53.*
PL22	0.562	1.537	0.763	1.564	113,971	94,457	0.681	1.401	0.890	1.414	50.
PL31	*0.442*	*2.082*	*0.848*	*2.254*	*141,554*	*129,136*	*0.467*	*1,989*	*0.875*	*2.228*	*54.*
PL32	*0.560*	*1.650*	*0.880*	*1.786*	*155,891*	*122,667*	*0.576*	*1.635*	*0.895*	*1.732*	*55.*
PL33	0.495	1.699	0.736	1.598	133,971	104,457	0.681	1.421	0.875	1.452	52.
PL34	0.662	1.437	0.863	1.464	103,971	95,457	0.679	1.426	0.884	1.445	49.
PL41	0.732	1.298	0.896	1.330	57,843	48,898	0.775	1.274	0.905	1.315	47.
PL42	0.811	1.168	0.933	1.189	64,149	41,274	0.836	1.149	0.948	1.168	46.
PL43	0.997	1.003	1.000	1.000	0,984	0	0.999	1.001	1.000	1.000	4.
PL51	0.866	1.118	0.980	1.080	25,797	16,279	0.889	1.098	0.996	1.023	32.
PL52	0.951	1.059	0.977	1.048	5,489	4,212	0.973	1.041	0.985	1.032	9.
PL61	0.814	1.212	0.949	1.193	65,744	50,638	0.838	1.199	0.952	1.174	48.
PL62	0.789	1.240	0.974	1.229	43,072	26,810	0.801	1.227	0.981	1.211	43.
PL63	0.827	1.158	0.946	1.154	31,255	28,873	0.842	1.145	0.959	1.136	39.
SK01	1.000	1.000	1.000	1.000	0	0	1.000	1.000	1.000	1.000	1.
SK02	0.834	1.110	0.876	1.072	13,476	8,622	0.855	1.089	0.887	1.562	20.
SK03	0.789	1.146	0.812	1.186	26,928	17,908	0,813	1.113	0.828	1.099	36.

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SK04	0.676	1.184	0.699	1.219	34,955	32,634	0.701	1.168	0.723	1.147	41.
AT11	*0.997*	*1.003*	*1.000*	*1.000*	*0,961*	*0*	*0.999*	*1.001*	*1.000*	*1.000*	*3.*
AT12	0.914	1.081	0.965	1.086	9,022	7,176	0.934	1.075	0.975	1.048	18.
AT13	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
AT21	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
AT22	0.951	1.059	0.977	1.048	3,489	2,212	0.973	1.041	0.985	1.032	6.
AT31	0.934	1.030	0.976	1.022	3,476	1,622	0.955	1.025	0.987	1.002	5.
AT32	0.967	1.101	0.988	1.048	6,299	5,011	0.987	1.089	0.995	1.023	12.
AT33	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
AT34	0.941	1.048	0.989	1.027	6,090	5,360	0.966	1.037	0.992	1.018	13.
DE11	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DE12	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DE13	0.969	1.099	0.991	1.035	5,999	5,017	0.989	1.075	0.997	1.019	10.
DE14	0.968	1.102	0.989	1.041	6,032	5,991	0.982	1.087	0.996	1.020	16.
DE21	0.960	1.103	0.980	1.084	6,199	5,081	0.972	1.099	0.984	1.069	12.
DE22	*0.998*	*1.002*	*1.000*	*1.000*	*0,764*	*0*	*0.999*	*1.001*	*1.000*	*1.000*	*2.*
DE23	0.951	1.059	0.977	1.048	5,099	4,105	0.973	1.041	0.985	1.032	8.
DE24	0.967	1.101	0.988	1.048	6,242	5,009	0.987	1.089	0.995	1.023	11.
DE25	0.953	1.055	0.980	1.045	5,075	4,071	0.978	1.039	0.989	1.027	7.
DE26	0.964	1.105	0.984	1.054	6,329	5,233	0.978	1.099	0.980	1.051	14.
DE27	0.864	1.190	0.914	1.246	16,129	15,233	0.898	1.247	0.964	1.203	25.
DE30	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DE41	0.867	1.201	0.908	1.248	16,299	16,011	0.867	1.299	0.978	1.218	26.
DE42	0.834	1.210	0.876	1.272	23,476	18,622	0.855	1.389	0.887	1.362	33.
DE50	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DE60	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DE71	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DE72	0.914	1.081	0.965	1.086	9,222	8,176	0.934	1.075	0.975	1.076	19.
DE73	0.922	1.079	0.971	1.070	8,992	7,089	0.942	1.069	0.981	1.079	17.
DE80	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DE91	0.989	1.026	0.992	1.016	6,928	4,908	0,993	1.013	0.995	1.009	15.
DE92	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DE93	0.953	1.055	0.980	1.045	5,075	4071	0.978	1.039	0.989	1.027	7.
DE94	0.964	1.105	0.984	1.054	6,329	5,233	0.978	1.099	0.980	1.051	13.
DEA1	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DEA2	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DEA3	0.989	1.026	0.992	1.016	6,928	4,908	0.993	1.013	0.995	1.009	15.
DEA4	0.953	1.055	0.980	1.045	5,075	4,071	0.978	1.039	0.989	1.027	7.
DEA5	0.964	1.105	0.984	1.054	6,329	5,233	0.978	1.099	0.980	1.051	14.
DEB1	0.934	1.130	0.976	1.112	13,476	11,622	0.955	1.115	0.987	1.092	21.
DEB2	0.914	1.081	0.965	1.086	29,022	27,176	0.934	1.075	0.975	1.048	37.
DEB3	0.922	1.079	0.971	1.070	18,992	17,089	0.942	1.069	0.981	1.039	29.
DEC0	0.964	1.105	0.984	1.054	6,329	5,233	0.978	1.099	0.980	1.051	14.
DED1	0.820	1.176	0.896	1.072	19,759	11,121	0.868	1.157	0.898	1.149	22.
DED2	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DED3	0.864	1.190	0.914	1.246	36,129	25,233	0.898	1.247	0.964	1.203	40.
DEE0	0.914	1.081	0.965	1.086	29,022	27,176	0.934	1.075	0.975	1.048	37.
DEF0	**1.000**	**1.000**	**1.000**	**1.000**	**0**	**0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.**
DEG0	0.934	1.130	0.976	1.112	13,476	11,622	0.955	1.115	0.987	1.092	21.

Note: * Coefficient of efficiency = average efficiency rate of country in period 2000-2013; ** Absolute ranking of V4, Austria and Germany NUTS 2 regions is based on their rank in DEA models in period 2000-2013
Source: Own calculation and elaboration, 2016.

REFERENDUM ABOUT "BREXIT" AND FURTHER DEVELOPMENT IN GREAT BRITAIN

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Abstract
The aim of this paper is to analyze the situation after referendum about the withdrawal of Great Britain from the European Union. Moreover, I will try to predict further development in the UK. We know that euroscepticism is growing and supporters of this attitude keep a permanent struggle with their opponents. People from the first group believe that UK gets a big boost from membership and it would be wrong to give up this matter. On the contrary, the other side says something else. According to them, it threatens the creation of a "United States of Europe." British society is highly polarized in these days. In/out referendum will be held on 23 June this year and it is very difficult to say what results can bring. European political elite is afraid and does not accept British leaving from the EU. UK´s position outside the Union would have far-reaching consequences on economic and trade policy of all interested countries. Referendum is seen as the biggest political decision in decades. The EU has changed a lot since its beginning and it is clear that this institution gains more and more control over citizens´ lives. But what is better for Great Britain, stay in or go out? There is no universal answer to this question. It depends which way we look at it or what we believe is important.

Keywords
Brexit, European Union, policy of changes, David Cameron, repetition of the referendum

JEL Classification
F52, F55, J68

1   Introduction

Brexit became a reality. A historic referendum held on Thursday June 23. But what is going to happen now that Britain has voted to leave the European Union? The British citizens have voted for withdrawal from the EU in a decision which will transform this nation forever. In my opinion, it is very difficult to say, what will happen next. In my contribution I will try to identify the key factors for further development in Great Britain after the in/out referendum. I will also define the impact of Brexit through concrete channels or sectors. There were for example sectors like regional policy, economics or migration. One of the aims of this paper is to compare the situation of Britain with other member states where we can see strong anti-EU moods. Across the Europe it was thought that Brexit will not be successful and UK stay the strong member of this supranational political organization. No one can imagine the future model of functioning within the EU. The outcome has prompted jubilant celebrations among Eurosceptics around the UK and sent shockwaves through the global economy. After the result, the pound fell to its lowest level since 1985 and David Cameron resigned as Prime Minister of this country. The Conservative 1922 Committee said his successor should take up office by September 2, at which point the UK would embark on its two-year political divorce from the EU (Foster, 2016). But there is now a short moment for reflection before Cameron's successor triggers this legal mechanism (Article 50 of the EU rulebook), which gives the UK two years to leave the Union. The Brexit vote has also reactivate calls for a second Scottish independence referendum and brought the resignation of Labour leader Jeremy Corbyn due to his weak support for the EU. Besides that, Spain has also called for joint control of Gibraltar and nationalist party of Sinn Fein is demanding a vote to reunite Ireland and Northern Ireland.

Meanwhile, the EU's leaders have called for the urgent opening of negotiations on Brexit. President of the European Parliament Martin Schulz declared that British Government should formally request

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for the withdrawal as soon as possible. According to him, the optimal alternative is EU summit which is planned on 28 and 29 June. Second day of the summit will take place without the participation of British delegates. Schulz also warned that delaying this step and temporization of the British Conservative Party is harmful to all. One of the first victims of Brexit was British European Commissioner for financial stability, services and capital union Jonathan Hill. He announced his resignation due to the results of the referendum on Saturday June 25. Hill sought to remain in the EU (ČTK, 2016). British commissioner´s agenda will assume Vice-President of the European Commission for the euro Valdis Dombrovskis from Latvia. Consequently, British withdrawal triggered similar reactions in other member states. Anti-immigration and nationalist parties in the Netherlands, Denmark, Sweden and France have called for a referendum about membership in the European Union, while Italian Movement of Five Stars announced that it will further promote the vote about the euro. After the results´ announcement launched a mass campaign for new vote. Thousands of Britons are asking after the close vote in favor of Brexit new referendum about membership in the European Union. 60 thousand people signed during the first day a petition to organize the new referendum about the UK's membership. According to British law, the government must respond to all the initiatives which have supported more than 10 thousand people. When there are more than 100 thousand signatures, parliament must deal with these requests. The petition was started in late May, but now sign it thousands of other people. The petition calls for a second referendum in the case that at 75 per cent participation in the first plebiscite neither side has not received at least 60 per cent support.

2   Economic impacts of Brexit

United Kingdom is the second largest European economy (Germany is the first). London´s financial market is the largest in the EU (ensures 25 per cent of all services provided in the EU, 40 per cent of financial services exports to the Union). More than 50 per cent of all UK exports go to the EU, while 14 per cent of import comes from the euro area. These facts speak clearly. Economic impacts of Brexit will be massive. Finance minister George Osborne said that Britain would have to raise taxes and cut spending to deal with the economic challenge posed after Britons voted to leave the European Union. Politicians are absolutely going to have to provide fiscal security to people and going to have to show the country and the world that the government can live within its means. Osborne said Britain would be poorer due to the public's decision to leave the EU, which he had campaigned against, and that the country now needed to deal with the economic consequences, as well as to tackle new social divisions Before the referendum Osborne said Britain would need an emergency budget to impose extra austerity if the country voted to leave the EU, but on Monday after the vote he said this would have to wait until Conservative party members elected a new leader (Milliken, 2016).

The British economy will likely be damaged by the decision. According to some experts, Brexit could well be the worst self-inflicted policy wound by a G7 country since the formation of the G7 40 years ago. The real question is how much the shadow of uncertainty spreads to other countries around the world. The 'Leave' vote paves the way for a period of political and economic uncertainty. We can expect that it will have a negative impact on UK growth and potentially spill over to other European countries (Phillips, 2016). On the contrary, leader of Eurosceptics and also the leader of UKIP Nigel Farage said that the Brexit vote is good news for exporters who have struggled with the high value of the pound. Great Britain has voted to leave the EU and it will no longer have to contribute billions of pounds a year towards the European Union's budget. Yes, Farage is right, but this issue is much more complicated. We can see that regions of the UK being supported by European Union funding are seeking guarantees that grants they will now not receive will be provided by the UK Government. Councils in Yorkshire were due to be given £600m of EU grants to help boost the area's economy before 2020, while Cornwall was expecting a further £400m. In total, £3.6bn was due to be spent in the UK under the EU's European Regional Development Fund between 2014 and 2020. Several roads, regeneration projects and energy schemes have also been given EU cash. And like

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farmers in other wealthier parts of the UK, people in the county raising animals for food or growing crops would have received an average of £16,000 a year in subsidies from the Common Agricultural Policy (Sky News, 2016). Part of the UK's EU funding was expected to head to Wales which was due to benefit from around £1.8bn in European Structural Funds between 2014 and 2020. It is important to say that West Wales and the Valleys region, which covers 15 local authority areas, had been identified as the poorest region in north-western Europe - poorer even than parts of Bulgaria and Romania.
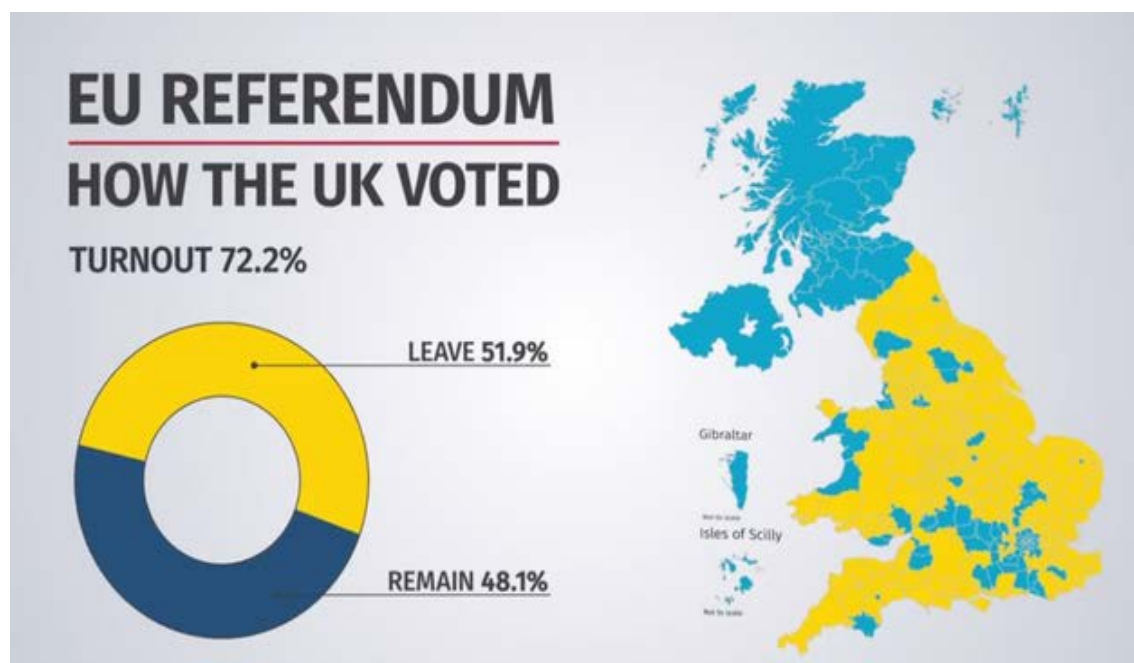
Fig. 1: Referendum turnout (Source: author, huffingtonpost.co.uk.)

3   Regional impacts of Brexit

Scotland unanimously voted to remain, Northern Ireland was largely remain, but Wales were almost entirely leave. The basis of Brexit was in northern England and Wales. Conversely, Scotland, Northern Ireland and London chose rather to remain in the Union. The surprise is the choice of the Welshmen, who receive financial aid in the form of EU funds. The greatest desire to remain in the EU was appeared by Scots. Every single council area in Scotland voted to stay the EU. Overall, 62% of the ballot papers were marked in favour of remain. The result is that another referendum on Scottish independence is almost inevitable. And this time, David Cameron and his government have no chance to block it. Cameron previously insisted that only by staying part of Britain could Scotland guarantee its place in the EU. Now is the situation very different. Many of those who voted to stay in the UK two years ago did so because they wanted to reject a narrow nationalism and its insular view of the world. Friday's result has recast independence as the positive, outward-looking option for Scotland (Clegg, 2016).

We could not expect these shattering results in Wales They comes on the heels of last month's election when UKIP rocked the political establishment by winning seven of the 60 seats in the Assembly. Another surprising reason of Wales´ rejection is the large amount of money coming from the EU. A major report by Cardiff University's Wales Governance Centre this year found that Wales receives £245m more from the EU than it pays in – the equivalent of £79 a head. Wales has received around £4bn in EU funding since 2000. Of Wales 22 local authorities, just five had a majority wanting

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to stay in the EU. There is nothing like the level of support for independence seen in Scotland in Wales, but both Labour and Plaid Cymru will be pushing for major changes to the nation's place in the UK. It is clear that the relationship between devolved administrations and the UK Government must now be placed onto an entirely different footing (Williamson, 2016).

A difficult situation can be expected also in Northern Ireland. The whole country is now to be dragged out of Europe against the wishes of the voting majority. The difference between supporters and opponents was about 90,000 votes. Of Northern Ireland's 18 constituencies, 11 voted remain and seven voted leave with clear division between nationalists and unionists. There was a curious contradiction between political leaders. The First Minister, Arlene Foster, who is ultra pro-unionist, demanded a non-EU road of Northern Ireland. On the other hand, Deputy First Minister, Martin McGuinness, tried to persuade citizens to vote remain. The greatest paradox is that he holds the position of Sinn Fein's chief negotiator and performs as a pro-nationalist. Ulster benefits from EU funds in the same way as Wales – markedly. In the last 21 years, Northern Ireland has benefited from three peace programmes and whopping financial contribution of EUR 1.3 billion. The question is - what will be the next situation of this issue. There are several complex problems which Northern-Irish politicians have to solve. I can give a few of them:
- Around 55% of Northern Ireland's manufacturing goes to the EU, most of this to the Irish Republic but Brexit risks leaving the UK without access to the single market.
- The EU's Common Agricultural Policy accounts for nearly 85% of farm income across Northern Ireland and the aid figure until 2020 is estimated at around €3 billion.
- Possible decline in relations between Northern Ireland and Irish Republic because of for border checks (Beattie, 2016)

Regions of Great Britain already have experience with the referendum about the EU membership. A vote held in 1975 and the question were simple – "Do you think the UK should stay in the European Community (Common Market)?" Results were quite clear at that time. More than 67 per cent of voters were in favor of staying. We can see that public opinion has turned in 40 years.

4   New era of migration

Migration has been one of the central topics before the referendum. The UK was one of three countries which decided to fully open the labour market to citizens of new member states in 2004. Only two other countries of the "Old Fifteen" (Ireland and Sweden) took a similar approach. In Britain this decision transformed the company: Polish is now the second most frequently used language. A significant part of the British society is not excited by this fact. Despite the fact that EU citizens are now less than half of the net immigration to the UK, they are blamed for the rise of immigration into the country for the past twenty years, as well as the problems that it attributed (whether rightly or not). And it is true that the vast majority of analytical studies about the impact of migration on the labour markets show that immigration has not a negative effect on unemployment or wages (Fidrmuc, 2016). Conversely, migrants from the new member states are mostly employed and contribute to the state budget significantly more in taxes than draw from it in the form of contributions and public services. Now is the situation perceived from the opposite view. Britons are becoming migrants themselves. Of course, they want to ensure that in the future can seamlessly travel to EU countries. More and more foreign British citizens try to obtain an Irish passport. They do not want to lose the benefits which membership offers. The same scenario we can see in Sweden. The number of British citizenship applications here increased by 500 per cent. For Swedish citizenship apply twenty people from the UK weekly on average. But last week there were 129 applications. We expect that a similar situation will exist in other countries, particularly in Scandinavia. A lot of people from Great Britain live here. Citizenship is also offered to British people by Bulgaria, Romania and other states.

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Fig. 2: Europe referendum 1975 v 2016 (Source: BBC)

Eurosceptics say Brexit will allow Britain to take back control of its borders in order to curb immigration and increase security. Britain will no longer have to accept free movement of people from Europe, which Brexiteers say puts pressure on public services. Brexit campaigners have said that Britain will be free to impose an "Australian-style points system" to better manage immigration and fill skill shortages here. But the Remain campaign believes that Brexit will hit the British economy, which relies on the free movement of EU migrant workers such as health professionals. Some Europhiles also said that Brexit will compromise the UK's ability to fight cross-border crime and terrorism. David Cameron even said he suspects that ISIS leader Abu Bakr al-Baghdadi would be happy when Britain leaves the EU (Foster, 2016). So activity of terrorist group ISIS can be an important factor. If it manages to secure Britain from the bombers, Eurosceptics will regard it as their political victory. In fact, they are convinced that free movement of people allows easy entry of terrorists into the country.

The present migration crisis may also undermine relations between Britain and France which are already strained. France will be apparently more demanding of the UK with regard to migrants in Calais camps. Brexit created an obvious political context for the discussion of Le Touquet treaty. The deal was reached between the UK and France back in 2003 and defined the rules of border control between the two countries. The Treaty of Le Touquet stipulated that France would carry out border checks in Calais to intercept those seeking to make illegal crossings to the UK. This deal regulates border controls and police, judicial cooperation in criminal matters, civil protection and migration. It came into force in 2005. The asylum seekers, who are mainly from Middle East, Africa and Afghanistan have travelled to France with the hope of crossing the English Channel to the UK, after having had their applications rejected elsewhere, or in expectation of better prospects in Britain than

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in the rest of the EU (Russia Today, 2016). The mass of migrants still lives in temporary refugee camp in Calais. It is possible that they will want to move violently through the EuroTunnel. France has threatened some time ago that it can stop to guard the coastal border if Great Britain leaves the European Union. The massive transfer of migrants would be a disaster for the residents of Calais and Dover as well as for the surrounding regions and roads linking them. "Furthermore, it is now a threat for the entire European logistics and freight industry, together with companies that rely on scheduled goods being delivered on time." (Bertrand, 2016)

5   Undermined support of the European Union

It is clear that the European Union will require a major reform. Public confidence is falling down and it seems that the Brussels´ administration is far from actual reality. The UK is going to begin the negotiations about the terms of its exit and new trade agreements. Representatives of European institutions have refused the talks with Scotland and probably we will see another referendum on independence in this region. As we know, Scots want to remain in the EU and it will be likely not possible within the Great Britain. Economically unstable members of the Union are already afraid of future. Brexit could lead to a potential exit of Greece and we have to say that this state has repeatedly threatened. Problematic members are also Italy, Spain and Portugal because of its economic results. Politicians from several countries have already announced the same attempt to hold a referendum – we can mention Germany, Netherlands, Belgium or France. The National Front in France will seize on Brexit ahead of the presidential election next year, in Germany would anti-EU moods stir up ahead of the federal elections also next year. Denmark, Finland and Sweden would lose the UK as a free trade ally in the European Union. Generally, group of the Nordic countries will suffer from the consequences of Brexit as one of the most. Euroscepticism is growing also in Central Europe. Hungarian Prime Minister Viktor Orban is permanently in dispute with EU politicians. A difficult situation is in Poland. Country began to move away from the European policy after the formation of new government headed by Beata Szydlo. Slovakia sued the European Union because of quotas for migrants. Prime Minister Robert Fico said that he will never assume the refugees according to the will of Brussels. In regards to asylum system, it is also necessary to implement radical changes, while better coordination of activities between the individual Border and Foreigner Police Offices with the competent Migration Offices. These countries will assist to the total acceleration in registration process, interviews and the examination of the cases. From that point of view should be considered to substantially increase the number of decision makers, interpreters, analysts and other professionals, including social workers, who are significantly involved in the asylum process with illegal migrants (Horváth, 2016, p. 372).

6   Conclusion

Before the vote, European Council president Donald Tusk warned that the long-term consequences of Brexit are dangerous and completely unpredictable. His claims were rubbished by Brexit campaigners who wanted to take the once-in-a-lifetime chance to set Britain free from Brussels rule and take back control of UK borders. After Britons voted to leave the EU, there were huge celebrations among Brexit campaigners and Eurosceptics across Britain. Anti-EU politicians throughout Europe also welcomed Brexit and looked to seize on the result in order to further their own causes and pushes for independence (Foster, 2016). However, now is the approach of Brexit supporters a little bit different. The two most prominent persons of Brexit Boris Johnson and Nigel Farage claim that there is no need to rush with exit negotiations. They believe that a vote for withdrawal from the EU does not mean that the UK will be less integrated or less "European". On the contrary, EU representatives do not share this opinion. The EU thinks that in the current situation is not possible for the UK to chair the Union in 2017. It is questionable what position will maintain

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leadership of the Union. Slovak political analyst Jan Baranek observes that responsibility for this situation is also on their shoulders. He is convinced that all leaders of EU should resign. Good example for them is David Cameron who abdicated immediately after the referendum. Brexit is not just an issue of Britain. But resignation of Tusk, Schulz and Juncker is not very probable. Britons have clearly shown us that there is something wrong. The worst is now to urge Britain to speed up the exit. Development in the UK is unpredictable. The fall of Great Britain can break down other countries (Baránek, 2016).
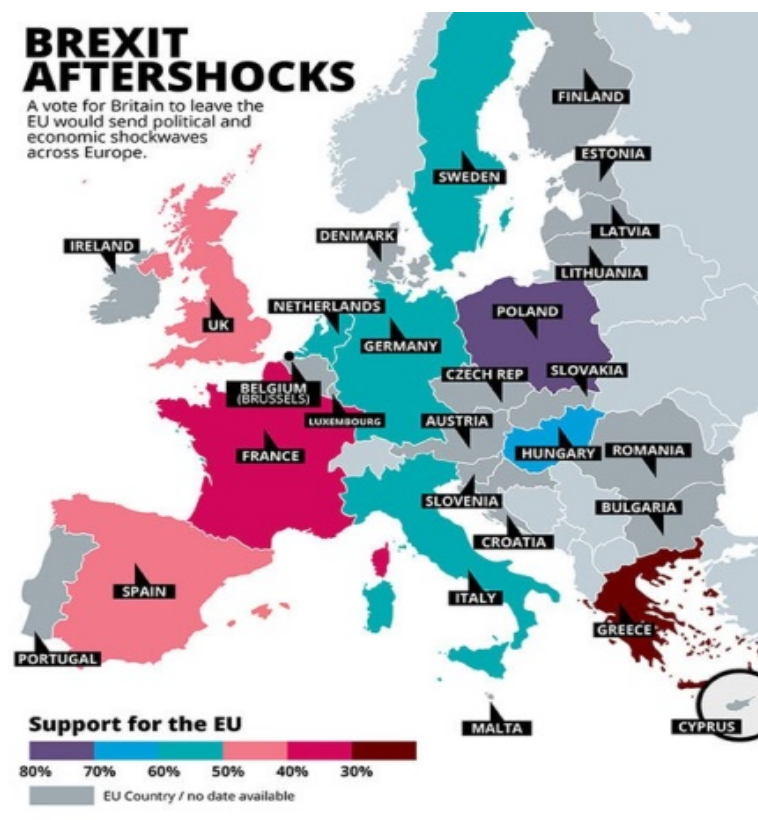
Fig. 3: Present support for the EU (Source: author, express.co.uk.)

We can argue that Brexit will have the greatest impact on the economic sector. This examination was one of the most important goals of contribution. Majority of member states have trade relations with Britain and they can feel the weakening of business branch. We also got to know that anti-EU opinions are growing and there is a threat of new in/out referendums in other Union countries. I think the EU can affect the wave of exit referendums. Surely, politicians will pay attention to these efforts. It could have meant also the destabilization of the domestic political scene. Radical politicians, of course, will make use of the situation and manipulate voters. Even the Britons who voted for withdrawal from the EU will recover very quickly and find out that their decision did not be completely correct. Britain's attitude has always been the most critical towards the EU, but the benefits from membership were for the country quite extensive. Britain will have big problems with inner integrity and with practical methods of Brexit implementation. For our country it is even more fundamental that it happened just a few days before the Slovakia takes up the Presidency of the Council of the European Union. What this will mean for us and for the whole Union? Brexit´s significant impact will be for example on the people from abroad who work in the UK. Only Slovaks there are about 80,000 and they feel threatened after 23 June. On the other hand, there is a real chance that the referendum will be repeated. In the UK launched the petition for the second Brexit

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referendum. But is the second vote really democratic? Anti-EU activists predicted that if the British people decide about the withdrawal of the UK, there will be immediate efforts to sabotage all kinds of elections in the country. "We could see a similar procedure in Ireland. They vote about Lisbon Treaty twice. At first, they voted against the contract, but the second time they vote for. This is process of anti-democratic EU politicians who just forces people to vote until they achieve results what they want. New referendum would allow the opposition Labour party to candidate to the parliament with a platform in which they undertook the British abolishment from the EU before it was decided on 23 June." (Zaujec, 2016) A month ago, said the nationalist leader of UKIP Nigel Farage that if the referendum wins the supporters of remaining in the EU narrowly, the vote should be repeated. At the close vote which was successful for Brexit supporters is Farage satisfied and no second vote does not want. As I mentioned, outcome of the referendum is not pleased by many Britons. Repeat petition for a referendum is signed on the website of the British Parliament by more than three million people. They ask the Government to introduce a rule that if vote for remain in the Union or for exit from the Union less than 60 per cent of people and the participation is less than 75 per cent, then it should be declared another referendum. However, is it possible? And what will happen to Scotland, Northern Ireland or Gibraltar? Citizens in these regions were clearly for a continuance in the Union. All answers will be known in the near future.

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USABILITY OF THE MCDM AND MULTIVARIATE METHODS IN THE PROCESS OF THE REGIONAL DISPARITIES EVALUATION: CASE OF THE VISEGRAD GROUP

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Abstract
The paper deals with a problem of quantitative analysis of regional disparities in the context of the EU Cohesion Policy. Thanks to the EU Cohesion Policy, the regional disparities decreased over the past decade, however a wide gap has still remained between the less developed and the highly developed EU regions. In terms of the evaluation of regional disparities there is no uniform methodological approach to determination of weights of regional indicators and regional disparities assessment. The multicriteria decision making (MCDM) methods and multivariate methods (cluster analysis) can be considered as a suitable and useful tool. The aim of the paper is to evaluate and compare the development of regional disparities in the Visegrad Group in the years 2004 and 2014 by the selected MCDM and multivariate methods. The selected weighting method (CRITIC method) is used to derive the weights of the regional indicators. Based on TOPSIS method and cluster analysis, ranking of NUTS 2 regions and homogeneous clusters of regions are determined. In the conclusion the results of case study and the advantages and disadvantages of the selected quantitative methods in the regional disparities evaluation are discussed.

Keywords
Evaluation, MCDM methods, multivariate methods, regional disparities, TOPSIS, Visegrad Group.

JEL classification
C02, C38, R11, Y10.

1   Introduction

The evaluation of disparities in the regional development in the countries of the European Union (EU) is actual and important topic of many discussions and regional research studies at the European and national level, see e.g. (Ginevičius et al., 2004; Campo et al., 2008; Viturka et al., 2009; Skokan and Staníčková, 2011; Kožiak, et al., 2014; Melecký, 2015). There is a general belief in the EU that regional differences should be kept in sustainable limits and the level of disparities is regarded as a measure of cohesion. In this context, three types of regional disparities can be distinguished: economic, social and territorial (Poledníková, 2014). Through the Cohesion Policy, the EU aims to reduce these regional inequalities and support lagging states and their regions to catch up with the rest of the EU members. Thanks to the EU Cohesion Policy, the regional disparities have decreased over the past decade, however the positive trend of the narrowing have stopped during the economic crisis and recession. The key cohesion challenge will therefore continue in the integration and convergence of the particularly EU members where the disparities among NUTS 2 regions have still significantly persisted and thus regional development is at the lower level. To these states have belonged also countries of the Visegrad Group (Visegrad Four; V4) that joined the EU in the year 2004 and their regional development has been strongly linked to the EU funding (Minarčíková, 2015).

The aim of the paper is to evaluate and compare the development of regional disparities in the Visegrad Group in the years 2004 and 2014 by the selected MCDM and multivariate methods. The rest of this paper is organized as follows. The quantitative approach to regional disparities evaluation and the selected methods used for a case study are introduced in Section 2. In Section 3, application of the methods and empirical results are presented. In Conclusion the main results of case study are summarized and the advantages and disadvantages of the selected quantitative methods in the regional disparities evaluation are discussed.

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2   Quantitative methods of the regional disparities evaluation

Knowledge of the level of regional disparities and the actual level of regions' socio-economic development is the most important condition for developing an effective regional (cohesion) policy. In terms of the evaluation of regional disparities there is no uniform methodological approach to determination of weights of regional indicators and regional disparities assessment. Several disparity indicators are processed by different mathematical and statistical methods. From the point of view of low calculation difficulty, a high informative level and the applicability of the results in practice, traffic light method (scaling), method of average (standard) deviation, method of standardized variable, method of distance from the imaginary point are often used for measurement of disparities, see e.g. (Kutscherauer et al., 2010). These methods are often used in an integrated approach based on the calculation of a synthetic index of disparities, see e.g. (Minarčíková, 2015; Melecký, 2015). More sophisticated quantitative methods that are very useful in the process of regional disparities evaluation are multivariate statistical methods, especially cluster analysis and factor analysis, see e.g. (Campo et al. 2008; Kožiak et al., 2014; Klímová and Žítek, 2015; Minarčíková, 2016). An alternative and not broadly extended approach in regional analysis represents multicriteria decision-making (MCDM) methods (e.g. AHP, SAW, TOPSIS, VIKOR) that help decision maker to organize the problems to be solved, and carry out analysis, comparisons and rankings of the alternatives, see e.g. (Tzeng and Huang, 2011; Ginevičius et al., 2004, Kashi and Franek, 2014; Poledníková, 2014; Minarčíková, 2015). The MCDM methods enable an expert to rank the regions according to their level of economic, social and territorial development, compare the results in given time period and describe changes and trends in regional differences. The assessment of regional development includes not only a problem of selection of evaluation criteria and method of their processing but also a big question of criteria weights. The regional indicators can have different representativeness during regional trends development. There is no uniform methodological approach to determination of weights of the regional indicators. Some researchers favour equal weights of regional indicators, others use the various approaches to weight determination, see e.g. (Ginevičius and Podvezko, 2005; Melecký, 2015; Minarčíková, 2016). The weighting methods can be classified as subjective, objective and combination methods, see e.g. (Ginevičius and Podvezko, 2005; Zou et al., 2006; Zardari et al. 2015; Zmeškal and Dluhošová, 2015). In objective weighting methods, weights are obtained by mathematical methods and decision makers have no role in determining the relative importance of criteria. Common objective methods are e.g. Entropy, CRITIC, literature review, standard deviation or statistical variance procedure (Zardari et al., 2015, p. 23-24; Ginevičius and Podvezko, 2005). In the use of subjective weighting methods, the process of assigning importance to criteria depends on the preferences of decision-makers, to these methods belong e.g. direct rating, ranking method, point allocation, pairwise comparison (used within method of AHP), swing method, Delphi method (Zardari et al., 2015, p. 23-25).

Regional development is wide and complex concept and thus the evaluation of region's development is a complicated problem to be addressed by complex approaches (Ginevičius et al., 2004). For this reason, the multicriteria approach consisting of the combination of the MCDM methods and multivariate method can bring the possibility to reflect the real the state of economic, social and territorial development of the regions and the related needs of the regions.

In this paper, CRITIC method is used to derive the objective weights of the regional indicators. Subsequently, TOPSIS method ranks the NUTS 2 regions according to their socio-economic development. Cluster analysis enables to classify the regions into homogeneous clusters with the same level of development.

2.1   CRITIC method

CRITIC (The Criteria Importance Through Intercriteria Correlation) has been proposed by Diakoulaki et al. (1995) and uses correlation analysis to detect contrasts between criteria. First vector x_j of the normalized matrix is generated where x_j denotes the scores of all n alternatives. Each vector

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x_j is characterized by the standard deviation σ_j, which quantifies the contrast intensity of the corresponding criterion. The standard deviation of x_j is a measure of the value of that criterion to be considered in the decision-making process. Next, a symmetric matrix is constructed, with dimensions $m \times m$ and a generic element r_{jk}, which is the linear correlation coefficient between the vectors x_j and x_k. The more discordant the scores of the alternatives in criteria j and k are, the lower is the value r_{jk}. In this sense, the sum shown in formula (1) represents a measure of the conflict created by criterion j with respect to the decision situation defined by the rest of criteria (Diakoulaki et al., 1995, p. 765):

$$\sum_{k=1}^{m}\left(1-r_{jk}\right), \tag{1}$$

the amount of information C_j, emitted by the j-th criterion can be determined by composing the measures which quantify the two notions through the following multiplicative aggregation formula:

$$C_j = \sigma_j \sum_{k=1}^{m}\left(1-r_{jk}\right), \tag{2}$$

The higher the value C_j, the larger the amount of information transmitted by the corresponding criterion and the higher its relative importance for the decision making process. Objective weights result by normalizing these values to unity according to the following equation (Diakoulaki et al., 1995, p. 765):

$$w_j = \frac{C_j}{\sum_{k=1}^{m} C_k}. \tag{3}$$

2.2 TOPSIS method

TOPSIS (the Technique for Order Preferences by Similarity to an Ideal Solution) is based on the determination of the best alternative that comes from the concept of the compromise solution. The compromise solution can be regarded as choosing the best alternative nearest to the ideal solution (with the shortest Euclidean distance) and farthest from the negative ideal solution (Tzeng and Huang, 2011). The procedure of TOPSIS method includes the following steps. The first step is to construct the decision matrix. Given a set of alternatives A= {A$_i$| i= 1.....n}, and a set of criteria (attributes), C= {C$_j$| j= 1..... m}, where Y= {y$_{ij}$| i= 1..... n; j= 1..... m} denotes the set of performance ratings and w= {w$_j$| j= 1..... m} is the set of weights for criteria. The second step is to calculate the normalized decision matrix according to formula:

$$r_{ij} = \frac{y_{ij}}{\sqrt{\sum_{i=1}^{n} y_{ij}^2}}, \; i=1...n; j=1...m, \tag{4}$$

The third step is to calculate the weighted normalized decision matrix expressed as $v_{ij} = w_j \cdot r_{ij}$.

The fourth step includes the determination of the positive ideal solution and the negative ideal solution. The fifth step is to calculate the separation from the ideal and the negative ideal solutions between alternatives. The separation values can be measured using the Euclidean distance which is given as:

$$d_i^+ = \sqrt{\sum_{j=1}^{k}\left(v_{ij}-H_j\right)^2}, \tag{5}$$

$$d_i^- = \sqrt{\sum_{j=1}^{k}\left(v_{ij}-D_j\right)^2}, \tag{6}$$

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The last step includes the calculation of the relative closeness from the ideal solution and ranking the alternatives in descending order. The relative closeness of the i-th alternative A_i is expressed as:

$$c_i = \frac{d_i^-}{d_i^- + d_i^+}. \tag{7}$$

2.3 Cluster analysis

Cluster analysis represents one of the multivariate statistical methods for classifying objects into homogeneous clusters. The objects in each cluster are similar to each other in some characteristics and dissimilar to those in other clusters. There are several clustering procedures for forming the clusters. The most popular procedures represent the hierarchical methods that use dissimilarities such as *distances* between objects when forming the clusters (e.g. the Euclidean distances, the squared Euclidean distance the Manhattan metric, etc.) After the computation of the distance measure, the clustering algorithm has to be selected. There are several *agglomerative procedures* and they can be distinguished by the way in which they define the distance from a newly formed cluster to a certain object or to other clusters in the solution. The most popular agglomerative clustering procedures include: methods of single linkage, complete linkage, average linkage, centroid, Ward's. Next step of cluster analysis is the graphical representation of the distance at which clusters are combined (dendrogram) and the determination of the cluster solution (optimal number of clusters). In this paper, the agglomerative clustering process is based on Ward's method, applying the squared Euclidean distance as the distance measure. Ward's method is selected because it is generally a very efficient method and uses an analysis of variance approach to evaluate the distances between clusters (Minarčíková, 2016).

3 Application of the selected methods on a case of Visegrad Group regions

Following sections describe the data base, discuss the results of CRITIC method and compare the positions of NUTS 2 regions according to the TOPSIS method and cluster analysis in the years 2004 and 2014.

3.1 Data description

In the context of the MCDM methods, the alternatives represent 35 NUTS 2 regions in Visegrad Group (8 regions in the Czech Republic, 7 regions in Hungary, 16 regions in Poland and 4 regions in Slovakia). These alternatives are evaluated by 16 criteria – indicators of the regional development within economic, social and territorial dimension, see Table 1. These indicators are most frequently used indicators of regional disparities monitored within Cohesion reports, see e.g. European Commission (2010). These indicators are available in the Eurostat database, the last available regional data are for the year 2014.

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Table 1. Selected regional indicators (criteria) of disparities

Type of disparity	Indicator	Abbreviation
Economic disparity	Gross domestic product per inhabitant (PPS/inhabitant)	GDP
	Gross fixed capital formation (mil. EUR)	GFCF
	Total intramural R&D expenditure (% GDP)	GERD
	Patent applications to the European Patent Office (number/mil. inhabitant)	EPO
	Employment in technology and knowledge-intensive sectors (%)	ETKS
Social disparity	Employment rate from 15 to 64 years (%)	ER15-64
	Employment rate of older workers from 55 to 64 years (%)	ER55-64
	Unemployment rate from 15 and more (%)	UR15+
	Persons aged 30-34 with tertiary education attainment (%)	TE30-34
	Early leavers from education and training, persons aged 18–24 (%)	EL
Territorial disparity	Density of railway (km/1000 km^2)	DR
	Density of motorway (km/1000 km^2)	DM
	Life expectancy at age less than 1 year (mean number of years)	LE
	Infant mortality rate (%)	IMR
	Hospital beds (number/100000 inhabitant)	HB
	Victims in road accidents (number/mil. inhabitant)	VRA

Source: Eurostat, 2016; Minarčíková, 2015; author's processing, 2016.

3.2 Empirical results

The final values of indicators' weights calculated by the CRITIC method in the years 2004 and 2014 are shown in Table 2. In the year 2004, indicators persons aged 30-34 with tertiary education attainment (TE30-34), early leavers from education and training (EL) and unemployment rate had the biggest importance in the evaluation. In the year 2014, the highest preferences had again indicators TE30-34, EL and indicator victims in road accidents (VRA). On contrary, CRITIC method determined the lowest importance of the indicators gross domestic product per inhabitant (GDP), density of railway (DR) and patent applications (EPO) in the year 2004. In the year 2014, the lowest weights were calculated by indicators GDP, DR and infant mortality rate (IMR). However, it can be seen small differences in the value of indicators' weights in the overall evaluation.

Table 2. Final weights of regional indicators in the years 2004 and 2014

Criterion\ year	2004	2014	Criterion\ year	2004	2014
GDP	0.036	0.045	TE30-34	0.085	0.084
GFCF	0.060	0.065	EL	0.113	0.081
GERD	0.048	0.058	DR	0.038	0.045
EPO	0.046	0.066	DM	0.046	0.062
ETKS	0.064	0.056	LE	0.063	0.066
ER15-64	0.065	0.057	IMR	0.068	0.047
ER55-64	0.055	0.051	HB	0.071	0.078
UR15+	0.082	0.057	VRA	0.060	0.081

Source: author's calculation, 2016.

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Table 3 provides the final ranking of regions according to their level of development based on TOPSIS method using weights of criteria. Table 3 presents and compares the scores of relative closeness to ideal solution (c_i) and the ranking of NUTS 2 regions in the years 2004 and 2014. The highest ranked region is the closest to ideal solution.

Table 3. Comparison of regions' ranking by TOPSIS method

Code	Year	2004		2014	
	Region	c_i	**rank**	c_i	**rank**
CZ01	Praha	0.793	1	0.755	1
CZ02	Střední Čechy	0.493	5	0.422	5
CZ03	Jihozápad	0.416	12	0.326	12
CZ04	Severozápad	0.312	28	0.283	22
CZ05	Severovýchod	0.424	10	0.371	10
CZ06	Jihovýchod	0.523	4	0.483	4
CZ07	Střední Morava	0.449	7	0.387	7
CZ08	Moravskoslezsko	0.418	11	0.353	11
HU10	Közép-Magyarország	0.609	3	0.621	2
HU21	Közép-Dunántúl	0.338	22	0.314	15
HU22	Nyugat-Dunántúl	0.329	24	0.289	21
HU23	Dél-Dunántúl	0.300	31	0.293	19
HU31	Észak-Magyarország	0.246	35	0.266	29
HU32	Észak-Alföld	0.270	33	0.274	26
HU33	Dél-Alföld	0.343	21	0.310	16
PL11	Łódzkie	0.348	19	0.282	23
PL12	Mazowieckie	0.488	6	0.414	6
PL21	Małopolskie	0.439	8	0.371	9
PL22	Śląskie	0.430	9	0.376	8
PL31	Lubelskie	0.346	20	0.265	30
PL32	Podkarpackie	0.337	23	0.276	25
PL33	Świętokrzyskie	0.348	18	0.269	27
PL34	Podlaskie	0.356	17	0.262	31
PL41	Wielkopolskie	0.379	14	0.302	17
PL42	Zachodniopomorskie	0.323	26	0.276	24
PL43	Lubuskie	0.308	30	0.246	34
PL51	Dolnośląskie	0.374	15	0.321	13
PL52	Opolskie	0.317	27	0.251	32
PL61	Kujawsko-Pomorskie	0.323	25	0.247	33
PL62	Warmińsko-Mazurskie	0.254	34	0.185	35
PL63	Pomorskie	0.369	16	0.300	18
SK01	Bratislavský kraj	0.630	2	0.615	3
SK02	Západné Slovensko	0.391	13	0.315	14
SK03	Stredné Slovensko	0.310	29	0.267	28
SK04	Východné Slovensko	0.288	32	0.290	20

Source: author's calculation, 2016.

In the both years, the shortest relative closeness to ideal solution was achieved by three regions with capital cities Praha, Bratislavský kraj and Közép-Magyarország followed by Czech regions

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Jihovýchod, Střední Čechy and Střední Morava. These regions were ranked at the top seven positions and they are considered as the most developed regions in V4. Polish region with capital city Mazowieckie was ranked at sixth position. On the other hand, the farthest distance to ideal solution was indicated by Hungarian regions Észak-Magyarország, Észak-Alföld, Dél-Dunántúl, Polish regions Warmińsko-Mazurskie and Lubuskie and Slovak region Východné Slovensko. These regions occupied the last five positions and are considered as less developed. However, in the year 2014 the positions of Hungarian regions got better while Polish regions dropped in their positions. At last five places were ranked NUTS 2 regions Lubelskie, Podlaskie, Opolskie, Kujawsko-Pomorskie, Lubuskie and Warmińsko-Mazurskie.

Generally, the analysis shows that Czech NUTS 2 regions had better and stable position in the level of regional development in comparison with the other V4 countries, the best region Praha was ranked at 1st position, and the worst region Severozápad was placed at 28th or 22nd position. On the contrary, Polish regions achieved worse ranking among V4 regions, since regions were placed at the second half of ranking in the year 2014. The regions' ranking implied visible differences among regions with capital cities and the rest of V4 regions.

Table 4. Cluster membership

Year		2004	2014	Year		2004	2014
Code	Region	Cluster	Cluster	Code	Region	Cluster	Cluster
CZ01	Praha	1	1	PL22	Śląskie	2	2
CZ02	Střední Čechy	2	2	PL31	Lubelskie	3	3
CZ03	Jihozápad	2	3	PL32	Podkarpackie	3	3
CZ04	Severozápad	3	3	PL33	Świętokrzyskie	3	3
CZ05	Severovýchod	2	2	PL34	Podlaskie	3	3
CZ06	Jihovýchod	2	2	PL41	Wielkopolskie	3	3
CZ07	Střední Morava	2	2	PL42	Zachodniopomorskie	3	3
CZ08	Moravskoslezsko	2	2	PL43	Lubuskie	3	3
HU10	Közép-Magyarország	1	1	PL51	Dolnośląskie	3	3
HU21	Közép-Dunántúl	3	3	PL52	Opolskie	3	3
HU22	Nyugat-Dunántúl	3	3	PL61	Kujawsko-Pomorskie	3	3
HU23	Dél-Dunántúl	3	3	PL62	Warmińsko-Mazurskie	3	3
HU31	Észak-Magyarország	3	3	PL63	Pomorskie	3	3
HU32	Észak-Alföld	3	3	SK01	Bratislavský kraj	1	1
HU33	Dél-Alföld	3	3	SK02	Západné Slovensko	3	3
PL11	Łódzkie	3	3	SK03	Stredné Slovensko	3	3
PL12	Mazowieckie	2	2	SK04	Východné Slovensko	3	3
PL21	Małopolskie	2	2				

Source: author's calculation, 2016.

Subsequently, cluster analysis is applied to the average value of the index of the relative closeness to the ideal solution. Results of cluster analysis determined *three optimal clusters*. As it can be seen from the table 4, NUTS 2 regions can be classified into three categories that have the same membership of regions in the both years. *Cluster 1* represents the category of *more developed regions* and includes regions with capital cities Praha, Közép-Magyarország and Bratislavský kraj. *Cluster 2* can be considered as category of *developed regions* and consists of nine regions – five Czech regions Střední Čechy, Jihozápad (only in the year 2004), Severovýchod, Jihovýchod, Střední Morava and

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Moravskoslezsko and three Polish regions Mazowieckie (region with capital city), Małopolskie and Śląskie. *Cluster 3* can correspond to the category *less developed regions* and comprises of the Czech region Severozápad (and Jihozápad in the year 2014), six Hungarian regions Közép-Dunántúl, Nyugat-Dunántúl, Dél-Dunántúl, Észak-Magyarország, Észak-Alföld, Dél-Alföld, 13 Polish regions Łódzkie, Lubelskie, Podkarpackie, Świętokrzyskie, Podlaskie, Wielkopolskie, Zachodniopomorskie, Lubuskie, Dolnośląskie, Opolskie, Kujawsko-Pomorskie, Warmińsko-Mazurskie, Pomorskie and three Slovak regions Západné Slovensko, Stredné Slovensko and Východné Slovensko.

4   Conclusion

Applying CRITIC and TOPSIS methods we got the final regions ranking based on distances to the ideal solution taking into account the importance of the economic, social and territorial indicators. The results showed and confirmed the fact that in the Visegrad Group main regional disparities have persisted between regions with capital cities and other regions in the period 2004-2014. Region Praha has had the high dominance resulting from the specific character of region and the territorial definition of NUTS 2 region Praha that has influenced the evaluation of the regional development. By cluster analysis three category of the NUTS 2 regions in V4 were defined.

In the context of regional development definition, the multicriteria approach (combination of the MCDM method and cluster analysis) to quantitative evaluation of the degree of socio-economic development of regions is useful and convenient. The MCDM methods enable an expert to rank the regions according to their level of economic, social and territorial development, compare the results in given time period and describe changes and trends in regional differences. The main advantage of the MCDM methods is that they are simple, easy to use and understand. In comparison with the one-dimensional evaluation, multicriteria evaluation of regional development takes into account the importance and mutual dependence of the decision-making criteria. The integration of the indicators' weights into regional analysis enables to better differentiate the results. Advantage of this method is the calculation of stable weight for given year in time period which enables to observe and analyse the changing trends in importance of regional indicators. CRITIC incorporates to the weights both contrast intensity and conflict which are contained in the structure of the decision problem. The disadvantage of the MCDM methods can be seen in the informative level that can be influenced by the selected type of the indicators and their weights. Cluster analysis brings the possibility to classify the regions according their distances to the ideal solution that can provide background information for the creation and adoption of the strategic measures to encourage the regional development. The results obtained by different hierarchical clustering methods are often very different, due to the interaction space between the objects. The used Ward's method appears to be appropriate, since it extends the space between cases by the formation of compact clusters with a large number of cases.

In the absence of the mainstream in the methodological approach to regional disparities evaluation, the presented quantitative methods can be considered as suitable toll that can be applied to the all regions in the EU at the different territorial level.

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PUBLIC DEBT AND ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS OF THE STRUCTURE CHANGES OF PUBLIC DEBT IN THE EU COUNTRIES

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Abstract

Public debt and its changes might be a determinant of long-term economic growth. There are many theoretical ways to treat public debt as inter-generation burden. Especially in EU and in EMU it seems to be crucial to deal with high level of debt to GDP due to several fiscal problems which might be leading to economic downturns in the future. Therefore, the aim of this paper is to evaluate the effects of shifts in public debt structure on economic growth of 18 EU countries, these countries are also the OECD members. Results should be used to optimization of debt management. The empirical analysis employs a dynamic panel regression in period from 2000 to 2015 making use of the GMM estimator. According to results there is an evidence that changes of public debt structure affect the economic growth. It seems to be important to linkage the structure with debt cost if one look at the maturity structure of public debt. Debt shift from long-term instruments to short-terms should promote the growth. From the point of view of debt residency of creditors, the public debt shift from domestic creditors to external creditors is harmful to growth. Moreover, there is no evidence that the Hausman origin sin hypothesis affects economic growth of surveyed sample, as one can expect because of Eurozone sovereign debt crisis.

Keywords
Public debt, Debt structure, Economic growth, Dynamic panel regression, GMM.

JEL classification
O47, H63, E62.

1   Introduction

Financial crisis leads to explosion of public debt in many developed countries. Economic growth and public debt are positively correlated, at least through mechanism of automatic stabilisers. Moreover, in time of economic downturn the correlation is more pronounced as one could witness from last decade development. According to many economist, raising debt creates debt burden in long-term which might be leading the relationship between debt and growth to self-fulfilling circle. Letting non-Keynesian effects aside, it is possible that consolidation applying tax raise or expenditure cuts may worsen economic situation. Therefore, it is important to focus on a debt management optimal to economic possibilities and their positive movements. From this point of view, the aim of this paper is to investigate and to find out whether any public debt composition shift could be helpful to growth. To make any conclusion, it is used an adapted omitted variable approach. It allows to estimate debt structure shift with neutral impact on the level of debt-to-GDP ratio. The economic growth model is estimated by a dynamic panel data regression (GMM) of EU 18 countries in time span from 2000 to 2015. These countries are also the OECD members. Empirical analysis focuses on three debt decompositions which are available from OECD Statistic Database. These are the original maturity of instrument, the currency denomination and the residency of creditors. It was found that in surveyed sample the original maturity of instrument and the residency of creditors plays statistically significant role.

The remainder of the paper is organised as follows. In section 2 it is put some theoretical light into relationship between public debt and economic growth. There is also highlighted some current challenges, apart from them, of an interesting theory's implications. Section 3 is devoted to method and data description. The aim of this paper is filled in section 4 in which is the empirical analysis of effect of public debt composition shift (with no impact on level of debt) on economic growth.

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2   Economics behind

After the last financial crisis many fiscal authorities were challenging to decision whether they focus their policies to avoid depression or to maintain long-term fiscal sustainability. Blanchard et al. (2010) point out that financial crisis brings active fiscal policy to light to be applicable. Decision making whether policy should be pro-active or it should be consolidating is dependent on many factors likely others than the economic ones. However, in literature one criterion exists, according to government should be able to choose between two aims, even if there is an option, that these aims are antagonistic. It is a fiscal space. Fiscal space is defined by Ostry et al. (2010) as a difference between debt limits, which is given by estimation of fiscal response function, and current level of debt to GDP. If this space is ample, paying down the debt creates additional distortion cost. According to them the benefit from lowering debt is to avoid fiscal crisis due to decrease of risk of public debt becomes unsustainable in the future. In case of ample fiscal space, it might be more important to focus on other possibilities to lowering debt (e.g. debt management).

As fiscal space becomes empty, rising sovereign bond spreads can be a channel of linkage between public debt and economic growth. However, positive effect of debt on spreads is ambiguous in developed countries. Dell'Elbra et al. (2013) stress out that spreads of emerging market countries (see appendix Table A1 in cited paper) are sensitive to the gross public debt-to-GDP ratio. The very similar results are gained for Eurozone countries, however one must emphasize that Eurozone's correlation was influenced by economic crisis, while it was not in emerging market countries. Nevertheless, sovereign spreads of developed countries other than Eurozone are not dependent on the level of public debt-to-GDP ratio.

Other channel of debt-to-growth relationship seems to be an intergenerational burden (see. Buchanan, 1958). It is interest payment which need to be transfer from taxpayers to bondholders. From an aggregate point of view, the sum of tax payments is equal to the sum of returns from bonds. Therefore, if all debt is domestic there is no debt burden put on future consumption ability as Lerner (1948) suggests. Diamond (1965) using neoclassical OLG (overlapping generation) growth model denies Lerner's conclusion. He shows that domestic bonds are rival for domestic private capital and their increase leads to higher real interest rate, in other words, to crowd out of private assets. However, Darreaue and Pigalle (2013) claims that there is no difference between Lerner and Diamond cases if openness of economy is incorporated into neoclassical OLG model and under the assumption of perfect substitutability of all assets (domestic and foreign bonds, private capital), both types of public debt put burden on future generations. Buchanan (1958) claims that intergenerational transfer of burden is due to that future taxpayers inherit an obligation to pay interest which they did not decide on. Main result here is that public debt theoretically leads to decrease of private capital accumulation.

Quite interesting conclusions are obtained in Teles and Mussolini (2014). They use OLG endogenous growth model to extend Adam and Bevan (2005) analysis by examining how the size of the debt-to-GDP ratio influences the effectiveness of productive spending, hence the economic growth. If an increase in public investment is financed by deficit it decreases the final growth effect through lowering savings. Furthermore, growth in productive spending raises real interest rate, the same interest rate which is applied on public debt stock. Interest payment is collected from a young generation that represent labour force and it is transferred to an older generation that is capital holder. The public debt has similar effect like pay-as-you-go system which is the Buchanan (1958) intergenerational transfer of burden by other words. Then public debt lowers effectivity of productive expenditure through higher debt cost.

Fig. 1 shows scatter graph of the debt-to-GDP ratio and the interest payable in all EU countries from 1997 to 2014. The hypothesis in which growing debt raises debt cost seems to be relevant but it is partly devalued by actual monetary policy.

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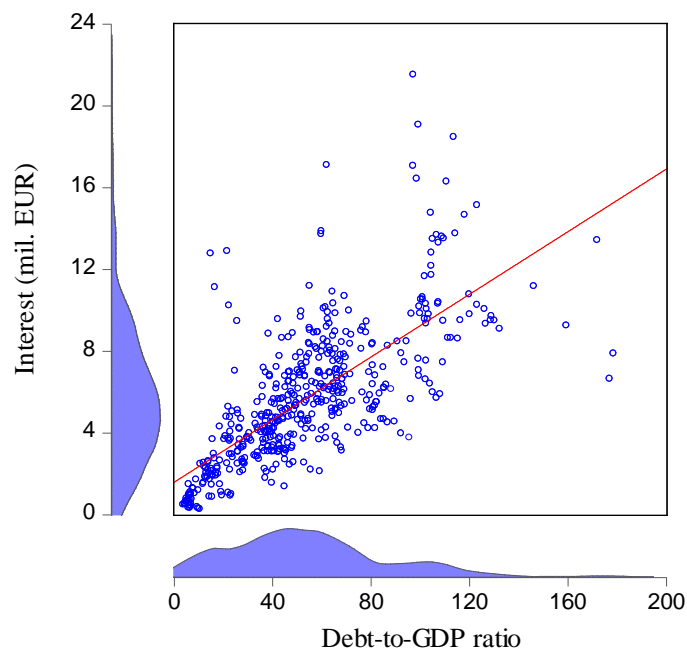
Fig. 1. Scatter graph of public debt and interest payable (Source: Eurostat)

As one can see in Fig. 2, the development of Maastricht criterion bond yields between 1996 and 2014 has declining trend in almost every country. Despite the fact that the monetary policy creates huge pressures on long-term interest rate to decline (i.e. policy of FED in terms of yield curve), Bacchiocchi et al. (2011) claims that if public debt increase, fiscal authorities are usually willing to cut public investment at first place. Analysis in Teles and Musollini (2014) points out that marginal productivity of private capital is declining with decrease in productive expenditure (effect of externalities – the primary impact of rising productive spending by government is an increase in private capital returns). According to these two conclusions the development which is shown in Fig. 2 is more than obvious.
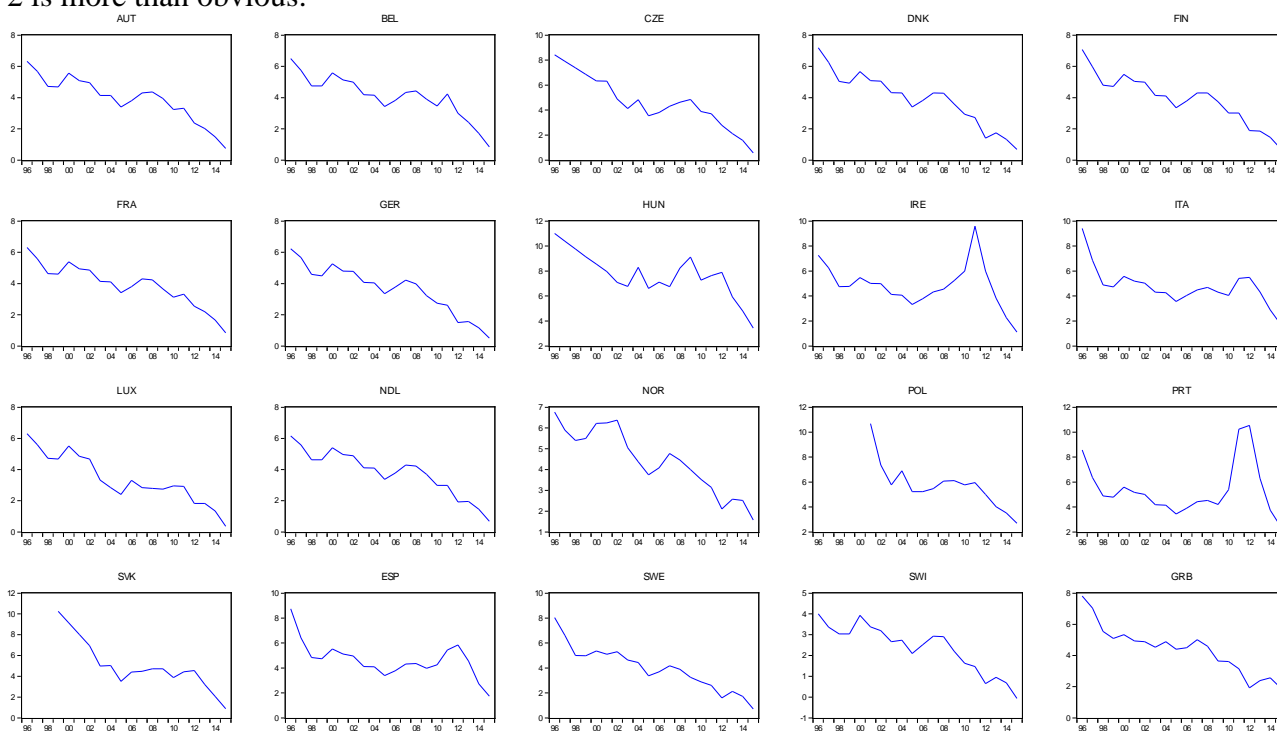
Fig. 2. Development of Maastricht criterion bond yields (Source: OECD)

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The composition of debt might be playing two important roles in economic growth perspective. The first is that government or responsible authority manages structure of debt to have the lowest debt cost possible. This leads to lower interest expenditure and allows for increase of other more productive expenditures, or decrease the tax burden. The second role is to create the structure at the lowest risk as possible. On cost side the maturity structure of debt's instruments might be key issue. On the risk side, Dell'Elbra et al. (2013) examines the role of composition of debt on bonds spreads. From their analysis currency structure (domestic vs foreign) seems to be important, especially in Eurozone. They confirm the Hausman's origin sin hypothesis that describes a situation in which the domestic currency is not used to borrow abroad or to borrow long-term even domestically, then an increase of foreign currency debt leads to higher spreads (because of the exchange rate volatility, higher risk or some institutional factors (Kutivadze, 2011)). Next section is devoted to empirical analysis. Its purpose is to estimate growth effect of debt structure shift with neutral debt-to-GDP ratio impact.

3   Empirical analysis

Empirical analysis of public debt to growth relationship has become a quite interesting topic after Reinhart and Rogoff (2010) published their work in which they claim that public debt in developed countries is hamper to economic growth if it passes 90 % to GDP. Similar results are obtained, for example, by Baum et al. (2012) using far more sophisticated econometrics and sample of EU13.

Panizza and Presbitero (2013) provide a detailed survey of literature and conclude that, while there are evidences that public debt is negatively correlated with economic growth, there is no study that can make a strong case for a causal relationship going from debt to growth. Therefore, the research should focus more on causality (Panizza and Presbitero, 2014) and cross-country heterogeneity (Eberhardt and Presbitero, 2015). Both cited works find public debt to economic growth causality as more than unambiguous.

In this paper the empirical analysis focuses more on impact of debt composition shifts than on debt to growth relationship. Due to methods using here it can let loose some issues mentioned above.

3.1   Method description

As it was already mentioned empirics of debt and growth relationship is delicate because of possibility of existing endogeneity of public debt or cross-country heterogeneity. In this paper it is followed (Cecchetti et al. (2011) method of estimation. The GMM estimator developed by Arellano and Bond (1991) is used to estimated dynamic panel regression of Eq. (1). GMM estimation controls for endogeneity by using the lagged values of the levels of the endogenous and of the predetermined variables as instrument. Hence, it is used the dynamic specification of lagged growth (instrumented by standard approach) and one period lagged level of public debt-to-GDP as the second instruments. It is necessary to point out, Panizza and Presbitero (2014) claim that this exercise is not satisfying to check causality of public debt to growth relationship and they rather specify instrument of public debt other than just its lagged value by instrumenting the debt-to-GDP ratio with the valuation effect brought about by the interaction between foreign currency debt and movements in the exchange rate. They do it due to capture effect from debt to growth. Here it is no need to deal with this causality of public debt and economic growth relationship, mainly because level of debt is used as control variable similarly like total public expenditure, which controls the size of public sector in regression.

Eq. (1) is a standard growth model estimation in which $g_{i,t}$ stands for the year-on-year economic growth, α_i is country specific fixed effect, $con_{j,i,t}$ is a j control variable, $debt_{d,i,t}$ is a d component of debt as share of whole public debt and $\varepsilon_{i,t}$ is an error term. All used variables are described in Table 1.

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$$g_{i,t} = \alpha_i + \phi g_{i,t-1} + \sum_{j=1}^{J} \beta_j con_{j,i,t} + \sum_{d=1}^{D-n} \lambda_d debt_{d,i,t} + \varepsilon_{i,t} \tag{1}$$

Fiscal variables, especially the budgetary components, should be used in estimation in respect of their own nature. For example, many authors dealing with tax shifts or with expenditure composition changes are based on misunderstanding of interpretation of regression results. One of attributes of regression is that all estimated parameters are interpreted in *ceteris paribus* condition. If someone put all types of taxes into regression he must not conclude, for example that tax shift from direct taxes to indirect taxes might be conductive to growth. He claims it under violation of *ceteris paribus* condition. More appropriated approach is that used by Acosta-Ormaechea and Yoo (2012). They modified an omitted variable approach, see e.g. Murín (2016). Acosta-Ormaechea and Yoo (2012) put into regression total tax revenue-to-GDP as one of control variables and they examine tax shift using all tax categories express in fraction of all tax revenue. By omitting et least one tax component they achieve results enable to be interpreted as tax shift from omitted tax to estimated tax. Moreover, controlling estimations by total tax revenues allows for capturing the impact of total-revenue-neutral tax shift on economic growth.

Same approach is used here, except for standard growth variables like physical capital accumulation, human capital accumulation, technological progress, openness, size of public sector, the set of control variables $con_{j,i,t}$ in Eq. (1) also contains the public debt-to-GDP. Set of $debt_{d,i,t}$ variables consists of all debt components expressed as share of total debt according to composition analysis, then n component(s) is omitted. As one can see, this approach is almost identical with Acosta-Ormaechea and Yoo (2012), but the topic has changed. Application of method explained above allows for examination the influence of neutral public debt shift on economic growth. The results of such analysis should put more light on the optimization debt structure towards to economic growth.

3.2 Data

The empirical analysis employs dynamic panel data regression for EU countries except for the Ireland, which are also OECD members, namely Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Luxemburg, Netherlands, Poland, Portugal, Slovakia, Spain, Sweden and Great Britain (it is important to have sample homogenous as much as possible and one can deny whole EU to be a homogenous cluster of countries. Ireland have many extreme outliers). The time span is set from 2000 to 2015 to captured all the information from the crisis.

$$G_{i,t} = \alpha_i + \phi G_{i,t-1} + \beta_1 Cap_{i,t} + \beta_2 Open + \beta_3 Gov_{i,t} + \beta_4 Debt_{i,t-1} + \sum_{d=1}^{D-n} \lambda_d debt_{d,i,t} + \varepsilon_{i,t} \tag{2}$$

Eq. 2 shows estimated models. All variables are described in Table 1. From Eq. 1 it is clear that every β_j variable is the control one. It needs to be emphasized that in more recent empirical contributions some approximation of the technological progress or of the human capital accumulation is used. In Eq. (2) many variables were tested to approximate human capital or technological progress (i.e. average years of schooling, number of patents per capita, R&D expenditure to GDP, etc.). Nevertheless, estimations incorporated these variables were not robust or the impact of variables were found to be inconsistent with theoretical predictions. It was decided to exclude these variables from regressions and the assumption that all control variables are able to captured progress in this manner has been adopted (due to relatively short time span).

Variable with parameter λ_d is d variable of debt structure which is used, in accordance with omitted variable approach, to captured effect of public debt structure shift. To meet the goal of this

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paper it has been needed to collected relatively large dataset. OECD database provides data for debt structure in quarterly periodicity. Hence, every fourth quarter is used to express debt composition in year *t*. Debt structure categories chosen for the following analysis are i) original maturity of instrument; ii) currency denomination; iii) resident of creditors. Except for these three categories, OECD publishes the fourth debt structure. It is the composition of debt by instruments. Our analysis does not cover this debt distribution mainly because of lack of theoretical foundation in this way and because of poor data availability.

All variables were checked for the stationarity. It was done by the same approach that is used in Murín (2016). Variable which had had a unit root were recalculated into first difference (it is intimated using prefix *diff* in Table 2).

Table 1. List of variables

G	Year-to-year growth rate of real GDP per capita, constant prices, constant exchange rates, OECD base year
Cap	Gross fixed capital formation, percentage of GDP, current prices, in logarithm
Open	Percentage of export + import to GDP, current prices, in logarithm
Gov	Percentage of total public expenditure to GDP, general government, current prices, in logarithm
Debt	Gross public debt-to-GDP ratio, current prices (c. p.)
i)	
Term1	Short-term debt by original maturity, share of gross public debt, c. p.
Term2	Long-term debt by original maturity, share of gross public debt, c. p.
Term21	Term2 with payment due in less than one year, share of gross public debt, c. p.
Term22	Term2 with payment due in more than one year, share of gross public debt, c. p.
ii)	
Credom	Debt held by domestic creditors, share of gross public debt, c. p.
Crefor	Debt held by external creditors, share of gross public debt, c. p.
iii)	
Curdom	Debt in domestic currency, share of gross public debt, c. p.
Curfor	Debt in foreign currency, share of gross public debt, c. p.

Source: OECD.

4   Results

As it was already mentioned the main aim of this paper is filled in this section. In Table 2 all results of all models estimated are presented (together 8 specifications). The dependent variable is year-on-year growth rate of real GDP per capita ($G_{i,t}$). First five variables in rows are the control variables. *Diff* in front of name of the variable (see description in Table 1) stands for first differences.

Although, effects of control variables on economic growth are not task here, it is worth nothing to mention that all growth variables were statistically significant and they were estimated with expected signs of β_j and ϕ (see Eq. 2). Furthermore, parameters stayed relative unchanged in all 8 model specifications.

Specification 1 is an estimation of benchmark model with no *d* variable. Specifications from 2 to 4 follow analysis of the debt shift in accordance with the original maturity of instrument. Shift in public debt structure from long-term to short-term instruments are positively correlated with economic growth (this stems from specification 2). In specification 3 one can note that this holds in opposite direction too because a reverse effect was obtained when long-term debt instruments portion on total public debt are incorporated into regression. Finally, if long-term instruments with payment

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due in more than one year are put into regression, the parameter is almost unchanged in comparison with the previous model specification.

Specifications 5 and 6 are aimed to evaluate debt structure effects in respect of residency of creditors. The results of 5 and 6 suggest that while shift to domestic creditors is not harmful to growth, the shift from domestic to external creditors might hamper growth slightly. The negative effect of shift towards external creditors is more than half smaller than the most negative shift stemming from the results in Table 2 (the shift towards long-term instruments of debt).

Despite the fact that the Hausman's origin sin hypothesis has been confirmed by e.g. Dell'Elbra et al. (2013) for the very similar sample, Table 2 do not present any confirmation in this manner (see results of spec. 7 and 8). It can be concluded that while the currency composition of debt is important to sovereign debt spreads, it creates not enough risk pressures to influence the economic growth.

Table 2. Estimations of economic growth model using dynamic panel regression of EU 18 from 2000 to 2015

				Dependent variable: Growth rate of real GDP per capita (G)				
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
$G(-1)$	0.187***	0.124***	0.126***	0.143***	0.185**	0.104**	0.154***	0.103*
	(6.659)	*(3.707)*	*(3.632)*	*(4.639)*	*(2.053)*	*(2.128)*	*(3.062)*	*(1.668)*
diff(Cap)	13.709***	16.480***	16.570***	13.939***	15.915***	18.870***	16.445***	16.851***
	(13.842)	*(13.745)*	*(13.358)*	*(5.515)*	*(5.377)*	*(14.241)*	*(10.436)*	*(6.983)*
diff(open)	9.699***	5.067**	4.873**	7.889**	2.825	4.259*		
	(3.745)	*(2.469)*	*(2.318)*	*(2.240)*	*(1.164)*	*(1.691)*		
diff(Gov)	-25.67***	-28.71***	-29.11***	-33.67***	-30.99***	-28.87***	-36.75***	-35.62***
	(-5.909)	*(-8.313)*	*(-8.537)*	*(-9.130)*	*(-8.516)*	*(-8.874)*	*(-25.861)*	*(-11.542)*
diff(Debt)	-0.177***	-0.218***	-0.218***	-0.158***	-0.175***	-0.178***	-0.151***	-0.199***
	(-10.142)	*(-9.091)*	*(-8.795)*	*(-9.551)*	*(-2.746)*	*(-8.008)*	*(-7.051)*	*(-4.054)*
Term1		0.129***						
		(3.244)						
Term2			-0.131***					
			(-3.270)					
Term22				-0.122***				
				(-2.875)				
Credom					0.006			
					(0.273)			
Crefor						-0.058***		
						(-2.689)		
Curdom							-0.006	
							(-0.473)	
Curfor								-0.056
								(-1.328)
J-statistic	13.354	9.721	9.599	12.774	9.300	10.345	12.162	12.342
Instr. R.	18	18	18	18	18	18	18	18
No	262	262	262	251	252	252	252	252

Note: t-statistics that are adjusted for heteroscedasticity and autocorrelation are included in parentheses; standard deviations are calculated using robust estimates; *, **, *** stand for significance levels of 10%, 5% and 1%.

Source: own calculation.

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5   Conclusion

Public debt and its impact on economic growth has been quite interesting topic over last decade. There are papers dealing with finding causality from debt to growth and there are some works that are looking for the impact of structure of debt. The effect of level neutral movements in public debt composition has not been under investigation as much. Hence, the aim of this paper was to investigate and to find out whether any of these public debt composition shifts could be helpful to growth. The dynamic panel regression estimated by Arellano-Bond GMM estimator was performed for sample consisted of EU 18 countries in time span from 2000 to 2015. From results of the empirical analysis stem that two from three debt decompositions play significant role. It's the maturity of debt instruments and the residency of creditors. In sense of the impact of maturity on economic growth, the shift from long-term instruments to short-term instruments can be link to debt cost. The short-term financial sources are normally much cheaper. Before the Great recession these instruments were used to roll-over debt obligations because of their low cost. From the results of empirical analysis one could conclude that it is important to create debt composition with higher portion of short-term obligations as possible, yet it needs to be emphasised that act this way could trigger a liquidity risk (we all were witnesses of doing that early in crisis). It is important to extend analysis done here by estimation of impact of debt shift on risk (e.g. using a debt spreads).

The shift in debt structure by creditors from internal to external creditors seems to hamper the growth. This conclusion is in conflict with Diamond (1965) or Darreaue and Pigalle (2013) and it supports Lerner's point of view on public debt burden and its transfer.

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THE EUROPEAN UNION AND ITS NEXT ENLARGEMENT

AFTER THE BRITISH REFERENDUM

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Abstract

Europe after a British referendum on withdrawal from the European Union must find a way, which direction to go. The European Union can´t remain the same in the new situation. It must be changed. In the case of leaving the UK from the EU there is a threat of the faster integration of the euro area and reduction of the importance of non-Eurozone countries within the EU with a significant impact on the ability of these countries to promote their interests. Structurally, it will position the EU Member States outside the euro area compared to the position in the euro area less favorable than it is today. In the case of medium a stay outside the Eurozone will therefore possibly after appearances UK and institutional negative impact on the Czech Republic and its capacity to defend their interests within the EU. The future of Europe is a pluralistic institutional order wherein different projects should find their distinct institutional form.

Keywords
European Union, United Kingdom of Great Britain and Northern Ireland, Secession, Subsidiarity Principle

JEL classification
F02, F15, F53, F55

1   Introduction

The referendum on the withdrawal of the UK from the European Union (EU) ended and shocked both British citizens and the world public. Feared and unexpected became reality. The United Kingdom of Great Britain and Northern Ireland (UK) is now facing a currency plunge, an economic slowdown, a political vacuum, the possible secession of Scotland and uncertainty over the Northern Ireland peace settlement. The British government nor the EU authorities had prepared scenarios, which would be based on the rejection of another UK membership in the Union. British politicians across the political spectrum reflect indecision as to respond to the situation.

2   The British Special Arrangements Inside the European Union

The relations of the United Kingdom (UK) with integrating Europe in the past was never free of complications. The success of the European Economic Community did not go unnoticed in neighboring countries, including the UK. Therefore, the UK made application for its membership which was vetoed by French President Charles de Gaulle in 1963. De Gaulle considered the UK to be strongly aligned to the United States of America. He also feared a loss of influence for France as a result of the possible entry of such a large country. Hence, the negotiations were aborted. De Gaulle vetoed the UK´s application also in 1967. Negotiations were resumed only after he was replaced by President Georges Pompidou in 1969 and concluded in the early 1970s. In 1973 the United Kingdom finally joined (together with Ireland and Denmark). While a superficial look at the course of events may suggest a steady process of integration, every step along a way involved difficult negotiations. The reason for this is very simple – politicians very often disagree on what they want to achieve. Member states have diverging opinions on the pace and scope of integration.

The United Kingdom has traditionally been a Eurosceptic member state. This is the reason why Britain has negotiated exceptions and the special arrangements in the past. That covered mainly some exceptions from the European primary law – especially the opt-out from common currency, the opt-out from the Schengen area, opt-out from most provisions in the field of police cooperation and

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judicial cooperation over criminal matters, with the responsibility to opt-in selectively at any time and also exception from the court of Justice ruling on the application of the Charter of Fundamental Rights. The UK rebate (or UK correction) is a financial mechanism that reduces the United Kingdom's contribution to the EU budget in effect since 1985. It is a complex calculation which equates to approximately 66 % of the UK's net contribution – the amount paid by the UK into the EU budget less EU expenditure in the UK. Although the rebate is not set in the EU treaties, it is negotiated as part of the Multiannual Financial Framework every seven years and must be unanimously agreed.

The institutional and legal separation that has already taken place between the non-Eurozone and the Eurozone states is real since Amsterdam Treaty adoption. Among the former, the opt-out member states have continued to claim their interest only in the economic community perspective of integration whereas the latter are engaged in more convoluted integration, under the impact of the euro crisis and in order to prevent future financial instability.

To prepare the ground for defining its policy on Europe, in July 2012 the British government launched a *Review of the Balance of Competences* of the EU, namely the balance between the EU institutions and the member states in the distribution of powers (Emerson, 2016). It is evident that the UK is already out of those EU activities that rates as undesirable, while remaining in those that are advantageous, namely the single market and general political deliberations. It seems that Britain wants to reap the benefits of membership and non - membership at once.

The new requirements were announced by British Prime Minister David Cameron in 2015 and were unanimously agreed at the European Council in February 2016. First, the City would not be subject to discrimination by the Eurozone. Second, the agenda of internal and external economic competitiveness would be boosted. Third, the UK would not risk being dragged into some future European federal super-state. Fourth, the UK could take steps to deter the EU migrants from so called social benefit tourism.

Table 1. Cameron´s four points

1. Position of non-Eurozone member states
    • Discrimination between euro and non-euro economic actors prohibited
    • Eurozone measures to respect the internal market of the EU as a whole
    • Banking union open to non-euro member states as an option

2. Competitiveness
    • Better regulation, lowering of administrative burdens
    • Repeal of unnecessary legislation, with an annual review mechanism
    • Ambitious trade policy towards the US, Japan, Latin America and Asia-Pacific

3. Sovereignty
    • Ever-closer union of peoples not a legal basis for extending EU competences
    • All member states do not have to aim at a common destination, with recognition that the UK does not want further political integration
    • Role of national parliaments enhanced with a new *red card* mechanism (55 % of vote trigger)

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4. Social benefits and free movement of workers
- Safeguard mechanism, restricting non-contributory in-work benefits for four years
- Member states control over benefits for non-active EU migrants
- Indexation of exported child benefits
- Measures against abuses, such as marriages of convenience

Source: Emerson, 2016

All these measures would be binding only on the assumption that the United Kingdom remains a member of the European Union. In fact, the commitments arising from the Decision of the European Council alters the relationship of the United Kingdom to the EU only slightly, because there are special arrangements adopted before. Nevertheless, it provided political assuring to various segments of British political and public opinion who have fears that the ever-closer Union means that the EU is moving to a federal super-state. However, there is a real danger that this Decision sets a precedent that will be misused in the future by other countries to negotiate their own special conditions of the EU membership.

Various authors (for example Piris, 2016) have outlined possible forms of arrangement of the relationship of the United Kingdom with the European Union in the event of initiating Article 50 on withdrawal from the EU. More options were already identified from big-bang exit to Norwegian, Swiss or Turkish model, a simple WTO trade model or a global free trade model (Emerson, 2015).

It seems that the UK after its withdrawal from the EU would want to keep the benefits that the internal market of the European Union brings. It will not be possible if the United Kingdom does not respect all four freedoms of movement of goods, services, capital, but mainly people. There is nothing like the internal market a la carte.

A final point of the utmost gravity can be made simply (Fojtíková, 2013). Scotland voted to remain, it could be the end of the UK. Political statements by the Scottish officials suggest this scenario is quite possible. The independent Scotland will be expected to seek to open accession negotiations with the EU while negotiating secession from the UK, and while at the same time as the UK was negotiating its own secession from the EU. The EU, however, might well not agree to open negotiations with Scotland, because Spain would fear the contagion in relation to Catalonia. In addition, there are serious worries in Ireland that the peaceful status quo there could be destabilized, with the re-introduction of border controls between Ulster and the Irish Republic.

For many politicians, these alarming prospects may outweigh the more complicated technical considerations of economic policy.

While we tend to regard these milestones as historical events by now, they were political decisions at the time they were made.

3   The Risk of EU Crumbling Enforces a Vigorous Reforms

Brexit is a symptom of a wider crisis of trust and the collapse of the EU´s political capital. The current stagnation or crisis of the European integration process is a threat to Europe's future, since so far achieved acquis can be gradually dismantled (Bitzenis, 2015). The European Union has harboured more than only one union in its legal and institutional order. This period should be overcome by a joint effort of EU member states, since no country in the continent should be deprived of the possibility of equal participation on the degree of progress and peaceful coexistence (Fabbrini, 2015). Just as with previous enlargements also the future ones will be mainly determined by political decisions of EU member states. Economic decisions will play a secondary role, even though the entire European integration process will slow down its pace in terms of the full economic union. Europe's

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future must lie in a pluralistic institutional arrangement, in which the different ideas about the future of European integration found its specific form (Navrátil, 2016).

Opinions on the next integration development after the British referendum are in the European Union different. The twenty seven member states face two challenges. The first is reconfiguring relations with the United Kingdom to allow for a close and reciprocal partnership. The second is recalibrating the European project in order to strengthen cohesion and regain the trust of citizens. Both negotiations with the UK and the EU institutional reform must be approached with humility.

Despite it France and Germany prefer the prospect of strengthening and speeding up the integration process towards full economic and monetary union. The Visegrad Group countries on the contrary, rapid development vigorously reject. It should be noted that the opinions that prevailed in the UK can be spread to other European countries. The public in many countries rejects a European super-state which will decide on all key matters. On the contrary, it wants to maintain state sovereignty on many issues, such as the influx of migrants and refugees or some economic issues including fiscal policy. It is necessary to prevent the Union was uncertain and fragile.

If the European Commission will promote and implement hasty steps that the public do not understand and rejects, it will result in another crumbling of the EU house. The bodies that are meant to instil a sense of common purpose have become symbols of alienation. Instead of protecting the unity of the EU, they have contributed to national division and public mistrust, especially in their response to the refugee crisis. The pressure of some countries to personnel changes at the head of the European institutions can´t be excluded. Thus, the Commission is changing into the political institution instead of being created by independent apolitical officials. It will need to have a discussion about whether the President of the Commission should in the future become the candidate of the political fraction that wins the elections to the European Parliament.

Pressure of European Union officers towards ever-closer Union did not meet the consensus of member countries. Moreover, the EU enlargement process gets into direct conflict with the policy of ever-closer union. The Commission must become a force for inclusion, not an agent of the "core". It must reinvent itself as a kind of marriage counsellor to prevent another divorce in the European Union (Zaorálek, 2016). For many politicians, these alarming prospects may outweigh the more complicated technical considerations of economic policy.

4   The EU Enlargement Must Remain a Priority of the European Integration

Leaving the United Kingdom from the European Union could strengthen the current reluctance of members to further enlargement, in particular in case of the candidate and potential candidate countries of the Western Balkans.

The European Union is today conducting a very active policy, which is focused on the states that surround it immediately. Interest in the neighboring countries is motivated among other efforts to eliminate the threat of economic, political and security nature that influence the development inside the EU. The second motive is to spread European values and to create around the EU a space of stable political systems. The EU enlargement policy, together with European Neighborhood Policy (relating to some East European or Caucasus countries (Moldova, Georgia) therefore belongs to those policies that should be intensively developed.

The European Union offers its members a variety of benefits not only the existence of the internal market, but also internal and external security and cohesion policy based on solidarity of the economically stronger members with the weaker ones. The problem is the issue of the optimal size of such a group. And also whether it will be the exclusive, limited in number grouping or a grouping open to all satisfactory candidates. The European Union is facing the dilemma of whether to continue expanding with new members, and the union more decentralized, or focus more on deepening integration, and thus become more centralized (Bauerová, Hlaváčková, Cabada, 2014). Always it is primarily a political decision.

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It is also necessary to consider the fact that the EU will be larger, the more the benefits of cohesion policy pulps (Olson, 1965). Olson developed a theory of political science and economics of concentrated benefits versus diffuse costs. Its central argument is that concentrated minor interests will be overrepresented and diffuse majority interests trumped, due to a free-rider problem that is stronger when a group becomes larger. The accession of new members is not undisputed, however. Critics point out that the current size of the EU already makes it too big to be able to make swift decisions. This complexity is not only the result of having too many members, but also a consequence of the increased diversity of the EU. (Lelieveldt and Princen, 2015).

According to Wohlgemuth and Brandi (2006), however, the European Union can act *flexibly*. This means that it is able to cope with enlargement and deepening and implements so called multi-speed integration. The agents of European politics ought to devote much more time and energy during the self-imposed *period of reflection* to also discuss various forms of flexible integration and enlargement. To be sure, heterogeneity as such is not a problem; to the contrary, with respect to the internal market it creates benefits, for example through a more efficient division of labour. On the other hand, more diverse EU membership will make it all the more difficult and costly to develop policies aimed at specific common purposes. The growing heterogeneity not only with respect to economic structure and performance but also with respect to political objectives, social needs, cultural preferences and financial constraints and the fact that the willingness as well as the capacity of individual EU member states to participate in accomplishing integration varies greatly, causes more flexible integration to be almost unavoidable.

The European Union now has (in relation to brexit and growing nationalism in the member states more than ever) to address the question of whether it prefers enlargement of new members and deepening of integration in partial areas. If we accept the assumption that the EU will compromise, a multi-speed integration, it is possible further expansion to admit, though it may be subject to stricter application of tools and pre-accession negotiations will take place in the longer term. Leaving the United Kingdom from the European Union would not in any case hinder or stop this process. The European Union must stop acting against candidates and potential candidates in the Western Balkan selfishly.

5   Conclusion

The European Union and its institutional representation must react to brexit by steps that improve its reputation in the eyes of citizens. EU project must have greater respect for the needs and interests of member countries. *One-size-fits-all* philosophy has been taken too far already and is not sustainable in the future.

Within the institutional structure of the EU must strengthen Member States. The European Commission should respect the views of Member States and not to propose anything against their will, as happened in the case of quotas for refugees. Responsibility for the solution must lie on the shoulders of the European Council, not the European Commission, which should play only the role that belongs to its. The European Council must be the anchor of realism and practical approach. The European Council must address the fundamental issues of future development with full responsibility, while the equal participation of all its members. The role of Germany and France, eventually of other founding countries must not suppress the role of the remaining ones. The idea of closer cooperation is acceptable in such areas where integration is essential to the collective interests of EU member states and make sense to citizens, e.g. in security, immigration, defense, law enforcement, energy, digital single market and so on.

These visions of the future of the European Union will probably require a change in the basic treaties on the European Union. It needs a simplified version without any reference to the promotion of an ever-closer union and celebrating exclusively its economic aims. Nevertheless, the process of integration has been based on more than one union, rather than on more than one speed. The future of Europe is a pluralistic institutional order wherein different projects should find their distinct

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institutional form. Particular countries are given the opportunity to present their proposals at the extraordinary summit, which will be convened in Bratislava, the capital of the EU Presidency in September 2016. In relation to the UK, it is necessary to find a mode that allows the mutually beneficial relations in the future.

The crisis at which we are arrived may with propriety be regarded as the era in which that decision is to be made. European leaders of traditional parties in the left-right political spectrum must find a way to clearly explain the new situation. The issue of the European integration future should not be left for authoritarian populists who pursue only their personal goals. Their growing popularity and the increased influence of populist movements, which appropriates the hot topics and offer slick solutions, is also a challenge for the European Union institutions. But it seems that voters cease to perceive the division between right and left, without worrying about the programs of political parties and do not favour them on the basis of values, long-term orientation and success in public service. The European integration process even in the current difficult situation, not to brake or stumble. European integration idea is still attractive, not only for the citizens of Southeastern and Eastern Europe, but for the majority of the European population.

6   Acknowledgement

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YOUNG MANAGERS, AGE MANAGEMENT AND LABOUR MARKET

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Abstract:
The analysis points to potential discrimination in the labour market. It is described the problem of personnel and age management in this article as influence attitudes on the young managers' decision in the case of participation of older workers in work tasks. Managers often discard older workers in recruiting in companies or assigning tasks because they have an idea about the unsuitability or inadequacy of older people for the job. Inappropriateness is not objectively determined, but it is based on tradition. This is a part of the stereotype. The problem of attitudes to age groups is described in an empirical investigation through a decision-making of student in defined situations of personnel management. Empirical data collection was conducted on a sample of university students. Coverage is 104 persons. The answers are in the form of alternative (younger versus older) and represented a kind of decision-making of the students. The decision was then compared with the study results of the respondents. Study results represent in our model of rational accent of possible attitudes. The comparison results are not conclusive.

Keywords:
Attitudes, personnel management, age management, study results, labour market.

JEL classification:
M53, M54.

1   Introduction

The demographic tendency of an ageing population in the Czech Republic (understood as a quantitative growth of a group of the older persons and low natality), and beyond, also means changes on the labour market and opens room for the implementation of a set of measures and creating conditions for more effective employment of older persons, collectively referred to as age management.

The data of employment, level of education of inhabitants by age are provided by the results of the census of population and housing: The data from 2011 are presented here and are supplemented for estimates for the following years taken from the results of a selective workforce research. On the basis of statistical data, some conditions and circumstances, to which the age management should react or has already reacted responded were described.

In addition, the results of an empirical research of attitudes towards employment of older persons performed by the authors of this the text are presented in the paper. The intention of the research was connected with an idea that these attitudes have an significant impact of the age management implementation.

The aim of this paper is to show a relationship between the changes on the labour market, age management and attitudes of potential managers.

2   Demographic characteristics of the labour market by age

In the end of 2015, the employment rate was 56.8% in the Czech Republic. This high employment rate was mostly a result of high working activity by men and women of 30-55 years of age. However, in the past twenty years the numbers of the youngest and oldest workers have dramatically changed (Petráňová, Mejstřík 2016a).

Since 1993, the employment rate from 15-24 years of age has been on steady decline, and currently it is one of the lowest in the entire EU. On the contrary, the number of workers who have reached 55

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years of age and more has increased. In 1993, 315,000 of persons from 55 to 64 years of age worked, but in 2015, it was more than 770,000 persons. This extraordinary increase was mostly compensated by sump of young workers by 25 years of age. In 2014, the employment rate in the group from 55 to 59 years of age reached 76.9 % in the Czech Republic, i.e. the fourth highest value of all EU countries after Sweden, Germany and Denmark. After 60 years of age, the employment rate in the Czech Republic drops under the average of 28 states of the EU(32.2 % against 36.6 % of the union average in the group from 60 to 64 years of age), which is mainly caused by a dramatic drop of economic activity of women of this age (Petráňová, Mejstřík 2016b). In our opinion, this is also influenced by lower retirement age in the Czech Republic.

The numbers in these age categories of 15 - 24 and 55 - 64 year-olds are influenced by demographic changes (in the population age structure), changes in the education structure (extension of the time of studies due to higher number of university students), also with a significant impact of gradual implementation of legal measures aiming to increase the retirement age for old age pension entitlements.

The data on employment by regions and industries of economic activity can provide a clear picture of the changes in he employment rate of seniors.

The difference in the employed persons aged 60 to 64 years and above 65 years varies significantly in different regions. When comparing numbers in these groups, the biggest difference is The Ústí, Olomouc, South Bohemian, Moravian-Silesian, Vysočina and Zlín regions where the share of the employed aged above 65 years is 41-44% against the younger group of 60 – 64 year-olds in the relevant region. The situation in Prague where the share of the groups is 68% is entirely different. In the South Moravian region with the second largest city in the Czech Republic, this share is 52% and with regard to this indicator the South Moravian region ranks second after Prague. Therefore we may say (also due to the fact that the absolute number of older workers is the highest here) that the problem of age management is most relevant in the biggest cities in the Czech Republic.

Naturally, this is not a consequence of the concentration of seniors in large cities, even though this may be worth some consideration. It follows from the data shown in Table No.P1 (Please see Annex No. 1) that the drop in the number of the employed older people is probably given mostly by the character of work.

In all regions, in the fields of agriculture, industry and building industry (with the exception of agriculture, forestry and fishing industry in Prague) the share of the employed aged 65 and over is lower in comparison with the group aged 60 – 64 years. At the same time, the biggest industry can be seen in the industry.

On the contrary, in the area of scientific activities, education and to some extent, health service and social services, the share of persons of 65 years and over is higher in comparison with the group aged 60 -64 years. This naturally does not mean an absolute increase of employment in the age group, but in absolute figures it is rather the same or lower. However, the numbers in the compared groups change and the base for the calculation of shares in reduced.

From the age management perspective, the group of highly educated workers in the field of highly sophisticated services (science, education and health services) appears to be a significant and numerous object. Therefore, the changes in the understanding of the required level of education must be taken into account. This is also confirmed by other statistical data.

The employed aged 65 years and over work mostly in the non-manual positions of highly qualified staff (specialists, technicians and professionals).

Also the structure of the employed aged 65 and over by education contributes to confirm the verity of the statement above. Here, the share of people with university degrees reached 36.8 %, and another 25.7 % completed secondary education with GCSE examination. In comparison with the share of workers with university degree of all persons aged 65 and over, these figures are even more striking, as they show continuous employment of more educated persons and retirement of persons with lower education.

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3 Characteristics of conditions for employment of older persons

The different employment rates and varying remuneration of different age groups can be seen as evidence of discrimination of older persons, if these value would significantly diverge from the average. We may not draw any definite interpretation from the data given in the following tables. In comparison with other age groups, the unemployment rate and remuneration of the elder persons, more or less favourable depending on which group is compared. With regard to salaries, it can be said that they increase with age. The wages show a decline with older age groups (in our opinion, the character of the work remunerated by wages being the reason) and regarding the employment, the group of 30 years-olds has the best position.

Chart 1 Number of the unemployed and total employment in age groups

	Job seekers (in thousands) MPSV 2. Q 2016	Total employment (in thousands) ČSÚ 2014
Until 19 years	11.491	21.6
20 – 24 years	38.802	278.0
25 – 29 years	40.922	525.5
30 – 34 years	40.262	585.8
35 – 39 years	46.891	**775.5**
40 – 44 years	46.668	728.3
45 – 49 years	41.039	624.4
50 – 54 years	46.055	576.1
55 – 59 years	**55.711**	533.9
60 – 64 years	25.782	234.3
Over 65 years	1.166	90.8

(Source: MPSV, ČSÚ)

The number of job seekers is the highest in the group aged 55 – 59 years. The total employment is the highest in the group aged 35 – 39 years. It can be said that in the higher age groups, the total number of employees rapidly drops, but the number of job seekers still remains at high level until the group aged 60 – 64 years.

Chart 2 Average wages by age for 2015

	Average	Median
Until 20 years	17,245	16,527
20 – 29 years	23,035	21,289
30 – 39 years	**29,642**	**24,495**
40 – 49 years	29,215	23,309
50 – 59 years	27,096	22,531
60 years and over	28,755	23,552

(Source: MPSV.CZ:ISPV)

The highest average wages and median are the highest in the group aged 30 – 39 years. In subsequent age groups the averages and medians drop.

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Chart 3 Average salary by age for 2015

	Average	Median
Until 20 years	13,547	12,177
20 – 29 years	22,909	22,328
30 – 39 years	27,712	26,021
40 – 49 years	28,485	26,794
50 – 59 years	28,657	27,490
60 years and over	**30,588**	**28,307**

(Source: MPSV.CZ:ISPV)

As opposed to wages, the situation regarding the salaries is different. Here, both the average and median gradually increase and the highest salaries can be foud in the group aged 60 years and over.

In general, not only the problems of employment of older employees are experienced by managers, but they are also proved by studies. However, the question is not the existence of the problems as such, but their stereotyping. At first, we must identify the individual problems.

There are many reasons against employing older workers, with one of the most significant being less willingness of older workers to learn. General requirements of modern businesses for flexibility collide with attitudes of older employees who have much less tolerance to fast changes when they have to change their activities or way of thinking than younger workers not only according to the results of researches but also experience of managers (Kunze et al.2013).

The ageing of population is shown most strikingly in the changed working potential. There are changes with regard to health, work performance at physical work and social relationships at workplaces. In general, the age management means creating conditions for effective work of older workers. At the level of organisation and the employed persons, it means the actual improvement of working potential of older persons. Finding effective means for effective work of the older workers is important.

A frequent objections against employment of older person is the above mentioned lack of flexibility and unwillingness to learn new things (Freeman 2007). The research in (Jobcentre Plus) showed that 40% of older workers believe that their younger colleagues will teach them skills that they did not have before, while one third of the younger workers believe that the older workers will not adapt to new challenges. The idea of a conflict in the communication between the younger and older workers based on mutual biases is also a frequent one. These are in fact an objective-based difference, but a conflict of opinions and beliefs. Sometimes it is a manifestation of an animosity in relationships than insufficient abilities of persons.

Employers thus should take into account a biological age but a mental one. The workers regardless of age must be healthy, active, creative, flexible, socially adaptable, adaptable to new things, easygoing, reliable and so on. The development of these traits is an important task of the HR management.

The main instruments for age management that may be used for full integration into organisation, can be divided in the following points:

- Acquisition and stabilisation of older workers.
- Health and quality of life of older workers.
- Flexible employment.
- Recruitment of younger workers.
- Redundancy and retirement.
- Social dialogue.

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The problem of the exploitation of the qualification of the workers may be considered to pose the biggest problem of the age management. Objectively seen, the older person have several handicaps that may significantly put their success on the labour market at risk.

The first problem and handicap being that older workers are generally regarded as less efficient, adaptable and therefore with less chances of employment . This may result in discrimination at work of persons of this age group. The reason for this may be that with older person, the difference in skills and work experience may significantly become more pronounced between individual workers. This is related to varying physical fitness, life philosophy and attitude to work. The varying skills are reflected in the different work results, and this results in more pronounced difference in income, with this difference being more pronounced than with younger workers(Gottschalk 2001). Therefore, the changes of work and employment will differ depending on age and by the type of working activity and what knowledge or skills or attitudes are required. In case of lower qualification, the older workers will be replaced by younger workers in line with the notion of the changes in physical performance of men.

There his/her social characteristics, conditions and factors may be a problem and handicap of an older worker. The older people may find themselves in the collision with the younger people due to different life styles and behaviour patterns, and due to greater adherence on the adopted values. The older workers has lower aspirations and less self-confidence, and are more critical to themselves. They have a steeper learning curve and they learn new things longer and they find it difficult to cope with changes (Cimbálníková et al. 2012). In this case, it holds true that the individual differences may blur differences by age and individual characteristics are more important than allegiance to a group.

There is yet another problem, the employment of older persons is connected with the pressure to labour costs on employees. The principle of seniority (the increase of salary in relation to the length of employment and age) puts a pressure of the growth of salaries and wages. The negative impact of the pressure will be present if the higher costs of salaries and wages will not be reflected in higher productivity (Disney 1996), but their relation is not direct and may include other reasons for increase than working skills (such an influence of technology advancements). Due to less absence of older persons the employment of older people may yield savings consisting in the elimination of additional costs related to the replacement of the absent worker.

The sickness rate and reduced competencies of the worker,e.g. as a result of a job-related injury reducing the productivity of work and may also be a reason for an early retirement may be another problem. At present, it is already apparent and it will become more obvious in the future that the general improvement of health care and the resulting better health condition mean better physical fitness of mean and productive force alike. In general, the reduction of manual work in the total volume of all work which is important with older persons has also a positive impact. In the old age, there is a decline in the physical fitness and older people have worse sight and hearing. The older people have less injury rate in comparison with other age groups, but if they suffer from the injury, their accidents at work are more severe. They show higher number of lost working days and longer recovery time than younger employees (Grosch, Pransky 2010).

It is clear from the above, that employment of older persons is influenced by both objective and subjective factors. The objective ones are given, but the instruments of the age management are directed towards their elimination. The subjective factors and the related stereotypes work strongly, but the limitation of unwanted effects is difficult due to the fact that they are considered "natural" and are thus invisible and not concious.

The following study of stereotypes in gender relationships may serve as an example of the effects of stereotypes (Dudová et al 2006). The authors established the on the manifest level, managers see differences in management work of women and men as negligible and in the vast majority they perceive this theme negatively. They do not support their opinion by arguments or real life examples. In their statements to minor problem they stereotypically praise characteristics by their gender division to women and men. Both women and men communicate in this way. The manageresses

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strongly defended an opinion that individual differences are more pronounced than differences that can be identified between men and women in general.Stereotyping of characteristics of manager by gender was so strong with both managers and manageresses that we may conclude that it is not predominantly based on authentic experience but on overstating the differences, need to distinguish, define and evaluate.

4   Presentation of research – method and results

As part of the performed empirical research to establish the existence of stereotyping attitudes towards older workers, we used our own questionnaire. The students of the master program at the University of Business Administration and the University of Economics were interviewed. The respondents were chosen randomly, the sample is not a result random selection. The aim of the paper was to describe potential attitudes of university students of economic fields and not to measure their prevalence. Therefore the representative group of randomly chosen respondents was not a necessary condition.

The identification of stereotypes was based on prevalent opinions of students that stereotypes make most of the people to respond in certain way in line with the existing stereotype. Otherwise, the responses will not have even distribution.

The interviewing took place from 14 to 18 March 2016 in four groups of students. In total, we interviewed 104 students and all questionnaires were included in the processing. MS Excel was used to process the data.

The respondents were asked for their potential decision in the following situations (Please see the Chart No. 4):

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Chart 4 Preferences of solutions in the defined situations

Decision-making situation	1. Alternative responses in %	2. alternative response in %
Your goal is to build a project team and one person who is to be hired from external sources is missing. When choosing this new person, will you prefer a worker with long or short experience?	73.1	26.9
You are choosing a worker who is to undergo a training for the new equipment and following the completion of the training he/she will train his/her colleagues. Will you rather choose younger or older staff member and who will be better for this task?	70.2	29.8
The principle of seniority, i.e. the basic salary is increased with the length of experience is applied in the remuneration practice. Do you think this principle is right and just or wrong and unjust?	51.5	48.5
What persons do you like working with, and who would you prefer in the evaluation of workers? Flexible, creative person who are not tied down by rules and dynamic persons despite the fact that their actions bring many risks and uncertainties. Or stable persons, reliable, knowledgeable of the set procedures without risks and uncertainties.	42.3	57.7
The head of an important department for the business is going to retire. His subordinate who is 50 years old has been long prepared to take the job. Also, a young employee aged 30 years who has had a major success when performing his first assignment also aspires to take the job. In your opinion, which of these candidates should be nominate the head of the department, the younger or the older?	50.5	49.5
We all make mistakes, but the tolerance to mistakes of different persons is not always the same. In your opinion, whose mistakes when performing on-the-job assignment can be more tolerable, the mistakes of an older or younger person?	21.0	79.0
In your opinion, which persons will have a tendency to mitigate and resolve conflicts that may arise among co-workers at the workplace? Younger or older persons?	25.7	74.3

Source: own

The situation regarding the selection of the worker in the project team, selection of the trainee for subsequent training of co-workers and also tendencies to resolve conflict are connected with the preference of older and more experienced persons. With regard to the selection of co-workers, certainty and reliability are rather preferred at the expense of routine at work. In the situation regarding the promotion or recognition of the seniority principle in respect of remuneration, the interviewed are divided in two approximately equivalent groups. Younger persons should be more tolerated if they make a mistake.

5   Discussion over the results

The decline of young employees on the labour market due to the shift in the preference of higher education and as a result of population changes logically means the necessity to be oriented to older people.

The profiling of a typical senior worker as the worker active in the field of science, education and health services may be inferred from the statistical data. These are the fields that are mostly concentrated in large cities where the alienation in social environment gains more ground. For this reason we believe that the age management programs must include knowledge transfer to younger colleagues. This is an important task of knowledge management, but at the same time, such program may overcome a natural tendency to stay within the circle of one generation.

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The examination of attitudes and potential stereotypes in the presented research do not provide clear results. The principle of seniority regarding the remuneration or selection of an older employee who has been prepared for the position or a younger employee with demonstrable results divided the respondents-university students into two equally large groups. There is a preference for older persons that can be interpreted as an assessment stereotype in case of the additional member of the project team, selection of more reliable persons for conflict resolution. As opposed to that the younger are preferred as trainees or with regard to the tolerance of mistakes. Given the above, we may not conclude that the decisions of students were clearly influenced by stereotyping attitudes.

6   Conclusion

In light of statistical data, the changes in the structure of older employees are shown. The extension of working activity beyond the limit for old age pension entitlement is mostly relevant for workers with higher education and also for workers in the field of science, education and health services. On the contrary, people with lower education and predominantly in the filed of industry gradually reduce their share in the total employment. The literature identifies different objective deficiencies of older people, such as worse physical fitness, lack of flexibility and willingness to learn, or higher demands for remuneration for work, if the seniority regarding the growth of salaries and wages is applied. The problem of "income -related discrimination" concerns the group of workers who are remunerated by wages and does not generally (it may vary in individual cases) relate to workers remunerated by salaries. The decision if it is a real discrimination in wages or the figures are result of objective ageing processes cannot be made. With regard to certainty of employment, it can be said that the statistical data demonstrate the problem of employment for people aged over 40 years, if the loose a job. Due to the shifts in the structure of employment with people aged over 60 years, the above mentioned problem loose a sense of urgency for individual persons.

The assumption the relationships between the older and younger persons are governed by stereotyping attitudes has not been validated. In the research among university students, the responses were equally divided, some imply potential stereotypes in some model situations. These would concern the assessment of the willingness of younger or older person to learn, or tolerance to mistakes. The older persons are believed to be able to resolve interpersonal conflicts.

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Annex 1

Chart P1 Employment of persons aged 60+ in regions of the Czech Republic by the field of human activity

	Prague		Central Bohemian		Karlovy Vary		Plzeň		Ústí		Liberec		Hradec	
	-64	64+	-64	64+	-64	64+	-64	64+	-64	64+	-64	64+	-64	64+
Number of employed inhabitants 60+. Of these %:	37407	25380	26689	12300	5869	2767	10641	5391	14245	5797	8526	4009	10422	5222
Agriculture	0.5	0.6	5.4	4.9	3.2	2.6	7.1	5.7	3.5	3.4	3.1	2.9	6.4	5.4
Industry	10.4	7.3	20.7	13.3	21.5	11.9	23.9	13.9	23.5	11.2	25.9	15.2	22.4	13.2
Building industry	6.6	4.4	6.8	4.2	6.3	4.0	6.5	3.9	6.9	4.5	6.3	4.9	5.8	3.6
Commerce	6.9	4.6	7.6	6.7	6.0	6.4	6.4	5.3	5.7	5.5	6.7	6.1	7.2	6.7
Transport	-	-	6.7	3.0	-	-	-	-	6.6	2.1	5.2	2.2	4.4	2.2
Science, technicalactivities	**9.0**	**12.8**	**4.6**	**7.0**	**3.3**	**6.3**	**3.7**	**6.4**	**3.8**	**7.2**	-	-	-	-
Education	**8.7**	**13.4**	**6.6**	**8.8**	**7.2**	**9.7**	**7.7**	**10.2**	**7.7**	**8.5**	**7.5**	**8.8**	**7.4**	**8.6**
Health and social services	7.8	8.3	6.4	6.7	9.1	10.2	7.4	8.2	7.1	8.5	6.1	6.3	7.4	8.4
Other	7.4	7.8	5.4	3.4	5.3	6.0	5.5	7.6	10.5	10.0	3.8	2.2	4.9	2.3
Not established	13.3	21.5	16.7	27.0	20.1	29.3	15.9	26.3	18.5	31.4	18.8	30.3	18.2	28.8

	Olomouc		Moravian-Silesian		Pardubice		South Bohemian		Vysočina		South Moravian		Zlín	
	-64	64+	-64	64+	-64	64+	-64	64+	-64	64+	-64	64+	-64	64+
Number of employed inhabitants 60+. Of these %:	9790	4117	16878	7324	8211	3749	11462	4958	7294	3195	19950	10365	8923	3954
Agriculture	5.9	4.4	2.8	2.2	7.4	5.2	9.3	8.1	11.8	11.0	4.7	3.6	4.3	3.9
Industry	23.6	12.9	24.5	11.3	25.1	14.6	20.5	11.8	25.7	13.7	20.7	12.6	29.0	17.0
Building industry	6.4	4.3	6.4	4.4	6.5	4.3	7.0	4.2	6.8	4.4	6.9	4.7	6.6	4.5
Commerce	6.9	6.8	6.3	6.4	6.9	7.7	6.9	6.8	6.6	6.7	6.5	5.7	7.0	7.5
Transport	-	-	-	-	5.1	2.3	4.8	2.5	-	-	-	-	4.4	2.3
Science, technical activities	**4.2**	**7.2**	**4.2**	**8.0**	**4.0**	**6.4**	**3.7**	**7.1**	**2.9**	**5.6**	**5.9**	**10.0**	**4.4**	**6.6**
Education	**8.3**	**9.1**	**9.0**	**9.1**	**7.6**	**9.1**	**7.9**	**7.4**	**7.4**	**7.7**	**10.0**	**11.5**	**7.7**	**8.0**
Health and social services	7.8	8.6	8.3	10.6	6.1	7.7	6.3	7.3	7.0	8.2	7.3	7.2	6.9	7.3
Other	5.8	7.6	8.1	10.8	4.2	1.8	7.1	4.8	4.5	7.2	6.3	7.3	4.8	6.5
Not established	15.0	27.4	15.8	27.8	15.9	27.0	16.2	27.9	13.9	25.2	14.7	24.9	15.2	27.3

(Source: ČSÚ)

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POLICY FOR INTEGRATION OF IMMIGRANTS IN THE CZECHOSLOVAKIA AND CZECH REPUBLIC

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Abstract:
The Czech Republic has gradually become a target country for increasing numbers of refugees and immigrants whose presence is often considered as threatening. In the Czech Republic there is a clear effort to learn from the experience of Western countries, whose immigration policies passed in the second half of the 20th century thorough the complicated development. Former Czechoslovakia in the 20th century became a refuge for economically deprived and politically persecuted foreigners. The article focuses on development of Czech integration policy in the past and in the present. The aim of paper is show which factors determinate the integration of immigrants from different countries in the economically, socially and culturally different state in the Central Europe. The paper analyses how Czech society accepted immigrants who wanted to preserve their national identity. The historical analysis will be based mostly on unpublished Czech archival sources.

Keywords:
Migration, Integration of immigrants, Labour market.

JEL classification:
J61, N34, N43

1 Introduction

The integration of foreigners is one of the important topic of migration policy. An appropriate integration policy increases the positive potential of migration as well as having also significant prevention effects. The question of integrating foreigners into the major society is highly contemporary issue in the time of current discussion about the impacts of migration since it represents one of the basis preconditions for creating a common migration policy at the European level. The integration of foreigners has economic, social, political and cultural aspects. Its success in individual European countries is influenced by different experiences with different types of migration and the resulting different approaches in the migration policy. The goal of the paper is show which conditions influence the policy for integration of immigrants.

  As this article is limited by space, attention will be therefore paid to the specific situation in the Central Europe which will be presented on the example of Czechoslovakia, Czech Republic respectively. The article will be focused on the political and economic context of immigrants' integration. Integration policies of the communist regime will be analysed on the example to Greek and Macedonian refugees which were adopted by Czechoslovakia at the end of the 1940´s of the 20th century. A connection with the European Union policy will be devoted to the forms of immigrant integration after 1989. Special attention will be paid to the changes of integration policy at the local level.

2 Theoretical background

Specific integration policies stem from different levels and integration degrees. Rákoczyová, a R. Trbola (2008) mention four basic degrees of social integration of the immigrants: structural, cultural, interactive and identification. The first of these involves the provision of basic rights and access to main social institutions as labour market or social system. The second dimension represents the acquisition of basic cultural skills and customs of major society. The third level means integration of

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foreigners into social relationships and the networks of a receiving community. Finally, the last dimension is characterised by subjective identification with the major society. In the literature, there are distinguished three basic models of integration of foreigners which can be related especially to the conditions in the Western Europe in the second half of the 20est century (Barša-Baršová, 2005). As the first, the exclusivist ethnic model can be stated, applied mainly in the case of „guest workers" accepted in accordance with the labour market needs. The assumption of their temporary stay does not create condition for a deeper integration into the major society. Assimilation approach as the second from the mentioned models expects full adoption of values and cultural patterns of the majority. On the contrary, the multicultural model recognizes the right to preserve the cultural differences of the immigrants. However, the variously conceived multicultural approach has recently become the target of open criticism.

Among the more vocal critics of traditional multiculturalism is famous Italian political scientist Giovanni Sartori who claims that one of the basic elements of a successful integration is reciprocity. This means that an entry into a country should bring about both „gain and compromise." In his opinion, the immigration policy should aim at creating a plural society as opposed to a multicultural one which deems diversity a priority. The truly plural society does not demand assimilation from immigrants but presupposes a mutual respect to each other's difference, including a respect for the majority's traditions and principles. According to Sartori, the project of multiculturalism stands in opposition to pluralism because multiculturalism not simply highlights differences but „produces" them, and tries to make them visible (Sartori 2005). This approach correspond with the critical perception of multiculturalism, which does not emphasize the importance of cultural differences, but trying to overcome the unequal access of different groups to education or reallocation of resources (Jánská, 2005).

This paper deals with policy for integration of foreigners in Czechoslovakia and Czech Republic. Changes of Czech integration policy will be in the first part analysed by the example of relations to Greek refugees in communist era. Analysis of the particular case can be used as a base for forming more general conclusions concerning nature of the integration policy in Czechoslovakia. The historical overview will be based mostly on unpublished Czech archival sources. The second part focus on characteristic features of integration policy in the Czech Republic related to the development of migration policy on the European level.

3   Historical changes of Czech integration policy

Development of post-war migration policy in Czechoslovakia was totally different in comparison with Western Europe. Czechoslovakia under communist rule became isolated and this isolation influenced immigration policy too. But also after rise of the communism Czech society accepted thousands of immigrants.

3.1   Integration of immigrants in communist Czechoslovakia – case of refugees from Greece

During the civil war the Greek Communist Party relocated almost 13 000 emigrants in Czechoslovak Republic. One of the characteristics of Greek emigration in communist countries was a high percentage of children. The fact has also influenced the form of care for Greek refugees in Czechoslovakia. There were thousands of children who arrived here in 1948-1949 as a vanguard of Greek emigration. The care for them was coordinated by the Czechoslovak and Greek Communist Parties. Common ideology and political aims made such coordination easier. In the first phase, aid to Greek and Macedonian children was determined by the conviction of their temporary stay in Czechoslovakia and other communist countries. Children from Greece were placed into children's homes that were established in border areas of Czech lands. Czechoslovak authorities used new conditions that arisen due to expulsion of German inhabitants and post-war nationalization. Placement of Greek refugees in Czech borderlands was also a part of national and social transformation of these areas. Operation of such children's homes was based on political education and social care controlled

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by the state. The migration policy in Czechoslovakia had a political dimension primarily, even in relation to children refugees from Greece. Particular form of aid to Greek and Macedonian children was determined here by KKE's concepts and ideologically established social policy in Czechoslovakia after 1948.

The first transport of 746 children from Greece arrived in Czechoslovakia in April 1948. Following months until the end of 1949, six more trains arrived and the overall number of children exceeded five thousands. In compliance with the agreement between Czechoslovak authorities and leadership of Greek communists, children from Greece were not supposed to be allocated to Czech families but they had to be placed in children's homes temporarily. The aim of the Greek Communist Party was maintenance of national identity (Provincial Archive in Opava a). This had to be supported by maintenance of family relations but mainly by ideological control provided in children's homes. Also older children whose parents came to Czechoslovakia had to be placed here. Conviction of temporary emigration and possibility to turn the result of civil war, which was in progress played the main part in this practice. Even actual defeat of communists in Greece in 1949 did not lead to essential change of the policy and during the following year, Greek children remained in children's homes.

Organization of aid to Greek refugees was ensured by various institutions during the years and its form was significantly influenced by the changes of social policy in the country. The interest in development in Greece showed on the government level soon after the end of World War II. In 1945, department for Greece that dealt with development of Czechoslovak-Greek relations was established within the new Ministry of Information. Czechoslovak state estates were first entrusted with care for Greek children. This happened in compliance with the resolution of the Central Committee of Communist Party of Czechoslovakia in July 1949. During the subsequent month, however, it was decided upon transfer of organization of aid to all refugees from Greece to the Ministry of Labour and Social Care. Special division named Greek Action that worked till the end of 1951 was established within the ministry in November 1949. However, coordination of care for the members of Greek emigration occurred in partisan line. International department of the Central Committee of the Communist Party of Czechoslovakia played the key part. In 1952, "liquidation of the Greek Action" was decreed and the Czechoslovak-Greek association within it was abolished. Social department of the Czechoslovak Red Cross, and later the Ministry of Education, became the main coordinator of aid to refugees from Greece (Tsivos, 2011) .

At local level, competences were transferred due to the change of administrative organization and implementation of approaches in social care. In the first phase, the care for Greek children came under the institutions that persisted from the period between the wars. Functioning of children's homes was conferred on the Land Care for Youth and its subordinated organizations in individual districts. After taking over the control in 1948 the communists decided to abolish lands as existing administrative units and to establish regions. Following such change the existing institutions at land level ceased to exist and their agency was taken over by newly established regional national committees controlled by the Communist Party of Czechoslovakia. Also care for youth had to be taken over by the state in compliance with the new principles of social policy. As per the government resolution of the end of May 1949, administrative authority in the sphere of labour and social care had to be transferred onto district and national committees. Thus, the administrative bodies had to control children's homes and care for persons without citizenship. Aid to Greek children and adult refugees had to be managed at the level of districts and regions by relevant national committees. In compliance with the instructions of the Ministry of Social Care of summer 1949, the above mentioned administrative bodies had to take the homes into their administration and concurrently they had to carefully check the personnel. The ministry required not only expertise but primarily political reliability and loyalty to the Greek action. The Czechoslovak-Greek association that had to cover all costs connected with aid to Greek refugees was the employer of all personnel in the homes until it was cancelled. Czechoslovak authorities presented the care for refugees from Greece as a significant social and political task and fulfilment of the obligations that Czechoslovakia accepted within the democratic world (Provincial

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Archive in Opava b). Later the political dimension of aid was repeatedly emphasized and it represented the fundamental principle of care for Greek refugees in communist countries.

In the first phase, 45 children's homes were established for Greek and Macedonian children, later the number decreased to 21. Reports on conditions in the homes where Greek and Macedonian children were placed show many problems of various nature. At the beginning, there was lack of required financial means, material equipment of the homes stagnated and shortage of suitable personnel caused difficulties too. For example the summary report on inspection of children's homes in December 1948 testifies similar problems. The report states significant financial difficulties – in some cases, the employees had to lend own money for operation of the homes. Reportedly, not always the personnel were sufficiently "fair and politically conscious". Functioning of children's homes was influenced by attitudes of local inhabitants who mostly, according to the report mentioned above, did not show sufficient understanding for Greek action (National Archive a). Conditions in the homes were gradually improving but many problems persisted even at the beginning of the 50th. Regular inspections showed that the conditions in individual homes could significantly differ. Deficiencies were attributed to bad educational work. On the contrary, good results were presented in the local authorities' reports as a proof that even Greek children that are "more temperament and different, as for the character" can be educated (Provincial Archive in Opava c).

Education of Greek and Macedonian children was another chapter of itself. On the Greek side, the Committee for Ait to Children that was established in compliance with the direction of the Greek Provisional Democratic Government in March 1948 played a decisive role in this sphere. Within the committee, there were 170 teachers who taught in individual hosting countries and were paid by authorities in such countries. Personal resources, however, significantly complicated the possibilities of education, especially at the beginning. Problems were caused mainly by the language barrier resulting from insufficient expertise of Greek and Czech personnel. High level of illiteracy was typical for children coming from Greece. The ratio of illiterate children was reaching up to 60 %. Breakup of the country during occupation and subsequent civil wars made proper education impossible. Since the 40th, textbooks in Greek and Macedonian languages centrally published by state publishing house in Warsaw were used in individual socialist countries. In case of education, the Czechoslovak and Greek partisan bodies combined the principle of social integration and support of original identity (Tsivos, 2011). Such integration policy had to be developed on the basis of jointly declared ideology and political membership. Education of Greek and Macedonian children had strong features of political indoctrination particularly in the first half of the 50th. Another typical tendency was preference of the fields, for which there was labour shortage in Greece. They were metal industry, car mechanics, mining and metallurgical industries, etc (National Archive b). Support of this type of education was together with economic orientation of Czechoslovakia in the 50th.

3.2 The main features of integration policy of foreigners in Czech Republic

After the fall of communism Czech Republic became the final destination of immigrants from Eastern Europe and Asia. The numbers of foreigners (including foreigners with asylum status) grew to 467 562 at the end of 2015. Foreigners make up 4.3% of the population (Czech Statistical Office). Foreigners from third countries make up more than a half of foreigners with a residence permit; citizens from EU, EES and Switzerland make up one third. The main source countries are Slovakia, Ukraine and Vietnam. Formation of Czech migration policy is characterized by the alternation of liberal and restrictive tendencies. The main coordinator of state integration policy is the Ministry of the Interior. Key position of Ministry of the Interior indicates that the migration in Czech Republic is considered especially as a security question. (Trbola and Rákoczyová, 2011). As main target group for the integration are presented the third-country nationals legally residing in the Czech Republic. The Ministry of the Interior defines as the main goal of integration policy the support of „*social cohesion and harmonic conflict-free coexistence of all inhabitants of the country*". According to the ministry to the main conditions for integration of foreigners belong knowledge of Czech language,

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knowledge of major society and economic self-sufficiency. Ministry of the Interior in the current conception of integration policy emphasizes that is neccesary to raise awareness of integration possibilities for immigrants and for major society. According to the Ministry the adaption courses should play important role in the process of integration. Participation in these courses could be the one of the conditions for residence in the Czech Republic. Ministry reminds potential problems with funding of the integration policy especially in the connection with the end of programming period of European fund for the integration of third-country nationals. The solution of this problem should be efficient use of European and state funds and also financial participation of local governments. Integration policy according to the Ministry should improve conditions for access of immigrants to the labour market (Aktualizovaná "Koncepce integrace cizinců – Ve vzájemném respektu", 2016).

Position of foreigners in the labour market is one key indicator of their integration. Typical tendency in the migration policy (not only in the Czech Republic) represent support of acceptance skilled immigrants. This approach has reflected in 2003 when the pilot project "The Selection of the qualified workers" was launched. Its aim was to obtain the foreign experts and highly qualified workers who will settle down with their families in Czech Republic for a long-term. The condition for participation in the project was the completed secondary education, valid residence permit or visa and work permit in the Czech Republic. However, the Czech authorities did not ensure either employment or housing or help with the execution of request for the project participants. The number of participants has also lagged behind the initial expectations. At the end of 2008 there were 1281 foreign project participants (together with their family members there were 2600 of them). After the end of the pilot phase there was approved the continuation of the program in the next year (Drbohlav 2010). But government of CR announced the termination of this project in December 2010. The results of the project of the green cards are sheepish too. Green cards were supposed to attract highly qualified work force from the third countries and other foreign experts with lower qualification. Project was also invoked by demand of some large industrial factories. Green cards are exposed by the Ministry of Interior to specific jobs for three years and they are renewable for qualified immigrants. The program is open for citizens of 12 selected countries which not included for example Vietnam, Mongolia or Russia. In the autumn 2009 there were only 9 owners of this long-term residence and work permit in the Czech Republic. After economic crisis Czech migration policy became more restrictive. The European project of the blue cards from the year 2009 promises more efficiently use of the human potential of immigrants. It is a new kind of work and residence permit within EU for highly qualified foreigners from the third countries. The effort to attract required specialists and use their human capital is a characteristic trend of European migration policy that is also promoted in Czech Republic in the last few years. The official definition characterizes candidates of blue card as „*workers with higher professional or university education who have an employment contract for at least one year*" (Portal of Ministry of the Labor and Social Affairs 2012). This program has been criticized as mean of brain drain in developing world. The Moroccan economic law professor El Husseini characterized it as „*new form of colonization*". He wrote: „*Developing countries spent lot of money educating and training technical students and then in the end the northern countries will cream off the best..it is a big mistake and criminal act of the north to drain the south of its brainpower.*" (D´Artis, Ciaian 2007).

The employment of immigrants as key criterion of the integration is specially emphasized in the time current refugee crisis. New data of Eurostat shows the interesting differences between activity rates and unemployment rate of non-EU citizens and of nationals. For most of the member countries is typical higher activity rate of nationals in comparison with non-EU citizens. In Czech Republic, Slovakia, Hungary and others countries activity rates of foreigners and national was very similar. The more significant differences were observed in Western and Northern Europe (Tab. 1). These results may not be only consequence of the less successful integration. The reason could be higher proportion of refugees and different legislative condition for employment of asylum seekers in the mentioned Western countries.

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Tab. 1 Activity rates of population aged 20-64, by citizenship, 2015 (Choosen countries)

	Nationals	Foreigners	Of which Citiziens of another EU state	Non-EU citiziens
EU	77, 3	74,8	81,6	69,8
Belgium	74	68,7	74,6	59,4
Czech Republic	78,7	80,6	82,3	79,2
Germany	83	72,4	81,9	64,7
Finland	80,3	70,3	82,9	61,5
France	78,1	67,1	77,2	62,4
Hungary	73,8	74,1	74.1	74,1
Netherlands	82,2	70,3	81,6	59,7
Poland	73,2	71,1	83	67,1
Slovakia	76,2	81,3	81,2	81,3

Source: Eurostat

It is evident that different experience with various types of migration also affects the integration practice. Integration policy in the Czech Republic characterizes the influence of prevailing national homogeneity and lack of experiences with culturally different immigrants. Specifics of Czech integration policy in the comparison with Western countries show its limits on the local level too. Typical is the absence of conceptual approach. According to Rákoczyová and Trbola (2008) is institutional integration in the most municipalities completely undeveloped. The new tendencies of integration policy represent the Centers for the support of the integration of foreigners (Centra pro podporu integrace cizinců - CPIC). CPIC presents the third-country nationals who are staying in the Czech Republic under long-term or permanent residence permit as their target group. These new regional centers emphasize teaching the language of the majority population in their work. Adoption of the language is considered as one of the key preconditions for successful integration. Language and other courses also respect the diversity of the culture and mentality of the individual immigrant groups. Effectiveness of CPIC is limited by problems with the funding and by low awareness of their activities (Aktualizovaná "Koncepce integrace cizinců – Ve vzájemném respektu,", 2016).

Conclusion

Specifics of Czech integration policy in the past and the present were influenced primarily by political factors and by changing international position of the country. In the second half of the 20th century immigration to the Czechoslovakia and the state's immigration policies were limited by the country's membership in the socialist block. Influence of the political orientation can be demostrated by the example of refugees from Greece and their integration. In the first years after the war, Czechoslovakia became a refuge for about 13 000 Greeks who left their war-torn country. At the end of 1940´s, Czechoslovakia was offering them so called hospitality which supposed to be only temporary. The attitudes of the Czech public towards the Greek refugees were initially somewhat contradictory. Incomplete official reports in the media were talking about accommodating acceptance, the information from local authorities and the reports from periodic inspections, however, indicate

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otherwise. But the Greek refugees have managed to integrate into the mainstream society without any major problems in the following period. It can be said that even more successfully than other national and ethnic groups in post-war Czechoslovakia. The main reason was political affinity. The anticipated temporary emigration and the mandatory way of integration policies played a significant role as well. Generally we can say, immigrants who came during the communist era became mostly assimilated into the Czech environment.

The different experience also influences the views on policy for integration of foreigners. The case of Greek community shows the limits of integration policy in conditions ethnically homogeneous country. For current situation are typical differences in the perception of individual ethnic/immigrant groups. Czechs show more sympathy towards immigrants who choose an assimilation model of adaptation. Fears from the influx of culturally distinct immigrant groups as well as the failures of integration policy in Western Europe have fundamentally effect on discussion about attitude towards immigrants in the Czech Republic. This fact corresponds with strengthening of restrictive approaches in Czech migration policy. For public discussion in the Czech Republic about migration is typical often too emotional character and the lack of attention to practical questions related to the integration of foreigners. Analysis of current situation shows the undeveloped conditions for institutional integration and problematic cooperation between individual subjects on the local level. The basic assumption for successful integration should be clearly defined vision of values and cultural orientation of the majority

4   Acknowledgement

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UNDERSTANDING OF CORPORATE SOCIAL RESPONSIBILITY IN LARGE COMPANIES IN SLOVAKIA WITHIN THE CONTEXT OF A SUSTAINABLE DEVELOPMENT

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Abstract
Nowadays, the corporate social responsibility (CSR) is a preferred matter within EU. Issues of most importance on EU level include environmental standards setting together with reporting formalisation of non-financial information on EU corporate attitudes toward the social responsibility. Corporate social responsibility (CSR) refers to corporate responsibility for their impact on society. The European Commission believes that CSR is important for the sustainability, competitiveness, and innovation of EU enterprises and the EU economy. It brings benefits for risk management, access to capital, cost savings, human resource management and customer relationships. In my article, I analyse the results of a questionnaire survey addressed to large companies in the Slovak Republic, regarding their understanding and attitude towards the corporate social responsibility. The questionnaire survey was performed in the second half of 2015 and its results confirm our expectations, i.e. entrepreneurs have selective attitudes towards the social responsibility, depending on their preferred areas, ownership and preferred stakeholders in areas of published information, and the most important motivation for reporting such information is a national legislation requirement.

Keywords
Corporate Social Responsibility, formalisation of non-financial information, sustainable development, large companies in Slovakia.

JEL classification
D21, D23, K32, M00, M14.

1   Introduction

Interest in sustainability and corporate responsibility and theirs implications for business has increased steadily. It is increasingly recognised that the sustainability not only poses ethical issues but also has direct implications on economic performance. (Kubaščíková, 2008)

Terms "sustainability" and "sustainable development" come from the 70's, initially used in connection with the idea that an uncontrolled growth of anything (population, production, consumption, pollution, etc.) is not sustainable when resources are limited (Petera and Wagner, 2015).

Corporate sustainability is implemented in a business model, which is not oriented only on getting profit from business just now, but with corporate self-regulation business goes social and ecology friendly. The condition of sustainable development is the application of a proper understanding of and compliance with the principle of corporate social responsibility in companies.

The development of the regulatory framework of markets, technical and organisational innovations, and new societal and consumer perceptions, have changed the business context and the determinants of corporate success not only in separate countries and European Union, but in the whole world.

Issues of most importance on EU level include environmental standards setting together with reporting formalisation of non-financial information on EU corporate attitudes toward the social responsibility. Corporate social responsibility (CSR) refers to corporate responsibility for their impact on society. The European Commission believes that CSR is important for the sustainability, competitiveness, and innovation of EU enterprises and the EU economy. It brings benefits for risk management, cost savings, access to capital, customer relationships, and human resource management.

Financial and non-financial reporting provides shareholders and other stakeholders with a meaningful, comprehensive view of the position and performance of companies. Large public-interest entities (listed companies, banks, insurance undertakings and other companies that are so designated

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by Member States) with more than 500 employees should disclose in their management report relevant and useful information on their policies, main risks and outcomes relating to at least environmental matters, social and employee aspects, respect for human rights, anticorruption and bribery issues, and diversity in their board of directors. There is significant flexibility for companies to disclose relevant information (including reporting in a separate report), as well as they may rely on international, European or national guidelines (e.g. the UN Global Compact, the OECD Guidelines for Multinational Enterprises, ISO 26000, etc.). (European Commission [online], 2016).

2   Aim, methodology and hypothesis

The aim of this paper is to analyse the results of a questionnaire survey addressed to large companies in the Slovak Republic, regarding their understanding and attitude towards the corporate social responsibility. The questionnaire was performed in the second half of 2015.

In the research, we focused on understanding of corporate sustainability and corporate responsibility of large companies in Slovakia within the context of a sustainable development.

Our methodology for getting results of research to fulfil the aim of this paper started with collecting information online by means of a questionnaire which was sent by email, with original approaches to online survey with large companies of various industry sectors, according to the statistical classification of economic activities – SK NACE (Financial Administration SK [online], 2015) by NACE (European Commission [online], 2015). The selection criteria for the company, which we applied when selecting the respondents of the questionnaire survey are related to the reported results for the year of 2014: Employees > 250 and turnover > 50 mio (€) or balance sheet total > 43 mio. We selected only companies from the following industry sectors: C – manufacturing, D – electricity, gas, steam and air conditioning supply, F – construction, G – wholesale and retail trade; repair of motor vehicles and motorcycles and J – information.

The aim of the questionnaire survey was to explore the processes involved in generating sustainable business information. This research was a part of broader international project (prepared and managed by IPRI – International Performance Research Institute) carried out in eleven Western, Central and Eastern European countries. (Pakšiová, 2016; Pakšiová et al., 2016)

Selection of respondents was carried out based on the filter of finstat.sk (Finstat [online], 2015) according to the given criteria. Contacts to selected companies that were requested to fill out the questionnaire sent, were obtained from the published documents of companies, websites and available databases so as to contact an employer who may have known the data to be filled out in the questionnaire or sent specific access to the questionnaire to submit, or fill in a questionnaire in the team of employees. This brought an exclusive approach to the completion of the questionnaire, and despite the anonymity during the processing of the questionnaire survey results, multiple completion of the questionnaire for one enterprise was excluded. Therefore, each fully completed questionnaire represents the output for a single enterprise, and there is no duplication of answers.

Data was collected by means of a web survey (LimeSurvey). The main features of the questionnaire were first designed by a coordinator of the whole international project (IPRI – International Performance Research Institute) and after comments and recommendations made by me the final version of the questionnaire was prepared in English and Slovak. The survey started in September 2015 and continued till November 2015. Our research has a quantitative character.

Hypothesis about the results of this questionnaire survey are:
1. Companies have selective attitudes towards the social responsibility, depending on their preferred areas, ownership and preferred stakeholders in areas of published information.
2. The most important motivation for reporting such information is a national and international legislation requirement.

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3 Economic policy in the European Union and in Slovakia concerning corporate social responsibility (CSR).

Economic policy of the EU and EU member states is the most visible in their legislation. The European Commission has defined CSR as the responsibility of enterprises for their impact on society. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions is a renewed EU strategy 2011-14 for Corporate Social Responsibility. CSR should be company led. Public authorities can play a supporting role through a smart mix of voluntary policy measures and, where necessary, complementary regulation. Companies can become socially responsible by following the law, or by integrating social, environmental, ethical, consumer, and human rights concerns into their business strategy and operations (European Commission, 2016).

In the framework of an integration economic policy within European Union the consolidation of access to the sustainable development in the common space is the priority. This attitude is reflected in EU strategies and consolidation of access to the reporting of financial and non-financial information on enterprises in the form of EU directives, IAS/IFRS Standards and Interpretations.

At first, the European Commission (European Commission [online], 2016) has launched a public consultation on the non-binding guidelines on methodology for reporting non-financial information following Article 2 of Directive 2014/95/EU on disclosure of non-financial and diversity information by certain large undertakings and groups. The purpose of this public consultation was to collect views from stakeholders. The consultation was part of the Commission work related to preparing non-binding guidelines on methodology for reporting non-financial information. Currently valid is the basic legal act, Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 (EUR-LEX [online], 2013) on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC (Directive 2013/34/EU) as amended by Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups (EUR-LEX [online], 2014).

In the Slovak Republic the Act 130/2015 Coll. (entered into force on July 1, 2015) amending and supplementing Act 431/2002 Coll. on Accounting, regulates measurement methods and reporting according to Directive 2013/34/EU of the European Parliament and of the Council on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC. This amendment was adopted based on the requirement of the Directive that Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 20 July 2015. Section 20 of the amended Act 431/2002 Coll. on Accounting was supplemented by Act No. 130/2015 Coll., with paragraphs with more obligations of reporting non-financial information about entities, effective from January 1, 2016 and some effective from January 1, 2017.

The most important wordings in section 20 (Financial Statements) effective from January 1, 2016 are (MF SK [online], 2015):

"(9) A public-interest entity, with the exception of an accounting unit according to Section 17b with the average calculated number of employees for the accounting period exceeding 500 employees, will also provide in its annual report non-financial information regarding the development, performance, position and effect of the accounting unit activity on the environmental, social and employment issues, information regarding the respecting of human rights and information concerning the fight against bribery and corruption (hereinafter referred to as the "social responsibility area") whereas it will provide at least

a) a brief description of the business model;

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b) a description and the results of the policy applied by the accounting unit in the social responsibility area;

c) a description of the main risks related to the accounting unit impact on the social responsibility area, which ensue from the accounting unit activity that could have adverse consequences, and when appropriate, also a description of the business relations, products or services provided by the accounting unit and a description of the way in which the accounting unit manages the above risks;

d) significant non-financial information regarding the accounting unit activity according to the individual activities;

e) a reference to the sums shown in the financial statements and an explanation of such sums as regards their impact on the social responsibility area, if appropriate.

(10) As regards information provided according to paragraph 9, a public-interest entity can use the European Union framework or another international framework governing non-financial information as a base if it accurately specifies which framework was used.

(11) A public-interest entity which is a subsidiary accounting unit is not obliged to provide the information according to paragraph 9, provided that the information about such a subject and its subsidiary accounting units is comprised in the annual report or in a similar report issued by the parent accounting unit.

(12) If a public-interest entity does not publish information according to paragraph 9, in its annual report it will provide the reasons due to which it did not publish such information.

(13) An accounting unit which emitted securities accepted for trading on a regulated market of any Member State will also provide a description of the diversity policy applied in its administrative bodies, governing bodies and supervisory bodies, mainly in relation to the age, sex, education and professional experience of the members of such organizations, the targets of such policy, the way of its application, and the results attained for the reporting period in its annual report, provided that on the date of the compilation of the financial statements it has fulfilled at least two of the following conditions:

a) The overall sum of assets exceeded EUR 20,000,000 while the sum of assets for this purpose means the sum ascertained from the balance in evaluation adjusted by the items in compliance with Section 26;

b) The net turnover exceeded EUR 40,000,000;

c) The average recounted number of employees exceeded 250.

(14) An accounting unit not providing a description of the diversity policy according to paragraph 13 in its annual report shall specify the reasons due to which it decided not to apply such a diversity policy in its annual report.

(15) By providing the information according to paragraph 9 the accounting unit has fulfilled its obligation to provide non-financial information regarding the impact of the accounting unit activity on the environment and employment according to paragraph 1 letter a)".

4 Results of survey about understanding corporate sustainability and corporate responsibility of large companies in Slovakia

Out off the selected 261 potential respondents – the companies (that meet the specified criteria), to whom we sent the e-mail with a request to fill out the questionnaire, we have 41 fully completed questionnaires (responses) of the respondents. The statistical rate of return of responses to the questionnaire is 15,71%, which is a sufficient percentage of the sample for evaluation for a questionnaire survey. It is a good statistical sample to obtain the findings and their analysis. For better understanding, the results are projected in figures.

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4.1 Basic characteristic of corporations that completed the questionnaire

A group of companies that completed the sent questionnaire consists of different businesses. Next figures (Fig. 1., Fig. 2., Fig. 3.) show basic statistic characteristic of these respondents of the questionnaire survey.
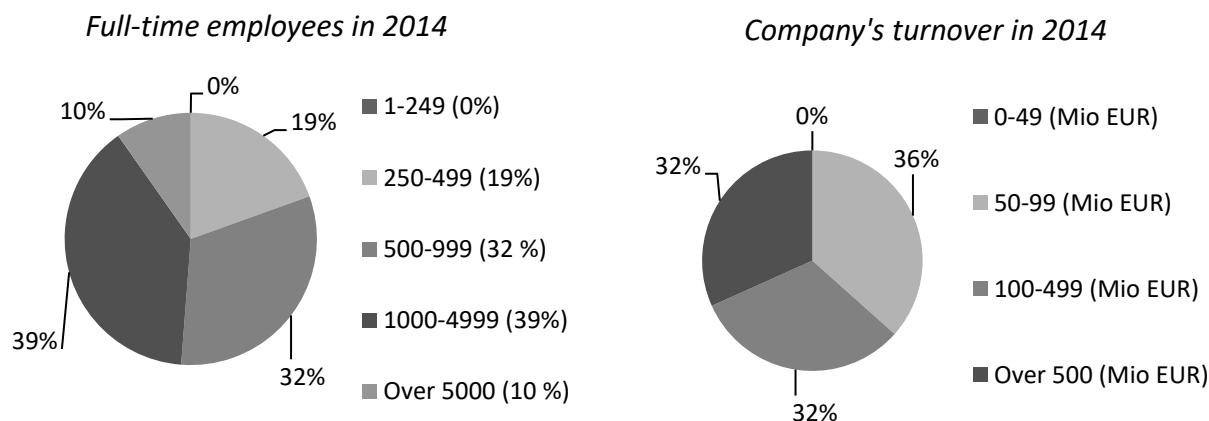
Fig. 1. Numbers of full-time employees and turnover of respondents in 2014 (Source: own data)
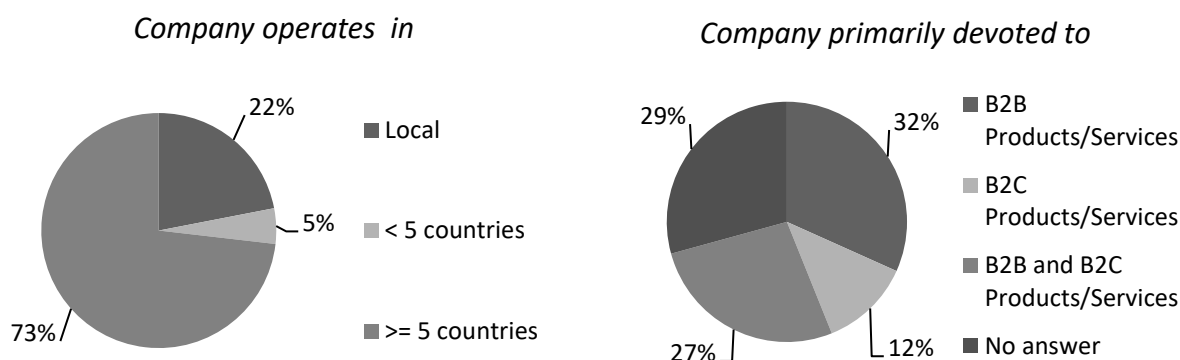
Fig. 2. Orientation of respondents in 2014 (Source: own data)
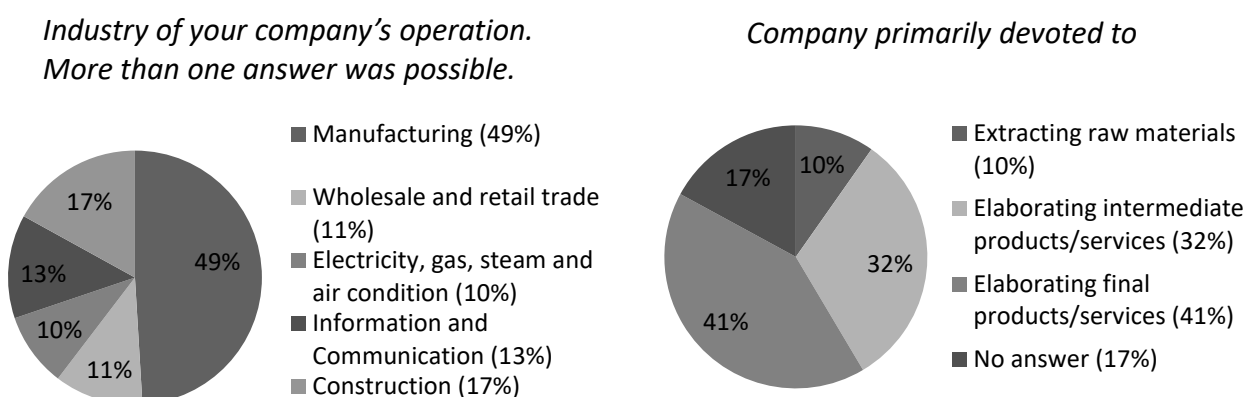
Fig. 3. Respondents' operation in 2014 (Source: own data)

Structure of respondents companies varies and it is very good for making conclusions out of the questionnaire survey.

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4.2 Sustainability management practices in companies – respondents of survey

Corporate sustainability is defined as a process which aims to integrate the systematic management of the environmental and social aspects of business together with the economic aspects, both to achieve sustainable business development for the company. Respondents answered the questions (Fig. 4., Fig. 5., Fig. 6., Fig. 7., Fig 8.) on how they understand this topic in their companies. Survey shows a very interesting conclusions, i.e. corporate sustainability is very important in companies (respondents) – for management and a corporate strategy.

Relevance of corporate sustainability
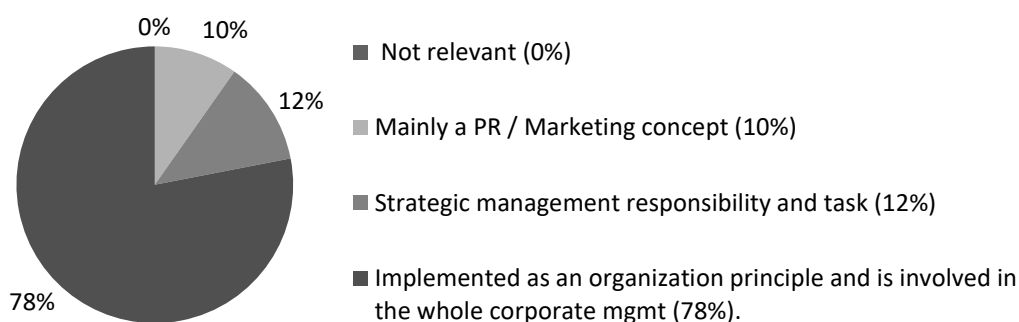
Fig. 4. *Relevance of corporate sustainability* (Source: own data)

Implementation of sustainable activities/practices
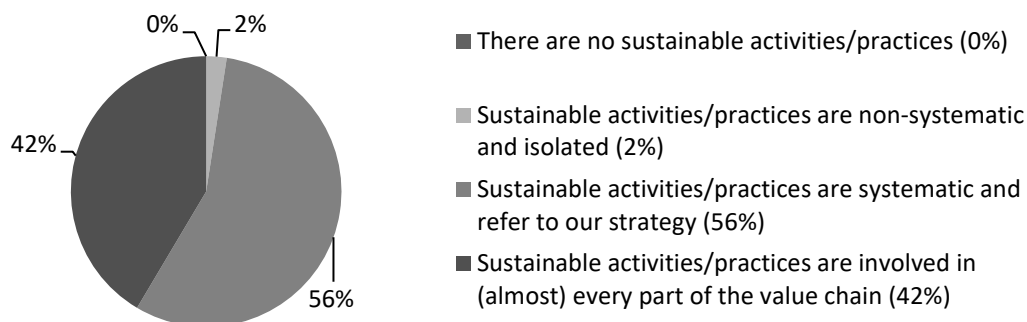
Fig. 5. Implementation of sustainable activities/practices in company (Source: own data)
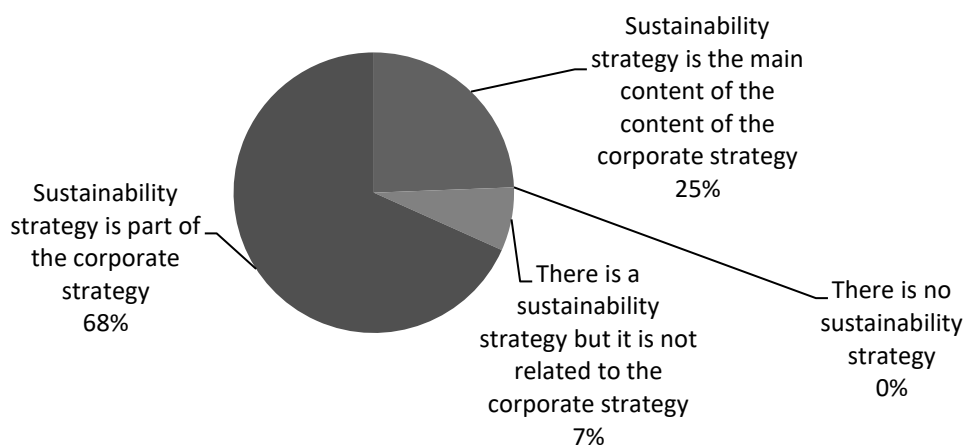
Fig. 6. Inclusion of sustainability into corporate strategy (Source: own data)

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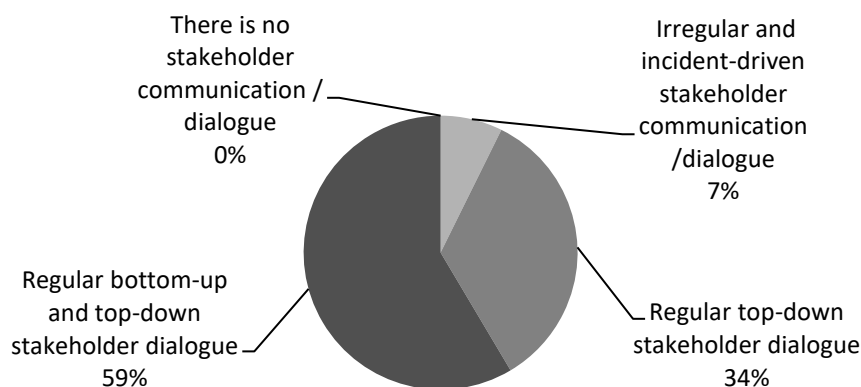
Fig. 7. Stakeholder communication – dialogue (Source: own data)

Broadening sustainability in the supply chain
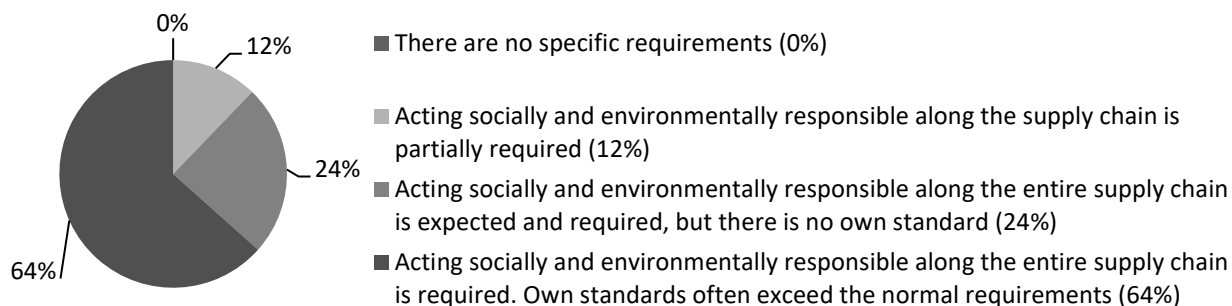
Fig. 8. Broadening sustainability over supply chain (Source: own data)

4.3   Collecting information about sustainability in companies – respondents of survey

The term 'sustainability accounting' was used in the survey to refer to the process of the collection, analysis and communication of sustainability-related information. This is any information that is needed for, or that is related to, corporate sustainability management. It can include both new types of information and sometimes also information which may already have been generated and used for some time before the term 'sustainability' became common usage (eg, on legal compliance with employment laws).

The following figures (Fig. 9., Fig. 10., Fig. 11.) show statistically presented results of the survey in the spectrum of information collected. According to findings, they are broad and there is not any single preferred environmental or social area.

Collecting information on sustainability-related issues
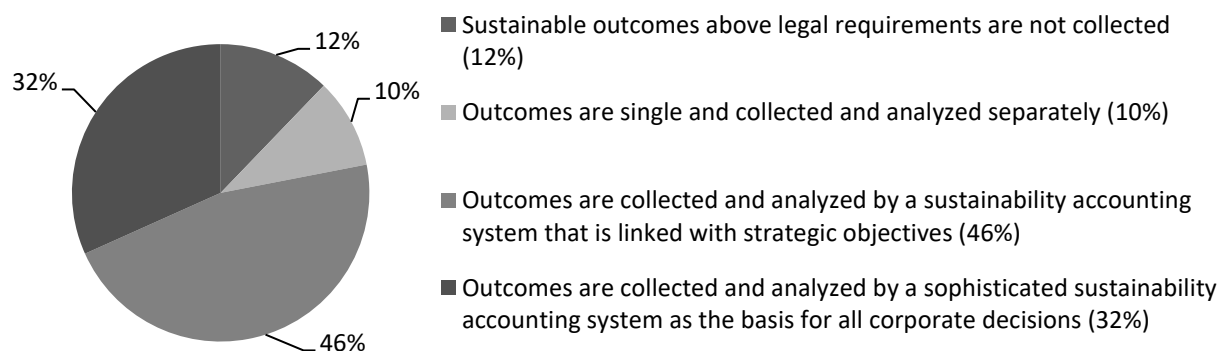
Fig. 9. Collecting information on sustainability-related issues (Source: own data)

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Collected information is

- Only on environmental issues (0%)
- Mainly on environmental issues (14%)
- Balanced between environmental and social issues (81%)
- Mainly on social issues (5%)
- Only on social issues (0%)
- No answer (3%)

Fig. 20. Balance of information regarding environmental and social issues (Source: own data)

Information collected is

- Only on engineering themes (2%)
- Mainly on engineering themes (11%)
- Balanced between engineering themes and softer aspects (84%)
- Mainly on softer aspects (0%)
- Only on softer aspects (0%)
- No answer (3%)
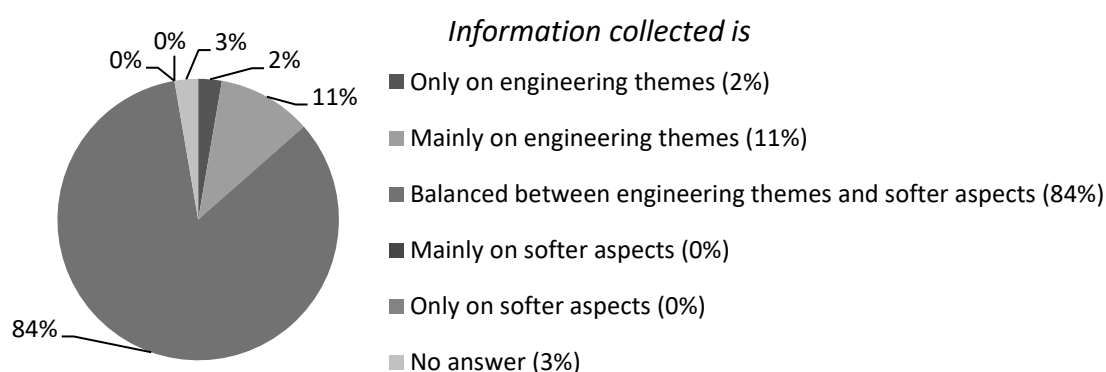
Fig. 11. Balance of information regarding engineering themes and softer aspects (Source: own data)

4.4 Channel of Sustainability Reporting in companies – respondents of survey

The following figure (Fig. 12.) shows the percentage rate of channels of sustainability reporting. More companies used more than one channel and this statistics is a summary. Percentage of each channel shows representation of individual forms of channels.
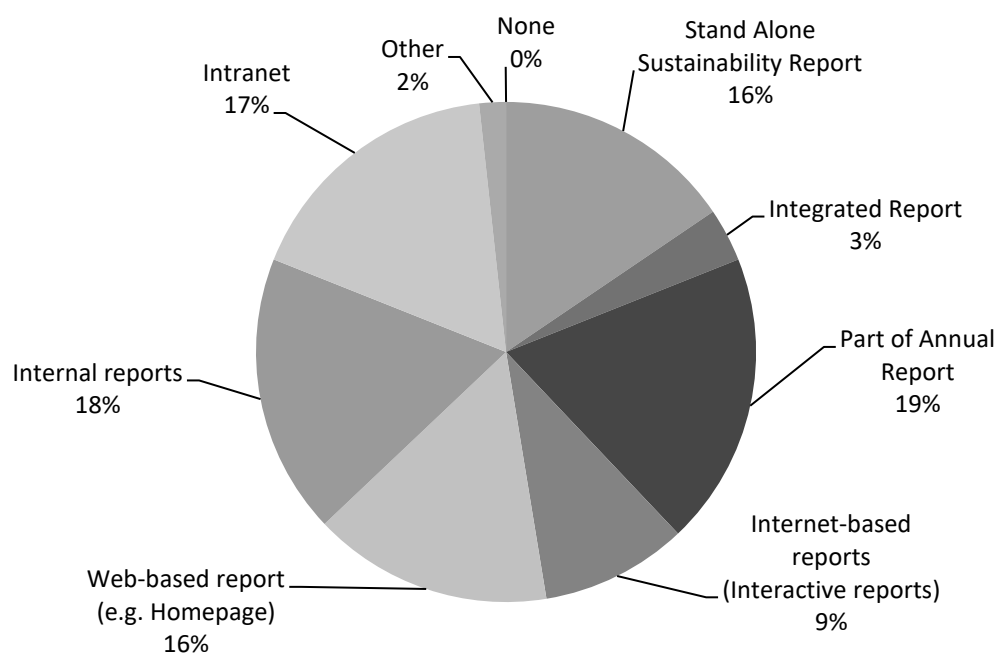
Fig. 32. Channels used for sustainability reporting – more than one option was possible (Source: own data)

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5   Conclusion

Interest in sustainability and corporate social responsibility and its implications for business in Europe has increased steadily. It is increasingly recognised that sustainability not only poses ethical issues but also has direct implications for economic performance. The condition of sustainable development is the application of a proper understanding of and compliance with the principle of corporate social responsibility in companies in the area or country.

Corporate social responsibility (CSR) refers to corporate responsibility for their impact on society. The European Commission believes that CSR is important for the sustainability, competitiveness, and innovation of EU enterprises and the EU economy. It brings benefits for risk management, access to capital, cost savings, human resource management and customer relationships. Information about corporate social responsibility is more non-financial information and there hadn't been any uniform standards for reporting a few years ago. Despite efforts invested into a global consolidation of standardisation of reporting non-financial information reporting (e.g. Global Reporting Initiative – GRI) in the field of sustainability development (GRI [online], 2016), the rate of standardisation and legal enforcement had been slow and formally insufficient. It did not reach the standardisation level of financial information reporting.

In this paper, I analysed the results of a questionnaire survey addressed to large companies operating in the Slovak Republic, regarding their understanding and attitude towards the corporate social responsibility. The questionnaire survey was performed in the second half of 2015.

The aim was fulfilled by statistical analysis of data obtained by means of our original empirical research (web-based survey), which was simultaneously realized and harmonized in several Central and Eastern European countries, including the Slovak Republic. Responses from the Slovak Republic were mutually compared in several areas. Results of questionnaire survey confirm our expectations formulated in hypothesis, i.e. entrepreneurs have selective attitudes towards the social responsibility, depending on their preferred areas, ownership and preferred stakeholders in areas of published information, and the most important motivation for reporting such information is a national legislation requirement. It is possible to summarize that on average, respondents systematically understand sustainability (in areas of perceived relevance of sustainability, inclusion of sustainability into corporate strategy, management of sustainability, as well as stainability accounting and reporting). An interesting finding was that 86.1% of respondents declared that senior management decides what aspects are covered within sustainability accounting. All of the respondents confirmed that there is a way in which information on corporate sustainability are reported now.

However, we can assume these issues are EU priority now, given the formulation of strategies and legislative on the European Union level and national strategies and legislation for the sustainable development. "The fiscal and economic policy focusing on those aspects of public finances and the real economy that shape up the future development will be the main instruments in achieving a balanced and sustainable development of Slovakia's national economy. These policies will be drafted in a manner strengthening Slovakia's orientation on the values enshrined in the Constitution - sustainable social market economy, environmentally-friendly economic development, and enhancement of life's certainties for the people." (Government SK [online], 2016)

In Slovakia, practical strengthening of non-financial information reporting can already be seen in the amended Act No. 431/2002 Coll. On Accounting by Act No. 130/2015 Coll. (MF SK, 2015), effective from January 1, 2016 and partly from January 1, 2017, implementing provisions of Directive 2013/34/EU of the European Parliament and of the Council on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings and Directive 2014/95/EU of the European Parliament and of the Council on disclosure of non-financial and diversity information by certain large undertakings and groups.

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DETERMINANTS OF BANKING PROFITABILITY IN THE VISEGRAD COUNTRIES

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Abstract

The aim of this paper is to estimate the determinants of profitability of banking sectors in the Visegrad countries. First we will calculate three profitability indicators, namely Return on Assets, Return on Equity and Net Interest Margin. Then we will estimate the determinants of profitability of banking sectors in the Visegrad countries. We consider several macroeconomic factors and bank-specific factors. We also consider the bank's affiliation with the financial conglomerate. For empirical estimation of profitability determinants we use panel data analysis with fixed effect. We found that both bank-specific factors and macroeconomic factors influenced banking profitability in analysed countries. The effect of affiliation with the financial conglomerate on banking profitability was not statistically significant.

Keywords

Bank profitability, Visegrad countries, Panel Data Analysis, Profitability determinants.

JEL classification

G21, C33.

1   Introduction

The aim of this paper is to estimate the determinants of profitability of the banking sectors in the Visegrad countries during the period 2004-2014. The group of the Visegrad countries consist of the Czech Republic, Slovakia, Poland and Hungary. The financial system of the Visegrad countries are bank-based and banks in these countries play an important role in economy. Thus, the profitability of these banks are an important topic. We used three profitability indicators, which are Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin (NIM) as a dependent variables in empirical models. For empirical analysis of profitability determinants we employed the panel data analysis with fixed effect.

The structure of the paper is follow. Next section presents the literature review regarding profitability and profitability determinants. Third chapter describes the methodology and used data. Fourth section presents the empirical analysis and results with discussion of findings. Last chapter concludes the results.

2   Literature Review

Most of empirical studies measured profitability by two measures which are Return on Assets and Return on Equity. E.g. Černohorská (2015) or Azam and Siddiqui (2012) used the return on equity and return on assets as endogenous variables in regression analysis. On the other hand, e.g. Kosmidou et al. (2008) measured the profitability using return on assets and net interest margins. Several studies (e.g. Fišerová et al., 2015; Sufian and Habibullah, 2009; or Alkassim, 2005) measured the profitability using three variables, which are Return on Assets, Return on Equity and Net Interest Margin.

The determinants of banking profitability was estimated in several studies and we mention some of them. The previous literature divided the factors influencing the banking profitability into bank-specific, industry-specific and macroeconomic determinants.

Kosmidou et al. (2008) measured bank's size by its total assets and argued that large bank size might result in scale economies with reduced costs, or scope economies that result in loan and product diversification, thus providing access to markets that a small bank cannot entry. Smirlock (1985) found a positive and significant relationship between size and bank profitability, large banks have a tendency to grow foreign capital and, therefore, seem to be more profitable. On the other hand,

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Sufian and Habibullah (2009) concluded that the size of the bank had negative impact on return on average equity, while the opposite was true for return on average assets and net interest margin. Ben Naceur and Goaied (2008) found that size was negatively related to bank profitability. Short (1979) stated that size was closely related to the capital adequacy of a bank since relatively large banks tend to raise less expensive capital and appear more profitable. Also Stavárek and Polouček (2004) confirmed the positive relationship between bank size and profitability.

Hoffmann (2011) found a negative link between the capital ratio and the profitability in US banking sector. Kosmidou et al. (2008) found that capital strength, represented by the equity to assets ratio, was the main determinant of UK banks' profits providing support to the argument that well capitalized banks face lower costs of external financing, which reduces their costs and enhances profits. Also Kosmidou (2008) found that profitability is positively associated with well capitalized banks and lower cost to income ratios. This fact confirmed also Ben Naceur and Goaied (2008). Fišerová et al. (2015) found the evidence of the fact that more capitalized and operationally efficient banks outperform their peers and the fact that a low non-performing loans (cost of risk) ratio was another key factor of foreign-owned banks' performance.

Risk can be divided into credit and liquidity risk. The results concerning liquidity are also mixed. Kosmidou et al. (2008) confirmed that the liquidity ratio had a positive effect on return on assets. Also Bourke (1989) reports an opposite result, while the effect of credit risk on profitability appears clearly negative. This result may be explained by taking into account the fact that the more financial institutions are exposed to high-risk loans, the higher is the accumulation of unpaid loans, implying that these loan losses have produced lower returns to many commercial banks. In contrast, Molyneux and Thorton (1992) reveal a negative and significant effect of liquidity on bank profits. Kosmidou (2008) also confirm this negative effect of liquidity ratio on net interest margin. In contrast, Bourke (1989) estimated an opposite result, while the effect of credit risk on profitability appears clearly negative. Athanasoglou et al. (2008) explained this result by taking into account the fact that the more financial institutions are exposed to high-risk loans, the higher is the accumulation of unpaid loans, implying that these loan losses have produced lower returns to many commercial banks.

Kosmidou et al. (2008) found that the impact of loan loss reserves was positive and significant on net interest margin. Bourke (1989) and Molyneux and Thornton (1992) found that ownership status is irrelevant for explaining profitability.

The last group of profitability determinants deals with macroeconomic variables. Sufian (2011) examined the negative impact of GDP on ROA. But Kosmidou (2008) argued that the growth of gross domestic product is positively related to bank profitability, while inflation rate is negatively related to bank profitability. Also Fišerová et al. (2015) investigated that the economic fundamentals affect the performance of foreign-owned banks. Kanwal and Nadeem (2013) found that GDP had an insignificant positive effect on ROA, but an insignificant negative impact on ROE and equity multiplier. Next, Sufian and Habibullah (2009) found that the macroeconomic variables had no significant impact on bank profitability, except for inflation, which had negative relationship with banks profitability. Also Ben Naceur and Goaied (2008) and Ben Naceur and Omran (2008) confirmed that macroeconomic indicators had not impact on banks' profitability.

3   Methodology and Data

We measure profitability using three common indicators: Return on Assets, Return on Equity and Net Interest Margin. In this section we characterize these indicators. For empirical analysis of determinants of profitability we used the panel data analysis. Thus, we present a brief information about panel data analysis and panel unit root test which. Data and selection of variables are presented in last part of this chapter.

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3.1 Methodology

Following Fišerová et al. (2015), Alkassim (2005) and among others, this paper used Return on Assets, Return on Equity and Net Interest Margin individually as the dependent variable.

Each of the ratios looks as a slightly aspect of profitability. Return on Assets measures the bank's ability to efficiently employ its assets. ROAevaluates the performance of management. Return on Assets should be higher than 1.75%. We calculate ROA as:

$$ROA = \frac{net\ income}{total\ assets} \qquad (1)$$

Return on Equity measures the return on each currency unit of shareholders' equity. The higher the return the better, as banks can add more to retained earnings and pay more in cash dividends when profits are higher (Rose and Hudgins, 2013). We calculate ROE using equation:

$$ROE = \frac{net\ income}{equity} \qquad (2)$$

Net interest income (NII) is the difference between interest income and interest expense. In interest rate term, it represents the interest spread differential. The net interest margin provides a measure of asset productivity. NIM should be higher that 3%. A good NIM is indicative of good yields on loans, lower cost rates, effective use of earnings assets and sensible mix of interest-bearing liabilities. We calculate NIM as:

$$NIM = \frac{net\ interest\ income}{total\ assets} \qquad (3)$$

For empirical estimation of profitability determinants we use Panel Data Analysis. As Asteriou and Hall (2011) presented the panel data set is formulated form a sample that contains N cross-sectional units that are observed at different T time period. A simple linear model as given by:

$$y_{it} = \alpha_i + \beta_1 x_{it} + \beta_2 x_{it} + \cdots + \beta_n x_{it} u_{it}, \qquad (4)$$

where the variables y_{it} and x_{it} have both i and t subscripts for $i = 1, 2, \ldots, N$ sections (in this paper banks) and $t = 1, 2, \ldots, T$ time periods. The coefficient α_i can differ for each bank in the sample.

3.2 Data and Selection of Variables

The data set used in this paper was obtained from the annual reports of commercial banks of the Visegrad countries during the period 2004–2014. All the data is reported on an unconsolidated basis. We use unbalanced panel data from commercial banks of the Visegrad group.The sum of total assets of selected commercial banks covered more than 70% of total assets of banking sector. The dataset is representative and we can present results for banking sectors of the Visegrad countries. Due to some missing observations we have an unbalanced panel of 432 observations.

We selected several factors which can influenced the profitability. We included the bank size, level of capitalization, credit risk and liquidity risk, interest rate, riskiness of the bank's overall portfolio, bank ownership structure, total capital ratio, affiliation with financial conglomerate, Gross Domestic Product (GDP) per capita, consumer prices and unemployment rate.

Bank size is represented by the amount of total assets. The level of capitalization is the ratio of equity to total assets. The ratio of total loans to total assets was used as a proxy for credit risk. Liquidity risk is represented by the ratio of total loans to total deposits. Interest rate is measure as a ratio of interest income on loans to total loans. Riskiness of the bank's overall portfolio is computed

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as a ratio of loans loss provision to total assets. Bank ownership structure is proxy by the market share of foreign-owned banks (% of total assets). An affiliation with financial conglomerate as a dummy variable represents whether the bank belongs to the financial conglomerate. GDPpresents the gross domestic product per capita in each country. Consumer prices is average percentage year on year. Unemployment rate is in percent. Descriptive statistics of variables is presented in Table 1.

Table 1. Descriptive statistics of independent variables

Variable	Mean	Median	Minimum	Maximum	St.Dev.
Bank size	5719322	1800785	10670	57249522	8465305
Level of capitalization	11.9537	9.7505	-0.2000	98.6600	9.6108
Credit risk	61.2212	64.3200	3.3400	97.1700	19.7795
Liquidity risk	86.1823	78.9100	6.3900	597.1000	58.5688
Interest Income on Loans	255345	133700	242.61	2537434	344024
Total Capital Ratio	17.17	13.49	4.88	211.65	15.55
Affiliation with the financial conglomerate	0.1791	0.0000	0.0000	1.0000	0.3837
GDP per capita	12129.15	10842.00	8152.00	20000.00	2741.05
Consumer prices	3.0991	3.3000	-0.2000	8.0000	1.9125
Unemployment rate	10.9865	11.0000	5.4000	18.5000	3.1294
Ownership structure	78.9083	83.0000	60.0000	99.0000	13.1839
Riskiness of portfolio	0.2752	0.0636	-0.6868	4.8629	0.5396

Source: Author's compilation.

4 Empirical Analysis and Results

First, we calculated the profitability of the Czech commercial banks. We measured simultaneously the Return on Assets, Return on Equity and Net Interest Margin. The values of return on assets of the Visegrad countries' banking sectors within the period 2004-2014 are presented in Table 2.

Table 2. Descriptive statistics of Return on Assets in the Visegrad countries

Year	Mean	Median	Min	Max	St.Dev.
2004	1.44	1.43	-5.93	8.23	2.44
2005	1.20	1.22	-7.94	6.77	2.06
2006	1.14	1.08	-8.60	8.27	2.26
2007	1.02	1.22	-8.49	7.52	2.08
2008	0.87	0.83	-9.07	4.33	1.90
2009	-1.03	0.48	-94.33	4.34	10.41
2010	-0.16	0.71	-23.26	3.69	3.55
2011	0.16	0.47	-8.41	10.66	2.80
2012	0.50	0.59	-7.16	12.45	2.85
2013	0.54	0.42	-6.89	14.99	2.82
2014	-0.63	0.41	-17.74	3.12	3.52

Source: Author's calculation.

The average value of return on assets in banking sectors of Visegrad countries reached the value in range of -1.03 to 1.44. The average ROA is very low, it means that the return on assets is very poor. We can see that average value of ROA was decreasing during analysed period. This deceased

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was registered especially during financial crisis. When we analysed the individual banks, we found that in most of analysed banks the profit decreased as a result of the financial crisis. When we compare these countries, the higher average ROA reached the Polish banks with the value of 0.8.

Table 3. Descriptive statistics of Return on Equity in the Visegrad countries

Year	Mean	Median	Min	Max	St.Dev.
2004	10.17	14.62	-215.00	66.52	35.58
2005	12.80	12.89	-24.59	51.04	12.90
2006	17.78	13.63	-32.52	200.00	34.36
2007	11.89	13.41	-35.77	77.26	15.52
2008	7.09	9.41	-90.85	34.74	20.34
2009	0.78	6.43	-125.39	67.24	24.73
2010	0.96	7.99	-102.14	23.51	24.39
2011	-3.51	6.17	-120.08	47.83	32.40
2012	-0.68	6.55	-124.06	39.58	28.95
2013	2.62	3.79	-74.54	80.93	20.81
2014	-5.51	4.12	-109.61	21.92	27.91

Source: Author's calculation.

Table 3 presents descriptive statistics of ROE in banking sectors of the Visegrad countries. The development of the indicator ROE is very similar like the development of ROA. In period 2009-2014 the average value was decreasing. The reason is the decrease in profit of analysed banks. The higher average ROE reached the Czech and Slovak banks. On the other hand, the lowest value registered Hungarian banks with the value of 0.8. The return on equity is very low. This value should be higher than 15. Values of average ROE were lower than this recommended value in all analysed years.

Table 4. Descriptive statistics of Net Interest Margin in the Visegrad countries

Year	Mean	Median	Min	Max	St.Dev.
2004	5.74	3.77	0.18	21.67	5.30
2005	5.26	3.26	1.27	22.52	5.06
2006	4.86	3.13	0.55	21.73	4.77
2007	4.46	3.10	0.31	19.17	4.16
2008	4.17	3.01	0.32	19.20	3.51
2009	4.04	3.03	-0.44	20.53	3.67
2010	4.32	3.24	0.49	22.36	3.64
2011	4.26	3.05	0.39	24.86	4.04
2012	4.12	3.17	0.39	26.14	4.01
2013	3.84	2.90	0.85	26.02	3.80
2014	3.31	2.82	1.45	7.64	1.54

Source: Author's calculation.

The descriptive statistics of net interest margin in the Visegrad countries' banking sectors are presented in Table 4. In contrast, the development of net interest margin shown only a slight decrease in average values. The average values of NIM were in range of 5.74 to 3.31. This indicator should be higher than 3 and we can conclude that this indicator is good in the analysed period.

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We estimated the profitability determinant of the banking sectors of the Visegrad countries. We employed the panel data analysis method for practical estimation of the profitability determinants. First, it is necessary to test the time series for the stationarity. We used Levin, Lin and Chu test to test the individual variables for the existence of the unit roots.More information about panel unit root test is described e.g. in Asteriou and Hall (2011). The result of the test indicates that all variables are stationary and can be used in panel regression analysis. We estimate Equation (4) using Ordinary Least Squares (OLS) method. For correction of heteroscedasticity we used White (1980) test. The heteroscedasticity was rejected and the error term is homoscedastic. For detecting multicollinearity we used correlation coefficient. From the correlation matrix it is obvious that the variable total assets and interest rate on loans are positively correlated. Thus, we remove interest rate on loans from final models. We found normality of the error term. The absence of autocorrelation of the error term is determined by the Durbin-Watson test. To allow for heterogeneity across the banks, we use an error-component model estimated as fixed effects. We simultaneously estimated three models, where we chose the ROA, ROE and NIM as dependent variables.

Table 5 presents the estimation results of model with return on assets as a depended variable. The results show that only level of capitalization, ownership structure and banks size positively influenced ROA in banking sectors of the Visegrad countries. On the other hand, riskiness of portfolio banks and total capital ratio had a negative impact on ROA in banks of the Visegrad group.

Table 5. Estimation results with dependent variable Return on Assets

Variable	Coefficient	Std.Error	t-Statistic
C	-1.7912	1.2131	-1.4765
Consumer prices	0.0578	0.0438	1.3182
Level of capitalization	0.2241[a]	0.0277	8.0916
Affiliation with the financial conglomerate	-0.0912	0.3542	-0.2574
Ownership structure	0.0204[c]	0.0116	1.7515
GDP per capita	0.0000	0.0001	-0.0613
Credit risk	-0.0016	0.0082	-0.2000
Liquidity risk	0.0007	0.0023	0.3031
Riskiness of portfolio	-1.3403[a]	0.1728	-7.7566
Bank size	0.0000[a]	0.0000	3.5821
Total capital ratio	-0.0790[a]	0.0198	-3.9795
Unemployment rate	0.0033	0.0457	0.0724

Adj.R^2= 0.57, DW = 1.91, Prob(F-stat)=0.00

Note: [a] denotes significance at 1% level, [b] denotes significance at 5% level, [c] denotes significance at 10% level

Source: Author's calculation.

From Table 6 we can see the estimation results of the model with ROE as a dependent variable. The variable level of capitalization, GDP per capita and unemployment rate positively influenced the ROE. Riskiness of portfolio and total capital ratio negatively affecting the ROE.

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Table 6. Estimation results with dependent variable Return on Equity

Variable	Coefficient	Std.Error	t-Statistic
C	-33.7071[a]	12.0474	-2.7979
Consumer prices	0.5405	0.4511	1.1980
Level of capitalization	0.6241[b]	0.2857	2.1840
Affiliation with the financial conglomerate	1.5696	3.4412	0.4561
Ownership structure	0.1788	0.1154	1.5494
GDP per capita	0.0010[c]	0.0005	1.8180
Credit risk	0.0846	0.0823	1.0275
Liquidity risk	-0.0040	0.0225	-0.1777
Riskiness of portfolio	-17.6461[a]	1.7516	-10.0745
Bank size	0.0000[a]	0.0000	5.0978
Total capital ratio	-0.3957[c]	0.2025	-1.9543
Unemployment rate	0.8557[c]	0.4521	1.8928
Adj.R^2 = 0.53, DW = 1.97, Prob(F-stat)=0.00			

Note: [a] denotes significance at 1% level, [b] denotes significance at 5% level, [c] denotes significance at 10% level

Source: Author's calculation.

When we analysed the impact of determinants on net interest margin (Table 7), we found that consumer prices, GDP per capita, credit risk and total capital ratio had a positive impact on NIM. Only level of capitalization influenced the NIM negatively.

Table 7. Estimation results with dependent variable Net Interest Margin

Variable	Coefficient	Std.Error	t-Statistic
C	-2.2822	2.1405	-1.0662
Consumer prices	0.0572[b]	0.0263	2.1753
Level of capitalization	-0.0658[a]	0.0162	-4.0596
Affiliation with the financial conglomerate	0.1510	3.3046	0.0457
Ownership structure	0.0150	0.0220	0.6842
GDP per capita	0.0001[c]	0.0000	1.7184
Credit risk	0.0471[a]	0.0085	5.5580
Liquidity risk	0.0001	0.0019	0.0475
Riskiness of portfolio	0.0242	0.1249	0.1942
Bank size	0.0000	0.0000	-0.6669
Total capital ratio	0.0598[a]	0.0156	3.8374
Unemployment rate	-0.0030	0.0428	-0.0709
Adj.R^2= 0.47, DW = 1.83, Prob(F-stat)=0.00			

Note: [a] denotes significance at 1% level, [b] denotes significance at 5% level, [c] denotes significance at 10% level

Source: Author's calculation.

In Table 8 it is summarized the effect of determinants on banking profitability. When we summarized the determinants influencing the banking profitability, we found that only level of capitalization and total capital ratio had an impact on ROA, ROE and NIM. But the impact is not the same, in case of level of capitalization, this variable positively influenced ROA and ROE but negatively affecting net interest margin. The effect of total capital ratio on banking profitability is not the unique. Total capital ratio had a negative impact on ROA and ROE but positive impact on NIM.

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Negative relationship between capital ratio and banking profitability was found also in Hoffmann (2011). The positive impact of level of capitalization on banking profitability was found in studies of Kosmidou et al. (2008), Kosmidou (2008), Ben Naceur and Goaied (2008) or Fišerová et al. (2015). In this study we confirm the fact that well capitalized banks face higher return on assets and return on equity.

Table 8. Effect of individual determinant on banking profitability

Variable	ROA	ROE	NIM
Consumer prices			+
Level of capitalization	+	+	-
Affiliation with the financial conglomerate			
Ownership structure	+		
GDP per capita		+	+
Credit risk			+
Liquidity risk			
Riskiness of portfolio	-	-	
Bank size	+	+	
Total capital ratio	-	-	+
Unemployment rate		+	

Source: Author's calculation.

Bank size positively influenced ROA and ROE. This results follow the findings of Kosmidou et al. (2008), Smirlock (1985), Stavárek and Polouček (2004) or Short (1979). Kosmidou et al. (2008) described this positive influence by the fact that large bank size might result in scale economies with reduced costs, or scope economies that result in loan and product diversification, thus providing access to markets that a small bank cannot entry.

Riskiness of portfolio had a negative impact on ROA and ROE. This results are in line with our estimation from economic theory. More unpaid loans leads to the lower value of ROA and ROE. Because higher value of loan loss provision negatively influenced net profit.

Ownership structure had positive impact only on ROA. It means that higher foreign share of total assets leads to higher return on assets.

Macroeconomic indicators had a positive impact on banking profitability. Consumer prices positively influenced net interest margin. Unemployment rate positively influenced return on equity and GDP per capita had a positive impact on ROE and NIM. The results of the positive impact of unemployment rate and consumer price on profitability are surprising. This results can be explained by the fact that when unemployment rate decline people do not need loans and thus the net profit slightly decrease. But this result is not in the line with economic theory. We found that the impact of macroeconomic indicators on ROA had not statistically significant.

In the previous studies the impact of macroeconomic variables were mixed. Our results are not in line with e.g. Kanwal and Nadeem (2013), Sufian and Habibullah (2009), Ben Naceur and Goaied (2008) or Ben Naceur and Omran (2008) who concluded that macroeconomic indicators had not impact on banking profitability. We can concluded that results of this paper confirm the findings of Kosmidou (2008) who also found positive relationship between growth of gross domestic product and profitability. We found that selected macroeconomic indicator positively influenced ROE and NIM. Thus we can concluded that profitability of banking sectors in the Visegrad countries were influenced by bank-specific factors and macroeconomic factors.

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5   Conclusion

The aim of this paper was to estimate the determinants of profitability of the commercial banks in the Visegrad countries during the period 2004-2014.We found that return on assets and return on equity was very low in the banking sectors of the Visegrad group.

In the paper it was found that positively influenced return on assets and return on equity but negatively affecting net interest margin. Total capital ratio had a negative impact on ROA and ROE but positive impact on NIM. Thus, we confirm the fact that well capitalized banks tend to higher ROA and ROE. Bank size positively influenced ROA and ROE. Riskiness of portfolio had a negative impact on ROA and ROE. Ownership structure had positive impact only on ROA. Credit risk had a positive impact on NIM.

Macroeconomic indicators had a positive impact on banking profitability. Consumer prices positively influenced net interest margin. Unemployment rate positively influenced return on equity and GDP per capita had a positive impact on ROE and NIM. We found that selected macroeconomic indicator positively influenced ROE and NIM.

Only affiliation with the financial conglomerate and liquidity risk had not statistically significant impact on banking profitability in banking sectors of the Visegrad countries.

We can concluded that profitability of banking sectors in the Visegrad countries were influenced by bank-specific factors and macroeconomic factors.

6   Acknowledgement

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SUPPORTING ENTERPRENEURS AND BUSINESSES FROM THE ESF

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Abstract:
This paper addresses the issue of financial support for companies from the European Social Fund (ESF) in the operational period 2007-2013. One of the objectives of the European Union is to reduce regional disparities, and increase employment in the individual regions. The ESF tries to solve problem in social sphere (reducing social disparities). The paper is focused on financial support for entrepreneurs and businesses from the ESF in selected region in the Czech Republic in relation with social disparities. The chosen regions are the Moravian-Silesian, Usti, Hradec Kralove and Plzen Regions. The aim of this paper was to monitor the financial support from the ESF in relation with social disparities. The paper is also focused on the most often problems with supporting from the ESF and division of beneficiaries.

Keywords:
Entrepreneurs and Businesses, European Social Fund, Financial Support from EU, Social Disparities, Regional Policy

JEL classification:
R11, R23, R28

1 Introduction

The European Union under the objective Cohesion emphasizes balanced development that reduces disparities between the regions. Despite of the European Union efforts to reduce disparities continuously between regions, there are still significant differences between them not only between regions from all European Union but also between regions form individual countries. For the reduction of the regional disparities the European Union used the structural funds. The European Social Fund (ESF) is one of three European Union structural funds. It is a key financial instrument for implementing the European Employment Strategy. The main mission of the ESF is to develop employment, reduce unemployment, and support social inclusion and equal opportunities with a focus on labor market development and human resources.

This paper is devoted to financial support from the ESF to entrepreneurship and business in the period 2007-2013 in relation with elimination of disparities in social sphere. The aim of this paper is to evaluate the financial support from the ESF in relation with social disparities. The paper is also focused on the most common problems with supporting from the ESF and division of beneficiaries.

The research included all businesses except municipalities, regions and public administrations in the four regions in the Czech Republic. Authors chose these regions: the Moravian-Silesian Region (MSR), the Usti Region (UR), the Hradec Kralove Region (HKR) and the Plzen Region (PR). These regions have been chosen because the Hradec Kralove and the Plzen Regions are known as the regions "good for life" and the Moravian-Silesian Region and the Usti Region are contrast to them. The Moravian-Silesian Region and the Usti Region belong to the "worst" regions in the Czech Republic. Selection of regions was supported by the results of previous studies (Hučka, Kutcheraurer, Tománek, 2008; Palová, 2015; Viturka, 2010; Wokoun, 2007).

2 Theoretic background

The research, which deals with relations of regional disparities and regional policy, is traditionally composed on the aggregated statistical data for individual regions and do not allow the partial decomposition of detailed knowledge. A complex evaluation of the spatial allocation of instruments

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of regional policy in relation to the objectives of balance and efficiency of the development region is rather less frequent topic of research papers. Crescenzi (2009) belongs to the exceptions, which points to a mismatch spatial allocation of funds, European regional policy with the intensity of socio-economic problems of the regions or Blažek and Macešková (2010), who speak about uniform spatial allocation of funds in the Czech regional policy in term 1995-2005 with a slight preference of lagging regions. Ederveen and Gorter (2002) alert on the different patterns of spatial allocation of funds of the European regional policy with respect to particular subject areas with the worst position of lagging region in case of progressive thematic areas.

Regional disparities primarily help the citizens to raise awareness of the region and their position relative to other regions. Due to them it is possible to determine the differences between entities of the regions, their performance, structure, activities, etc. The focus here is primarily on what the total level of regions is and what the region offers for the living conditions of its inhabitants namely from the social, economic and environmental point of view (Hučka and Kutscheraurer, 2011). Viturka (2008, 2010) and Skokan (2011) devoted their researches of the regional disparities also.

The programming period 2007-2013 programming period opened for the Czech Republic a unique opportunity to draw funds from the European regional policy, and this policy is the volume of its financial allocation more or less marginalized financial schemes of regional national policy (Wokoun, 2007; Blažek, 2006).

In the Czech economy structural changes, i.e. changes in the sector (branch) structure of the economy, are still ongoing, and the related changes in the professional and qualification structure of the labour force - during the transformation process labour force has been transferred from the primary and secondary sectors to the tertiary, where in the tertiary sector banking and insurance have recorded the steepest increase (Tvrdoň, 2015). This is the reason why is very important using of financial support from the ESF.

Above mentioned studies were applied mostly to the socio-economic sphere of regional disparities, with a focus on business support. This study is focused on financial support for businesses which realized social projects from the ESF. These social projects should solve problem of social disparities.

3   Supporting Entrepreneurs and Business from the ESF in relation with social disparities

This chapter is devoted into five parts. The first part solves the problematic of social disparities in the chosen regions. The second part introduces the operational programs from the ESF which were included into the research. The fourth part evaluates the financial support from the operational programs in the individual regions. The last part evaluates the research among the beneficiaries.

3.1   Evaluation of Social Disparities

The study by Palová and Šebestová (2016) was focused on measurement of regional disparities in social sphere. In to the social sphere there were included a lot of indicators which were divided into six integrated indicators: living standards, health condition, social facilities, social pathology and unemployment. These indicators solved problems in social, healthy and educational area. The solution of problem of social disparities through the ESF could be explained as process (refer with: Fig. 1). It is process where at the beginning there is a problem with social disparities due to bad social condition in the region. This problem could be solved using the ESF. The ESF tries to improve the social situation in problematic regions by financial support. At the end the social disparities should be decreased due to improvement of social situation in problematic regions.

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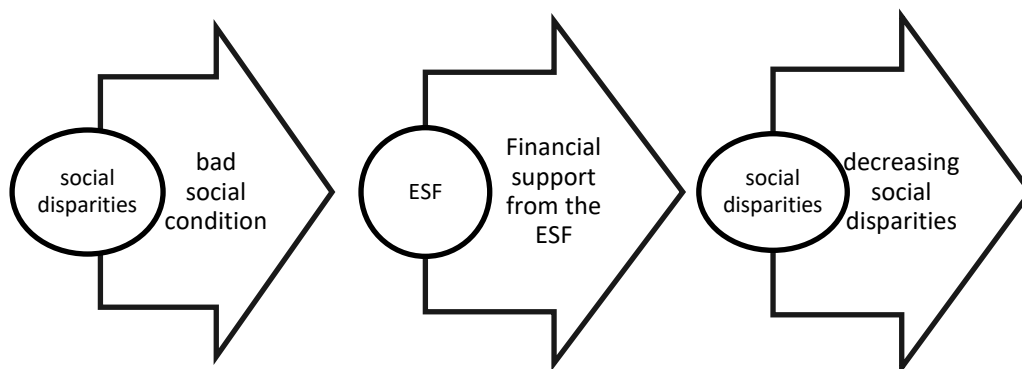
Fig. 1. Solving of social disparities. (Source: Own proceeding.)

Palová and Šebestová (2016) used the point method for the measuring of regional disparities. The measurement was done in period (2007-2013), when average values were used. The more points the average region gained, the better was its social situation (there existed smaller social problems). The average evaluation of regional disparities (refer with: Fig. 2) clearly confirmed that the best situation (the lowest social problems) was in the Plzen Region (PR), where regional average value of index reached 942 points. In the second place, with not so significant difference, the Hradec Kralove (HKR) was. In the third position the Moravian-Silesian Region (MSR) was, which lost 101 points on the Plzen Region. The worst social situation was in the Usti Region (UR) which got only 771 points. If there would be used median values instead of average values the order would be the same only the large of disparities would be a little lower.
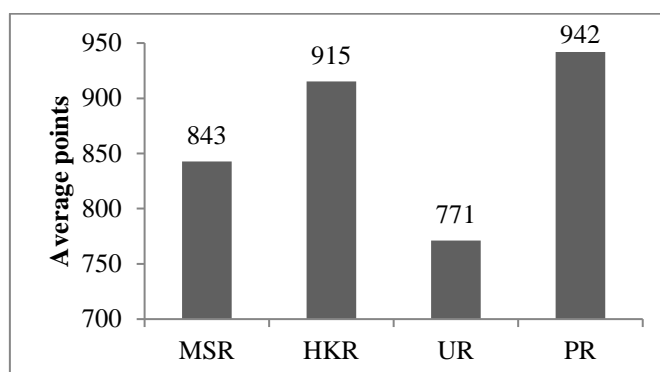
Fig. 2. Average evaluation of regional disparities. (Source: Palová and Šebestová, 2016).

3.2 Operational Programs

In the empirical part there was evaluated the spatial distribution of funds from the European Social Fund (in operational period 2007-2013), which should meet the objective of Convergence.

The European Social Fund in 2007-2013 period consisted of 4 operational programs:

- Operational Programme Human Resources and Employment (OP HRE), managed by the Ministry of Labor and Social Affairs,
- Operational Programme Education for Competitiveness (OP EC) managed by the Ministry of Education, Youth and Sports,
- Operational Programme Prague - Adaptability (OPPA) controlled by the City of Prague,
- The European Microfinance Facility.

Two operational programs from the ESF have been chosen for this evaluation, and so Operational Programme Human Resources and Employment and Operational Programme Education for Competitiveness. The Operational Programme Prague and the European Microfinance Facility were not suitable for this kind of analysis.

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The Education for Competitiveness was focused on improving the quality and modernizing systems of initial, tertiary and further education and linking it to the comprehensive system of lifelong learning, and improving the conditions in research and development. The Education for Competitiveness Operational Program consisted of 5 priority axes. Priority axes were: Initial education, Tertiary education, research and development, Further education, Systematic framework for lifelong learning and Technical assistance. In this paper authors used only three priority axes: Initial education, Tertiary education, research and development, Further education. Other priority axes were determined for public government and therefore they were not included into the research.

The Human Resources and Employment Operational Programme was included into the analysis of financial support resolving social disparities. This program was focused on minimization of unemployment by means of active policy on the labor market, professional education, reintegration of socially excluded citizens into society, improvement of public administration quality and international cooperation in the above mentioned areas. Program consisted of five priority axes. In this paper authors used only four priority axes: Adaptability, Active labor market policy, Social Integration and Equal Opportunities. Priority Axes 4 – Public Administration and Public Services was not included in this analysis because beneficiaries of funds were municipalities, regions and public government.

3.3 Secondary Data Analysis

The data was collected from the official websites of individual operational programs. For better evaluation of the financial subsidies deployed in each region it was necessary to determine the amount of financial support for one region (refer with: Table 1, Table 2). Many of the projects were implemented in more regions in the same time, and in these causes it was not possible to adequately distribute financial support by region, these projects were discarded from the overall analysis.

In the OP EC there were significant differences in support among priority axes and regions (refer with: Table 1). The Hradec Kralove Region had the largest income in priority axes 1 and 3. In the second place the Plzen Region was. The Hradec Kralove Region got the highest income also in total with income 2210 CZK per 1 inhabitant. Contrary the lowest income was in the Usti Region (total income 839 CZK per 1 inhabitant).

Table 1. The OP EC projects implemented by priority axes and regions realized only in one region (in CZK)

		1 Initial education	2 Tertiary education, research and development	3 Further education	Total
MSK	number of projects	446	76	2	524
	total allocated amount	648576834	721690533	10002758	1380270125
	amount per inhabitant	524	583	8	1114
UR	number of projects	131	20	13	164
	total allocated amount	496546185	165528230	35383436	697457851
	amount per inhabitant	597	199	43	839
PR	number of projects	150	35	14	199

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		1 Initial education	2 Tertiary education, research and development	3 Further education	Total
HKR	total allocated amount	387440510	465170013	41281763	893892285
	amount per inhabitant	679	816	72	1567
	number of projects	260	23	73	356
	total allocated amount	688131155	377090539	158125148	1223346842
	amount per inhabitant	1243	681	286	2210

Source: Own proceeding according data by OP Education for Competitiveness . [online] [cit. 2015-11-02]. Available from https://databaze.op-vk.cz/Project/Search/.

The most of the projects from OP HRE were realized in the Moravian-Silesian Region in Priority Axes 2 – Active labor market policy with 162 projects in total amount 612 mil. CZK (refer with: Table 2). The Usti Region was on the second place. In contrast with the Hradec Kralove and the Plzen Region where there were realized several times fewer projects.

Table 2. The OP HRE projects implemented by priority axes and regions realized only in one region (in CZK)

		1 Adaptability	2 Active labor market policy	3 Social Integration and Equal Opportunities	5 Transnational Cooperation	Total
MSR	number of projects	112	56	162	11	341
	total allocated amount	321855529	276129836	612256288	54931741	1265173394
	amount per inhabitant	260	223	494	44	1022
UR	number of projects	58	50	136	5	249
	total allocated amount	54931741	259242280	604107018	19993417	938274455
	amount per inhabitant	66	312	727	24	1129
PR	number of projects	41	6	37	0	84
	total allocated amount	136758689	25757850	134932197	0	297448736
	amount per inhabitant	240	45	237	0	522
HKR	number of projects	41	5	26	5	77
	total allocated amount	160454743	24555439	94644714	18565568	298220465
	amount per inhabitant	281	43	166	33	523

Source: Own proceeding according data by ESF CR. [online] [cit. 2015-05-27]. Available from Internet: http://www.esfcr.cz/modules/projects/index.php?lang=1.

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It is possible to see large differences among the operational programs (refer with: Fig. 3). The largest income from OP EC was directed into the Hradec Kralove Region (39%) and the Plzen Region (27%). On contrary the largest income from the OP HRE was directed into the Usti Region (35%) and the Moravian-Silesian Region (32%).

Fig. 3. Share of the financial support per 1 inhabitant OP EC (left) OP HRE (right). (Source: Own proceeding).

The highest financial support from both operational programs (refer with: Table 3) was in the monitored period per one inhabitant in the Hradec Kralove Region, then in the Moravian-Silesian Region. In the third position was the Plzen Region and on the last place the Usti Region was. If there would be compared these results with the regional disparities in the social sphere there could not be assumed that the region with the most problematic social situation got also higher financial support.

Table 3. Total financial support per 1 citizen

	in CZK
Moravian-Silesian Region	2136
Usti Region	1968
Plzen Region	2089
Hradec Kralove Region	2733

(Source: Own proceeding).

3.4 Primary Data Research among Programme Beneficiaries

In the questionnaire survey authors got 323 correctly filled questionnaires from the beneficiaries, which received financial support from the OP EC or the OP HRE in the selected regions. The most of the beneficiaries (refer with: Table 4) were created by medium businesses with 10-49 employees (35%). The next in order were businesses with 50-249 employees (28%) and small businesses with 1-9 employees (28%). The smallest representation there was in the large business with 250 and more employees (9%).

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Table 4. Structure of beneficiaries

The number of employees	OP EC	OP HRE	Total	%
without employees	1	0	1	0,3%
1-9	38	50	88	27,7%
10 - 49	67	44	111	34,9%
50 - 249	40	49	89	28,0%
250 and more	12	17	29	9,1%

Source: Own proceeding according questionnaire research.

53% of beneficiaries (refer with: Table 5) received less than they asked for. If authors compared both of the programs it is possible to see that in the OP EC beneficiaries most often received everything that they had applied.

Table 5. Approved projects according budget

	OP EC	OP HRE	Total	%
approved with a budgetary amendment	66	106	172	53%
approved without any budgetary amendment	92	59	151	47%

Source: Own proceeding according questionnaire research.

The budged of most of the projects (83%) was reduced of 20% against the application. Only 17% of projects were reduced more than 20% of total amount of the budged.

The evaluation of administrative workload of the applied and realized projects from the ESF was very similar by both of the programs (refer with: Fig. 4). Almost nobody evaluated the administrative workload as unassuming. 51% of respondents answered that the application and realization of projects were moderately challenging. 48% of respondents considered the application and realization as challenging. Only 1% of respondents considered the administrative workload as unassuming. Differences among individual operational programmers almost did not exist.
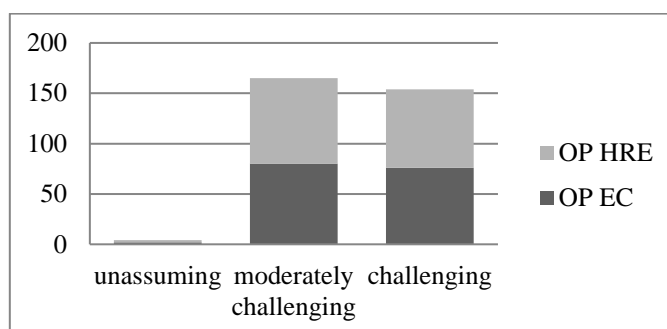
Fig. 4. Evaluation of administrative workload. (Source: Own proceeding according questionnaire research.)

From the questionnaire results the administration of ESF's projects is challenging that is good opportunity for external specialists who deal with administration of EU's projects. Although most of the beneficiaries considered administration associated with EU's project as moderately challenging or challenging the external specialists 63% of beneficiaries did not use any external specialists for administration or for application (refer with: Table 6). Most of the beneficiaries who used these specialists used them for application and administration of projects (21%). 15% of beneficiaries used specialists only for application of project and the least of beneficiaries (2%) used them only for administration.

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Table 6. Use of external specialists

	OP EC	OP HRE	Total	%
no	107	96	203	63%
yes, only for administration of project	3	3	6	2%
yes, only for application of project	19	28	47	15%
yes, for application and administration of projects	29	38	67	21%

Source: Own proceeding according questionnaire research.

In the questionnaire there were surveyed the future plans of beneficiaries in the new operation period (refer with: Fig. 5). 88% of them want to obtain the financial support on their social projects in the new period again. Authors can assume that the administrative demands will not be deterred them from the possibility to obtain additional financial support. The reason could be that for the social project are not so many possibilities how to get money. The social projects can never earn to itself as a project in usual entrepreneurship.
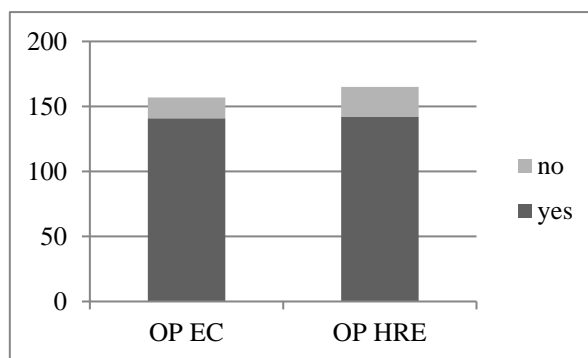
Fig. 5. Planning the submission of applications in 2014-2020 operational periods. (Source: Own proceeding according questionnaire research.)

The most of beneficiaries would like to ask again (refer with: Table 7), especially in the Moravian-Silesian Region. In contrary the least beneficiaries plan to ask in new period in the Plzen Region. Higher percentage of beneficiaries who did not use any external specialist would like to ask in the new period. The budgetary amendment could be considered as barrier for continuing in the new period. Higher percentage of beneficiaries, whose budget was amended, does not want to ask for grant in the new operational period.

Table 7. Planning the submission of application wider division

Continuing in 2014-2020 according region		Continuing in 2014-2020 according external specialist		
			continuing	do not continuing
MSR	41%	without external specialist	64%	51%
UR	17%	external specialist only for administration of project	2%	3%
PR	13%	external specialist only for application of project	14%	15%
HKR	20%	external specialist for application and administration of projects	19%	31%
Continuing in 2014-2020 according budget			continuing	do not continuing
approved without any budgetary amendment			48%	38%
approved with a budgetary amendment			52%	62%

Source: Own proceeding according questionnaire research.

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4   Conclusion

The European Union under the objective Cohesion emphasizes balanced development that reduces differences (disparities) between the regions. "*Cohesion policy should contribute to increase growth, competitiveness and employment by incorporating the Community's priorities for sustainable development as defined at the European Council in Lisbon and Gothenburg ...*" (Council Regulation, 2006). Despite of the European Union efforts to continuously reduce disparities between regions, there are still significant differences between them. The aim of this paper was to monitor financial support from the ESF, which should reduce social disparities. The evaluation was performed for the location of the project.

Due to the development of regional economics in the period 2007-2013 it could be expected that the Moravian-Silesian and the Usti Region will use the ESF funds more than other regions because their social situation was worst (refer with: Fig. 2). But the largest income for the social sphere was in the Hradec Kralove Region (2733 CZK) and the lowest in the Usti Region (1968 CZK). If the attention will be given to separate operational programs it is assumed that in OP EC received the highest support the Hradec Kralove and the Plzen Region. Contrary the highest support from the OP HRE was directed into the Moravian-Silesian and the Usti Region. It is possible to deduce that the regions with higher social problems with unemployment, social inclusion etc. were more drawing from the OP HRE which was more focused on this area. The regions without such large social problems directed their attention into the education and raising money for projects which were focused on education. So this result leads to conflict of addressing of financial support from the ESF. Due to it, it will be better to do deeper research and so to find out what the funds were used for.

Among entrepreneurs and businesses which received the financial support from the ESF was done a questionnaire research. More than 50 percent of them had problem with their budget. They usually asked for more finance than they received. Beneficiaries also evaluated the administrative workload related with application and administration of projects. 51% of respondents answered that the application and realization of projects were moderately challenging. 48% of respondents considered the application and realization as challenging. Only 1% of respondents considered the administrative workload as unassuming. Despite of these results 63% of beneficiaries did not use services from external specialist for administration. The main reason of low utilization of these services was that these services could not be paid from the budget of the ESF project. Despite the administrative demands of the ESF projects 88% of the benefices would like to obtain the financial support for their social projects in the new period again. The reason could be that for the social project there are not many possibilities to get money. The social projects can never earn to itself as project in usual entrepreneurship. One of the highest of barriers of the using of funds could be consider instead the large administration workload also budgetary amendment. The highest percentage of beneficiaries whose budget was amended does not want to ask for grant in the new operational period.

In the new operational period 2014+ the public government should help more to new applicants with application, administration and assist with creating of the budget. Also, there should be reduced the administrative workload, the funds are channeled to more specific issues and not on project administration. At the end there should be more realistic link between the support for social area and regions with the largest disparities in social sphere. Into the regions with the highest social problem should be directed larger financial support for decreasing of these social disparities. There should not only be direction according the EU's rule for the regions for Convergence (GDP lower than 75% of average of the EU).

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EUROPE 2020 STRATEGY AND ITS IMPLEMENTATION IN VISEGRAD GROUP COUNTRIES

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Abstract
Europe 2020 Strategy can be seen as an answer of the European Union to challenges resulting from both global crisis 2008+ and internal structural weaknesses of the EU. It focuses on three priorities, namely: smart growth, sustainable growth and inclusive growth. All EU Member States have been obliged to undertake necessary actions and activities in order to achieve higher levels of employment, productivity and social cohesion. The main objective of the paper is to study and analyse Europe 2020 Strategy and its implementation in Poland, Czech Republic, Slovakia and Hungary. The national targets for V4 economies in the fields of employment, innovation, education, social inclusion and climate/energy have been compared to the objectives set on the EU level. The so far implementation of the Strategy in V4 economies has been presented. An attempt has been made to list strengths and weaknesses of the analysed economies in respect to the Strategy. In addition to that changes in competitiveness (competitive position) of the V4 countries have been described.

1   Introduction

Economic development is considered a key concept reflecting the economic structure of contemporary world. It is a broad economic category involving both quantitative and qualitative improvements (Piasecki, 2003). Economic development includes three areas that go beyond increase in per capita income, namely: development of the economic system of the country (economic development is facilitated by structural changes, including urbanization, increase in the size of companies, relative decline in the importance of agricultural sector, rising significance of processing industry and service sector, geographical expansion of markets, increased diversity of produced and traded products), distribution of benefits resulting from economic growth, which brings the reduction in the area of poverty, as well as sustainable development (i.e. development that allows to meet the needs of current generations at a level that does not limit the possibility to meet the needs of future generations) (The Princeton Encyclopedia of the World Economy, 2009).

The complexity and intensity of integration processes carried out by the European Union creates the need for building a consistent development strategy for the EU as a whole (Borowiec, 2011; Oziewicz, 2006). It became especially important to fight the crisis, to overcome its negative effects and to complete the creation of single European market, as well as to transform the EU into a more competitive economy (Nawrot, 2009). One should mention here sustainable development as a new paradigm of development policy in the EU. It is a comprehensive holistic concept of development policy that takes into account the economic, social, environmental and intergenerational perspective. The main aim of development policy is to expand and improve the quality of productive potential of the economy, to strengthen its competitiveness, and as a result - social welfare.

The objective of the paper is to study and analyse Europe 2020 Strategy and its implementation in Visegrad Group (V4) countries. The main goals of the paper include: description of the priorities of Europe 2020 Strategy, presentation of the national targets for Poland, Czech Republic, Slovakia and Hungary in the fields of employment, innovation, education, social inclusion and climate/energy in comparison with the objectives set on the EU level, as well as critical analysis of

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the so far implementation of Europe 2020 Strategy in V4 economies. Another objective of the paper is to find and list strengths and weaknesses of V4 economies (in respect to the Strategy). The final goal of the paper is to present changes in competitiveness (competitive position) of Poland, Czech Republic, Slovakia and Hungary between 2010 and 2016.

Methodology of research includes: the critical literature review (in order to frame, focus and justify a research project), statistical data collection and analysis, comparative analysis, descriptive research method, deductive and inductive reasoning.

2   Europe 2020 Strategy – its priorities and targets

Adopting Europe 2020 Strategy by the European Union resulted from both failure of Lisbon Strategy and negative effects of global crisis 2008+ on the economies of EU member states. Europe 2020 Strategy was introduced in 2010. It formed the basis for EU policies for the years 2010-2020 (Sulmicka, 2013). Europe 2020 Strategy focuses on three priorities: smart growth, sustainable growth and inclusive growth (Czech National Bank, 2016). Smart growth priority aims at developing an economy based on knowledge and innovation. The second priority of Europe 2020 Strategy stresses the significance of strengthening sustainability of EU development. According to this priority the EU should be transformed into a green and resource efficient economy. The last priority of the Strategy underlines the necessity to increase social inclusion, to fight poverty and social exclusion through higher employability, as well as social and territorial cohesion (European Commission, 2010a).

In relation to the above described priorities, the following measurable targets were selected:

-    75 % of the population aged 20-64 should be employed;

-    3% of the EU's GDP should be invested in R&D;

-    greenhouse gases emissions should be reduced by 20% compared to 1990 level;

-    the share of renewable energy should constitute 20% of final energy consumption in the EU;

-    energy efficiency should be increased by 20%;

-    the share of early school leavers should be reduced below 10%;

-    at least 40% of the younger generation (people aged 30-34 in 2020) should have a tertiary degree;

-    the number of people at risk of poverty or social exclusion should be reduced by 20 million (European Commission, 2010a).

Due to the fact that each EU member state was different and that the inner diversity of the EU was really great, the EU targets were translated into national targets and trajectories to reflect the current situation of each Member State. Poland, the Czech Republic, Slovakia and Hungary joined the EU in 2004 as relatively poor countries. A relatively low economic development of V4 countries (as compared with the so called "old" EU Member States) was reflected in the targets set for them in Europe 2020 Strategy (Błasiak, 2013; Pawlas, 2014). Table 1. presents the targets for each Visegrad Group country and for the EU as a whole.

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Table 1. The headline targets for the EU and national targets for V4 countries in 2020

Country	Employment rate (%)	GERD (% GDP)	Share of renewable energy (%)	Early school leavers (%)	Tertiary education (%)
Poland	71↓	1.7↓	15↓	4.5↑	45.0↑
Czech Republic	75	1.0*↓	13↓	5.5↑	32.0↓
Hungary	75	1.8↓	13↓	10.0	30.3↓
Slovakia	72↓	1.2↓	14↓	6.0↑	40.0
EU28	75	3.0	20	10.0	40.0

↓ - national target below the target for the EU
↑ - national target above the target for the EU
* - public sector only,

Source: EUROSTAT.

The employment target for the Czech Republic and Hungary was set on the same level as for the EU, i.e. 75%. In the case of Poland and Slovakia national targets were established below the target for the EU (71% and 72% respectively). With respect to gross expenditure on research and development, the national targets for all V4 countries were fixed well below the target for the EU (the target for the EU equalled 3% GDP, and the national targets in V4 countries ranged from 1% GDP to 1.8% GDP). The very same situation was observed for the target regarding the desired share of renewable energy in 2020 (the national targets for V4 countries ranged from 13% to 15% while the one for the EU equalled 20%). A different situation was noted in the case of educational target regarding early school leavers: the national targets in Poland, the Czech Republic and Slovakia were set well above the target for the EU (4.5%, 5.5% and 6.0% respectively). The national targets in the field of tertiary education were really diversified in V4 countries. They ranged from 30.3% in Hungary (i.e. almost 10 percentage points below the EU target) to as much as 45% in Poland (i.e. 5 percentage points above the EU target).

3   Implementation of Europe 2020 Strategy in Visegrad Group countries

In 2010 Council of the European Union formulated ten recommendations which were supposed to help in practical implementation of the Strategy. The Europe 2020 Integrated Guidelines included:
- Ensuring the quality and the sustainability of public finances;
- Addressing macroeconomic imbalances;
- Reducing imbalances in the euro area;
- Optimising support for R&D and innovation, strengthening the knowledge triangle and unleashing the potential of the digital economy;
- Improving resource efficiency and reducing greenhouse gases emissions;
- Improving the business and consumer environment and modernising the industrial base;
- Increasing labour market participation and reducing structural unemployment;
- Developing a skilled workforce responding to labour market needs, promoting job quality and lifelong learning;
- Improving the performance of education and training systems at all levels and increasing participation in tertiary education;
- Promoting social inclusion and combating poverty (European Commission, 2010b).

The above listed guidelines should be taken into account by Member States in the implementation of their economic policies and the development of national reform programmes (Council, 2010).

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After a couple of years of Europe 2020 Strategy implementation, Council decided to change the sound of Integrated Guidelines. Since 2015 the following guidelines have been implemented (European Commission, 2015a; European Commission, 2015b):

- Boosting investment;
- Enhancing growth by the Member States implementation of structural reforms;
- Removing key barriers to growth and jobs at Union level;
- Boosting demand for labour;
- Enhancing labour supply and skills;
- Enhancing the functioning of labour markets;
- Ensuring fairness, combating poverty and promoting equal opportunities (European Commission, 2015b).

Poland, Czech Republic, Slovakia and Hungary (just like other EU Member States) built their national reform programmes in strong correlation with the Integrated Guidelines (*National Reform Programme. Republic of Poland. Europe 2020*, 2011; *Krajowy Program Reform. Europa 2020, Aktualizacja 2013/2014*, 2013; *National Reform Programme of the Czech Republic,* 2015; Terem, P., Ćajka, P., Rysova, L., 2015; *National Reform Programme 2015 of Hungary*, 2015)).

The year 2020 marks the horizon of Europe 2020 Strategy. It seems not only possible but also important and necessary to undertake mid-term evaluation of the Strategy. The so far implementation of Europe 2020 Strategy has been studied for both the EU as a whole and for each V4 country. The analysis has been done separately for employment objectives, educational objectives, research and development objectives, environmental objectives and the reduction of poverty.

3.1 Implementation of employment objectives of Europe 2020 Strategy in Poland, Czech Republic, Slovakia and Hungary

A high level of employment constitutes one of the most important objectives of Europe 2020 Strategy. Employment rate in V4 countries and in the EU for the period 2010-2015 was presented in table 2.

Table 2. Employment rate, age group 20-64 (%)

Country	Change between 2010 and 2015	2015	2014	2013	2012	2011	2010
Poland	+3.5	67.8	66.5	64.9	64.7	64.5	64.3
Czech Republic	+4.4	74.8	73.6	72.5	71.5	70.9	70.4
Hungary	+9.0	68.9	66.7	63.0	61.6	60.4	59.9
Slovakia	+3.0	67.7	65.9	65.0	65.1	65.0	64.7
EU-28	+1.2	70.1	69.2	68.4	68.4	68.6	68.6

Source: EUROSTAT.

In the analysed period of time employment rate in the EU increased from 68.6 to 70.1% (i.e. by 1.2 percentage point only). The situation in each V4 economy improved to a much greater extent: a 9 percentage points increase was observed in Hungary, employment rate in the Czech Republic rose by 4.4 percentage points, employment rate in Poland increased by 3.5 percentage points and a 3 percentage points rise was observed in Slovakia. The Czech Republic almost achieved the target, while other V4 countries were still far from it in 2015. Therefore, intensification of pro-employment efforts in Poland, Hungary and Slovakia is strongly advisable.

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3.2 Educational objectives of Europe 2020 Strategy and their implementation in V4 countries

Undoubtedly educational system constitutes an important factor of economic development. Better educated society lies in the centre of both the 1st Priority and the 3rd Priority of Europe 2020 Strategy. The EU Member States agreed there was a strong need to reduce school drop out rates and to promote higher education.

Early leavers from education in the EU and in V4 countries from 2010 to 2015 were shown in table 3., while data regarding tertiary education attainment in the age group 30-34 years were presented in table 4.

Table 3. Early leavers from education (%)

Country	Change between 2010 and 2015	2015	2014	2013	2012	2011	2010
Poland	-0.1	5.3	5.4	5.6	5.7	5.6	5.4
Czech Republic	+1.3	6.2	5.5	5.4	5.5	4.9	4.9
Hungary	+0.8	11.6	11.4	11.9	11.8	11.4	10.8
Slovakia	+2.2	6.9	6.7	6.4	5.3	5.1	4.7
EU-28	+3.9	11.0	11.2	11.9	12.7	13.4	13.9

Source: EUROSTAT.

School drop-out rate in the EU was reduced by 3.9 percentage points - from 13.9% in 2010 to 11% in 2015. In 2015 early leavers from education in Poland amounted to 5.3%, school drop-out rate in the Czech Republic was a bit over 6% and in Slovakia it was close to 7%. The worst situation was observed in Hungary, where early leavers from education accounted for 11.6% in 2015.

Table 4. Tertiary educational attainment, age 30-34 (%)

Country	Change between 2010 and 2015	2015	2014	2013	2012	2011	2010
Poland	+8.6	43.4	42.1	40.5	39.1	36.5	34.8
Czech Republic	+9.7	30.1	28.2	26.7	25.6	23.7	20.4
Hungary	+8.2	34.3	34.1	32.3	29.8	28.2	26.1
Slovakia	+6.3	28.4	26.9	26.9	23.7	23.2	22.1
EU-28	+4.9	38.7	37.9	37.1	36.0	34.8	33.8

Source: EUROSTAT.

A significant improvement was observed in regard to tertiary education, both on the EU level and V4 one. In 2015 tertiary education attainment for the age group 30-34 years in the EU reached 38.7%, i.e. almost 5 percentage points more than in 2010. The best situation was noted in Poland (43.5%), while the worst one could be seen in Slovakia (28.4%). It is worth stressing that in the case of Poland, the Czech Republic and Hungary tertiary education attainment increased by more than 8 percentage points from 2010 to 2015.

3.3 Implementation of R&D objectives of Europe 2020 Strategy in Visegrad Group countries

According to the 1st Priority of Europe 2020 Strategy, the EU should be transformed into a more competitive economy based on knowledge and innovation. Therefore it is so important to significantly increase gross expenditure on R&D. Gross expenditure on R&D (GERD) in V4 countries and in the EU for the period 2010 - 2014 was presented in table 5.

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Table 5. Gross domestic expenditure on R&D (% of GDP)

Country	Change between 2010 and 2014	2014	2013	2012	2011	2010
Poland	+0.22	0.94	0.87	0.88	0.75	0.72
Czech Republic	+0.66	2.00	1.91	1.79	1.56	1.34
Hungary	+0.22	1.37	1.40	1.27	1.20	1.15
Slovakia	+0.27	0.89	0.83	0.81	0.67	0.62
EU-28	+0.10	2.03	2.03	2.01	1.97	1.93

Source: EUROSTAT.

In 2010 the EU spent 1.93% GDP on research and development. According to Eurostat data, GERD increased by 0.1 percentage point only from 2010 to 2014 up to 2.03% GDP. It will be extremely difficult (if not impossible) for the EU to reach the 3% GDP target by the year 2020. In the analysed period of time one could observe a considerable rise in GERD in the Czech Republic (from 1.34% GDP to 2.00% GDP). The situation in other V4 economies looked much worse: GERD in Poland rose by 0.22 percentage point (from 0.72% GDP to 0.94% GDP – still below 1% GDP); GERD in Slovakia rose from 0.62% GDP to 0.89% GDP – also remained below 1% GDP); GERD in Hungary increased by 0.22 percentage point (from 1.15% GDP to 1.37%). Active promotion and stimulation of R&D activity in Poland, the Czech Republic and Hungary is necessary for the future development of their economies. Otherwise they will remain a periphery of the EU.

3.4   Implementation of the environmental objectives of Europe 2020 Strategy in V4 countries

In the 21st century the EU has to take environmental aspects of development into account. Therefore sustainability of development appeared in Europe 2020 Strategy as its 2nd Priority.

Share of renewable energy in gross final energy consumption in the EU and V4 countries was presented in table 6., while greenhouse gas emissions levels for the EU and V4 economies were shown in table 7.

Table 6. Share of renewable energy in gross final energy consumption (%)

Country	Change between 2010 and 2014	2014	2013	2012	2011	2010
Poland	+2.2	11.4	11.3	10.9	10.3	9.2
Czech Republic	+3.9	13.4	12.4	11.4	9.5	9.5
Hungary	+0.9	9.5	9.5	9.6	9.1	8.6
Slovakia	+2.5	11.6	10.1	10.4	10.3	9.1
EU-28	+3.2	16.0	15.0	14.3	13.1	12.8

Source: EUROSTAT.

One should note an increase of the share of renewable energy in gross final energy consumption in the UE by 3.2 percentage points from 2010 to 2014 (from 12.8% to 16.0%). The share of renewable energy in gross final energy consumption in the Czech Republic rose by almost 4 percentage points in the analysed period of time (from 9.5% to 13.4%). In the case of Poland and Slovakia the shares of renewable energy in gross final energy consumption rose by a bit more than 2 percentage points (from 9.2% to 11.4% and from 9.1% to 11.6% respectively). The worst situation was observed in Hungary (just a 0.9 percentage point rise – from 8.6% to 9.5%).

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Table 7. Greenhouse gases emissions, base year 1990 (Index 1990=100)

Country	Change between 2010 and 2014	2014	2013	2012	2011	2010
Poland	-5.24	80.68	83.42	84.15	85.48	86.10
Czech Republic	-7.19	63.45	65.87	67.88	69.94	70.64
Hungary	-8.96	61.02	61.34	64.06	68.17	69.98
Slovakia	-7.91	54.50	57.50	58.02	61.27	62.41

Source: EUROSTAT.

Another important aspect of sustainable development is the reduction of greenhouse gases emissions in order to protect further climate change. All V4 countries managed to significantly reduce the level of greenhouse gases emissions in the period 2010-2014. In the case of Hungary the reduction was close to 9 percentage points. The reduction of greenhouse gas emissions in the Czech Republic was close to 8 percentage points, in Slovakia it was over 7 percentage points, while in Poland it was a bit over 5 percentage points.

3.5   The reduction of poverty in Visegrad Group countries

Global financial crisis and later economic instability and uncertainty resulted in a considerable rise in poverty and social exclusion in EU Member States.

The number of people at risk of poverty or social exclusion in the EU and and in V4 countries in the period 2010-2014 was presented in absolute numbers in table 8. and as % of total population in table 9.

Unfortunately, when it comes to the EU as a whole the situation got worse: in 2010 the total number of people at risk of poverty or social exclusion in the EU amounted to 118.1 million and it rose to more than 122.1 million in 2014 (i.e. an increase by more than 4 million was noted). The tendency for V4 Group was completely different. The number of people at risk of poverty or social exclusion in V4 Group was reduced by more than 1 million (mostly thanks to a considerable reduction of poverty and social exclusion in Poland – also by more than 1 million).

Table 8. People at risk of poverty or social exclusion (thousand persons)

Country	Change between 2010 and 2014	2014	2013	2012	2011	2010
Poland	-1,072	9,337	9,748	10,128	10,196	10,409
Czech Republic	+37	1,532	1,508	1,580	1,598	1,495
Hungary	+149	3,097	3,398	3,272	3,093	2,948
Slovakia	-158	960	1,070	1,109	1,112	1,118
V4	-1,044	14,926	15,724	16,089	15,999	15,970
EU-28	+4,033	122,176	122,894	123,834	121,031	118,143

Source: EUROSTAT.

Table 9. People at risk of poverty or social exclusion (% of total population)

Country	Change between 2010 and 2014	2014	2013	2012	2011	2010
Poland	-3.1	24.7	25.8	26.7	27.2	27.8
Czech Republic	+0.4	14.8	14.6	15.4	15.3	14.4
Hungary	-1.9	29.9	31.5	33.5	34.8	31.8
Slovakia	-2.2	18.4	19.8	20.5	20.6	20.6
EU-28	+0.6	24.4	24.6	24.7	24.3	23.8

Source: EUROSTAT.

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In 2014 almost 25% of the EU population was at risk of poverty or social exclusion. In the case of Hungary the share of people at risk of poverty or social exclusion was close to 30% in 2014 and amounted to almost 32% in 2010. A relatively favourable situation was observed in the Czech Republic (14.8% in 2014) and in Slovakia (18.4% in 2014). In Poland the share of people at risk of poverty or social exclusion equalled 24.7% in 2014, while in 2010 it was close to 28%. Both V4 countries and other EU member states must continue pro-development policies aiming at reduction of poverty and social exclusion.

4   Competitive position of Visegrad Group countries

Increasing global competitiveness of the EU remains one of top priorities of the EU. Accession of V4 states to the European Union was also treated as a way of stimulating their overall competitiveness. International competitiveness of a national economy is a broad and complex category. It can be viewed as both competitive position and competitive advantage. Institute for Management Development, Lausanne and World Economic Forum, Geneva undertake complex studies and research on international competitiveness of nations, in that of the EU Member States economies. Competitive position of V4 economies according to World Competitiveness Scoreboard was presented in table 10., while their competitive position according to Global Competitiveness Index was shown in table 11.

In the analysed period of time the Czech Republic was classified above other V4 economies in World Competitiveness Scoreboard in the period 2010-2016. Its highest position was noted in 2016 (27th). In 2016 the next positions were taken by Poland (33rd) and Slovakia (40th). One should note that Slovakia's position got better and better in the analysed period of time (from 49th in 2010 to 40th in 2016). On the other contrary, Hungarian's competitive position has been the worst since 2013 (50th in 2013, 48th in 2014-2015 and 46th in 2016).

Table 10. Competitive position of V4 economies according to World Competitiveness Scoreboard 2010-2016

Country	2016 Rank	2015 Rank	2014 Rank	2013 Rank	2012 Rank	2011 Rank	2010 Rank
Poland	33	33	36	33	34	34	32
Czech Republic	27	29	33	35	33	30	29
Hungary	46	48	48	50	45	42	45
Slovakia	40	46	45	47	47	48	49

Source: Institute for Management Development (2010, 2011, 2012, 2013, 2014, 2015, 2016).

Table 11. Competitive position of V4 economies according to Global Competitiveness Index 2010/2011 - 2015/2016

Country	2015/16 Rank	2014/15 Rank	2013/14 Rank	2012/13 Rank	2011/12 Rank	2010/11 Rank
Poland	41	43	42	41	41	39
Czech Republic	31	37	46	39	38	36
Hungary	63	60	63	60	48	52
Slovakia	67	75	78	71	69	60

Source: World Economic Forum (2010, 2011, 2012, 2013, 2014, 2015).

According to a competitive competitiveness ranking presented by World Economic Forum the Czech Republic was also positioned above other V4 economies in 2015/2016 ranking (It took the 31st position). Poland was classified as the 41st economy, while Hungary and Slovakia took places in the seventh decade (63rd and 67th position respectively).

Undoubtedly, all V4 economies have undergone a long way since the beginning of the 1990s. Their accession to the EU gave an impulse for their competitive development. Unfortunately, the global financial crisis and later economic instability and uncertainty adversely affected their

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development. It is necessary to stimulate their competitive development if they are not to remain on the periphery of the enlarged EU.

5   Conclusion

Global financial crisis 2008+ adversely affected the EU as a whole and each EU Member State. Europe 2020 Strategy was introduced in 2010 in order to stimulate and re-direct growth and development of the EU. It focuses on three inter-related priorities, namely: smart growth, sustainable growth and inclusive growth. The goals of the paper have been fulfilled. Undertaken research and study proves that Visegrad Group countries actively participate in the implementation of Europe 2020 Strategy. It stems from the comparative analysis that due to a relatively low economic development of V4 countries (as compared with the so called "old" EU Member States), the targets set for them in Europe 2020 Strategy were – in some cases – lower than the targets fixed for the EU (e.g. employment rate target for the EU amounted to 75%, while employment rate target for Poland equalled 72% and the one for Slovakia amounted to 71% only; target concerning the share of renewable energy in final energy consumption was set on the level of 20% for the EU, while for V4 economies it ranged from 13% to 15%; target regarding gross expenditure on R&D was set on 3% GDP level for the EU, and for Visegrad Group countries it ranged from 1% GDP to 1.8% GDP. Mid-term evaluation of the implementation of the Strategy in Poland, the Czech Republic, Hungary and Slovakia let me conclude that intensive efforts are still necessary especially in the field of R&D expenditure (GERD in Poland and Slovakia was still below 1% GDP in 2014), employment promotion (employment rate in Poland, Slovakia and Hungary did not reach 70% in 2015) and social inclusion (in 2014 people at risk of poverty or social exclusion in V4 countries amounted to 14.9 million). What's more, BREXIT will complicate the EU integration and will change it in a way one cannot foresee or anticipate in July 2016. On the other hand, one can be pretty sure, the EU integration is really a chance and opportunity of intensified economic development for Visegrad Group countries.

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THE PROPOSAL TO EXTEND THE SCOPE OF THE SUPREME AUDIT OFFICE TO MUNICIPALITIES AND REGIONS

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Abstract
Recently, a planned extension of the control authority of the Supreme Audit Office in relation to local government units, and their legal entities, has become a hot topic in the sphere of public administration. This goal was defined in the Government's Policy Statement of the Government of B. Sobotka. It was fulfilled then in the draft amendment to the Constitution of the Czech Republic and in the draft amendment to Act no. 166/1993 Coll., On the Supreme Audit Office, as amended. The proposal has become the subject of intense criticism from municipalities and regions especially considering that it is not based on any thorough analysis of the system of control activities at all levels of government and public administration. The amount and frequency of the various checks carried towards municipalities and regions have been criticized for a long time. Therefore, the proposal to extend the monitoring authority of the Supreme Audit Office has been perceived as an unjustified additional burden and in May 2016 was rejected in the Senate. There will be presented circumstances connected with the discussion of the draft in the present paper. The paper will also summarize the most important objections of municipalities and counties to the draft. The aim of this paper is to highlight the apparent lack of concept and redundancy of the proposed solution.

Keywords
public administration, legislative process, Supreme Audit Office, local government units, control authority.

JEL classification
K40.

1   Introduction

The complexity of the audit system in the public sector is due to the fact that this sector of the national economy is very complicated because it involves different sectors and institutions, among which there are multilateral interactions with varying relationships of subjects and objects of control (Rektořík et al., 2003).

So far, the scope of the Supreme Audit Office in Art. 97 para. 1 of the Constitution of the Czech Republic is limited to the control of management of state property and the state budget. This application is generally defined on the basis of Art. 97 para. 3 of the Constitution set out in more detail in Act no. 166/1993 Coll., On the Supreme Audit Office, as amended (hereinafter the "Act on SAO"), and especially in § 3 of this Act. Supreme Audit Office can therefore, on the current constitutional framework, perform the audit of other entities than is the state, including municipalities and regions and by them established legal entities, only when they manage state property, incl. state money (Nemec et al., 2010).

Supreme Audit Office is responsible for external control systems. It performs inspections of ministries and other state authorities as well as state organs, individuals and legal entities. It supervises dealings with state property, adherence to state budget, usage of foreign funds provided to the Czech Republic, state guarantees or public procurements. It does not have right to inspect regional or municipal authorities except of control of state subsidies (Hladík, 2013).

Recently, a planned extension of the control authority of the Supreme Audit Office in relation to local government units, and their legal entities, has become a hot topic in the sphere of public administration (Vejvodová, 2015). This idea has also become a subject of interest of the project "Reconstruction of the State", which it strongly promotes and also gains a political support for this idea.

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It was already the government of Prime Minister Petr Nečas in 2011 which submitted a draft amendment to the Czech Constitution and to the Act on SAO containing those proposals. After several months of debate, however, senators declined the amendment to the Constitution and the Act on SAO in January 2013. Senators at that time did not like especially newly enabled control of municipalities and regions.

The draft amendment to the Constitution of the Czech Republic, which was substantively identical to that previously refused, was then presented by a group of 75 deputies in December 2013. The parliamentary draft amendment to the Constitution of the Czech Republic was then in September 2015 complemented with the government's proposal of a "detailed" amendment to the Act on SAO. These latest proposals will be the subject of my interest in the present paper. Attention will be devoted to the circumstances related to the consideration of this drafts and will also be pointed to the most important concerns of municipalities and counties to the draft. On the basis of that I will answer the question, whether the proposed legal amendment is conceptual, justified and necessary. The aim of this paper is to highlight the apparent lack of concept and redundancy of the proposed solution.

The paper focuses on the problems associated with the content of the legislation and the legislative process. It has not been prepared under any specified research project. It is based on theoretical knowledge and practical experience of the author. Nevertheless, the author argues that the topic fits well into the framework of the conference.There will be applied in particular the scientific methods of analysis, synthesis, explanation and comparison in the paper to achieve the stated objectives. There will be quoted some opinions from the scientific literature in the paper. Attention will also be paid to some "historical" circumstances associated with the addressed issues. Subsequently the interpretation of the process of the approval of the new law by the parliament will be given.

2 The reasons of the proposed legislation

It should be noted that the extension of powers of the Supreme Audit Office was highlighted in several parts of the Government's Policy Statement of February 2014. The proposals are, therefore, in this sense "only" fulfilling of this commitment of the government. At the same time, the Government's Policy Statement declares its commitment towards the elimination of duplicate ex post controls. Both of these commitments in the Government's Policy Statement have been actually closely tied, because there was exactly written:

We will submit a proposal to extend the powers of the Supreme Audit Office so that it can monitor all expenditures of public budgets while removing duplicates control systems.

As will be pointed out, the question is, how the proposers of amendments were successful in fulfilling the obligation to eliminate duplicates control systems.

The proposed scope of the Supreme Audit Office, according to the promoters, responds to the trend towards a wider range of audit scope of the SAO expressed in the newly conceived version of Art. 97 para. 1 of the Constitution of the Czech Republic. The proposed wording of the amendment to the Czech Constitution assumes that the Supreme Audit Office as an independent body exercises control of the management of public funds and with funds provided from public funds. It also assumes that it exercises control of the management of legal entities owned by the state or local governments units.

Regarding the definition of "legal entities owned by the state or local governments units" it was proposed to choose the size of the ownership interest in the legal entity as the decisive criterion. It is proposed to provide that only those legal entities, in which the interest of state or local governments units is more than 50 %, will be a subject to control of the Supreme Audit Office.

Members of Parliament submitting a draft amendment to the Constitution of the Czech Republic and also minister Jiří Dienstbier as the submitter of the Government draft amendment to the Act on SAO justify the need for changes to legislation, among others, referring to the Lima Declaration of Guidelines on Auditing Precepts (Polčák, 2016). This declaration is an important document of the International Organisation of Supreme Audit Institutions (INTOSAI), which is generally

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acknowledged in the European Union. According to Art. 18 of this declaration the entire administration of public funds, regardless of whether and how this is reflected in the state budget, should be a subject to verification by the competent Supreme Audit Office. According to Art. 23 and 24 of the Lima Declaration private bodies have to be a subject to control of the Supreme Audit Office, if they are under significant influence of the public sector. The Lima Declaration, although it has not the nature of an international agreement or other legally binding source of international law, however, is probably the most important document and is internationally respected in the field containing the general standard status and powers of Supreme Audit Institutions (Cupalová, 2010). The proposed constitutional Act is to extend the scope of the Supreme Audit Office, and so, according to the promoters, as well as to bring Czech legislation in this standard.

In this context, there are provided examples of some European countries that have similar constitutional regulation that is proposed to be extended to the Czech law. E.g. on the basis of Article 203 of the Constitution of the Republic of Poland the Supreme Audit Chamber checks the management of government bodies, national banks, state-based legal persons and other organizational units of the state, as well as the management of local government bodies, economic entities established by legal persons and other organizational units of local government and, finally, also economic and other entities, if they use the property of the state or local governments or fulfill financial obligations to the state (in relation to the three circuits of entities whose operations may be subject to inspection). The Polish Constitution also specifies various criteria of such checks, with regard to territorial autonomy, then the next rationality and legality and also the usual care when dealing with property. Art. 121-128 of the Austrian Constitution defines the powers of the Court of Auditors in relation to the management of the federation, countries, counties and their associations (there are also local governments at the district level in Austria) and other statutory legal entities. According to Art. 150 of the Constitution of the Slovenian Republic the Court of Auditors has supervisory authority over not only the state budget but also over all public expenditure. According to Art. 216 of the Portuguese Constitution the Court of Auditors is the supreme body responsible for checking the legality of public expenditure. According to Art. 136 of the Spanish Constitution the Court of Auditors is the highest authority for checking accounts and management of state property and the public sector. In other forms, they have assured control of public finances by independent audit bodies in other European states. In economically developed countries, such as France, the audit of regional and local authorities is performed by regional audit courts that have independent status and a similar range of powers as supreme audit institution in France - Court of Auditors. Each province in Germany has its own authority of external financial audit, which cooperates closely with the Federal Court of Auditors on the principle of equality. These authorities focus their control activities at establishing whether public expenditure meets all the requirements set by legislation and whether public funds are used economically, efficiently and effectively.

At this point it should be noted that the control of municipalities and regions by SAOs is definitely not the norm in all countries of the European Union. According to available information, in 16 countries (from 28 member states) municipalities and regions are controlled by the highest supervisory body. This means that only a little more countries from all have therefore this legislation (Mandík, 2016).

3   The most important objections of municipalities and counties to the draft

Above all, it should be stressed that the consent of regions and municipalities with the submitted proposal is certainly not motivated by a desire of local authorities to conceal or hide anything. On the contrary, local governments are committed to maximum openness, which is proved by specific steps of many of them (voluntary disclosure of agreements, broadcasts and recordings of the meetings of the assembly …). Municipalities and counties have no objections to a greater control of the SAO in cases of the monitoring of the management of state subsidies. Prevailing belief, however, is that when local governments manage the resources of its budget (except for state subsidies), there is no reason

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for a fundamental change in the existing control system (i.e. the economic review), which has been proved.

Objections of municipalities and counties to the draft can, in principle, be divided into three basic categories:

1) Non-standard course of the consultation process (failure of regulatory impact assessment - RIA, unsettled major observations).
2) Lack of conception of the submitted proposal (the question of the amount of control, duplication of the activities of the SAO with the economic review).
3) The substantive objections to the content of the amendment (extension of the SAO audits on all the resources of the local government units and their legal persons).

Nonstandard course of the consultation process is evident in the case of a draft amendment to the Act on SAO presented by Minister Jiří Dienstbier. The proposal was submitted without processing the RIA document, which was initially used to justify by the fact that the law is implementing the draft amendment to the Constitution of the Czech Republic, and in such case the RIA document is not required. However, there is no such exemption in the rules for processing the RIA. Later, Minister Dienstbier argued that he has received an exemption from the government, under which in this case the RIA process was not necessary. The lack of the RIA document is the reason why there is written in the explanatory memorandum to the draft amendment e.g. that the proposal has no impact on the budgets of regions and municipalities. This statement is false just for the reason that according to the law "expenses incurred in connection with the checks on the controlled persons carry these persons."

If I speak about lack of conception of the proposal, I mainly mean a chaotic evolution of the proposal in relation to revocation or maintenance of the economic review of the management of municipal and regional authorities. As is generally known, substantially parallel with the amendment of the Act on SAO was prepared and discussed a draft Law on Internal Management and Control. There was enshrined abolition of the economic review in the original draft of this law and it was expressly stated in the explanatory memorandum that the function of reviewing the management of local governments will be replaced by the audit procedures of the SAO. In the course of discussing the draft Law on Internal Management and Control (resp. Law on the Management and Control of Public Finances, as the new version is named) the cancellation of the economic review was completely omitted. This new situation, however, is not in any way taken into account in the draft amendment to the Act on SAO. The new wording of the explanatory memorandum of the proposal explicitly states that the extension of the powers of control of the SAO will have no impact, among other things, just on the economic review of operations. In this situation, therefore, the management of municipalities and regions in the future would be each year a subject to economic review of the Ministry of Finance (resp. Regional office) and audits by the SAO. In fact, knowing the details which are examined by the Ministry of Finance in the economic review of the region, I can hardly imagine what moreover actually reasonably may determine control by the SAO. Despite claims of the promoters of these drafts, duplicity of the audits is evident.

This situation results from the fact that the proposal to extend the powers of control of the SAO is not based on any thorough analysis of the system of audit activities at all levels of government and public administration. I believe that such an analysis is necessary. Based on its outcome it may be possible to initiate amendments to laws in order to achieve more effective controls, removal of duplication and the final definition of the competencies of the various supervisory bodies. Counties and municipalities have repeatedly pointed to the existence of a Senate resolution no. 62 of January 30, 2013, when the Senate recommends the implementation of such a detailed analysis. In addition, there is also the Chamber of Deputies resolution no. 708 of April 9, 2015, in which the Chamber of Deputies asks the Government to prepare document that would clearly acquaints representatives with the existing system of audits in public administration and in the utilization of public funds.

In November 2015 the Association of Regions critically commented on the document presented to the Government by the Minister of Finance - "Information on the system of audits in public

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administration and in the utilization of public funds", referring precisely to the resolution of the Chamber of Deputies mentioned above. This document can´t be considered an analysis, but it is a brief and simplistic statement of the situation. With just a tendency towards simplification it can lead to an incorrect understanding of the current system of audits in public administration and its functioning. The Information certainly does not affect the control of the public sector in the full breadth and focuses essentially on a system of financial control pursuant to the Act no. 320/2001 Coll., On Financial Control in Public Administration and Amending Certain Laws (Financial Control Act), as amended, while from the legislation beyond this there is only mentioned audit by the Supreme Audit Office and by the Office for the Protection of the Competition. I miss there any mention of a wide range of controls in the area of delegated powers exercised by regional authorities or state institutions (ministries, inspections, etc.). It e.g. ignores the fact that local governments check, on the basis of the Financial Control Act, the state budget funds, which passes through the regional budgets and which counties redistribute to the final beneficiaries.

At the end of April 2016, directors of regional offices were addressed by Deputy Minister of Finance Dr. Tomáš Vyhnánek with a request to cooperate in providing information for the upcoming analysis of the audits carried out against the local governments. It follows, therefore, that the required analysis has not yet been processed (resp. is still being processed) and it is not easy to understand that the MPs in this situation approved an amendment to the Act on SAO in the 3rd reading of May 14, 2016.

To illustrate the quantity of audits, which are regions already subject, I can present the information regarding controls implemented to the Moravian-Silesian Region as the auditee. It was launched a total of 104 inspections in 2015. This exercise of delegated powers to the regional office was targeted only in 9 checks. Within 95 controls focused on the performance of independent competence are also included 2 economic reviews of the Ministry of Finance (phase 2 of 2014 and the first phase of 2015). Economic review of the Ministry of Finance took place at the Moravian-Silesian region a total of 72 working days.

Local government units also criticize an enhancement of enforcement authority of the SAO according to legal persons established or founded by them, unless the SAO controls the management of subsidies provided directly from the state budget. Such an extension constitutes interference in the supremely self-competence of the bodies of municipalities and counties (council, assembly, the finance committee) as founders of these organizations, as well as to the management and control activities of these organizations. In the case of trade company of counties or municipalities I point to the fact that it is a legal entity of private law, subordinate to civil legislation, primarily the Civil Code and the Law on Business Corporations. Range of the control powers of the SAO to these legal persons should respect their constitutionally guaranteed rights within the meaning of Art. 1 and 11 of the Charter of Fundamental Rights and Freedoms – i.e. in particular, that ownership of the property of all owners has the same statutory content and protection.

4   Result of the proposals in the Chamber of Deputies and the Senate

As I stated above, the draft amendment to the Constitution of the Czech Republic was submitted by a group of MPs on December 2, 2013. This proposal was then on May 14, 2014 approved by the Chamber of Deputies at the third reading and delivered to the Senate. Legal and Constitutional Committee of the Senate, which has been designated as the competent, on the June 11, 2014 adopted a resolution which recommended the Senate to reject the proposal.

Accompanying Law amending the Law on the Supreme Audit Office and establishing the details of the extension of the control powers of the Supreme Audit Office was submitted by the Government (i.e. by the minister Jiří Dienstbier) to the Chamber of Deputies on September 23, 2015. This bill was approved by the Chamber of Deputies in the third reading on April 22, 2016, and delivered to the Senate.

Upon receipt of this "implementation" proposal, the Senate has also returned to the discussion of the draft amendment to the Constitution and both proposals submitted to a joint discussion on May 25, 2016. Even before, on May 4, 2016, passed the Senate in cooperation with the Association of Towns and Municipalities and the Association of Regions seminar on the extension of powers of the SAO. At this seminar, on the proposal's supporters spoke Minister Jiří Dienstbier, together with the president of the SAO Miloslav Kala, on the side of the opponents of the draft, then spoke mayors, representatives of the Association of Towns and Municipalities and the Association of Regions. By opponents of the proposal there were again presented most objections to the proposal, as I have already stated above. Above all, there was again pointed out the amount and thoroughness of inspections, which are subject to local government units and the lack of reasonable solutions to control activities in public administration. Once again, it was also pointed out that it is not permissible to the SAO to check the effectiveness and efficiency of decisions and investments of local governments (e.g. if instead of tap water they should build roads), because only the assembly resp. citizens of the municipality can assess what is needed in the city to realize. The view of enforcement officer may be totally different (Drahovzal, 2016). The proposal's supporters failed to adequately argue for the necessity of the extension of the control authority of the SAO. According to the president of the SAO, aim of the amendment is not to burden the municipality or region with the same audits, which they must undergo many times during a year (Kala, 2016). As an overriding reason in principle remained the only political reason consisting in the commitment contained in the Government's Policy Statement of February 2014. The course of this seminar suggested that in the Senate begins to dominate rather negative attitude to the proposal to extend the scope of the SAO's control.

A request on connection of a proposal to extend the powers of control SAO and eliminating duplications of controls in public administration, which is embedded in the Government's Policy Statement, was also reflected in the resolutions adopted by some committees of the Senate. Specifically, the Committee for Regional Development, Public Administration and Environment adopted a resolution in accordance with the recommendations to the Government to submit a draft amendment to the Constitution of the Czech Republic concerning the extension of the powers of the SAO and the draft amendment to the Act on the SAO up simultaneously with the proposal to eliminate duplicity of control systems.

After extensive discussions, which took place in the Senate and in the framework of which have been re-presented arguments from opponents and proponents of the extension of the powers of the SAO, senators on May 26, 2016 disapproved draft amendment to the Constitution of the Czech Republic (resp. did not accept the resolution on the approval or rejection of the proposal in the matter). The Senate subsequently adopted the accompanying resolution recommending the Czech Government to submit a draft amendment to the Constitution of the Czech Republic concerning the extension of the powers of the Supreme Audit Office and a draft amendment to Act no. 166/1993 Coll., On the Supreme Audit Office, up simultaneously with the proposal to eliminate the duplicity of control systems. Due to the failure to approve the draft amendment to the Constitution of the Czech Republic was subsequently on May 26, 2016 quite logically also rejected a draft amending Act no. 166/1993 Coll., On the Supreme Audit Office, as amended. Then on May 27, 2016 Senate returned the draft back to the Chamber of Deputies to the formal completion of the legislative process.

5   Conclusion

The idea of the extension of the control authority of the SAO in relation to municipalities, counties, and their legal entities raised controversial reactions ever since its inclusion in the Government's Policy Statement of February 2014. The importance of this draft confirms the interest of citizens' initiatives, in particular the project "Reconstruction of the State", which placed it among the key points of the fight against cronyism and corruption. Representatives of the "Reconstruction of the State" commented disapproving of the proposal the way that "coalition senators withdrew lobbyists for municipalities and counties."

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European nations approach to this problem is not uniform and SAO audit in relation to municipalities and regions is definitely not the norm. It is usually said that extension of the control powers of the SAO to local governments served two main objectives:

- to help strengthen external control over the lawful use of public-sector resources; and

- to help reduce corruption risks and disclose cases of corruption (Oviir, 2007).

The Government's Policy Statement commitment to the extension of powers of the Supreme Audit Office is closely connected with the commitment to eliminate duplicity of control systems. Now unfulfilled of the government's commitment to eliminate duplicity of audits has also apparently become the main reason for not approving the proposal in the Senate. As seen above, the original intention in relation to municipalities and counties was obviously to replace the existing economic review by the audit of the SAO. This idea, however, was abandoned and management review and audit SAO should operate in parallel. Such a procedure quite naturally led to the fact that the proposal was criticized by municipalities and regions as planned subjects of the audit as unsystematic, thoughtless and unnecessary. This criticism is significantly underlined by the fact that the proposal was not supported by any analysis of control activities in public administration, let alone a proposal to eliminate duplicity. During discussing the draft in the Senate Ministry of Finance has asked municipalities and counties with a request for cooperation in processing analysis of audits performed against a local government units.

As I have already mentioned above, the consent of regions and municipalities with the submitted proposal is certainly not motivated by a desire of local authorities to conceal or hide anything. On the contrary, local governments are committed to maximum openness, which is proved by specific steps of many of them (voluntary disclosure of agreements, broadcasts and recordings of the meetings of the assembly …).

Taking all these facts I do not consider the wording of the Act on SAO approved by the Chamber of Deputies and presented to the Senate is conceptual, justified and necessary, because it is not based on any analysis of verification activities in public administration and brings to local governments (and their corporations) additional burden. Audit which should perform the SAO in relation to regions and municipalities, is excessive with regard to preserving the institute of economic review of the management of municipalities and counties. Under these circumstances, therefore, I consider the current Senate's decision to reject the draft to be correct.

The political will of the Senate to extend the powers of inspection SAO is evident from the accompanying resolution recommending the Czech Government to submit a draft amendment to the Constitution of the Czech Republic concerning the extension of the powers of the Supreme Audit Office and a draft amendment to Act no. 166/1993 Coll., On the Supreme Audit Office, up simultaneously with the proposal to eliminate the duplicity of control systems. It is therefore expected that the proposal will in future be presented to lawmakers again.

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CURRENT ISSUES ASSOCIATED WITH THE DEVELOPMENT OF SOCIAL SERVICES IN THE EUROPEAN UNION

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Abstract:
The issue of ageing populations directly concerns all EU member countries. The structure of the population is changing significantly, which is placing increasing demands on individual social systems. In the context of discussions between experts on such issues, attention is being consistently devoted particularly to the long-term sustainability of pension systems and, over recent years, attention has also focused on social services and health care. The aim of this paper is, against the background of the various characteristics of the problems concerning the comparison of the systems which provide and finance social services in European countries, particularly with respect to Austria, to identify new solutions which individual states have implemented in recent years and, on that basis, to suggest proposals for a range of new measures and approaches which might be transposed into both legislation and practice in the Czech Republic.

Keywords:
ageing population, international comparison, social services, European Union.

JEL classification:
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1 Introduction

The problems inherent to any international comparison of social services present a particularly complex issue which, unlike the comparative analysis of individual benefit systems aimed at the social protection of the population, has not previously been addressed in a consistent manner. One of the most important studies that attempted to compare the basic conditions for the provision of social services in individual countries at the turn of the millennium consisted of a report which was prepared by the Council of Europe based on a survey carried out by the Steering Committee on Local and Regional Democracy (Council of Europe, 1999). This report consisted of a summary of information submitted by the member states of the Council of Europe on the role of different levels of local and regional government in terms of the provision of local social services.

In recent years, it has been possible to obtain a range of stimulating information from regular reports on social services of general interest produced by the European Commission (European Communities, 2008, 2010, 2013) or from reports on political reforms under way in European Union countries (European Union, 2015). These reports indicate, *inter alia*, that, in the context of current demographic trends in individual countries new forms are being sought of securing care providers who provide assistance for senior citizens and disabled people in their natural home environment while ensuring their basic living requirements. Therefore, this paper proposes to focus on a detailed characterisation of the approach that is applied to such groups of citizens in Austria since the Austrian social services system presents a major source of inspiration with concern to the search for answers to key questions related to the financing and management of the Czech social services system.

The introduction to the paper devotes attention to the problems that need to be considered when comparing the social services systems of individual countries. It is clear that the concepts applied in other European states are considerably broader than the concept presently applied in the Czech Republic which has led, inter alia, to many of the complications which currently face those working in the field, e.g. when attempting to design an integrated long-term social health care system.

The following section focuses on a detailed analysis of new measures that have been introduced into the Austrian social system in recent years. The author firmly believes that Austria is able to

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provide inspiration in terms of the search for answers to a wide range of questions that must be addressed by Czech society concerning the provision of health and social services in connection with expected demographic trends.

The final section of the paper, which is devoted to a brief analysis of the expected consequences of ageing on the demand for social care, suggests a range of social contexts relating to the position of care providers, including those issues that both individuals and social services providers are required to address at the time of the emergence of the need for intensive care for elderly and physically handicapped family members and loved ones. On this basis, the paper then goes on to consider the potential for the integration of the main principles of the Austrian system in the field of care provision into the Czech legal system.

2   Material and Methods

To achieve this goal was made secondary analysis of available literature that deals with this issue, on the basis of its own proposals were conceived on the basis of which it would be possible to apply the basic principles of the Austrian solution to the situation of caregivers in our legal system.

3   Results and Discussion

3.1 The concept of social services in the legislation of European countries, problems associated with international comparison

The term "social services" is understood in most European countries not only as the concept of social services as applied in the Czech legal system, but rather as a much broader concept which includes health care, the social protection of individuals, families and groups, social housing issues and employment services. When characterising social services, emphasis is placed on ensuring that individualised services are accessible to all citizens according to his/her own situation and are tailored to the specific needs of different regions and areas. The fact that these consist of local services does not necessarily mean that local authorities are accountable for the provision of such services, rather the provision thereof is seen as a guarantee of the rights of individual citizens; the legal regulation of social services in EU countries is, therefore, considered to make up a regular component of their national legal systems. The anchoring of social services in legislation evolved hand-in-hand with the development of the welfare state and the grounding thereof in legislation (Council of Europe, 1999).

Those states whose social systems follow the Scandinavian model, as a rule, offer the widest range of social services while, at the same time, however, they provide the least scope for non-state players since social services in these countries are not only funded but also mostly provided by the public sector. Conversely, the so-called corporate model, of which Germany provides a typical example, emphasises the important role of non-governmental non-profit organisations as social service providers. In this case, the financing of social services is administered by means of a separate care insurance system (Pflegeversicherungssystem) which represents a modern approach to addressing the various problems related to the funding of the social services system.

The so-called Anglo-Saxon model, represented by the United Kingdom, represents a further alternative in terms of attempting to resolve the problems associated both with the funding of social services and increasing demands on the effectiveness thereof through the introduction of a "quasi-markets" system, the intention of which was to increase the efficiency and flexibility of the system which, when provided by the public sector, was generally considered to be particularly inflexible. While this attempt at changing the approach to social services yielded positive results, the drawback was that it reduces the range of "non-lucrative" services offered and, conversely, may create a surplus in terms of paid-for services (Matoušek et al., 2011) (see Table 1).

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Table 1. Comparison of social services in selected countries

	Great Britain	Germany	Denmark	France
Variety of services offered	limited	adequate	broad	for seniors, limited
Role of the public sector	limited	limited	extensive	extensive
Role of the private sector	increased	extensive	limited	limited
Funding	state budget, client reimbursement	insurance, subsidies	state budget	insurance, state budget

Source: Matoušek et al. (2011)

Although it is recognised that the standard of social services provision varies from country to country, it is clear that a minimum level of services must be available to all citizens. While the minimum standard of social services can only be defined at the national level, it is essential to ensure that regional and local authorities are involved in the process of determining the minimum standard of social services offered to citizens, particularly in those areas in which it is assumed that these authorities will be required to provide such services. The state bears the primary responsibility for ensuring that these services are provided and should have certain powers in the areas of planning, coordination and supervision. The fact that in many countries local and regional authorities bear responsibility for the operational aspects of the provision of social services has resulted in efforts to broaden the involvement of local and regional authorities in terms of the provision of these services. This trend has taken two basic forms - in some countries all the responsibility has been transferred to local and regional authorities while in other countries merely the management of those social services which are fully, or mainly, financed by the state has been transferred to local and regional authorities (Council of Europe, 1999).

Despite these differences, certain tendencies are common to the development of social services. European countries are searching for new and more effective forms of assistance for social services clients in situations where they require help from society. The state as a service provider is moving assistance in the direction of local authorities and non-governmental organisations that occupy a position which is closer to citizens, i.e. services are being decentralised and removed from state control. The financing of social services is shifting towards multi-source financing which accentuates the personal responsibility of the client and/or his/her family and which involves the application of the so-called partnership model according to which the provision of services is generally subject to a contract between the provider and the consumer or his/her representative. Emphasis is being increasingly placed on developing services, provided in the home of the service consumer, which lead to the individualisation of client services through their being "tailored" so as to best meet the consumer's current needs, thus also contributing to an increase in the level of efficiency of the services provided (Matoušek et al., 2011).

3.2 New approaches to the provision and financing of social services in European countries – the example of Austria

In recent years, a number of EU member states have adopted a series of measures aimed at increasing the availability, quality and sustainability of social services. These measures have mainly concerned the financing of social services, the provision thereof, ensuring both the supervision and quality of the services provided and support for caregivers. The aim of these reforms is to ensure the further development of home-based care services and the strengthening of the integration of social and health care (European Union, 2015).

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Austria, for example has placed emphasis on increasing the effectiveness of the financing of social services; contributions towards long-term care are provided monthly, depending on the time scale of the care provided. Whereas up to 2015 it was necessary that social services be provided to the extent of at least 60 hours per month in order for clients to be entitled to the level 1 benefit, and to the extent of at least 85 hours for clients to be entitled to the level 2 benefit, these limits were raised in January 2015 to 65 and 95 hours per month respectively. Consequently, this led to a reduction in the number of people receiving such lower dependency level benefits and, thereby, reduced the cost of the provision of social services by around €19 million in 2015 (the total cost of care provision was in the region of €2,035 million).

At the same time emphasis was placed on increasing the level of support for the country's care providers. Measures were introduced on 1 January 2014 aimed at helping employees to balance their work obligations with caring for family members and for attending terminally ill family members or very severely ill children. These care leave measures involve the shortening of working hours and time off for the purposes of family hospice care. Care leave results in the non-payment of salaries and, with respect to shorter working hours for the purposes of care provision, in a proportionate reduction in earnings. However, those who take advantage of these provisions are entitled to claim the corresponding care attendance allowance.

The aim of providing care leave and the shortening of working hours for the purpose of caring is to allow employees to care for a close family member in the case of sudden need or for the relief of a care provider for a pre-determined time period so as to re-organise the care regime. The possibility to arrange care leave or reduced working hours for the purpose of caring is open to employees in private employment relationships, federal, provincial and municipal employees and recipients of unemployment and assistance in need benefits who, for the purpose of care leave, have de-registered from unemployment insurance.

Care leave or reduced working hours for the purpose of care is applicable to the care of close family members who have been granted the level 3 care allowance, family members who are minors or family members with dementia who have been granted the level 1 care allowance. The condition for claiming consists of an agreement in writing concerning leave from work or a reduction in working hours between the employee and employer; importantly, the employer is not obliged to agree with such an arrangement since, to date, no legal entitlement to care leave and shorter working hours has been established.

Care leave and shorter working hours for the purpose of providing care represent a bridging measure and can be agreed for a minimum period of one month and a maximum period of three months. In principle care leave or reduced working hours for care purposes is arranged for a specific close family member in need of care once only; however, in the case of a substantial increase in the need for caring for a given person, i.e of at least one care allowance level, care leave or reduced working hours for the purpose of caring can be negotiated for a further time period. Moreover, care leave or reduced working hours for the purpose of caring can be claimed by more than one person with respect to the care of a single person in need of care. For example, two siblings are entitled to arrange care leave or reduced working hours for the purpose of caring for a parent for individual periods of up to three months, i.e. thus making up a total care period of up to six months. In the case of a significant increase in the need for care of at least one care allowance level it is possible to renegotiate care leave or shorter working hours for the purpose of caring for up to a maximum period of three months per worker. The care attendance allowance can be paid for one person in need of care for a maximum period of 12 months.

Since 1 July 2002 Austrian employees have had the option to attend terminally ill close family members and very seriously ill children for a pre-defined period of time in the context of so-called family hospice care leave. Employees claiming family hospice leave may opt for shortened working hours (shorter working hours for the purpose of family hospice care), a change in the distribution of normal working hours or time off work with a consequent loss of earnings.

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Austrian employees enjoy a legal entitlement to family hospice care and it may be taken advantage of by more than one family member simultaneously. Attendance of the terminally ill applies initially for a maximum period of three months and, if necessary, it can be extended up to a total period of six months. The period of leave with regard to seriously ill children consists initially of a maximum of five months and, if necessary, it can be extended up to a total period of nine months.

The financial support for caring for family members when taking advantage of care leave, shorter working hours for care purposes, leave for family hospice care or shorter working hours for family hospice care is provided in the form of the attendance leave allowance to which all persons who are fully insured (i.e. sickness, accident and retirement pension insurance) are entitled on the basis of being in continuous employment immediately prior to claiming care leave, provided they have agreed in writing with the employer on care leave or reduced working hours for care purposes (or provide evidence concerning the claiming of family hospice care leave or, where relevant, provide proof of having opted out of the receipt of unemployment benefits) and further provided they submit a statement that, for the period of care leave or shortened working hours for care purposes, claimants intend, principally, to provide care and treatment.

The amount of the attendance leave allowance for care leave and leave for the purpose of family hospice care is dependent on the level of previous income and is provided in the same amount as the unemployment benefit (i.e. 55% of net daily income); the minimum amount provided is the same as the limit set for so-called small-scale employment, i.e. €405.98 per month.

In the case of shorter working hours for care purposes and shorter working hours for family hospice care the number of working hours is, necessarily, reduced with a consequent reduction in earnings; therefore, the attendance leave allowance is provided in the proportionate amount. The allowance is calculated on the basis of the difference between average gross earnings before the shortening of working hours and earnings during the period of care leave. The basic amount provided in such cases is 55% of the difference, with a minimum set at the limit for small-scale employment, proportionate to the reduction in working hours.

Unemployed persons who, for reasons of claiming care leave or leave for family hospice care, opt out from receiving unemployment benefits or opt out of health and pension insurance in accordance with the Act on Unemployment Insurance, receive the attendance leave allowance in the amount of the unemployment insurance benefits received immediately prior to opting out, with a minimum amount set at the limit for small-scale employment, i.e. €405.98 per month in 2015 (Allgemeines, 2015).

3.3 The Czech Republic in the light of new European trends

The findings outlined above represent a new challenge for the entire social services field in the Czech Republic. In addition to the considerations presented previously on the appropriateness of differentiating the amount of the care allowance depending on whether the care is provided to clients at residential or outpatient facilities or in their home environment either by a registered provider of social services or family member or loved ones (Průša, 2015), it is necessary to determine solutions that will contribute towards improving the financial security of those families and loved ones caring for their family members in the natural home environment as is the case in e.g. Austria. Moreover, the fact of an ageing population requires that other solutions be sought that ensure that those in need are provided with quality social services.

In terms of the short- to medium-term horizons, the number of persons that will depend on help from another person will increase significantly. This will result from the fact that those born after the end of the Second World War are currently entering the 65-plus age group. This group will reach the age of 80 by around 2030 and, according to current predictions, it can be expected that they will require a level of care for which contemporary society is not currently prepared.

Based on a projection of trends concerning the number of care recipients, an increase in the need for care for all age groups over 70 can be expected; in the year 2030 around 523 thousand persons

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over the age of 65 will be in receipt of care services (i.e. 1.8 times more than in 2015) and the most significant increase will concern those persons older than 90 years (it is expected that in 2030 a total of 88.3 thousand persons in this age group will be in receipt of care benefits, i.e. approximately 2.2 times more than in 2015). In terms of individual degrees of dependence, the biggest increase can be expected with concern to recipients of the level IV dependency care allowance, i.e. in 2030 it is expected that the number of those receiving this dependency allowance will total around 94 thousand persons, i.e. approximately 2.2 times more than in 2015. (Průša, 2015b).

Currently, it is generally accepted that the abolition of the allowance for caring for a relative or other person in connection with Act no. 108/2006 Coll., on social services was somewhat short-sighted. Consequently, at the end of 2015 the Czech Ministry of Labour and Social Affairs started work on preparing a new benefits concept aimed at the financial support of those caring for a family member whose health condition has suddenly deteriorated to such an extent that they require continuous all-day care in the home environment. This form of care makes up one of the priority areas of the draft National Strategy for the Development of Social Services for the period 2016 to 2025.

The financial situation of families and households caring for a family member or loved one is, in most cases, currently very unfavourable; indeed, in addition to losing their own income and, at the same time, incurring further expenses related to ensuring the necessary care, some families and households find themselves threatened by material deprivation. Furthermore, in addition to a reduction in income levels, the period of caring for a family member also has an impact on the amount of old age pension claimed by the carer in future years. This situation is particularly alarming from the perspective of the afore-mentioned National Strategy. Due to the lack of capacity of the residential social services sector and the underdeveloped nature of outpatient social services (the most common service provided by such services in most regions of the Czech Republic continues to consist of the provision of meals under the auspices of care services), this care, in many cases, is provided by family members or loved ones; indeed, approximately 70% of recipients of the care allowance do not use any form of care from registered social service providers (Jeřábková and Průša, 2013).

Long-term care for a family member or loved one has a number of complex social, economic and health consequences for the care provider and his/her immediate life environment. Those who provide care are in a situation of constant "emergency preparedness", often lose contact with the outside world resulting in social isolation, often suffer from a lack of social support and frequently suffer both physical and psychological stress that may, eventually, have consequences for his/her overall health. Even though most of those caring for a family member are completely unprepared for the task, they are often required to perform duties which require a great deal of physical strength and even often lack the required skills. Such services, provided continuously by a single care provider, often result in physical and mental exhaustion and, therefore, it is necessary that professional assistance is made available aimed at reducing the huge burden placed on care providers. In practice, a shared caring model is gradually emerging which aims to enable dependent persons to live independent lives in their own homes with the help of family and community services for as long as this method remains appropriate and practical. Extending the level of cooperation between families and the services provided by specialised organisations and institutions not only contributes towards improving the overall standard of care for dependent persons, but also reduces the burden placed on family care providers (Formánková, Novotný and Efenberková, 2012).

When evaluating to what extent lower income provided from economic activity is offset by care benefits in cases of the requirement to provide care for a family member or loved one, it is necessary not only to compare the difference between previous income from economic activity and the amount of the care allowance but also to take into account the conditions under which unemployment and sickness benefits are currently provided. Given that current legislation does not exclude the simultaneous receiving of unemployment and sickness benefits (with respect to the caregiver) and the care allowance (for those for whom the care is provided), it can be assumed that as a consequence of the termination of the economic activity of the care provider - at least in the short term – he/she

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may receive such benefits. Previous research indicates that this form of home care is, in the vast majority of cases, provided by women aged 50 and more (Průša, 2013).

When searching for suitable alternatives with respect to addressing the financial security of care providers, it is necessary to proceed from the fact that the deterioration of the health condition of a family member or loved one usually occurs suddenly, for which family members are usually unprepared and with respect to which they are merely at the beginning of the process of considering potential ways in which to provide the necessary care. Initial information is usually obtained from the social affairs departments of municipalities with extended powers or, where relevant, municipalities with an authorised town hall department followed by contacting the appropriate social and health services provider with a view to their becoming involved in the case. The situation with respect to family members or loved ones is further complicated by their not knowing for how long it will be necessary to provide such care. Initial treatment at a medical facility is usually followed by the relocation of the handicapped person to a hospital for the chronically ill where a social worker, in cooperation with the relevant municipal social affairs department, commences the search for the most suitable way in which to provide additional care, a process which is complicated by a number of key factors:

- the handicapped person has usually not previously needed to take advantage of any form of outpatient social services (especially care services) and has, consequently, never submitted an application for relocation to a residential social service facility, with respect to which both waiting times are usually very long and availability differs significantly from region to region,
- the handicapped person was usually not in receipt of the higher-level of dependence care allowance prior to the sudden deterioration of his/her health status,
- health insurance companies exert pressure on healthcare facilities to provide long-term health care for a period of no longer than three months despite the fact that this practice has not for many years been supported by legislation,
- health insurance companies are increasingly exerting pressure on doctors to prescribe home-based health care,
- handicapped persons, in the vast majority of cases, prefer to spend the remainder of their lives in the home environment,
- family members, in most cases, would be willing to provide handicapped persons with care at home, despite all the problems mentioned above; however, due to a lack of funds they cannot afford to leave their jobs since current forms of material support for the providing of care are generally viewed as being totally inadequate.

It is therefore necessary to formulate such forms of assistance that would help the care provider in terms of maintaining his/her standard of living while providing home care for a handicapped person and that would simultaneously guarantee the possibility of returning to the original job position following the completion of the treatment process. The author would suggest that the solution adopted in Austria over recent years provides one of a number of potential approaches to addressing such social problems in the Czech Republic.

There is no doubt that one of the conditions for providing financial security should consist of the prior involvement of the care provider in the retirement and health insurance systems. As with the provision of the parental allowance, any newly-introduced benefit could be provided in the form of a fixed amount since, in principle, there is no difference between caring for a child and caring for a handicapped person. Other conditions concerning entitlement to this benefit – especially with respect to employment legislation - could be designed following similar principles to those applied in Austria. On the positive side, such a benefit could serve to remove unemployed persons from the unemployment register, thus changing their social status from that of unemployed persons to that of care providers.

In fact, this principle already exists in the Czech social system. The parental allowance period, which is currently the longest such period provided in Europe, is based, inter alia, on the fact that

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employers only rarely offer women, i.e. mothers of young children, the opportunity to work part time or innovative forms of employment relationship, e.g. homeworking. It is, therefore, possible to argue that the application of a similar approach to the security of persons who care for elderly or handicapped persons should be positively perceived both on the part of care providers and employers.

4   Conclusion

International comparisons of basic principles of the organisation, financing and management of social services in individual countries provide one of the most important sources of information when searching for answers to questions concerning the provision of social services. When using such information for practical decision-making purposes, it is, however, necessary to bear in mind the differences between the concepts of social services applied in individual countries and, therefore, it is essential that the main principles of these systems be both properly understood and reflected appropriately in the environment of a given country.

In recent years, a series of new measures have been adopted in many European countries relating to issues surrounding the organisation, financing and provision of social services with an emphasis on the important question of how to ensure care providers. Austria, for example, took the decision to introduce the so-called care leave period, shorter working hours for care purposes and leave for family hospice care, as well as financial support for care providers via the care leave allowance. The aim of these measures was to provide help for employees in terms of balancing their responsibilities at work and caring for family members in need of assistance and attending terminally ill family members and chronically ill children.

In this connection, the existing level of support for care providers in the Czech Republic is insufficient and, furthermore, it is clear that the abolition of the allowance for caring for a relative or loved ones following the adoption of Act no. 108/2006 Coll., on social services was a mistake. The financial situation of those families caring for an elderly or handicapped person is, in the majority of cases very unfavourable; long-term care has social, economic and, often, health impacts for care providers and those around them. When searching for suitable alternatives to solving the issue of the financial security of carers, it is necessary to proceed from the fact that the deterioration of the health condition of a family member usually occurs suddenly, for which family members are completely unprepared. The solutions that have been adopted in recent years in Austria represent one approach towards improving the social situation in the Czech Republic; moreover, a further significant advantage of such measures is, inter alia, the fact that – as with the parental allowance – they serve to change the social status of care providers by removing unemployed persons from the unemployment register.

In connection with the expected consequences of population ageing, as well as the introduction into practice of individual measures set out in the National Strategy for the Development of Social Services for the period 2016 to 2025, it will be necessary to continue to place emphasis on issues concerning the financial security and comprehensive support of care providers so that, in the short- to medium-terms, the appropriate form of assistance is provided for elderly and handicapped persons at a level of quality which corresponds to that expected of a modern European state in the 21st century.

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REINVESTIGATING THE DETERMINANTS OF GENDER WAGE GAP: EVIDENCE FROM SURVEY

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Abstract
This paper contributes to the literature with analyses of different aspects of wage differentials between men and women with a special attention to socio-psychological factors and job-related characteristics. For purposes of this study we conducted a survey on a representative sample of employees in the Czech Republic, in which we asked 64 questions covering various aspects of work and family life, preferences, personality and other characteristics of employees and their jobs. In addition to already established questions, we introduce a number of novel controls, such as grit among psychological factors based on research in psychology by e.g. Duckworth and Quinn (2009), and novel gender identity and family situation variables. This unique survey helps us to shed some light on factors explaining gender wage gap as a whole. In our analyses we first run wage equations starting with very parsimonious specification with the female dummy as a sole explanatory variable, and then we add various subsets of variables one by one in order to examine the effect of their inclusion on the female dummy coefficient. We find that female dummy shows 25.3% wage difference with respect to men and it explains approximately 11.6% of the variance in monthly wages (adj. R-sq) in this most parsimonious model specification. Adding our rich subsets of variables decreases the coefficient to female dummy substantially to 3.2%, and our full model specification explains 53.5% of variance of monthly wages.

Keywords
gender wage gap, human capital, non-cognitive skills, family decisions.

JEL classification
J16; J31; J2

1   Introduction

Even though the research in the gender wage gap is one of the most important topics in labour market economics and has been systematically studied since the early 1970s, the existing gender wage differentials cannot be fully explained. Differences in human capital accumulation and discrimination have been discussed as the main sources of the gender wage gap and occupational segregation by gender. However, recent studies suggest that in addition non-cognitive skills and socio-psychological factors may explain large proportion of the gender differences in labour market outcomes (Bertrand, 2011). Specifically, some experimental literature has proved systematic differences in psychological attributes between men and women in the sense that women are more risk averse than men, prefer less competitive environment, are more altruistic with stronger preferences for redistribution and negotiate worse for themselves than men (Bertrand, 2011; Borghans et al., 2009; Mueller and Plug, 2006). Further, other socio-psychological factors, such as the impact of gender identity roles and social norms were put forward as possible determinants of the gender differences on the labour market. In particular, the hypothesis that as long as the social norm that "men work in the labour

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market and women work at home" exists, women will have lower motivation to participate in the labour market than men with the consequences on wages and other labour market outcomes (Akerlof and Kranton, 2000). However, the empirical research on the role of those psychological and socio-psychological attributes in explaining the labour market outcomes is still in its infancy. Moreover, the existing research has often focused on single aspects of psychological and socio-psychological factors, and often due to data constrains did not cover other factors that may explain the gender differences.

This paper contributes to the literature with analyses of different aspects of gender based wage differentials using a rich survey, which we designed for the research project. In this way we are able to enrich the human capital model as envisioned by Becker (1964) and to dig deeper into the potential existence of gender based wage discrimination. In particular, the survey helps us to understand better the role of psychological, non-cognitive skills, socio-psychological and gender identity factors, job characteristics and work-life preferences, which are rarely considered in the previous literature. The survey is described in detail in Balcar et al. (2012).

In our analyses we first run wage equations starting with very parsimonious specification with the female dummy as a sole explanatory variable, and then we add various subsets of variables one by one in order to examine the effect of their inclusion on the female dummy coefficient. We find that female dummy shows 25.3% wage difference with respect to men and it explains approximately 11.6% of the variance in monthly wages (adj. R-squared) in this most parsimonious model specification. Adding our rich subsets of variables decreases the coefficient to female dummy substantially to 3.2%, and our full model specification explains 53.5% of variance of monthly wages. One of the major factors contributing to explanation of the difference between men and women is lower tenure and more leave due to child bearing taken by women. Finally, based on our results we present a number of policy recommendations that could help bringing more gender equality on the labour market, and at the same time lessen problems of population aging that the Czech Republic experiences.

The rest of the paper is organized as follows: The next section 2 derives hypotheses and briefly describes the data. Section 3 provides the empirical model of wage determinants and presents its results. Section 4 offers some concluding remarks and discusses policy implications.

2   Hypotheses Development, Data and Some Descriptive Evidence

What do we know about factors explaining the observed gender differentials? Most of the existing earlier research tries to uncover how much of the gender wage gap remains after adjusting for an individual's productivity enhancing characteristics such as education, experience, occupation and industry, variables covered by commonly existing micro-data. Using this approach most research finds a sizable "unexplained" gender wage gap, which has been usually considered as discrimination. However, many argue that this approach may be biased because it omits important, although unobservable in the data, variables. Recent research, suggests that there are a number of factors that influence the wage differentials and that are not covered at commonly available micro-datasets.

In order to get these characteristics we have created questionnaire containing 64 questions covering various aspects of work and family life, preferences, personality and other characteristics of employees and their jobs. On the basis of this questionnaire the specialized company conducted a survey on a representative sample of employees aged 25-54 years in the Czech Republic in 2011. The survey was conducted as face to face computer assisted personal interviews (CAPI). The sample was chosen to be representative for the Czech Republic on the basis of the following criteria of population structure: sex, age, highest achieved education, region and size of municipality of residence. Respondents were chosen randomly according to quotas. Given the method of data capture (CAPI), maximum control was ensured by using an electronic questionnaire. The CAPI system ensured correct and complete filling of questionnaires and disqualified inappropriate respondents. Further logic data control focused on deeper relations among variables and control of answers in the open

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questions. In the case of incomplete or ambiguous answers, respondents were asked again in order to make the answers more precise. The whole process resulted in a unique, quality survey including 1048 observations of men and 936 observations of women.

The factors hypothesised to have an effect on pay could be divided into the following groupings: human capital factors, demographic and family factors, job and employer characteristics, gender identity and family situation variables, psychological traits, health and appearance characteristics.

Regarding the human capital factors, in line with previous research in tradition of Mincerian earnings function (Mincer, 1974), a number of traditional human capital controls such as education, tenure and experience are usually covered in the previous studies as factors determining wages. Often individuals' age served as a proxy for their experience or tenure. In our survey we ask directly about respondents' tenure, experience and age, thus we can separate effects of all those variables. A number of studies suggest that labour market experience gained through job changes might affect wages positively or negatively depending on the voluntary or involuntary job change's character. In particular, the voluntary job mobility might be the quickest way in which workers can advance in their careers and move up in the wage structures, whereas the layoffs might be correlated negatively with wages (Antel 1986; Loprest, 1992; Bernhardt et al. 1999). In the survey we ask about the number of employers (employment lasting for at least 6 months) the respondent have had in his working career and in this way we control for wage gains (or loses) in connection with respondents' job mobility.

Work experience and consequently wages may be affected by leaves due to child bearing, and in this way women receive a "maternity penalty". This is of particular importance when studying gender differentials in wages in the Czech Republic, as the total length of paid maternity and parental leave of 164,5 weeks is highest among the developed OECD countries and most likely in the world (OECD, 2012). The maternity and parental leave system in the Czech Republic is also very generous in comparison to other countries. Specifically, the spending on child related leave and birth grants per childbirth in the Czech Republic is third highest among the developed OECD countries after Luxembourg and Norway, and even higher than other Nordic countries traditionally considered to be very generous (OECD, 2012).

Maternity and parental leave is meant to improve mothers' health and in particular to increase children's welfare. Proponents further argue that childcare leave promotes gender equality as it allows mothers to retain their valuable firm-specific human capital and it helps them to come back to labor market due to their job protection over the maternity and parental leave period. Thus, proponents argue that childcare leave helps women to keeps their carriers and wages on track (Schönberg and Ludsteck, 2012). But the long and generous maternity and parental leave that is considered almost sacred by most of Czech society may be working against women who want to advance in their career. Such a long leave from work is likely to influence negatively women's work experience and affect their wages negatively in comparison with the same cohort of men. It may also make women to suffer from a depreciation of their skills, which may show up in lower occupational positions after their return to their jobs. One may also expect that the longer the period of leave, the higher the costs borne to employers will probably be if they need to replace employees for the absence from work, and thus employers may in this way indirectly discriminate against female employees by giving them lower wages or hiring men. All three factors point towards a negative effect of long periods of leave on worker's wages.

Previous evidence suggests that leave affects wages negatively and the effect is relatively persistent over workers´ careers. For instance, for Germany, each year of work interruption is estimated to depress the wage received on return to work and within the few years after by 6% to 19%, depending on empirical specifications (Ondrich et al., 2003; Beblo et al., 2009). Similarly, for France, each year of leave is estimated to lower wages by 7% to 17% depending again on specification (Lequien, 2012). There is mixed evidence on whether the negative effects are long lasting. Schönberg and Ludsteck (2014) found that increasing maternity benefit period beyond the job protection period

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reduced earnings of employed mothers by around 3% two to six years after childbirth, whereas other expansions of maternity benefit period within the job protection period had only very small effects on mothers' income three to six years after the childbirth. Other studies did not find any detrimental effects on labour market outcomes in the medium and long run, see Lalive et al. (2011) for evidence from Austria. In our survey we directly ask for the number of weeks respondents took off in connection with the parental leave. We are not able to distinguish between mechanisms (i.e. depreciation of skills and lower occupational positions, lower work experience or discrimination) and say anything about a causal effect of leave duration on wages, but we expect wages to be negatively correlated with the length of parental leave.

Besides, it is also suggested that individual's cognitive ability has an effect on his earnings. The ability is often hard to observe by the commonly available data, and in previous studies usually individual's unobserved time constant fixed effects were added to control for the unobserved ability. By using our survey we are able to single out the cognitive ability by questions related to respondent's math grades in the grammar school and his satisfaction with the grade. We expect the wage to be higher the better is the math grade and the higher is the satisfaction. Please note that in the Czech system, the grade goes from 1 to 5 with 1 being the best grade and 5 the worst, thus we expect a negative relationship between math grade and wages.

Regarding demographic and family factors we cover variables usually considered in previous literature, such as age, nationality (approximated by mother tongue), marital status, number of children and number of household members. In addition, we ask about respondent's sisters and brothers. It has been hypothesized that parents face a trade-off between "child quantity" and child quality" and therefore a number of sisters and brothers can have an effect on respondent's labour market performance (Butcher and Case, 1994). Further, we use information on parental education of the respondent as a proxy for her unobserved family background. We use both mother's and father's schooling as there might be difference in the wage effects, see Altonji and Dunn (1996) or Plug (2004). Other incomes such as social benefits may influence the willingness to work, therefore we asked the respondents about their net monthly income from other than main job and social benefits. We further include a dummy indicating whether with losing respondent's income the living standard of the family would decrease significantly.

Regarding job and employer characteristics that determine wages we control similarly as in the previous literature for employee's occupation (ISCO code), working hours, employers, industry (NACE), region, size and firm ownership. Previous research showed that allocation of men and women into different jobs play a key role in explaining gender differences in wages. In addition, we ask a number of questions related to: (i) job specialization, such as a performance of the same or very similar work / work tasks during workers labour market career, (ii) correspondence of job with their field of study (the variable uses the following scale: "it does not correspond at all - I am doing something else", "it does not correspond much", "it corresponds partly" and "it corresponds entirely"), and (iii) job flexibility, such as availability of flexitime, working from home and change of workload, and their use (the variable uses the following scale: "employer provides it and I use it", "employer provides it but I do not use it", "employer does not offer it"). We would expect that more specialized jobs will be correlated positively with wages, whereas the effect of job flexibility on wages may be unclear. On one hand job flexibility can be a part of earnings package in worker's negotiations and thus job flexibility would be negatively correlated with wages. On the other hand, job flexibility is usually connected to white collar better-paid occupations and it may also reflect more modern and more successful firms, and thus it may be positively correlated to wages. Further, we expect that there might be differences in pay depending on whether respondents' job performance is rewarded in objective/measurable or subjective fashion. We also ask a question related to gender of respondent's supervisor and friendship with their bosses. We would expect that female supervisor would discriminate less and help women to earn more, and that friendly relationship with bosses would be positively correlated with wages. Further, we create dummies for different ways of getting

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a job, such as getting a job through an offer, recommendation, somebody's referral, employment office, media advertisement etc. Finally, we test for the existence of monopsonistic situation and request information about the number of potential employers in respondents' commuting area. We expect the number of potential employers to be positively correlated with wages.

Previous research suggests that gender identity, family situation and socio-economic preferences are important when explaining wage differences between men and women (Akerlof and Kranton, 2000; Fortin, 2005; Hakim, 2008). In the survey we focused on covering preferences, gender identity and position in the family. In particular, we asked respondents questions on who should be responsible for ensuring an adequate income for the family and who for housework (meal preparation, dish washing, cleaning, shopping, washing and ironing) and taking care of children; and questions on who does it in reality (at scale almost entirely me, mostly me, me and my partner equally, mostly a partner, almost entirely a partner). We would expect respondents higher "real" responsibility for housework (income) to be negatively (positively) correlated with wages. Respondents were also asked to order life areas (family, working career, hobbies & free time, non-paid activities) according to their general preferences and according to energy and time devoted to them at present (reality). Again we would expect those respondents preferring a working career over other areas to have higher wages. Further a number of questions investigate respondent's use of help with housework or with their children up to age of 3 years. We would expect the use of different types of help to be positively correlated with wages. Further, respondents were enquired to declare their preferences for selected job characteristics (job security, job flexibility, personal self-fulfilment, demands and/or stress related to work and good interpersonal relationship) over wage. The question was asked in such a way as to reveal what is more important to them (at scale almost entirely wage level, rather wage level, rather the other characteristic, almost entirely the other characteristic), and thus we use the variables as categorical variables. We would expect that wages would be positively correlated with more importance put on wages and career advancement, whereas we would expect wages to be negatively correlated with more importance on other job characteristics such as flexibility, security and good atmosphere.

In addition, psychological factors were much in focus in recent literature (see e.g. Heckman et al., 2011, for a comprehensive overview of research advancement in the area). In our survey, we approximated respondents' psychological traits through respondents' agreement with statements describing certain behaviour. In particular, the survey focused on the role of risk-aversion, competitiveness, self-esteem, determination and locus of control. Respondents were asked whether they "feel a really strong need to excel, and be better than others at what they do" (at scale "no", "not really", "fairly", "yes"). Based on previous evidence we would expect higher returns to wage for more risky and competitive individuals (Mueller and Plug, 2006), and individuals with higher self-esteem and with larger control of their life (Fortin, 2008). We add to the literature by introducing a variable on grit following literature in psychology by e.g. Duckworth and Quinn (2009). In particular, we asked respondents on whether they are determined in their life by asking the following question: "I often leave the goal I have set, when I find it's reaching difficult", see Appendix 1 for an overview of questions asked in our survey. We expect more determined respondents to have higher wages. Previous literature also suggests that being able to negotiate pays off and that they receive a pay penalty for "not asking".

Finally, previous literature suggests that appearance and health plays a role in explaining wages. In particular, there is some evidence that more beautiful and healthy people earn more and therefore we add variables related to health and BMI index (as a proxy for appearance) to our analyses of wages.

Descriptive statistics of the variables from our survey provided separately for men and women showed the following interesting differences between men and women:
- Women are slightly better educated and have higher reported ability in terms of better math grades and being more satisfied with them
- Women are working less in terms of working hours - both scheduled and real working hours

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- Women have lower tenure than men
- Women keep much longer maternity leave
- Women are more likely to be evaluated objectively
- Women have more likely female as a boss than men do
- Women are more likely working in state sector
- For women is more important to have higher job security, job flexibility, career advancement, less stressful job and a good atmosphere in the workplace over a higher wage.
- Women prefer to equally share income and household responsibility with their partners, but in reality men are more likely to be responsible for income and less responsible for households. On the other hand, men would prefer to be responsible for income and less responsible for households, and it is indeed like that in reality.
- Women tend to score higher in the locus of control, but less in competition, negotiations, risk and grit.

3   Empirical Model of Wage Determinants and Results

We investigate determinants of wages in the modified (1) Mincerian wage model:

$$ln\ w_i = \lambda\ Female_i + \beta X_i + \varepsilon_i, \tag{1}$$

where w_i stands for monthly earnings, $Female_i$ is a dummy equal 1 for a female, 0 otherwise, and λ is the coefficient of our interest. The matrix X contains a number of control variables as described above. We stick to the division introduced in the previous sections and we divide the control variables into the following subsets:

- demographic and family factors such as: age, number of children, marital status, number of household members, number of brothers and sisters, education of mother and father, nationality, all other earnings of respondent, social benefits in household and a dummy for the fact that with losing the person's income the living standard of the family would decrease significantly;
- human capital factors such as: education (with basic and no education being the omitted category), proxies for ability (math grades in the grammar school and satisfaction with those grades), tenure and its square (in order to account for possible non-linearity), length of the total parental leave period, dummy for any training within the last 12 months and the number of companies the person worked so far,
- job characteristics such as: occupation, a dummy for fit of person's job with his/her education, a dummy for having a specialist job, a dummy for job evaluation based on objective criteria, scheduled working hours, real working hours, category variable for a way of getting an employment, a dummy for being dependent on work of others, a dummy for the freedom to decide about method or order of tasks to reach a work-related goal, a dummy for having a female boss, a dummy for having a friendly relationship with a boss, a dummy for having a possibility to change the starting and stopping times at work, a dummy for having a possibility to work some regular paid hours at home, a dummy for having a possibility to change workload, and a dummy for having not many other job opportunities in the person's commuting area/a proxy for monopsony situation, industry (NACE2) controls, firm size and firm ownership;
- gender identity and family situation variables such as: dummies for a preference of job security / job flexibility / career advancement / less demanding and stressful job / good atmosphere over wage; dummies for preference / reality of being the main breadwinner; dummies for preference / reality of being responsible for household chores; a dummy for person's involvement in charity activities; dummies for lifestyle preferences / reality, a dummy for any help with the household duties, and a dummy for help with children,

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- psychological traits such as: locus of control, competitiveness, self-esteem, risk aversion, and grit (determination) as a newly introduced psychological characteristics by the authors based on psychological research by e.g. Duckworth and Quinn (2009), and health and appearance characteristics (such as health, BMI and height).

We first run the analyses with the female dummy as the sole explanatory variable, and then we add one by one the subsets of variables in order to examine an effect of their inclusion on the coefficient λ central in our analyses. We should emphasize that we report estimated relationships between our variables and wage, not causal links.

The results of our analyses following the model (1) are presented in Table 1 in an attachment. We start with a very parsimonious model specification with a female dummy and a constant on the RHS to show the raw differences in terms of gender, and we add different subsets of additional controls as defined above. In this most parsimonious model specification, see column 1 in Table 1, the female dummy shows 25.3% wage difference with respect to men, and it explains approximately 11.6% of the variance in monthly wages (adj. R-squared). The raw wage differential is similar of the one found in previous studies for business sector using linked employer-employee data, i.e. 25.6% in Gottvald et al. (2002) and Jurajda (2003) for year 1998. Adding regional dummies and demographic variables increases slightly the size of coefficient to female dummy so that now the gender wage gap is on 25.5%, but some increase the explanatory power up to 23.7%. As expected, the coefficient of female dummy decreases to 19.6% once the human capital variables are added and the variables now explain 38% of the variance in monthly wages. This model specification is the closest to the specifications using the traditional micro-data sources, and the wage gap is very similar to coefficient reported in Eriksson, Pytlikova and Warzynski (2013). Adding job characteristics again decreases the female dummy coefficient to 13.7% and increases significantly the models explanatory power to 51.1%. Adding gender identity and other family position variables decreases the gender wage gap further to 6% and increases the explanatory power up to 52.5%. The psychological characteristics decrease the coefficient to female dummy further to 5.6%. Finally, the health and appearance characteristics decrease the gender wage gap to 3.2% and actually take away the statistical significance from the female dummy coefficient. The last two sets of variables do not add much up to the explanatory power of model. Thus, in the fully specified model the gender wage gap is negligible at 3.2% and not statistically significant any more.

We can observe from the Table 1 that in particular the addition of subsets of demographic and family variables, human capital and job characteristics increases the explanatory power of the model substantially, however also the set of gender identity and position in the family characteristics and psychological traits are not negligible in terms of adding to the explanatory power. Our fully specified model explains 53.5% of variance of monthly wages.

From the demographic and family explanatory variables considered, we can observe that wages are positively associated with age, number of children, education of father, and with having a partner – being either in marriage or in partnership. As expected, wages are negatively correlated with social benefits.

Among the human capital measures the return rate on education is high at approximately 14%. The grades from math, which serves as our proxy for ability, are as expected negatively correlated to wages (please note that in the Czech system, the grade goes from 1 to 5 with 1 being the best grade and 5 the worst). Thus individuals with higher ability earn more. As expected there are statistically significant positive returns to tenure and negative to quadratic tenure. We find a strong negative effect of the maternity leave. In particular, our results indicate that an increase in parental/maternity leave by one year is estimated to lower wages by 6.25%, ceteris paribus, an effect similar to studies found for Germany and France (e.g. in Lequien, 2012)

Regarding job characteristics, wages are positively correlated with being a specialist, with higher scheduled and real working hours, with work task freedom, with a higher number of job opportunities in the person's commuting area and with the foreign-owned firms. Interestingly, a dummy of being

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evaluated on the basis of objective criteria as compared to subjective criteria is associated with a 2% decrease in monthly wages and having a female boss is associated with 3.3% lower wages.

Among the gender identity and other family position variables, preference of job flexibility is associated with 2% lower wages. Further, being a breadwinner is associated with approximately 10% higher wages. A dummy for families getting help with housework is associated with 3.3% higher wages.

Regarding psychological traits, being competitive and having high score in grit (determination) is associated with higher wages. From the health and appearance characteristics only height is positively correlated with wages.

4. Conclusions

This paper analyses different aspects of wage differentials between men and women. In particular, we developed a wide model of wage determinants using an especially rich dataset from our survey, which can shed some light on determinants of wages usually not covered by commonly available micro-datasets, such as work-life preferences, family identity, psychological non-cognitive skills and job characteristics.

While there have been a number of previous studies based on different data sets that show evidence of a significant gender based wage gap in the Czech Republic (Eriksson et al., 2013, Gottvald et al., 2002; Jurajda 2001, 2003b and 2005), we found only negligible evidence of a wage gap of 3.2% in analyses using our rich survey data. In our analyses we first run wage equations starting with very parsimonious specification with a female dummy as the sole explanatory variable, and then we added various subsets of variables one by one in order to examine their inclusion on the female dummy coefficient. We found that female dummy shows 25.3% wage difference with respect to men in this most basic model specification, and it explains approximately 11.6% of the variance in monthly wages (adj. R-squared). Adding our rich subsets of variables decreases the coefficient to female dummy substantially to 3.2% with no significance, and our full model specification explains 53.5% of variance of monthly wages. In particular, the addition of the subset of demographic and family variables, human capital and job characteristics increases the explanatory power of the model substantially, however also the set of gender identity and position in the family characteristics and psychological traits are not negligible in terms of explanatory power of the model.

Our results show that women earn less than men overall, but the difference is due to observable factors as the actual unexplained term considered often as an indicator of discrimination is negligible. Nevertheless, our results should be a concern for policy makers given that one of the main factors determining wages and explanatory part of the wage gap in the Czech Republic is the length of maternity/parental leave and lower tenure. Thus, one of the ways to close the gender pay gap is for policymakers to do more to get mothers to come back earlier to work from their leave related to child bearing. In light of this, we think the reform from 2006 allowing women to choose between 2, 3 and 4 year of maternity/parental leave (thus reducing the maternity/parental leave from the paid 3 to 4 year scheme to paid 2 and 3 year scheme) was a step in the right direction. We suggest reducing the length of maternity leave even further, but preserving mothers' choice of length, e.g. choice between leave till 1, 2 or 3 years of child's age. At the same time we recommend the policy makers to increase publicly subsidized high-quality child care in order to truly give the young mothers choice of early return to their jobs in case they would like to. In particular, the childcare for children between 0 to 3 years old should become more widely available and affordable through a formal publicly-funded center-based care such as crèches or day care. The Czech Republic has extremely expensive system of parental leave; the spending on child related leave and birth per childbirth is one of the highest in the OECD countries particularly because of the longest in the world and relatively generous parental leave. Thus by shortening the leave there could be some financial resources left to support establishment of a high-quality (at least partly) publicly supported child care for children 0-3 years. Further, the evidence from our survey shows that women in the Czech Republic continue to be

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primarily responsible for most of the housework and childcare. Supporting inclusion of men as househusbands would help families in achieving more equality on that front and consequently more gender equality on the Czech labour market. For instance, some policy initiatives promoting sharing of care responsibilities between parents such as periods of parental leave for the exclusive use of fathers (such as in Norway), could be a measure bringing greater gender equality.

The evidence from our survey shows that job flexibility as a tool in reconciling work and family life is important explanatory variable in explaining differences between men and women. Perhaps some legislation promoting flexible workplace practices – such as giving a right to request flexible working hours -would make it easier for both sexes to combine work and family. Some countries could serve as an example, for instance the Netherlands have a legislation allowing workers in companies with more than 10 employees to request a more flexible working hours. In the UK, policymakers have granted parents with children under age six the right to request flexible working hours.

Finally, our analyses show that women tend to be less competitive and determined, and that the two psychological characteristics positively influence the explained part of the gender wage gap in a significant way. This might have some implications (together with the factors mentioned above) for the observed low female representation on company boards and in executive management positions.

5. Acknowledgement

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Attachment

Table 1. Determinants of monthly wages, pooled OLS

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DepVar: log(monthly wage)							
Female	-0.253***	-0.254***	-0.255***	-0.196***	-0.137***	-0.060**	-0.056**	-0.032
	(0.016)	(0.015)	(0.015)	(0.021)	(0.020)	(0.026)	(0.026)	(0.029)
Region	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic and family characteristics								
Age			0.030***	0.031***	0.022**	0.021**	0.023***	0.023***
			(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.009)
Age squared			-0.000***	-0.000***	-0.000***	-0.000**	-0.000***	-0.000***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Children			0.019	0.029**	0.022*	0.020*	0.023*	0.024**
			(0.014)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
Marital status: b Single								
Married			0.099***	0.048*	0.037	0.048*	0.046*	0.046*
			(0.029)	(0.027)	(0.024)	(0.026)	(0.025)	(0.025)
Single, partnership, no coh.			0.071*	0.055	0.028	0.019	0.019	0.016
			(0.039)	(0.036)	(0.031)	(0.031)	(0.031)	(0.031)
Single, partnership, cohabitation			0.050	0.039	0.039	0.048*	0.049*	0.048*
			(0.030)	(0.028)	(0.025)	(0.027)	(0.027)	(0.027)
Divorced/widow, without partner			0.048	0.044	0.038	0.017	0.018	0.017
			(0.034)	(0.031)	(0.027)	(0.027)	(0.027)	(0.027)
Divorced/widow, partner., no coh			0.085*	0.109***	0.078*	0.083**	0.088**	0.086**
			(0.047)	(0.041)	(0.041)	(0.041)	(0.041)	(0.041)
Divorced/widow, partner., coh			0.106**	0.070*	0.035	0.042	0.034	0.030
			(0.045)	(0.042)	(0.039)	(0.040)	(0.039)	(0.039)
No of household members			-0.002	-0.001	0.007	0.009	0.009	0.009
			(0.010)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
No of brothers			-0.010	-0.011	-0.009	-0.007	-0.008	-0.008
			(0.012)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
No of sisters			-0.006	0.002	0.002	0.004	0.002	0.003
			(0.012)	(0.011)	(0.009)	(0.009)	(0.009)	(0.009)
Education of mother			Yes	Yes	Yes	Yes	Yes	Yes
Education of father			Yes	Yes	Yes	Yes	Yes	Yes
Czech nationality			0.037	0.093	0.064	0.063	0.062	0.068
			(0.051)	(0.064)	(0.053)	(0.055)	(0.057)	(0.058)
All my other earnings			0.000	-0.000	0.000	-0.000	-0.000	-0.000
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Social benefits			-0.000***	-0.000***	-0.000**	-0.000***	-0.000***	-0.000***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Living standards would decrease			-0.005	0.000	0.006	-0.005	0.001	-0.001
			(0.020)	(0.018)	(0.016)	(0.015)	(0.015)	(0.015)
Human capital characteristics								
Education: b no or basic								
Secondary and vocational				0.107***	0.027	0.041	0.027	0.026
				(0.038)	(0.033)	(0.033)	(0.034)	(0.033)
Post-secondary non-tertiary				0.212***	0.062	0.085*	0.070	0.069
				(0.050)	(0.045)	(0.045)	(0.046)	(0.045)
Short-cycle tertiary & Bachelor				0.230***	0.102**	0.110***	0.093**	0.095**
				(0.047)	(0.041)	(0.042)	(0.042)	(0.041)
Master & PhD				0.327***	0.152***	0.156***	0.140***	0.138***
				(0.049)	(0.044)	(0.044)	(0.044)	(0.044)
Math grade (1highest-5lowest)				-0.047***	-0.037***	-0.034***	-0.030***	-0.028**
				(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
Satisfied w. math grades				0.004	-0.011	-0.010	-0.010	-0.010
				(0.018)	(0.016)	(0.016)	(0.016)	(0.016)
Tenure				0.016***	0.010***	0.010***	0.011***	0.011***
				(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Tenure squared				-	-0.000**	-0.000**	-0.000**	-0.000**

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	(1)	(2)	(3)	(4)	(5)
	0.000*** (0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Maternity leave	-0.026*** (0.005)	-0.019*** (0.004)	-0.015*** (0.004)	-0.015*** (0.004)	-0.015*** (0.004)
Training	0.062*** (0.015)	0.026* (0.014)	0.019 (0.014)	0.010 (0.014)	0.009 (0.014)
No of employers so far	-0.001 (0.006)	0.002 (0.006)	0.003 (0.006)	0.004 (0.006)	0.004 (0.006)
Job characteristics					
ISCO		Yes	Yes	Yes	Yes
Match of education & job		0.011* (0.006)	0.010 (0.006)	0.010 (0.006)	0.009 (0.006)
Specialist		0.034** (0.014)	0.034** (0.014)	0.034** (0.014)	0.035** (0.014)
Objective job evaluation		-0.022*** (0.007)	-0.023*** (0.007)	-0.021*** (0.007)	-0.020*** (0.007)
Scheduled working hours		0.014*** (0.003)	0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)
Real working hours		0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
Way of getting employment		Yes	Yes	Yes	Yes
Teamwork		0.004 (0.007)	0.004 (0.007)	0.005 (0.007)	0.005 (0.007)
Work & job tasks freedom		0.029** (0.014)	0.029** (0.014)	0.026* (0.014)	0.028** (0.014)
Gender of boss		Yes	Yes	Yes	Yes
Relation with boss		Yes	Yes	Yes	Yes
Flexitime		Yes	Yes	Yes	Yes
Work from home		Yes	Yes	Yes	Yes
Changing workload		Yes	Yes	Yes	Yes
Monopsony		0.030*** (0.008)	0.026*** (0.008)	0.025*** (0.008)	0.025*** (0.008)
NACE		Yes	Yes	Yes	Yes
Firm size		Yes	Yes	Yes	Yes
Ownership of firm		Yes	Yes	Yes	Yes
Gender identity and position in the family					
Job security			-0.007 (0.008)	-0.009 (0.008)	-0.009 (0.008)
Job flexibility			-0.020** (0.009)	-0.019** (0.009)	-0.020** (0.009)
Career advancement			0.015 (0.010)	0.006 (0.010)	0.005 (0.010)
Less demanding & stressful job			-0.012 (0.009)	-0.003 (0.009)	-0.001 (0.009)
Good atmosphere			-0.015* (0.009)	-0.015 (0.009)	-0.014 (0.009)
Responsibility for income - preferences			Yes	Yes	Yes
Responsibility for income – reality: b Exclusively me					
Mainly me			-0.031 (0.021)	-0.026 (0.020)	-0.028 (0.020)
Me and partner equally			-0.037* (0.021)	-0.031 (0.021)	-0.033 (0.021)
Mainly partner			-0.120*** (0.025)	-0.112*** (0.025)	-0.114*** (0.025)
Exclusively partner			-0.122*** (0.037)	-0.107*** (0.036)	-0.109*** (0.036)
Parents that I live with			-0.119** (0.054)	-0.118** (0.054)	-0.117** (0.055)
Responsibility for households - preferences			Yes	Yes	Yes

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Respons. for households – reality: b Exclus. me								
Mainly me						0.002 (0.020)	-0.002 (0.019)	-0.002 (0.019)
Me and partner equally						0.031 (0.021)	0.020 (0.022)	0.021 (0.021)
Mainly partner						0.029 (0.024)	0.023 (0.024)	0.024 (0.024)
Exclusively partner						0.039 (0.029)	0.033 (0.029)	0.033 (0.029)
Parents that I live with						0.006 (0.062)	0.001 (0.062)	0.001 (0.062)
Charity						-0.004 (0.018)	-0.007 (0.018)	-0.004 (0.018)
Lifestyle - reality						Yes	Yes	Yes
Lifestyle - preferences						Yes	Yes	Yes
Help in households						0.037*** (0.013)	0.035*** (0.013)	0.033*** (0.013)
Help with kids						-0.016 (0.016)	-0.017 (0.016)	-0.017 (0.016)
Psychological traits								
Locus of control							0.002 (0.008)	0.003 (0.008)
Competition							0.027*** (0.009)	0.028*** (0.009)
Self-esteem							0.007 (0.009)	0.006 (0.009)
Negotiation							-0.022* (0.013)	-0.022* (0.013)
Risk (1-10)							0.004 (0.003)	0.004 (0.003)
Grit (Determination)							0.028*** (0.009)	0.027*** (0.009)
Health and appearance								
Health								-0.032 (0.021)
Bmi								-0.000 (0.002)
Height								0.002** (0.001)
Constant	9.964*** (0.011)	10.149*** (0.025)	9.067*** (0.190)	8.920*** (0.218)	8.594*** (0.306)	8.676*** (0.306)	8.397*** (0.301)	8.013*** (0.348)
Observations	1,984	1,984	1,984	1,984	1,978	1,978	1,978	1,978
Adjusted R-squared	0.116	0.163	0.237	0.380	0.511	0.525	0.533	0.535

Source: Questionnaire, 2011

Notes: Dependent Variable: Ln (monthly wage). *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in parentheses.

CURRENT ISSUES ON THE SLOVAK LABOUR MARKET AND REGIONAL ASPECTS

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Abstract
The paper is focused on the analysis of developments in key areas of the Slovak labour market. It highlights the continuing problems in ensuring stronger growth in employment and regional differences in levels of unemployment and structural problems in selected regions. The labour market is sensitive and vulnerable place of the Slovak economy, the adverse impacts of the crisis in past years exhibited significantly compared to most EU economies, which resulted in deepening structural problems in the labour market and higher unemployment rate, which is moreover in the long term significantly spatially differentiated on axis east - west. Despite significant regional differences in unemployment levels is a regional mobility of labour in Slovakia relatively low. Nowadays, to reducing regional disparities can be used a support from the state for the least developed districts of Slovakia. The latest economic forecasts confirm that there is an ongoing recovery in Slovakia also because of low energy prices and very accommodating monetary policy. Nevertheless, the results of the labour market are still affected by the persistence of large regional disparities in economic growth and employment. The European Commission also notes that unemployment remains one of the biggest problems of economic policy, with regard to its structural nature.

Keywords
Labour market, unemployment, structural problems, regional aspects, Slovakia.

JEL classification
J01, J08

1   Introduction

The labour market is considered one of the most important markets, because it facilitates allocation of the national resource - work among regions, sectors and employment subjects. The labour market is a sensitive and vulnerable aspect of the Slovak economy; even recent years of the last crisis have manifested themselves more prominently in Slovakia since 2009 when compared with the majority of the EU economies, which transferred into deepening of structural issues of the labour market and increase of unemployment rate. Its ineffective working has many negative social and economic consequences. Negative effects of the crisis affected especially the category of disadvantaged persons, as well as some regions of Slovakia, with typical lower economic activity and lower pay rate. Unemployment of disadvantaged groups is a big problem in Slovakia also when compared to the rest of the Europe.

The latest economic forecasts confirm that there is a moderate recover in Slovakia in the context of low energy prices and a very accommodating monetary policy. The development of summary indicators of the Slovak labour market is positive, and this trend should continue in the next two years based on short-term forecasts. However the results of the labour market still reflect the persistence of big regional disparities in economic growth and employment. As stated by the European Commission, unemployment remains one of the biggest problems of economic policy, also due to its structural character.

The goal of this paper is to consider the development in the labour market sector in the conditions of the SR with focus on unemployment and identify continuing problems of employment growth from the macroeconomic and regional point of view. We examine the data on the level of Slovakia and on the regional level. The basic statistical information sources are the Selective labour force survey for households, implemented by the SO of the SR, information system of unemployment registration through the Central Office of labour, social affairs and family and Eurostat data.

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2 Specific issues of the Slovak labour market

The high unemployment rate in majority of the EU countries is related especially to the decline, respectively low economic growth as one of the manifestations of the crisis after 2008. Labour market trends are partially the result of cyclic movements and especially major economic crisis, but they are also caused by structural and institutional issues of the labour market affecting the economic activity and labour markets performance. During the previous three years, after the aftermath of the most significant manifestations of the crisis, Slovakia made considerable effort to remove macroeconomic imbalance from previous years, however there are still many problematic areas and there are always new challenges.

After the crisis, the economic growth of Slovakia was one of the highest in the EU and the convergence continues, albeit at slower pace. The economic production quickly recovered and in 2011 achieved levels, which exceeded levels prior to crisis, however the growth rate after the crisis is still lower (Fig. 1). During 2012 – 2014 the annual growth of GDP slowed to an average of 1.8%, while during 2006 – 2008 the average level was 8.3%. During the last quarter of 2015 the economic growth was as much as 4.3%, which was the best result for the past 5 years. Despite continued economic recovery the production gap remained negative in 2015 and it is expected that it will be closed only in 2017. The real convergence towards more developed member states continues, albeit at slower pace than before the crisis. Actual GDP per capita in 2014 in Slovakia was approx. 75 % of the EU level. The growth of actual GDP in 2015 increased to 3.5 %. The driving factor was major increase of investment activity tied to the use of the EU funds and a major growth of consumption of households (Európska komisia, 2016).
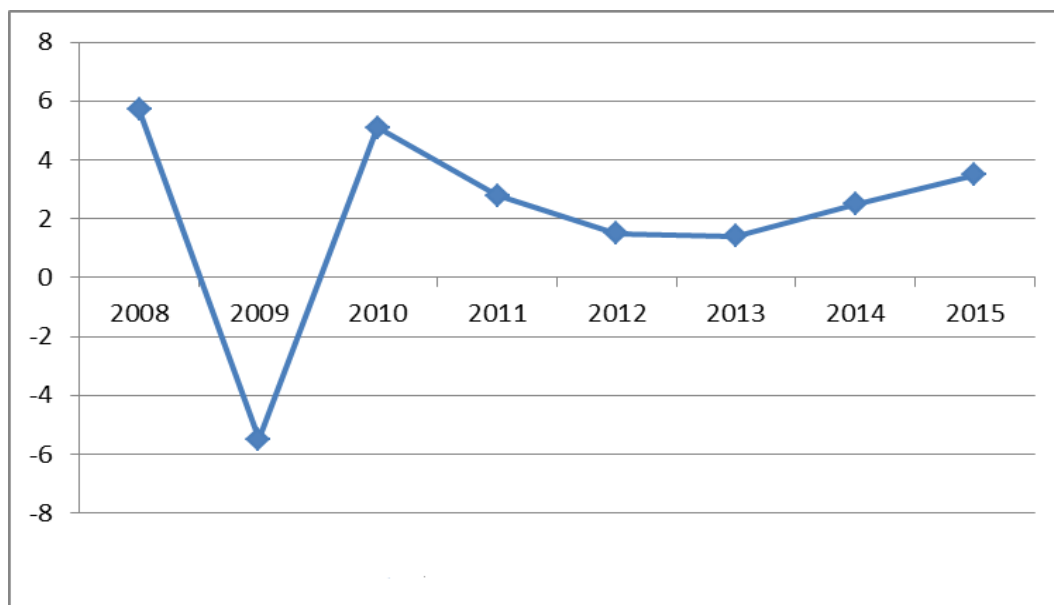
Fig. 1. Annual percentage growth rate of real GDP at market prices (Source: Eurostat)

Note: forecast for 2015

In the following years it is expected that the strongest impulse of growth will continue to be the growing private consumption with contribution of increasing employment, growth of actual salaries, low interest rates and continuing decline of energy costs. However decline of export, also in the automotive industry production, can represent a certain risk, which can be caused especially by external factors.

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In its decade strategy Europe 2020, in 2010, the European Union determined that by 2020 on average there will be at least three of four active citizens of the EU employed, in the age from 20 to 64 years. The average employment rate should reach 75%. Slovak goal of employment rate was set slightly below the European average to 72 % also with respect to the long-term position of Slovakia among weaker countries in the field of labour market execution. The Slovak labour market traditionally remained in employment rate significantly behind the average, in the last third of countries with the lowest rate of employment, higher rate was achieved also by the V4 countries, of which the best results were achieved by the CR (Fig. 2). In Slovakia 2014 was the long awaited year of labour market recovery, after the economic growth of 2010 through 2012 did not introduce significant growth of employment. Crisis years 2009 – 2010 again confirmed the vulnerability of the Slovak labour market against cyclic economic slumps, due to which the employment rate fell more sharply than in the EU and in the Eurozone. 2013 and especially 2014 recorded in this context positive development. Employment of 20 through 64-year-old persons increased in Slovakia in 2014, when compared to the previous year, but it is still below the level of 2008. Employment growth continued also in 2015. Employment grew significantly in this year and the labour market should continue its positive growth, copying the stable economic growth.
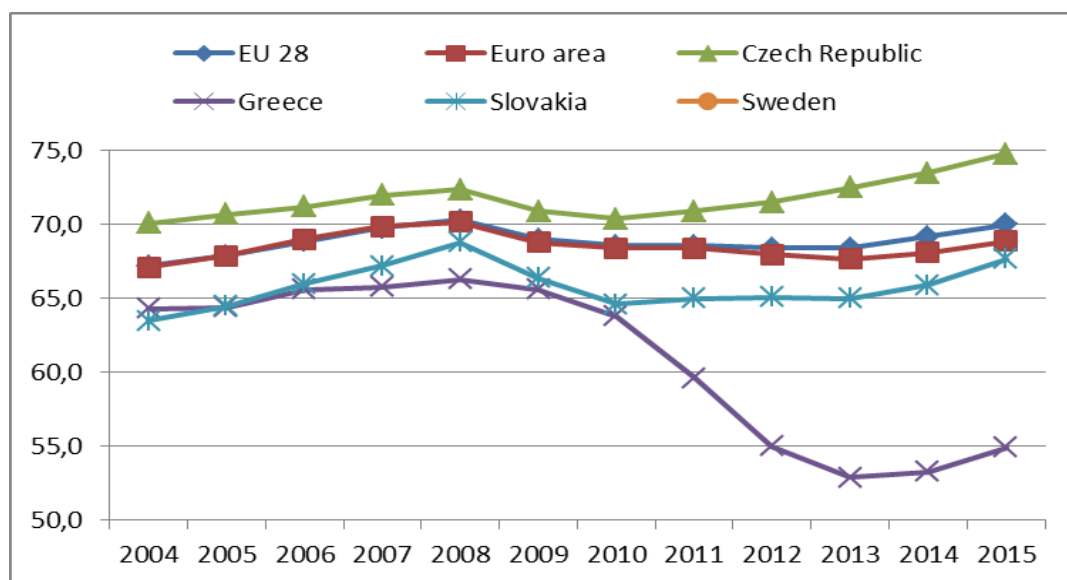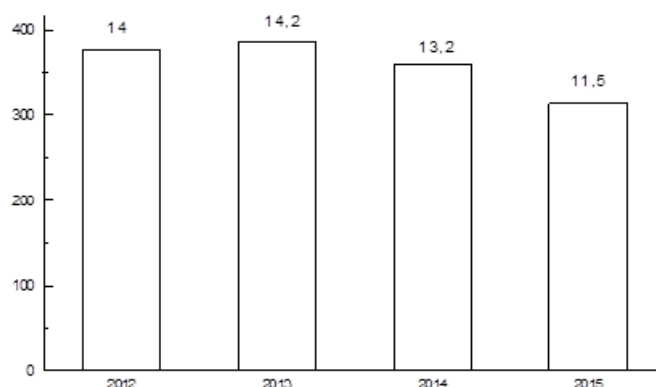

Fig. 2. Employment rates in EU and Euro area (%), age group 20-64 (Source: Eurostat)

Unemployment in Slovakia is one of the most serious economic and social issues, which long-term prohibits the full realization of the economic growth potential. The last biggest growth of unemployment rate related to the drop of employment manifested itself during the economic slump due to the global crisis in 2010, when almost every sixth individual in the active population was looking for a job and the average annual unemployment rate was 14%. During the following 4 years the share of economically active persons looking for a job was above 13 %. Neighbouring countries of the Visegrad Four were in significantly better shape; Hungary with the closest development of unemployment was 2 - 3 percentage points better, when compared to Slovakia; the Czech republic record post crisis unemployment 5 to 6 percentage points lower than Slovakia (Lubyová – Štefánik a kolektív, 2015).

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Fig. 3. Unemployment in the Slovak Republic, in thousands and % (Source: Eurostat)

As stated in the Country Report for 2016 (Európska komisia, 2016), structural unemployment, which is also the reflection of strong geographic differences, still represents a key political problem. Significant geographic differences in the labour market, which are enhanced by low mobility of the work force, contribute to the fact that the country has one of the highest levels of long-term unemployment rate in the EU. Unemployment is focused in the centre and in the East of the country. Low sensibility of unemployment to increase of actual salary only enhances the fears about the extent of the structural unemployment.

Slovakia is one of the countries, which fight especially high level of long-term unemployment. This fact significantly contributes to the negative development of public finances, but it also reflects possibly insufficient use of production resources in the economy. High unemployment rate is not related only to lack of demand for work force, but it is also the result of imbalance between them (Workie Tiruneh – Štefánik a kolektív, 2014). In 2014 the long-term unemployment rate (more than 12 months) was one of the highest in the EU (9.3 % when compared to 5.1 % in the EU-28). Two thirds of the unemployed are long-term unemployed and majority of the long-term unemployed don't have work for more than two years, while the rate of the very long-term unemployment rate is 6.6 % (more than double of the EU average).
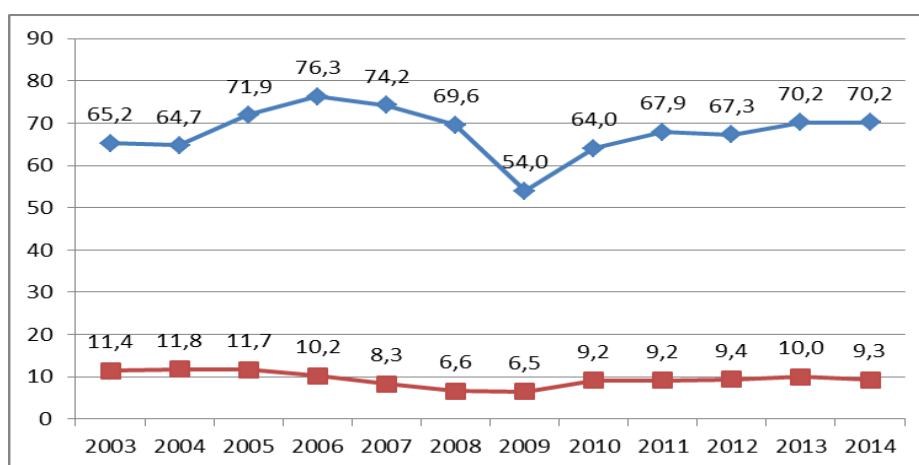
Fig. 4. Long-term unemployment (red line) and its share on total unemployment (blue line), in %

(Source: Eurostat)

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Fig. 4 shows two basic facts. The first is the fact that there is no direct correlation between the share of long term unemployment on the total unemployment and the total unemployment. Examples are the years 2004 - 2006, when there was decrease of overall unemployment, but the share of long-term unemployment on the total unemployment continued to grow. This development shows that the Slovak labour market was not capable to absorb the long-term unemployed - employers are not interested in hiring long-term unemployed, since they assume they lost their qualification and their work ethics, and the long-term unemployed got used to life without work, social benefits and don't strive to find a new job. The second is the fact that long-term unemployed make on average more than two thirds of all unemployed. In an effort to reduce the overall unemployment, this fact represents a major problem, since it is a group of people, which has greater problems when re-entering the labour market. Slovakia is a Member State with the highest long-term unemployment persistence rate and that means the job finding chances are bleak (European Commission, 2015).

Long-term unemployment represents for the workers with low qualification and young people a significant risk. Slovakia has the highest rate of unemployment of workers (age 20 - 64) with a low qualification in the entire EU (36.9 % compared to 16.3 % in the EU-28 in the third quarter of 2015). Workers with low qualification represent a high percentage of the long-term unemployed. In 2014 workers with low qualification represented 24 % of the long-term unemployed compared to 4 % of workers with low qualification in the employed population. Unemployment of young people in the third quarter of 2015 dropped to 26.6 %, which is still significantly above the EU average of 20.1 %. The share of young people, who are not employed and they are not in the educational process or process of professional training also declined and in 2014 it was 12.8 % (12.5 % in the EU-28). Young workers (less than 25 years) represented 17 % of the long-term unemployed (compared to 6 % in the employed population) (Európska komisia, 2016). For young people in Slovakia the transition from school to work continues to be difficult, while the educational system doesn't react immediately to the needs of the labour market despite the reform measures of 2012 focused on improving the quality and relevancy of education for the needs of the labour market. In order to lower youth unemployment rate there are also the EU structural funds available. So far, Slovakia has implemented several national projects in private and self-governing sector for the thousands of young people under 29 (European Commission, 2014).
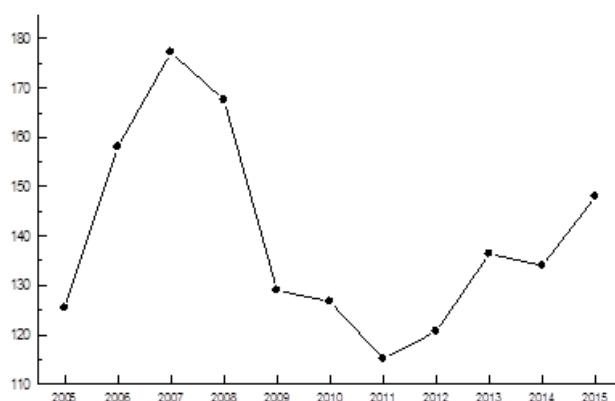
Fig. 5. Slovak citizens working abroad, in thousands (Source: Eurostat)

According to the OECD statistics Slovakia is gaining on the leaders of economic migration, we rank on the ninth place among OECD developed countries, from which people leave to most for work abroad. The number of Slovaks working abroad during the past three years is in the range 130 - 148 thousand (Fig. 5). The greatest number of Slovaks left for work abroad during the pre-crisis years 2006 - 2008, decrease occurred after the start of the global crisis, which affected the hosting countries.

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During recent years when recovery of economies began this trend increased again. We consider especially this fact as one of the indicators of decrease of unemployment and increase of employment. The greatest amount of people leaves for work to the CR and Austria, especially due to higher salary. Regions, from which the greatest number of people leave is the Prešov region, which is caused by greater unemployment and poverty of this region.

Main findings related to the field of labour market and employment, resulting from the analysis of the EC for Slovakia, are as follows (Európska komisia, 2015):
- Improved situation at the labour market transformed into significantly lower level of long-term unemployment. Higher and persisting long-term unemployment represents a social-political challenge, which has an effect especially on workers with low qualification and young people, while great regional disparities persist;
- Participation of the Roma on the Slovak labour market continues to be very low and increase of their employment is progressing very slowly;
- Employment of women is also below its potential;
- Educational system is insufficiently focused on increasing the economic potential of Slovakia. Results in the area of education are not satisfying and in international comparison inequalities appear to be high;
- Administrative and regulatory barriers harm the business environment
- Attractiveness of the Central and Easter Slovakia regions for private investments suffer due to problematic physical infrastructure.

Several Slovak economists supplement these findings by other facts preventing higher rate of creation of new jobs: high contribution burden on labour, minimum wage, high rate of regulation burden on employment on part of the state, high level of bureaucracy and low interregional mobility of work force (Dinga – Ďurana, 2015).

3   Regional aspect of unemployment

Slovakia is composed of heterogeneous regions. Various areas have various economic infrastructures, various developmental conditions and differentiated access to resources, due to which spatial structures are defined, which have different unemployment rate. Regional unemployment represents in Slovakia a serious and long-term economic and social issue. Unevenness of unemployment development in individual regions is related not only to the historical development of the Slovak economy, but also to its modern, very differentiated development. After the 1990's the West of the SR developed even more intensively than the East. It is true that the regional disparities in the labour market remain in the direction from the Bratislava region, which has a dominant position (allocation of international investments, lowest unemployment rate, richest offer of jobs), towards the Eastern part of the Republic. Regional unemployment is affected by a whole set of factors, which are mutually interconnected and are found on various levels of the decision-making process. These factors can be split into two basic groups, namely into direct factors and indirect factors. Both groups of factors affect regional unemployment, specifically in terms of its rate and differentiability. Basic determinants affecting regional unemployment include indicators of the labour market, heterogeneous development of salaries and productivity, insufficient territorial mobility of the work force, economic development of the region and qualification of the work force. Differentials express especially the internal quality aspect of the regions, correlation of individual components within the regions, their overall status, which subsequently transforms into the character of differences of individual regions (Rievajová et al, 2015). In terms of geography unemployment in Slovakia is concentrated in the Southern and Eastern counties of the country with lower economic activity and lower salary rate - in these regions due to the current status of the market there aren't simply enough jobs created. Thus if the applicants aren't willing to commute or move because of work to larger

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cities, their chances of finding a job are slim (Dinga – Ďurana, 2015). We can conclude that the combination of insufficient job creation in the Eastern and Central Slovakia and the lack of labour mobility to the west is the main reason for the significant regional disparity (OECD, 2014).

Despite economic recovery the regional differences of unemployment are still significant. Despite certain progress achieved under removing these differences, in 2015 the unemployment of the Bratislava region (5.34 %) was still less than a half of that of the Prešov region in the East of Slovakia (15.50 %). Main reasons for this fact is the combination of low growth and low creation of new jobs in the Central and Eastern part of the country, as well as insufficient regional mobility of the work force into areas with higher number of free job positions. Factors prohibiting higher mobility include insufficient transportation infrastructure, higher travel and accommodation costs when compared to the average salary, as well as insufficiently developed market with rented housing. The situation is complicated by the insufficient infrastructure and business environment, which prevents the inflow of investments into less developed regions and the creation of new jobs. When compared to the rest of the EU there are always shortcomings in the business environment of Slovakia. Reasons listed most often are frequent changes of legislation, complexity of administrative procedures, as well as burdening requirements based on government regulations. Administrative and regulatory burdens damage the business environment, lower external competitiveness and restrict domestic economy.

Table 1. Registered unemployment rate in the Slovak Republic: by region, in %

Region/Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bratislava	2.6	2.29	1.98	2.27	4.36	4.63	5.4	5.7	6.17	6.13	5.34
Trnava	7.15	5.22	4.3	4.29	8.37	8.17	8.9	9.4	9.16	8.03	6.71
Trenčín	6.8	5.19	4.5	4.95	10.1	9.51	10.0	10.9	10.7	9.56	7.71
Nitra	11.4	9.09	7.1	7.41	11.7	11.8	13.3	14.1	12.5	11.21	9.71
Žilina	9.33	7.03	5.55	6.2	10.9	10.9	11.9	12.8	12.5	10.91	8.86
Banská Bystrica	18.3	16.1	14.1	14.3	19.2	18.9	19.8	20.8	18.2	17.22	14.94
Prešov	15.8	13.7	12.1	12.9	18.3	17.8	19.0	20.7	19.4	17.45	15.50
Košice	17.5	15.2	13.0	13.1	17.3	16.8	18.8	19.6	17.2	15.92	14.39
Slovak Republic	11.4	9.4	7.99	8.39	12.7	12.5	13.59	14.44	13.5	12.29	10.63

Source: Central Office of Labour, Social Affairs and Family.

Table 1 shows the development of the percentage of the unemployment rate since 2005, which is a year after the Slovak Republic joined the European Union, until 2015. Statistics show that while the regional differences in the unemployment rate grew after joining the EU, average unemployment from 2005 was decreasing in Slovakia until 2008. Permanently low unemployment rate was and is in the Bratislava region. Unemployment was high above the Slovak average until the end of 2013 in the Banská Bystrica, Prešov and Košice regions. In 2015 the number of unemployed declined annually with the exception of the Trnava region in all regions, in the range from 2.5 % in the Žilina region to 16.6 % in the Košice region. The greatest number of the unemployed was concentrated in the regions of Eastern Slovakia (Prešov and Košice regions) and in the South of the Central Slovakia (Banská Bystrica region), which also showed the highest unemployment rate. Despite positive results of the national economic growth, major regional differences in the unemployment rate still remain. Unemployment rate below the SR average is found in five regions (Bratislava, Trnava, Trenčín, Nitra and Žilina), unemployment rate above the average was showed in 2015 by the Košice, Prešov and Banská Bystrica regions.

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Table 2. Unemployment in regions in 2015

Region	Job seekers	Less than 1 year	More than 1 year	More than 4 years
Slovak Republic	354.582	46.6%	53.4%	21.2%
Bratislava	20.853	63.3%	36.7%	6.2%
Trnava	24.130	60.9%	39.1%	9.6%
Trenčín	28.901	54.6%	45.4%	13.3%
Nitra	41.667	49.9%	50.1%	17.0%
Žilina	36.819	53.2%	46.8%	14.4%
Banská Bystrica	60.474	39.2%	60.8%	28.9%
Prešov	75.361	40.6%	59.4%	26.9%
Košice	66.378	40.3%	59.7%	26.7%

Source: Central Office of Labour, Social Affairs and Family.

A very serious problem is long-term unemployment, which is crucially concentrated in East of Slovakia and South of Central Slovakia. The fact that majority of the Roma population lives in the Southern and Eastern counties plays also its role.

Table 3. Average nominal monthly wage in the economy of the Slovak Republic (EUR)

Region/Year	2009	2010	2011	2012	2013	2014	2015
Bratislava	970	991	1 001	1 029	1 049	1 107	1 122
Trnava	689	705	735	736	745	772	799
Trenčín	635	657	687	724	750	779	812
Nitra	625	636	662	661	680	705	736
Žilina	657	686	707	726	732	750	786
Banská Bystrica	605	635	652	675	706	730	751
Prešov	573	594	608	613	636	657	683
Košice	684	716	726	735	758	775	803
Slovak Republic	745	769	786	805	824	858	883

Source: Statistical Office of the Slovak Republic.

Unemployment depends to a large extent to the salary level in individual regions - i.e. to a large extent it is true that the higher the unemployment, the lower the average salary. The Košice region is a certain exemption, where the amount of salary is affected by salary in the capital of the region, where there are international employers. Second exemption is the Nitra region, which shows low unemployment under low salaries, where the reason is self-employment in the agricultural sector. Minimum salary is a specific question, which is set across the board in Slovakia and thus paradoxically it mostly affect negatively the poorer regions, since it pushes job applicants out of the labour market, which are below the level of minimum wage (Dinga – Ďurana, 2015).

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Table 4. Median wage growth in the years 2008-2014 (by region)

Region	Median wage (in EUR)		Increase 2008-2014	Registered unemployment rate (2014)	Minimum wage as a proportion of median wage (2008)	Minimum wage as a proportion of median wage (2014)
	2008	2014				
Slovak Republic	609	756	24.14%	12.29%	44.1%	46.56%
Bratislava	769	948	23.28%	6.13%	35.0%	37.13%
Trnava	606	743	22.61%	8.03%	44.4%	47.38%
Trenčín	573	723	26.18%	9.56%	46.9%	48.69%
Nitra	572	696	21.68%	11.21%	47.0%	50.57%
Žilina	592	728	22.97%	10.91%	45.4%	48.35%
Banská Bystrica	568	716	26.06%	17.22%	47.4%	49.16%
Prešov	533	648	21.58%	17.45%	50.5%	54.32%
Košice	610	755	23.77%	15.92%	44.1%	46.62%
Minimum wage	268.9	352	30.90%			

Source: (Dinga – Ďurana, 2015).

4   Conclusion

Development in the labour market of the Slovak Republic is the key question of the short-term and long-term aspect of the development of the economy of Slovakia. The labour market records cyclic improvement in the conditions of the SR. The unemployment rate decreases and it is expected that it will drop just below 10 % in the next two years, which will be caused by the economic growth, as well as increase of households' consumption. However structural unemployment continues to be the key problem, since it is the manifestation of extensive geographical differences in the conditions of the labour market, which are accompanies also by low mobility of the work force. The unemployment rate is not distributed equally in Slovakia, quite the contrary; it is spatially differentiated in relation to economic performance and demographic characteristics. Differences between the regions are determined by their different conditions, whether natural or social-economic, and they are reflected also in the extent of unemployment of the population of given regions. A typical characteristic of the Slovak labour market is growing unemployment in the West - East axis, which leads to the concentration of unemployment and poverty in some regions of the Central and Eastern Slovakia. It is the consequence of a different demographic, economic, technical and other potential in relation to geographic characteristics. These characteristics affected also the development of inflow of foreign investments, which were directed mostly towards the Western areas of Slovakia, which had an even greater effect on the differentiation of the regions of Slovakia. High unemployment rate is also related to insufficient infrastructure and with unsuitable structure of job applicants, which discourages

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investors despite the low price of work. Some economists point also to the negative effect of minimum wage on employment in lagging regions, low level of education and low mobility of the unemployed into more developed regions.

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THE ROLE OF P2P LOANS IN THE FINANCING OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE CZECH REPUBLIC

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Abstract:
Competitive small and medium-sized enterprises (SMEs) form a significant element of all well-functioning market economies. As a result of their autonomy and flexibility, they are able to satisfy individual demand in areas that are often perceived as being financially unattractive for larger companies. According to data from the Czech Statistical Office, in 2014, 99.84 % of active companies employed from 0 to 249 employees. The key question that all companies are forced to address consists of securing funding, in which respect SMEs are primarily dependent on the banking sector. However, the development of technology has provided a new form of financing, i.e. so-called "P2P lending" which consists of a platform or marketplace in which lenders and borrowers are able to meet virtually. This development leads to the question of the role that P2P lending plays in terms of the funding of SMEs compared to traditional means of financing economic entities such as bank loans. The aim of the paper is to provide a description of the role of P2P lending with respect to the funding of SMEs in the Czech Republic. The method employed in order to assess the role of business financing consists of comparing P2P lending with traditional ways of financing businesses. The paper was written in cooperation with the Association of Small and Medium-Sized Enterprises and Crafts of the Czech Republic.

Keywords:
SMEs, lending, funding, loan, overdraft, P2P.

JEL classification:
D92, G23, G21.

1 Introduction

One of the main economic objectives of most countries with market economies consists of economic growth, represented by the growth of gross domestic product as an aggregate of production (Samuelson et al, 2010). Clearly GDP growth cannot be achieved without the existence of efficient companies that are able to satisfy market demand. Notwithstanding, a critical economic view has been proposed of societies that focus excessively on economic growth which suggests that a strong and ever-strengthening economy does not necessarily lead to people living a happier life (Reich, 2003). The following article, however, focuses principally on purely economic considerations.

The contemporary escalation of the fight for customers in the market is evident particularly in relation to the rapid development of technology accompanied by the accelerating trend towards globalisation. Unlike large firms, small and medium-sized enterprises are capable of rapidly reacting to changing business environments. It is therefore perhaps not surprising that such companies are increasingly becoming responsible for the introduction of innovative ideas (Kislingerová et al, 2005). In comparison with large companies, however, they are faced with a fundamental problem, i.e. the funding of planned projects.

Hence, the aim of this paper is to determine the role of P2P loans with respect to the external financing of SMEs in the Czech Republic. A method involving the comparison of P2P lending with traditional ways of financing businesses in the form of overdrafts and short- and medium-term business loans is employed in order to assess the role of business financing. This is then complemented with an analysis of the resulting data and the subsequent synthesis of the knowledge.

The issue of financing small and medium-sized enterprises (hereinafter referred to as SMEs) is not only a problem in the Czech Republic but also extends to the whole of the European Union, concerning which the topic most frequently discussed concerns the problem of financing businesses by means of personal loans as a result of the failure to obtain a business loan (Kneiding and Kritikos, 2011).

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The primary mission of the financial markets is to transfer financial sums from parties with surplus reserves to those in deficit, especially to those who can put such reserves to the most effective use (Rejnuš, 2014). In this respect banks emerged as the financial intermediary in market economies (Holman, 2009). Gradually, however, a trend has emerged in developed economies towards a decline in the share of banks in terms of the mediation of financial transactions and, conversely, an increase in that of non-bank financial intermediaries. For example, the share of banks in the mediation of financial transactions in the Czech Republic fell from around 90 % in 2000 to 80 % in 2010 (Revenda, 2012).

The usual forms of SME external financing such as bank loans have, thanks to the development of technology and the expansion of Web 2.0, been supplemented by the potential to take advantage of a new method of externally financing businesses in the form of Peer-to-Peer lending (sometimes referred to as P2P, people to people, etc.) (Emekter et al, 2014). P2P consists of a platform, *de facto* a marketplace through which lenders are able to meet virtually with borrowers. Borrowers are able to obtain loans directly from lenders and may, theoretically, pay lower rates of interest than they would on conventional loans. Conversely, one of the major problems with concern to P2P lending consists of an information asymmetry between the borrower and lender; the lender is unable to estimate the credibility of the borrower and vice versa. The danger of such asymmetric information is that it may result in both undesirable selection (Akerlof, 1970) and moral hazard (Stiglitz and Weiss, 1981).

As a result of the relative ease of obtaining a loan through P2P, this new type of financing can be taken advantage of not only by domestic households but also by micro-enterprises and SMEs.

In addition, the paper attempts to build upon the "Financial planning and requirements of the SB (small business) and SME segments" research study commissioned by the Association of Small and Medium-Sized Enterprises and Crafts of the Czech Republic with whose valuable cooperation this paper was written.

2   The situation of SMEs in the Czech Republic

Self-employment makes up one of the most important segments of every market economy. As a result of its autonomy and flexibility it is able to capture and satisfy individual demand which is often unattractive financially or content-wise, as well as unattainable in terms of production, for larger companies; indeed, these factors represent some of the most significant competitive advantages for such businesses. Moreover, in certain sectors, the products and services of such business entities compete with those of larger companies and thus contribute to the overall development of the market.

In the context of the intensification of the trend towards globalisation, which has led to an increase in the number of multinational corporations and chains, SMEs act against the strengthening of monopolistic tendencies. In addition, many SMEs cooperate with larger companies in the form of e.g. suppliers (Veber et al, 2012).

When properly set, the conditions for the operation of such businesses can create the ideal tool for satisfying market demand and thereby contribute to the growth of the economy as a whole. On the other hand, the market competitiveness of SMEs also has a large number of weaknesses, the most striking of which, compared to larger firms, consist of a smaller capital base and lower productivity which stem from the nature of their activities; indeed, these two weaknesses often lead to the failure of such enterprises.

The definition of SMEs employed within the European Union is set out in Annex 1 of regulation of the Commission (EU) no. 651/2014 of 17 June 2014. The basic criteria for assessing the size of businesses include the number of employees, the amount of annual turnover and the annual balance sheet total.

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Table 1. Definition of micro-enterprises and SMEs according to Regulation of the Commission (EU) no. 651/2014 of 17 June 2014

Company designation	Number of employees	Turnover / Annual balance sheet total
Micro-enterprise	up to 10 employees	up to EUR 2 million
Small enterprise	up to 50 employees	up to EUR 10 million
Medium enterprise	up to 250 employees	up to EUR 43 million

Source: Czech National Bank, time series database - ARAD

The share of micro-enterprises and SMEs of the total number of active business entities in the Czech Republic amounted to an impressive 99.84 % in 2014.

Table 2. Enterprises employing 0-249 persons as at 31.12.2014

Size of enterprise by number of employees	Legal persons	Physical persons	Total
0-249	246 861	877 519	1 124 380

Source: Czech Statistical Office

At the same time, according to the Ministry of Industry and Trade, the SME share of value added of the total for the Czech Republic in 2014 amounted to 53 %. The Czech Association of Small and Medium-Sized Enterprises and Crafts has been engaged in SME issues for many years and its knowledge and experience is used in this paper.

Innovation, investment in SMEs and their significance for the economy

As mentioned above, while SMEs often come up with innovative ideas, they frequently lack the financing to develop and implement them.

From the economic perspective, capital investment activities concern goods which are not intended for immediate consumption but, rather, are intended for use in the production of consumer or other capital goods (Adam and Arnold, 1989); the business investment concept is similar to that of economic investment, i.e. investment is seen as a one-time expenditure on resources that will provide financial income over the long term (Synek et al, 2011).

Innovation can be divided into product, process, marketing and organisational innovation. The analysis of data for the period 2012 - 2014 reveals that 36.2 % of small and 59.1 % of medium-sized enterprises and 77.2 % of companies with more than 250 employees invested in innovation. SME investment in 2014 amounted to CZK 396,406 million, which represented an increase of CZK 25,888 million on 2013, i.e. 6.99 % (Czech Statistical Office (CSO), 2016). Investment in innovation is essential for the successful functioning of any company especially today at which time innovative solutions, particularly in the field of IT, extend to most areas of business.

The output of small and medium-sized enterprises in 2014 amounted to CZK 4,381,517 million (Ministry of Industry and Trade, 2015a) which represented an increase on 2013 of 2.7 %; the share of SMEs of total output in the same year amounted to 49.38 %. It is clear therefore that SMEs make up an indispensable part of the Czech economy and that it is important to address those operational areas which risk leading to the destabilisation of such business entities.

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Table 3. Selected factors limiting the growth of enterprises in the period 2012 - 2015 (1 = not at all, 5 = to the greatest extent)

Period	Lack of funding	Secondary insolvency (cross default)	Prices of raw and other materials	Energy prices	High labour costs
2015	2.8	2.2	3.6	3.3	3.2
2014	2.8	2.2	3.6	3.4	3.1
2013	2.7	2.2	3.7	3.5	3
2012	2.6	2.2	3.5	3.6	3

Source: Czech National Bank, time series database - ARAD

Entrepreneurs themselves named a lack of financing as an exceptionally important factor limiting the growth of their businesses; it might be assumed therefore that easier access to temporary funding would at least partially remove those barriers preventing businesses from increasing their productivity.

3 Entrepreneurship financing

SMEs, as with large enterprises, require sufficient available funds in order to implement a wide range of business plans. Financing is needed for the bridging of short-term cash flow fluctuations, restocking, repairs and the funding of innovation as outlined above. However, for SMEs securing financing is often a difficult process, concerning which a number of reasons have been identified. SMEs are, generally, more "opaque" in terms of the provision of information than large companies and are, therefore, seen as a riskier proposition; furthermore, they cannot issue shares and so on in order to raise finance. Hence, they are even more dependent on the banking sector than large enterprises.

Long-term experience suggests that despite the availability of a wide range of business loans in the market, it is often impossible for SMEs and micro-entrepreneurs to succeed in obtaining such funding; the reason may well lie in the prospect of low profitability. Further, banks tend to reject requests from high-risk profiles, which is a legitimate stance with regard to enterprises which are unable to provide clear information on their business undertakings (see, *inter alia*, Stiglitz and Weiss, 1981). A further limiting factor consists of a lack of entrepreneurial history. Therefore, should entrepreneurs be unable to secure a business loan, they might take advantage of overdraft facilities or an innovative form of business financing known as P2P funding which is agreed via the virtual meeting of lenders and borrowers using a unique platform. These three types of external financing, i.e. P2P funding, overdraft facilities and business loans will be further discussed and analysed in detail later in the paper.

Further external financing options include loans from family members and friends; however, this type of funding cannot be aggregated. Moreover, only in a limited number of cases can such financing be taken advantage of repeatedly. Perhaps most importantly, when borrowing from the family it is essential that the merging of personal and business finances is not allowed simply to shift the various risks involved to the entrepreneur's private home environment (Kneiding and Kritikos, 2011).

The Action Plan for the Support of SMEs 2016, introduced by the Ministry of Industry and Trade, which aims to promote entrepreneurship in the Czech Republic has eased the problem of the funding of SMEs to a certain extent. One of the aims of the plan is, for example, the concluding of a contract between the Czech-Moravian Guarantee and Development Bank (ČMZRB) and the European Investment Fund for the granting of counter – guarantees allowing Czech entrepreneurs to take out loans totalling CZK 4.4 billion. Furthermore, as in previous years, efforts continue to boost funding for the support of SMEs from the state budget. Although efforts in this direction have been

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useful, the problem of the huge administrative burden for applicants, i.e. entrepreneurs, has still not been adequately addressed. Hence the low level of uptake of such financial assistance to date (Havlíček, 2016).

A further form of external financing should not be overlooked at this point, i.e. the direct involvement of private investors who, in return for their funding, often require a share in the management of the company. No reliable information is currently available on the extent of this type of financing in the Czech Republic. Furthermore, other companies may provide funding. However, these forms of financing fundamentally influence the management and character of companies and, therefore, are not discussed in detail in this paper.

3.1   Selected SME external financing options

Three approaches to the financing of SMEs will be further analysed below, i.e. business loans, overdraft facilities and P2P lending. However, attention will be devoted particularly to P2P lending since this represents the most recent development in terms of SME financing. The aim is to determine the role of P2P funding in the context of other more traditional means of SME financing. The reasons for selecting these three financial instruments lies in the fact that they have a number of basic characteristics in common, i.e. 1) a relatively short repayment period; 2) similar amounts of funding; 3) minimum intervention in the management of the company.

Short- and medium-term business loans

Bank loans make up one of the most important types of external capital (Staňková, 2007). Generally, such loans must be repaid in full, including the relevant interest, on a predetermined date. Repayment is in the form of regular instalments, the amount of which is determined in advance. Currently, the financial market offers a huge variety of such loans; however, for the sake of simplicity short-term loans are considered herein as having a repayment period of up to one year and medium-term loans up to four years.

Given that SMEs are perceived as presenting a greater risk than large firms, such entrepreneurs are subject to higher interest rates corresponding to the higher risk of default.

Lenders often accord a "score" to entrepreneurs when applying for funding which determines the applicant's ability to repay his/her obligations (Staňková, 2007). In the case of higher amounts, it is often necessary to provide collateral in the form of property, real estate, etc.

Figure 1, the development of client bank bad loans in the period 1/2004 - 1/2016, differentiates between non-financial companies and household sole-traders. The curves reveal a similar long-term pattern; however, the risk presented by household sole-traders is noticeably higher. Unfortunately, Czech National Bank statistics do not focus specifically on SMEs; however, such businesses are often run or owned by household sole-traders, hence such traders can be understood as SMEs.

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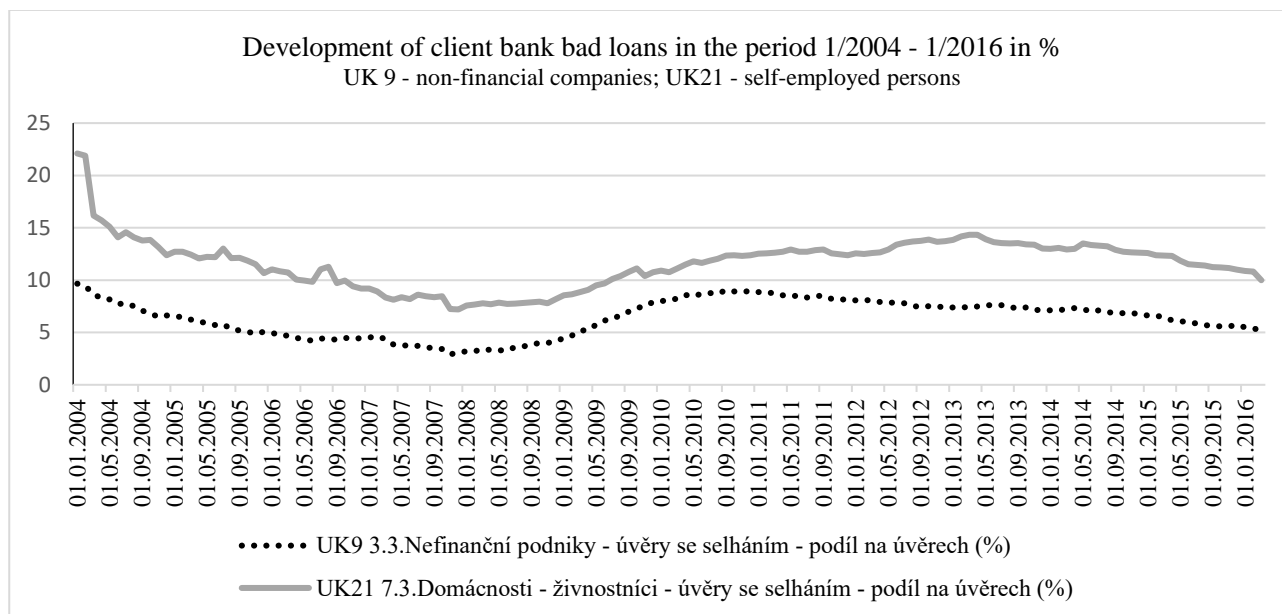
Figure 1. Development of client bank bad loans in the period 2004 - 2016 (Source: Czech National Bank, Time series database ARAD)

The above data reveals the significant risk associated with SMEs as well as the logic behind the setting of higher interest rates for such businesses and the requirement that banks be provided with the business history of the entrepreneur.

Furthermore, both the theory and the macroeconomic data are confirmed by publicly available data from selected banks (Sberbank, Raiffeisen bank and CSOB) which reveals that while banks currently offer relatively low annual interest rates (Sberbank from 4.44 %), this applies only to carefully selected cases; therefore, bank overdraft facilities are often used instead of short-term loans.

Overdraft facilities

An overdraft facility is a banking service that allows a withdrawal from a bank account even if the account does not contain sufficient funds to cover the withdrawal. In comparison to conventional business loans, overdrafts are more flexible and can be arranged relatively quickly. In some cases, the bank account automatically includes an overdraft facility. The disadvantage is that the amount of such loans are substantially lower than that of conventional loans.

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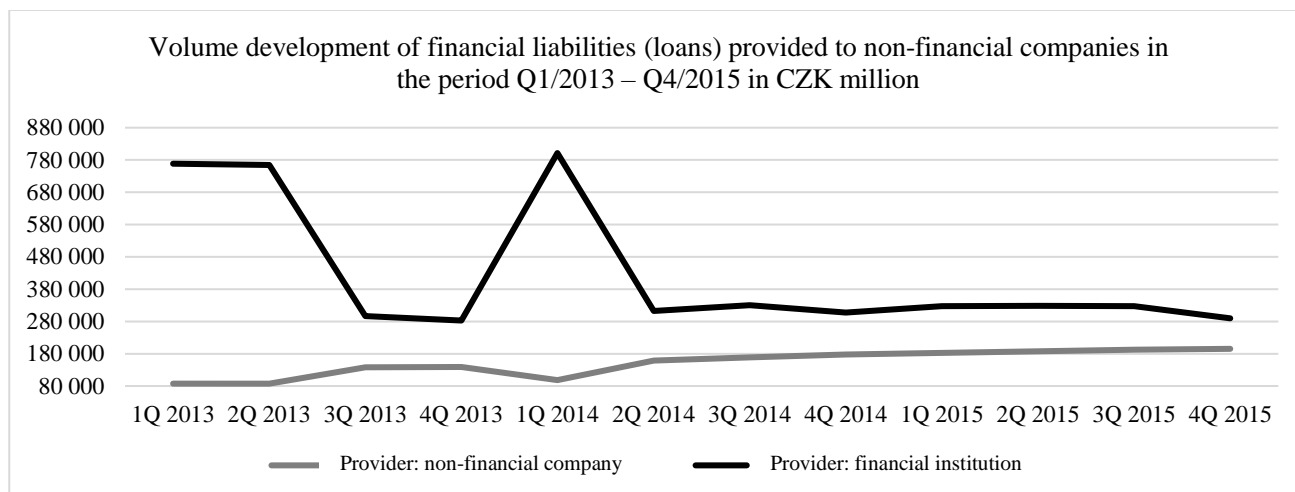
Figure 2. Volume development of financial liabilities (loans) provided to non-financial companies in the period Q1/2013 - Q4/2015 in CZK million. (Source: Czech National Bank, financial accounts statistics - data, financial statements including counterparties)

An overdraft can be paid off at any time, but not later than one year following withdrawal. Such short-term loans incur a rate of interest which is considerably higher than that charged on conventional loans; currently, overdraft interest rates vary between 10 and 20 % per annum.

The total volume of loans provided in the Czech Republic by financial institutions and non-financial companies to non-financial corporations in the period 2013 - 2015[1] is shown in Figure 2. Between Q3 2015 and Q4 2015 a decline is evident in terms of loans provided by financial institutions. Conversely, from Q1 2014 there was a constant increase in the volume of loans provided by non-financial companies to other non-financial corporations. Although it seems that there was a decrease in the volume of loans from financial institutions and, presumably, a decrease in demand for such loans, growth continued in terms of the volume of loans provided by non-financial corporations.

P2P lending

P2P lending is a relatively new way in which to obtain a loan directly from the lender. The intermediary consists of the P2P platform rather than a bank, which results in cost minimisation. P2P lending functions on the basis of an internet auction house through which financial resources are traded.

The concept of P2P lending originated in Great Britain (Zopa) in 2005, and in 2013 loans totalling $1.7 billion and $2.4 billion were arranged in this way in the UK and USA respectively. While these amounts are negligible in comparison with bank lending, the volume of P2P loans continues to increase rapidly. The history of P2P lending in the Czech Republic is much shorter, dating back to 2011 and the establishment of Bankerat. In the following sections, this paper will analyse Bankerat data only even though several P2P internet auction platforms are active in the Czech market, such as Finx, P2P finance CZ, and so on. The main reason lies in the degree of similarity and consistency of the operation of and rules governing the various platforms. Further reasons for choosing the Bankerat platform consist of its leading position in the Czech market, the relatively long period of time over which it has been active and user popularity.

As with other P2P portals, the Bankerat portal involves a "clash" between two groups of users – loan applicants, i.e. borrowers who choose the best loan offer(s) and the second group made up of

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[1] Developments are shown for the period 2013 – 2015 only due to changes to data tracking methodology which were introduced on 1 January 2013. The previous ESA 95 methodology varied considerably from the new ESA 2010 methodology and thus it is not possible to create a continuous time series over a longer period. Given the fact that P2P lending has featured in the Czech market only since 2011, the length of the time series can be considered sufficient.

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investors, i.e. lenders who are looking for a high return on their funds and provide offers to loan applicants. At the time a loan applicant receives an offer from a selected lender, Bankerat as the administrator checks the creditworthiness of the applicant. Following the approval of the loan by the provider, the funds are transferred to the borrower. Bankerat provides for the administration of the loan up to the time that the loan has been fully repaid (including repayment billing, the sending of reminders, contacting borrowers etc.). If the loan is administered by Bankerat, it is entitled to a commission from the lender for the administration of the loan in the amount of 1 % of the current outstanding balance for each year of the loan agreement (i.e. up to the time the loan is fully repaid).

This way of fundraising allows SMEs, which would not otherwise enjoy access to capital, to finance growth, to better manage working capital and to cope with any sudden financial emergency. On the other hand, P2P lending tends to demand higher interest rates than do traditional bank loans. Since a considerable proportion of loans are unsecured, logically lenders undertake a considerable risk. In the event that small businesses are unable to meet their repayments on time, lenders are often powerless to act.

The proportion of non-paid loans depends on the type of loan. The lowest proportion concerns so-called type N loans (loans secured with real estate assets), whereas the highest proportion concerns type D loans (loans granted without proof of income and without register proof), which is reflected in the annual interest rate, i.e. the lowest rate is charged on type N loans (averaging around 20 % p.a.) and the highest on type D loans (averaging around 65 % p.a.) (Bankerat, 2016).

The higher the risks, the higher the interest rate. In the period 13 May to 13 June 2016 the highest interest rate charged to entrepreneur loan applicants, according to the Bankerat portal, stood at 55 % per annum and the lowest at 9 % per annum. The lowest requested loan amounted to CZK 10,000 and the highest CZK 600,000. The reasons for loan applications vary from investing in marketing, the purchase of supplies and tangible assets, etc. In some cases, loan requests even concern the redemption of previous loans and debt foreclosure. Lenders are not only exposed to the risk of repayment delays or the unwillingness of borrowers to meet their repayments, but even to the risk of insolvency and the loss of their funds (Režňáková et al., 2010).

3.2 Other selected results from the "Financial planning and requirements of the SB and SME segments" research study

This research focused primarily on the attitude of SMEs to financial planning and management; however, related issues include, *inter alia*, the identification of the role of banks with respect to internal financial management and planning. Although the research study was not primarily concerned with P2P lending, thanks to the availability of data on the use of traditional forms of financing at a time when P2P lending had already become widely known, it is possible to deduce both the role and potential for P2P lending. Information obtained as a result of the research therefore fundamentally helped with respect to defining the role of banking institutions in the financing of SMEs. A total of 524 respondents provided responses via the CATI[2] research method in 2012.

Respondents consisted of representatives of individual companies and were divided into two categories:
- SB: Small Business; N = 200; fewer than 30 employees; all in the Czech Republic, representative distribution;
- SMEs: N = 300; 30 and more employees; all in the Czech Republic, representative distribution.[3]

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[2] CATI (Computer Assisted Telephone Interviewing) is an interviewing technique conducted through the use of telephone questioning.
[3] Complete information is available at http://www.amsp.cz/.

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The key information obtained from the research used in this paper concerns issues surrounding the previous drawing of loans and financial planning as an important part of obtaining a loan and the trust that banking institutions have in SBs and SMEs.

**Table 4.** Time horizon of the preparation of SB and SME financial plans

Over what time horizon do you prepare financial plans? Closed question, multiple answers possible. N = 524			
Long term: More than 1 year	Short term: 3 months to 1 year	Operative: 1 – 3 months	No financial plan
30 %	71 %	45 %	4 %

Table 5. Use of the services of a corporate bank advisor

Who do you consult concerning corporate finance? Semi-open question, multiple answers. ***Answer: corporate bank advisor***	
SB: 36 %	SME: 40 %

Table 6. Current and planned utilisation of bank loans

Utilisation of different types of bank loans		
Are you currently drawing upon an operational bank loan? Closed question, one possible answer. N = 524		
Yes	SB:38 %	SME:46 %
Do you intend to draw upon an operational bank loan in the near future? Closed question, one possible answer. N = 524		
Yes	SB: 17 %	SME: 22 %
Are you currently drawing upon an investment bank loan? Closed question, one possible answer. N = 524		
Yes	SB: 13 %	SME: 31 %
Do you intend to draw upon an investment bank loan in the near future? Closed question, one possible answer. N = 524		
Yes	SB: 10 %	SME: 16 %
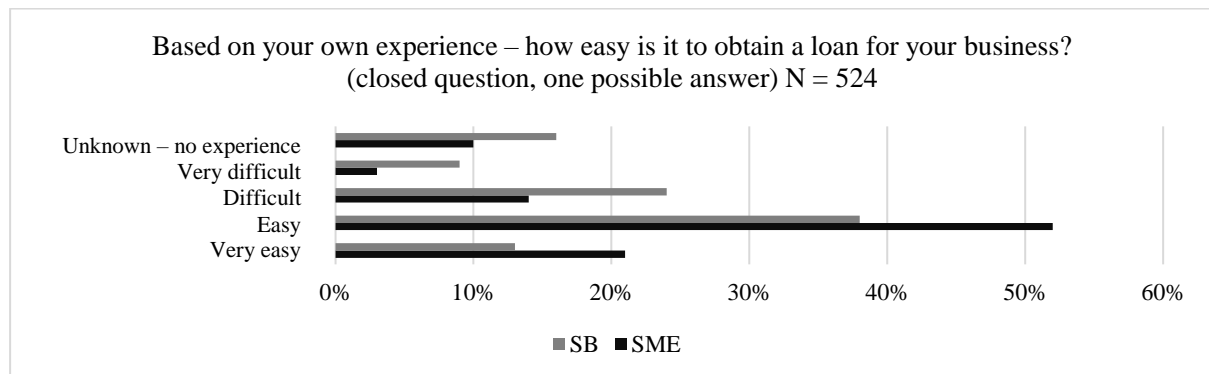
Figure 3. The complexity of obtaining a bank loan for SBs and SMEs

4   Determination of the role of P2P lending in the financing of SMEs in the Czech Republic

In comparison with traditional bank business loans, P2P lending undoubtedly has an advantage for SMEs in terms of their being able to secure a loan when all other possibilities have been exhausted. Financing through P2P lending does not require a lengthy applicant screening process with the very real risk of failure to obtain a loan or at least the full amount applied for and, moreover, P2P lending does not require that the loan application be supported by a business plan, etc. However, the savings made in terms of time and administration are compensated for by higher interest rates which may even exceed 71 % per annum (Bankerat). Compared to traditional loans, there is no obligation to guarantee a P2P loan with the applicant's property; however, again this seeming advantage is

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reflected in the high interest rates charged. In short, P2P lending can be summed up as offering the opportunity to obtain lower amounts of credit relatively quickly (maximum CZK 600,000). Naturally, higher amounts of credit can be obtained through classic bank loans, reaching into CZK millions.

The research revealed that obtaining a loan from a bank is difficult or very difficult for 17 % of SMEs and 33 % of small businesses.

While higher amounts of funding can be borrowed through the P2P lending system than via a bank overdraft, the latter has a number of advantages, i.e. the option to repay the balance of the loan at any time, immediate access to funding and repeated use.

P2P lending is therefore more attractive for those entrepreneurs who are unable to prove an entrepreneurial track record but who still require external financing to fulfil their business plans whatever the interest rates charged. Currently P2P fulfils a somewhat complementary role; it provides an interesting tool for small and medium-sized enterprises in addition to bank financing. It is aimed at would-be borrowers whose applications are rejected by banks, or as a tool for covering seasonal financial fluctuations. A certain proportion of Czech entrepreneurs have a negative attitude towards banks (Havlíček, 2015). A certain amount of scepticism may be due to the inherent conservatism of the Czech financial environment as well as the possible future regulation of new types of investment as a result of European Union concerns with respect to the financing of terrorism (Hampl, 2016).

The ratio of the volume of loans granted through P2P lending to that of the banking sector is so small that currently P2P lending presents no significant competition to the bank loan market. Moreover, the future of this new type of funding is uncertain, especially with respect to the consideration that technology may well fully take over the operation of transactional systems which involve the simple aggregation of supply and demand; however, it will never provide a substitute for the banking system. Other systems through which people lend money to each other have existed for centuries (Singer, 2016a). It is evident that not enough empirical evidence is available to accurately predict future development in this field (Kohout, 2016). However, it is clear that European and US banks will not always have enough cash reserves to ensure continued low interest rates (Kohout, 2016).

5   Resulting questions

P2P lending is a financing system based purely on the technology boom which has permeated not only the world of business, but also society in general and peoples' everyday lives. In this respect, it is necessary to take into account market developments in the context of the National Industry Initiative 4.0. (Ministry of Industry and Trade, 2015b) which discusses not only the issues of efficiency and productivity, but also education and security in a society based on the technology boom. As with any form of technological advancement, P2P lending carries certain risks especially for the lender through knowingly or unknowingly providing credit to those with existing debt or those in debt foreclosure. However, risk is not only associated with such extreme cases, one cannot ignore the risk of failure of an entrepreneur who does not have a well thought out business plan. The banking sector is, of course, also exposed to risk, however banks have developed relatively sophisticated systems of regulation designed to prevent lending to high risk clients. With P2P lending, the collapse of a business may potentially affect both the entrepreneur and his domestic environment as well as the lender. P2P lending therefore represents a clear transfer of risk from banks to private households. One could argue that neither the lender nor the borrower is obliged to agree to a P2P transaction; however, on the other hand, it is important that the low level of regulation of this type of financing not be overlooked, especially with respect to the asymmetrical character of the information exchanged between lender and borrower. In addition, the overestimation of the planned revenue of SMEs and the granting of a loan based on the overestimated turnover which, subsequently, the business is unable to repay may result in the destabilisation of the business and even bankruptcy, especially if one takes into account the outcomes of research which indicate that 31 % of the companies surveyed employed no CFO. Moreover, as mentioned above, 4 % of the companies surveyed stated that they had not even

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prepared financial plans. At the same time, however, 71 % of respondents declared that banks are able to understand the needs of their clients.

The theoretical background is confirmed by the collected data which points to the fact that small businesses have greater problems securing a bank loan than SMEs, which is not to say that the latter do not, in many cases, have the same problem. Hence, the question of the optimal instruments available for the financing of SMEs with concern to both the lender and the borrower remain open.

6   Conclusion

The main problem of SMEs across the whole of the European Union over the long term remains the significant problem of obtaining financing. As a result of recent technological advancements, new forms of financing have emerged in addition to traditional forms of bank lending one of which consists of P2P lending which provides a platform for the virtual meeting of lenders and borrowers and their mutual interaction without the need for an intermediary in the form of a bank. In comparison to securing bank loans, this form of financing appears to be more readily accessible for those SMEs which, for example, do not have a long business track record or, in some cases, even a business plan that can convince a banking institution of their future profitability. As far as banks are concerned, such applicants present an unacceptable risk, thus rendering the availability of such loans almost impossible, as revealed by the results of the research. The relative ease of obtaining credit through a P2P platform on the other hand is compensated for by high interest rates, often reaching as high as 55 % per annum. Moreover, one must not overlook the considerable risk undertaken by the lender as a result of the asymmetrical nature of the information exchanged.

Currently, P2P loans in the Czech Republic play a complementary role to that of bank loans with respect to the financing of SMEs, as illustrated by the fact that 46 % of the SMEs surveyed are working on operational loans. And, despite the administrative burden entailed in securing a bank loan, a considerable portion of SMEs and small businesses plan to finance their businesses by means of bank loans – 22 % of SMEs via operational loans. Clearly, therefore, banking institutions continue to represent important partners in terms of business funding. Further, 40 % of SMEs stated that they resort to a bank financial adviser should they need advice on the financial management of their businesses. Nevertheless, while the banking system continues to play an important role in terms of the financing of most businesses, there remains a need for alternative ways of funding. Entrepreneurs themselves consider a lack of funding as an exceptionally important factor limiting the further growth of their businesses. Easier access to securing interim funding would, at least partially, remove the barriers to greater productivity, which would be reflected in an increase in the country's overall GDP.

The main issues concerning the use of P2P lending remain the lack of a regulatory system or clear legal framework and the transfer of risk from banks to the lender and/or their households. It also remains difficult to predict the future development of P2P lending in terms of SME financing, primarily due to the present lack of empirical evidence. While technology may well serve as a transaction systems aggregating supply and demand, it will never fully replace the banking system. A further factor concerning the credit market in general consists of the question of just how long European and US banks will have enough cash assets so as to ensure continued low interest rates. Finally, therefore, the question remains open with respect to alternative and, at the same time, effective ways of financing small and medium-sized enterprises which will contribute towards eliminating one of the most significant barriers to business expansion.

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INNOVATION PERFORMANCE OF THE CZECH REPUBLIC AND INTERNATIONAL BENCHMARKING

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Abstract

The paper is focused on innovation flagship initiative. Based on the average innovation performance, the states fall into four different performance groups: innovation leaders, innovation followers, moderate innovators, modest innovators. Sweden has once more the best performing innovation system in the European Union (EU), followed by Denmark, Finland and Germany. The most innovative countries have balanced innovation systems with strengths in dimensions such as enablers, firm activities, outputs. The aim of the paper is to evaluate the innovation performance of the Czech Republic based on the Summary Innovation Index 2014 which contained 25 different indicators in total. The paper analyses the progress of the Czech Republic in the field of research, development and innovation and provides the comparison with other Member States of the EU. Innovation performance is closely connected with the regional innovation paradox concept. The objective of the paper is also to point out the innovation paradox in the EU.

Keywords

Innovation, Summary Innovation Index, Innovation performance, Benchmarking.

JEL classification

O31, O32.

1   Introduction

The innovation, R&D expenditures and the investment in technology are premises for ensuring competitiveness and progress, and through them a sustainable economic growth (Pece et al., 2015). Seven flagship initiatives will commit both the EU and the Member States: innovation union, youth on the move, a digital agenda for Europe, resource efficient Europe, an industrial policy for the globalization era, an agenda for new skills and jobs, European platform against poverty (European Commision, 2010).

The paper is focused on innovation flagship initiative. Innovation is closely connected with two sources of activities in the region (Wokoun, Malinovský, 2008, p. 129) with:

- results of research and development, which are realized in the form of technical innovations.
- business activity where innovation is realized (preferably those activities in manufacturing and services). Interconnection activities between the business activities and regions are particularly innovative ways at the beginning of important personal contacts. Geographic proximity factor plays a very important role.

Innovation performance is generally considered as a crucial component of long-term competitiveness of countries and regions. Innovation performance of regions is closely connected with the regional innovation paradox concept. Regional innovation paradox expresses a state when some regions with lower innovation performance and higher investment needs exist but at the same time these regions are not able to gain offered resources (Klímová, Žítek, 2015). The characteristics of regional innovation systems, namely, economic infrastructure, quality and structure of innovators and regional openness were analysed in the paper of Wang et al. (2016). The analysis of innovation performance helps to improve the innovation system and to identify regulation deficits in these countries (Horbach, 2016).

Innovation can be measured by using various frameworks dealing with technology, processes and marketing. Another way is to monitor spending on research and development as a percentage of GDP.

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Other framework - the Global Innovation Index (GII) is an annual ranking of countries by their capacity for innovation and success in innovation. However, according to Sohn et al. (2016) it does not consider potential structural relationships among factors affecting the innovation performance of a country. Kou et al. (2016) evaluated the innovation efficiency of countries in the multi-period and multi-division context, which presents and analytical technique and some systemic evidence for national innovation decisions in the long run. Frank et al. (2016) aimed to understand how innovation activities (innovation input) are related to and affect innovation results (innovation output).

The Innovation Union Scoreboard (IUS) provides a comprehensive evaluation of innovation, this attempt tries to capture the innovative capacity and efficiency, and it is primarily focused on evaluating the potential of innovations of individual EU countries. Innovation Union Scoreboard (IUS) includes individual indicators as well as a comprehensive indicator called Summary Innovation Index (SII). The number and structure of individual indicators evolves and changes with each edition of IUS. In the year 2005 the scoreboard included 5 innovation dimensions (Stimulators of innovation, Knowledge creation, Innovation and entrepreneurship, Use of industrial property), the dimensions had in total 26 indicators. In the year 2014 the IUS included 8 innovation dimensions (Human resources, Open, excellent research systems, Finance and support, Firm investments, Linkages and entrepreneurship, Intellectual assets, Innovations, Economic effects), the dimensions had in total 25 indicators.

2   Measurement framework

Innovation performance of countries based on IUS is measured using a composite indicator – the Summary Innovation Index – this index summarizes the performance of a range of different indicators. The Summary Innovation Index distinguishes between 3 main types of indicators (Enablers, Firm activities and Outputs). The measurement framework is presented in Figure 1. All the 3 main types of indicators are divided in innovation dimensions.
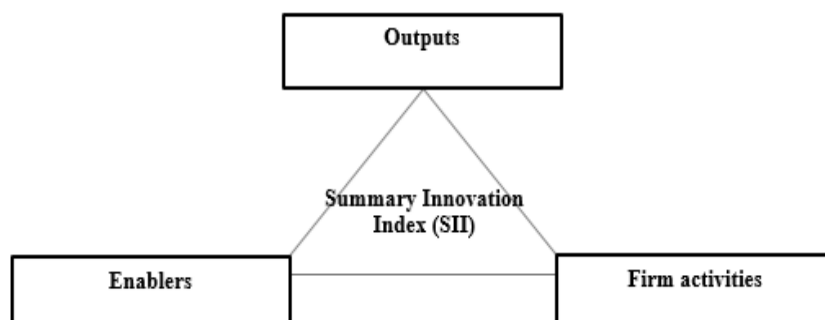
Fig. 1. Measurement framework (Source: own processing)

Enablers are the source of the innovation process of innovation performance external to the firm. The Enablers are divided in 3 basic dimensions: Human resources; Open, excellent research systems; Finance and support. The indicators of the dimension Human resources measure facilities of high-skilled and educated workforce of the country, the human resources are the basic assumption for successful innovation activities in business or public sector. The dimension Open, excellent research systems captures international competitiveness of the science. The dimension Finance and support contains indicators of financial support for research and innovation activities both form public funds and venture capital.

Firm activities are the innovation process source on the business level. The firm activities are divided into 3 basic dimensions: Firm investments; Linkages and entrepreneurship and Intellectual

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assets. The indicators within Firm investments capture the funds on the support of innovation processes of the businesses. The dimension Linkages and entrepreneurship captures indicators describing how many companies are doing innovation activities and the collaboration between innovating firms and research collaboration between the private and public sector. Intellectual assets captures the results of innovation process including patent applications, community trademarks and community designs.

Outputs capture the effects of firms´ innovation processes. The outputs differentiate between 2 dimensions: Innovators; Economic effects. Dimension Innovators includes 3 indicators measuring the share of firms that have introduced innovations onto the market or within their organisations, covering both technological and non-technological innovations and Employment in fast-growing firms of innovative sectors. Economic effects capture the real development in area of export quantity, employment and sales due to innovation activities and license and patent revenues from selling technologies abroad.

3 Innovation performance and trends

Based on the Summary Innovation Index the member states fall into four different performance groups (European Commision, 2015):

- Innovation leaders with innovation performance well above that of the EU average (Sweden, Denmark, Finland, Germany) – more than 20% above the EU average.
- Innovation followers with innovation performance above or close to that of the EU average (Netherlands, Luxembourg, UK, Ireland, Belgium, France, Austria, Slovenia) – less than 20% above or more than 90% of the EU average.
- Moderate innovators with innovation performance below that of the EU average (Estonia, Czech Republic, Cyprus, Italy, Portugal, Malta, Spain, Hungary, Greece, Slovakia, Croatia, Poland, Lithuania) – between 50% and 90% of the EU average.
- Modest innovators with innovation performance well below that of the EU average (Latvia, Bulgaria, Romania) – less than 50% of the EU average.

Table 1 shows the Summary Innovation Indexes of EU28 and the Czech Republic (CZ) and that the innovation performance has been increasing over most of the period with a decline only in the year 2012. The performance relative to that of the EU has been increasing between 2007 and 2011 to 80% and, after a decline in 2012, to almost 81% in 2014.

Table 1. Summary Innovation Index (SII) time series

	2007	2008	2009	2010	2011	2012	2013	2014	Growth rate
EU28	0.519	0.519	0.529	0.543	0.545	0.542	0.554	0.555	0.98%
CZ	0.373	0.382	0.387	0.425	0.436	0.421	0.438	0.447	2.61%

Source: European Commision, 2015, own processing.

Table 2 shows performance scores per dimension of EU28 and the Czech Republic (CZ). Relative strengths compared to the EU average are in Human resources, Innovators and linkages and entrepreneurship. Relative weaknesses are in Open, excellent and attractive research systems and Intellectual assets. In the first, there is a quite diverse pattern with below average performance for most cited scientific publications and Non-EU doctorate students and above average performance for International scientific copublications.

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Table 2. Performance scores per dimension

	Human resources	Research systems	Finance and support	Firm investment	Linkages and entrepreneurship	Intellectual assets	Innovators	Economic effects
EU28	0.598	0.542	0.556	0.454	0.473	0.624	0.505	0.601
CZ	0.595	0.258	0.420	0.410	0.425	0.409	0.490	0.515

Source: European Commision, 2015, own processing.

Performance has improved most in Linkages and entrepreneurship (7.9%) and Intellectual assets (6.2%). The fast growing indicators are License and patent revenues from abroad, Community trademarks and Population with completed tertiary education. A strong decline is observed in Venture capital investments (-30%).

The Czech Republic is a Moderate innovator according to Summary innovation index 2014. Relative performance of the Czech Republic was 0.490 based on the Summary innovation index 2014 and it was at 90% of the European level of the 28 Member States. According to the Summary innovation index, Czech Republic held 14th imaginary place from the Member States. Within the Moderate innovators 1 country (Estonia) had higher Summary Innovation Index 2014 than the Czech Republic. On the other hand, the Czech Republic reached higher index values than 2 states of prime European Fifteen (Spain and Greece), these 2 states don´t exhibit high innovation performance.

It is interesting to assess the Czech Republic in individual areas or indicators of the Summary Innovation Index. The Czech Republic ranked among the European elite within some indicators, but in most indicators the Czech Republic was below average of the European Union. A different pattern emerges when a comparison in performance is made across the eight innovation dimensions. The performance order for overall innovation performance is observed for the individual innovation dimensions of the Czech Republic. In this context it should be noted that it is namely the Summary Innovation Index for the year 2014, the data of the innovation dimensions are generally from the years 2010 - 2014.

In innovation dimension Human Resources the Czech Republic reached performance above average in Youth upper secondary level education 90.9%, it was 9.9 percentage points increase compared to the average performance of the European Union. The Czech Republic had the second highest value of this indicator after Croatia. Czech Republic reached such a high level of young people with secondary education also in previous years. Almost average values reached the Czech Republic in the indicator - New doctoral graduates. In the year 2014 the Czech Republic had 1.7 doctoral graduates per 1,000 population aged between 23 and 34 years, that was only about one-tenth less than the European average (1.8). Germany (2.7), Denmark (2.4), Croatia (2.3), Ireland (2.0) exhibited performance above EU average in New doctoral graduates. It is important to think about how to motivate students to continue and in particular successfully complete doctoral studies. It is necessary to create better conditions, including financial conditions, for doctoral graduates. It is important to know that the values of indicator - New doctoral graduates improved in recent years, the average growth rate exceeded 5% for the previous four years. The indicator (Percentage population aged 30-34 having completed tertiary education) exhibited values significantly below average in the year 2014. Only 26.7% population between 30-34 years completed tertiary education in the Czech Republic, while the EU average was 36.9% in the year 2014. Czech Republic reached the third worst position in this indicator, Italy reached 22.4 % and Croatia 25.9%. The current effort of the Ministry of Education, Youth and Sports of the Czech Republic to limit the number of students admitted to public universities could reverse this trend. On the other hand, it is necessary to take into account the quality of the teaching process and the fact of weaker boomers.

In innovation dimension Open, excellent research systems the Czech Republic reached performance above average in International scientific co-publications per million population. Number

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of scientific publications with at least one co-author based abroad (where abroad is non-EU for the EU28) was 598 scientific publications. Average performance of EU was 363 scientific publications in the year 2014. The Czech Republic had values significantly below average for the remaining two indicators in this innovative dimension. The share of Non-EU doctorate students as a % of all doctorate students was 4.4%, while in the European Union as a whole it was 25.5% in the year 2014. Czech Republic had no significant improvement in this indicator. The share of non-EU doctorate students has increased annually by 4.3% over the past four years in the Czech Republic. 5.6% scientific publications among the top-10% most cited publications worldwide had Czech Republic from total number of scientific publications, while European Union had 11% scientific publications among the top-10% most cited publications worldwide as % of total scientific publications. It is obvious that it is necessary to improve the quality of Czech scientific publications especially in terms of quality. The disadvantage may still be in large proportion of publications (papers) in the Czech language.

The innovation dimension Finance and support included 2 indicators. In the year 2014 the R&D expenditures in the public sector were 0.87% of GDP, in the European Union the expenditures were 0.72% of GDP. Countries which are included among the innovation leaders had the expenditures for making the transition to a knowledge-based economy as well as for improving production technologies and stimulating growth from 0.94% of GDP (Germany), 1.01 of GDP (Finland and Sweden) to 1.04% of GDP (Denmark). Significantly below the average was the indicator Venture capital (% of GDP) in the 2014. The amount of venture capital is a proxy for the relative dynamism of new business creation. In particular for enterprises using or developing new (risky) technologies venture capital is often the only available means of financing (expanding) business. The venture capital formed only 0.002% of GDP in the Czech Republic while in the European Union it was 0.062% of GDP. The average annual rate of venture capital has achieved a decline of 29.7% in the Czech Republic over the last four years. Venture capital has declined by 7.9% in the European Union. In the Czech Republic the venture capital formed only 0.002% of GDP, while in the European Union it was 0.062% of GDP. The average annual rate of reduction in the use of venture capital in the Czech Republic over the last four years for which data are available, have achieved a decline of 29.7% in the European Union declined by 7.9% for this indicator.

The innovation dimension Firm investments included 2 indicators. The indicator R&D expenditure in the business sector (% of GDP) reached values below average of the European Union in the year 2014. The indicator captures the formal creation of new knowledge within firms and in the Czech Republic the indicator was 1.03% of GDP, in the European Union it was 1.29% of GDP. In addition, the average annual growth rate was 4.8% in the Czech Republic over the last 4 years, while in the European Union it was 1.9%. The indicator Non-R&D innovation expenditures (% of turnover) achieved above average performance in the Czech Republic. The total turnover for all enterprises was 0.73% in the Czech Republic. The expenditure as percentage of total turnover of EU was 0.69%.

The innovation dimension Linkages and entrepreneurship included 3 indicators. Czech Republic reached essentially the average level of indicator Innovative SMEs collaborating with others (% of SMEs). In the year 2014, 27.3% of total number of SMEs had any co-operation agreements on innovation activities with other enterprises or institutions in the three years of the survey period in the Czech Republic. 28.7% of SMEs had any cooperation agreements in the European Union. Over the last three years (2011 - 2014), 11.6% of small and medium-sized enterprises in the Czech Republic cooperated on innovation with other competitive company in the Czech Republic, in the European Union it was 10.3% of small and medium-sized enterprises. However, the indicator Public-private co-publications per million population was below average in the Czech Republic. Public-private research linkages and active collaboration activities between business sector researchers and public sector researchers resulting in academic publications had the level 25.1 publications per million population in the Czech Republic while the European Union had 50.3 scientific publications per

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million population in the year 2014. This indicator may indicate the fact that the results of research and development of the Czech Republic are not implemented in the private sector at a sufficient level.

Four indicators were involved in the innovation dimension Intellectual Assets. Within 3 indicators of this dimension the Czech Republic showed values below-average. Very unfavorable values obtained the indicator PCT patent applications per billion GDP (in PPS€). The number of patent applications per billion GDP (in purchasing power standard in euros) at the European Patent Office was 0.79 applications in the 2014, while in the European Union it was 3.78 applications. The highest number of applications had Finland (9.37 applications) and Sweden (9.16 applications). The level of PCT patent applications in societal challenges per billion GDP (in PPS€) was even slightly worse in the Czech Republic. The indicator measures PCT applications in health technology and environment-related technologies and is relevant as increased numbers of patent applications in health technology and environment-related technologies. The number of patent applications in societal challenges was 0.2 while the European Union level was 0.98. The number of patent applications grows slightly, in the societal challenges it decreases. Community trademarks per billion GDP (in PPS€) and community designs per billion GDP (in PPS€) were slightly above average of the European Union in the Czech Republic. The number of applications for Community trademarks per billion GDP was 1.14 submitted applications in the Czech Republic, while the European Union had 1.13 submitted applications in the year 2014. The Czech Republic had significantly better results in the area of patents, industrial designs and trademarks. The average annual growth rate amounted to 15.5% in community marks and 10% in patterns over the last four years.

Innovation dimension Innovators included three indicators in the Summary Innovation Index for the 2014, namely SMEs introducing product or process innovations (% of SMEs), SMEs introducing marketing or organizational innovations (% of SMEs) and Employment in fast-growing enterprises in innovative sectors (% of total employment). 30.9% of SMEs introduced a new product or new process from total number of SMEs, the European Union average was 30.6% from the total number of SMEs. Similarly, 30.2% of total number of SMEs in the Czech Republic introduced a new marketing innovation or organizational innovation to one of their markets, the level of European Union was 36.2% in the year 2014. These two indicators showed negative growth both the Czech Republic and the European Union. Employment in fast-growing enterprises in innovative sector (% of total employment) amounted 18.7% of total employment in the Czech Republic and 17.9% of total employment in the Czech Republic. This indicator provides an indication of the dynamism of fast-growing firms in innovative sector as compared to all fast-growing business activities.

The final innovation dimension Economic Effects contained 5 indicators. In the year 2014, the indicator Employment in knowledge-intensive activities (% of total employment) indicated 12.9% in the Czech Republic. Knowledge-intensive activities provide services directly to consumers, such as telecommunications, and provide inputs to the innovative activities of other firms in all sectors of the economy. The European Union reached higher share, 13.8% of total employment. The indicator Export of medium and high-technology products as a share of total product exports reached above average performance in the Czech Republic. Total value of medium and high-tech exports was 62.5% in the Czech Republic, 53% of total product exports was in the European Union. This indicator reached the fourth highest value in the Czech Republic after Hungary (66.3%), Slovak (63.3%) and Germany (65.9%). This indicator was heavily influenced by exports of the automotive industry. On the other hand the indicator Knowledge-intensive services exports as % of total services exports the Czech Republic reached results below average. 35.2% of total services exports measured the Czech Republic, 49.5% measured the European Union. Above average results reached the Czech Republic in Sales of new-to-market and new-to-firm innovations 13.4% as % of turnover in the year 2014. The European Union reached 12.4%. Highly below average results reached the Czech Republic at the final indicator License and patent revenues from abroad as % of GDP in the year 2014. Trade in technology comprises four main categories: Transfer of techniques (through patents and licenses, disclosure of know-how), transfer (sale, licensing, franchising) of designs, trademarks and patterns,

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services with a technical content, including technical and engineering studies, as well as technical assistance, and industrial R&D. License and patent revenues capture disembodied technology exports. The Czech Republic reached 0.13% of GDP in the indicator, while the European Union 0.65% of GDP. Such a low proportion of foreign revenue from licenses and patents to GDP is obviously linked to the very low number of patent applications.

4   Conclusion

The European Union and the Czech Republic are aware of the importance of research, development and innovation for the future competitiveness of their economies. Research, development and innovation are key initiatives of the European long-term strategy Europe 2020. The Czech Republic has elaborated the issue of development, research and innovation in its National Innovation Strategy (Pavelka, 2013, p. 12). Europe 2020 Strategy sets out a vision of EU´s economy based on smart growth (by developing an economy based on knowledge and innovation), sustainable growth (by promoting a more resource efficient, green and more competitive economy) and inclusive growth (by fostering a high-employment economy delivering social and territorial cohesion) (Minarčíková, 2015, p. 26).

Innovation Union Scoreboard for the EU at large innovation performance has been stalling in the last year. The impact of the economic crisis has become visible for several Member Stats which showed a decreasing innovation performance compared to last year. As each year, there are several upward and downward movements inside each of the performance groups (European Commision, 2015, p. 4). Some of the most innovative regions in Europe, despite being highly innovative, grow at a slower pace than their national counterparts, as well as presenting poor economic outcomes such as low income per capita and high unemployment rates (Fragkandreas, 2013). The Czech Republic is classified within third performance group "Moderate innovators" based on the average innovation performance index. The Czech Republic lagged in many areas not only behind "Innovation leaders" but also behind the European Union average. Significantly below average results reached the Czech Republic in the field of intellectual property. The Czech Republic is unable to convert R & D results in patents administered by the European Patent Office. The Czech Republic should pay attention to funding of research, development and innovation. It is also necessary to improve the conditions for research and development in schools, to improve the motivation system for research and development and to strengthen international cooperation. The Czech Republic is a small open economy, whose production resources are limited, and therefore development of human resources, science and research development and innovation development are essential areas for future economic development (Pavelka, 2013, p. 13).

Based on the SII analysis, it is possible to point out the innovation paradox in the 8 dimensions within the European Union in general. Differences within performance scores per 8 dimensions between Member States are smallest within the Innovation leaders and largest within the Modest innovators, confirming that to achieve a high level of performance, countries need a balanced innovation system performing well across all dimensions. Sweden, Denmark, Germany and Finland (Innovation leaders) are mostly on top and clearly above the EU average within innovation performance. Only in the Open, excellent and attractive research system Germany performs slightly below the EU average, in the Economic effects dimension Finland and Sweden perform below the EU average. Slovenia is the fastest growing Innovation follower. In the group of Moderate innovators Czech Republic and Malta have improved the most the innovation performance. The highest innovation progress is recorded in Latvia and Bulgaria among the Modest innovators.

Most Innovation followers perform above the EU average in the Human resources dimension. Most Moderate innovators perform below the EU average in the Human resources dimension. 15 EU Member States perform above the EU average and 13 EU Member States perform below the EU average in the Human resources dimension. The Czech Republic performs below the EU average in the Human resources dimension.

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All the Modest and Moderate innovators perform below the EU average in Open, excellent and attractive research system dimension. 10 EU Member States perform above the EU average and 18 EU Member States perform below the EU average in the Open, excellent and attractive research system dimension. The Czech Republic performs below the EU average in this dimension.

Almost all Modest and Moderate innovators perform below the EU average in the Finance and support dimension. 11 EU Member States perform above the EU average and 17 EU Member States perform below the EU average. The Czech Republic performs below the EU average in the Finance and support dimension.

All the Modest and Moderate innovators perform below the EU average in the Firm investment dimension. 8 EU Member States perform above the EU average and 20 EU Member States perform below the EU average in this dimension. The Czech Republic performs below the EU average in the Firm investment dimension.

All Innovation leaders and followers perform above the EU average in the Linkages & Entrepreneurship dimension. All Modest and most of the Moderate innovators perform below the EU average in the Linkages & Entrepreneurship dimension. 15 EU Member States perform below the EU average and 13 EU Member States perform above the EU average in this dimension. The Czech Republic performs below the EU average in the Linkages & Entrepreneurship dimension.

Half of the Innovation followers perform below average, as do all the Modest and Moderate innovators in the Intellectual assets dimension. 20 EU Member States perform below the EU average and 8 EU Member States perform above the EU average in this dimension. The Czech Republic performs below the EU average.

All Innovation leaders perform above the EU average in the Innovators dimension. All Innovation followers except Slovenia perform above the EU average in the dimension. 14 EU Member States perform above the EU average and 14 EU Member States perform below the EU average in the Innovations. The Czech Republic performs below the EU average.

All the Modest and Moderate innovators perform below the average in the Economics effects dimension. 22 EU Member States perform below the EU average and 6 EU Member States above the EU average. The Czech Republic performs below the EU average in the Economics effects.

Relative weaknesses for EU are in Firm investments, Intellectual assets and Economics effects. Relative strengths for the EU are in Human resources dimension. Some differences in dimensions are natural, even desirable, and can have an incentive effect. Too big differences are not perceived positively. EU policy should be focused on reducing disparities. It is needed to improve the skills needed to participate in a further develop the knowledge-based economy. The research systems of all EU countries should be geared towards meeting the demand from companies. Moderate and Modest innovators will need to intensify their efforts increasing the output of their research systems if they want to close the performance gap with the Innovation leaders and followers. In order to solve the innovation paradox it have to be formed cooperation between the public and private sector within the EU countries, it is needed to form the links between universities and businesses within the EU countries and to form business networks and clusters within the EU countries. In order to solve the innovation paradox, the EU would also try to build complex innovation system for Member States which will be able to solve the problems of Member States, one problem of innovation paradox can be connected with lower innovation performance and higher investment needs, other problem can be connected with the possibility to gain the offered innovation resources provided by the EU.

5   Acknowledgement

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CURRENCY – A RELIC OF THE PAST OR LIVE ECONOMY CATEGORY?

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Abstract
Theoretical economists, politicians and other representatives of general public are presenting the views to currency. They express the idea that the currency as an economic category slowly but surely expires and will be in undetermined timeframe replaced by other forms of money. This assertion is repeat with the same regularity, with which is refuted by other economists. This article aim is to describe trends in currency in the Euro area over the last fifteen to twenty years, compare those trends with the development in Sweden and try to answer the question whether the currency as an economic category is actually on the decline. Summary of examples of aforementioned discussions is a first part of this speech. Next part of article is devoted to contemporary reality – views to a statistics of ECB and evaluation of development of currency in Euro area and in Sweden which is an example of country, which declare preparation to moving to cashless society. An integral part of the contribution is attempted to forecast the evolution of currency in the EU in the coming years.

Keywords
Currency, payments, banknotes, coins, payment card

JEL classification
E 58, G 12

1 Introduction

Currency, currency in circulation, cash, hard cash indicates for centuries the economic category, which is becoming the subject of discussion of experts from the staff of central banks, other banking institutions, theorists employed in scientific institutes and universities, as well as politicians and other representatives of the general public. These discussions are mostly based on expert knowledge of the issues and lead to decisions on the future direction of the development of cash circulation in individual countries, or (as in the case for the euro area) in the whole monetary area. But often they have the character rather populist speeches of their author, who wants to get attention to their views.

This article aim is to describe trends in currency in the Euro area over the last fifteen to twenty years (longer period for the comparison of data before and after the introduction of euro cash, shorter with respect to the availability of certain statistical data), compare those trends with the development in Sweden (which is said to be heading towards the abolition of cash) and try to answer the question whether the currency as an economic category is actually on the decline.

In the first part of this speech currency will be defined as an economic category and short summary of some published opinions on the evolution of currency as a separate category and economic factor that can affect its size will be carried out. In the following text will be published examples of these two streams of opinion. The following chapters will summarize the development of currency in the countries included in the euro area before and after they started using euro in its cash form. Following the earlier essay, the author will try to predict the currency development in the next five years. A brief evaluation and mutual comparison of the cash in Sweden, which is often described as a country that aims to eliminate using of the cash will be provide in the final part of the article

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[1] All opinions and conclusions published in this paper are the author's personal conclusions and are not the official opinions of the Czech National Bank.

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2   Theoretical approach to currency

Economic theory generally defines money as an asset, which is widely accepted and recognized by economic entities sheet when paying for goods and services or pay other obligations (Jílek, 2004). Generally moment is important in this theoretical definition of money - the asset must be generally accepted in the long term and by all actors in society as a general equivalent for exchange values. It is important to their credibility and for the existence of money according to the above definition, which ensures their sustainable use by all stakeholders, and closely linked to the continuity of the purchasing power of money

The definition of money as universally recognized assets implies a functional definition. This involves defining the three basic functions that money performs: medium of exchange, accounting unit and store of value (Revenda 2001).

Function of the medium of exchange is to distinguish money from other financial assets or material possessions decisive. The willingness of the individual entities sheet in the economy that accept money consistently used as a medium of exchange is based on currently the certainty that and this money will again be allowed whenever and wherever required to purchase goods or services. Formally, the general habit of receiving money as money backed legislation and legal means of payment.

Money as a unit of account or accounts indicates the individual price of goods and services in the economy. Their use reduces transaction costs and limiting the number of prices that would be necessary for the expression of the value of goods and services in an economy in which would be there no universally recognized equivalent - money.

Subjects in the economy - households and companies - generally do not use cash pension their once when you receive, but postpones use the according to its delay their consumption. At this point, they use of the ability to act as a store money values. The ability of money to perform this function again depends on their credibility - if confidence in money in an economy shaken (egg. in times of financial crises, or when, due to high inflation or hyperinflation are losing their purchasing power) can function wholly partially or lost.

3   Overview of some published opinions on the future development of cash

On the Internet recently appeared view of the German economist Peter Bofinger (Bofinger, 2015), which can be described as follows: "Cancel the coins and notes, are only good for the mafia." The other argument states that cash is an anachronism that in the modern world has no place. As a supporting argument use the fact that most European states introduced restrictions on cash payments to a certain amount. At the same time also referred to the fact that the third printed banknotes has denomination 500 euros, which are banknotes, which no one pays - they are only used for money laundering. Former President Vaclav Klaus in December 2015 during a performance at the University of Economics in Prague said that European Union countries will want to phase out banknotes and coins, leading to a restriction of our freedom. According to him, states will start with a liquidation of large bills. With contests this view for example Lukas Kovanda from the company Roklen think that in response to this view is that the Czech economy will not happen cashless even in 2100.

A study was published in 2008 (Cimburek, Řežábek, 2008), which disputed the assertion of Economist (2007), that the cash after the millennium functioning as one of the most flexible and most enduring of payment technologies will probably completely vanish over the next fifteen years (i.e. until 2022) and succumbs to a new era of electronic money or use of other virtual forms of payment. In the study, among other things, qualitative factors affecting use of cash on side of demand were defined (availability, universal acceptance and security adoption, user-friendliness, efficiency, anonymity, control and monitoring, low costs associated with the use of cash and the ability to maintain the value) and on the supply side (security, crisis management solutions in the absence of

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infrastructure). Truthfulness of the claim of the authors of the study had since been confirmed among others during the financial crisis in 2008 - compare Cimburek, Řežábek (2013) or Skaunic (2010).

The ECB published in 2011 the results of two surveys that were conducted in selected EU countries in 2008 and 2009. Surveys show that in euro area in 2008, the cash was an important means of payment, and the value of cash transactions was still 1.5 and 2 times the value of electronic payments at points of sale. Cash seems to be the most preferred means of payment for transactions below EUR 100, but a considerable number of people (20% of respondents in the countries surveyed) pay usually with cash even for amounts up to EUR 1,000. Both the direct results of the survey and the indirect method of estimating the value of cash used as a store of value suggest that the amount of cash stored in the euro area is significant, compared with the total value of banknotes in circulation.

It is possible to find a number of interesting views on the subject of cash compensation by other payment instruments (mainly payment cards) in recent years. Very often in them resounds the view that it is impossible to tell people what means of payment to use. Amount of cash in circulation in Euro area is increasing every year. Under the representative studies of Bundesbank just less than 80 % of purchases are paid for in cash. In terms of value, however, only slightly more than 50 % of purchases are paid for using cash (Bundesbank, 2015).

An interesting look at the process of compensation payment cash by payment cards presented research executed by De Nederlandsche Bank NV (DNB - Dutch central bank). The starting point for the research was the finding that despite the efforts that commercial banks have made to promote the use of debit cards and the introduction of new payment methods, the migration from cash to electronic payment methods is not proceeding as quickly as sometimes expected. DNB has therefore been investigating the psychological aspects of payment method choice. The research had three components: a literature study, a virtual-reality study and a neuroscientific study. Rationally thinking banker may be a little surprised by the conclusion of the research. Paying in cash or by card is not the outcome of a conscious choice, but is largely habitual and therefore difficult to influence, because people usually act before they know why (van der Horst, Matthijsten, 2013).

The results of harmonizing payment diary surveys from seven countries (Canada, Australia, Austria, France, Germany, Netherlands and the United States) were published in 2014 by Bank of Canada. Surveys were conducted during three years (2009 – 2012) in individual states. The paper shows that in all seven countries considered, cash was still used extensively – particularly for low-value transactions. The paper signals the importance of cross-country differences. First, the level of cash usage differs across the various countries. Second, differences can be found in the type of alternatives used of cash (Bagnall, et al., 2014))

Vice-Governor of Sveriges Riksbank, Lars Nyberg had its performance in January 2010 in the Nordic Card Markets, entitled "It's time to replace the cash payment cards?". It is possible to use some interesting data from his performance. He noted that the Swedes are using payment cards over time more and more intensively. But - another indication that it is possible appearance of Vice Governor Nyberg citing is the fact that payments for low value cash are preferred, while for cards is the opposite. Payments to 100 SEK in 2009 were paid 63% in cash, payments between 100 SEK and 500 SEK it was 22% and for payments of 500 SEK, it was only 12% of cases. In 2006, another survey found that customers prefer payment by credit card if the value is at the least 123 SEK. The willingness to pay by credit card the customer declines with age. People over 65 prefer cash payments even for amounts in excess of 500 SEK (Nyberg, 2010).

4   Currency in Europe in 21st century

4.1   Development of currency in circulation in euro area.

The developments of currency in circulation in the euro area in 1995 - 2015 will be evaluated in the next part of the article. Basic data on the development of currency gives the graph in Fig. 1. There are shown curves of the currency, GDP and monetary aggregate M1 from 1995 to 2015. From course

of curves is apparent steady increase in all evaluated parameters. The growth rate of currency in circulation is yet lower than the growth rate of M1, which suggests faster growth of non-cash forms of payment than cash the growth of. At the same time it is clear that the steady increase in currency in circulation is not indicative of reducing its needs.
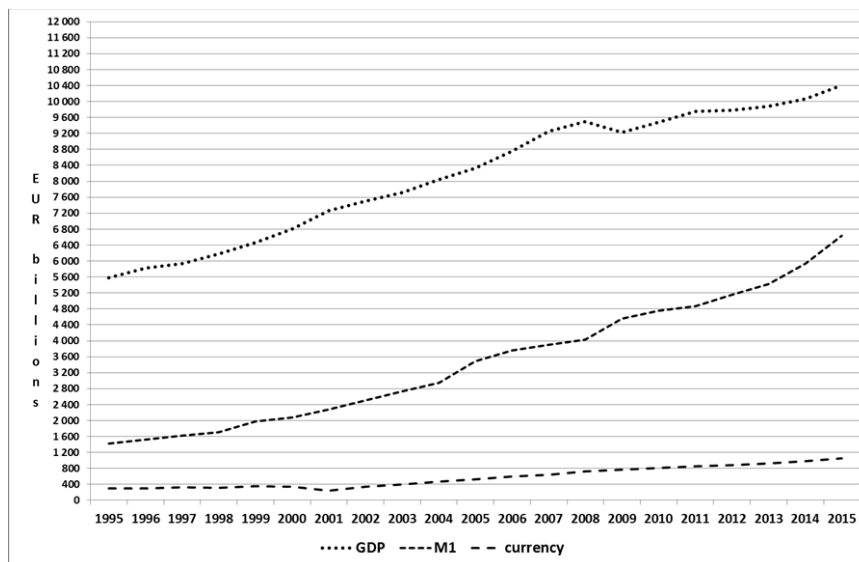
Fig. 1. Development of currency, GDP and M1 in euro area (Source: ECB 2016 b, c, d)
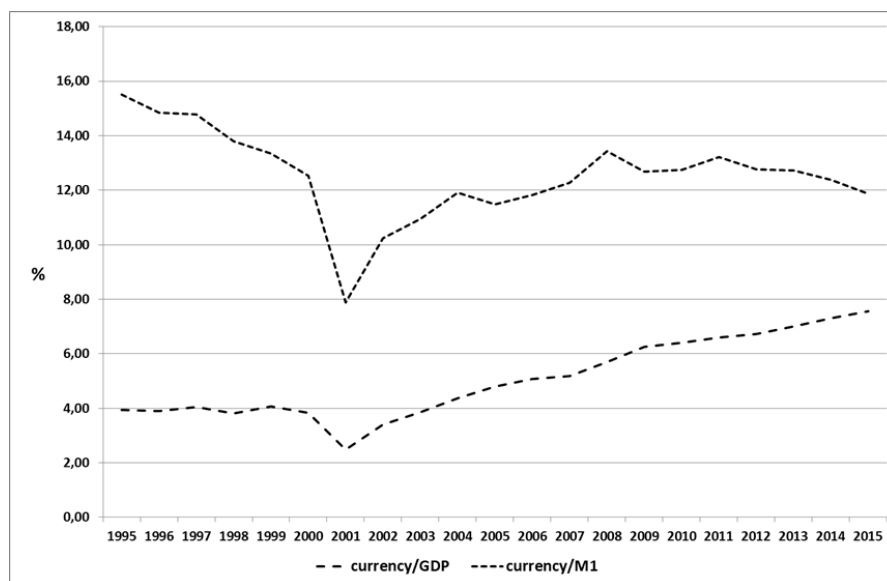
Fig. 2. Ratio between the amount of currency and the amount of GDP, M1 %. (Source : ECB 2016 b, c, d)

Figure 2 shows the evolution of the ratio between the amount of currency and the amount of GDP, respectively M1. From the chart it is possible to deduce two conclusions. On the one hand increase the share of currency to GDP suggests the constant growth of currency as forms of payment. On the other hand, decrease in the ratio of currency to the M1 supports the idea of a faster growth of cashless payment instruments

The following three pictures speak about the structure of currency in the euro area since its establishment in 2002. The first two (Fig. 3 and 4) indicate the development of a structure according to the individual currency denominations in value statement. The first of them (Fig. 3) are presented banknotes, whose share in the total volume of currency is relatively small and since 2002 has not

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changed. First three are notes with the lowest value - 5, 10 and 20 EUR - their share of the value is consistently lower. Next one with a relatively low share is EUR 200. This fact may be somewhat surprising given its high nominal value, but fact is that this bill is too small to be used as a store of value, and with respect to the price level is too high on regular payment.
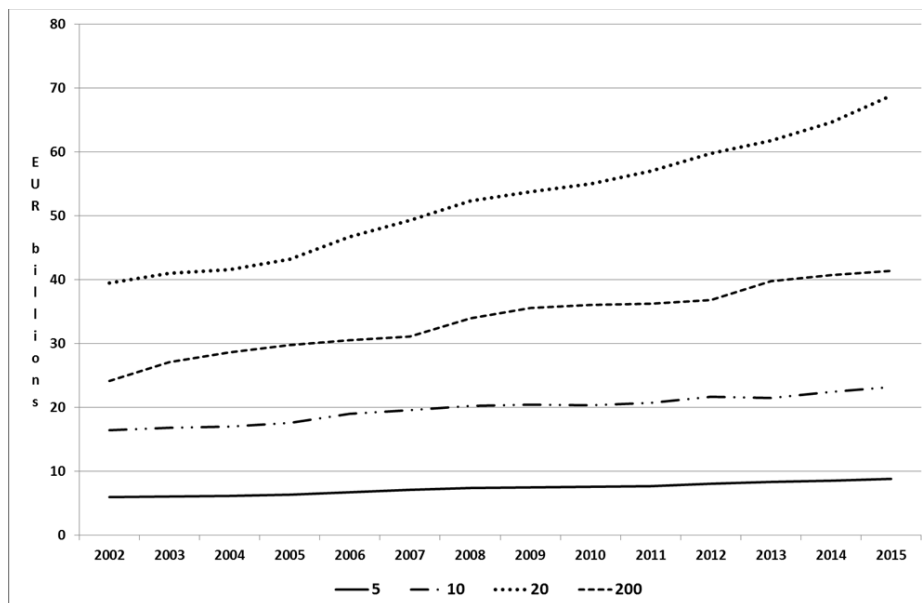
Fig. 3. Value of banknotes EUR 5, 10, 20 and 200 in circulation (Source: ECB 2016 d)
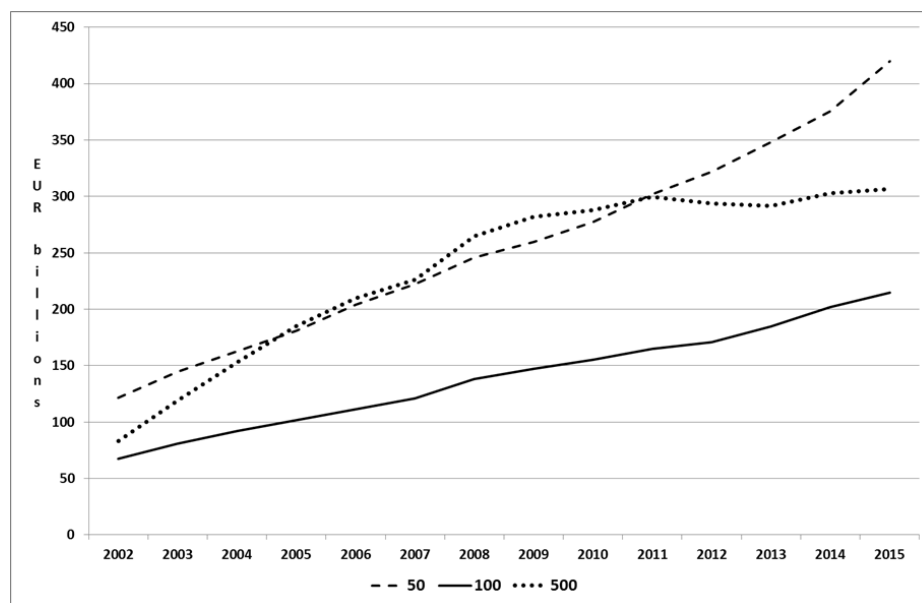
Fig. 4. Value of banknotes EUR 50,100 and 500 in circulation (Source: ECB 2016 d)

Figure 4 shows the development of value of banknotes of the denomination 50, 100 and 500 euros. The first two denominations are frequently used for everyday payments and especially nominal EUR 50 is also frequently used in ATMs. Banknote of EUR 500 is typically used as a store of value. Unfortunately, it is also true that for its high value it can be successfully used as well as in the gray economy - hence the ECB held discussions about whether it will be limited to the issuance, respectively whether it will ever be used in the future.

Figure 5 shows the development of currency in the European Union from the perspective of another criterion - the amount of banknotes in circulation broken down by denominations of

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banknotes. If we look at the amount of notes, we see that the most frequent one is really a nominal 50 EUR, as was shown in figure 4. The second most common banknote denomination is 20 EUR, the fastest growth since 2002 can be observed with 100 EUR notes. Banknotes in circulation shows one fact - in circulation most likely dominate two banknotes, which are used most frequently at ATMs - EUR 20 and EUR 50, for payments on the (unofficial) upper limit for cash payments is most frequently used banknote with denomination 100 EUR.
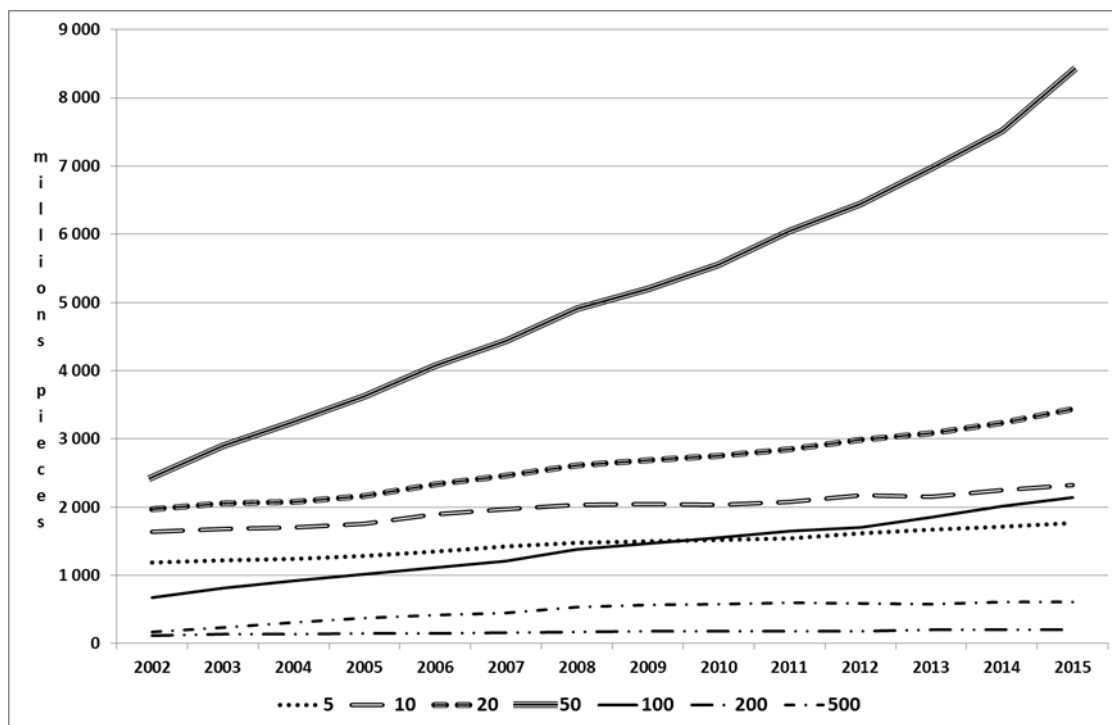
Fig. 5. Number of EUR banknotes in circulation (Source: ECB 2016 d)

It is possible to draw an interim conclusion from the data included in this chapter - currency in euro area countries is growing. Throughout the existence of the euro cash did not occur less than one year, which would be reflected in its tendency to decline. One of the reasons for this, which have not yet been mentioned in the article, is using of the euro as a globally reserve currency. According to internal sources of the ECB (ECB, 2016a) around to around quarter one-third of euro banknotes (values) are held outside the euro area, predominantly in neighboring countries. This phenomenon, which partly related to the so-called euroisation or dollarization of economies, is well known to experts of FED. They estimate that between 55 percent and 70 percent of the U.S. currency stock was currently held outside the country (Porter, Judson, 1996).

4.2 Prediction of development of currency in circulation in the euro area by 2020

The content of this subchapter is estimated development of currency in the euro area by 2020 - following the earlier work of the author (Skaunic, 2007). Assumption that the share of currency to GDP will grow slightly (as it was in the past years) and that the share of currency for M1 will stagnate was used when the predicted curves showed on a figure 6 of this decade was calculated. From the calculated values, the average value was used. Figure includes estimation from author´s work from 2007.

Developments of currency between 2007 and 2010 did not confirm the former author's assumptions - the real development was much faster. Even with this in mind (and with regard to the

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experience of the development during following years) indicate that forecast in Fig. 6 can be considered as real.
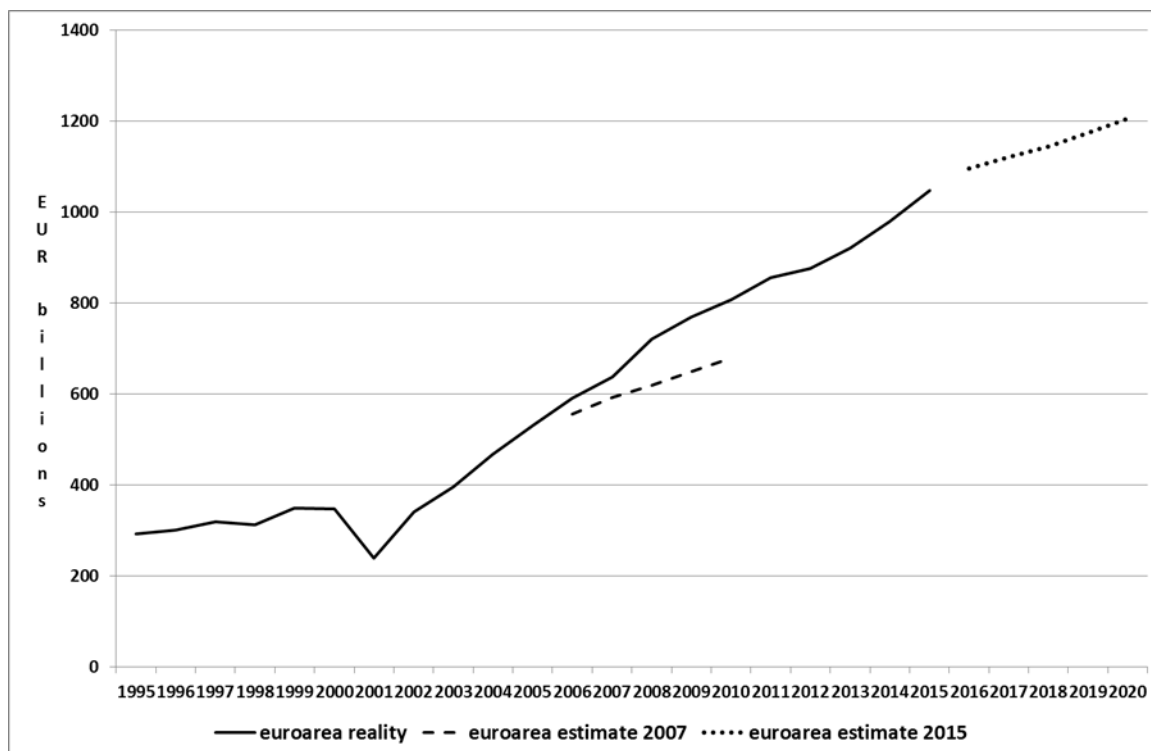
Fig. 6. Prediction of development of currency in the euro area by 2020 (Source Skaunic 2007, ECB 2016 d,author's own calculation)

4.3   Sweden - a country that is going to abolish the cash?

The following two tables are both evidence for the claim that Sweden is heading towards a society that does not need cash, on the other hand, at the same time reject this claim. As already author wrote in one of his earlier works (Skaunic, 2015), cash in Sweden in the first half of the reporting period grew in a way that was typical for the development of most of the currencies in this period. This trend stopped in 2008 and then followed equally sharp drop. This and the growing popularity of cashless forms of payment reason brings reflections on the end of banknotes and coins in this Nordic country that had the first modern central bank in the world and in which notes and coins in modern-day form has been circulated since 1661. Experts including leading representatives of the Swedish Central Bank (Sveriges Riksbank) are, however, in their pleadings relatively cautious. Research of the development of currency in this Nordic country can lead to interesting conclusions, which do not always confirm the idea of an early termination of cash in Sweden (Nyberg, 2010). In other words - conclude the investigation, however, on the basis of a single indicator that Sweden is heading towards a cashless society would be very premature.

It is possible to compare the development of currency in its structure in Figure 7 according to the numbers listed in Figure 8. The Swedish central bank emits currently banknotes with a nominal value of 1000 SEK, 500 SEK, 100 SEK, 50 SEK and 20 SEK. The validity of the two lowest denominations 10 SEK and 5 SEK was ended in 2007.

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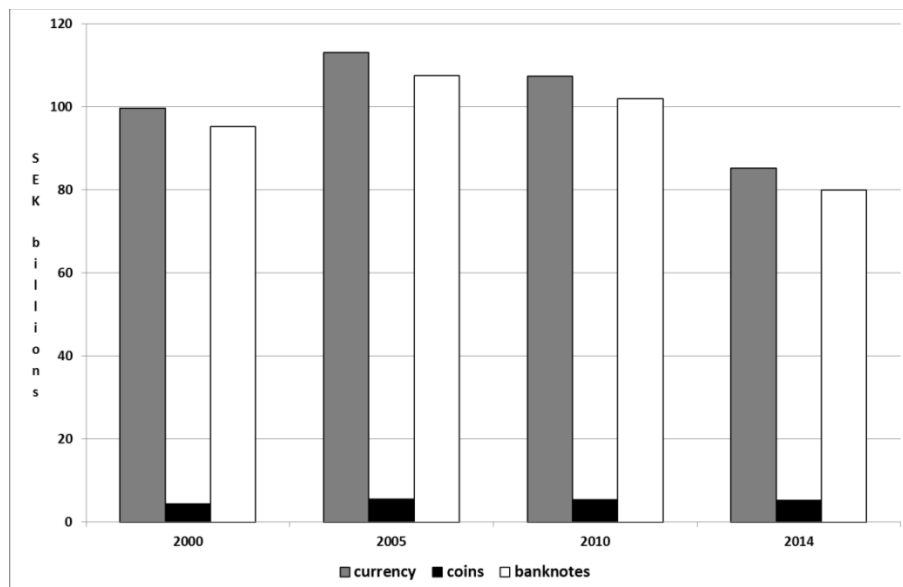
Fig. 7. Development of volume of currency in Sweden (source: ECB 2016 d)

Both figures can be read this way – declining cash in Sweden is clearly a cause of the declining of 1000 SEK banknotes in circulation. Other denominations approximately stagnated since 2008. In recent years Sweden started to process of refund cash by cashless payments, but the payment of small amounts up to a value of 100, - SEK are still largely paid in cash and payments to 500 SEK remains significant proportion of cash transactions (Nyberg, 2010). Regarding the decline in the use of banknotes nominal 1000 SEK is possible to say that the causes of this phenomenon can be based on speculative information. The most likely reason should be low participation rate of the gray economy into the economy of Sweden, low levels of corruption and good payment behavior. These are factors which can have negative influence to the level of use of cash in the business environment.
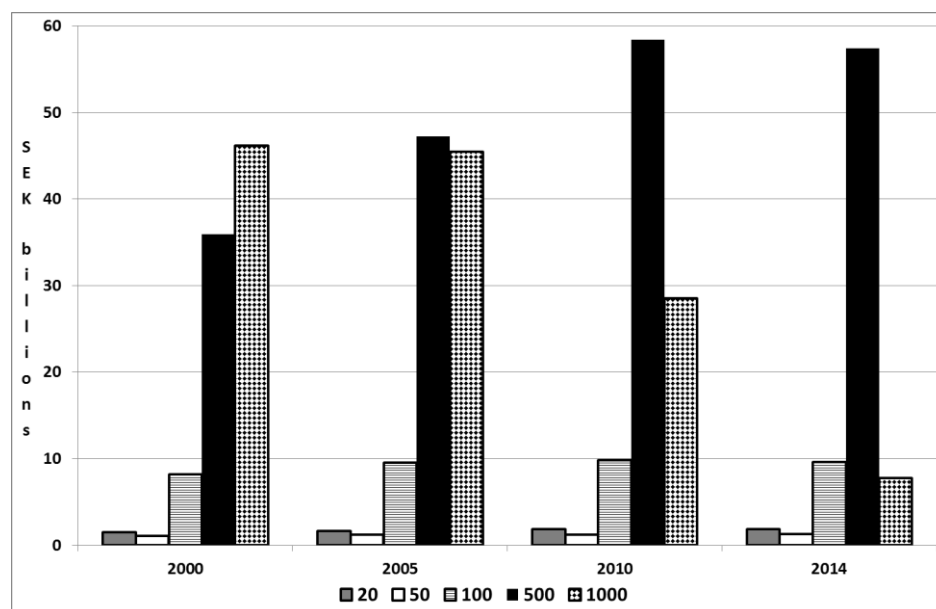
Fig. 8. Number of SEK banknotes in circulation in Sweden (Source: ECB 2016 d)

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5 Conclusion

Cash in European economies is still not dying economic category. The common European currency (euro) is not restricted to use only to the euro zone, but it is used beyond its borders in and outside Europe. The results of the analysis of long time series total of amount of cash in circulation and various denominations of currency in many countries confirm what could be expected after reading the theoretical materials done by experts from many central banks in Europe and/or USA. Countries, which can be regarded as one of the most advanced economies in the world are going to situation, in which the use of cash is significantly restricted and society in these countries are targeted movement towards to situation, which is in foreign literature known as "cashless society". But it absolutely would be premature conclusions to draw about when it will happen. Development will lead likely to a situation where cash payments will be used for the payment of small sums and cashless payment instruments will be replacing cash payments with higher amounts.

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ENGAGEMENT OF LOCAL COMMUNITY MEMBERS IN TERMS OF PARTICIPATORY BUDGETING BASED ON MUNICIPALITY OF RZESZÓW

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Abstract
Participatory budgeting serves as a convenient and verified instrument, by means of which ordinary citizens are capable of directly influencing the allocation of public financial resources. Simultaneously, the citizens can become familiar with public finances' operations, as well as exercise control over local authorities. Due to such form of public cooperation, the interested can identify and prioritize public spending projects in a way that they choose the projects that may significantly improve living standard. The idea of civil budget allows the enhancement of social inclusion and, thus, the development of civil society.
The article presents the outcomes of research, whose aim was to evaluate the awareness on participatory budgeting (PB) issues among local community members of the municipality of Rzeszów. The survey also aimed at evaluating the activity degree of its inhabitants with regard to PB.

Keywords
local community, participatory democracy, participatory budgeting, PB, RBO.

JEL classification
A13, C92, D7, H72

1   Introduction

Economic policy of any country deals with activities that are aimed at influencing and equally modelling its economy. Pursuing the policy clearly would not be able without the contribution of all entities involved in the process, such as specifically the entities of local governments. They, in turns, are in charge of the policy implementation based on possessed budget. Within the budget some amount of financial sources is selected and allocated to so called participatory budgeting.

Participatory budgeting is a mechanism allowing local communities to decide upon or contribute to decisions concerning full or partial allocation of accessible public funds (UN-HABITAT, 2004). Based on this idea, each and every citizen may affect the sources' distribution.

South America is regarded the homeland of participatory budgeting. Originally, this form of direct social co-engagement in budget allocation occurred in Brazilian municipality of Porto Alegre in 1989 (Wampler, 2000). Since then, the idea spread over the American continent as well as Africa, Asia and Europe gaining lots of supporters. The literature of the subject quotes three phases in the history of participatory budgeting. The PB origins go back to the period of 1989-1997, when it was implemented in the municipalities of Porto Alegre and Santo Andre (Brazil) and Montevideo (Uruguay). The domestic expansion of the system dates back to years from 1997 till 2000. Approximately, 130 municipalities benefited from participatory budgeting procedure. The third phase started in 2000 when local governments from other continents started launching the PB procedure. As far as Europe is concerned, it was the Italian town of Grottammare which used it for the first time. Nowadays, the idea is successfully practiced by over 1500 local government units around the world (Sintomer et al., 2012) in town districts, small communities or large cities.

In Poland participatory budgeting was first used by the municipality of Sopot in 2011. Very soon it was launched in a number of other regions by local government units – not only in municipalities, but also in districts or even in voivodships. It can be even stated that recently practicing PB in Poland has become quite fashionable. The municipality of Rzeszów enabled its inhabitants to contribute to

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selected part of local budget allocation in 2013, when the first poll of *Rzeszowski Budżet Obywatelski 2014* (*Rzeszow Civil Budget 2014*) was organised and held.

It shall be noted, however, that the idea of participatory budgeting is not very well known in Polish society, although lots of interest is paid to it these days. On one hand, the citizens of local communities where participatory budgeting has already been pursued, had the opportunity to learn its main principles due to intensive information campaigns. On the other hand, the citizens of communities where the system has not been introduced yet, are mostly still unaware of its existence and main assumptions. This can be proved by the research outcomes held on the respondent sample being the citizens of the municipality of Rzeszów (Sołtysiak, 2016a) and the sample of citizens of the provinces of south and eastern Poland (Sołtysiak, 2016b). The respondents admitted being acquainted with the issues of participatory budgeting in the percentage of 77.76% and 23.17% of the sample, respectively. This trend becomes even more evident, if one notes that in the case of locations where participatory budgeting is pursued the awareness among citizens grows to the level of 79.11% of the respondents and in the case of locations where the budgeting is not practiced, it is as low as 11.08% of the respondents.

It shall be pointed out, however, that the idea of participatory budgeting is not supported by coherent and uniform law to regulate its operations in Poland, yet.

Polish local government units use the 5a article of the Act of 8 March 1990 on Municipalities to implement the PB idea in practice. They can also benefit from and support their operations by the prerogatives presented in the Act of Village Fund of 2009.

2   Participatory budgeting in Poland and scientific research

Polish literature of the subject, as well as the foreign one, provide lots of details on the very idea of participatory budgeting. They usually elaborate on practical implementations of this idea by selected units of local governments (Diaz, 2014; Shah 2007; Sintomer et al., 2016).

Due to the fact that participatory budgeting is a quite new phenomenon in Polish public finances, complex and detailed presentations of Polish research outcomes are still awaited. What is available for the time being is the few reports on implementing participatory budgeting by particular local governments. Even though, they are incomparable as each of them was designed to learn solely the opinion of local community on the form of performing the vote.   What is more, the research sample was small and non-representative, such as in the case of surveys held by the municipalities of: Elbląg[1], Kórnik[2], Lublin[3], Mysłowice[4], Poznań[5], Pszczyna[6] and Wrocław[7]. The issue of participatory budgeting often occurs as a secondary topic in the research held on the issue of civil society[8].

It shall be highlighted that presently in Polish literature comprehensive results of research in the field of participatory budgeting cannot be found, especially in terms of research encompassing a sample larger than a single local government unit. In the case of research held in different countries one shall remember that comparing them could be more than a troublesome due to various legal arrangements or conditions of historical, social or cultural differences which, in turns, greatly influence attitudes of local communities in this aspect.

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[8] See e.g.: *Dialog obywatelski w Krakowie w opiniach mieszkańców, przedstawicieli organizacji pozarządowych i mediów.*

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Last but not least, the outcomes of the survey elaborated in the article were based on the sample of respondents living in a single local community and shall be treated as pilot research. The following stages of the research in question include conducting the survey among citizens of other Polish local communities involved in participatory budgeting.

3   Methodology and research outcomes

In the survey on "Engagement of Local Community Members in Terms of Participatory Budgeting Based on Municipality of Rzeszów" a questionnaire was used as the measuring tool. There was a sample of 643 respondents questioned - 327 females (50.85% of the survey sample) and 316 males (49.19%) – aged 16, and older. Each respondent fulfilled the condition of permanent or temporary registered residence in the municipality of Rzeszów, which is the essential condition to participate in *Rzeszowski Budżet Obywatelski* poll.

The underlying aim of the conducted survey was the attempt to evaluate local community members' awareness on the issues concerning participatory budgeting, as well as identification of the level of civil activity in this area.

In 2016 inhabitants of the municipality of Rzeszów had the possibility to attend the vote poll for the fourth time in terms of participatory budgeting procedure. It clearly explains why the idea is so popular and well-known in this particular community. Over 77% respondents of the survey (including 76.15% of females and 79.43% of males) admitted being familiar with the idea of participatory budgeting. They mostly learned about it from the people in their close neighbourhood and from the Internet. These were the relatives that mainly provided the knowledge on PB (for 73.4% of respondents – 71.49% of females and 75.3% of males) or acquaintances and family (for 38.8% of respondents – 37.35% of females and 40.24% of males). Fairly significant share of 39.4% of the respondents searched information on PB in the Internet (37.35% of females and 41.43% of males). Approximately, one fifth of the respondents browsed social networks in search of PB information and only 16% of them referred to the website of the Town Council of Rzeszów. Every fourth of the respondents declared gaining knowledge from brochures or leaflets (Fig. 1).
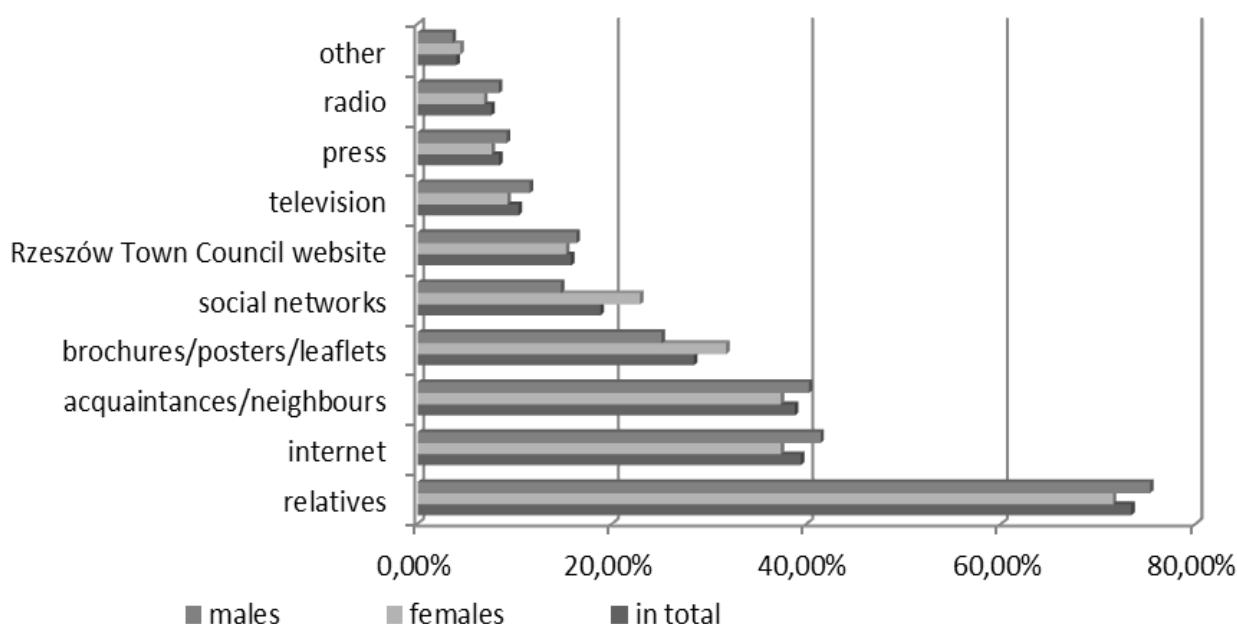
Fig. 1. Sources of information on participatory budgeting among the survey respondents
(Source: own elaboration based on the authors' research)

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The sources of information considerably influence the knowledge gained by the respondents. More than half of the respondents admitted having very little knowledge in this area. The answers *minor* or *little* were selected by 55.42% of female and 51.79% of male respondents (Fig. 2). Only every ninth female respondent and every seventh male respondent assessed their knowledge in the PB field as broad. However, mere 2.4% of the respondents claimed to have expertise in PB (2% of women and 2.79% of men).
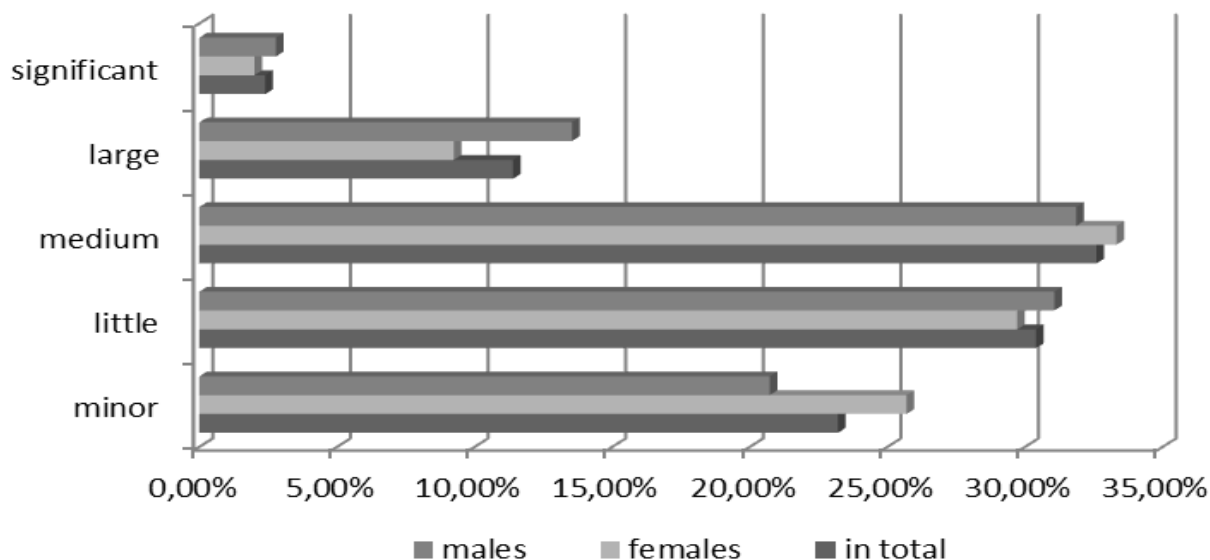
Fig. 2. Knowledge self-evaluation in the field of participatory budgeting among the survey respondents
(Source: own elaboration based on the authors' research)

Despite the low level of awareness on PB among the survey respondents, vast majority of them appreciate this form of social co-management. The 79% of the respondents (77.34% of females and 80.27% of males) claim citizens should be given the power to directly influence local government budget distribution by means of voting system in participatory budgeting procedure.

3.1 Engagement of local community members in terms of participatory budgeting based on municipality of Rzeszów

The inhabitants of the municipality of Rzeszów have got the right to directly participate in the allocation of selected amount of public funds within the scope of participatory budgeting since 2013. This idea grows quickly and gets loyal supporters who annually give several tens of thousands of votes to submitted projects (in 2013 – 72817 votes, in 2014 – 34417 votes, in 2015 – 45292 votes). The survey respondents (over 87% of them, including 88.38% of females and 85.76% males) generally have some knowledge on the operations of *Rzeszowski Budżet Obywatelski* (RBO). They also actively participate in the RBO polls. 68.12% of the respondents (66.36% of females and 69.94% of males) declared having voted in the most recent poll. In previous editions of RBO 2014, 2015 and 2016 respectively 12.29%, 24.57% and 48.99% of the survey respondents took part in (Fig. 3).

It is interesting to note that some of the respondents attended the poll more than mere once. 41.52% of them admitted having voted twice, 14.62% - three times and 3.26% - four times. What is more, winning successful project for 56.81% of the respondents (53,43% of females and 60.31% of males) became a strong stimulus to take part in the following editions of RBO. However, losing a project in one RBO poll for 18.23% of the respondents (23.26% of women and 13.68% of men) effectively contributed to avoiding voting activity in the following editions.

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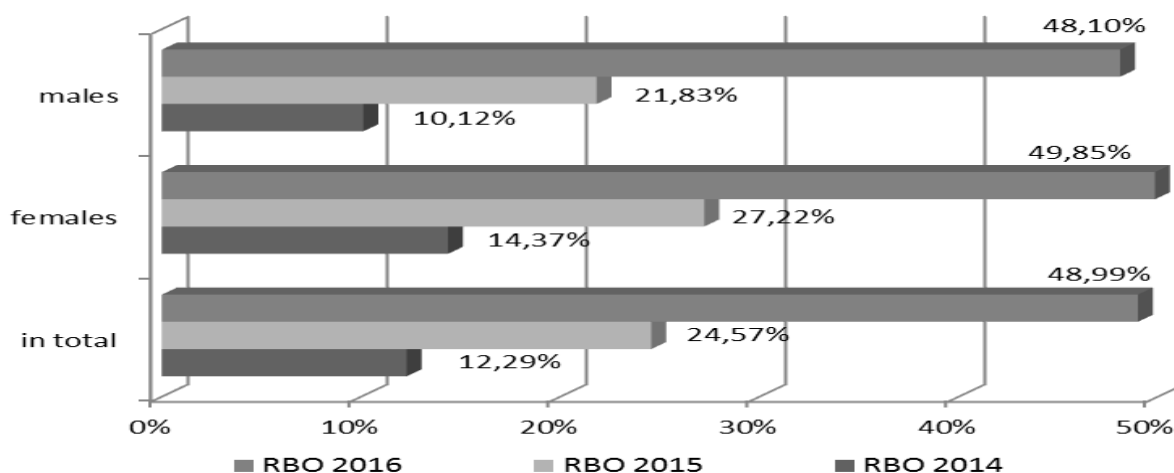
Fig. 3. Percentage share of the survey respondents voting in Rzeszowski Budżet Obywatelski poll in editions 2014-2016
(Source: own elaboration based on the authors' research)

The survey outcomes prove that the idea of RBO is well-known to the municipality inhabitants and the annual vote gradually becomes sort of routine and tradition for them. Finally, 66.49% of the respondents (72.17% of females and 62.66% of males) intend to take part in RBO polls in the oncoming years.

3.2 Factors determining engagement of individuals in participatory budgeting poll

What can be learned from the survey outcomes is that ultimate activity of individuals within the RBO procedure, on many occasions, does not really result from internal motivation to co-manage the local community. The main stimulus to vote, however, seems to be of external character. The survey respondents admit having been asked to contribute. This answer option was selected by 72.4% of the respondents (Fig. 4). Men vote this way more often than women (respectively 76.09% and 68,67%).
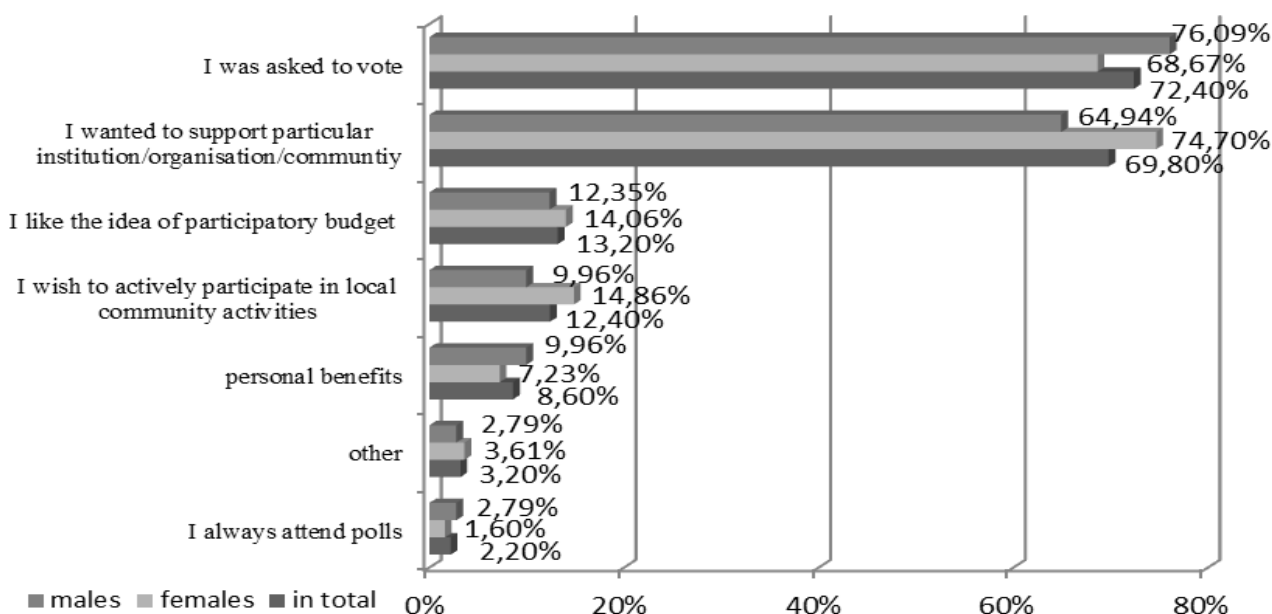
Fig. 4. Factors determining engagement of individuals in participatory budgeting among the survey respondents
(Source: own elaboration based on the authors' research)

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However, one shall note, that almost 70% of the respondents took part in the poll due to their willingness to support projects of a particular institution, organisation or local community. 74.7% of female respondents are more likely to act as mentioned above, whereas in the case of males it is only 64.94%.

Every eighth respondent in the survey took part in RBO polls because they liked the idea of participatory budgeting (13.2%) or they wanted to contribute to local community activities (12.4%). It is worth mentioning that these motivators are more important for women than men. What is more, every tenth male and every fourteenth woman voted in RBO polls in expectation of certain personal benefits. In the survey sample, there were few respondents (2.2%) for whom the very existence of RBO polls was enough to motivate them to vote.

Taking into account the fact that majority of the respondents were motivated by the third party persuasion, it could be interesting to learn, who these individuals were. The respondents' answers reveal that the strongest motivation comes from the close neighbourhood of the voter, such as members of the family, friends or neighbours (Fig. 5).
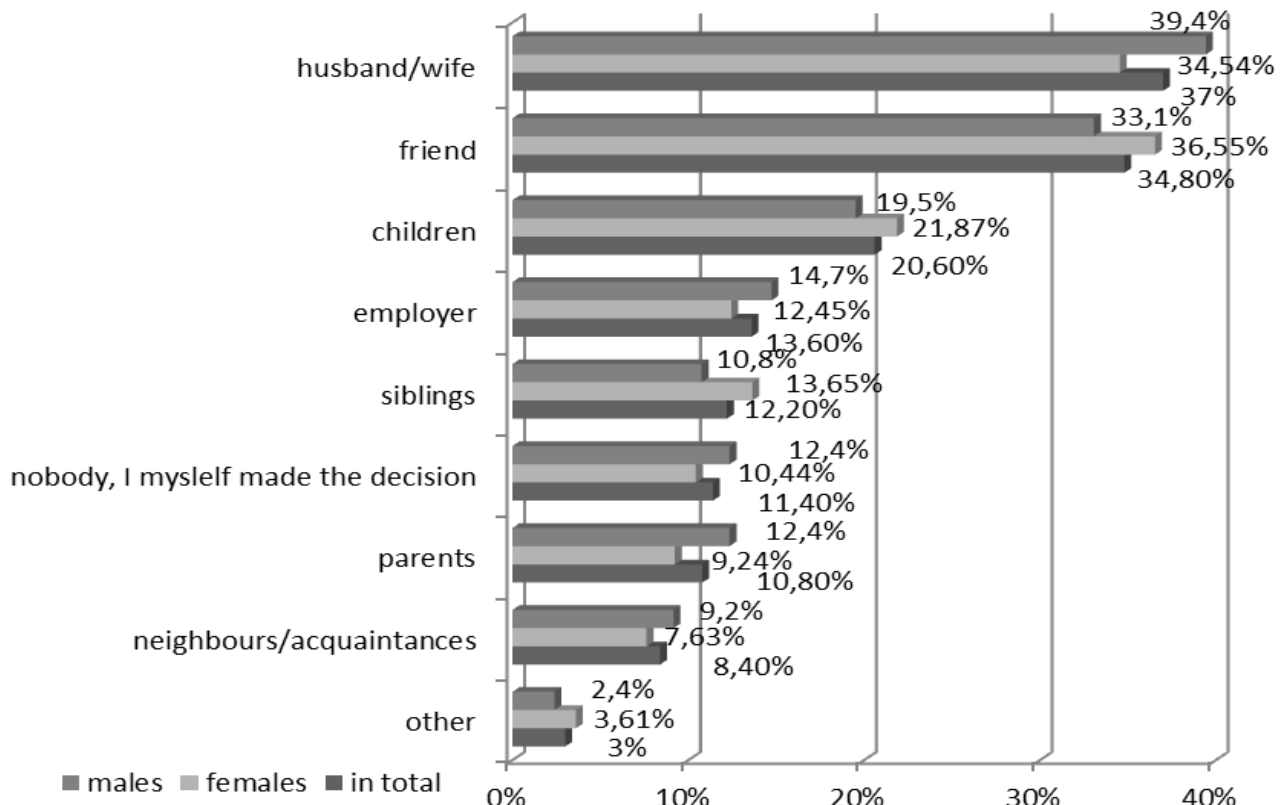
Fig. 5. Individuals having impact on voters' activity among the survey respondents
(Source: own elaboration based on the authors' research)

Assessing influence of the close relatives on voters' activity, one shall note that 37% of the respondents were encouraged by their spouses. More susceptible to the beloved's suggestion were the males - 39.44% of them voted as a result of their wives' encouragement, whereas women were less vulnerable, only 34.54% were persuaded by their husbands or partners. Other individuals having impact on the voters were children (for 20,6% of the respondents), siblings (12.2%) and parents (10.8%). As a rule, women are more obedient to their children's suggestions, whereas men respond more willingly to their parents' requests.

In the group of non-relatives having impact on voters' activity, one shall note the significance of friends (34,8% of the respondents did a favour for them - 36.55% of females and 33,07% of males). Employers successfully lobbied every seventh voter in the RBO polls – 14.74% of male respondents

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and 12,45% of female respondents. Moreover, every twelfth respondent was influenced by neighbours or acquaintances. It may worry a bit, however, that mere 11.4% of the survey respondents (10.44% of females and 12.35% of males) made the voting decision on their own, without the contribution of the third party. This brings us to unfavourable conclusion that over 90% of the electors needed external stimulus to act and vote in the RBO polls.

3.3 Factors determining the project choice of individuals in participatory budgeting poll

Majority of the survey respondents having voted in RBO polls admitted that the main reasons for choosing particular project (Fig. 6) was either pure willingness to support projects promoted by certain educational or charitable institution (62% of the respondents),or favourable opinions on the project expressed by the relatives (53%).

The third vital reason was that the elector had been asked to vote. This answer was selected by 45.6% of the respondents – 44.58% of women and 46.61% of men. The necessity to perform certain task was the main stimulus for 38% of the respondents – 35.74% of female voters and 40.24% of the males. Over one third of the respondents gave their vote for a project as influenced by their acquaintances (37.75% of females and 31.47% of males). Finally, only 6.4% of the questioned were motivated to choose particular project in expectation of future personal benefits.
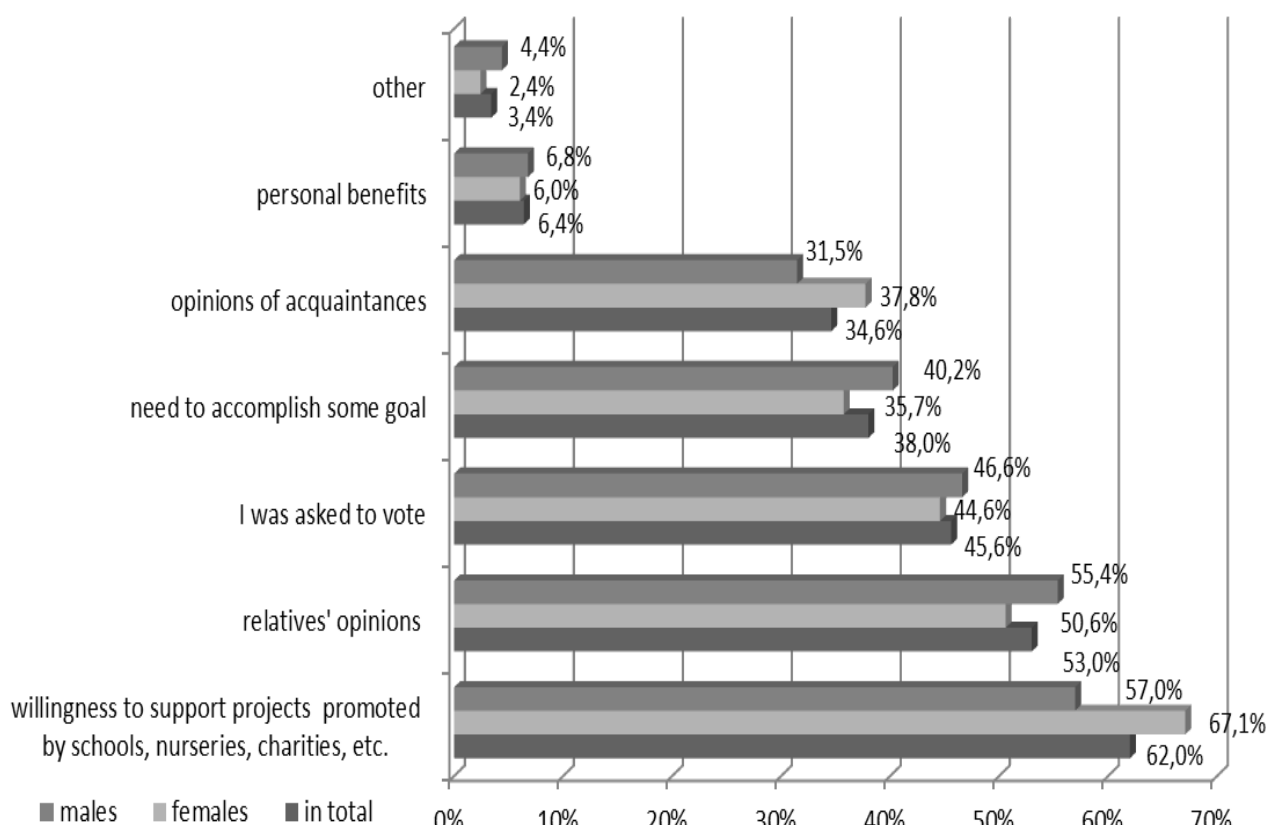

Fig. 6. Factors determining the project's choice in participatory budgeting poll among the survey respondents
(Source: own elaboration based on the authors' research)

A very important outcome of the survey was that less than one third of the respondents (28.31%) had acknowledged the main assumptions or contents of a project, before they voted for it. Most of all, this may be explained by the authority of organisations in charge, or the opinions of relatives or acquaintances lobbying for the projects.

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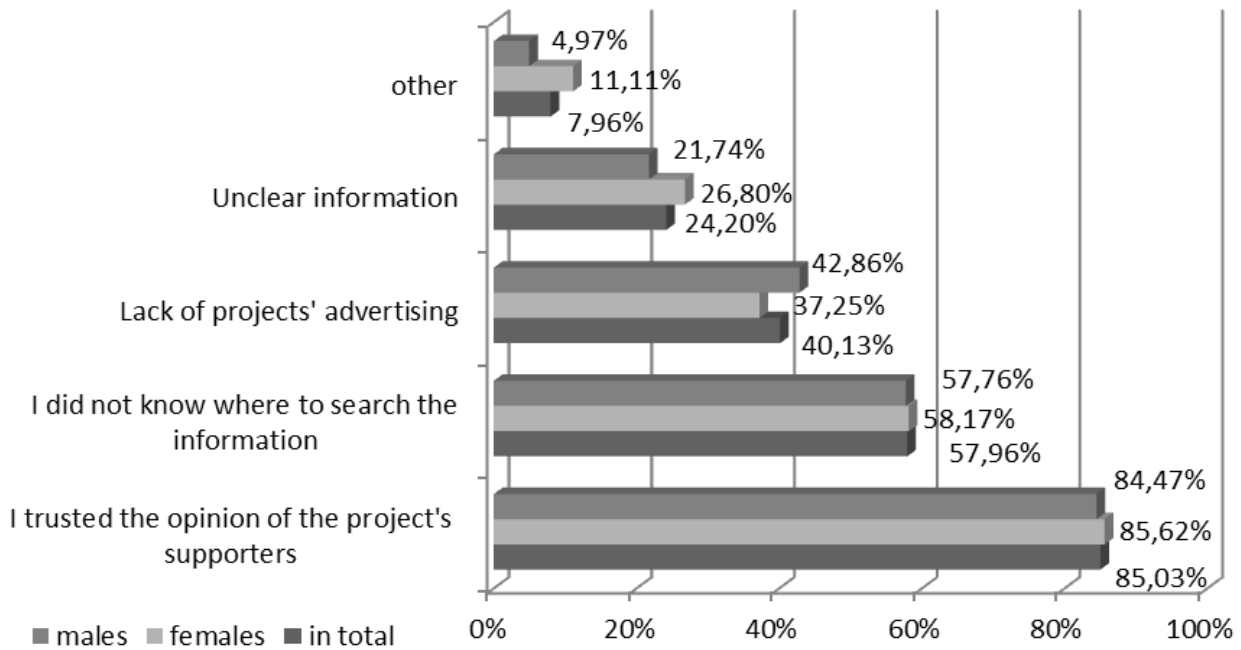
Fig. 7. Reasons why the respondents did not become familiarised with projects in the RBO polls
(Source: own elaboration based on the authors' research)

The main set of excuses explaining the lack of knowledge on projects further voted for, was the trust towards people giving recommendations (Fig. 7) (85.03% of the respondents), lack of information where to find project details (57.96%) or lack of project advertising (40.13%).

Little initial interest in the details of projects contribute to and influence further lack of monitoring of the successful projects' realisation. Mere 18.68% of the respondents (20.61% of females and 16.67% of males) were ever interested in the next stages of the projects, or monitored them.

4   Conclusion

Participatory budget not only serves as the source of budget funds' distribution that local community representatives can have a direct influence on. On one hand, it gives the possibility to learn about financial management methods of local governments. On the other hand, it allows partial responsibility transfer on citizens by means of budget funds' allocation. Thus, it possesses and brings educational values, as well as promotes social inclusion in local communities. It enables social empowerment of individuals and supports their feeling of being in charge of their place of residence.

Participatory budgeting is favourably perceived by the majority of the respondents, who either have already taken part in it, or intend to, in the following editions. However, a worrying trend is that attending the RBO poll is influenced greatly by some kind of fashion, which can be proven by general low awareness on participatory budgeting and the fact that almost 90% of the respondents needed external triggers from close neighbourhood to get together and vote. Even more worrying fact is that most respondents did not make any effort to analyse projects thoroughly before the vote, and afterwards they did not monitor the projects' progress. This evidently shows that local community needs civil education and there is much to be done in this aspect, as well.

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EU RESILIENCE TO ECONOMIC CRISIS: IS THE APPLICABILITY OF RESILIENCE CONCEPT REALISTIC?

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Abstract

The economic crisis the world has faced since 2007 has had devastating effects on many regions to various degrees. How regions respond to economic shock depends on regional economic structure and performance, administrative capacity, resources, human capital, social capital, and other factors, and is perceived as resilience: the ability of a regional economy to withstand, absorb, or overcome an external economic stress. In the context of the economic crisis is often mentioned concept of resilience. Despite the notion of 'resilience' has recently risen to prominence in several disciplines, and has also entered policy discourse. Yet, the meaning and relevance of the concept are far from settled matters. Because one of the future strategic goals for the European Union is fostering its resilience, we studied the performance of European Union in the pre- and post-crisis period in order to assess the effects of the economic crisis. The results have revealed differences among selected groups of countries as well as some country-specific characteristics of the response that can generally be seen in the weaker performance of some countries.

Keywords

Economic Crisis, European Union, Resilience, Territorial Heterogeneity.

JEL classification

F02, F63, H79, O18, O52.

1   Introduction

Starting in 2007-08, an economic crisis with no comparable precedent after WWII has affected most of the World, and Europe in particular. Yet, despite of the pervasiveness of the crisis, it has affected differently different European Union (EU) countries, with some countries losing a very large number of jobs, and others being able to maintain employment. At the same time, for some countries the burden on public finances due to increasing interest rates has become un-tractable, while others have been able to maintain public finances under control, also thanks to a lower starting debt. Global economic changes have caused problems for both individuals and businesses, affecting entire economic sectors, regions, and their socioeconomic structures (Aubert, Jónás-Berki, Gergely, 2013). The macroeconomic country-level effects are very important, but and also within countries the impact on the various regions has been far from uniform, with some regions, often the most urban, able to resist the crisis better than others. Economic crisis has presented many challenges to policy planners, who are trying to protect countries from negative effects and are seeking solutions for more resilient development in the future. Structure of countries is hence an important determinant of how they can afford periods of distress and therefore contemporary regional development issue is enriched with a conception of the regional resilience. With respect to this issue, the main aim of the paper is to analyse via multivariate method of cluster analysis the performance of European Union in the pre- and post-crisis period (based on the main macroeconomic indicators) in order to assess the effects of the economic crisis and to provide basic directions on how to make this area more resilient in the future.

2   Aspects of territorial resilience to economic crisis

Most of the recent uses of the term resilience in regional or urban applications refer to the idea of the ability of local socio-economic systems to recover from a shock or disruption. Although the idea of resilience has been used for some time, it is only very recently that it has attracted attention from regional analysts, spatial economists, and economic geographers (Martin, 2012) to explain economies' resilience and their ability to recover quickly (Brozzi et al., 2015).

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2.1 Resilience as reaction to economic shocks

The EU faces increased competition from other continents, their nations, regions and cities. Territorial potentials of European regions and their diversity are thus becoming increasingly important for the resilience and flexibility of the European economy, especially now in times of globalisation processes in world economy. The EU, its regions and larger territories are increasingly affected by developments at the global level. New emerging challenges impact on territorial development and require policy responses. Territorial imbalances on the other hand challenge economic, social and territorial resilience within the EU.

Resilience is a concept that is frequently used but rarely well defined. The concept of resilience is routinely used in research in disciplines ranging from environmental research to materials science and engineering, psychology, sociology, and economics. The notion of resilience is commonly used to denote both strength and flexibility. The concept of resilience is defined as an ability of the territory to restore the original level after the incident that causes significant negative deviation from equilibrium. As an example of the negative step change it could be considered not only the impact of the global economic crises but also natural and anthropogenic disasters. Engineering resilience interprets it as the ability of a system to return to, or resume, its assumed stable equilibrium state or configuration following a shock (Martin, 2012). Evolutionary economists argue that economies can never be in equilibrium (Simmie, Martin, 2010) and that returning to pre-disaster normality is not always a suitable goal (Weichselgarner, Kelman, 2014). Evolutionary approach focuses on historical processes (Boschma, Frenken, 2011) and on the adaptive capability of a system (Martin, 2012).

How do economies respond to recessionary and other shocks? The first aspect is that of resistance; that is, the vulnerability or sensitivity of the economy to disturbances and disruptions, such as recessions. The second aspect is that of the speed and extent of recovery from such a disruption. The third aspect concerns the extent to which the economy undergoes structural re-orientation and what implications such re-orientation has for the region's output, jobs, and incomes. The fourth dimension concerns the degree of renewal or resumption of the growth path that characterized the regional economy prior to the shock (Martin, 2012; (Crescenzi et al., 2016).

Risk mitigation is a crucial factor for achieving the conditions for sustainable development of local systems (Graziano, 2013). The role of institutions is crucial in resilience-building efforts through various risk-reduction strategies. Resilience literature also points to the needs of policy and practice. The strength and prosperity of any community, no matter how large or small, are enhanced by the resilience of its individuals and communities (Mock, Easterbrook, Banks, 2013). In the resilience literature there have been some attempts to measure resilience (Espon, 2013; Hill, Wial, Wolman 2008; Briguglio et al., 2008; Graziano, 2013; Rizzi, Dallara 2011). In this paper, resilience is defined according to the Espon project (Espon, 2013) as the *ability of the economy to withstand, absorb, or overcome an external economic stress*.

The concept of resilience seeks to understand the factors that affect the ability of economies to respond to changes and to recover from quite significant shocks. In measuring it, the *gross domestic product* (GDP) and *unemployment rate* are the most visible variables that show economic and social wellbeing. Resilience is measured based on these macroeconomic indicators through multivariate method – Cluster analysis which is used in a wide range of human activity from the natural sciences to the area of economic analysis. Methodical procedures within the cluster analysis offer the option of choosing the most useful methodology for data processing, display outputs and results interpretation to the problem. The advantage of the method is its simplicity, the gothic graphic chart output of the results and the ability to use statistical software, which typically offer this method in the context of multivariate data analysis. Given the objective of the paper, the method of cluster analysis was chosen and this method is in practice used for segmentation of various economic entities – in this case EU countries. In this paper, *Cluster analysis (CA) is used for defining clusters of countries based on the value of the individual indicators coming into analysis*, resp. CA is a way of grouping cases of data based on the similarity of responses to several variables. CA is a strong tool of the multivariate

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exploratory data analysis. It involves a great amount of techniques, methods and algorithms which can be applied in various fields, *including economy*. The aim of CA is to identify groups of similar objects (countries, enterprises, households) according to selected variables (unemployment rate of men and women in different countries, deprivation indicators of households, etc.). CA classifies objects that are very similar to others in the cluster based on a set of selected characteristics – indicators. The resulting cluster of objects should exhibit high internal (within-cluster) homogeneity and high external (between-cluster) heterogeneity. The object is sorted into groups, or clusters, so that the degree of association is strong between members of the same cluster and weak between members of different clusters. The task of clustering is then to divide the set of objects into the disjunctive clusters. There are many types of CA techniques. Probably the most applied method in economy is *agglomerative hierarchical cluster analysis*. It is based on a proximity matrix which includes the similarity evaluation for all pairs of objects. It means that various similarity or dissimilarity measures for different types of variables can be used. Moreover, different approaches for evaluation of the cluster similarity can also be applied. Apart from giving a possibility to analyse data files with qualitative variables, the main advantage of this type of analysis is a graphical output in the form of a *dendrogram*. To determine the optimum solution, in the paper is used the most common approach – *method of hierarchical cluster analysis* and the clustering algorithm is *Ward's method* applying *Squared Euclidean Distance* as the distance or similarity measure, which are most suitable for territorial analysis (Poledníková, 2014). The aim in *Ward's method* is to join cases into clusters such that the variance within a cluster is minimised. To do this, each case begins as its own cluster. Clusters are then merged in such a way as to reduce the variability within a cluster. To be more precise, two clusters are merged if this merger results in the minimum increase in the error sum of squares. Basically, this mean s that at each stage the average similarity of the cluster is measured. The difference between each cases within a cluster and that average similarity is calculated and squared (just like calculating a standard deviation). The sum of squared deviations is used as a measure of error within a cluster. A cases is selected to enter the cluster if it is the case whose inclusion in the cluster produces the least increase in the error (as measured by the sum of squared deviations). This approach helps to obtain the optimum number of clusters we should work with. The next step is to rerun the hierarchical cluster analysis with this selected number of clusters, which enables us to allocate every case in our sample to a particular cluster.

2.2   Economic crisis and territorial consequences

Economic shocks occur periodically to economies, though the effect that these shocks have varies from region to region as does the region's adjustment and recovery to them. We are particularly concerned with economic resilience: why are some economies that are adversely affected by shocks able to recover in a relatively short period of time while others are not? There is widespread agreement that effective and efficient way to respond the economic shocks is to improve economic resilience of the territories, also in the case of economic policies as reaction on economic crisis starting in 2008. A number of scholars agree in considering the recent financial crisis one of the most severe economic crises in post-war economic history (Arestis et al., 2011; Helleiner, 2011). The 2008 global economic crisis has been the most severe economic recession since the Great Depression. Far from being limited to the instabilities of some of the world's largest private financial institutions, as it appeared to be at the early stages, the financial crisis gradually turned into a global economic crisis, resp. economic recession based on theory of economic cycle and it phases. The pervasiveness and geographical heterogeneity of its impacts have attracted increasing interest in understanding how and why territories, local and regional economies react to economic shocks (Archibugi, Filippetti, 2011; Brakman et al., 2015; de Beer, 2012; European Commission, 2013; Fingleton et al., 2012; Groot et al., 2011; Hassink, 2010; Kitson et al., 2011; Lagravinese, 2015; Martin, 2010).

In the EU, the crisis interrupted fairly constant average GDP growth and employment growth, opening the doors of several countries to economic recession (Dvoroková, 2012). The recession

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technically started in the first quarter of 2008 and lasted until the last quarter of 2009. Between the second half of 2010 and 2011, the EU recorded a second wave of negative economic growth. Whereas the recession has impacted on the majority of European countries, its depth has been highly unequal across the Continent and its long-term impacts are likely to be similarly uneven (Crescenzi et al., 2016). As argued by earlier policy reports and academic papers, the proper understanding of the recession impacts upon which to modulate future regional policies calls for a perspective able to take into account the different geographies and intensities of the social, economic and territorial dynamics triggered by the downturn (European Commission, 2013; Martin, 2010). The recession is, in most EU Member States, a private debt crisis that turned into a sovereign debt crisis (Milio et al., 2014). These two different, yet intertwined, phases of the crisis have followed successive paths, with the outbreak of the private debt crisis in 2008 and the subsequent uprising of the sovereign debt crisis in 2010. Economic recession in a severe downturn, leading to a slump in demand, a fall in economic output and increasing unemployment. Europe was no longer clearly moving towards economic and social cohesion (Melecký, 2015). The territorial impacts are asymmetrical. The impacts of the recession vary greatly throughout Europe and not all countries and regions experienced economic decline. Also the important point is fact that crisis developed at different times and 'Resilience' has become an increasingly significant concept in European policy making (Brozzi et al., 2015).

3   Towards more resilient economies: case of the European Union

Some countries and their regions are more resilient when confronted with economic shocks than others. These regions are either less affected by such shocks on impact and/or they recover more quickly. Consequently, countries and regions cannot be understood as the only decisive factors in providing resilience because they strongly depend on the macroeconomic framework conditions of the entire country (Kovářová, 2015). Therefore, the first step towards more resilient economies should be made at the national level, providing attractive socioeconomic conditions such as an innovation-friendly tax system, openness to foreign investment, a competitive business environment, a flexible employment system, and, above all, a trustworthy and stable political system that plays an important role in confidence building while interacting at the international level.

Sector-specific characteristics of the economic crisis can be overcome by a diversified mix of companies and sectors that can only be achieved in the long term (Fojtíková, 2011). Residues of unprofitable economic activities remain for a long time and are often a burden to economic development (Žítek, 2014). For example, unqualified workers, when unemployed, cannot meet the requirements for knowledge-intensive sectors, which are currently gaining in importance. In particular, human capital requires a longer period to adapt, and therefore educational policy should constantly strive to provide a highly skilled and flexible workforce that is able to change employment within the sector or even to pass on to another sector (Halásková, Halásková, 2015).

Far from being limited to the instabilities of some of the world's largest private financial institutions, as it appeared to be at the early stages, the financial crisis gradually turned into a global economic crisis. In the EU, the crisis interrupted fairly constant average GDP growth and employment growth, opening the doors of several countries to economic recession. This chapter assumes that EU countries have not been immune to the downturn of key economic indicators (see Table 1 and Table 2). The development of socioeconomic indicators (GDP and unemployment rate) at the NUTS 0/1 level can be utilized to recognize intra-national differences in the effects of the global economic crises and therefore it is employed in the case of EU economies. In addition, in order to achieve greater accuracy in evaluating whether the economic crises affected EU economies to a greater or lesser extent, several groups, resp. clusters of EU countries have been identified according to the multivariate method of CA.

As Table 1 shows, all of EU countries experienced GDP decrease across the reference period. At the national (NUTS0/1) levels, GDP values were the lowest in Estonia, Cyprus, Latvia, Lithuania, Luxembourg, Malta and Slovenia, compared to other EU countries. The highest values of GDP

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recognized Germany, France and United Kingdom. For all evaluated EU countries in the period 2007-2015, values of indicator are additionally highlighted through *conditional formatting feature*, which makes it easy to spot the differences in the values of indicators. The better results countries have, the appropriate value is more highlighted in a darker shade of green. The worse results countries have, the appropriate value is more highlighted in a darker shade of red. Higher values of indicator indicate better results. It is evident that in most EU has been decline in GDP, especially between years 2008 and 2009. On the other hand, towards the end of reference period, it is evident increase in GDP.

Cluster analysis is used for defining country cluster profile based on the value of trend in GDP indicator development. In this paper, the best interpretation of data ensures *three-cluster solution* for indicator across the reference period. Results of cluster analysis are in line with *conditional formatting feature* (see Figure 1 and dendrogram of countries grouping). The best results are confirmed by traditional economically strong countries, i.e. cluster no. 3. Countries grouped in group no. 2 recognized satisfactory results. The highest number of countries is located in cluster no. 1 because showed the lowest value in GDP.

Table 1. Gross domestic product, percentage of EU28 total (based on million PPS)

Country/Time	2007	2008	2009	2010	2011	2012	2013	2014	2015
Belgium	2,4	2,4	2,5	2,6	2,6	2,6	2,6	2,6	2,6
Bulgaria	0,6	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
Czech Republic	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,8
Denmark	1,3	1,3	1,3	1,4	1,4	1,4	1,4	1,4	1,4
Germany	19,0	19,0	18,7	19,3	19,7	19,7	19,8	20,0	20,0
Estonia	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
Ireland	1,3	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,3
Greece	2,0	2,1	2,1	1,9	1,7	1,6	1,6	1,6	1,5
Spain	9,3	9,3	9,3	9,0	8,7	8,5	8,3	8,3	8,3
France	13,7	13,6	13,8	13,9	14,0	13,9	14,1	13,9	13,8
Croatia	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Italy	12,4	12,4	12,4	12,3	12,2	12,0	11,7	11,5	11,4
Cyprus	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1
Latvia	0,3	0,3	0,2	0,2	0,2	0,2	0,2	0,3	0,3
Lithuania	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4
Luxembourg	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3
Hungary	1,2	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3
Malta	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Netherlands	4,5	4,6	4,5	4,4	4,4	4,4	4,4	4,3	4,3
Austria	2,0	2,1	2,1	2,1	2,1	2,2	2,2	2,2	2,1
Poland	4,0	4,2	4,5	4,7	4,9	5,1	5,1	5,1	5,2
Portugal	1,7	1,7	1,7	1,7	1,6	1,6	1,6	1,6	1,6
Romania	1,7	2,0	2,0	2,0	2,0	2,1	2,1	2,2	2,2
Slovenia	0,4	0,4	0,3	0,3	0,3	0,3	0,3	0,3	0,3
Slovakia	0,7	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
Finland	1,2	1,3	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Sweden	2,3	2,3	2,3	2,3	2,4	2,4	2,4	2,3	2,4
United Kingdom	14,4	14,0	13,9	13,4	13,2	13,5	13,7	13,9	14,0

Source: Eurostat, 2016, own elaboration

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Fig. 1. Dendrogram – Clusters of EU28 countries based on GDP in time 2007-2015
(Source: own calculation and elaboration in IBM SPSS Version 22, 2016)

In the case of second indicator and as Table 2 shows, all of EU countries experienced unemployment increase across the reference period. At the national (NUTS0/1) levels, it is not surprising that the highest values of unemployment south European countries recognized, i.e. Greece, Spain, Portugal and Cyprus, and then Baltic countries (Estonia, Latvia and Lithuania), compared to the other EU countries. Other countries of Western and Central Europe showed much more satisfa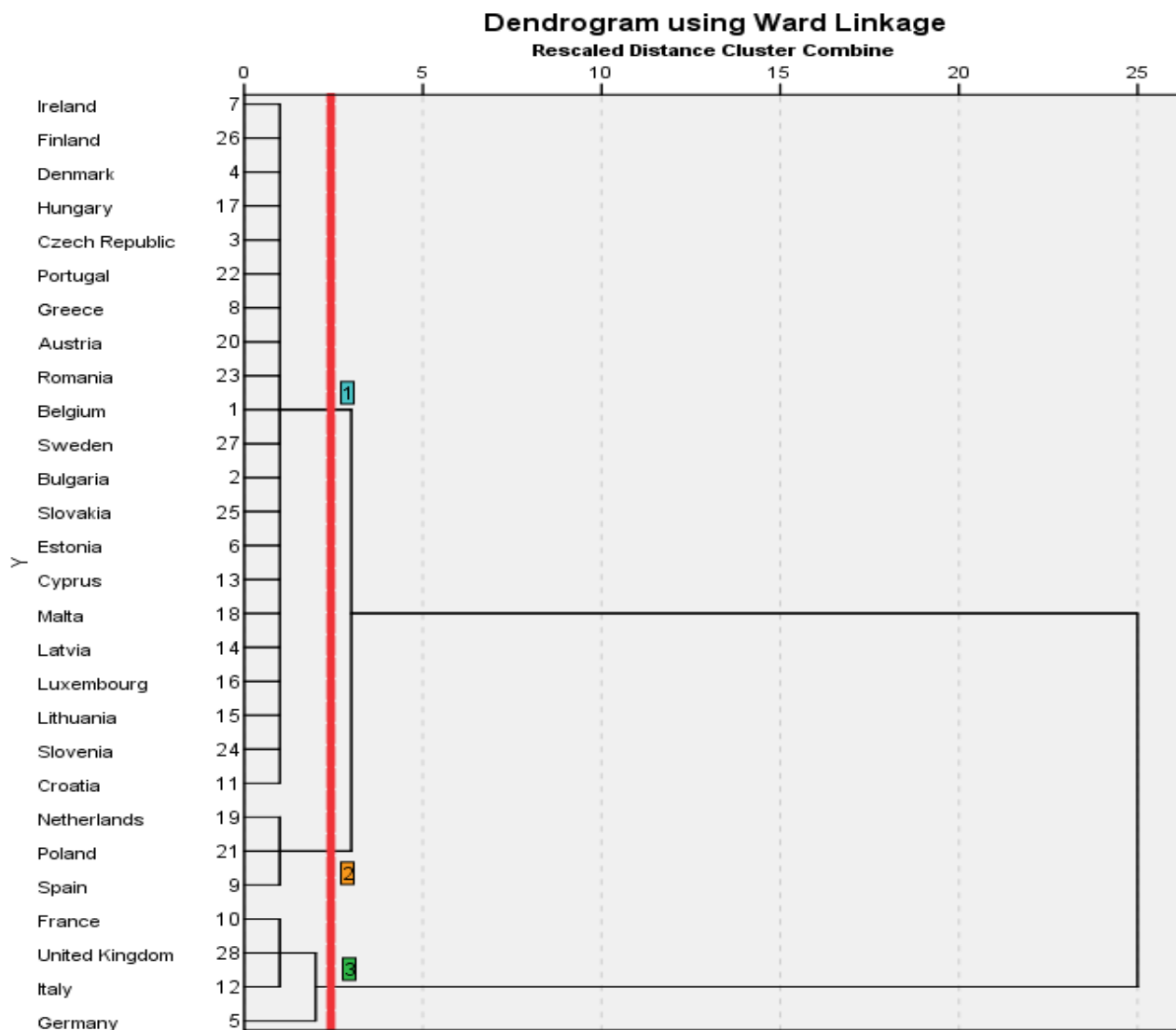ctory results. For all evaluated EU countries in the period 2007-2015, values of indicator are additionally highlighted through *conditional formatting feature*, which makes it easy to spot the differences in the values of indicators. The better results countries have, the appropriate value is more highlighted in a darker shade of green. The worse results countries have, the appropriate value is more highlighted in a darker shade of red. Lower values of indicator indicate better results During the crisis period, in all countries are evident noticeable fluctuations in unemployment, despite its growth to the current downturn.

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Table 2. Unemployment rate, annual average (percentage of total population)

Country/Time	2007	2008	2009	2010	2011	2012	2013	2014	2015
Belgium	4,5	4,2	4,7	5,0	4,2	4,5	5,1	5,1	5,1
Bulgaria	4,0	3,4	4,0	6,0	6,5	7,2	7,7	6,9	5,5
Czech Republic	3,4	2,8	4,2	4,6	4,2	4,4	4,5	3,9	3,3
Denmark	2,7	2,5	4,3	5,3	5,3	5,2	4,8	4,5	4,2
Germany	5,6	4,9	5,1	4,6	3,9	3,6	3,6	3,4	3,2
Estonia	3,0	3,7	9,0	11,1	8,3	6,8	5,9	5,0	4,3
Ireland	3,2	4,3	7,9	9,0	9,4	9,4	8,4	7,3	6,1
Greece	4,9	4,6	5,7	7,6	10,6	14,5	16,3	15,7	14,8
Spain	5,3	7,4	11,7	13,1	14,2	16,5	17,3	16,0	14,5
France	4,8	4,4	5,5	5,6	5,5	5,9	6,2	6,2	6,3
Croatia	5,7	5,0	5,4	6,7	7,8	9,1	9,8	10,1	9,6
Italy	3,3	3,7	4,2	4,6	4,6	5,9	6,7	7,1	6,7
Cyprus	2,7	2,5	3,6	4,3	5,3	8,0	10,7	11,0	10,1
Latvia	4,0	5,2	11,5	12,6	10,4	9,9	7,8	7,2	6,7
Lithuania	2,6	3,6	8,6	11,1	9,8	8,6	7,6	7,1	6,1
Luxembourg	2,4	3,0	3,1	2,7	3,0	3,2	3,7	3,7	4,3
Hungary	4,1	4,2	5,4	6,1	6,1	6,2	5,8	4,5	4,1
Malta	3,4	3,2	3,7	3,7	3,5	3,5	3,7	3,4	3,2
Netherlands	2,3	2,0	2,5	3,1	3,5	4,1	5,1	5,2	4,8
Austria	3,2	2,7	3,5	3,2	3,0	3,2	3,6	3,8	3,8
Poland	5,5	4,1	4,8	5,8	5,8	6,1	6,3	5,5	4,6
Portugal	6,0	5,7	7,0	8,0	8,6	10,5	10,8	9,2	8,3
Romania	3,8	3,4	4,0	4,2	4,2	4,1	4,2	4,1	4,1
Slovenia	3,1	2,8	3,8	4,7	5,2	5,6	6,4	6,2	5,7
Slovakia	7,0	6,0	7,6	9,1	8,6	8,8	9,0	8,4	7,3
Finland	4,6	4,3	5,5	5,6	5,2	5,1	5,4	5,7	6,2
Sweden	4,4	4,4	5,9	6,1	5,5	5,7	5,8	5,7	5,4
United Kingdom	3,6	3,9	5,2	5,3	5,5	5,4	5,2	4,2	3,7

Source: Eurostat, 2016, own elaboration

Also in the case of unemployment indicator, cluster analysis is used for defining country cluster profile based on the value of this indicator. In this paper, the best interpretation of data ensures *four-cluster solution* for indicator across the reference period (see Figure 2 and dendrogram of countries grouping). Results of cluster analysis are in line with *conditional formatting feature.*

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Fig. 2. Dendrogram – Clusters of EU28 countries based on Unemployment rate in time 2007-2015
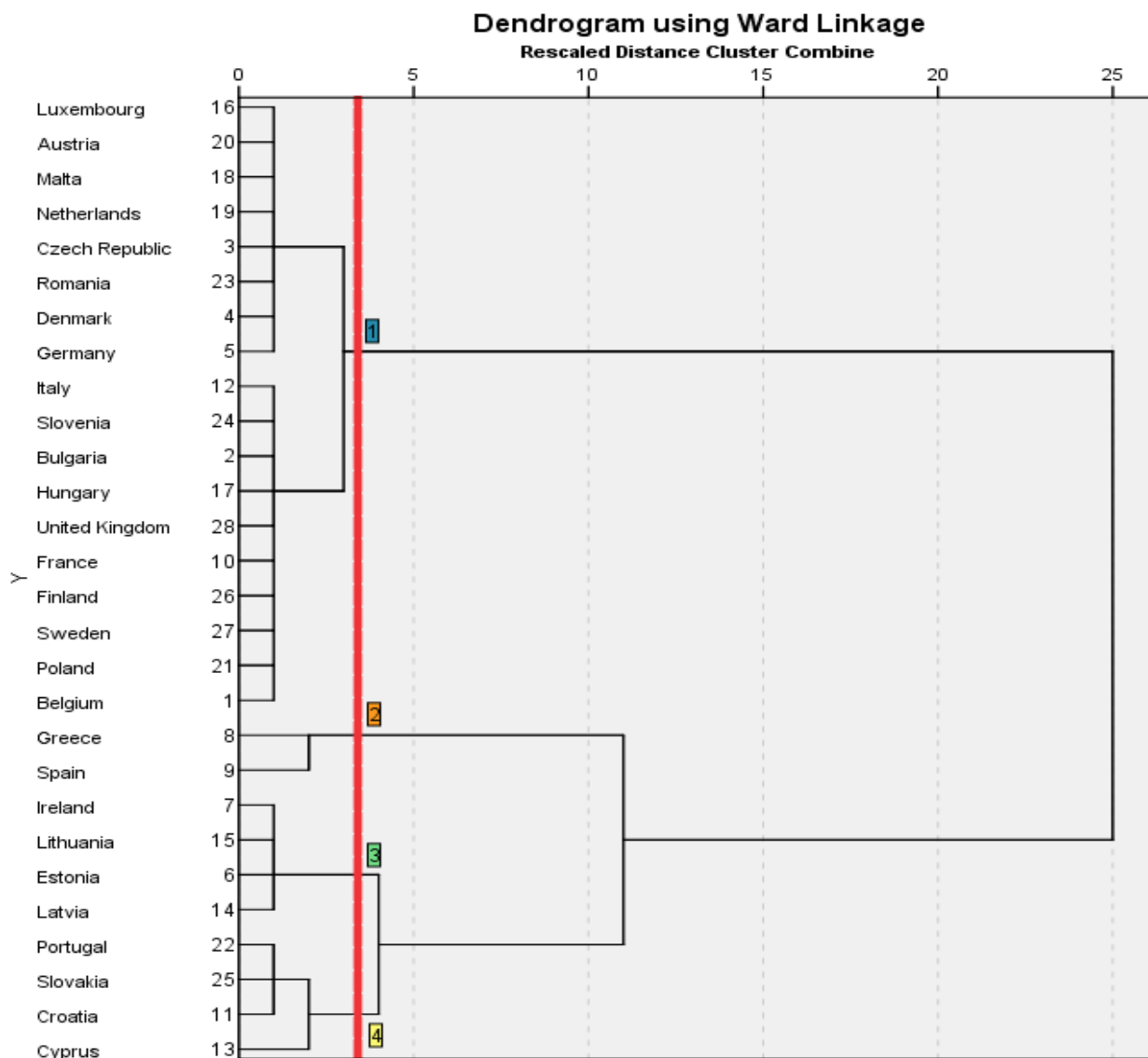(Source: own calculation and elaboration in IBM SPSS Version 22, 2016)

4   Conclusion

Economic crisis was an external factor more severely influencing countries that were strongly connected to the global market, be this through resource dependency or through their export activities. To increase their resilience, countries should increasingly mobilize their own resources, which is a challenging opportunity. Effects of the economic crisis quickly covered all of European territory, whereas recovery requires much more time. Differences in vulnerability and recovery between countries point to the role of a flexible economic system and the importance of a quick and coordinated response of all crucial actors – all levels of government (national, regional, and local), the public, and private sectors (Bagley, 2012). A quick response and adaptability are crucial, particularly because changes are becoming one of the rare constants of the contemporary increasingly interconnected world. Successfully facing daily challenges might contribute to higher resilience in the long run. In this regard, actions must be taken as soon as the first signals of a change appear; no matter the size of a challenge, a prompt reaction could help in overcoming it more easily. To this end, constant monitoring of economic trends is mandatory (Brozzi et al., 2015).

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   Economic crisis is also the right time to introduce locally led strategic planning, to enhance administrative capacity and participation of regional stakeholders in decision-making process, and to introduce reforms, new standards, and higher accountability. A proactive approach could considerably minimize the role of external economic factors; therefore, cooperation of all crucial institutional actors is desirable particularly concerning those measures aimed at safeguarding economic growth and employment, which ultimately can contribute to increasing resilience. Not only can proactivity provide an adequate response to external challenges, it can also put regions in a position where they generate and lead a change.

5   Acknowledgement

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NEW DEVELOPMENTS AND REFORM PROPOSALS OF THE MACROECONOMIC IMBALANCE PROCEDURE

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Abstract
The European Union (EU) has had a five-year experience with the Macroeconomic Imbalance Procedure (MIP) that was introduced by the European Commission in December 2011 as a response on accumulation of huge imbalances with the EU and the euro area. This paper evaluates results of the MIP and aims to examine what kind of imbalances have been revealed by the MIP, evaluate the current settings of the MIP and propose reforms that would enhance functioning and applicability of the MIP in practice. Based on results published in Alert Mechanism Reports and In-Depth Reviews and evaluation of the yearly cycle of the MIP we propose several reforms and changes in the MIP and the scoreboard of indicators in particular. We bring forward a concept of relative thresholds that reflect the economic development much better than currently applied absolute thresholds. Moreover, we recommend modification of some of the indicators involved in the MIP and introduction of maximally three flagship indicators that would receive special attention in assessment of the risk stemming from macroeconomic imbalances.

Keywords
Macroeconomic imbalance, relative thresholds, scoreboard, economic surveillance.

JEL classification
E61, E66, H12

1 Introduction

The great financial crisis was the most immense shock to the European economy since 1930s. One can find two particular reasons why the European Union (hereafter EU) and particularly the euro area has been experiencing the crisis and facing difficulties of resolving it. First, major differences between countries in economic development as well as political and social systems. Second, the euro area's inadequate economic governance typical of unsystematic discussions and toothless policy actions and responses.

As regards to the first aspect, different initial conditions in the core and the periphery of the euro area, mainly in terms of interest rates, led to the credit boom in the periphery financed by the capital flows from the core affecting competitiveness (Sapir and Wolff, 2015). As a result, current account balances and net foreign asset positions diverged to an unprecedented degree between the core (in surplus) and the periphery (in deficit). When the financial crisis hit in 2008-2009, private capital flows from the core to the periphery suddenly stopped (Merler and Pisani-Ferry, 2012), leaving behind a mountain of external debt (private and public) in the periphery owed to creditors in the core countries.

In the field of the euro area's economic governance, the European Commission introduced the Macroeconomic Imbalance Procedure (hereafter MIP) in December 2011 as an integral part of the EU economic surveillance framework. Although the MIP is designed and applied on all EU members, the euro area countries with no independent monetary policy are the primary target. The MIP purpose is to identify macroeconomic imbalances and induce remedial policy actions.

This paper is motivated by the fact that we have had a five-year experience with application of the MIP and we consider this as a proper time to evaluate the outcomes of this economic governance tool. Therefore, the aim of the paper is to examine what kind of imbalances have been revealed by the MIP, evaluate the current settings of the MIP and propose reforms that would enhance functioning and applicability of the MIP in practice. The remaining of the paper is structured as follows. The Section 2 introduces the MIP and its scoreboard of macroeconomic indicators. The Section 3 summarizes outcomes of the MIP on individual EU member states and macroeconomic imbalance indicators. In the Section 4 we propose calculation of relative version of the MIP indicators and

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compare their values and development with original indicative thresholds of the MIP indicators. We also bring forward some institutional reform proposals. The Section 5 concludes the paper with summary of the most important findings and results.

2   Characteristics of the Macroeconomic Imbalance Procedure

The MIP is a macroeconomic surveillance procedure established by the EU in response to the economic crisis and applied by its member states with the aim of improving economic governance. The MIP has two arms – preventive and corrective – with different objectives. While the preventive aim is to adopt good policies the corrective aim is to identify and correct policy failures.

The yearly MIP cycle starts with a comprehensive economic analysis, the Alert Mechanism Report (AMR), which covers all EU member states not benefiting from financial assistance. The analysis is based on the reading of a scoreboard of 14 headline indicators in combination with auxiliary indicators. Table 1 summarizes all the indicators along with ways how the data is transformed and the indicators are calculated. Table 1 also reports indicative thresholds for each indicator which specify the accepted range in which the indicator should be preferably found. The scoreboard includes both stock and flow indicators aiming at capturing the accumulation of imbalances over time as well as detecting short-term risks (Bobeva, 2013).

Table 1. Macroeconomic Imbalance Procedure scoreboard and indicators

Indicator	Measure	Accepted range
External imbalances and competitiveness		
Current account balance	3-year moving average, % of GDP	Between +6% and -4%
Net international investment position	% of GDP	> -35%
World export share	In current value, 5-year percentage change	> -6%
Real effective exchange rate	Vis-á-vis 42 industrial countries, based on consumer-price indices, 3-year percentage change	-/+ 5% (euro-area) and -/+ 11% (non euro-area)
Nominal unit labor costs	3-year percentage change	< 9% (euro-area) and < 12% (non-euro area)
Internal imbalances		
Private sector debt	% of GDP	< 160%
Private sector credit flow	% of GDP	< 15%
House prices relative to consumer prices	Year-on-year changes, in %	< 6%
General government debt	% of GDP	< 60%
Financial sector liabilities	Year-on-year changes, in %	< 16.5%
Unemployment rate	3-year moving average, in %	< 10%
Activity rate	3-year change, in p.p.	> 0.2%
Long-term unemployment rate	3-year change, in p.p.	< 0.5%
Youth unemployment rate	3-year change, in p.p.	< 2%

Source: European Commission [online] [2016-06-08]. Available from:
http://ec.europa.eu/economy_finance/economic_governance/macroeconomic_imbalance_procedure/mip_scoreboard/index_en.htm

After discussions of the AMR conclusions by the Council and the Eurogroup, the Commission decides for which countries it will prepare country-specific In-Depth Review (IDR). The purpose of the IDRs is to assess whether imbalances and excessive imbalances exist in the member states identified in the AMRs. If, on the basis of this analysis, the situation is considered unproblematic, the Commission will not propose any further steps. If the Commission however considers that

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macroeconomic imbalances exist, it will come forward with proposals for policy recommendations for the member state(s) concerned. In the preventive arm these are part of the integrated package of recommendations under the European semester. If the Commission instead considers that there are severe or excessive imbalances that may jeopardise the proper functioning of the euro area, it may recommend to the Council to open an Excessive Imbalance Procedure (EIP) which falls under the corrective arm of the MIP.

Then, the member state is obliged to present a corrective action plan (CAP) setting up a roadmap to implement corrective policy actions. If the Council considers the CAP to be insufficient, the Council adopts a recommendation to the member state to submit a new CAP. If the new CAP is still considered to be insufficient, a fine (0.1% of GDP) can be imposed. If the Council considers the CAP to be sufficient, it will endorse the CAP through a recommendation that lists the corrective actions and their implementation deadlines. Then, once a sufficient CAP is in place, the Council assesses whether or not the member state concerned has taken the recommended actions according to the set deadlines. Again, two possible outcomes can be distinguished. If the actions of the member state were insufficient the Council can impose an interesting-bearing deposit (0.1% of GDP) which can be converted into annual fine if the inability of the member state to correct imbalances continues. If the member state concerned has taken the recommended correction actions the EIP can be closed or placed in abeyance depending on whether the Member State is still experiencing excessive imbalances.

3   Outcomes of the Macroeconomic Imbalance Procedure application

Five issues of the AMR have been published since the introduction of the MIP. As discussed above, the AMR is the starting point of the annual cycle of the MIP, which aims to identify and address imbalances that hinder the smooth functioning of the national economies and EU economy as a whole. Based on findings of AMR the countries potentially facing economic risks are further analysed by the IDR and classified by the European Commission. This chapter summarizes findings of this process and shows how each EU member state has been evaluated in the MIP and which macroeconomic imbalances have been most pronounced in the EU during the analysed period.

3.1   Macroeconomic Imbalance Procedure classification of the EU member states

Table 2 summarizes findings of all AMRs that have been published so far. We apply a streamlined categorization of countries and distinguish four categories of seriousness of macroeconomic imbalances. Any EU member state can be classified as country with no imbalance, country with imbalance, country with excessive imbalance or country under a special assistance program. If the country falls to the last category it is not assessed by the AMR. The European Commission instead uses a more precise categorization that reflects individual phases and settings of the MIP. The configuration of MIP imbalance categories currently appears as follows: (a) no imbalance; (b) imbalances, which require monitoring and policy action; (c) imbalances, which require monitoring and decisive policy action; (d) imbalances, which require specific monitoring and decisive policy action; (e) excessive imbalances, which require specific monitoring and decisive policy action; (f) excessive imbalances, leading to the EIP.

It is evident from Table 2 that eight EU member states did not experience macroeconomic imbalances in any of the years examined. In all rounds of the MIP imbalances were not identified in Austria, Czechia, Estonia, Latvia, Lithuania, Luxembourg, Poland and Slovakia. All the countries are small or medium-sized economies and mostly new member states that joined the EU in 2004. Two more countries, Finland and Sweden, show a consistency in categorization that has not changed during the analysed period. However, both countries have been permanently experiencing macroeconomic imbalances, in particular developments related to competitiveness (Finland) and debt and housing market (Sweden).

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Several countries have improved the ranking as they corrected their imbalances. Whereas some countries reached the "no imbalance" status only in 2016 (Belgium, Hungary, Romania, UK) other countries adjusted the imbalances sooner (Denmark, Malta). By contrast, there are also EU member states where macroeconomic imbalances have accumulated and their MIP ranking deteriorated. Germany and Netherlands were initially evaluated as no imbalance countries but increasing external surplus and strong reliance on external demand induced the European Commission to classify the countries among countries with imbalances. Even more serious economic situation has evolved in Bulgaria, Croatia, Cyprus, France, Italy and Portugal. All these countries have faced or are still facing severe external and internal economic pressures and vulnerabilities. Hence, the European Commission categorizes them as countries with excessive imbalances.

Table 2. Classification of the EU member states according to MIP

	2012	2013	2014	2015	2016
Austria					
Belgium					
Bulgaria					
Croatia	N.A.	N.A.			
Cyprus					
Czechia					
Denmark					
Estonia					
Finland					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Luxembourg					
Malta					
Netherlands					
Poland					
Portugal					
Romania					
Slovakia					
Slovenia					
Spain					
Sweden					
United Kingdom					

Source: Author's compilation from various issues of AMRs and IDRs.

Note:

No imbalance		Imbalance		Excessive imbalance		Assistance program	

3.2 Macroeconomic Imbalance Procedure assessment of economic developments

Table 3 reports how many EU member states exceeded the reference values of the MIP scoreboard indicators. It should be noted that data evaluated in the AMRs are two years older than the year of the AMR issue. For example, the 2016 issue of AMR is based on data of 2014. One can see significant differences in number of threshold breaches among the indicators. While no or very few countries

reported private sector credit flow or total financial sector liabilities above the indicative reference value the net international investment position, export market shares or general government sector debt seemed to pose a macroeconomic risks in most of the EU member states.

Table 3. Number of EU member states breaching the MIP indicators thresholds

	2012	2013	2014	2015	2016
Current account balance	11	10	9	5	6
Net international investment position	15	15	16	16	16
Real effective exchange rate	4	1	9	0	1
Export market shares	15	17	19	17	18
Nominal unit labor cost	8	4	1	5	3
House price index - deflated	2	0	0	2	5
Private sector credit flow	1	1	0	1	0
Private sector debt - consolidated	15	15	14	15	13
General government sector debt	14	14	14	16	16
Total financial sector liabilities	N.A.	1	0	0	1
Unemployment rate	7	9	11	14	12
Activity rate	N.A.	N.A.	N.A.	N.A.	2
Long-term unemployment rate	N.A.	N.A.	N.A.	N.A.	11
Youth unemployment rate	N.A.	N.A.	N.A.	N.A.	13

Source: Author's compilation from various issues of AMRs and IDRs.

We can also observe interesting trends in some of the indicators. There are imbalances that have been reduced over the examined period and the number of countries beyond the thresholds decreased from 2012 to 2016. Most notably, imbalance of current accounts, nominal unit labour costs and real effective exchange rate are actually less worrying than they were in 2012. By contrast, another imbalances have remained present in relatively constant number of countries or have spread to even more member states. For instance, large negative net international investment position and general government debt have persisted in 14-16 countries. The imbalance that has remarkably increased its occurrence across the EU is the unemployment rate (from 7 to 12 countries). The remaining imbalances with rising incidence are deflated house price index and export market shares. For proper interpretation of figures presented in Table 3 it is worth to note that exceeding the indicative thresholds does not automatically mean that the country is facing a serious macroeconomic imbalance. Instead, the indicator values only identify the member states which may be affected by imbalances and for which further analysis should be undertaken before concluding on the existence or persistence of imbalances and their nature.

4   Proposed reforms of the Macroeconomic Imbalance Procedure

Although the decision of the European Commission to introduce the MIP has been taken positively and the MIP is generally considered as a useful tool of economic governance and surveillance on the EU level one can reveal several vulnerabilities and bottlenecks that limit applicability of the MIP and credibility of the MIP outcomes. This opinion is also well established in literature.

For instance, Moschella (2014) points out that the MIP is much better placed than the system applied by the International Monetary Fund in identifying imbalances and inducing corrective action. On the other hand, the MIP does not provide mechanisms to prevent political and arbitrary considerations from interfering with the decision to activate sanctions and on how to share the burden of adjustment. Bénassy-Quéré and Ragot (2015) argue that the MIP was built asymmetrically as it uses different thresholds depending on whether the country has an external surplus of deficit. The aspect of built-in asymmetry is stressed also in Sapir and Wolff (2015) as they call for symmetric application of the MIP and for completion of the MIP by national procedures to monitor and correct

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competitiveness problems. Furthermore, Sapir and Wolff (2015) along with Ederer (2015) and Boysen-Hogrefe et al. (2016) articulate the need for increasing national ownership of the MIP and its outcomes and policy recommendations. The sufficient ownership at the country level is conditioned by transparency and consistency of the MIP with regard to how the results of the scoreboard are linked to the final outcome of the MIP.

In this chapter, we bring forward two kinds of MIP reform proposal. First, propose application of relative version of the scoreboard indicators' thresholds. Second, we recommend several changes of the MIP scoreboard institutional settings that would increase the MIP efficiency.

4.1   Relative version of the indicators' thresholds

As Gros and Giovannini (2014) point out a key point in the MIP and EIP is that it should warn of impending problems within the euro area and the whole EU. It is thus questionable whether one should use absolute indicators thresholds. For example, if all countries had a large external deficit, a sudden stop to capital inflows would affect all of them at the same time. And if most EU countries run external surpluses, a particularly large surplus in any one country should not be regarded necessarily as an "imbalance". Moreover, the loss of in export market share is common to all advanced economies due to structural change in international trade imposed by the rise of emergent countries. Therefore, the absolute change of the single member state is not an effective indicator per-se. This consideration applies more in general to almost all indicators included in the MIP scoreboard. Application of relative version of the indicators' threshold is a methodological response to a common criticism of the MIP that it implies that imbalances arise solely within a single country, and not between countries (see e.g. Ederer, 2015).

The relative version of the indicator threshold is calculated as a weighted average of the respective indicator values observed in all countries included in the sample. The weights are determined according to national GDP of the involved countries. Mathematically, the relative indicator threshold is calculated as follows:

$$RT_i = \frac{\sum_{j=1}^{n} \omega_j i_j}{\sum_{j=1}^{n} \omega_j} \tag{1}$$

where RT_i is the relative threshold of the scoreboard indicator i, ω_j is the weight of the country j determined by its national GDP and i_j is value of the indicator i in the country j. The relative thresholds are computed in relation to the whole EU and the euro area. Although the relative thresholds are calculated for all MIP scoreboard indicators, the practical applicability is limited for the current account balance and net international investment positions. As it was already discussed above, particularly these two imbalances have evolved in the EU and the euro area to the situation in which one group of countries have surplus and the other one is in deficit (core vs. periphery, north vs. south). Hence, the relative threshold will be, by its definition, oscillating around a constant value far from original thresholds, which makes it difficult to interpret. Fig. 1 depicts development of all relative thresholds as compared with original thresholds given in the MIP scoreboard.

The relative thresholds reflect much better the current economic environment and developments in the whole sample of countries than the original and fixed indicative reference values. As can be seen from graphs in Fig. 1 the relative thresholds diverged from the original ones extensively in most cases and the differences remained present for a long period of time. If we focus on four imbalances whose original thresholds have been breached by most countries (export market shares, private sector debt, general government debt, and unemployment rate) we can reveal two typical discrepancies between the relative and absolute thresholds.

As regards to export shares and government debt, Fig. 1 illustratively shows that the original thresholds were very ambitious comparing with the general development in the EU and the euro area.

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In that case many examples of imbalance identified by the absolute threshold did not have to be out of the prevailing economic situation and, therefore, the original MIP rules could be too strict. By contrast, graphs of private sector debt and unemployment rate suggest that the official thresholds might be too permissive and potential risks stemming from imbalances could be hidden behind much lower values of the indicator than the absolute threshold.

Current account balance

Net international investment position

World export share

Real effective exchange rate

Nominal unit labor costs

Private sector debt

Private sector credit flow

House prices relative to consumer prices

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Fig. 1. Relative and original thresholds of the MIP scoreboard indicators
(Source: Author's calculations based on data from Eurostat MIP scoreboard database)

Hence, the relative thresholds should be actively used in the process of identification of macroeconomic imbalances. Our specific recommendation is to compare national indicator values with the relative thresholds and define a symmetric tolerance zone around the threshold in which the member state would be considered as no-imbalance country. The relative thresholds may completely substitute the current reference values or complement them in order to make the evaluation more accurate. Boysen-Hogrefe et al. (2016) also call for revision of the thresholds to improve the early warning properties of most MIP scoreboard indicators.

4.2   Changes of the Macroeconomic Imbalance Procedure scoreboard settings

We continue with further reform proposals that would limit, along with relative thresholds, several problematic aspects of MIP scoreboard institutional design. Moschella (2014) argues that the MIP builds on the application of asymmetric rules. This is evident, among others, in the MIP scoreboard as the indicative thresholds for the current account imbalance refer to +6 % of GDP on the surplus side and -4 % of GDP on the deficit side. Implementation of a symmetrical treatment would increase both effectiveness and credibility of the MIP.

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Some of the scoreboard indicators should be revised to increase their relevance and ability to identify a true imbalance risk. As pointed out by Bénassy-Quéré and Ragot (2015) the real effective exchange rate is computed relative to 41 industrial countries, most of which to not belong to the euro area. This binds the indicator to the evolution of the euro, which is outside the control of governments. Similarly, because unit labor costs are given in nominal terms, this measure will vary with inflation, which itself can vary widely across time periods. The crucial role of financial system in economy is not sufficiently reflected in the MIP scoreboard. Although an indicator of the growth rate of the financial sector liabilities has been added to the scoreboard it does not fully capture the ways how instability of financial sector may give rise to serious imbalances.

The last recommendation we bring forward in this paper regarding reforming the MIP scoreboard is introduction of maximally three flagship indicators. Breaching threshold of any of these indicators would automatically call for an IDR. While Bénassy-Quéré and Ragot (2015) suggest application of the current account balance for such a purpose. Our recommendation is to consider export share and private sector debt. The empirical analysis by Boysen-Hogrefe et al. (2016) revealed that particularly these indicators had proven to be useful in providing early warning signals in the financial crisis.

5   Conclusion

The aim of the paper is to examine what kind of imbalances have been revealed by the MIP, evaluate the current settings of the MIP and propose reforms that would enhance functioning and applicability of the MIP in practice. We found out substantial differences among member states in terms of degree of imbalances faced in national economies. While there is a group of eight countries (mostly new member states) that have constantly achieved a status of no-imbalance country 14 countries have been experiencing imbalances or excessive imbalance for at least three years. If we look on the MIP outcomes from a different perspective we reveal that 12 countries have maintained the same imbalance ranking over the whole period of five years. On the other hand, five countries have improved the classification and four countries received a worse ranking in 2016 than the starting classification from 2012. Whereas no country experienced excessive imbalance in 2012 and four countries were under special assistance program the figures from 2016 show that six countries faced excessive imbalance and only one country remained with special program and financial assistance.

As regards to the MIP scoreboard indicators and frequency how often their thresholds have been breached by the member state one can also reveal considerable differences among indicators. While export market share, net international investment position or general government debt exceeded the indicative reference values in most of the member states the total financial sector liabilities or private sector credit flow seemed to pose imbalance risk in very few or no country. Such a finding raises the question whether selection of indicators and structure of the MIP scoreboard are appropriate.

Our key proposal on how to reform the MIP is introduction of the relative thresholds for the scoreboard indicators instead of the current absolute thresholds. We believe that decision on (non)existence of the macroeconomic imbalance must reflect the actual economic development in the examined group of countries. Therefore, the threshold will be probably different in times of economic boom than in period of economic crisis and recession. The current absolute thresholds can be totally replaced by the relative version or they can be applied concurrently for an interim period. Furthermore, we propose to supplement the thresholds reform with several minor institutional changes such as computation of the scoreboard indicators or introduction of maximally three flagship indicators in order to increase relevance and economic rationale of the MIP results.

6   Acknowledgement

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SERVICES ON THE EVE OF THE NEW SINGLE MARKET STRATEGY

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Abstract
Services are a driving force in modern economies. However, to exploit their full potential in a European dimension, the effective functioning of the Single Market in services is necessary. However, the Single Market in services still cannot be perceived in terms of full operational efficiency. Despite the efforts undertaken by the EU, the services sector is highly fragmented along national lines and there are many restrictions that hold it back. The EU has again set itself the target to advance the Single Market. Services are one of the priorities in a new strategy and thus it is important to analyse the present situation regarding barriers that obstacle the effective functioning of the Single Market for services. It is evident that the improvement can be make only with the voluntary cooperation between Member States. And this might be the most difficult barrier to overcome. The aim of the paper is to present the situation in services sector in the European Union at the moment of launching a new strategy for Single Market.

Keywords
Services, Single Market, liberalisation, barriers, Service Directive

JEL classification
L80, O52, P17

1   Introduction

Services are a driving force in modern economies. However, to exploit their full potential in a European dimension, the effective functioning of the Single Market in services is necessary. The EU Single Market as one territory without any internal borders or other regulatory obstacles to the free movement of goods and services people and capital is, from the point of view of economic integration, one of the most important steps to deepen cooperation between the Member States. But, despite more than two decades since introducing the idea of Single Market in the European Community, free movement of services still cannot be perceived in terms of full operational efficiency. During this period, the effectiveness of liberalization was relatively low and resistance of Member States to introduce such liberalising solutions - high.

The Service Directive adopted in 2006 intended to increase the effectiveness of the Single Services Market in a way of abolishing discriminative restrictions and facilitating provision of services EU-wide. But since there is not a great progress in reducing regulatory barriers in Member States, the services sector in the European Community should be still characterised as the set of national markets rather than one single market for services. In 2015, the European Commission once again has made efforts to implement the basic principles of the Single Market to foster process of creation effective the services sector.

The aim of the paper is to present the situation in services sector in the European Union at the moment of launching a new strategy for Single Market.

The paper is structured as follows. Section two the development of the Single Market is discussed. In the section 3 the internal services market acquis is characterised. The aim and main principles of the Services Directive are presented in the section 4, followed by analysis of the present situation in the Single Market for services, especially in regard to limitations and barriers. Services market comprises of two categories of services: services ruled by the sectoral regimes and services undergoing provisions of the Services Directive. In the sixth section there is some deeper insight made into the situation in selected services, especially business services and construction services, as the ones having the highest level of restrictiveness. The future activities relating to services

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announced in the new Single Market Strategy are mentioned in the last section. The paper is concluded by a general appraisal of present and future in services sectors of the European Union.

2   Since the implementation of the Single Market to a new Single Market Strategy

The Single Market was supposed to be a key step in deepening economic cooperation in an integrated structure as the European Union. Its foundations and principles were set out in the Single European Act of 1986, and their execution took place on 1 January 1993. But, since then the implementation of those provisions and regulations at the level of Member States as well as the coordination at the Community institutional level, were far from effectiveness. Moreover, after the first period of increased interest in the Single Market in the 90s, the stagnation period started in late 90s and was continued at the beginning of XXI century. The main problems of this period are identified as (Kuczewska and Stefaniak-Kopoboru, 2016):

•   poor involvement of Member States in the implementation of the Community law;
•   low rate of implementation of tools and complementary actions adapted to changing conditions;
•   a focus shift to other areas of integration such as political and institutional changes, enlargements and the introduction and then stabilizing the euro zone.

A new impetus for actions to revisit mechanisms of the Single Market and the development of new tools and activities or reform the existing ones was given by the Monti's report (Monti, 2010). A state of the Single Market at this time has been characterized there as highly diversified between Member States with big loopholes between regulations at the Member States and Community levels. In addition, it was also characterized as having low levels of competitiveness and innovation and, unfortunately, a low level of citizens' trust.

Based on the Monti's report, in 2011, the European Commission has launched a program of reforms: "Twelve levers to boost growth and strengthen confidence" (European Commission, 2011). This strategy was supposed to lead to the development of a strong and competitive economy based on innovations, intelligent technologies and knowledge and to support entrepreneurship. However, these reforms has not been implemented. That happened due to the economic downturn arising from the crisis of 2008-2010 which caused a shift the focus on operations of stabilizing national economies in Member States, while at the Community level the focus was on measures stabilizing the euro zone (Kuczewska and Stefaniak-Kopoboru, 2013). The next attempt to improve the competitiveness of the European economy was undertaken in 2015, including a new strategy for the Single Market.

3   The internal services market acquis

The acquis for the services sector is very broad. The fundamental principles are set out in the Treaty on the Functioning of the European Union (TFEU). To make these principles a reality the horizontal and sectoral regimes needed to be set up in order to regulate specific types of services (Fig. 1).

The main horizontal regulation is the Services Directive (2006/123). The number of services covered by this Directive is very wide (e.g. retail services, business services or construction), but it does not cover all services. Some services due to their specific importance to economies are excluded from the scope of the Services Directive and are regulated by a specific sectoral laws (e.g. financial services, transport, telecommunications, postal services). The horizontal regimes include also that of public procurement and related regimes for public works, infrastructure for network industries (especially cross-border and the EU-wide ones) and, finally, two-tier government for the internal market in services, granting the EU agencies with more trust and powers (CEPS, 2014).

The sectoral services regimes were set up in regard to services of specific characteristic and a special importance to national economies as well as the economy of the whole European community. Since those regimes exist for decades, they can be assessed as quite developed, however due to the economic and technological development they need to be amended to reflect the current situation.

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Finally, the services sector is not existing separately from the other sectors of the economies. Therefore the regulatory frameworks should somehow be coherent with the regulations governing other areas such as labour market and the freedom of movement of workers, trade and the freedom of goods at the intra-EU and extra-EU perspective, or consumer rights.

Treaty 'chapeau'

- General TFEU obligations
- Free movement & right of establishment
- EU competition policy
- EU regulation & European standards

Horizontal services regime

- horizontal services directive (2006/123)
- public procurement, works & concessions
- infrastructures for network industries
- appropriate, subsidiarity-driven EU powers in a two-tier Union (incl. Agencies)

Sectoral services regime

Financial markets

- banking
- insurance
- investment services
- asset management
- financial stability

Transport modes

- road haulage
- river/maritime
- bus/coach
- air/rail (see network section)\
- Agencies (safety)

Network sectors

- broadcasting
- eCommunications
- gas (electricity)
- postal
- air/rail transport

Regulated professions

- diploma recognition
- link services directive
- EU-wide codes

Temporary cross-border services & Directive 96/71

- posted workers
- no circumvention

Sensitive sectors

- private security
- cross-border health (patients)
- gambling

Cross-cutting regimes for single market activities

- Internal retail market
- Digital single market
- Internal market for logistics
- Horizontal consumer aquis

Fig. 1. Holistic view of internal services market acquis (Source: CEPS, 2014)

4   The Services Directive – aim and main principles

The services sector accounts for nearly 70% of EU GDP and is a key employment sector (CEPS, 2014; European Commission, 2016a; Erixon and Georgieva, 2016). However, this sector is also burdened with functioning of number of barriers, especially in relation to cross-border trade in services, rights for establishment business or the recognition of qualifications. Prior to the

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implementation of the Services Directive there were about 35,000 regulatory barriers (Corugedo and Perez Ruiz, 2014).

Legal and administrative barriers considered to be the most limiting the effective functioning of the Single Market in services were identified as (Kulawik and Jankowski, 2010):
• difficulties in obtaining information about formalities,
• difficulties in finding competent authorities responsible for issuing licenses and other formalities,
• a need to address a number of different bodies in order to obtain various permits,
• unclear and unjustified requirements,
• long, complicated and costly procedures.

Countries with the largest number of regulatory impediments were Germany, the Netherlands, Spain and Austria, and the countries with the most open access to the services market were Cyprus, Malta, Luxembourg and Finland (Corugedo and Perez Ruiz, 2014).

Despite the general decline in interest in the internal market in the late 90s, some activities were carried out aimed at improvement of functioning of the free movement of services. Implementation of this freedom, however, proceeded in a more restricted way than it was in the case of other freedoms. Services, in general, were subject to the core principles of the EU Single Market, that have been developed through the case law of the European Court of Justice. This case law was codified into EU law with the adoption of the Services Directive in 2006 and implemented on 28 December 2009 (Directive 2006/123/EC).

The aim of the Directive was twofold: firstly, to eliminate obstacles to the development of service activities between Member States and, secondly, the establishment of general provisions facilitating the exercise of the freedom of establishment for service providers and the free movement of services, while maintaining a high level of quality of services. It should be emphasized that the Services Directive applies only to requirements which have a direct impact on the taking up and pursuit of service activities, and does not apply to requirements which should be followed in conducting such activities. Additionally, it should be stressed that it does not harmonise national regulation. It rather facilitates cross-border services activities for the services falling under it (CEPS, 2014).

The main task of the Services Directive was to simplify administrative procedures relating to access to and exercise of service activities, for example by abolishing requirements to provide certified documents proving the right to exercise particular service activities. Novum in the directive was the introduction of points of single contact (PSCs), where service providers can complete all procedures and formalities, especially to start a business (in every legal process form), to obtain all necessary permits and licenses to conduct business, and implement other procedures to provide services. Moreover, all these administrative procedures should be possible to be completed by mail, phone or electronically.

In order to prevent the introduction of new barriers in place of those abolished, the provisions of this Directive oblige EU Member States not to introduce their own requirements or procedures, unless they are essential and necessary (particularly in view of public safety). Additionally, there is imposed an administrative cooperation between EU countries in order to give mutual assistance in the supervision of service providers. That should ensure effective supervision of service providers and guarantee that such supervision does not lead to additional and unjustified obstacles for service providers (European Commision, 2016b).

The scope of the Services Directive is not limited to services provided between the EU countries only however and also covers services provided within countries (European Commission, 2016a).

5 The Services Directive in practise

Despite the large contribution to the implementation of the free movement of services, the Services Directive did not cover fully all the issues related to the effective functioning of the free movement of services. Above all, the notion of cross-border provision of services still remained imprecise [Kulawik and Jankowski, 2010]. This concept has been shaped only on the basis of the case law of

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the EC Court of Justice, which should be considered inadequate from the point of view of legal certainty. Interpretation of the various situations is still subordinated to the decisions of national and judiciary authorities. Moreover, it is estimated that the introduction of the Directive has not significantly contributed to the simplification of the European laws [Kawka, 2015]. This situation occurs due to several factors. Firstly, the Services Directive is not a law that is directly implemented into the national legislation systems. It functions as the one more legislation layer added on the top of national laws, which aim at setting up a general framework. Secondly, differences in the way of implementation and the number of national implementing measures (NIMs) concerning the Services Directive vary significantly between Member States. Most of the countries decided to adopt one horizontal law, whether Germany and France implemented several acts (European Commission 2016c). As for the NIMs, differences between countries are much greater: from 1 legislative act in Bulgaria or Estonia to 220 legal acts in Germany and 423 national acts in Hungary (EUR-Lex, 2016). And, thirdly, the situation is getting more complicated due to a lack of clear support of some Member States for further liberalization of trade in services and also due the number of exceptions that make adopted common regulations not applicable to all types of services.

In relation to the PSCs, the Directive requires easy access to information, but this is limited only to assistance to providers and recipients in obtaining general information how requirements are usually interpreted or applied in a particular Member State. This does not include the obligation to the competent authorities to deliver a legal advice in individual cases. In addition, there is no obligation, but only incentive to ensure that such information should be also available in languages other than the official language of the country. The greatest problems are concerned with the integration of PSCs in the e-government structures (European Commission, 2013). This obligation has been fulfilled in some countries (e.g. Estonia, Spain, The Netherlands or Sweden), however some countries still lag behind (e.g. Belgium, Germany, Poland, Latvia or Romania).

Having the first analysis and evaluations of performance of the services sector after the implementation of the Services Directive, the European Commission has taken a number of measures and recommendations for individual Member States in order to achieve more effective implementation of the Services Directive - "A partnership for new growth in services" (European Commission, 2012). As a result of actions taken, Member States have increased their efforts to carry out appropriate reforms. But still, the degree of trade integration in the single services market amounted to approximately 5%, while in the commodities market about 22%. Also assessments of consumers regarding the single market in services were less positive than of a single market for goods (European Commission, 2013). Additionally, evaluations of the implementation of the Services Directive indicated constrains retained at the Member States level, major differences in national legislation on labour, taxation, health and safety, consumer protection and contract law as well as restrictions on access to professional activities in the field of services. There are still some lingering barriers such as a spurious justification of retained regulation in e.g. certain professions (e.g. where Member States did not have regulation), the retention of restrictions for establishment of companies via their mandatory legal form and/or ownership requirements and, finally, requirement of insurance in the absence of a market for such occasional (cross-border) activities (CEPS, 2014). Discrimination of the recipients of services was also noticeable, especially in the form of restrictions on possibilities of purchasing services on grounds of nationality or place of residence, and in increase of prices, they had to pay in such situations, especially in the online transactions (European Commission, 2013).

Services are a special kind of activity, and to a large extent, are provided within the framework of the highly specialised professions. According to the European database of regulated professions, in all Member States there are currently over 5000 regulated professions having separate national regulations where different procedures in respect to service providers from different Member States apply. This situation creates regulatory obstacles to mobility of these providers. The positive is that actions taken by the Commission in previous years resulted in a greater involvement of Member States in the process of reforms what led to easiness or abolishing many of the regulatory barriers.

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However, still regulations to some professions vary greatly between individual Member States (more liberal or strict approach), especially for construction engineers, architects, accountants, lawyers, real estate agents, tour guides and patent attorneys (European Commission, 2015b).

The effective functioning of the Single Market in services relies on the will of its Member States. However, many times it is quite questionable. No such a structure as the one common market will work effectively if countries constituting it disobey provisions of the community law concerning the obligation of notification new regulatory measures planned for implementation within national regulatory regimes. That creates the legislative burden and there is no verification of the reasonableness and proportionality of new national rules that restrict the free movement of services, as well as no clarity for consumers and businesses required by provisions of the Transparency Directive (2015/1535).

6   Barriers in selected services

Services market comprise of two categories of services: sectoral services and general. As mentioned in the third section, sectoral services are excluded from the scope of the Services Directive. These services differ significantly (e.g. professional services, healthcare services, transport, financial services, gambling). Although there are separate regulations at the European and national levels for each of type of sectoral services, there is no possibility to perceive any of them as functioning in a way of the effective internal market. There are number of reports analysing barriers functioning in those sectors (Monteagudo et al., 2012; CEPS, 2014; EU High Level Group, 2014; Canton et al., 2014; European Commission 2015c). Pelkmans and Mutilli (CEPS, 2014) characterized the European markets in sectoral services as: moderate fragmented (in case of financial services and transport services other than rail), considerable fragmented (professional services) and severely fragmented (network services, eCommunications, rail services). As for services undergone the Services Directive two type of services are recognised as of the highest level of restrictiveness. These are business services and construction services.

There are four key business services sectors: accountants, architect, engineers and lawyers (European Commission, 2015c). Within these sectors rules may be different according to the type of activity considered. There is a number of regulatory and non-regulatory barriers relating to business services. The regulatory barriers refer to: 1) reserved activities, 2) authorisation requirements, 3) compulsory chamber membership requirements, 4) restrictions on corporate form, shareholding structures and multidisciplinary activities, 5) insurance requirements, 6) tariff restrictions, and 7) restrictions on advertising. The non-regulatory barriers include provision of information on legal requirements and the completion of procedures online through the Points of Single Contact.

The overall analysis of the situation in the business services was made by the EU High Level Group (2014) and the European Commission (2015b). Results of those analysis show that the business services market is highly fragmented and the levels of business services barriers varies greatly between Member States. Furthermore, there is a lack of information on procedures needed for going cross-border, excessive bureaucracy, fragmented legislation as well as taxation and insurance regimes that inhibit cross-border trade. The highest level of overall restrictiveness is in Luxemburg and Austria, while the lowest in Sweden and the United Kingdom. The results differ additionally depending on the key sector of business services and the type of restrictions.

Construction services includes construction/building companies; certification services in the area of construction; crafts businesses in construction sector. This is the second sector with the largest number of barriers in the EU (European Commission, 2015c). The regulatory barriers in construction concern in general restrictions on authorisations, registrations and notifications, especially with obtaining building permits (Ecorys, 2015). Secondly there is a number of restrictions for access to construction services. They include technical and professional capacity conditions, organisational requirements and certifications (especially to fulfil health and safety standards or special management standards), and last, but not least, economic or financial requirements. Additionally, the performance

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of construction services is directly impacted by specific fields of law, including environmental, energy efficiency, urban and spatial planning, labour and social security law, with some of this legislation introduced at EU level. There is also a whole set of burdensome formalities concerned posting workers issues and requirements applicable to professional services.

The analysis undertaken by the European Union (2015c) shows that the EU construction sector is characterised by very restrictive national regulations what results in low integration across Member States and significantly lower level of intra-EU imports and exports compared to other services sectors. The highest level of overall restrictiveness is in Denmark and Bulgaria, while the lowest in the United Kingdom and the Netherlands.

7 Services sector in a new Single Market strategy

Unsatisfactory results of measures undertaken by the European Commission in monitoring and disciplining the Member States in better achievement of objectives of the Services Directive, led the European Commission to indicate tis sector as a one of priority areas in a new Single Market strategy. After the economic crisis of 2008-2010, Member States have continued to focus on strengthening their economies and the Commission's assessment was needed to give a new impulse to re-engage them in the efforts for realization of Single Market per se, not only in services. On the basis of research and public consultations, including the Monti's report and 12 levers Programme, a new program of actions to improve the competitiveness of the European economy was proposed (Kuczewska and Stefaniak-Kopoboru, 2016). The new Single Market strategy as an element of this broader program has been presented by the European Commission on 28 October 2015 in the document "Upgrading the Single Market: more opportunities for people and business" (European Commission, 2015a).
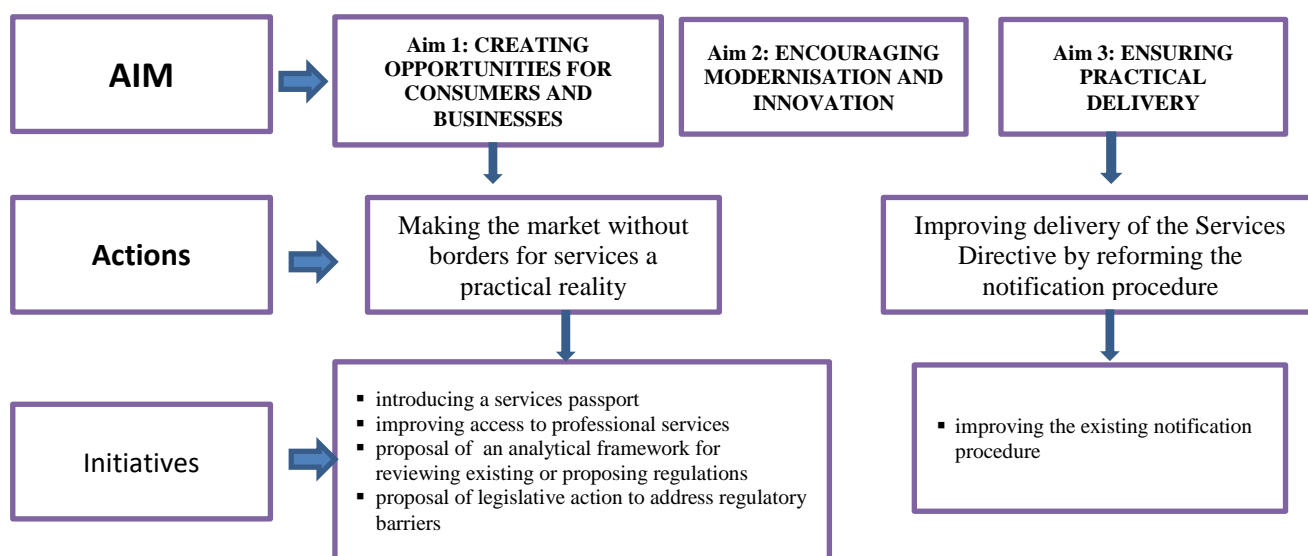
Fig. 2. Services in the new EU Single Market strategy (Source: Author's elaboration)

The new Single Market strategy is a package of measures to improve the functioning of the single market through the implementation of targeted actions in three key areas:
• creating opportunities for consumers, professionals and businesses;
• encouraging and enabling the modernisation and innovation that Europe needs;
• ensuring practical delivery that benefits consumers and businesses in their daily lives.

In these key areas there are 11 specific objectives and 22 initiatives. As regard to services there are two specific objectives and 5 initiatives (Fig. 2). Implementation of those initiatives was planned

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for 2016, however at the moment of submitting this paper (June 2016), there are no information on progress in these projects.

8   Conclusions

Single Market was created with the intention to improve economic performance of the European Community. But the European Union is amalgam of different nations. Therefore it is diversified culturally and linguistically. Different approaches to the role of governments and policies management result in regulatory heterogeneity amongst Member State in the scope of national regulations concerned directly with the Single Market issues, as well as those which fall outside the internal market domain, such as private law issues or taxation, networking and trust. Additionally important determinants are cultural biases, local service traditions and national reputation what all together constitutes informational asymmetries (CEPS, 2014). As the result the services sector is highly fragmented along national lines and there are many restrictions that hold it back (Erixon and Georgieva, 2016).

The European Commission is in the process of launching a new strategy for Single Market. One of the priorities is to make the services sector a practical reality. Will this strategy be successful at the end of the day? So far, despite the efforts undertaken by European institutions, the services sector is lagging behind markets for goods. The European legislative bodies are lacking of powers to solve all the issues at the EU level and, therefore, voluntary cooperation between Member States is obligatory for the Single Services Market to become a reality. But Member States are not eager to abolish barriers of any kind that will lead to opening an access to their services markets. And this might be the most difficult obstacle to overcome.

So far the progress of liberalising the services sector in the European Union has fallen short of expectations.

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IMPACT OF THE INFORMATION ABOUT TAX BURDEN ON THE STOCK MARKET

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Abstract

The paper investigates relationship between the stock price returns and tax burden of US companies listed on NASDAQ. The special emphasize is put on the role of perception of the news related to changes in tax burden. Using Google Search data I show that increasing tax searches decrease stock prices. Additionally, I differentiate between the market capitalization. The results confirmed higher impact of perception on large cap companies and point out the importance of sentiment analysis at liquid markets.

Keywords
Google trends, corporate tax, sentiment, stock price, search intensity

JEL classification: D83

1   Introduction

A tax system consists of a set of taxes imposed upon taxpayers by a state or a functionally similar entity. The purpose of taxes is to cover public expenditures and to better distribute the impact of negative influences on the state's economy. The impact of taxation on the tax payers' profit generally outweighs the profit it brings to the state (Láchová, Vančurová, 2014). The tax burden is reflected in the investment sentiment in the form of rationality vs. irrationality of the investor.
In 2006, Amromin et al. focused on the hypothesis that the decrease in tax on dividends had an impact on stock prices in 2003. They substantiated their hypothesis e.g. by comparing newspaper articles on the topic of stock prices development published by 15 of the greatest American newspapers. I thus presume that the market is influenced by the media, with the influence being reflected in changes in stock prices.

Nowadays, taxes are a much-discussed topic, which concerns especially the corporate tax. In the United States, the public wants the government to both reduce the corporate tax and to focus on loopholes to ensure that American corporations pay as much on foreign profits as they do on profits made in the United States. (americansfortaxfairness.org). The identification of market reaction on information in the media could be useful for more efficient tax planning.

The study also focuses on the differences in the processing of media information related to market capitalization. Low capitalization countries are less sensitive to tax-related information than high capitalization companies. Therefore, the study's findings could also be used to achieve more efficient business valuation.

The aim of the present paper is to demonstrate that tax burden influences stock prices not only through tax rate but also through the information the investor receives about the tax burden.

The structure of the paper is as follow. Section 2 reviews the literature concerning the use of Google Trends data, fundamental and psychological factors. Section 3 introduces data and the methods used in the paper. Section 4 discusses my results. Section 5 concludes and Section 6 references.

2   Literature references

Keim and Stambaugh (1986), Fama and French (1989), Balvers et al. (1990), Chen (1991) and Lee (1992) proved a connection between the fundamental factors (industrial production, dividend

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yields,…) and the stock market. Other studies, e.g. those conducted by Fama (1990), Schwert (1990) and Barro (1990), reported that several economic variables helped to predict future movements in stock return in the United States. Therefore, the fundamental factors appear to be important variables in the prediction of stock prices volatility. A number of studies focused on tax rates and their influence on stock prices (e.g. Blouin, Raedy, and Shackelford, 2002; Ayers, Lefanowicz, and Robinson, 2003; Dhaliwal, Li, and Trezevant, 2003). The studies proved that tax burden has an impact on stock prices (e.g. Günther and Willenborg, 1999). The study by Günther and Willenborg proved the influence of taxes on corporate cost, with a reduction in tax burden leading to an increase in stock prices.

Later studies focused on the stock market sentiment related to the attitude of investors towards securities. Evans and Honkapohja (2001) used the investors' expectations as one of the variables. Their research employed the adaptive learning method which assumes that economic agents are constantly learning and adapting. The study revealed optimism and pessimism shocks induced by outside factors such as news, changes in market sentiment etc. These effects introduced a new source of volatility to the stock market. Psychological factors were used by many researchers; Evans and Honkapohja (2003), for instance, employed them in their study of monetary policy. Other studies include Milani (2014) and Carceles-Poveda and Giannitsarou (2008).

Clearly, then, it is not only changes in the tax burden that affect stock market prices, In taxation isn´t important only the change of tax burden but also the information about tax rates (Chetty, Looney and Kroft, 2009; Finkelstein, 2009; Edgerton, 2012; Alstadsaeter and Jacob, 2013).

Bijl, Kringhaug and Molnár (2016) investigated the impact of sentiment on dividend yields using Google Trends. High frequency of searching for relevant keywords on the internet was found to negatively affect the yields. Using the Google Trends application the authors of the study proposed a new business strategy, according to which the investors should buy stocks when the search intensity is low and sell their stocks when it is high. A similar study conducted by Takeda and Wakao (2014) focused on sentiment using a sample of 189 Japanese companies The study revealed a mild positive correlation between search intensity and dividend yields. The study confirmed the authors' hypothesis that an increase in online searching activity is associated with an increase in trading activity.

In my work I focus on market sentiment using the Google Trends application which will provide information on the levels of online search for tax-burden related keywords.

3   Data and methods

To provide a detailed analysis of stock returns I employ panel data regressions where $prices_{it}$ represents average stock price of company i listed at NASDAQ stock market in year t. First, I use generally known CAPM model with the additional regressors related to market sentiment:

$$prices_{it} = \sum_{m=1}^{M}\beta_m marketindex_{ct}^m + \sum_{g=1}^{G}\beta_g \, google_{ct}^g + + \mu_i + \theta_t + \varepsilon_{it} \tag{1}$$

where the variable *marketindex* represents Nasdaq Composite Index m. The last set of variables includes Google Trends's search index in the country c g (total amount of searches in the year t and maximal values of monthly searches during the year t). The country c represents different US states and the US as the federal republic. Finally, I include company fixed effects μ_i, time effects θ_t, and applied OLS robust estimator to estimate robust standard errors ε_{it}.

Second, I differentiate between the market capitalization:

$$prices_{it} = \beta_m marketindex_{ct}^m + \sum_{g=1}^{G}D_i\beta_g \, google_{ct}^g + \mu_i + \theta_t + \varepsilon_{it} \tag{2}$$

where Google Trends's search index in the country c is interacted with dummy variable D for a company i. The dummy is determined by the different level of market capitalization of the company i at the NASDAQ market.

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The dataset contains yearly data from the period 2004-2015 and includes 4 788 companies located in the USA (provided by The NASDAQ Stock Market). Outliers were removed below the 1st and above the 99th percentile. The data were transformed using chain indices and logs. All the data are unique because of their manual searching and processing.

To understand the relationship between tax burden and stock prices I work with a group of keywords and their search intensity using the Google Trends application. This application provides a time series index (from 0 to 100) of the volume of internet search queries for a set of keywords or phrases. The search intensity is an indicator sentiment of economic agents towards information about changes in tax rates. I chose the following group of keywords: corporate tax/corporate taxes, corporate income tax/corporate income taxes, corporate tax rate/corporate tax rates, with all the phrases focusing on taxation of the companies. There are 4 variables representing the searching activity of investors, either pertaining to the individual states or to the whole of the USA. Two of them are composed only of maximum values of the search intensity.

4   Results

Table 1. Impact of the information about tax burden on the stock market 2004-2015

VARIABLES	(1)	(2)	(3)	(4)
Market index (ln)	0.332***	0.260***	0.607***	0.607***
	(0.041)	(0.051)	(0.017)	(0.017)
Index of search intensity by state (ln)	-0.023			
	(0.016)			
Index of max. search intensity by state (ln)		-0.133***		
		(0.037)		
Constant	0.255***	0.321***	0.002	0.002
	(0.032)	(0.043)	(0.007)	(0.007)
Year - specific effects	yes	yes	yes	yes
Observations	27,358	27,358	39,133	39,133
R-squared	0.109	0.111	0.099	0.099
Number of id	2,704	2,704	3,390	3,390

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 1 contains the basic output data used to study the relationship between the index of stock prices and variables representing the market (investor) sentiment. The data reveal a positive correlation between the index of stock prices and market index, meaning that an increase in the market index is accompanied by an increase in stock prices. The results were found to be significant at the 1 % significance level. With respect to the independent variables representing the market sentiment, a negative correlation was found between the index of stock prices and impact of the information on tax burden, regardless of the nature of the information, with 1 % significance level. A significant explanatory variable *Index of max. search intensity by state* reflects the limits of using the Google Trends application for the study of the behavioural response of economic agents. It has been shown that it is possible to use only data related to economic shocks, i.e. unexpected events affecting the economy. The above results follow from the data related to the *index of max. search intensity by state* variable; the category only includes search frequency peaks where the search intensity was the greatest.

In specific terms, it can be said that a 1% increase in the perception of information about tax burden is accompanied by a 0.13% decrease in the index of stock prices.

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Table 2. Impact of the information about tax burden on the stock market in 2004

VARIABLES	(1)	(2)	(3)	(4)
Y2004	0.041***	-0.001	0.045*	0.020
	(0.014)	(0.013)	(0.027)	(0.029)
Market index (ln)	0.461***	0.480***	0.486***	0.492***
	(0.021)	(0.021)	(0.023)	(0.023)
Index of search intensity by USA (ln)	-0.172***			
	(0.019)			
Index of max. search intensity by USA (ln)		0.041**		
		(0.017)		
Index of search intensity by state (ln)			-0.018	
			(0.015)	
Index of max. search intensity by state (ln)				0.043*
				(0.026)
Constant	0.207***	0.198***	0.179***	0.174***
	(0.008)	(0.008)	(0.009)	(0.009)
Observations	39,133	39,133	27,358	27,358
R-squared	0.065	0.064	0.073	0.073
Number of id	3,390	3,390	2,704	2,704

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Impact of the information about tax burden on the stock market in 2005

VARIABLES	(1)	(2)	(3)	(4)
Y2005	0.143***	0.142***	0.102***	0.101***
	(0.019)	(0.019)	(0.010)	(0.009)
Market index (ln)	0.499***	0.500***	0.482***	0.496***
	(0.023)	(0.022)	(0.020)	(0.020)
Index of search intensity by state (ln)	-0.013			
	(0.016)			
Index of max. search intensity by state (ln)		0.005		
		(0.025)		
Index of search intensity by USA (ln)			-0.100***	
			(0.023)	
Index of max. search intensity by USA (ln)				0.011
				(0.024)
Constant	0.168***	0.166***	0.192***	0.184***
	(0.009)	(0.009)	(0.008)	(0.007)
Observations	27,358	27,358	39,133	39,133
R-squared	0.076	0.076	0.067	0.066
Number of id	2,704	2,704	3,390	3,390

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The information about tax burden doesn't always have a negative impact. A closer look at the individual shocks reflected by an increase in search intensity (or in the frequency of keyword appearances) reveals some positive impacts. The above is clear from Table 2 with 2 variables representing the max. search activity of the economic agents in a given year. These variables can be related to the economic policy of George Bush, who enacted tax breaks for overseas corporate profits. The idea was to cut taxes on the profits returned to the US and thus to induce multinational corporations to transfer their profits "back home". It was supposed to boost the economy through increasing domestic employment, research and development. Congress prohibited the use of overseas profits for repurchasing the companies' own stock and paying higher dividends to their shareholders.

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The tax break made it possible for the companies to pay a tax rate of 5.25%, instead of the normal 35% corporate tax rate (taxjustice.blogspot.cz, huffingtonpost.com).

A liberal Mostary policy is indeed likely to bring the profits back to the USA. It will either boost production and employment, or it will result in the money returning to shareholders in the form of increased dividends (in spite of the prohibition) (cbpp.org). This implies a positive correlation between the abovementioned economic shocks and the investors' attitude. An increase in the index of max search intensity for the USA was accompanied by a 0.041 % increase in the index of stock prices. It can be concluded from the above that the tax policy of George Bush had a positive influence on the stock market.

The positive impact of information concerning the tax break is obvious in 2005, too (see the *max search intensity* variable in Table 3), despite the fact that the news concerning the tax break was accompanied by negative comments from the opponents, who warned that it will deepen the deficit, disadvantage domestic firms and push even more corporate dollars offshore (Dharmapala, Fritz, Forbes, 2009; commondreams.org).

In the Table 4, the panel data were divided by company capitalization into 2 groups. The first group includes the data where the capitalization of the companies is higher than the average value and second group includes the opposite portion of the data. Thus, the Table 4 investigates the possible difference in the behaviour of economic agents depending on the share of the company in the stock market.

Table 4. Impact of the tax burden on the stock market (with capitalization division) 2004-2015

VARIABLES	(1)	(2)	(3)	(4)
Market index with high	0.791***	0.726***	0.815***	0.791***
capitalization (ln)	(0.043)	(0.041)	(0.038)	(0.037)
Index of search intensity by state with	-0.026			
low capitalization (ln)	(0.019)			
Index of search intensity by state with	-0.024			
high capitalization (ln)	(0.024)			
Index of max. search intensity by		-0.077**		
state with low capitalization (ln)		(0.039)		
Index of max. search intensity by		-0.324***		
state with high capitalization (ln)		(0.041)		
Index of search intensity for USA with			-0.295***	
high capitalization (ln)			(0.048)	
Index of max. search intensity for USA				-0.440***
with high capitalization (ln)				(0.051)
Constant	0.371***	0.411***	0.248***	0.251***
	(0.021)	(0.027)	(0.015)	(0.015)
Observations	27,358	27,358	39,133	39,133
R-squared	0.136	0.138	0.127	0.127
Number of id	2,704	2,704	3,390	3,390

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The data in Table 4 confirm the negative relationship between economic subjects and tax burden. As with the first model, it has been shown that it is possible to use only those Google Trends data related to economic shocks. The division by capitalization enabled the study of differences in the investors's behaviour, as reflected by the decrease in the index of stock prices. High capitalization companies were found to be affected by tax burden information to a greater extent than low capitalization companies, with the results being statistically significant at the 1 % significance level. The reason was that the companies in the first group were more often discussed in the media; therefore, the investors had more information about them. In addition, the companies from the former group are

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more likely to be known by non-professional investors who tend to react more sensitively to economic shocks. On the other hand, the companies with low capitalization and less public visibility tend to attract investors well-acquainted with a given company and those regularly searching for new information and studying profit--and-loss statements. In a financial crisis, the stability of smaller companies is more volatile than that of high capitalization companies; therefore, these companies need investors with clear strategies and thorough knowledge, who do not overreact to information about tax burden. Another explanation is the greater liquidity of high capitalization companies, which means that they can better incorporate information into stock prices.

The above explains why a 1 % increase in the *index of search intensity by state* caused a decrease of as much as 0.324 % in the index of stock prices (as reflected by the index of max. search activity) of high capitalization companies, but at the same time caused a decrease of only 0.077 % in relation to low capitalization companies (see Table 4).

5   Discussion and Conclusions

The perception of information about tax burden is generally negative. Of the variables only the variable representing the maximum search intensity was found to be significant, which implies the limits of using the Google Trends application for the study of the behavioural response of economic agents. The Google Trend is only effective when there is a shock in economics in terms of information about tax burden.

A negative correlation was found between the variables of search intensity divided by capitalization and between the index of stock prices. It also shows that companies with high capitalization exhibit greater sensitivity to perception of information about tax burden than companies with lower capitalization. One of the reasons could be the higher level of knowledge about these companies through the media. In addition, companies with high capitalization are more likely to attract non-professional investors overreacting to changes in economics. Another factor could be the higher liquidity of stock in high capitalization companies which means that they are better at absorbing information from the market. In some cases the perception of information related to an economic shock can be positive. In 2004, George Bush enacted tax break for overseas corporate profits. His policy had a positive impact on stock prices, leading to their increase.

Acknowledgements

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WORK-LIFE BALANCE IN SELECTED COUNTRIES OF THE EUROPEAN UNION

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Abstract:
The aim is to compare the attitude of employers and employees of selected countries of the European Union towards flexible forms of employment and work, including ways how to apply the flexible forms of employment and work to the work-life balance. The introduction comes out of the method of comparison and suggests a procedure of resolution. The second chapter analyses a concept of flexicurity and compares the European models of work-life balance in relation of a flexibility of working conditions and a security of job market. The third chapter presents the results of work-life balance on the Czech labour market. The fourth chapter discusses and explains the main achievements of the concept of flexicurity. The conclusion confirms an importance of application of the flexible forms of employment and work for both employers and employees in selected European Union countries, including the Czech Republic, from a viewpoint of the employment policy and labour legislation.

Keywords:
Balance, Family, Flexibility, Life, Reconciliation, Work.

JEL classification:
J58, J580.

1   Introduction

A theoretical basis of the essay, which concerns about reconciling of work and family life (work-life balance) in selected countries of the European Union (EU), comes out of the concept of *flexicurity*. The aim of this essay is to compare the attitude of employers and employees of selected EU countries towards more flexible forms of employment and work, including ways how to apply the flexible forms of employment and work to the work-life balance. A methodology of the essay is based on the *comparison* (Reichel, 2009, p. 32), which regards a comparison of work-life balance on a selection sample of EU countries and familiarisation with the current state of work-life balance at five European models. The comparative analysis relies on achieved results of the concept of flexicurity in European models of work-life balance with a combination of two aspects, which are a flexibility of the labour market and a security of the job position.

It compares the labour market models with measures of a family policy on a basis of common and different features. The used data are based on European models of work-life balance of selected EU countries. The aim of a construction of selection sample of countries (Sweden, Germany, Spain, Great Britain, and Czech Republic) is to present a possibility of work-life balance of employers and employees as a subject of exploration. The reasons are the different types of flexible working conditions and a security of the job position on the national labour markets of selected EU countries.

2   Analysis of flexicurity in European models of work-life balance

A concept of flexicurity represents a comprehensive approach to the labour market policy, which combines a sufficient flexibility in contractual arrangements that enables the employers and employees to manage changes with simultaneous provision of guarantees, that employees can remain in a current job, or that they will be able to find quickly a new job with certainty of an adequate income between jobs. This can be achieved by a lifelong learning, active labour market policies and a high level of social protection. (European Commission, 2006) Solutions of the concept of flexicurity are the types of flexibility and security that can be identified on the European

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labour market. According to Wilthagen et al. (2004) and a viewpoint of the European Economic and Social Committee on flexicurity (2007), the following types of flexibility exist on the European labour market:

1) External quantitative flexibility, expressing a difficulty/ease of hiring/dismissing of employees by the employer as an adaptation of volume of employment through the external labour market;
2) Internal quantitative flexibility, expressing the difficulty/ease to adapt a workload to the needs of employers through internal labour market, using overtime or a reduction of working hours;
3) Internal functional flexibility, expressing the difficulty/ease of employers to implement the organizational changes and an ability of employees to adapt to the changes the way that they alternate the work activities and perform different working tasks;
4) Financial flexibility, expressing a possibility of the employer to adapt the wage costs to the current economic conditions of the organization.

According to Wilthagen et al. (2004) and a viewpoint of the European Economic and Social Committee on flexicurity (2007), the following types of security exist on the European labour market:

1) A security of the job position is achieved by measures that prevent employers from quick dismissal of employees, enshrined in the legislation, protecting the employment;
2) A security of the employment is undertaken through a high employment by education, training courses and training, and gives a security to the employees to keep their jobs, although not always with the same employer;
3) The income security is achieved by degrees of steady and adequate income in case of unemployment;
4) The security of a possibility to combine expresses the ability/inability of employees to combine the work with other activities, which includes a paid employment combined with childcare, including other dependent family members, or a combination of paid employment with further education.

The types of flexibility and security can be on the national labour markets of selected EU countries combined and analysed as a tool of evaluation of the work-life balance of employers and employees. By applying the aspects of flexicurity, which are the flexible working conditions and a security of the job market, the European models of work-life balance can be described. According to Principal Components Analysis a Clustering Analysis (Employment in Europe 2006, 2006), five European models of work-life balance can be distinguished.

Tab. 1. European models of work-life balance

Model	Flexibility	Security	Selected EU countries
Scandinavian	middle - high	high	Sweden
Continental	middle - low	middle - high	Germany
Mediterranean	low	low	Spain
Anglo-Saxon	high	low	Great Britain
Eastern-European	middle - high	low	Czech Republic

Source: European Commission.

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Referring to the subject of inquiry, which are the possibilities of work-life balance of employers and employees, the main achievements of the concept of flexicurity can be highlighted on examples of selected EU countries. *How to apply the main achievements of the concept of flexicurity on examples of selected EU countries?* The used data are based on European models of work-life balance of selected EU countries, which are compared by Paraskewopoulos (2009).

Sweden

An example of a concept of flexicurity with combination of a high level of flexibility of working conditions that enable employers to respond quickly to the changes in economic environment with a high level of certainty for employees to keep in the labour market, is the Scandinavian model of work-life balance. The result of the Scandinavian model in Sweden is a high long-term employment of the economically active population, including women's employment, which indicates their high security to combine the employment and work with other personal activities. From the above stated, it follows that in Sweden they managed to combine a flexible and liberal labour market with a broad network of pro-family services. Sweden comes from the effort to equalize both genders both within the family and within the society. A stabilization of the birth rate is realized by connection of the employment policy with the family policy. A basis is the support of employed parents by a network of services, guaranteeing a quality childcare both at home and during a period the parents are at work. The family policy with services for families is a support for the high combination of security of the labour market with a possibility of flexible forms of employment and work. The childcare is enshrined in a parental leave. The work-life balance is a reconciliation of work and family life for both parents. The parental leave lasts approximately 1.5 years and the parents are entitled to 480 days of parental leave. According to Křížová, Dudová, Hašková, Maříková and Uhde (2009) an entitlement for the right to parental leave has in addition to the mother also the father and he may make use of three pro-family measures. *Firstly:* He may take the paternity leave immediately after birth. *Secondly:* He has a non-transferable right for a care and staying with the child. *Thirdly:* He has a right for compensation of a loss of earnings, which acts as an important motivational factor.

Germany

Germany is engaged in the most important law, which deals with a flexibility of labour relations and works for several years, including a sharing of the job. An important event was issuing of the Act on Part-Time Work and the Act on Employment for an Indefinite Period. A civic duty is to report any violations of the labour law policy. The Federal Ministry for Family Affairs, Senior Citizens, Women and Youth knows the labour and family law and respects it. The children are referred to as *"nesthocker"* and the work-life balance as a dynamic relationship between the private and public spheres. The German model of family policy guarantees a high level of protection of the family as a direct result of the national constitution. In the past, a marriage, family, education and childcare had been seen as a private matter of the citizens. Women's interest in work, which had brought the demographic decline in the birth rate in Germany, however, caused significant changes in family policy. (Prowse and Prowse, 2015, p. 757-774) Due to the said reason, a new model of family policy is therefore in force in Germany since 2007, which aims to satisfy a growing interest of women to work with the current rise of the birth rate, which is achieved by greater tax advantages and high allowances for children. (König and Cesinger, 2015, p. 571-589)

The German employment rate of women in the labour market can be interpreted by two ways. *Firstly:* A lower employment of German women may rely on their conscious decision, against which no arguing can be done in focus on every citizen's right to self-determination. The state does not affect the free decision of the German women by any incentives or mechanisms. *Secondly:* The lower employment of German women can be a sign of the *"hidden unemployment"*, because jobs that enable the work-life balance are not on the German labour market yet in sufficient quantities.

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How therefore is the potential of labour force in a scope of the work-life balance applied in Germany? To evaluate the implementation of the potential of workforce in a context of the work-life balance, it can be recommended to research the productivity of employees on the part-time work. The part-time work (kurzarbeit) is described by Franke and Gregorz (2013, p. 43) as an effective instrument of the employment policy, which allows employers to retain part of the staff, who they do not dismiss, but cut according to the needs their work time to a half. A decrease of wages is to the employees substantially reimbursed by the Federal Labour Agency. The kurzarbeit demonstrates the following benefits to the German employers. *Firstly:* The employers do not need to acquire quickly the required skilled workforce. *Secondly:* The employees do not have big revenue shortfalls. *Thirdly:* An aggregate demand for a workforce is on the German labour market stabilized. *Fourthly:* The employees do not lose the necessary qualifications.

In connection with a development of flexible forms of employment and work in the German labour market, Axmann (2012, p. 17-18) of WU ZBP Career Centre according to the results of research among employees of Deloitte found that the *work-life balance* was understood by 77% of the employees as *flexible arrangement of the working hours*, by 52% as a *flexible workplace* (home office, mobile work), by 47% as a *compatibility of work and family life*, by 38% as a *pro-family corporate culture* and by 35% as an *IT infrastructure with regard to the personal flexibility in working activity*. The results of Axmann's research indicate that in Germany the concept of *flexicurity* intersects the Scandinavian model of family policy. The German employers have implemented into strategies of employment the changes in favour of a family-friendly corporate culture, aimed at satisfying the interests of women to work. Based on the results of the research, Axmann recommends to the management Deloitte to strengthen the professional training of employees, create conditions for functional reconciliation of work and family life, satisfy the expectations and needs of different generations of employees, combine the work-life balance with the management of the organization, individualize the work and a professional career of the employees, combine the corporate economics with work-life balance and improve the conditions for exercising of parental roles, especially at raising of children. Deloitte therefore applies the *work-life balance* in a framework of the employment strategy as a measure to maintain a high quality workforce, streamline the work performance, motivate the employees and reduce the corporate costs.

Spain
A low employment of women can be seen in the Mediterranean model of work-life balance (Spain), where a low security of job market is combined with a low flexibility of working conditions in conjunction with the traditional model of family policy. Spain thus has no specific family policy, because an important role is played by the private activities of employees. The problem is a lack of childcare facilities, which are also open only for a short time. Mothers of children under three years do not do a full-time work, but mostly a part-time work. The work-life balance was popularized in Spain by Castells (2000) as a summary of topics from the spheres of childcare, parental leave and the situation of childless women. Although the difference between childless women and women-mothers in other EU countries decreased significantly, in Spain the difference between these two cohorts stays around 50%.

Great Britain
A high employment rate of women can be seen in the Great Britain, where, however, a provision of flexibility in working conditions and a security of job market, including security to combine both aspects of flexicurity, is based on a personal responsibility of women for self-reconciliation of work and family life. (Henz and Mills, 2014, p. 1-13) Great Britain maintains the traditional division of work with non-overstressing of the employees, including commitments to observe the European

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standards and efforts of employers to deal with employees. The children are seen as *"Kids in Parent's Pockets Eroding Retirement Savings"*. A model of lever swings (modell der wippe) is useful for British family policy, which understands the work-life balance as a balanced relationship between work and family life. The family centres as pre-school facilities for children from three years have been established in the UK since the 90s of the 20th century in socially disadvantaged neighbourhoods.

Czech Republic

In the Czech Republic (CR), the work-life balance is affected by the diversification of organization of work. The legal protection against discrimination for Czech women is still ineffective. Czech women are working, but in the context of Czech research the work-life balance is a marginal topic. Traditional Czech society is towards the work-life balance distrustful. Non-standard employment includes only a fixed-term work, a work agreement or a contract to do a work. In the work-life balance, in equal opportunities for women and in a diversity of flexible forms of employment and work, the Czech Republic has a deficit. Zálohová (2012, p. 2-4) refers to the data of Czech Statistical Office on a share of flexible forms of employment and work in the Czech labour market. It follows that the Czech women achieve for the same work done at a comparable qualifications with male colleagues lower earnings. Zálohová shows that usage of flexible forms of employment and work in the Czech labour market among men in 2011 amounted to about 71%, while among women only 57%. Typical is the vicious circle of Czech families with unemployment of more than 20% of women. Czech family policy concept is familistic.

Due to a need of work-life balance for Czech workers, it is nevertheless necessary that the flexible forms of employment and work penetrate more into the sphere of middle and senior management. In connection with the application of flexible forms of employment and work, Zálohová (2012, p. 7-8) refers to the results of research company LMC that investigated an interest of employers and employees in flexible forms of employment and work on the Czech labour market in 2011. The results have confirmed an interest of 64% of respondents from employees on flexible forms of employment and work. Of the employers, there were among the research respondents 42% of HR managers, who stated a higher labour productivity in case of flexible working arrangements and comparability with labour productivity of 11% of employees at the full-time job. The legislation of working hours is connected to a non-finished legislation. A modification of the labour law focuses only on the Labour Code, where, however, the complexity of the modification does not involve in itself the modification of flexible forms of employment and work with a view of shared job position, shortened working hours and adjustment of a work from home.

The results of national labour markets of selected EU countries suggest in employment of economically active population positive impacts of flexicurity to the development of work-life balance. The phenomenon of flexicurity can be observed in Sweden, Germany and Great Britain, where the indicators of flexible forms of employment and work indicate that they are most often used by women. (Thévenon, 2016, p. 471-497) Then the benefits of flexicurity are applied less in Spain and the Czech Republic. Scandinavian, continental or Anglo-Saxon model of the work-life balance is not generally applicable for reconciliation of the work and family life in the Czech Republic; because it is necessary to take into account the specific development and different condition of the national labour market.

3   Results of the work-life balance on the Czech labour market

So where to include the Czech Republic? According to a classification of European models of work-life balance, the Czech Republic can be included into the Eastern European model, in which is a medium - high flexibility of working conditions, but a low security of the labour market. In the Czech Republic, due to the austerity measures in public expenditure, there occurred a decreasing of

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social benefits at birth and upbringing of children (child, birth, social allowances), a share of which in the Czech household budgets decreased. A problem of the Czech Republic, similarly as in Spain, remains a lack of childcare facilities for children under three years of age. Duration of maternity allowance and parental leave in an adequate amount therefore motivates the Czech women to stay longer outside the labour market. For staying longer outside the labour market also contributes the low - medium flexible working conditions and a low security of the job market. From the stated a generally low flexicurity of the Czech labour market towards the Czech women follows, which is caused by a low flexibility of working conditions at employment, compounded by a lack of job opportunities for the part-time job, sharing of a job and a work from home. In the Czech Republic, the reconciling of work and family life of employees is at its beginning, therefore the Ministry of Labour and Social Affairs of the Czech Republic (MPSV ČR) applies the measures of work-life balance according to the strategies of EU. Currently, MPSV ČR at employment policy comes out from the Strategy of Europe 2020 and recommends to the employers in the Czech labour market for work-life balance to fulfil the following mandatory national targets. The Czech government submitted to the European Commission as the national targets: (National targets of the Czech Republic in a frame of the Strategy of Europe 2020, 2016)

1) An overall employment rate of 75% of the economically active population;
2) An female employment rate of 65%;
3) An employment rate of older workers of 55%;
4) Reduction of the youth unemployment rate of 15-24 age group by one third compared to the year 2010;
5) Reduction of unemployment among low-skilled persons by a quarter compared to the year 2010;
6) Reduction of the administrative burden for small and medium-sized entrepreneurs in comparison with the year 2005 by 30%;
7) Increase of the labour productivity in comparison with the year 2010 by 20%.

In a framework of fulfilling the national targets for employment policy, the projects that shall induce employers to develop a work-life balance of employees are arising in CR. The most significant event of MPSV ČR was a creation of the program *Audit of family and employment*, which was co-financed by the European Structural Fund (ESF) by the Operational Programme of *Human Resources and Employment*. The Audit of family and employment is an example of a gender audit, which provides data on equal opportunities for Czech women and Czech men. The gender audit characterizes the employing organization connected both to the employees to sharpen their focus on flexible forms of employment and work, motivating to work for a longer time, and towards the customers. (Loretto and Vickerstaff, 2015, p. 233-249) The employers let themselves to be evaluated by a point system, a result of which is a *"testimonial"*, which has benefits for them in advertising and in competition with others. The gender audit researches and evaluates the employer by ten areas, including *working hours, work procedures and job description of employees, workplace conditions, information and communication policy of the organization, competence of managers, HR staff development, natural and financial benefits, services to families, business specifics and personal data model*. A methodology for the Audit of family and employment in the Czech Republic became the *National Centre for Family in Brno*, which implemented in the period of 2009-2011 the project ANIMA PLUS CZ as innovative measures for promotion of the work-life balance. (The family, all about it and for it. *On the project*, 2015) An aim of the project was to support employers' organizations during development of family-friendly corporate culture and a start-up of an internal process with defining of the objectives and measures of family-friendly personal policy, increasing of an attractiveness of the employer and setting the conditions to cope

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successfully with demands of the labour market. The National Centre for Family created a pilot version of the project, which was adapted to Czech conditions. The gender audit of the project ANIMA PLUS CZ was divided into four phases: (The family, all about it and for it. *Audit of family & employment as a key activity of the project ANIMA PLUS CZ*, 2015)

1) *The first* was an informational and planning phase in February 2010, when an information workshop was held, a target of which was an integration of the audit into the employment strategy of an organization the way that the audit objectives would correspond with its focus and specifics.

2) *The second* was an interim phase in March 2010, when the first implementation workshop was held, evaluating the state of measures relating to the work-life balance. There were prepared the documents, which were a source of information about an audited employer with evaluation by an independent expert. The evaluator worked out the first review as a situational audit, where was described a status of measures, related to the work-life balance. In April 2010, the second workshop was held, concerning a draft of measures, which became a part of the employment strategy of audited employer with respect to the work-life balance. In May 2010, the third implementation workshop with an analysis of audit requirements was held, which assessed whether the measures of employment strategy in relation to the work-life balance are sufficient.

3) *The third* was the implementation phase with the measures in duration of 6 months from receiving the basic certificate, when the audited employer issued a report on implementation of measures related to the work-life balance in a context of the employment strategy.

4) *The fourth* was the final phase with a subsequent audit, whether and how the measures with respect to the work-life balance were implemented into the employment strategy of the audited employer. (The family, all about it and for it. *Progress of the Audit of Family & Employment*, 2015)

4   Discussion

The work-life balance is affected also by lifestyle of the families. An art of everybody then consists on their ability to reconcile and harmonize the personal activities related to living areas, so no one would be left out, and the work and family life remain in a long-term balance. A reconciliation of work and family life is structured by Knoblauch (2013, p. 18) in a concept, which emphasizes as important factors such areas of life, without which the work-life balance cannot work in the long-term perspective:

1) *Health* is based on the psychophysical condition, physical activities, appearance and nutrition.
2) *Work* as a purposeful social activity is related to the development of professional, methodical and social competencies, ongoing projects and future professional and personal goals.
3) *Money* is associated with income, savings, investments and pensions.
4) *Family* is associated with a life partner, children, parents and relatives.
5) *Housing* is associated with the housing situation, personal ownership of a house or apartment.
6) *Relationships* are associated with long-term care and enrichment of existing interpersonal relationships, as well as with expansion of network of friends and close relatives.
7) *Education* is associated with the development of character, development of strengths and abilities to learn to deal with people, a development of personal literacy (linguistic, mathematical, informational) and the improvement of active citizenship and human capital.
8) *Entertainment* is associated with the leisure activities and a way of spending a leisure time.

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Horáková (2004) refers to results of the Centre of Public Opinion Research, which examined how the Czech employees apply the work-life balance in their families practically. The research results showed that the crucial role was by the Czech respondents attributed to a partnership cooperation and division of working roles in the family. 80% of Czech men and 61% of Czech women reported that a willing life partner helped them to evenly divide the housework. 66% of Czech men and 50% of Czech women fundamentally divide the care about children and other family members. 63% of Czech men admit a help from his life partner during maintaining the work-life balance with respect to her willingness to take the running of household to herself. So as to the Czech men would learn to maintain the work-life balance for a long time, it is necessary to shape their attitudes towards a division of labour roles in the family without gender stereotypes. In this connection, it is recommended to work with the example of own father, who helps to mother, and expect that in adulthood the Czech young men would more identify themselves with this family model. In the life of a family then support the areas that require attention and commitment by all its members.

The results of the research are therefore raising a question: *What prevents the Czech employers to use more extensively the flexible forms of work?* Zálohová (2012) refers to the finding of experts of the company LMC, s.r.o. that for 36% of respondents, a nature of their work does not allow a flexible job. 29% of HR managers reported that the employer had no reason to use the flexible forms of labour more frequently. 18% alluded to a need for changes in organization of work processes, unnecessary administrative burdens, ambiguous legislation of the labour law, increased financial costs and a little support from a senior management of the employer. The Czech employees are interested in flexible forms of work, which enhance the business productivity and have a positive impact on development of employment. But on the Czech labour market, the flexible forms of work are not used in its entirety. Due to organizational demands it can be assumed that a reason of their little utilization is a low work motivation of Czech employers, including the deficiency of labour legislation from the side of the state.

5   Conclusion

In a framework of the European employment policy, there are existing efforts to implement the work-life balance in relation to a need to introduce the flexible forms of employment and work. They help to increase employment of the economically active population as a measure for working application of people, who cannot work in a classical employment. The work-life balance is based on the concept of *flexicurity* as a modernizing of the labour law with an aim to interconnect the flexibility of working conditions and to improve a security of the job market. An intention of flexicurity is to ensure a benefit not only for employers, but also for employees. For employers, an ability to respond quickly to changes in the economic environment and assure a competitive workforce. For employees, to ensure the professional career and the career advancement, including the reconciliation of work and family life. One of the main problems of flexible forms of employment and work is their use mainly by ordinary employees, who are recruited from members of the middle and working classes. (Warren, 2015. p. 691-717)

If we compare the implementation of measures of the work-life balance in employment strategies of Scandinavian, continental and Anglo-Saxon models, we can pronounce a higher level than have the Mediterranean and Eastern European models. Reactions of Scandinavian, continental and Anglo-Saxon model to the requirements of EU with respect to the work-life balance are more sophisticated. The employers modernized the forms of employment and work not only in terms of flexibility of working conditions, but also the security of the labour market. The measures of work-life balance have in employment strategies of Scandinavian, continental and Anglo-Saxon models the importance particularly in a development of employment of women. Family-friendly corporate

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culture is more amiable for women-mothers and at a higher level than the Eastern European and Mediterranean ones.

The requirements of work-life balance from a viewpoint of the employment policy, based on the 2020 Europe Strategy, CR fulfils at a minimum limited degree. Although in CR it is possible to apply the work-life balance on a principle of what is not forbidden is allowed, the labour law lacks a defined legislative framework for flexible forms of work for both employees and employers. The Czech Republic overlooks the comprehensive effort of EU to promote in strategies of employment of the member countries the concept of flexicurity. In the Czech Republic, the employment strategy, including measures of work-life balance, belongs into the competence of MPSV ČR and a reconciliation of work and family life does not have in its framework an adequate space.

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DOES PUBLIC R&D EXPENDITURE EFFECT ON ECONOMIC GROWTH IN CEE COUNTRIES?

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Abstract
The aim of the paper is to quantify effect of public R&D expenditure on economic growth. The empirical evidence is focused on 8 selected Central and Eastern European countries (Bulgaria, Czech Republic, Hungary, Latvia, Poland, Romania, Slovak Republic and Slovenia) in the period 1995–2014 and attention is also given to impact of a crisis. The research is based on dynamic panel regression. Basic source of data is Eurostat database, which is complemented by information from statistical offices and OECD. The findings confirm that increase of government R&D expenditure contributes to the economic growth and its effect on economic growth is stronger than traditional growth variables. Results suggest that higher government R&D expenditure by 1% increases economic growth by 2%. Increment of qualified human capital (expressed as HRST) reports also positive and significant effect. Impact of investment increase is reported as minimal and significant only in one case. Contrary, business R&D expenditure and higher education R&D expenditure are found insignificant. The reported effect of the crisis on economic growth is negative and statistically significant as was expected.

Keywords
Research and Development, Economic Growth, Public Expenditure, Tax Incentives, Dynamic Panel Regression.

JEL classification
O38, H25, F63.

1   Introduction

Research and development (R&D) is of a crucial importance in a creation of knowledge, products and technologies as has been recognised (Solow, 1956; Köhler et al., 2012; OECD, 2012; Szarowská 2013, 2016; Halásková and Halásková, 2015). Generally, governments have three main instruments for financing R&D (own R&D, direct and indirect funding), each of which has advantages and disadvantages from the perspective of economic theory (David et al., 2000). Direct support is more focused on long-term research, while indirect channnels primarily support short-term applied research and increase incremental innovations (Westmore, 2013). European Commission (2003) reports that most OECD/EU member countries apply a mix of direct and indirect measures to support R&D. Several countries have introduced or ex-tended fiscal instruments to support R&D. Indirect fiscal R&D incentives reduce the costs of R&D for a wide variety of firms, including SMEs. Fiscal incentives are recommended to be used to support private R&D because these schemes have the potential to address a wide range of firms, and leave the decision as to the content of the research to their discretion. If well designed, fiscal schemes can contribute to raising the overall level of investment in business R&D.

The financial crisis obliged many governments to introduce tough fiscal consolidation measures, prioritizing other issues over R&D. On the other hand, Hud and Hussinger (2015) point out the fact that in order to prevent firms from reducing their R&D expenses and to maintain the national R&D capacities, policymakers in many countries reacted immediately to the crisis and increased the public R&D budget. Anyway, the limited financial resources and pressure to balance expenditure on innovation against expenditure on other policies, force the governments to look for new instruments.

The goal of the paper is to ~~examine and~~ quantify effect of public R&D expenditure on economic growth in 8 selected Central and Eastern European countries in the period 1995–2014. The article is organized as follows. Next section presents theoretical background and a literature review. Followed

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chapter introduces methodology and data. Empirical part is focused on basic forms of funding R&D and testing effect of R&D expenditure on economic growth. Conclusions summarise main findings.

2   Literature review and theoretical background

The neoclassical growth model known as Solow-Swan model (1956) considers the long-run economic growth. This model explains the economic growth with the capital accumulation, productivity, population growth and technological progress as the dominant drivers of economic growth. The model recognized the significance of the positive impact of technology on growth, but it is considered as exogenous. Next, the development of endogenous growth theory has provided many new visions into the sources of economic growth. Dzambaska (2013) points out, the essence of the new theory is that growth is an effect of rational economic decisions.

Barro and Sala-i-Martin (2003) modelled technological progress as an expansion of the variety of intermediate goods used by producers. The rate of growth depends on various characteristics of preferences and technology, including the willingness to save, the level of the production function, the cost of R&D, and the scale of the economy (measured by the quantity of a fixed factor, such as raw labour or human capital). Some alternative specifications of the R&D technology can preserve most of the growth implications while eliminating the apparently counterfactual scale effects. Barro and Sala-i-Martin´s equilibrium growth rate in the model corresponds to the exogenous rate of technological change in the Solow–Swan (1956) models. They note that if the diffusion of ideas from one country to another is rapid, the model explains why the technology in all countries would improve over time. Therefore, the model can explain why the long-term growth rate of the world's real per capita GDP would be positive.

Steger (2005) writes that growth models which focus on R&D are used for explaining sustained economic growth in industrialised countries. The first generation of R&D-based growth models suffered from the scale effect, according to which public policy increases the long-run growth rate with the size of the economy. A second generation of R&D-based growth models (called non-scale growth models) is not spurred by the scale effect. These models imply a strong ineffectiveness proposition and state that public policy is powerless to increase or affect the long-run growth rate. Perez-Sebastian (2007) notes that even policy in Jones-type non-scale models (1995) has no long-run growth effects and level effects can be substantial.

Literature offers support for varied impact of R&D on economic growth – positive, negative and zero. Svennson (2008) presents an overview of the economic literature on the relationships between R&D investments and economic growth. He discusses positives and negatives of different types of public funding of R&D and analyses what differentiates R&D from other forms of input. Becker's study (2015) offers the most systematic review and critical discussion focused on R&D literature with attention to mutual comparision between conclusions of published studies.

The empirical evidence is often focus on studies that econometrically analyse the impact of R&D tax incentives on key policy goals of the instrument. Since a primary goal of R&D tax incentives is to raise R&D spending by enterprises, most studies look at input additionality, i.e. the change in private R&D expenditure that can be attributed to the tax incentive (Castellacci and Lie, 2015; Ientile and Mairesse, 2009). Many studies are based on firm-level panel data and either cover periods before and after the introduction of a tax incentive, or they analyse the effects of changes in the generosity of R&D tax incentives. E.g. Hall and Van Reenen (2000) study the econometric evidence on the effectiveness of fiscal incentives for R&D.

Guellec and de la Potterie (2004) introduce factors important for the growth. These factors are the absorptive capability, the origin of funding, the socioeconomic objectives of government support, and the type of public institutions that perform R&D. Bilbao-Osorio and Rodriguez-Pose (2004) present results which indicate that R&D investment, as a whole, and higher education R&D investment in peripheral regions of the EU, in particular, are positively associated with innovation. The existence and strength of this association are, however, contingent upon region-specific socio-economic

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characteristics, which affect the capacity of each region to transform R&D investment into innovation and, eventually, innovation into economic growth.

Berliant and Fujita (2011) state that long-run economic growth is positively related to the effectiveness of pairwise R&D worker interaction and to the effectiveness of public knowledge transmission. Kim (2011) investigates the effect of R&D stock for economic growth during the years 1976–2009. Silaghi et al. (2014) empirically estimate the role of private and public R&D for growth of Central and Eastern European Countries during 1998–2008 and public R&D is found to be statistically insignificant. Brautzsch et al. (2015) analyze the macroeconomic effects of R&D subsidies in the business cycle. Their findings suggest that the R&D program counteracts the decline of GDP by 0.5%. Compared to the strongly discussed alternative uses of subsidies for private consumption, R&D spending is more effective.

Finally, Köhler et al. (2012) summarize results of 18 published papers and note that regardless of a growing number of studies on the effect of R&D expenditure and tax incentives, the knowledge about the effectiveness of R&D expenditure and how a scheme should be designed to maximise its impact, remains limited.

3 Methodology and data

The aim of the article is to quantify effect of public R&D expenditure on economic growth. Empirical evidence is based on unbalanced annual panel data of the selected Central and Eastern European countries in the period 1995–2014 (the longest available time series). The sample selection is limited by the availability of data. That's why, the empirical evidence is performed for 8 EU countries, namely Bulgaria (BG), Czech Republic (CZ), Hungary (HU), Latvia (LV), Poland (PO), Romania (RO), Slovak Republic (SK) and Slovenia (SI). The empirical analysis is based on the methodology of Barro and Sala-i-Martin (2003), which is adapted to the framework of this study.

A panel regression is used for identifying the direct impact of R&D expenditure and other control variables on GDP growth. The below models include a lag of one period and fixed effects as is usual in this type of studies (Perez-Sebastian 2007; Silaghi *et al*. 2014). The software E-Views (9) is used for estimations. Empirical evidence uses panel data as panel data have both cross-sectional and time series dimensions and the application of regression models to fit econometric models are more complex than those for simple cross-sectional data sets. Both fixed effects and random effects regressions were performed before analysis. A Durbin–Wu–Hausman test indicated significant differences in the coefficients so model with fixed effects is used in the paper. A panel model with fixed effects can be formally written as:

$$y_{it} = \alpha_i* + \beta'X_{it} + u_{it}, \qquad i = 1, 2, ..., N, t = 1, 2, ..., T \qquad (1)$$

where y_{it} depends on a set of K explanatory variables x_{it} and the constants are specific to the *i*-th unit (country) at time *t*, at the same time but are constant. β' is the vector dimension *1xK* constants and α_i* is a constant representing the effects of those variables, which are characteristic of the *i*-th observation. u_{it} error component represents non-significant effects of variables inherent in the *i*-team observations and a given time interval. Furthermore, it is assumed it does not correlate with the vector x_{it}, for all the *i* and *t,* and it comes from independent identical distribution with zero mean and constant dispersion (Dougherty, 2007). The suitability of the fixed effects model can be assessed using the F-test too, which is strongly justified in this case. Furthermore, Wooldridge test for autocorrelation in panel data shows that at 5% the null hypothesis of no auto-relation cannot be rejected.

Many studies point out that using non-stationary macroeconomic variable in time series analysis causes superiority problems in regression. A unit root test should precede any empirical study employing such variables. Thus, the Augmented Dickey-Fuller test (ADF test) is applied. The equation (2) is formulated for the stationary testing.

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$$\Delta x_t = \delta_0 + \delta_1 x_t + \delta_2 x_{t-1} + \sum_{i=1}^{k} \alpha_i \Delta x_{t-i} + u_t .$$ (2)

ADF test is used to determine a unit root x_t at all variables in the time t. Variable Δx_t-i expresses the lagged first difference and u_t estimate autocorrelation error. Coefficients δ_0, δ_1, δ_2 and α_i are estimated. Zero and the alternative hypothesis for the existence of a unit root in the x_t variable are specified in (3).

$$H_0: \delta_2 = 0, H_\varepsilon: \delta_2 < 0.$$ (3)

The result of ADF test confirms the stationary of all time series on the first difference (except GDP, which is stationary on level data). Therefore it is not possible to use level data. So the first differences of variables were estimated and are used in the model. For example, the *dGERD* is defined in (4):

$$dGERD_{it} = GERD_{it} - GERD_{it-1}$$ (4)

In order to test if R&D expenditure effect on economic performance, there are estimated econometric models. The basic model is defined in (5) and variables are explained below:

$$lnGDP_{it} = \beta_0 + \beta_1 * dGERD_{it} + \beta_2 * dINV_{it} + \beta_3 * dHRST_{it} + \varepsilon_{it},$$ (5)

A dynamic panel regression is defined in (6) and it reflects development of GDP better as GDP growth changes are influenced by earlier GDP growth.

$$lnGDP_{it} = \beta_0 + \beta_1 * dGDP_{it-1} + \beta_2 * dGERD_{it} + \beta_3 * dINV_{it} + \beta_4 * dHRST_{it} + \varepsilon_{it},$$ (6)

where β_1 to β_4 contain the coefficients assigned to the independent variables, and β_0 is a constant, the subscript t indexes the year, i country. *GDP* means GDP growth per capita expressed by the amount of GDP per capita in purchasing power parity (EU28), the series for GDP are converted into logs. *GERD* means Gross domestic expenditure on R&D, *INV* is expressing investment ratio on the GDP, *HRST* as a share of the active population classified as HRST (i.e. having successfully completed an education at the third level or being employed in science and technology) as a percentage of total active population aged 15–74, and ε is the error term.

Finally, the dummy variable is added to the specification of a model to focus on crisis impact. Dummy is equal zero in years 1995-2007, and equal 1 in a period 2008-2014. The final equation is defined in (7).

$$lnGDP_{it} = \beta_0 + \beta_1 * dGDP_{it-1} + \beta_2 * dGERD_{it} + \beta_3 * dINV_{it} + \beta_4 * dHRST_{it} + dummy_{it} + \varepsilon_{it}$$ (7)

R&D expenditure are expressed not only as total *GERD*, but it is also divided in its main components by performing sectors: business R&D (*BUSINESS*), and government (*GOV*) as well as higher education (*EDU*) R&D expenditure which make up public R&D. In this way it is possible to assess which types of activities has an effect on economic growth.

4   Results and discussion

This chapter is focused on forms and modifications of R&D financial support and it also presents results of testing effect of R&D expenditure on economic growth in the country sample.

4.1   Financial support of R&D

It is known that R&D is fundamental for the knowledge-based economies' competitiveness and support of R&D and innovation is also a political measure. In line with Lisbon strategy and Europe 2020 targets (European Commission, 2014), investment in European R&D should be raised to 3% of GDP (increasing combined public and private investment in R&D) by 2020 but this target was not reached

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yet. Gross domestic expenditure on R&D (GERD) is total intramural expenditure on R&D performed on the national territory during a given period. GERD includes R&D performed within a country and funded from abroad but excludes payments for R&D performed abroad. GERD is usually reported for sectors of performance: business enterprise, higher education, government and private not-for-profit institutions serving households.

Business enterprise expenditure on R&D (BERD) records gross expenditures on R&D performed by all firms, organisations and institutions whose primary activity is the production of goods and services for sale to the general public, and the private non-profit institutions mainly serving them. Government-funded business R&D is the component of R&D performed by business enterprises attributed to direct government funding. It includes grants and payments for R&D contracts for procurement, but not R&D tax incentives, repayable loans or equity investments.

As Deloitte (2015) notes Central and Eastern European countries are in the process of transforming into knowledge–based economies. After political changes, countries in CEE region have begun their transformation from a similar level although currently they are at different stages of development. The European Commission's Innovation Union Scoreboard 2014 shows that among countries taking part in their survey, only Estonia is ranked in the group of so-called innovation followers (those whose innovation performance is close to or above the EU average). Croatia, the Czech Republic, Hungary, Lithuania, Poland and Slovakia are among the moderate innovators with performance below the EU average, while Bulgaria, Latvia and Romania are rated as modest innovators (innovation performance well below the EU average).

Average EU-28's R&D expenditure was 2.02% GDP (Eurostat database and OECD, 2014). The importance of the source of funding has been recognized in one of the Barcelona targets of the Lisbon agenda where it is said that the appropriate split for R&D is 1/3 financed by public funds and 2/3 by private (European Commission, 2013). As OECD (2015) reports, the business sector accounts for the largest share of R&D performed in most economies and more than 60% of expenditure on R&D (GERD). This share has remained fairly stable over the past decade. Higher education R&D accounts for almost 20% of total GERD. The government sector plays a relatively minor role as a performer of R&D but it is a major funder of R&D performed in the higher education and business sectors. R&D is typically concentrated among a limited number of firms in which large ones are typically over-represented. In some countries, however, small and medium-sized firms (SMEs) account for a significant share of total business R&D. SMEs receive a relatively large share of government funding in several countries including Estonia and Slovakia. The distribution of business R&D by economic activity reveals a pattern of specialisation influenced by a country's economic structure. In most countries, a limited number of activities account for a large share of total business R&D.
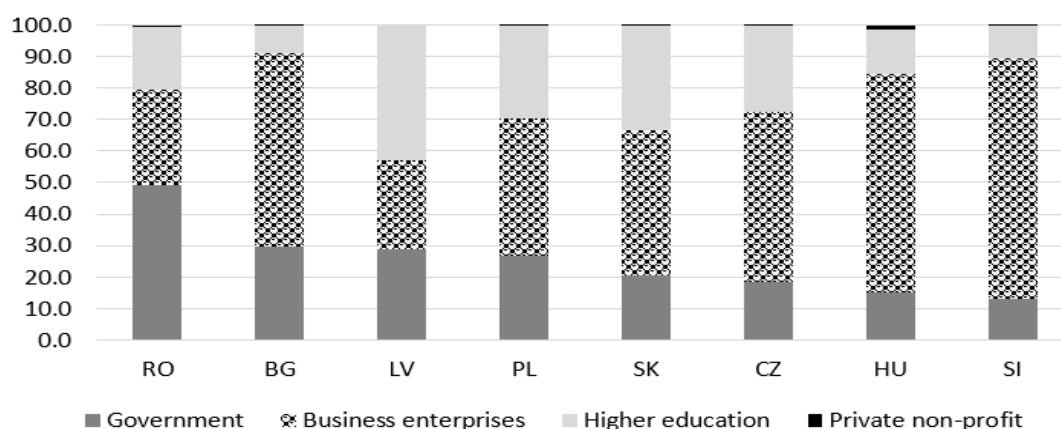
Fig. 1. R&D Expenditure by Performing Sectors in percentage (Source: author's calculations based on OECD data)

Fig.1 shows total R&D expenditure (GERD) divided into performing sectors in 2014 (the latest available time series) in analysed countries. Slovenia and Hungary meet required limits as private R&D

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expenditure are 76.5 % in Slovenia and cca 70% in Hungary. Bulgaria (61%) is also approaching the target. Different structure of R&D expenditure is reported in Latvia and Romania with only 28% (resp.30%) of business enterprise R&D expenditure. These countries support primarily higher education and government R&D expenditure.

OECD (2010) notes that indirect public funding is mostly realized as tax incentives and it is usually more neutral than direct support in terms of industry, region and firm characteristics, although this does not exclude some differentiation, most often by firm size. Tax incentives reduce the marginal cost of R&D and innovation spending. While direct subsidies are more targeted towards long term research, R&D tax schemes are more likely to encourage short term applied research and boost incremental innovation rather than radical breakthroughs.

Guellec and van Pottelsberghe (2003) mention that tax incentives applicable to different tax arrangements, including corporate and personal income taxes, are also widely used to encourage private investments in R&D and the exploitation of IP assets, to attract business angels and leverage early-stage finance, and to attract foreign talent or foreign multinationals.

Indirect support in recent years become more important to encourage investment in R&D and as write Garnier *et al.* (2014) at least one form of stimulus R&D currently exists in 26 EU countries. Within the EU, only Germany and Estonia currently do not have a tax policy aimed directly stimulating innovation. Although tax incentives are usual, they are far from homogeneous and differ noticeably across countries, with most countries offering more than one type of instrument (OECD, 2014).

Table 1. Tax arrangements for R&D

Tax incentive	Expenditure-based	Income-based
Corporate income tax	Czech Rep., Hungary, Poland, Slovakia, Slovenia	Hungary, Poland
Payroll withholding and soc. sec. taxes	Hungary	
Personal income tax	Hungary	
Value-added tax	Poland	

Source: author´s compilation based on OECD (2012, 2014)

Tab. 1 summarises expenditure-based and income-based tax incentives applied in the sample of CEE countries in 2014. A detailed description of financial instrument variety can be found in Szarowská (2015). R&D tax incentives aim to encourage firms to perform R&D by reducing its costs. Compared with direct subsidies, R&D tax incentives allow firms to decide the nature and orientation of their R&D activities, on the assumption that the business sector is best placed to identify research areas that lead to business outcomes.

Tab. 2 summarises available R&D incentives in the country sample. Table is based on tax incentives applied in 2014, detailed information and description can be found in Ernst & Young (2015) or OECD (2012, 2014). As Deloitte (2015) reports, availability of more types of incentives is still the most important factor affecting the level of expenditure on R&D. Anyway, each country choose and applies specific forms of tax measure in line with a complex strategy for R&D, R&D policy, economic development and awareness, objectives in terms of competitiveness as well as historical experience and tradition. Based on collected data is found that cash grants and tax deduction are the most often used tools for support and funding R&D in the selected sample of CEE countries.

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Table 2. Available R&D tax incentives (2014)

	Bulgaria	Czechia	Hungary	Latvia	Poland	Romania	Slovakia	Slovenia
Accelerated depreciation on R&D assets	yes			yes		yes		
Cash grants		yes	yes		yes		yes	yes
Financial support								yes
Infrastructure/land preferential price		yes					yes	yes
Loans								yes
Patent-related incentives			yes				yes	
Reduced tax rate			yes					
Reduced SSC			yes					
Tax deduction	yes	yes	yes	yes	yes	yes		yes
Tax credits			yes				yes	
Tax exemptions					yes			
Tax holiday		yes					yes	

Source: author's compilation based on Ernst & Young (2015) and OECD (2012, 2014)

4.2 Testing Effect of R&D Expenditure on Economic Growth

In order to quantify and test if R&D expenditure effect on economic growth, there are estimated econometric models. Variables in models are chosen in line with above empirical studies. Information criteria identified 1 year as the optimal time lag. Tab. 3 presents the most appropriate specifications of models resulting from panel regressions.

Table 3: Panel regression estimations

	Model 1		Model 2		Model 3		Model 4	
Dep. variable	lnGDP		lnGDP		lnGDP		lnGDP	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
C	0.286*	0.023	0.280*	0.023	0.290*	0.02	0.285*	0.02
lnGDP$_{-1}$	0.706*	0.024	0.688*	0.026	0.707*	0.022	0.693*	0.023
dGERD	0.057	0.156	0.065**	0.165				
dGOV					2.199*	0.411	2.037*	0.416
dBUSINESS					0.07	0.18	-0.039	0.188
dEDU					-0.676	0.416	-0.708	0.412
dINV	0.005	0.005	0.010**	0.006	0.001	0.005	0.004	0.005
dHRST	0.019**	0.014	0.018**	0.014	0.020**	0.013	0.020**	0.013
dummy			-0.068**	0.032			-0.054**	0.029
Total observat.	139		139		139		91	
R-squared	0.885		0.885		0.886		0.886	
Adjusted R^2	0.884		0.884		0.885		0.885	
S.E.of regr.	0.149		0.147		0.134		0.132	
F-statistic	0		0		0		0	
D-Watson stat	2.149		2.052		2.178		2.106	

Note: symbols * and ** denote statistical significance at the 1% and 5% level
Source: author´s calculations

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In Model 1, series for R&D expenditure are expressed as GERD and the basic dynamic panel model is defined in (6). Model 2 contains the dummy variable, which is added to the model with the aim to include a crisis impact. Dummy is equal zero in years 1995-2007, and equal 1 in a period 2008-2014. Its adding increased a statistical quality of the models. The equation for Model 2 is defined in (7).

Next, *GERD* is divided and substituted by its main components (*BUSINESS, GOV* and *EDU*). In this way, it is possible to analyse R&D impact of each sector. Model 3 is defined in equation (8)

$$lnGDP_{it} = \beta_0 + \beta_1 *dGDP_{it-1} + \beta_2* dGOV_{it} + \beta_3 *dBUSINESS_{it} + \beta_4 *dEDU_{it} + \beta_5 *dINV_{it} + \beta_6* dHRST_{it} + \varepsilon_{it} \qquad (8)$$

The final Model 4 comprises also dummy variable as (9) presents.

$$lnGDP_{it} = \beta_0 + \beta_1 *dGDP_{it-1} + \beta_2* dGOV_{it} + \beta_3 *dBUSINESS_{it} + \beta_4 *dEDU_{it} + \beta_5 *dINV_{it} + \beta_6* dHRST_{it} + dummy_{it} + \varepsilon_{it} \qquad (9)$$

The main results concerning the effect of R&D expenditure on economic growth indicate that R&D expenditure GERD affects economic growth positively (and statistically significant after adding dummies) and its effect is stronger than impact of other variables (e.g. human resources, investment).

More detailed results can be found after substituting *GERD* by its main components - *BUSINESS, GOV* and *EDU* R&D expenditure. Model 3 shows that estimated coefficient of *GOV* expenditure is positive and statistically significant. This finding confirms that increase of government R&D expenditure contributes to the economic growth. Results suggest that higher government R&D expenditure by 1% increases economic growth by 2%. It is necessary to point out that government R&D expenditure seems to be the main driver for economic growth with stronger effect that traditional growth variables (investment and human capital approximated by *HRST*).

Contrary, business R&D expenditure reports to have not influence on economic growth, as coefficients are statistically insignificant during the reported period. Possible reason can be found in development of business and public R&D expenditure when the financial and economic crisis hit the EU in 2008. R&D expenditure of the business sector distinctly fell in 2008 and 2009 (and also in next years, see OECD 2012). As Cincera et al. (2012) note, businesses usually decrease the amount they spend on R&D during economic crisis as a cost-reduction strategy in time of economic pressure and tight credit constraints, the similar development was reported also in some countries in the sample. On the other hand, Czech Republic, Slovenia and Poland increased public R&D expenditure with the aim to stimulate economic growth and again encourage private R&D investment. These circumstances could explain insignificant effect of business R&D on economic growth.

Higher education is composed of universities, colleges of technology and other institutions providing formal tertiary education programmes as well as research institutes, centres, or experimental stations. *EDU* R&D expenditure affects economic performance negatively, but its impact is not statistically significant. The value of *EDU* R&D expenditure is very divergent in the selected countries as it varies from 0.02% GDP in Bulgaria to 0.52% GDP in the Czech Republic. Moreover, most of CEE countries belong to group of moderate or modest innovators without enough developed system of R&D on higher education. Contrary, results confirm positive impact of *HRST* - a higher share of the active population having successfully completed an education at the third level or being employed in science and technology. This is in line with the assumption about a positive effect of a qualified human capital on economic growth. The crisis (approximated by dummy variable) reports negative and statistically significant influence on economic growth as it was expected.

Overall, the model performance is satisfying. The goodness of fit is high - the adjusted coefficient of determination (R^2) is very high (89%). The probability of F statistic is 0.00 what indicates that model as a whole is statistically significant. Durbin-Watson test is used to detect independence of residuals from the regression analysis. Its value (2.1) indicates the absence of autocorrelation in the residuals and confirms a quality of the model.

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Our findings are in line with conclusion of many studies, e.g. Bilbao-Osorio and Rodriguez-Pose (2004) who indicate importance of public R&D investment and higher educated worked labour. Positive influence of government R&D expenditure is confirmed also by Castellacci and Lie (2015), Ientile and Mairesse (2009), Hall and Van Reenen (2000) or Kim (2011). Becker (2015) supports especially conclusions about importance of high-skilled human capital and investment. Perez-Sebastian's conclusion (2007) supports the findings about R&D as a whole as states that R&D models have no definite long-run growth effects and level effects can be substantial.

In terms of a business R&D expenditure, the results are not in line with the findings of earlier empirical studies focused on impact of private expenditure and economic growth, such as Becker (2015), Silaghi *et al.* (2014) or Brautzsch *et al.* (2015). The variety of findings is generated due to differences used in econometric models, country samples, observation periods and considered variables.

5   Conclusion

The aim of the paper was to quantify effect of public R&D expenditure on economic growth in the period 1995–2014. The presented empirical evidence is based on unbalanced annual panel data of 8 selected Central and Eastern European countries.

Review of theoretical literature and empirical studies shows that importance and impact of R&D on economic growth is not unequivocal and published studies present positive as well as negative effects.

This research confirms that there is a trend to combine direct public and indirect public funding instruments. Governments offer direct support through a variety of grants, subsidies, loans or equity funding. While direct subsidies are more targeted towards long-term research and growth, indirect funding and R&D tax schemes are more likely to encourage short-term applied research and boost incremental innovation. Due to limited financial resources, indirect support has become more important in recent years. It was found that cash grants and tax deduction are the most often used tools for support and funding R&D in selected CEE countries. As availability of more types of incentives is still the most important factor affecting the level of expenditure on R&D (see Deloitte, 2015), especially countries with moderate or modest R&D expenditure should offer more tax and fiscal arrangements supporting R&D expenditure and subsequently economic growth.

The direct empirical evidence quantified and tested if R&D expenditure effect on economic performance. R&D expenditure were investigated not only as a whole GERD, but also as its components: business R&D, and government as well as higher education R&D expenditure which make up public R&D. Explanatory variables were not examined in individual regressions, but the study used dynamic panel regression. An important finding resulting from this research is that the dynamic panel analysis confirms positive and statistically significant impact of government R&D on economic growth conclusively. Results suggest that higher government R&D expenditure by 1% increases economic growth by 2%. Government R&D expenditure is the main driver for economic performance with stronger effect than traditional growth variables (investment and human capital approximated by *HRST*) so policy makers should focus their attention on this kind of R&D support and funding. Based on the obtained data it can be concluded that a higher share of the active population having successfully completed an education at the third level or being employed in science and technology (*HRST* R&D expenditure) influences economic growth positively. It supports assumption about increasing importance of qualified labour capital / force, generally.

Surprisingly, business and higher education R&D expenditure were found negative and statistically insignificant in most cases. It is the main difference from conclusions of most studies. As businesses usually react very sensitively on external economic conditions and decrease R&D expenditure during economic depression and crisis, it is important to increase cooperation with public sector and encourage and stimulate their R&D activities by direct as well as indirect funding. Special attention should be given to higher education R&D support, as it is composed of universities, colleges of technology and other institutions providing formal tertiary education programmes as well as research

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institutes, centres, or experimental stations. These subjects can be major centres of research, and can help expand R&D in specific fields and transform economy to knowledge-based. The reported effect of the crisis (approximated by dummy variable) on economic growth is negative and statistically significant as was expected.

Determination of models is high (cca 89%), also results of Durbin-Watson test indicate the absence of autocorrelation in the residuals from the regression analysis and confirms a quality of the model.

6   Acknowledgement

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FINANCIAL SERVICES AND SMALL AND MEDIUM FIRMS IN THE CZECH REPUBLIC

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Abstract
Small and medium enterprises form important part of business sector in the Czech Republic. Generally, small and medium firms are very often dependent on financial services and they are more constrained (by internal factors like age of firms, size or launching a new product on the market as well as legal or financial restrictions) than large firms. Finding main factors that affect applying for a loan or a credit is important for removing obstacles and creating favorable business environment also for small and medium enterprises. The aim of this paper is to find out, which determinants increase a probability that small or medium enterprise in the Czech Republic will ask for a loan or a credit. Probit model with marginal effects is used due to binary independent variable. All data about Czech small and medium firms are obtained from the database of the World Bank for year 2013.

Keywords
Financial services, Small and medium enterprises, Czech Republic, Probit model

JEL classification
C25, D21, G30

1 Introduction

Financial services in context small and medium enterprises are at the interface of microeconomics (by focusing on business sector and mainly on small and medium firms) and macroeconomics, due to legal and financial constraints which influence exploitation financial services by the small and medium firms.

During the decision making about using financial services, firms are influenced by external factors (like regulatory environment or financial constraints in the form of lack of funds in banking system, high interest rates, excessive bank bureaucracy, etc.) and also by internal factors.

Attention is focused on small and medium firms primarily because these firms are more constrained by legal and financial limitations than large firms. For small and medium firms exists a presumption that these companies are already at its inception often dependent on the use external funds, as well as for investing in their development. The company's decision on the use of external funds is not a simple process, but finding, what motivates small and medium firms for application for a loan or a credit and what are the main factors which affect this decision, could provide basic information for deeper analysis area of financial services.

The goal of this paper is to find out, which of the selected variables significantly increases or decreases probability, that small or medium firm in the Czech Republic will ask for a loan or a credit.

First chapter after introduction provides a brief literature review. Next chapter is focused on description probit model, sources of data and explanation variables. In the third chapter after introduction are presented result of probit model. This chapter is divided into three parts. In the first part are basic tables containing descriptive statistics, the second part provides results of estimation and verification of probit model and in the last part are presented results of marginal effects, which explain influence of individual independent variables on probability, that small or medium firm in the Czech Republic will apply for a loan or a credit.

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2   Literature review

Area of financial services within small and medium firms is of interest to many authors, because small and medium firms create a substantial part of private sector in individual countries. External sources of funding are important especially for small and medium enterprises, because this is often only option, how firms can invest funds for example in new technologies, which can increase their productivity and create new jobs. However, there are also a number of restrictions that prevent the use of external funds (Gertler and Gilchrist, 1994).

As LaPorta et al. (1998) stated that legal and financial systems of individual countries belongs between main determinants of financing firms. However, we can not unambiguously say, which of these aspects has more influence on financing firms and how this influence varies depending on the size firms.

Beck, Kunt and Maksimovic (2005) were interested in legal and financial constraints in connection with the size of firm and they concluded that small firms are far more affected by these limitations, than medium and large enterprises. They are influenced notably by the following restrictions - access to long term loans, high interest rates, negotiations with banks or lack of funds in the bank system.

Krishnan et al. (2014) was interested in access to funds, especially in younger and smaller firms, because previous research was focused rather on relationship of corporate financing and their establishment/closure. Important area is also relationship between financial means of banking institutions and productivity of firms. Demarcation of the above mentioned relation is very complex especially thanks to possible reverse causality, because can be expected, that more productive firms will require additional funds or vice versa better access to financial funds will increase firm's productivity. In terms of research it was found, that productivity of firms rises significantly in those countries, where exists better access to financial funds of banks.

Allegrezza et al. (2012) dealt factors influencing company's applications for a loan or credit and he hypothesized negative influence of firm's age, because can be expected, that smaller firms will be more dynamic, they will tend to expand and borrow financial funds more often than larger firms. He also concluded that companies borrow money for two reasons, firstly they have a problem with cash-flow and secondly, they plan investment. Vice versa he did not confirmed hypothesis, that firm's decision about use of external funds is influenced by past experiences with a loans or a credits.

Okura (2009) shows that smaller firms and firms in the regions with less developed financial environments are more constrained in using bank loans and he also concluded that size, age, and ownership are the most reliable variables for classification criteria in analyzing financial constraints.

3   Used methods and data

This chapter is divided into two parts. The first part is focused on the description and justification choice of probit model. The second part is devoted to data description and formulation variables, including the determination of expected effects.

3.1   Probit model

Probit method calculates the maximum likelihood estimates of regression coefficients and has been developed due to the need to analyze the qualitative dependent variable, because many dependent variables has binary form (eg. Yes/No) and in the case of using discrete dependent variable the least squares method proved to be inadequate over the time (Verbeek, 2008).

In case of using probit model, it is necessary to consider two probabilities. Firstly, what is the probability of the phenomenon (the probability that a small or medium-sized company in the Czech Republic will ask for a loan or credit), and secondly, if changes independent variable by one unit (and other independent variables do not change), what will be impact of this change on the likelihood that small or medium-sized company will apply for a loan or credit (Söderbom, 2009)?

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Binary dependent variable takes the values 0 or 1. Value 0 is interpreted as a negative result (failure) and all other values (excluding missing values) are positive results (achievements) (Baltagi, 2011; Verbeek, 2008; Gujarati, 2004).

3.2 Data and selected variables

All data for this paper was obtained from the World Bank (WB), concretely from the Enterprise Surveys. This database receives data from entrepreneurs and top managers of companies on the basis of standard survey methods for collecting data at the enterprise level in the business environment. Data are collected from a wide range of areas, such as the access of companies to finance, area of corruption, infrastructure, barriers to growth companies, or from the area of labour market (WB, 2014a; WB, 2014b).

From the above mentioned database was selected data for small and medium enterprises in the Czech Republic in 2013. Sample includes a total of 182 companies, 119 small and 63 medium-sized companies, whose size is determined based on the number of employees.

Given the focus of the article at financial services of small and medium-sized enterprises was chosen as an approximation of the financial services research question of whether companies applied for a loan or a credit in the previous year? Answer to this question (Yes/No) was converted to the format of ones and zeros, and was chosen as dependent variable called *pujcka*.

From the Enterprise Surveys were also selected eight research questions (explanatory variables), where it is expected their influence on the likelihood that small or medium-sized company in the Czech Republic will ask for a loan or credit. The explanatory variables are listed below.

As the first explanatory variable, was chosen size of the company, measured by number of employees. Small businesses are by the WB survey defined as enterprises with 5-19 employees and medium companies with 20-99 employees. Variable *f_stredni* takes the value 1, if it is a medium-sized company and value 0, if it is a small firm. As was mentioned in the chapter devoted to literature review, company size is one of the key explanatory variables, as well as following explanatory variable *poclet*.

Another variable is the *poclet*, which reflects the age of the company (the number of years that have elapsed since the founding of the company until 2013 when the survey took place). As was mentioned, this variable belongs between the most important variables that influence firm's decision about application loan or credit. We can assume that younger firms are more likely to apply for a loan or a credit.

The third variable also contains a number of years but this is the number of years of experience they have managers of small and medium enterprises in the field of business. Here we can assume positive or negative influence. This variable has been reported as *zkusenosti*.

One of the selected explanatory variables is also *kontokorent*. This variable refers research question whether companies use overdraft? The assumption is that if a company uses an overdraft, this also increases the likelihood that asks for a loan or credit, because overdraft may be the first source of funds for companies and may lead to further demands for additional funding in the form of loans or credits. Answer on the question in form of Yes/No was again converted to a format 1/0.

Next explanatory variable in the model is variable *export*. This variable is expressed by means of export revenues as a % share of total annual revenues small and medium enterprises. Export activity of the company is associated with many risks and obstacles eg. in form of entry barriers, exchange rate risk, which may be associated with the expenditure of additional costs funded by loans or credits.

Independent variable *ztraty* represents the research question of whether companies recorded losses as a result of theft, robbery, vandalism or arson. Answer Yes/No has been converted into 1/0.

One of the variables is also *nakup* containing a Yes/No answer on question on whether the company last year bought some fixed assets. Purchase of fixed assets in form of machinery, buildings

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or land is one of the major cost items, and very often these purchases are financing through a loan or a credit.

The last variable is *nprodukt*, which contains information about the putting a new product on the market in the last three years. Launching a new product on the market is associated with investments in research and development of this product and these investments can be financed through loans or credits.

Table no. 1 shows the anticipated effects of individual variables.

Tab.1. Supposed effects of explaining variables

Explaining variable	Supposed effect
f_stredni	+
poclet	-
zkusenosti	+/-
kontokorent	+
nakup	+
nprodukt	+
export	+
ztraty	+

Source: own assumptions based on the literature review

The resulting equation of probit model can be written as follows:

$$Prob\ (dependent\ variable = 1) = \alpha + \beta_1 f\_stredni + \beta_2 poclet + \beta_3 zkusenosti + \beta_4 kontokorent + \beta_5 nakup + \beta_6 nprodukt + \beta_7 export + \beta_8 ztraty + \varepsilon_i \qquad (1)$$

4   Results

This chapter is focused on the interpretation of results. Attention is paid to the descriptive statistics, as well as the model estimation, including verification probit model and they are subsequently interpreted marginal effects of probit model. All data were compiled in the software Stata 12.

4.1   Descriptive statistics

Table no. 2 shows the basic descriptive characteristics of variables. Table shows that the model contains a total of 182 observations (small and medium firms), concretely 119 small companies and 63 medium firms. Variables *poclet*, *zkusenosti* and *export* are quantitative continuous. Other variables are dichotomous.

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Tab.2 Descriptive statistics of selected variables

Variable	Obs	Mean	Std. Dev.	Min	Max
pujcka	182	.2307692	.4224873	0	1
f_stredni	182	.3461538	.4770554	0	1
poclet	182	16.38462	5.866412	3	52
zkusenosti	182	21.24725	9.706714	1	50
kontokorent	182	.510989	.5012582	0	1
nakup	182	.5989011	.491473	0	1
export	182	14.75824	27.28136	0	100
nprodukt	182	.5	.5013793	0	1
ztraty	182	.3461538	.4770554	0	1

Source: own calculations

Stata 12 excludes an independent variable when exists a problem of serial multicollinearity in the model. In this case weren't excluded any variables. This fact does not suggest any problem with multicollinearity. In the table no.3 are results of pair correlation. Again, these results do not show signs of dependence between independent variables.

Tab.3 Pair correlation

	f_stredni	poclet	zkusenosti	kontokorent	nakup	export	nprodukt	ztraty
f_stredni	1.0000							
poclet	-0.1189	1.0000						
zkusenosti	-0.1188	0.2502	1.0000					
kontokorent	0.2035	-0.0785	-0.0693	1.0000				
nakup	0.0063	-0.0516	-0.0335	0.0292	1.0000			
export	0.0459	-0.0372	0.0896	0.0919	0.1308	1.0000		
nprodukt	0.0115	0.0056	-0.0539	0.0110	0.2130	-0.0501	1.0000	
ztraty	-0.0439	0.0667	-0.0186	0.2035	0.1242	-0.1723	-0.0577	1.0000

Source: own calculations

4.2 Estimation and verification of probit model

Table no. 4 contains the results estimation of probit model. Within the estimate have been used robust standard errors, which removed the problem of autocorrelation, heteroskedasticity and any wrong model specifications. First part of the table contains data on the number of observations, the value of Wald test, including the number of degrees of freedom. Null hypothesis of this test is that all of the regression coefficients are simultaneously equal to zero. Given that the value of 0.0013 (Prob > chi2) is less than selected level of significance (0.05) then at least one of the regression coefficients in the model is not equal to zero. Pseudo R2 is rounded up to 0.15. Values of 0.2 to 0.4 the pseudo R2 correspond to values from 0.7 to 0.9 of traditional coefficient of determination within the least squares method. Model has very good explanatory power.

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Tab.4 Probit model estimation

Probit regression			Number of obs	=	182	
			Wald chi2(8)	=	25.48	
			Prob > chi2	=	0.0013	
Log pseudolikelihood = -83.921344			Pseudo R2	=	0.1464	

pujcka	Coef.	Std. Err.	z	P > |z|	[95% Conf. Interval]	
f_stredni	.3839398	.2278742	1.68	0.092	-.0626855	.8305651
poclet	-.0355965	.0212439	-1.68	0.094	-.0772337	.0060407
zkusenosti	.021251	.0118768	1.79	0.074	-.0020272	.0445291
kontokorent	.4726693	.2291963	2.06	0.039	.0234528	.0218858
nakup	.3900831	.2382637	1.64	0.102	-.0769052	.8570713
export	.0064481	.0040094	1.61	0.108	-.004102	.0143065
nprodukt	-.0980813	.2294742	-0.43	0.669	-.5478423	.3516798
ztraty	.6454015	.2409494	2.68	0.007	.1731493	1.117654
_cons	-1.616462	.4617084	-3.50	0.000	-2.521393	-.7115297

Source: own calculations

The second part of the table contains a list of variables and also constant, then coefficient values, values of standard deviations, the z value follows a standard normal distribution, column $P > |z|$ expresses statistical significance of coefficients at the selected level of significance (0.1; 0.05 or 0.01). Last two columns contain values of 95% confidence interval.

From the table no. 5 is possible to find out, that the probit model as a whole is statistically significant, because value in the last line (Prob > chi2) is higher, than selected level of significance (0.05).

Tab.5 Verification of probit model

number of observations =	182
number of covariate patterns =	182
Pearson chi2(173) =	180.77
Prob > chi2 =	0.3274

Source: own calculations

4.3 Interpretation of marginal effects

Estimated coefficients do not quantify the impact of explanatory variables on the probability that explained variable will have a value of 1. To interpret the estimated parameters is needed to use the marginal effects. Marginal effect of explanatory variable is the effect of the change of one unit of this variable on the probability $P(Y = 1 | X = x)$, assuming that the other explanatory variables are constant (Long and Freese, 2014). Therefore coefficient values listed in table no 4. can't be interpreted directly.

In this case are used marginal effects (sometimes also called average marginal effects). Changes are calculated for each observation in the file, and then averaged. Interpretation of individual coefficients depends on the type of variable.

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Tab.6 Marginal effects of independent variables

	Change	p-value		Change	p-value
f stredni			nakup		
Marginal	0.099	0.085	Marginal	0.100	0.096
poclet			export		
Marginal	-0.009	0.086	Marginal	0.002	0.104
zkusenosti			nprodukt		
Marginal	0.005	0.067	Marginal	-0.025	0.670
kontokorent			ztraty		
Marginal	0.122	0.034	Marginal	0.166	0.005

Source: own calculations

Table no. 6 contains values of changes, how is increasing or decreasing the likelihood that a small or medium-sized company in the Czech Republic will request for a loan or a credit when the independent variable changes by one unit. This table also contains p-values. These p-values represent the statistical significance of individual variables at 1%, 5% and 10% significance level.

Variables *f_stredni*, *poclet*, *zkusenosti* and *nakup* are significant on 10% level of significance. Variable *kontokorent* is significant of 5% level of significance. Variable *ztraty* is significant on 1% level of significance. Two variables, concretely *export* and *nprodukt* was not significant nor on 10% level of significance.

Table no. 6 shows that for medium firms is higher probability that they will ask for a loan or a credit than for small firms, by 9.9 percentage point.

Independent variable *poclet* can be interpreted so, that increase in number of years that have elapsed since the founding of the company by one unit (one year), decreases probability, that firm will ask for a loan or a credit by 0.9 %. It confirms the hypothesis that loans and credits are more used by younger firms because these external funds are usually main source of finance their business activities.

In the case of independent variable *zkusenosti*, increase in number years of experiences top managers by one unit (one year), increases a probability that firm will apply for a loan/credit by 0.5 %. Even though this increase is not so high, we can expect, that more experienced managers may be able to better evaluate all the pros and cons of loans/credits and may not be afraid ask for a loan/credit to finance eg. investments.

If a company decides to use the *kontokorent*, then it is increases the likelihood that the company will also request for a credit/loan by 12.2 percentage points. This relationship can testify about the financial difficulties of some small and medium-sized firms.

Another variable is *nakup*, which expresses purchase fixed assets in the last year. Purchase fixed assets increases the likelihood that a company asks for credit/loan by 10.0 percentage points. This relationship suggests that it is likely that the company will use this loan or credit to pay for the purchase of fixed assets because small and medium firms usually do not have enough financial funds to finance these expensive investments.

Independent variables *export* and *nprodukt* are not significant nor 10% level of significance, so there is not any statistically significant relationship between these variables and probability that firm will ask for a loan/credit.

Last independent variable is *ztraty*. When firms realize losses as a result of bribe, theft or arson it increases a probability that small or medium firm will apply for a loan/credit by 16.6 percentage points. These losses could be considerable extent and especially small firms could cover these losses by loan/credit.

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5   Conclusion

Companies are in their deciding to use financial services affected by both external factors and internal factors. Small and medium enterprises tend to be affected through regulatory and financial constraints much more than large firms. There is also the assumption that small and medium companies are rely on the use of external funds already at its inception.

The aim of this article was to determine which of the selected variables significantly increases or decreases the likelihood that a small or medium-sized company in the Czech Republic will request for a loan or a credit.

From the database of the World Bank Enterprise Surveys was selected data on small and medium enterprises in the Czech Republic in 2013. Due to 182 observations within a one time period (2013) was chosen the cross-section regression, namely probit model. This model was chosen on the basis that the dependent variable (research question, whether small or medium-sized company in the Czech Republic has requested the previous year for a loan or a credit) takes the value 0 (if the answer is No) or 1 (if the answer is Yes).

For the model was selected a total of 8 explanatory variables, only two of them were not statistically significant nor at the 10% level of significance.

In this article was confirmed a hypothesis, that more often applying for a loan younger firms in the Czech Republic. Young and start-ups companies have to invest a financial means to development new product (service) or improve a quality their products with a goal to increase a competitiveness of their products and create a stable position on the market. All these factors are connected with a requirement on substantial funds. We can suppose, that young and start-ups firms do not have a financial reserves to finance these activities, so they usually ask for a loan or a credit.

It was also found, that more often applying for a loan medium companies, than small companies and small and medium enterprises with top managers with more years of experience. It is probable, that medium firms will be tend to expand and become a large firm and this expansions can be financed by loans or credits.

Positive relationship was also confirmed by independent variable nakup. This means that small and medium firms, which buying fixed assets are asking for a loan or a credit. It is probable, that these purchases are financed just through loans or credits.

Possible options for extending this article is the inclusion of data from previous surveys, which took place in 2009, 2005 and 2002. The solution would be a panel probit regression.

6   Acknowledgement

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THE EVALUATION OF ECONOMIC IMPACT USING REGIONAL INPUT-OUTPUT MODEL: THE CASE STUDY OF CZECH REGIONS IN CONTEXT OF NATIONAL INPUT-OUTPUT TABLES

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Abstract

Regional input-output analysis brings unique information about the local structure of a national economy in regional divisions. Regional analysis has several advantages compared to national input-output analysis. Firstly, it provides detailed information on the regional structure of output. Moreover, it allows researchers to quantify the impact on aggregates using regional structure.
This paper follows the newly compiled regional input-output tables and the interregional flows in the Czech Republic for the year 2011. We process this unique information into the model of interregional Leontief's multipliers. This paper aims at illustrating the shock into the final consumption by employing data from the regional input-output tables. We compare the results among individual regions as well as the entire national economy through Leontief's multipliers. Moreover, we consider the impulse in the demand into the final consumption of households and final consumption of governments for the construction of buildings and infrastructure in the value of 1 bn. CZK in the Moravian –Silesian Region.

Keywords
Regional Input-Output, Input-Output analysis, Leontief`s multipliers, IRIO

JEL classification
C67, R13, E21

1 Introduction

Input-output analysis (IOA) offers unique information about the structure of economy. Input-Output tables (IOTs) represent the main tool of IOA as they provide information of time, territory and products from the point of view of the place of output (domestic, import, total economy). IOA and IOTs were established by W. Leontief during the first half of 20th century. Since than many analytical tools, which serve for the analysis of the impact of some impulses into the economy, for the use of IOTs were developed (Miller and Blair, 2009).

IOA is used notably for the modelling of impact of exogenous impulses into the structure of economy such as regulations or administrative restrictions. The aim of IOA is to provide the information not only about the size of such impulse but mainly about the allocation of this impulse into the flows of national economy. The primary limitation of IOA lies in the territory definition of IOTs. IOTs are officially published for the Czech economy. The problem lies in the formulation of effects on the regional bases as exogenous impact is not spread into the economy through one region. The impact rather appears within region which is the target of the impact and connected regions. If the structure of regions would be the same as the national structure we could use the national IOTs. However, regional products have regionally different production functions. The bigger regional particularity the most significant differences between results gained by IOTs and regional input output-tables (RIOTs). RIOTs offer a tool how to solve the discrepancy created by national IOTs (Leontief and Strout, 1963). The most common analytical tool represents location quotients method. Using coefficients we can approximate regional structure from the national data source. This simplified structure serves for the application of the final analysis (Single Region Input-Output Analysis, SRIO). This application entirely ignores interconnection of regions and

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creates divert estimations of reginal impacts of total and the structure of individual regional industries. Moreover, the structure of individual regional industries become different and unstable (Šafr, 2014).

This paper illustrates the differences between usually used SRIO and method which work with the interconnection of all regions. The solution of this problem represents the application of Interregional Input-Output Analysis (IRIO) which takes into account the interconnection of all regions and solves the underestimation from SRIO. The paper is organized as follows. Chapter 2 deals with the literature review of SRIO and IRIO, chapter 3 explains the methodology with the emphasis on the design of the construction of regional intermediate consumption matrix. Chapter 5 introduces regional data sources. Chapter 4 brings results gained from IRIO and SRIO using RIOTs. All the important conclusions, results and discussion covers chapter 6.

2   Literature review

There are many models and techniques how to construct interregional input-output models (Miller and Blair, 2009). Most of the regional models malfunction lies in the analysis of connection to other regions (Miller and Blair, 2009). There are three fundamental approaches (see Figure 1) how to model regional IOA. The first approach (Case I) consider each industry separately. The second approach (Case II) consider regional import and export only for the region which we investigate. The last approach (Case III) represents interregional approach which consider all connections within all regions which we investigate (Lenzen et al. 2004).

Figure 1. Three approaches how to model regional IOA
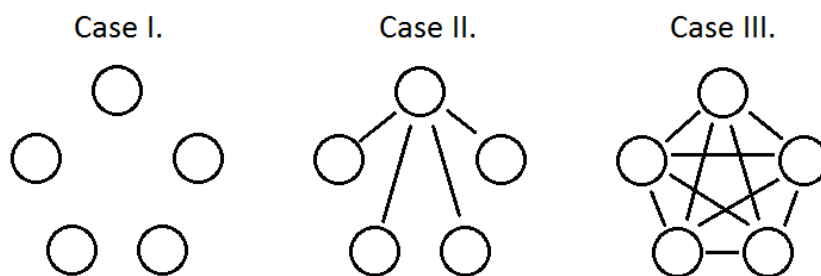
Source: Own elaboration using Lenzen et al (2004).

Case I depicts disconnection of regions. It means that it is necessary to prepare the analysis individually for each region. Interregional export is allocated into vectors with no influence into other estimations (without multiplication). Case II analyse inosculation of other regions into the one we analysed. This approach does not take into account relations originated in relation of supplier/consumer region on other supplier/consumer regions. Case III represents fully connected model. The increase of demand on product in one region causes exhaustive interregional multiplication among all regions.

This paper deals with Case II and Case III where we consider similar flows of output between regions. Case II represents analogy with the national model (EUROSTAT, 2008). Case III can be analysed by two main methods (Miller and Blair, 2009). First approach represents Isard's IRIO model (Isard et al, 1960). Second approach Multiregional Input-Output model (MRIO) was created by Chenery (1953). The structure of data represents the most important difference between both approaches. Isard's model requires detailed data about the structure of import and export for each industry. On the other hand, Chenery's approach uses only import and export vectors without detailed structure of the allocation of export and import.

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The increasing significance of interregional and multiregional input-output analyses emphasize several studies such as analysis of renewable and emission (Daniels et al., 2011, Okadera et al., 2014) or infrastructure studies (Kim et al., 2004) with eminent regional aspects.

3   Methodology

3.1   National Input-Output Methodology (NIO)

The core of IOA lies in the matrix of intermediate consumption **X**. Components of this matrix represent flow of output from industry i to industry j. If we summarize everything that one industry i supply to the rest of industries and add total final consumption (y) and export (e) of this industry we get total output of this industry. This represents basic equation of IOA (EUROSTAT, 2008):

$$\sum_{j}^{n} x_{ij} + y_i = x_i , \quad j = 1,2,3\ldots\ldots,n. \tag{1}$$

x_{ij} represents the flow of intermediate consumption from industry i to industry j, y_i is final use of product i (final consumption together with export). The portion of intermediate consumption flows from industry i to industry j on total production of industry j represent technical coefficients:

$$Matrix{:}\mathbf{A} = (a_{ij})_{nn}, \text{where: } a_{ij} = \frac{x_{ij}}{x_j} , \quad j,i = 1,2,3\ldots\ldots,n. \tag{2}$$

Technical coefficients present production functions of individual industry which are stable and unchanged during long time period. Moreover, they show how many inputs of intermediate consumption are necessary for one unit of output of the industry i. From the equation (2) we can construct the fundamental input-output model which describes the value of total output necessary for fulfilling of final use:

$$\mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{y} , \tag{3}$$

where *I* represents identity matrix and (*I-A*)$^{-1}$ presents Leontief inversion.

3.2   Single Region Input-Output Analysis (SRIO)

The regional relations are similar to the national relations. The fundamental production function described in Miller and Blair (2009):

$$\sum_{j}^{n} x_{ij}^{R} + y_{ij}^{R} = x_{i}^{R} , \quad j = 1,2,3\ldots\ldots,n. \tag{4}$$

where x_{ij}^{R} represents the flow of intermediate consumption from industry i to industry j in the particular region R. y_{ij}^{R} presents final use of product i in region R. The difference between national and regional model lies in export as the part of final use. Regional model include not only export outside the country ($e_i^{N_R}$) but export to other regions in the country (e_i^R) as well.

Technical coefficients are described as follows:

$$\text{Matrix:} A^{R} = (a_{ij}^{R}), \text{ where: } a_{ij}^{R} = \frac{x_{ij}^{R}}{x_{i}^{R}}, \quad j,i = 1,2,3\ldots\ldots,n. \tag{5}$$

Regional technical coefficients differ from national technical coefficients. Šafr (2016) described their relation as follows:

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$$\left[\sum_{R=1}^{m} \mathbf{A}^R diag(\mathbf{x}^R)\right] diag(\mathbf{x})^{-1} = \mathbf{A} \tag{6}$$

Finally, equation (3) can be adjusted for the regional model:

$$\mathbf{x}^R = (\mathbf{I} - \mathbf{A}^R)^{-1} \mathbf{y}^R \tag{7}$$

3.3 Interregional Input-Output Analysis (IRIO) – Isard's approach

IRIO is based on decomposition of matrix A (Miller and Blair, 2009). Our goal is the construction of matrix of intermediate consumption X^T that simultaneously differentiates individual products and individual industries. This matrix consists of n products and m regions (this matrix have $m \times n$ columns and rows in total). The diagonal of X^T represents regional matrix of intermediate consumption (X^R). Matrices outside the diagonal represent the allocation of import from region i to region j:

$$\mathbf{X^T} = \begin{bmatrix} \mathbf{X^1} & \mathbf{F^{1,2}} & \cdots & & \cdots & \mathbf{F^{1,m-1}} & \mathbf{F^{1,m}} \\ \mathbf{F^{2,1}} & \mathbf{X^2} & \cdots & & \cdots & \mathbf{F^{2,m-1}} & \mathbf{F^{2,m}} \\ \vdots & \vdots & \ddots & & & \vdots & \vdots \\ & & & \mathbf{X^R} & & & \\ \vdots & \vdots & & & \ddots & \vdots & \vdots \\ \mathbf{F^{m-1,1}} & \mathbf{F^{m-1,2}} & \cdots & & \cdots & \mathbf{X^{m-1}} & \mathbf{F^{m-1,m}} \\ \mathbf{F^{m,1}} & \mathbf{F^{m,2}} & \cdots & & \cdots & \mathbf{F^{m,m-1}} & \mathbf{X^m} \end{bmatrix} \tag{8}$$

It is important to fulfil the condition of the transition from X^T to national matrix X:

$$\sum_{R=1}^{m} \sum_{\beta=1}^{m*n} x^T_{[(R-1)*82+i],\beta} = \sum_{j}^{n} x_{i,j} \quad . \tag{9}$$

The same has to be fulfil for columns of X^T

$$\sum_{R=1}^{m} \sum_{\alpha=1}^{m*n} x^T_{\alpha,[(R-1)*82+j]} = \sum_{i}^{n} x_{i,j} \quad . \tag{10}$$

(9) and (10) ensure comparability of interregional impacts and national impacts. Thus, this represents interregional decomposition of national matrix with respect to interregional particularity.

The final part presents the construction of matrix $\mathbf{F}$. The unsolved problem lies in the construction of regional matrices $\mathbf{F}^{R,P}$ where rows represent export of output from industries of region R to region P. This matrix has the same number of columns and rows as matrix of intermediate consumption and has to respect the volume of interregional flows (Šafr, 2016). Using matrix of intermediate consumption of import ($\mathbf{X}^{R,imp}$) we are able to approximate the structure of $\mathbf{F}^{R,P}$:

$$\sum_{R=1}^{m} \mathbf{F}^{R,P} = \mathbf{X}^{P,imp} \quad . \tag{11}$$

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Moreover we have information about $\mathbf{F}^{R,P}$:

$$
\begin{bmatrix}
F_{1,1}^{R,P} & \cdots & F_{1,j}^{R,P} & \cdots & F_{1,n}^{R,P} \\
\vdots & \ddots & & & \vdots \\
F_{i,1}^{R,P} & & F_{i,j}^{R,P} & & F_{i,n}^{R,P} \\
\vdots & & & \ddots & \vdots \\
F_{n,1}^{R,P} & \cdots & F_{n,j}^{R,P} & \cdots & F_{n,n}^{R,P}
\end{bmatrix}
\sum =
\begin{matrix}
e_1^{R,P} \\
\vdots \\
e_i^{R,P} \\
\vdots \\
e_n^{R,P}
\end{matrix}
\qquad (11)
$$

$$
\sum =
$$

$$
i_1^{R,P} \quad \cdots \quad i_j^{R,P} \quad \cdots \quad i_n^{R,P}
$$

As we know rows and columns sums of $F^{R,P}$ we can use RAS method (Sargento et al, 2012) for the approximation of the structure of matrix $F^{R,P}$ with conditions of similar structure of $F^{R,P}$ and $X^{P,imp}$. This concept ensures the consistency between regional and national Leontief's coefficients.

4   Data

The Czech Statistical Office publishes national IOTs. For this paper we use RIOTs constructed for the reference year 2011 by the Department of Economic Statistics from the University of Economics, Prague (Sixta and Vltavská, 2016, Sixta et al, 2014). RIOTs describe the structure of output in individual region (NUTS 3 level) as IOTs. Moreover, each region has its own IOT of imported goods. For the analysis we need both of these tables and information of regional flows of import and export. This data source is not available. We have only total amount of import and export for individual industry without any information which region is the source and which region is the recipient. However, for the construction of IRIO we have to have more detailed information about the trade – which region imports and exports to another region. Thus, we calculated this information using Karush-Kuhn-Tucker theorem (Šafr, 2016).

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5 Results

5.1 Leontief's Multipliers

We calculated the decomposition of Leontief's multipliers for individual region using SRIO and IRIO.

Table 1. Average Leontief's Multipliers, regions

Region	Jhc	Jhm	Kar	Krh	Lib	Mrs	Olm
SRIO	1.32	1.44	1.22	1.32	1.29	1.34	1.30
IRIO	1.60	1.58	1.62	1.60	1.59	1.57	1.55
% IRIO/SRIO	83%	90%	75%	82%	81%	85%	84%
Region	Par	Plz	Pra	Stc	Ust	Vys	Zln
SRIO	1.29	1.35	1,49	1.32	1.30	1.27	1.29
IRIO	1.60	1.56	1.71	1.63	1.67	1.67	1.61
% IRIO/SRIO	81%	86%	87%	82%	78%	76%	80%

Source: Authors' calculation using data from the Dept. of Economic Statistics.

Note: Pha – the capital city of Prague, Stc – Central Bohemia Region, Jhc – South Bohemia Region, Plz – The Plzen region, Kar – The Karlovy Vary Region, Ust – The Usti Region, Lib – The Liberec Region, Krh – The Hradec Kralove Region, Par – The Pardubice Region, Vys – the Vysocina Region, Jhm – The South Moravian Region, Olm – The Olomouc Region, Zln – The Zlin Region, Mrs – The Moravian-Silesian Region

Results show (Tab. 1) that the interregional multiplication reach approximately 10-25% of interregional multiplier. This difference represents undervaluation of regional Leontief's multipliers of production.

5.2 Exogenous Impulse – the Case of the Moravian-Silesian Region

Leontief's multiplier of CZ-CPA 42 'Constructions and construction works for civil engineering' in the Moravian-Silesian Region reaches 2.21 using IRIO and 2.12 using SRIO. Thus, SRIO multiplier is underestimated approximately by 4%. CZ-CPA 42 represents unique product which is closely related to the regional economy because of import demand of services and goods.

Table 2 shows the decomposition of Leontief's multiplier of CZ-CPA 42 in the Moravian-Silesian Region. Figure 2 depicts the geographical decomposition of multiplication of Leontief's multiplier of industry CPA 42 without the Moravian-Silesian Region.

Table 2. Decomposition of Leontief's multiplier CZ-CPA 42 in the Moravian-Silesian Region through regions

Kraj	Jhc	Jhm	Kar	Krh	Lib	Mrs	Olm
Multiplier	0.000880	0.006120	0.000030	0.003350	0.000110	2.121410	0.007980
%	0.039960	0.277050	0.001290	0.151410	0.005020	96.014110	0.361360
% import	1.002480	6.950820	0.032330	3.798540	0.125980	-	9.066010
Kraj	Par	Plz	Pha	Stc	Ust	Vys	Zln
Multiplier	0.000100	0.000060	0.041210	0.002250	0.000150	0.000610	0.025220
%	0.004370	0.002640	1.865030	0.101740	0.007010	0.027680	1.141330
% import	0.109660	0.066240	46.790900	2.552620	0.175810	0.694410	28.634200

Source: Authors' calculation using data from the Dept. of Economic Statistics.

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Figure 2. Geographical decomposition of interregional multiplication, the Moravian-Silesian Region, CZ-CPA 42
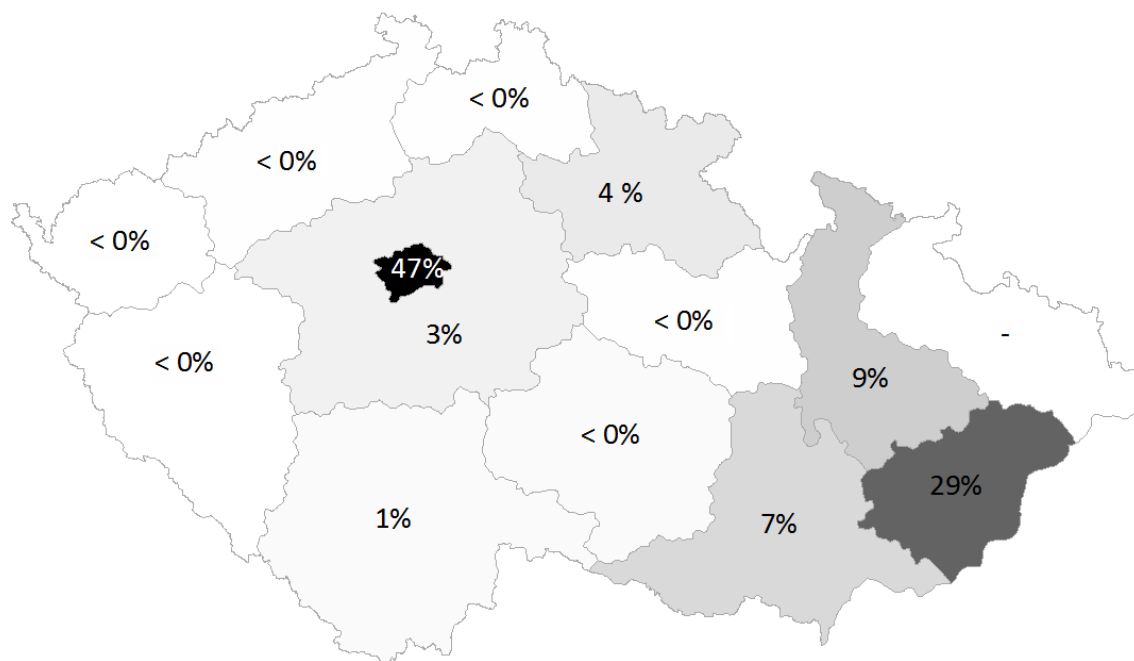
Source: Authors' calculation using data from the Dept. of Economic Statistics.

The most significant relation of CZ-CPA 42 from the Moravian-Silesian Region goes to the capital city of Prague (47% of import), the Zlin Region (29% of import), the Olomouc Region (9% from import) and the South Moravian Region (7% from import).

Table 3 illustrates the increase of output caused by the exogenous impulse of 1 bn. CZK into the final use of CZ-CPA 42 in the Moravian-Silesian Region.

Table 3. The increase of output caused by the exogenous impulse of 1 bn. CZK, the Moravian-Silesian Region

Jhc	Jhm	Kar	Krh	Lib	Mrs	Olm
0.00088	0.00612	0.00003	0.00335	0.00011	2.12141	0.00798
Par	Plz	Pha	Stc	Ust	Vys	Zln
0.0001	0.00006	0.04121	0.00225	0.00015	0.00061	0.02522

Source: Authors' calculation using data from the Dept. of Economic Statistics.

6   Conclusion

The results provide us with several differences among regions. The main difference lies in different production functions of individual regions. Another difference can be found in different preferences of regional consumers as they partially consume dissimilar goods. Moreover, these differences come from unlike strength of connection among individual regions.

Our results mainly depict that regions with strong interregional relations are significantly underestimated. This can be found in SRIO mainly in industries and regions which have strong interregional flows. In both examples, the highest multiplier was achieved in the capital city of Prague. The difference of 13% is caused mainly by the export of services which the capital city of

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Prague offers to remaining regions. Moreover, this difference is created by import of goods that are not produced in the capital city of Prague (e.g. products of agriculture). The weakest multiplier was achieved in the Liberec Region and the South Bohemia Region. This is caused by their weak connection to the rest of regions. Furthermore, these two regions have weak connection of their import of goods to the national economy. This caused weak multiplication and low multipliers.

Using only one region, the Moravian-Silesian region, Leontief's multiplier is underestimated (4%) than the average multiplier (15%) for CZ-CPA 42. This is caused mainly by high demand for transport. The stronger connection of the Moravian-Silesian region to the rest of the regions in other products is produced mainly by the high demand on transportation, financial services and capital demanding products that come from other regions. The capital demanding products caused the strongest connection with neighbouring regions (see Figure 2). The strongest connection (the multiplication outside the region) of this product (CZ-CPA 42) can be found in the capital city of Prague (47%) because of intermediate consumption of financial services which present important role. This reason identify strong connection of the remaining regions to the capital city of Prague.

Differences between SRIO and IRIO models prove noticeable multiplications between both approaches. The analysis confirmed that SRIO approach neglected 10-25% of Leontief's multipliers in average in regions. The underestimation is caused by ignoring interregional relations. This result was demonstrate in decomposition of CZ-CPA 42 even if this product is notably regional product with small recoverability in interregional and international production. The decomposition was mainly depict in regions close to the Moravian-Silesian Region and the capital city of Prague. This example proved what could happen by using only SRIO approach. By employing SRIO models one can expect significant neglect in products that are import demanding in intermediates.

7   Acknowledgement

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THE STRENGTHS AND THE BOTTLENECKS OF THE EUROPEAN BANKING UNION

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Abstract
This paper evaluates the main shortcomings and potential risks of the current shape of the EU's banking union. The institutional set-up of the single banking supervision is called into question; the rationale behind its establishment is explained and possible drawbacks are pointed out. Further and mainly, the paper concentrates on the analysis of the single banking resolution and its supporting legislation in the form of the Bank Recovery and Resolution Directive (BRRD). The BRRD's main innovation, the "bail-in" principle of resolving failing banks is assessed, both in terms of clear advantages as compared to the classic public bailout, and of potential drawbacks, especially concerning the contagious effects and adverse impact on specific groups of creditors with political repercussions. The European bail-in is also compared to the US "Dodd-Frank Act solution", yet there has not been found any straight forward inspiration for the European scheme. Finally, the need for a common fiscal backstop is identified given the resource inadequacy of the current single resolution fund, especially if a major systemic crisis occurs. Thus, various arrangements of the fiscal backstop are proposed; it is argued that the European Stability Mechanism would serve the backstop purpose better than the options involving national budgets.

Keywords
European central bank, banking supervision, resolution, bail-in, bailout, fiscal backstop

JEL classification
E62, G18, G21, G33, H63

1   Introduction

The aim of this paper is to analyse the currently functional pillars of the European banking union (EBU), namely the single supervision and resolution mechanisms, and to propose options to further tune the current EBU's architecture. The EBU has been conceived as a new milestone on the path to complete the financial union which in turn is one of the strategic responses of the EU to the recent global financial and European sovereign debt crises. Two of three notional pillars of the EBU are already in operation. Before adopting the third and final part, the European deposit insurance scheme (EDIS), it is worth to assess and to look more in depth at the pros and cons of the mechanisms in question. In our analysis, a great emphasis will be put on the resolution procedure which is inherently connected to the new EU-wide resolution and recovery rules. We attempt to spot the main advantages and downsides of the new procedures, compare it to the existing framework outside the EU and to propose possible options to improve the current set-up.

The paper is organized as follows: In the section 2 we describe the Single Supervisory Mechanism (SSM) and its main features and components. We explain the rationale behind the shift from national to the European oversight and point out potential institutional drawbacks. In the section 3 we analyse the overall resolution scheme with a particular focus on the newly introduced bail-in principle. In 3.1 the rationale behind as well as the downsides of this mechanism will be presented. In 3.2 a comparison with the American equivalent of the resolution legislation will be carried out. In 3.3 the fiscal backstop question associated with the inadequate resources of the resolution fund will be tackled; various possible options for the future set-up will be proposed. In the section 4, we conclude with some basic recommendations.

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2   Single supervision

In November 2014, the European Central Bank (ECB) took on the direct supervision over the significant banks ("systemically important financial institutions" – SIFIs) in the Eurozone. As defined in the Single Supervision Mechanism (SSM) Regulation (Article 6) and the SSM Framework Regulation, 129 banks are representing more than 85 % of the aggregate total banks' assets in the Eurozone.[1] At the same time there are more than three thousand of the less significant credit institutions ("less significant supervised entities" – LSSE) accounting for less than 15 % of the aggregate total assets that stay under the direct supervision of the national competent authorities. However, the banking sector as a whole is overseen by the ECB in matters of risk concentration, so it has the right to intervene with these small banks.

So what exactly can the ECB do now? The SSM regulation (1024/2013), Article 4 confers on the ECB the following tasks and powers:[2]

- the authorisation of banks and the withdrawal of authorisations (ultimate licencing authority)
- the assessment of notifications of the acquisition and disposal of holdings in banks
- ensuring compliance with regulatory requirements, such as own funds requirements or large exposure limits
- ensuring compliance with the requirements regarding the governance of banks
- supervisory reviews and stress tests
- the supervision of recovery plans and early intervention when a bank does not meet the regulatory requirements
- the possibility to make resolution recommendations to the Single Supervisory Board (see further)

Certainly, there are some clear benefits of the European banking supervision. Firstly, the ECB is having an overall, consolidated view over the cross-border banking activities. As the large banks usually operate in more than one country, the European level overview enables an earlier identification of problems and better crisis-management. Secondly, it prevents a possible lenience of national supervisors when dealing with domestic banks. A reluctance to intervene may appear so that their national champions did not get a competitive disadvantage compared to foreign banks. Thus sub-optimal results stemming out of national interests should be effectively eliminated by removing the distinction between home and host supervisors and imposing an impartial European perspective. Thirdly, the more the ECB establishes itself as a common supervisor, the more financial integration should advance; *"the creditors of banks will increasingly look for European solutions to banking problems as they can rightly claim the ECB has been supervising the banks"* (Wolff, 2014). Finally, it is supposed that with the ECB in charge the banking supervision will exhibit a significant level of quality as its reputation and expertise is very rarely disputed.

As for the assessment of the functioning, indeed it was witnessed that the quality of supervision amounts to the high standards. However, there are some objections too. Generally, with more data reporting required the new system is considered intrusive (Schoenmaker and Véron, 2016). Moreover, there are some concerns of a more systemic nature. Firstly, it is often feared (Allen et al. 2011) (Ioannidou, 2012) that within the same institution the supervisory mandate and the monetary policy may get easily in conflict; when monetary policy objectives stand in opposition to financial stability.[3] Because, although a new Supervisory Board was established within the ECB, the Governing Council has the ultimate say even on the supervisory matters, so the trade-offs between the two may occur. Secondly, with taking up the influential role and performing new delicate powers, the ECB will

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[1] That makes the ECB one of the world's biggest banking supervisors (Dombret 2015).

[2] Summary listed according to: Demary and Bauer (2014).

[3] A situation may arise in which the Governing Council might be tempted, out of monetary policy concerns, to alter decision the Supervisory Board proposed from a supervisory perspective (Dombret 2015).

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become more politicized. Furthermore, the institution is getting much more powerful without too much scrutiny or accountability, for instance from the European Parliament (Beck and Gros, 2012). Another concern is that the part of banks exempted from the direct ECB supervision, i.e. the "less significant" banks — often dubiously managed and, with the largest portion of them concentrated in a limited number of countries, are creating an asymmetry with yet unknown consequences. Finally, another considerable segment exempted from the single supervision is the shadow banking, i.e. the financial institutions performing more or less the same activities as banks yet not considered and treated as banks, particularly in the sense of banking regulation, despite the fact that some are systemically important. *"This puts the regulator at a disadvantage as financial intermediaries shift risk towards outside of the regulatory perimeter"* (Beck, 2016).

3   Bail-in and single resolution

It is important to point out that especially the big credit institutions are by no means ordinary market players that could be easily put in the standard insolvency proceedings. Their abrupt exit from the market would not be without serious consequences for the payment system, at least. From the regulator's perspective, it is often essential to preserve their critical functions and to evaluate the impact of the restructuring on the financial system as a whole. Nor it is often particularly responsible to put the bank into the lengthy national insolvency proceedings and keep the creditors in uncertainty for years. The resolution process thus also has to be swift and reassure depositors (Micossi, 2013). This is why "too big to fail" institutions need special treatment. In the recent crisis we have seen many ad hoc rescues orchestrated by the member states when trying to support their failing banks.[4] As the states were too often too small vis-à-vis their banking sectors which they were supposed to bailout, and as the use of public funds for "redeeming" banks' misbehaviour was quite unpopular among the public, it made sense to policy-makers to move the resolution authority to the European level and to set up a uniform framework to manage orderly bank resolutions in the future.
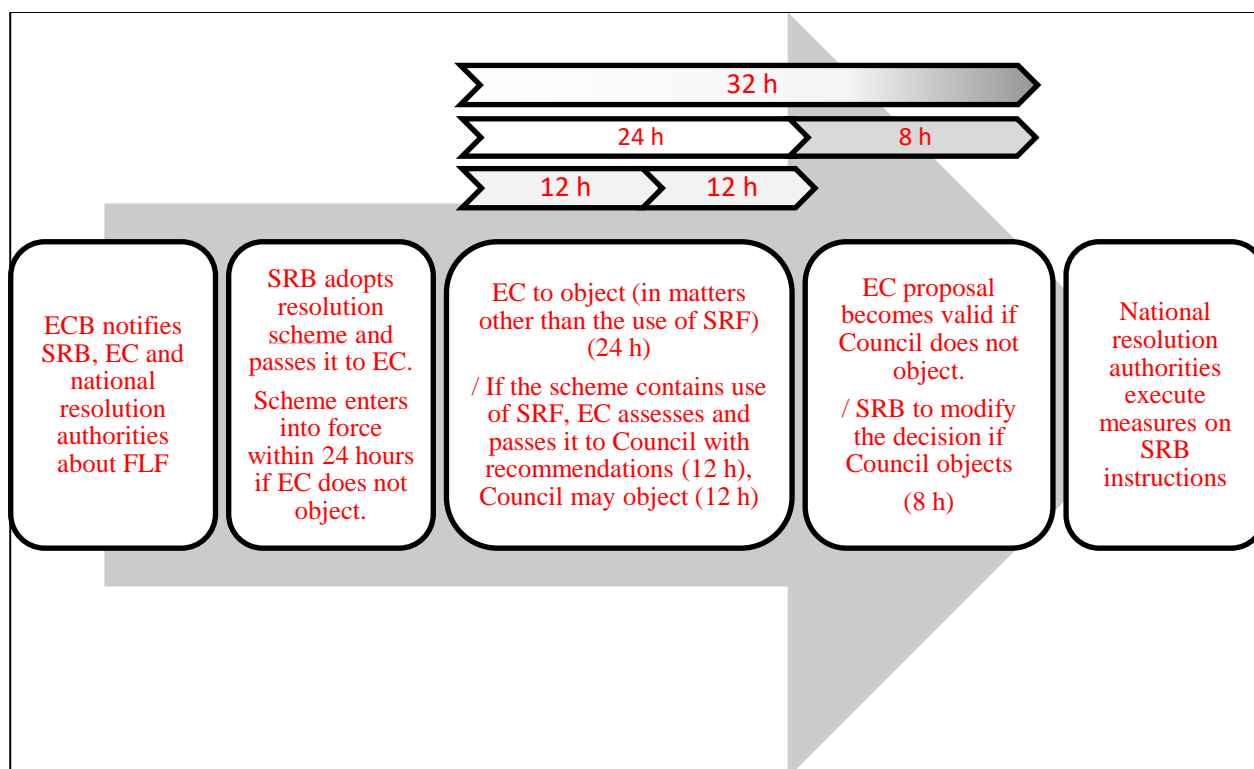
The Single Resolution Mechanism (SRM) provides for centralised decision-making and resolution financing for the Eurozone (and for voluntary non-Eurozone members of the EBU) banks. It consists of the new established agency, the Single Resolution Board (SRB) and the Single Resolution Fund (SRF).

The decision making process is rather complicated,[5] involving the ECB, SRB, European Commission (EC) and national finance ministers (Council). It is thus *"a mix of national and Eurozone-wide decision processes, especially when funding decisions are involved"* (Beck, 2016) and the question remains how effective will it be given the involvement of so many actors. Most questions revolve around the role of the SRF which will be closely examined below.

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[4] It led to many inconsistencies and emergence of a new phenomenon, *the doom loop* between the highly indebted countries and their banking sectors, creating a situation where the sovereign rescued the failing institutions only at the cost of increasing its own insolvency risk. This in turn reinforced the bank insolvency risk as they were loaded with the government bonds which were now becoming riskier, thus catalysing the debt crisis.
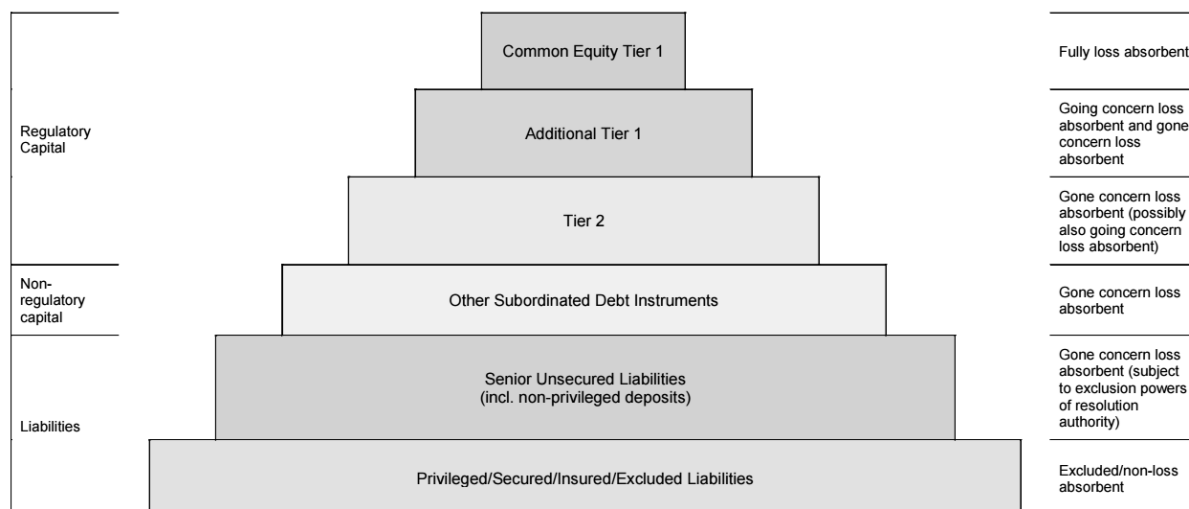
[5] Based on Council of the EU (2016) the resolution process works as follows: The ECB notifies the SRB that a bank is failing or likely to fail (FLF). Such a decision can be made also by the SRB alone, if after having informed the ECB it receives no reaction for three days. The SRB then adopts a resolution scheme which determines the tools and the use of the SRF and transmits it to the European Commission (EC). If the EC does not object, the scheme enters into force within the 24 of its approval by the SRB. Of course the EC may object (regarding the discretionary aspects) or propose to the Council to object (regarding the necessity of the resolution or the amount to be used from the SRF). In that case it has to do so within 12 hours of the SRB's approval of the resolution scheme, enabling the Council to take a decision within the next 12 hours. If the Council objects to the placing of an institution under resolution, that institution is wound up in accordance to the applicable national law.

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Fig. 1 The EBU resolution process, simplified (Source: Council of the EU, 2016; authors' own processing)

SRM is based on the Banking Resolution and Recovery Directive (BRRD) that is applied in all the EU member states and sets a common ground for member states to deal with the bank failures. Besides the new requirements for the banks such as to prepare its own recovery plans, the main objective of the BRRD is to enable banks to fail in an orderly manner and without recourse to the use of public funds; it grants the resolution authorities the capacity to make credit institutions internalize the costs of their own failure. It is ensured by a new principle referred to as *bail-in*, as opposed to the classic public *bailout*.

So as of 1 January 2016 in the EU the bank shareholders are again the first to absorb the losses generated by the non-performing assets with their equity. But if the regulatory (and non-regulatory) capital is not enough, the unsecured bondholders are next in the row to write-off their claims, or converting them into equity. If needed, the pecking order could be extended until the insured deposits in the hierarchy of creditors are reached.

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Fig. 2 Bail-in sequence under BRRD (Source: Alonso and Jennings-Mares, 2015)

However, the resolution directive does not rule out the external rescue altogether. It leaves bailout an option to be applied in case of a systemic crisis and high contagion risk. But there is a condition that at minimum 8 % of total liabilities and equity capital are used in the bail-in before any other specific measures envisaged in the resolution plan, including the use of SRF take place. In addition, the SRF can only provide funds in the maximum amount of 5 % of the total liabilities and equity capital of the bank.

3.1   Some of the main advantages and shortcomings of the bail-in

The bail-in principle has some incontestable advantages. It mitigates the destabilizing impact on public finances and sovereign debt associated with the public bailout (the so-called "doom loop"). It also reduces the moral hazard by making the bank owners and creditors responsible for the bank failure instead of the taxpayers. Moreover, even with the use of the resolution fund which is financed by industry levies, bail-in essentially replaces the public subsidy with private penalty, as explained by Avgouleas and Goodhart (2014).[6] Implicitly, it is believed that turning unsecured debt into bail-inable debt will incentivize creditors to take part in more vigilant monitoring of the owing institution (Avgouleas and Goodhart, 2014) and demand more prudent conduct, e.g. curbing excessive leverage which was and still is the main reason why the rescue of a SIFI is not an easy task for the regulator.

Nonetheless, it is worth paying more attention to the hidden downsides of the bail-in. First of all, perhaps obvious point is that the bail-in does not mean the losses somehow disappear; they are only shifted to other entities, consequently individuals; besides owners and creditors, through worsened terms also to bank managers, bank staff, and borrowers (Avgouleas and Goodhart, 2014).[7] The whole bottom-line is only to impose losses upon those who can bear the burden "the best". And as the recent Italian development shows, the idea of bail-in as a tool of private penalty does not work always as expected and thus raise questions whether the bail-in is universally applicable. There are specifics, often of political nature, in EU member states that hinder the smooth application of this principle;

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[6] Avgouleas and Goodhart (2014) are citing Huertas (2013) when relating to this concept.
[7] Essentially, bail-in is "only" *"a radical rethinking of who bears the ultimate costs of the operation of fractional reserve banking"* (Avgouleas and Goodhart, 2014).

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home resolution authorities can be reluctant to use the bail-in tool because of its adverse impact on specific groups of creditors.

The Italian example is illustrative: the country's banking sector has been for years suffering from hoards of bad loans, weak profits and poor corporate governance which could potentially threaten a wider Eurozone banking system stability. Recently the problem has worsened. The non-performing loans (NPLs) have amounted to about one fifth of the country's GDP (Banca d'Italia, 2016)[8] and many banks are finding themselves in bad need of new capital. Since a direct bailout is almost ruled out under the new European rules,[9] the bail-in should have kicked in. Yet there is a catch. In Italy, imposing losses on bondholders means hitting the retail depositors, i.e. households and small businesses, which is politically very problematic. So a third way must have been invented. To avert a banking crisis, a government-led private banks coalition has put together a fund with the aim to recapitalize the troubled banks by buying their shares and to clean their balance sheets by buying the NPLs in securitised form.[10]

Secondly, it should be stressed again that the bail-in will not remove the need to inject public funds, especially in the event of a systemic crisis or a large cross-border institution. And even if the bailout was avoided, *"simply being able to resolve a bank without taxpayer's money does not necessarily reduce the economic cost of the resolution, since a failure of a systemic bank can impact GDP, unemployment and hence tax revenues and welfare expenditures"* (Mayes, 2014a). Moreover, at times of shock and with the herd behaviour in the market, it is very likely that the generalised adoption of the bail-in across the EU would trigger contagious consequences that would have destabilizing effects (Avgouleas and Goodhart, 2014). As demonstrated by Paolo and Paris (2016), the smaller and safer a bank is, the larger the advantage (in terms of less default probabilities in the banking system derived from contagion effects) of choosing the bailout option instead of the bail-in option. And *"while the debate between bailing in and bailing out banks has swung strongly in favour of bailing in, governments are finding that some of their "investments" through bailing out are turning out to be beneficial for the taxpayer"* (Mayes, 2014b, p. 1).

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[8] The sum of bad debts for households and firms is €348 467 million according to the April 2016 Bank of Italia's Financial Stability Report (Banca d'Italia, 2016).
[9] And the already high indebtedness of the government would probably make this option impossible anyway.
[10] More on the matter in Financial Times (Hale et al., 2016) or in The Economist (2016).

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	Strengths	**Weaknesses**
Bail-in	Fairness. The investors bear the cost of the recapitalisation, restructuring or resolution of troubled banks.	Contagion; a generalised adoption of bail-in across the EU would trigger contagious consequences with destabilizing effects.
	Mitigation of the destabilizing impact on public finances and sovereign debt (the "doom loop") associated with the public bailout.	Distributional consequences; an adverse impact on specific groups of creditors with political implications; universal application is questioned.
	Reduction of the moral hazard by making the bank owners and creditors responsible for the bank failure instead of the taxpayers.	No removal of the need to inject public funds, especially in the event of a systemic crisis or of a large cross-border bank.
	Incentivization of creditors to take part in more vigilant monitoring of the bank; potentially curbing excessive leverage.	No automatic reduction of the economic cost of the resolution.
		Necessity for a bank of having sufficient amount of the eligible liabilities. E.g. Czech banks have only a few bail-inable instruments.
		Increased risk reflected in worsened terms for the bank by the investors.
Bailout	Often effective and safer solution especially in case of systemic crises. The smaller and safer a bank is, the larger the advantage of bailing it out.	Unfairness. The taxpayers have to pay for the bank's failure.
	Potentially a cheap solution, Governments' "investments" can turn out to be beneficial for the taxpayer.	Potential destabilizing impact on public finances and sovereign debt (the "doom loop").

Fig. 3 Strengths and weaknesses of the bail-in and bailout mechanisms (Source: authors' own processing, based on Avgouleas and Goodhart, 2014; Mayes, 2014a; Paolo and Paris, 2016)

3.2 Dodd-Frank legislation: comparative analysis and early assessment

Having stated several bottlenecks of the new bail-in regime, it is important to look at how the same principle is being treated in the American *Dodd-Frank Wall Street Reform and Consumer Protection Act* of 2010 comparing to the European BRRD.

To start with, there is a distinction in the US and EU bail-in's purpose. The European resolution authorities, unlike Federal Deposit Insurance Corporation (FDIC), can apply two approaches. Either the bail-in is triggered to effect bank recapitalization to restore it to health (going concern), or it treats the bank as bankrupt (gone concern) and provides with sufficient capital the entities that will emerge following the liquidation of the resolved parent institution (Avgouleas and Goodhart, 2014). In the US, only the latter approach is used. Anyhow, the underlying reality determining the choice of one of these two approaches can be rather opaque.

The Dodd-Frank Act's orderly liquidation authority (OLA), the equivalent to the European resolution procedure, gives FDIC the possibility to treat similarly situated creditors differently, FDIC can favour certain unsecured creditors over others. In the BRRD this is possible only in limited number of circumstances. However, both legislations contain the safeguard which provides that no creditor incurs greater losses than it would have incurred if the institution had been wound up under normal insolvency proceedings in accordance with the no creditor worse off principle.[11]

Unlike in BRRD, in Dodd-Frank Act, the costs of resolution is borne by the shareholders and unsecured creditors of parent top-tier holding company. This is called the Single Point of Entry approach. *"The FDIC would then form a bridge holding company ('NewCo') and transfers the failed*

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[11] Thus specified by the BRRD.

holding company's ownership of healthy operating subsidiaries into it, leaving the holding company shareholders and creditors behind in the estate of the failed holding company. Operating subsidiaries that face no solvency problem will be transferred to the new solvent entity or entities (NewCo)" (Avgouleas and Goodhart, 2014, p. 4).

Having presented the main distinctions between the American and European versions of the bail-in legislation, should there be any straightforward inspiration for the European resolution procedure? The answer is still not clear.

Bail-in has distributional consequences and potentially clear losers. Strong disagreements might arise as to which subsidiary is bailed-in and which is not. *"Where there are subsidiaries in non-EBU European countries such disagreements could even go as far as creating serious problems in the relationship of the EBU with non-EBU European countries, serious problems in the relationship of the EBU and non-EBU countries, especially where losses are bound to fall unevenly"* (Avgouleas and Goodhart, 2014, p. 10). Group-based solution in accordance with the American model would be the obvious solution for this issue, but on the other hand it might reinforce the subsidiarisation, which would go against the principles of the European single market (Avgouleas and Goodhart, 2014).

3.3   Resolution fund and fiscal backstop

After a part of the creditors was bailed-in, the SRF, financed by the banking sector itself, could be called to the rescue by the SRB. There are several downsides relating to the SRF's use; the first one is the time needed to complete the process of progressive mutualisation of the originally national funds – the target size shall be built gradually over the coming decade. The second one is the size which is rather unimpressive; the 1 % of covered deposits equals to approximately €55 billion. One may argue that the fund of such size would be able to make a difference only in case of a relatively modest medium-size bank failure. For instance, almost €80bn of federal guarantees were required to wind-down the Franco-Belgian Dexia Group (Dierks, 2015). But back then the effective tools including the powerful bail-in principle were missing. Gros and de Groen (2015) computed that the targeted fund might have been enough to solve the bank failures during the recent global financial and Eurozone crises if the new rules were in effect. Thus SRF might be indeed sufficient but certainly not for a major crisis of a systemic nature. In fact, no resolution fund would handle such crisis alone (Gros and De Groen, 2015). But the only thing that matters for markets is who bears the ultimate, catastrophic risk, i.e. shouldering the cost of a banking system rescue (Pisani-Ferry, 2016). Therefore, a sort of fiscal backstop is needed, should the resolution mechanism have credibility, strengthen market confidence and thus help promote financial stability.

Although the need for such common backstop is widely recognized, its concrete shape remains unclear. An inspiration could be drawn from the agreement between the Eurogroup ministers on the provisional set-up of a system of bridge financing agreements which is to ensure the SRF will have sufficient funding during the transitional period (Council of the EU, 2015).While the fund is being gradually built-up (collected from the banking sector levies), member states agreed to provide credit lines to the SRB to back their national compartments in the SRF in case of possible funding shortfalls. This emergency national funding will be recovered via ex-post contributions of the banking sector. Yet in the case of connecting SRF to the national budgets, *"the link between banks and their sovereign would not be weakened and different member states position could still lead to potentially very large heterogeneity in the approach to financial sector problems"* (Bruegel, 2014, p. 2). Also, as long as the mechanism has the national fiscal resources on line, the SRM decision making process is likely to remain complex, specifically involving the Council of the EU, and without granting the exclusive resolution authority to a single agency, i.e. the SRB or the Commission (Bruegel, 2014).

Another option would be to allow the SRB to borrow on markets while using guarantees granted by the member states. As explained by the European Political Strategy Centre (2015), this could be done in two ways. The guarantees may be granted by each member state individually for resolution operations on its territory, or they may be provided on pro-rata basis where in case of a shortfall, they

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would be called in proportion to a specific key from each member state. The former variation of this option is least favourable as the sovereign-banking link is not weakened. The latter on the contrary follows the mutualisation principle and thus is more effective in weakening the link. A combination of these two variations is also conceivable.

Finally, the obvious and also politically feasible long-term solution is involving the European Stability Mechanism (ESM) in the process. In fact, the ESM was already considered as a backstop for the transition period by the Ecofin ministers in 2013 (Council of the EU, 2013) but was eventually abandoned. The ESM's main advantages as a backstop should make this option return to the serious discussion. It is already in place (although a Treaty change would be necessary), its size would be sufficient and credible, and thus warding off doubts the markets might have about the resilience of the European banking system in times of crisis. Should there still be any doubts about the sufficient capacity represented by the ESM, a credit line from the ECB to the ESM could be established. For now this additional backup option is however far from politically acceptable. But with or without the credit line from the ECB, the ESM as a common backstop still represents a better risk sharing mechanism than the options involving national budgets.

	Strengths	Weaknesses
Public credit lines from member states (MS)	Existing framework Possible mutualisation principle solution	Sovereign-banking link not weakened MS-level approval needed
Intercompartmental MS lending	Existing framework	Limited additional resources
Market borrowing + public individual guarantees	No (immediate) increase in public debt	Coordination questions MS-level approval needed Limited credibility Sovereign-banking link not weakened
Market borrowing + public pro-rata guarantees	No (immediate) increase in public debt	MS-level approval needed
Public credit lines from ESM	Potentially significant amount of resources available Mutualisation principle solution Breaking of the sovereign-banking link	ESM Treaty change needed MS-level approval needed

Fig. 4 Strengths and weaknesses of the various backstop options for the SRF (Source: authors' own processing, based on European Political Strategy Centre, 2015)

4   Conclusions and recommendations

This paper was to summarize and evaluate the key features of the current shape of the EBU. Its two main pillars which are already in operation were outlined; the single supervisory mechanism and the single resolution mechanism; and their main advantages as well as downsides and potential risks were examined. Most of the possible shortcomings of the supervisory mechanism are more of a hypothetic nature than of an actual immediate threat. Although there is a strong rationale for the establishment of the supervision at the European level and its performance is yet rated positively, there are hidden risks in the interaction between the supervisory and monetary policy mandates within the one institution. Also, a delicate segment of the banking sector, the small banks, is exempted from this central supervision. The single resolution mechanism based on the new bail-in principle is even more contentious. The main concern revolves around the fact the resolution process is rather complicated, involving many actors, thus it may prove cumbersome when a swift action is needed. The bail-in mechanism has been assessed taking into account all the clear benefits and all the main downsides. Among the benefits we can highlight the reduction of the moral hazard or the mitigation of destabilizing impact on public finances. The downsides include mainly the contagion risks to the financial system or the adverse impact on specific groups of creditors which raises concerns about

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the universal applicability of the mechanism. . The reality, especially the recent Italian example shows that some amendments in terms of greater flexibility of this instrument might be needed. We compared the BRRD to the US "Dodd-Frank solution" but concluded there is no straight forward inspiration for the European scheme. Finally, the risk of the resolution fund's insufficiency in the event of a systemic crisis should be tackled better sooner than later. We outlined four possible backstop arrangements and concluded that the ESM would serve the backstop purpose better than the options involving national budgets. In any case, for any convincing backstop arrangement and therefore for the completion of the current state of the EBU, there is a need for member states to reach consensus on this critical issue.

5 Acknowledgement

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MANAGING EFFECTIVENESS OF EU FUNDS OUTPUTS: LESSONS LEARNED FROM PERIOD 2007-2013

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Abstract
Main weakness of EU-funded projects could be seen in a support of European policies in achieving their overall goals. These indicators are mostly connected with entrepreneurial activity and their innovative spirit which have an influence on local society behaviour and the real outputs of Operational Programmes as whole. In such context, this paper aims to evaluate real effectiveness of financial support from European Social Fund in 2007-2013 in chosen regions (Moravian-Silesian, Plzen, Hradec Kralove and Ústi). The analysis will be done in two independent layers, primarily from data collected from beneficiaries, secondly in comparison of regional socio-economic indicators. The 3E method was used to evaluate selected programme's effectiveness. Finally, Social Return on Investment indicator (SROI) was used in modified version to be able to resume financial returns of those programmes. Community-Led Local Development planning within EU region is one of requirements in area of recommended programme indicators.

1   Introduction

Factors like prosperity, profitability or loss are among the important information necessary for financial management and performance measurement, including information on cost structure and its links to revenues, especially in public sector. This approach is applied not only to public sector institutions, although they often do not provide many of paid services, however, they always have their output and revenues as well (in the form of subsidies and transfers, tax revenues, EU funds support) during every economic activity. The results of economic activity (products, services), generally named as performance, represent revenues of each supported organization and they are outputs of the economic process. Desirable outputs are the positive result of the system in context of public policy goals (Otrusinova and Pastuszkova, 2012).

In the context of publicly supported services as education or social services, evaluation and measurement have often focused on performance aspects other than productivity. Evaluation of the EU supported projects aiming to achieve better measurement in provision of public services may conclude that such efforts have not been successful in dealing with public or regional problems (Hookana, 2011).

Over past decade, researchers have discussed the topic of efficiency in two main areas as public duty to increase output and secondly in area of value added to citizen's expectations or project beneficiaries as well (Manzoor, 2014).

In such context, this paper aims to measure firstly through a marketing quantitative research, using the survey research method (based on an evaluation questionnaire applied on beneficiaries) the level of impact of projects financed through Human Resources and Employment Operational Programme (HREOP) and Operational Programme Education for Competitiveness (OPEC) in 2007-2013 over the target audience in selected regions in the Czech Republic. Secondly, the effectiveness of support allocation is measured by modified ratio of Social return ratio (SROI),

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suggested by authors. Finally, an evaluation tool based on performance evaluation is presented. The paper deals with performance management within regional beneficiaries using the principles of "3E's", which mean area of economy, effectiveness and efficiency, namely on the example of selected regions in the Czech Republic.

2 Effectiveness, efficiency and economy within EU funded programmes

Efficiency and effectiveness are the common terms used in assessing and measuring the performance of organizations (Mouzas, 2006). Efficiency is associated with "*doing things right*" and effectiveness with "*doing the right things*" (Drucker, 1977). A measurement of effectiveness is connected with main project goals achievements (Asmild et al., 2007). The efficiency of public expenses and support describes relationship between the economic and social effects resulted from programme implementation and the effort made to finance that program (economy side). Those three "E's" were expanded by Norman-Major (2012) into four "E's", when *economy* means managing resources to provide desired effect for the fewest money, *efficiency* have a tie to production of services, other public goods and performance indicators as well (i.e. quantity of services, time schedule). This approach includes *effectiveness* in area of evaluation of goal achievement and *equity*, which means fairness and complex treatment of social needs for disadvantaged persons.

In the Czech Republic, the principle of "3E's" is a basic principle for managing financial control in public administration under the rule of statutory regulations (Act No. 320/2001 Coll., on Financial Control). Basic items could be interpreted as *economy* as performance in relation to price, when main criterion for that are is reaching maximum output inexpensively, *efficiency* as relationship between inputs and outputs based on the rule in achieving outputs in little money and finally area of effectiveness, which expresses the degree of progress towards the set objectives (Otrusinova and Pastuszkova, 2012).

Mandl et al. (2008) explain efficiency and effectiveness in relation to inputs, outputs, and outcomes (see fig. 1).
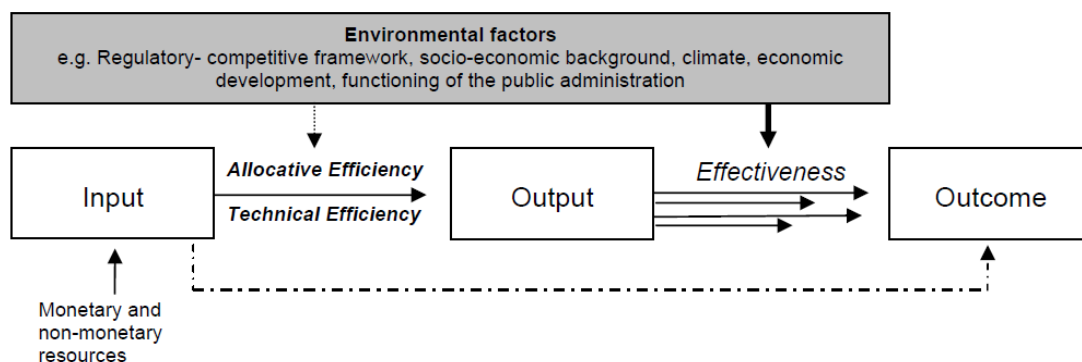
Fig. 1. 3E components (Source: Mandl et al., 2008)

In this model could be seen beneficiary's sensitiveness on environmental factors, which may affect output or outcome. The monetary and non-monetary resources produce an output. Effectiveness relates the input or the output to the final policy goals. Efficiency consists of technical efficiency (pure relation between inputs and outputs) and allocative efficiency (reflects the link between the optimal combination of inputs taking into account costs and benefit).

On the other hand, the effectiveness is the main indicator given by the ratio of the result obtained to the one EU funds programme to achieve and that area is widely expressed. Within the framework of the Human Capital Operational Programme and Operational Programme Education for Competitiveness, we can distinguish the following types of performance indicators, which we can find in other EU countries (Poland, Romania and others) in their National Reports and research

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analyses covering programme above (Jalocha, 2012; Pădurean, et al., 2015; Wolińska, et al., 2010): (i) *Impact indicators* – describing immediate effects on beneficiaries and they are applicable in medium term. The Managing Authority is responsible for measuring the impact indicators. (ii) *Product indicators* – describe the product of activities of the persons as beneficiaries of the programme. They differ according to priorities of the Programme. (iii) *Results indicators* – present information about the changes taking place with regard to the direct beneficiaries (Šebestová and Palová, 2016; Potluka and Liddle, 2014). Efficiency cannot be directly measured. Therefore, a different approach concerning data and methodological framework has been used. Generally expressed, one would expect that public funds are directed to the essential policy areas, which support the overall objectives of the State, other prefers regional development or disparity measurement, when indexes and performance indicators are used by themselves to measure efficiency.

2.1 Human Resources and Employment Operational Programme 2007-2013

The Human Resources and Employment Operational Programme (HREOP) was the program which was focused on the social sector and produced social innovations more than the other operational programmes. The Ministry of Labour and Social Affairs acted as the managing authority of the HREOP. That was the reason why authors included the Human Resources and Employment Operational Programme into this research. This program was focused on minimization of unemployment by means of active policy on the labour market, professional education, reintegration of socially excluded citizens into society, improvement of public administration quality and international cooperation in the problematic areas. Especially, Social innovation call (SIC) was opened in 2013 by the Czech Ministry of Labour and Social Affairs to foster societal impact of the programme (Kadeřábková and Moghadam-Saman, 2013).

2.2 Operational Programme Education for Competitiveness

Operational Programme Education for Competitiveness (OPEC) is a multi-year thematic program sponsored by the Ministry of Education, Youth and Sports (MoE), in which it is possible in the period 2007-2013 to draw on funds from the European Social Fund (ESF), one of the Structural funds of the European Union (EU). (The total amount of financing OP in the programming period 2007-2013 is 2,084.5 miles. € (ie approx. 53.766 billion. CZK), with EU resources (ESF), up 85% (1,771.8 miles. €, ie approx. 45,701 bn. CZK) and national resources from the state budget the remaining 15% of the total allocation. The global objective of OP 2007-2013 is the development of educational society to strengthen the competitiveness of the Czech Republic through the modernization of initial, tertiary and further education, integrating them into a comprehensive system of lifelong learning and improving conditions in research and development.

The study undertaken aims to explore the immediate effects of using the European Structural Funds on the current context of regional development, highlighting the influences on socioeconomic indicators and social return of investment ratio (SROI) in context of "3E's" method.

3 Problem Formulation, Methodology and Results

The research included all businesses except municipalities, regions and public administrations in the four regions in the Czech regions. Authors chose these regions: the Moravian-Silesian Region, the Usti Region, the Hradec Kralove Region and the Plzen Region (NUTS III). These regions have been chosen because these regions completed condition of (1) not sharing a border, (2) they differ in regional competitiveness indicators (Viturka, 2007) as Hradec Kralove (HK) and Plzen Regions (PR) are both classified in B group (good competitive position) and the Moravian-Silesian Region (MSR) and the Usti Region (UR) are in the contrast to them ("C" group – less favourable position). This classification is supported by Melecký and Staníčková (2011) when they divided NUTS II

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regions (8) as follows MSR (8th place), UR (part of region Severozápad, 7th place), HK as part of Severovýchod (4th place) and PR as part of Jihozápad (3th place).

The objective of followed study is to capture sufficient data and information to assess the economy, efficiency and effectiveness principle of the HREOP and OPEC programmes. The detailed secondary information is based on data acquired from the monitoring system (IS Monit7+) up to September 2015. At that time, it contained data on 1 820 applications in HREOP programme and 1 665 applications in OPEC programme. A questionnaire survey was distributed to all the 3 485 programme applicants in selected regions at the beginning of 2016. Some of the applicants applied for EU funding several times. The survey obtained 158 valid responses from OPEC and 165 valid answers from HREOP programme. It was a statistically representative sample with a confidence level 99%, 5% margin of error. Economic entities are divided into five groups according the size according EU definition of small and medium sized companies (28% till 9 employees; 28% till 49 employees; 26% till 249 employees and 18% in size of 250+ employees). The most active segments in area of social innovation are entities till 49 employees (56% of the sample). Based on the questionnaire survey, the minority of projects (30.3% in HREOP and 37.3% in OPEC) at the time of realization declared any type of social innovation to make a contribution to regional development as sufficient output.

3.1 Economy and Efficiency evaluation

Economic issues and ratios could be measured by standard financial ratios covered in cost-benefit analysis. EBIT was used as standard indicator of revenue flow; costs were explained as amount of allocated money. SROI indicator was used to improve efficiency evaluation of the programme. Several modifications have to be made to be more effective with evaluation within operational programmes. Basic SROI ratio covers EBIT and programme costs. This approach had to be modified according priority axes and operational programme (OP) as summarized in table 1 (Šebestová and Palová, 2016).

Table 1. SROI modification

OP	SROI type	EBIT	Focus group size (based on survey)
	Basic type	Number of clients enrolled * earning difference (ED)	--
HROEP	Axis 1 Adaptability	Number of successful participants * ED per participant for two years	50
	Axis 2 – Active labour market policy	Number of newly employed person * savings from compensations in unemployment (5 months)	100
	Axis 3 – Social Integration and Equal Opportunities		
OPEC	Priority Axis 1 – Initial Education	Number of supported pupils*ED for two years (to complete elementary education)	100
	Priority Axis 2 – Tertiary education, research policy	Number of supported students*ED for three or five years (to complete academic degree)	100

Source: own.

In order to define the efficiency of expenditures in education (OPEC programme), we must start from the purpose of the education activity, following the way in which it may be achieved (completion of elementary education or university degree in tertiary education). The efficiency must be analysed and calculated according to the rational production and use of resources allocated to

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training the individuals (Gherghina et al., 2009; Duca, 2013). In order to know and assess the economic efficiency SROI evaluation made in terms of establishing the elements that characterize the efficiency of this priority axes.

Table 2. Efficiency evaluation

			Moravian-Silesian Region	Usti Region	Plzen Region	Hradec Kralove Region
HREOP	Priority Axis 1 - Adaptability	Number of projects	112	58	41	41
		Total support (Mil. CZK)	322	55	137	16
		EBIT (Mil. CZK) per project	1.62	2.02	2.33	1.5
		SROI	0.56	2.13	0.7	3.84
	Priority Axis 2 – Active labour market policy	Number of projects	56	50	6	5
		Total support (Mil. CZK)	276	259	26	25
		EBIT (Mil. CZK) per project	6.57	6.24	5.58	6.347
		SROI	1.33	1.2	1.29	1.27
	Priority Axis 3 – Social Integration and Equal Opportunities	Number of projects	162	136	37	26
		Total support (Mil. CZK)	612	604	135	65
		EBIT (Mil. CZK) per project	6.57	6.24	5.58	6.347
		SROI	1.74	1.41	1.53	2.54
OPEC	Priority Axis 1 – Initial Education	Number of projects	446	131	150	260
		Total support (Mil. CZK)	648.5	496.55	387.44	688.13
		EBIT (Mil. CZK) per project	39.38	43.86	36.3	41.17
		SROI	27.08	11.57	14.06	15.56
	Priority Axis 2 – Tertiary education, research policy	Number of projects	76	20	35	23
		Total support (Mil. CZK)	721.69	165.53	465.17	377.09
		EBIT (Mil. CZK) per project	130.76	134.22	125.96	125.20
		SROI	13.77	16.22	9.48	7.64

Source: own.

They are significant differences in efficiency results. When maximum of SROI in HREOP programme is 3.84 in Hradec Kralove Region (Axis 1), in the OPEC programme the minimum is 7.64 in the same region (Axis 2). It seems that more significant for regional development is to develop human resources, which, in final results brings more than 7% in social innovations than HREOP projects. Finally, we used ordinal scale to compare examined regions (1 - the best performance in support, projects, EBIT or SROI; 4 - last in efficiency).

Table 3. Efficiency evaluation

		Moravian-Silesian Region	Usti Region	Plzen Region	Hradec Kralove Region
HREOP	Priority Axis 1 - Adaptability	2.25	2.25	2.25	3
	Priority Axis 2 – Active labour market policy	1	2.75	3	3.25
	Priority Axis 3 – Social Integration and Equal Opportunities	1.25	2.75	3.25	2.75

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		Moravian-Silesian Region	Usti Region	Plzen Region	Hradec Kralove Region
OPEC	Priority Axis 1 – Initial Education	1.75	3	3.5	1.75
	Priority Axis 2 – Tertiary education, research policy	1.5	2.5	2.5	3.5
	Average rating	1.55	2.65	2.9	2.85

Source: own.

The best efficiency was reached in Moravian-Silesian Region in most priority axes (except Adaptability). The worst efficiency had surprisingly Plzen and Hradec Kralove Region. The efficiency is connected with regional problems, what was confirmed in Moravian-Silesian region, not in the Ústí region.

3.2 Effectiveness evaluation

Effectiveness was evaluated as a linkage between financial support from the Operational Programme and the creation of social innovation, when correlation analysis was used. The interpretation of correlation analysis results was based on the scale according to Liebetrau (1983). It was found a very strong direct correlation (correlation coefficient was 0.69, Sig. 0.00, $\alpha = 0.05$) between the amount of financial support (divided by priority) and a number of social innovation (divided by priority axis). Other assumptions were tested in a partial dependency with cross tables, depending on the region and implementation of the priority axis. The table 4 summarizes the various factors of relationships. The evaluation was based on value of Cramer V (Sig. 0.00, $\alpha = 0.05$) If a relationship has been found, then we used a sign "+ ", if a relationship not exists, we used a sign of "0".

Table 4. Effectiveness evaluation

Variable	HREOP		OPEC	
	Relationship to the region	Relationship to priority axis	Relationship to the region	Relationship to priority axis
Legal form of beneficiary	0	+	+	+
Number of employees	0	+	+	+
Main business activity	0	+	+	0
Type of innovation	+	+	0	+
Amount of innovations per project	0	0	+	+
Willingness to continue in 2014-2020	0	+	0	+
Networking	+	+	+	0
Total direct impact (total "+")	2	6	5	5

Source: own.

Summing up, better effectiveness in outcomes was measured in OPEC programme, because there is equal relationship between regional development and programme priority. Opposite of that, HREOP cared on effectiveness in axis only, not in regional development, what was confirmed in efficiency part also.

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4   Conclusion

Finally, we can state that efficiency of EU operational programmes is a problem which most local governments have to face (as being analysed in four selected regions), and which is determined, mainly, by the existence of some other external factors, which have an influence on final performance objective (Mihaiu et al., 2010). In comparison with Strategy of regional development 2014-2020 (MMR, 2013) we learned that both programmes did not bring expected effect, when situation in Ústí region worsened and this region was classified as region without any competitive advantage together with region of Karlovy Vary. Other three regions were classified as regions with unclassified competitive advantage, which describe worsened situation in Plzeň and Hradec Králové Regions. They have together two problematic districts, which have to be supported (Stříbro, Broumov). The situation in the Moravian-Silesian region is stable. Ministry of regional development suggested two types of indicators, mostly based on macroeconomic data to evaluate efficiency of their support as GDP per capita, migration, unemployment rate and other (MMR, 2013).

Finally, there is a place for local governments to improve this situation a evaluate efficiency by real societal impact in region as was proposed in this paper, on other hand effectiveness based on significant factors based on filed study, which support networking, willingness to make social innovations and other activities. By studying the indicators, we identify new action directions along the line of improving the use of European funds in the field of human resources support, which are not insignificant per se, as labour force, but only in relation to certain EU criteria, regarding the educational process objectives and system purposes (Duca, 2013).

It seems that in the EU-funded projects discussed in this paper, it is not always obvious and accepted that success is a multi-dimensional construct (which was described above), because the criteria for success are very rigid and based mostly on indicators imposed by the financing bodies not by local governments.

5   Acknowledgement

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THE INFLUENCE OF R&D EXPENDITURES AND TAX INCENTIVES ON FIRMS´ GROWTH IN SELECTED COUNTRIES OF EUROPEAN UNION

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Abstract
R&D expenditures made by businesses are considered as variables that have an impact on firms' growth. This article approach R&D tax incentives that apply in the EU member states and the need of these incentives as an important factor in stimulating economic activities. This study aims at understanding the simultaneous influence of R&D investment and R&D tax incentives on firms´ growth in selected countries of the European Union. The aim of this paper is to evaluate the influence of research and development on firms´ growth in selected countries of the European Union from 2003 to 2014. Using panel regression analysis will be tested the influence variables such as for example the R&D intensity, generosity of tax incentives, capital intensity, profitability, firm size and R&D investment on firms´ growth in selected countries of the European Union. It is expected the positive influence for firms´ net sales growth of their investment in R&D and of tax policies that benefit the individual companies. It is expect also a positive influence of R&D intensity in firms´ growth. On the basis of the article we can find information about importance of R&D investment and R&D tax credits and their consequent impact on firm´s growth.

Keywords
Firm´s growth, R&D intensity, R&D investment, R&D tax credits

JEL classification
H20, H30, O32

1   Introduction

Research and development (R&D), includes innovation. It is important for economic growth, competitiveness and growing standards of living. We must pay much more attention to this part of the economy. Every single country finances its R&D in a different way. Some of the countries spend a huge amount of money on its R&D and on the other hand there are other countries that spend less money and therefore they put less emphasis on their research. Science, technologies, innovations are changing and transforming and they are adapting to the current challenges as well as other areas of social life. These new values strengthen the competitiveness of the economy, which also represents one of the government´s priorities.

According to Peková (2008) important economic variables such as economic growth, unemployment or companies competitiveness are largely dependent on a research and development results. Varadzin (2004) argued that what makes the research and development profitable looks like a temporary monopoly on the market. The good thing for the economy is that if one company innovates and spends its money on R&D, other companies might get inspired and follow such a process. Science and research is becoming a generator of positive externalities.

The aim of this paper is to evaluate the influence of research and development on firms´ growth in selected countries of the European Union from 2003 to 2014. Using panel regression analysis will be tested the influence variables such as for example the R&D intensity, generosity of tax incentives, capital intensity, profitability, firm size and R&D investment on firms´ growth in selected countries of the European Union. The aim of this paper is to identify which selected factors affecting firm´s growth. The first chapter includes literature review. Next part of this paper describes a methodology and using date. Attention is given purpose of the panel regression analysis. The third chapter of this paper is focused on the results of estimating panel regression analysis and their comments.

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2   Literature Review

Undoubted benefit of this contribution will be finding the factors that affect the firm´s growth in selected countries of the European Union. The vector of explanatory variables will be include variables such as the R&D intensity, generosity of tax incentives, capital intensity, profitability, firm size and R&D investment . The outcome will determine which variables affect the firms growth and which variables had no effect the firms growth. It is quite evident that a very important task is mainly to fill a vector of explanatory variables and so that we can tap into as many factors that could affect the firms growth in selected countries. For this purpose, it will be needed to process a detailed literature review.

Hall (1987) found a positive impact of R&D investments on 1-year employment growth of US firms.

According to (Cohen and Levinthal 1989) R&D must be viewed as a source of new information feeding the innovation discovery, but also as a way to develop the firm's ability to exploit external knowledge. R&D investment increases absorptive capacity. This is the capacity to absorb knowledge created from the relationships formed with agents outside the firm, as well as the capacity to use that knowledge to increase firm performance (Cohen and Levinthal, 1990).

(Benhabib & Jovanovic, 1991) claimed that R&D can promote employment. R&D becomes an essential factor to boost productivity. Another significant benefit of R&D to the economy lies in its spillover potential. Specifically, when a firm sells new products or new intermediate products to other firms at relatively low prices, it generates "pecuniary spillover". On the other hand, when the new technology created from a firm's R&D is shared by others, it generates "non-pecuniary spillover" effects. The spillover effect can definitely help improve the productivity and the welfare of the economy. Therefore, R&D activities can positively boost the growth of individual firms and the economy as a whole.

Brouwer et al. (1993) showed a negative impact of the growth of R&D intensity on the 5-year compound employment growth rate, though the share of product-related R&D displays a positive effect of 859 Dutch manufacturing firms.

R&D investments tend to be smoothed over time, cumulative (Ruttan 1997), and path dependent (Atkinson and Stiglitz 1969; David 1985). R&D investments are further characterised by a highly uncertain and risky investment context. According to the bounded rationality theory investment managers use basic rules of thumb (RT) to make R&D investment decisions (Thompson 1999).

Greenhalgh et al. (2001) found a positive impact of R&D investments on 1-year employment growth of UK firms. R&D expenses develop competitive advantages and have a cumulative effect on firm performance (Zahra and George 2002).

Del Monte and Papagni (2003) and Lee (2009) concluded that the effect of R&D intensity on firms' growth varies according to the sector: on the one hand, firms with limited technological intensity find that innovations resulting from R&D investment are relatively easily copied by competitors and are not a barrier to new firms entering the market; on the other hand, in sectors with high technological intensity, characterised by high investment in R&D and sizeable economies of scale, R&D investment can function as an effective barrier to new firms entering the market. Therefore, R&D investment can positively influence the growth of firms belonging to high-tech sectors.

Huergo and Jaumandreu (2004) and Rochina et al. (2010) using analysis of Spanish panel data further improved our understanding of delayed or long-term effects of innovation on economic performance. They found the effect of process innovations on productivity growth to somehow persist over time. In addition they found that this effect is expected to be larger in case there is persistence in the firm's innovative behaviour.

Varadzin (2004) argued that what makes the research and development profitable looks like a temporary monopoly on the market. The good thing for the economy is that if one company innovates

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and spends its money on R&D, other companies might get inspired and follow such a process. Science and research is becoming a generator of positive externalities.

Castro (2006) thinks that tax policies have a permanent impact on the economic growth rate. Coad and Rao (2008) reveal that the positive impact of innovative activities on firm growth is concentrated among the fastest growing firms, while for others it can be negative.

According to Peková (2008) important economic variables such as economic growth, unemployment or companies competitiveness are largely dependent on a research and development results. Hölzl (2009) found that R&D intensity has a positive influence on firm 1-year growth rates in countries closer to the technology.

Warda (2009) concluded that R&D tax concession policies are an effective mechanism to increase the levels of investment in technology.

Hölzl and Friesenbichler (2010) found that high-growth firms present a higher R&D intensity than other firms only in countries close to the technology frontier.

Huergo and Moreno (2011) analysed the relationship between R&D expenditures, innovation and productivity growth taking into account the persistence of firm's behaviour. Their results show that the omission of innovation persistence leads to an overestimation of the current impact of innovations on productivity growth. However, the presence of persistence in technological inputs and outputs entails current R&D activities having long-run effects on a firm's productivity.

Lian (2011) provides evidence at the firm level regarding the relationship between R&D investment and firm growth, with respect to the influence of financial constraints, government support and involvement of financial intermediaries and insurers. The data is derived from the survey of 609 high tech firms in China from 2007 to 2009. The results show that R&D expenditure can significantly enhance firm growth. The effects of government support show a "crowding out" effect on firm level R&D activities. Firms facing financial constraints tend to suppress their R&D expenditure, resulting in significantly lower returns from R&D. There is no evidence supporting the role of financial intermediaries and insurers in firm growth being enhanced by R&D. The results demonstrate that investment in R&D can significantly enhance firms' growth potential, but with some lags, rather than concurrently. Furthermore, with more financial constraints limits, firms tend to reduce R&D expenditure that eventually leads to lower returns from R&D. The authors found that investment in R&D can significantly enhance firms' growth potential, but with some lags, rather than concurrently. The authors also found positive impact of government support on firm growth resulting from R&D activities. Moreover, firms' financial constraints status has an important role in shaping R&D activities, in that firms facing severe financial constraints tend to reduce R&D expenditure, resulting in lower returns from R&D. The authors acknowledge that support from financial intermediaries and insurers could help firms resolve financial constraints and thus expedite firm growth. However, the authors do not find such a role as the latter in the authors' study.

Demirel and Mazzucato (2012) were exploring how innovation affects firm growth in US pharmaceutical firms from 1950 to 2008. They found that the positive impact of R&D on firm growth is highly conditional upon a combination of firm characteristics such as firm size, patenting and persistence in patenting. For large pharma firms, R&D affects firm growth positively with the exception of those that do not patent. On the other hand, for small firms, R&D boosts growth for only a small subset of firms: namely those that patent persistently for a minimum of 5 years.

García-Manjón and Romero-Merino (2012) sum up that it is expected that the creation of knowledge will influence the development of the firm in terms of sales growth, profitability or employment creation, causing an expected positive relationship between R&D investment and a firm's growth. They presented a model of endogenous firm growth with R&D investment as one of the main mechanisms of growth. They found a positive effect of R&D intensity on the sales growth by using OLS, quantile regressions, and GMM system estimators for a sample of 754 European firms for the 2003–2007 period. They also found this association is more intense in high-growth firms and is especially significant when referring to high-technology sectors.

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Soares Tiago et al. (2012) examined the effects of factors affecting firm´s growth using panel regression analysis for 21 countries from 2003 to 2012. The model was estimated by using Ordinary Least Squares (OLS) with dated panel and fixed effects. Authors used variables including R&D intensity, firm size, firm sales, tax incentives, profitability and capital intensity. The results confirm the positive effect of R&D intensity, firm sales in firm´s growth. The results also confirm the negative effect of fime size in firm´s growth.

Triguero-Cano et al. (2012) analyzed the role of innovation output persistence on employment growth. Using a GMMsystem estimator they showed that process innovation has a positive effect on employment while the effect of product innovation is positive but insignificant. They also found the compensation effect of process innovation to increase over time.

Wang (2013) examined the effect of publicly-supported research and development (R&D) subsidies on firm growth in Taiwan. The empirical models were estimated using firm-level balanced panel data for the years 1991-1999 for a sample of 67 firms in Taiwan. He used variables such as: the ratio of accumulated innovation patents to total accumulated patents, the ratio of the firm's R&D expenditure to its total sales, the ratio of R&D employees to total employees. The results indicated that a higher ratio of publicly-supported R&D subsidies to total project expenditures would contribute to the firm growth of both sales and employment. Contrary to what one might expect, it also results in a decrease in the growth rate of employment in R&D.

Deschryvere (2014) analysed how the relationship between R&D and firm growth varies between continuous and occasional innovators for a sample of Finnish firms between 1998 and 2008. He found that only continuous product and process innovators show positive associations between R&D growth and sales growth. Also the links between sales growth and subsequent R&D growth were stronger for continuous innovators than for occasional innovators, but only for product innovators.

Triguero and Córcoles (2014) considered the effect of the persistence of innovation on employment in Spanish manufacturing firms during the period 1990–2008. They use a GMM-system estimation to study the importance of persistence of product and process innovation on employment growth. The empirical results indicate that process innovation measures show a positive effect on employment while the effect of product innovation is positive but not significant.

Segarra and Teruel (2014) analyzed the impact of internal and external R&D on firm growth for a group of high-growth firms. Their results show that investing in R&D increases the likelihood of becoming a high-growth firm. Furthermore, internal and external R&D investments show varying impacts according to the firm growth distribution. Internal R&D shows a positive impact among high-growth firms, while external R&D has a significant positive impact for firms with median growth rates.

Capasso et. al (2015) analysed the effect of R&D expenditure on firm employment growth in the medium term, using six cross-sectional waves of an innovation survey conducted in the Netherlands in all sectors. The analysis was focused on firms having positive R&D expenditure and investigates whether higher investments in R&D (in proportion to firm turnover) translate into higher medium-term growth rates. Quantile regression techniques indicated that a higher R&D has a positive effect on high growers and allows a higher number of firms to be high growers. They used the data from the Community Innovation Survey (CIS) that refer to the Netherlands, and from the Business Register (Algemeen Bedrijven Register—ABR) provided by the Dutch statistical office (Statistics Netherland—CBS). They considered the six waves of the innovation survey conducted between 1996 and 2006 and match them with yearly data from the Business Register from 1996 to 2011. With the linear regression model they estimated the average firm growth given the firm's R&D intensity.

3   Data and Methodology

The aim of this paper is to evaluate the influence of R&D intensity, generosity of tax incentives, capital intensity, profitability, firm size and R&D investment on firms´ growth in selected countries of the European Union from 2003 to 2014. The empirical analysis is performed for 13 Eurozone

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member states, namely Austria, Belgium, Finland, France, the Netherlands, Germany, Greece, Ireland, Italy, Luxembourg, Portugal, Slovenia and Spain. The analysis uses data taken from OECD database and the EU Industrial R&D Investment Scoreboard that has been published within the context of the Industrial Research Monitoring and Analysis activities. The all data are on an annual basis. Table 1 presents basic descriptive statistics of variables. Table 2 presents description of used variables.

Tab. 1. Descriptive statistics of variables

	G	RDI	BI	CI	P	FSI	RINV
Mean	267171,00	2,48	0,15	5,98	9,32	981914,02	6963,01
Median	128837,48	2,46	0,11	6,60	8,20	474421,73	2159,89
Standard deviation	375206,66	1,36	0,14	2,73	4,50	1443138,71	10584,22
Maximum	1633086,11	8,30	0,43	13,24	21,30	5885277,00	47566,33
Minimum	104,00	0,18	-0,02	0,36	-4,37	323,00	4,06

Source: author´s processing

Tab. 2. Description of used variables

Abbreviation of variable	Description of variable
G	Depend variable: Growth of firms: Difference between sales in present period and sales in previous period (%)
RDI	R&D Intensity: Ratio of R&D investment to total sales (%)
BI	tax subsidy, the generosity of tax incentives: Measured as 1-B-index
CI	Capital Intensity: Ratio of R&D investment to employee (EUR million per employee)
P	Profitability: Ratio of profit to sales (%)
FSI	Firm size: Number of employees R&D
RINV	R&D investment (EUR million)

Source: author's processing

The B-index model measures the relative attractiveness of R&D tax treatment in the country or region. The model is based on the marginal effective tax rate approach. The marginal model is designed specifically to look at the tax burden on income generated by an "additional dollar" invested in R&D, and to construct an overall measure of the corporate tax burden on marginal R&D investments in different countries. The marginal model provides a useful summary of the main features of business taxation and is effective in making international comparisons (Warda, 2009). Formula for B-index is following:

$$B = \frac{1-A}{1-t} \qquad (1)$$

Where A is the net present discounted value of depreciation allowances, tax credits and other R&D tax incentives available (i.e. after-tax cost), t is corporate income tax rate. In economic terms, the model represents a before tax rate of return on one euro (€ 1) of R&D investment – in present value. In accounting terms, the B-index formula represents a ratio of the after-tax cost (ATC) of € 1 of

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expenditure on R&D divided by 1 less the corporate income tax rate. The ATC enters the numerator of the B-index equation. It is defined as the net cost to the company of investing in R&D, taking account of all available tax incentives for R&D. Tax incentives lower the ATC of an R&D project. Corporate income tax rates influence the level of ATC, as well. The higher the tax rate the lower the ATC of R&D, which gives an impression that having high corporate income tax rates is beneficial to the firm. (Warda, 2009).

It is needed to test the stacionarity time series before the implementation of a panel regression analysis. It is a decision on the existence of a unit root. For this purpose, it was used Levin, Lin Chu test that demonstrated the time-series that are stationary. Due to this fact can be accomplished panel regression analysis. The estimates were made on the basis of the panel regression. There was used panel model with fixed effects. Using panel regression analysis will be defined equation to find variables (factors) affecting firm´s growth. The equation is following:

$$G_{it} = \alpha_0 + \sum_{i=1}^{n} \alpha_i X_i^G + u_t^G \ , \tag{2}$$

Git is the firms growth of firms conducting firms in selected countries i at time t; α_0, α_i shows the regression coefficients for firms growth; X_i^G is a vector of explanatory variables for the firms growth; u_t^G represents an error component.

Three main types of economic data can be distinguished: time-series data, cross-section data and panel data. Time-series data are historical data. Historical data can be observed at different frequencies, like annual data, quarterly data, etc. Cross-section data are data collected during one period, for example, for people, companies or countries. Cross-section data are then collected typically in one month or one quarter. Panel data are cross-section data that are collected at various points of time, but the data concern the same panel of subjects or objects in every period. In most studies, large cross-sections are found collected for only a few points of time (Vogelvang, 2005). Brooks (2008) defined time series data as data that have been collected over a period of time on one or more variables. Time series data have associated with them a particular frequency of observation or collection of data points. The frequency is simply a measure of the interval over, or the regularity with which, the data are collected or recorded. Cross-sectional data are data on one or more variables collected at a single point in time. Panel data have the dimensions of both time series and cross-sections. A panel of data will embody information across both time and space. Importantly, a panel keeps the same individuals or objects (entities) and measures some quantity about them over time (Brooks, 2008). In panel regression model is one variable on the left-hand side of the equation, called the dependent variable. Variables on the right-hand side of the equation are the explanatory variables. Panel data are cross-section data that are collected at various points of time, but the data concern the same panel of subjects or objects in every period. In most studies, large cross-sections are found collected for only a few points of time. In an economic model there is one variable on the left-hand side of the equation, called the dependent variable. Variables on the right-hand side of the equation are the explanatory variables (Vogelvang, 2005).

4   Results and Discussion

This part of the paper describes and presents results of panel regression analysis. Using panel regression analysis we have determined which variables affect the firms growth and which do not. We conducted a test of stacionarity or the unit root test. The conducted tests stacionarity showed that we accept the null hypothesis when the time series contains a unit root and is not stacionarity.

Then we tested all considered variables. We used the results of diagnostic tests determining redundancy of parameters to reduce the number of explanatory variables. It was taken on information criteria including the Akaike criterion, Schwarz criterion and Hannan-Quinn criterion. We also watched the values of the degree of correlation and statistical significance of individual variables.

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The aim of this contribution was to find a model with a high value of the adjusted coefficient of determination where all the variables model will be statistically significant. For estimating the linkages between firm´s growth and selected factors (explanatory variables) was detected resulting equation estimating factors affecting firm´s growth for 13 member countries of Eurozone. The results of the panel regression analysis are included in table no 3.

Tab. 3. Panel data estimations

	Coefficient	Std. Error	t-Statistics
RDI	0.6852*	0.0685	10.0032
P	0.0529**	0.0237	2.2336
FSI	-0.2843*	0.0542	-5.2406
RINV	0.7251*	0.0590	12.2708
S.D. dependent var.		2.0479	
S.E. of regression		0.1093	
Adjusted R-squared		0.9971	
Durbin-Watson stat		1.8770	

Source: author's calculations

Note: * denotes statistical significance at the 1% level, ** denotes statistical significance at the 5 % level

Table no 3 presents the resulting relation between selected variables and firms growth. We can see that coefficients are positive and statistically significant at the 1% level. Only profitability (P) is statistically significant at the 5% level. It was found that the most important variables influencing firm´s growth are R&D intensity, profitability, firm size and R&D investment. In other words, increase of R&D intensity, profitability and R&D investment contribute to the firm´s growth. The decrease of firm size contributes to the firm´s growth. Other variables weren´t statistically significant or weren´t included in calculation due to high linkage with other variables. The resulting values suggest that an influence of R&D intensity and R&D investment is the highest and the most intensive on firm´s growth. We can see also the high explanatory power of model. The value of adjusted R-squared is around 99%. The value of Durbin-Watson test confirms that residues are not burdened autocorrelation.

The obtained results suggest that the influence of R&D intensity on firms' growth is significantly positive. This means that the increase (decrease) in R&D intensity will cause growth (decline) the firm´s growth. This is consistent with study Cohen and Levinthal (1990) and García-Manjón and Romero-Merino (2012).

Another statistically significant variable is the profitability. There was recorded a positive relation between this variable and firm´s growth. In other words, the increase (decrease) in profitability will cause growth (decline) the firm´s growth. This is consistent with study García-Manjón and Romero-Merino (2012).

Firm size is another statistically significant variable. The increase (decrease) in firm size will cause growth (decline) the firm´s growth. This is consistent with study Soares Tiago et al. (2012).

R&D investment and their increase will cause growth (decline) firm´s growth. This is consistent with study Del Monte and Papagni (2003) and Lee (2009).

5   Conclusion

Research and development (R&D), including innovation is important for economic growth, competitiveness and growing standards of living. We must pay much more attention to this part of the economy. Every single country finances its R&D in a different way. Some of the countries spend a huge amount of money on its R&D and on the other hand there are other countries that spend less

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money and therefore they put less emphasis on their research. Research in the developed societies has an irreplaceable position. Science, technologies, innovations are changing and transforming and they are adapting to the current challenges as well as other areas of social life. These new values strengthen the competitiveness of the economy, which also represents one of the government´s priorities.

The economic and social growth is dependent on the level of research and development activity in different countries. The economic growth can mean also the increase in the competitiveness on stable competitiveness. Information, innovation and knowledge has attained significance in economy. The key role is played by research and development. Companies and economy can obtain advantages within the ability to find new information and to create new knowledge and to transform it into new technologies, services and products. All technological innovation activities comprise scientific, technological, organizational, financial and commercial steps, including investments in new knowledge. It are intended to lead to the implementation of technologically new or improved products and processes. R&D is only a part of these activities and may be carried out at different phases of the innovation process. R&D intensity is used as an indicator of an economy's and firm´s relative degree of investment in generating new knowledge.

The aim of this paper was to evaluate the influence of research and development on firms´ growth in selected countries of the European Union from 2003 to 2014. Using panel regression analysis was tested the influence variables such as the R&D intensity, generosity of tax incentives, capital intensity, profitability, firm size and R&D investment on firms´ growth in selected countries of the European Union. The results of the panel regression analysis showed that the firm´s growth influenced mainly R&D intensity, profitability, firm´s size and R&D investment. These variables confirmed a positive impact at firm´s growth. Other variables weren´t statistically significant.

6 Acknowledgement

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DYNAMICS OF CZECHIA-EUROZONE TRADE RELATIONS: VALIDITY OF MARSHALL-LERNER CONDITION IN MANAGED FLOAT REGIME

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Abstract
The interventions on CZK/EUR exchange rate have been adopted by the Czech National Bank as an unconventional monetary policy tool to avoid deflation or long-term undershooting of the inflation target. Czech koruna devaluated against the currency of Czechia's most important trading partners what has led to renewed interest in the question of how sensitive Czech export and import flows are with respect to exchange rate movements. The purpose of this paper is to evaluate the dynamics of CZK/EUR exchange rate effect on the most important segment of Czechia´s foreign trade represented by manufactured goods, miscellaneous manufactured articles, machinery and transport equipment with most important trading partners within the Eurozone. The cointegration procedure and vector error correction model were applied on the foreign trade data for the period 1999 – 2014. Results suggest significant effect of the exchange rate on the tested traded products in the long term.

Keywords
Marshall-Lerner Condition, Managed Float Regime, Exchange Rate, Foreign Trade.

JEL classification
F1, F31.

1 Introduction

One of the macroeconomic policy instruments is exchange rate, which can influence the price competitiveness of international traded products. According to economic theory, policies prescriptions have generally assumed that currency depreciation stimulates exports and curtail imports, while currency appreciation is detrimental to exports and encourage imports. Domestic currency depreciation (devaluation in fixed currency regimes) increases the price of imports in domestic currency terms, which means more expensive imports. Simultaneously it decreases the price of exports in foreign currency terms, in other words, exports become cheaper. Given the above, price effect of currency depreciation can increase the volume of exports and decrease the volume of imports. Based on this presumption, this paper considers exchange rate as an instrument which plays a critical role in profitability of both export-oriented and import-competing industry and can affect the foreign trade.

The interventions on CZK/EUR exchange rate have been adopted even by the Czech National Bank since 2013 as an unconventional monetary policy tool to avoid deflation or long-term undershooting of the inflation target. Czech koruna devaluated against the currency of Czechia's most important trading partners what has led to renewed interest in the question of how sensitive Czech export and import flows are with respect to exchange rate movements. The purpose of this paper is to evaluate the dynamics of CZK/EUR exchange rate effect on the most important segment of Czechia´s foreign trade represented by manufactured goods, miscellaneous manufactured articles, machinery and transport equipment with most important trading partners within the Eurozone.

Data used in this study cover period from 1999 to 2014 and are based on the SITC classification. To distinguish the long term effects from the short term ones, the J-curve theory is applied. J-curve phenomenon says that currency depreciation improves the trade balance only from long run perspective; in the short run it can even worsens the trade balance before improving it. In the study is employed a Johansen cointegration test to analyse the long term relationship between variables. Short run effects are explored by estimating the vector error correction model.

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2 Literature Review

J-curve theory is the traditional instrument to analyse the dynamic effect of exchange rate changes on trade balance. J-curve theoretical basis comes from the Marshall-Lerner condition, which states that the sum of export and import demand elasticity has to be at least one and then the currency depreciation has a positive impact on the trade balance (Auboin and Ruta, 2012). Usually, Marshall-Lerner condition is not met in the short run, goods tend to be inelastic and depreciation deteriorates the trade balance initially. In long run consumers can adjust to the new prices, volume effect is generally believed to dominate the price effect and trade balance will be improved. Short run effect of currency depreciation and related J-curve phenomenon was first advanced by Magee (1973), who pointed that short run deterioration and long run improvement of trade balance after depreciation resemble the letter J.

Literature concerning the J-curve issue tends to fall into one of the following three categories: studies using aggregate trade data; studies employing disaggregate trade data at bilateral level; and recent studies using disaggregate trade data at commodity level. The first type of studies concentrates on the use of aggregate export and import data between a country and the rest of the world in assessing the effectiveness of currency devaluation (e.g. Felmingham, 1988). These studies have to employ the effective exchange rate, what can be misleading when country´s currency appreciate against one currency and simultaneously depreciate against another currency (Bahmani-Oskooee and Brooks, 1999).

The weighted averaging will therefore smooth out the effective exchange rate fluctuations, yielding an insignificant link between the effective exchange rate and the trade balance. Therefore, many other studies employ bilateral exchange rates and bilateral trade balance data between a country and its major trading partners (Bahmani-Oskooee and Ratha, 2004). There has been a growing body of literature arguing that the second-generation study may still suffer from the aggregation bias problem, as significant exchange rate impacts with some commodities could be more than offset by insignificant exchange rate effects with others, thereby resulting in an insignificant exchange rate impact and vice versa. Therefore, the newest studies disaggregate data to industry level (e.g. Bahmani-Oskooee and Hegerty, 2011).

Although many studies on the J-curve effect have been published, few of them focus on Czechia. Bahmani-Oskooee and Kutan (2009), based on data from 12 countries covering the period 1990-2005, found empirical support for the J-curve effect in Bulgaria, Croatia and Russia. By contrast, no evidence of the J-curve effect was revealed for the Czechia. More recently, Nusair (2013) applied a similar methodology of autoregressive distributed lag (ARDL) cointegration and a corresponding error correction model on data from 17 emerging and transitioning countries over the period 1991-2012. In empirical estimations, an aggregate trade balance data and effective exchange rates are used. Although the J-curve effect was present in Armenia, Georgia and Ukraine, the Czech economy remained free of the J-curve effect.

Some studies confirmed the existence of some characteristics associated with the J-curve effect on a bilateral basis. Hacker and Hatemi (2004) tested the J-curve for Czechia, Hungary and Poland in their bilateral trade with Germany. They came to the conclusion that trade balance deteriorates within a few months after depreciation and then rises to a long-run equilibrium value higher than the initial one. The J-curve effect in bilateral trade between Czechia and Germany was also empirically confirmed by Šimáková (2012), who applied a traditional methodology comprised of Johansen's cointegration and error correction model. Moreover, Šimáková (2012) also found the J-curve in Czechia's trade with Poland. On the contrary, Hsing (2009) examined the J-curve for the bilateral trade of six CEE countries, including V4 and the USA, and found no evidence of this effect in any of the analysed states. This inconsistency can be related to the relatively insignificant share of the USA in the international trade of the CEE countries. Šimáková (2014) discusses problems arising from the use of aggregated data and in the case of Slovakia demonstrates the effect of the distortion of the results caused by the aggregation of data.

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A product-level studies have so far been applied to the Czech Republic during 1993-2013 Šimáková and Stavárek (2015) confirm by Johansen cointegration test the presence of long-term relationship with the exchange rates for almost all the sub-trade balance of the Czech Republic and demonstrate beneficial effects of depreciation on the majority of SITC categories.

In summary, results of the few previously published studies indicate almost no evidence for the J-curve effect. In addition, the third-generation approach for the particular sectors is really limited. As compared to other papers, this study uses the most recent available data on international trade on the commodity level to avoid the aggregation bias problem which can influence the results. Therefore, this study substantially contributes to scientific discussion in this field and fills the gap in literature about territorial-commodity trade.

3   Model and Data Specification

This study employs a reduced form of trade balance model to analyse the long-run effects of changes in exchange rate on the trade balance. The trade balance is expressed as a function of exchange rate and the domestic and foreign income. The Johansen cointegration procedure is applied to avoid the main criticism of early studies, whose results could suffer from spurious regression problem because of non-stationary data. For empirical analysis of tested trade flows, the model is specified as follows (1):

$$\ln TB_{p,t} = \alpha + \beta \ln Y_{d,t} + \chi \ln Y_{f,t} + \lambda \ln ER_{f,t} + \varepsilon_t, \tag{1}$$

where TB_p is a measure of the trade balance in time period t defined as the ratio of exports of the domestic country d to foreign country f over the domestic country imports from country f in a selected product group p. Y_d is measure of the domestic income (GDP) set in index form to make it unit free; Y_f is the income of trading partner f and ER_f is the bilateral exchange rate. The exchange rate is defined in a manner that an increase reflects a depreciation of the domestic currency. ε represents an error term. Since an increase in foreign income Y_f is expected to increase the exports to respective country, an estimate of γ is expected to be positive. Contrary, since an increase in domestic income Y_d is assumed to increase the imports, an estimate of β is expected to be negative. Finally, the parameter λ is expected to be positive as the trade balance of respective industry should improve due to domestic currency depreciation.

In order to test the short run relationship a short term dynamics are incorporated into the long run model. According to Hsing (2009), the following error correction model was applied (2):

$$\ln TB_{p,t} = \alpha + \sum_{k=1}^{n} \omega_k \Delta \ln TB_{t-k} + \sum_{k=1}^{n} \beta_k \Delta \ln Y_{d,t-k} + \sum_{k=1}^{n} \chi_k \Delta \ln Y_{f,t-k} + \sum_{k=1}^{n} \lambda_k \ln ER_{f,t-k} + \vartheta_k EC_{t-1} + \varepsilon_t \tag{2}$$

where EC is the disequilibrium term and $\vartheta_k EC_{t-1}$ represents the error correction mechanism.

All time series used for estimation are in the quarterly frequency and cover the period from 1999:1 to 2014:4. Data for GDP and exchange rate are obtained from the OECD iLibrary statistical database in current prices. Data for imports and exports flows are obtained also from OECD. Estimated product groups representing the commodity structure of trade in selected sectors are determined on the basis of SITC classification:

- T0: Food and live animals;
- T1: Beverages and tobacco;
- T2: Crude materials, inedible, except fuels;
- T3: Mineral fuels, lubricants and related materials;
- T4: Animal and vegetable oils, fats and waxes;
- T5: Chemicals and related products;
- T6: Manufactured goods;

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- T7: Machinery and transport equipment;
- T8: Miscellaneous manufactured articles;
- T9: Commodities and transactions not classified elsewhere in the SITC.

The selected tested segments of Czechia´s foreign trade are based on the share of trade of given product category on total trade turnover. In this case are most traded product categories of manufactured goods, miscellaneous manufactured articles, machinery and transport equipment. This fact can be seen in Fig. 1. which shows development of commodity structure of trade as a share of selected SITC basic categories on the total foreign trade turnover in the sample period.
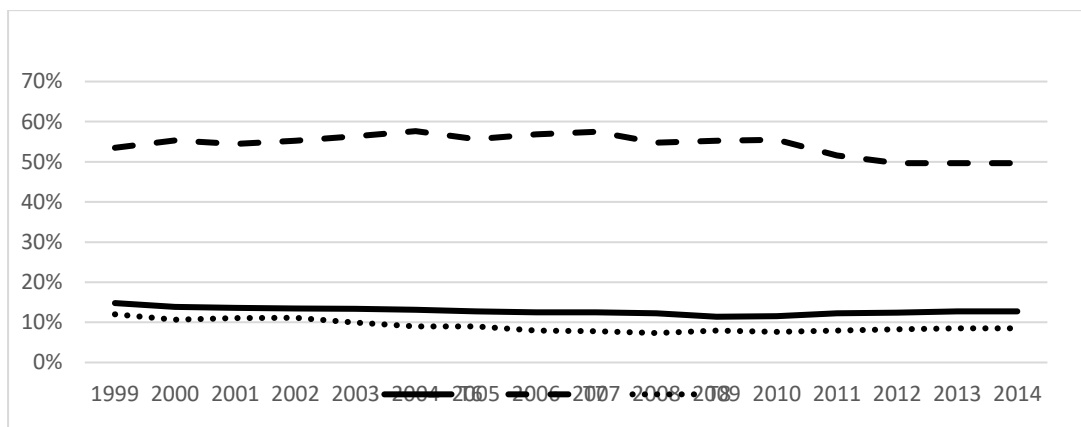
Fig. 1. Development of Czech trade flows in SITC product categories T5, T6, T7, T8 (Source: OECD)

Significant predominance is characteristic for traded category of machinery and transport equipment, whose average share of trade flows in the sample period represents almost half of total foreign trade, exactly 47%. Another important trade flows are manufactured products which for the Czech Republic represents another 20% share. Miscellaneous manufactured articles represent about 10% share, what means that selected product categories account for two thirds of total Czech foreign trade.

The bilateral analysis uses cross-border trade data between a particular country and its five major trading partners within eurozone. The selection of partner countries represents 55% of the total foreign trade turnover of the Czech Republic. Fig. 2 shows that Czechia´s major foreign trade is concentrated in five bilateral trading flows. Approximately 32% average share of foreign trade is realized with Germany (DE). Foreign trade of the Czech Republic is so clearly influenced by German economic development, although it must be noted that the share is decreasing in time. Another important partner is Slovakia (SK). Bilateral trade between these two countries is based on the long-term economic ties. Other important partners are Austria (AT), France (FR) and Italy (IT).
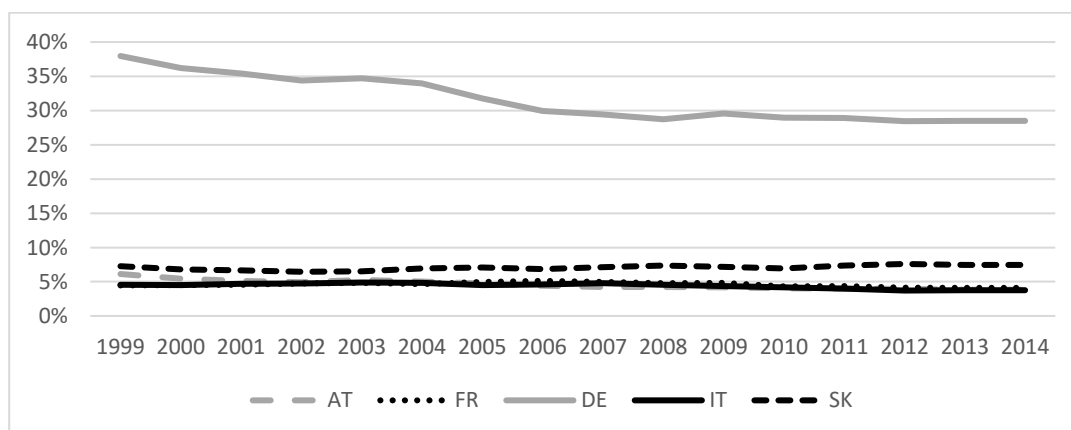
Fig. 2. Development of Czech trade flows with most important trading partners (Source: OECD)

4   Empirical Results

Logarithmic transformation was performed at the beginning of empirical testing to reduce skewness and heteroscedasticity and to stabilize variability. Integration of time series was determined using the augmented Dickey-Fuller test. The augmented Dickey-Fuller test for each individual time series confirmed the presence of unit roots, which is the basic precondition of cointegration between variables.

Since the choice of lag orders of the variables in the vector error correction model specification can have a significant effect on the inference drawn from the model, the appropriate lag length for each variable is sequentially determined. The optimal lags for each estimated trading partner within different product groups were determined on the basis of Schwarz information criterion. Results of the cointegration procedure can be seen in Table 1.

Table 1. Number of lags and cointegration equations

	AT		DE		FR		IT		SK	
	lag	*r*	*lag*	*r*	*lag*	*r*	*lag*	*r*	*Lag*	*r*
TT	4	1	2	1	2	1	4	1	2	1
T6	5	0	4	1	9	1	5	0	5	1
T7	5	1	4	1	9	1	9	1	5	1
T8	5	1	9	1	9	0	9	1	9	1

Source: author's computation in EViews program.

The empirical estimates of the effects of the level of foreign exchange rates on the Czechia's trade balance was performed for trading partners AT, DE, FR, IT and SK. The optimal lags calculated for each trading partner in individual product categories show that the average delay in product groups T6 to T8 is higher than the average lag for total bilateral trade (TT). Lags in tested product categories fluctuate between 4 and 9 quarters.

Johansen cointegration test results of the number of existing cointegration equations say that the aggregate bilateral trade balance are in the long-term relationship at all observed cases. Nevertheless, at the product level can be found some exceptions. Analysis do not prove any long-term relationship in trade balance of manufactured goods with Italy and Austria and in trade balance of miscellaneous manufactured articles with France. However, on the overall bilateral level, it can be concluded that the individual trade balances are characterized by long-term joint development of Czech GDP, GDP of its trading partners, as well as a bilateral CZK/EUR exchange rate.

Table 2. Estimated long-run coefficients of trade models

	AT			DE			FR			IT			SK		
	Y_d	Y_f	ER	Y_d	Y_f	ER	Y_d	Y_f	ER	Y_d	Y_f	ER	Y_d	Y_f	ER
TT	-5.32	1.47	-1.27	0.42	0.86	0.20	0.38	1.34	-0.23	0.21	1.53	1.27	-3.74	3.10	-0.16
T6	x	x	x	-0.00	1.01	1.59	0.06	1.69	2.42	x	x	x	-1.32	0.94	-0.11
T7		-5.07	-2.17	0.09	0.51	0.18	-1.27	4.73	-2.67	6.65	-3.10	-2.04	-6.76	3.64	0.29
T8	-2.39	2.35	-1.75	-0.84	0.50	-0.50	x	x	x	3.68	1.21	0.90	0.08	-0.38	0.66

Source: author's computation in EViews program.

Analysis of long-term coefficients of Czech GDP showed significant differences not only across product categories, but also across trading partners. Coefficients in trade with Austria demonstrate

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negative effects of domestic GDP. Therefore, with growth of the GDP of the Czech Republic, there is expected an increase in quantity demanded of Austrian goods and thus increase of the amount of imported goods, which leads to a worsening of the trade balance and is reflected in the negative coefficient estimate on the total bilateral trade balance. A similar conclusion is also estimated for Slovakia, what was reflected in negative effect of Czech GDP in total bilateral trade balance, as well as for partial trade balances except miscellaneous manufactured articles. For trading partners Germany, France and Italy cointegration analysis showed the opposite relationship with domestic GDP on total bilateral level. The results of the commodity level are a clear indication of possible bias resulting from the aggregation of data on the overall bilateral level.

Estimated coefficients of foreign GDP represent more clear results. The income increases in foreign economies can thus be approximated with an increase in the purchasing power of foreign investors, increasing the quantity demanded of domestic goods abroad and therefore an increase in exported goods. The highest rate was detected for Slovak GDP, which clearly shows the interdependence of the economy with the Czech Republic. On the commodity level, one can also find the opposite effect. In the case of product category of machinery and transport equipment it was detected for trade with Austria, in case of miscellaneous manufactured articles for trade with Slovakia and Italy.

The results presented in Table 2 further show that the coefficient of exchange rate are positive on the overall level in trades with Germany and Italy. These estimates are supported by expected positive effect of the depreciation of the Czech koruna on their trade balances. Total average share of these countries in the total foreign trade turnover of the Czech Republic in the period was 37%. For trading partner Austria is negative coefficient supported by the estimated coefficients of tested product categories. For other partial trade balances the effects of exchange rate mixed. Partly expected effect of depreciation on commodity trade balance is observed in trade flows with Germany and Slovakia.

Table 3. Estimated short-term effect of CZK depreciation against EUR

Effect of depreciation	Product category	Trading partner
Negative	TT	AT
	T7	AT
Positive	T6	DE, FR, SK
	T7	DE, IT
	T8	AT, IT, SK

Source: author's computation in EViews program.

As indicated before, the short-run effects of depreciation are reflected in the coefficient estimates obtained for the lagged value of the first differenced exchange rate variable. The J-curve approach allows us to distinguish the short-run effects from the long-run effects. The traditional J-curve is confirmed if the estimate of the coefficient for the exchange rate is significantly negative at lower lags and is followed by a significantly positive coefficient at longer lags. Simultaneously, the J-curve can be represented as negative short-run coefficients, followed by a positive long-run coefficient. In this study, only some short-term coefficients are statistically significant. The short-run significant negative coefficient followed by positive improvement cannot be found in any tested product category. However, as can be seen in Table 3, by the short-term analysis were indicated product categories with short term negative and positive effects. Hence the J-curve phenomenon is not supported by the estimated coefficients of exchange rates. By contrast, the inverse J-curve effect was detected for trade of manufactured goods with Slovakia and trade of miscellaneous manufactured articles with Italy. For these two cases Marshall-Lerner condition is not met in the long-term period and even there can be observed short-term improvement of particular trade balances, there is proved worsening in the longer perspective.

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5   Conclusion

The purpose of this paper was to evaluate the dynamics of CZK/EUR exchange rate effect on the most important segment of Czechia´s foreign trade represented by manufactured goods, miscellaneous manufactured articles, machinery and transport equipment with most important trading partners within the Eurozone.

Results of the paper show that the long-term coefficients of exchange rate are positive on the overall level in trades with Germany and Italy. These estimates support the expected positive effect of the depreciation of the Czech koruna on their trade balances. Total average share of these countries in the total foreign trade turnover of the Czech Republic in the period is 37%. On the other hand, the worsening of trade balance after depreciation is proved for trading partner Austria, what is supported even by the estimated coefficients of tested product categories. For other partial trade balances the effects of exchange rate are mixed. The short-term analysis did not prove statistically significant negative coefficients followed by positive improvement. However, there were indicated product categories with short term negative and positive effects. Hence the J-curve phenomenon is not supported by the estimated coefficients of exchange rates. By contrast, the inverse J-curve effect was detected for trade of manufactured goods with Slovakia and trade of miscellaneous manufactured articles with Italy. For these two cases Marshall-Lerner condition is not met in the long-term period and although there can be observed short-term improvement of particular trade balances, there is proved worsening in the longer perspective.

The results of the paper clearly demonstrate that the role and effect of CZK/EUR exchange rate on Czechia's foreign trade is not definite. One cannot simply assume that the depreciation of Czech koruna will improve exports, reduce imports and, hence, improve the trade balance. This conclusion can be associated with the fact that Czech exporters and importers intensively hedge their foreign trade activities, Czech exports are significantly dependent on imports, and Czech companies are largely owned by foreign investors and belong to multinational corporations. Therefore, product groups and trading partners should be carefully distinguished when considering exchange rate effects on foreign trade.

6   Acknowledgement

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EVALUATION OF REGIONAL LABOR MARKET USING THE INDICATOR THE SHARE OF UNEMPLOYED PERSONS, AND THEIR AGE STRUCTURE

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Abstract
The paper aims to show whether the indicator "The share of unemployed persons" in the population of the working age 15-64 may be used in the evaluation of the situation on the labor market in the areas smaller than a county or district. As part of the solution three options for calculating its value by five-year age groups were implemented and evaluated in the villages of the Frýdek-Místek district. After selecting an appropriate option from the municipalities, based on cluster analysis, three clusters by their issues were identified. The results of the solution showed that the indicator could be used for assessing the age structure of the unemployed in the area within the constraints associated with the construction of the indicator. Its use in the municipalities with fewer than 200 inhabitants is not appropriate

Keywords
unemployment, share of unemployment, age structure, small municipalities

JEL classification
J21, J64, R23

1 Introduction

Statistics of the economically active population, employment, unemployment and underemployment can be used as an essential base for the design and evaluation of government programs geared to employment creation, vocational training, income maintenance, poverty reduction and similar objectives.

Until December 31, 2012, the Ministry of Labor and Social Affairs had expressed the level of unemployment in the area (region, district, municipality) using the indicator Registered Unemployment Rate, which was a rate of available job applicants and the labor force expressed in %. Since 2013 the Ministry has been using the indicator Rate of Unemployed Persons which expresses the rate of available job applicants aged 15 to 64 out of all inhabitants of the same age (MPSV, 2012).

During the first half of 2015 as part of the solution of the ESF project for service development in job openings, an evaluation of the current situation and development in unemployment in the Czech Republic was carried out based on the values of the indicator Rate of Unemployed Persons in a group of inhabitants in productive age. The aim of this study is to compare the values of the indicator, its behavior and influence when compared to the previously used unemployment rate (Šimek et al., 2015). Based on these results possible issues were noted that can occur when using this indicator when interpreting its values and monitoring the development in a specific region.

The evaluation of the influence of the demographic situation, labor migration and the use of age standardization were also part of the analysis of the indicator's behavior. The identification of differences between individual aggregation levels, the study of geographical differences and time development were also included. Based on the study of these influences, the impacts on interpretation were evaluated and recommendations formed accordingly (Šimek et al., 2015).

The paper aims to show whether the indicator "the share of unemployed persons" in the population of the working age 15-64 may be used in the evaluation of the situation in the labor market in the areas smaller than a county or district.

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2   Theory and a review of literature

Indicators reflecting the level of unemployment and development can be assessed and used to explain various phenomena in the labor markets.

Dynamics of regional disparities in labor markets at NUTS 3 level in the Czech Republic expressing unemployment rate is described by Tvrdoň and Verner (2012). This paper test if regional and national unemployment rates are co-integrated, in other words if the long-term relationship between regional and national unemployment rates exist. Monthly Czech Ministry of Labor and Social Affairs data were used for the analysis, when evaluating the application of the general unemployment rate.

Bradbury (2006) also addresses the differences when measuring the level of unemployment by the unemployment rate. In his article he shows how unemployment is measured in the United States and Europe and describes recent research investigating the permeability of the dividing line between the unemployed and "marginally attached" subgroups of those out of the labor market. A continuum between unemployed and entirely inactive individuals indicates that measures beyond unemployment may be useful in judging the state of the labor market.

Gatarik (2015) follows the development of the so called general indicator of the rate of unemployment in Austria based on the methodology recommended by Eurostat and the development of the registered unemployment in Austria based on the data of Statistik Austria.

Hussmann (2007) states in his study that the statistics of the economically active population, employment, unemployment and underemployment serve a large variety of purposes. They provide measures of labor supply (rate of employment and unemployment), the structure of employment, and the extent to which the available labor time and human resources are actually utilized, or not. Such information is essential for macro-economic and human resources development planning and policy formulation. The unemployment rate, in particular, is widely used as an overall indicator of the current performance of a nation's economy.

Statistics of the economically active population and its components can be generated from various sources. Common sources of statistics on economically active, employed and unemployed persons are labor force surveys and other household sample surveys, as well as population censuses. Data on employment can also be obtained from establishment sample surveys, establishment or economic censuses, social security records, public sector payrolls, etc., and data on unemployment from administrative records on registered job seekers or recipients of unemployment benefits. The use of harmonized classifications, units, concepts and definitions enhances the comparability between statistics obtained from different sources. Data users must be aware that each source has its strengths and limitations, that different sources can validly provide different estimates and that the use of several sources can help in analyzing different facets of the employment situation, and in evaluating and improving the quality of statistics obtained from each source. Analytically they are used for alternative measuring of unemployment types.

Aysun, Bouvet a Hofler (2014) derive an alternative measure for structural unemployment using a stochastic frontier analysis. They find that their measure does not always track the long-run trends in total unemployment in the U.S. and when compared to the existing measures can provide different insights into the evolution of structural unemployment. Demographic and regional evidences offer some validation for our approach and allow us to determine how demographic and regional factors are related to the variation in structural unemployment across time and regions.

The above indicators may also serve for identification and explanation of the factors that affect regional unemployment.

Elhorst (2003) attempts to provide an integrated overview of theoretical and empirical explanations used in the applied literature on regional unemployment differentials. While theory is found to predict that the regional unemployment rate depends on labor supply factors (a collection of factors which affect natural changes in the labor force, labor force participation, migration and commuting), labor demand factors and wage-setting factors,

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Labor market indicators may support a graphical description of the labor market situation in towns. Inspektor, Ivan and Horák (2014) published a paper focused on mapping and monitoring unemployment hot spots using the registers of the local authorities in the city of Ostrava (the Czech Republic) to identify socially excluded localities at micro-scale. The register of unemployed persons and the population register provide data for a quantification of specific indicators of local labor situation. A share of the registered unemployed in reference to the residents in productive age can substitute the rate of unemployment due to the high correlation of both indicators. The mapping of unemployment hot spots has been based on data from 2007, 2009, 2010 and 2011 using kernel density estimation. Various settings of bandwidths have been tested to identify socially excluded localities in the city to identify the most accurate way to visualize the pattern. These localities have been identified in two expert studies and the most significant sign is considered to be increased unemployment.

Indicators on regional unemployment are also used in the examination of the factors for companies when hiring labor in the industry. Yang (2014) in his paper constructs a footloose entrepreneur model with Diamond– Mortensen–Pissarides job search and matching frictions in the manufacturing sector. It captures unemployment adjustment both within the manufacturing sector and in the regional labor market. He also extends the analysis by examining the role of labor market frictions across sectors and the interdependence between agglomeration and unemployment.

A number of studies using the unemployment rate identifies issues at the regional and local gender levels. E.g. Belloc and Tilli (2013) examine the dynamic behavior of unemployment rates by gender and of the gender unemployment gap over the 1992–2009 period in Italian regions. They findings suggest that the gap between male and female unemployment rates has been narrowing in 14 out of 19 regions over the last few years. However, they also show a great degree of cross-region heterogeneity in the pace of catching-up and in the characteristics of the underlying dynamics: in some regions the male unemployment rate has increased more than the female rate, in others it has decreased less, while in yet other regions the former has increased and the latter decreased. These preliminary conclusions suggest the importance of identifying the region-specific aspects responsible for such heterogeneous dynamics.

Various labor market indicators are used in assessing the situation on the labor market for the use of the employment policy in the area. Blien, Hirschenauer and Hong Van (2009) in their paper present a model-based classification system which is designed to assess labor market conditions which influence the outcomes of active labor market policy. They find a strong distinction between east and west of Germany, reflecting primarily the different unemployment rates, but also different labor market conditions. In the East the labor market performance of some larger cities (Potsdam, Dresden, etc.) is better than that of the rural country. The worst labor market conditions are to be found in rural areas far away from western Germany and from metropolitan areas (Sangerhausen, Eberswalde, etc.). In the West, however, the rural districts in Bavaria and Baden-Wuerttemberg show the most favorable labor market performance. The cities can be divided into types with a poor or at least moderate labor market (cities of the Ruhr area and Hannover, etc.) and one whose members represent a better situation (Munich, Stuttgart, etc.).The innovation in this paper is the development of a procedure that combines a theory-guided analysis of determinants of regional disparities with standard classification approaches.

The data on specific unemployment rates are also often used for the assessment of the situation on the labor market in the case of the so-called disadvantaged groups.

The importance of the knowledge about regional, local labor market is emphasized by Winkler et al. (2014). They note that without the knowledge of regional, respectively local labor markets, job vacancies and skills as well as of the needs and skills required by employers the counselors may not effectively assign jobseekers to vacancies (the matching process). In comparison with similar situations in Sweden they note that the specifics of the Swedish approach is to focus on local and regional differences

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Štefáník, Lubyová, Dоválová and Karasová (2014) assess the impact of active employment policy measures on the level of unemployment in local labor markets. The study shows that every region has its own specifics, the best approach being a different combination of instruments of active labor market policy.

3   Data and methods

To express the age structure of unemployment we have applied the indicator the Rate of Unemployed Persons according to five-year-age groups per inhabitants of the productive age, from 15 to 64 by March 31, 2011. The results focus on the small municipalities in Frýdek-Místek.

The data were drawn from the following sources:

• The number of the unemployed in the municipalities by five-year-age groups at Labor Office of the Czech Republic, from the database of job seekers for the municipalities in Frýdek-Místek.

• The number of the available unemployed in small municipalities (villages) in the 15-64 age group by five-year-age groups at Labor Office of the Czech Republic, from the database of job seekers for the small municipalities in Frýdek-Místek.

• The age structure of the population in selected small municipalities - Census of inhabitants, houses and apartments, the Czech Statistical Office.

When assessing the similarity of the municipalities the cluster analysis method was used (Ward's method). The cluster analysis is a multivariate statistic method used for the classification of objects. It is used to classify units into groups (clusters) so as the units belonging to the same cluster would be more similar than objects from other groups. The cluster analysis can be carried out on a set of objects from which each object has to be described through the same set of signs that are worth studying in a particular set, as well as on a set of signs that are characterized through a particular set of objects which have these signs. The cluster analysis belongs to the methods that investigate similarities of multivariate objects, i.e. objects where a higher number of signs was measured and followed by classifying objects into clusters. Within the cluster analysis, a method of quadratic Euclidic distance (which forms the basis of the Ward's cluster method) was used in this article to measure the distance among objects. It is based on minimizing the information loss when connecting two classes. At each step a possible pair of subjects (clusters) is considered so as the sum of squared deviations from the mean value would reach its minimum upon the creation of its cluster.

4   Results

In the course of our own examination of the age structure of the unemployed at the small municipalities level a serious issue became apparent. For an exact calculation of the proportion of the unemployed respective age groups in the population it was required to identify the number of the available unemployed by age back to 31. 3. 2011. According to the specialists at the regional branch of the Labor Office in Ostrava it is not possible to identify them retrospectively. This calculation can be done only for the total number of the unemployed. To approach as closely as possible the methodology for the calculation of the proportion of the unemployed an alternative solution has been applied.

In the first scenario, the number of the available unemployed was estimated using the coefficient which was determined as the number of the available unemployed for the district of Frýdek-Místek to the number of all the unemployed by 31. 3. 2011. Subsequently, the analysts of the regional branch restated this coefficient by the age structure of the unemployed. After counting the number of the available unemployed acquired by age their sum was compared with the officially published statistics for the GIS municipality. Having added up all the municipalities in Frýdek-Místek there was the difference of the 74 unemployed achievable in favor of the converted data, which is about 1% difference at the municipality level. The highest absolute difference occurred in Frýdek-Místek (-44 persons), Frýdlant nad Ostravicí (-14 persons) Jablunkov (12 persons) and Třinec (61 persons). In

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relative terms, the conversion influenced significantly smaller municipalities, e.g. the difference between the conversion and GIS statistics in the case of the available unemployed was important for the small municipality of Dolní Lomná (16%), Horní Domaslavice (21%), Hrčava (20%), Pazderna (15 %) and Žermanice (19%). These were small municipalities with a very small number of the available unemployed and even the difference of one person caused a significant relative change.

Being aware of the inaccuracies, which were based on the recalculations of the age structure in the small municipalities, the second variant proceeded to recalculate the age structure of the unemployed in total at the municipal level to establish the age structure of the unemployed.

The age structure of the unemployed and the age structure of the available unemployed for each municipality of the district Frýdek-Místek were selected from the database of the LO on 15. 3. 2015. In the next stage, an experiment was conducted to determine the partial coefficients of the ratio between the unemployed and the total number of the unemployed for each five-year-age group and every community and those factors were then multiplied by the total number of the unemployed for five-year-age groups in the small municipalities of the district for 31. 3. 2011. Due to the cases arising from the higher number of the available unemployed than compared to the number of the unemployed in total in some age groups, the weighting for each municipality was abandoned and the coefficients were calculated only for the five-year-age groups at the district level. The obtained coefficients were then weighted for the total number of the unemployed by five-year-age groups for all municipalities of the district by 31 3. 2011. This provided the number of the available unemployed by five-year-age groups. After calculating the number of the available unemployed acquired by age the total was compared with the officially published GIS (Geographical Information System) statistics for the small municipalities. The sum of all the municipalities in the district of Frýdek-Místek resulted in the difference of the 407 unemployed achievable in favor of the converted data, which is a county level difference of about 4.2%. The highest absolute difference occurred in the towns Třinec (111 persons), Frýdek-Místek (77 persons) Jablunkov (20 persons) and Bystřice (19 persons). In relative terms, the conversion was influenced significantly by smaller municipalities, e.g. the difference between the conversion and GIS statistics in the case of the available unemployed was important in the small municipality of Horní Domaslavice (21%), Hrčava (20%), Žermanice (19%) and Pazderna (15%). In this case it was a case of the municipality with a very small number of the available unemployed and the difference of only one person caused a significant relative change. The greater inaccuracies and deviations were probably caused by a different distribution of unemployment in the area by age in 2015 than it was the case in 2011. With this variant the age structure of the unemployed job applicants in the small municipalities in one year (2015) was applied to a somewhat different structure of the unemployed in in the small municipalities in 2011.

The third option used the age structure of all of the unemployed persons in the small municipalities and not the age structure of the available unemployed. The difference between the total number of the unemployed and the number of the available unemployed at the district of Frýdek-Místek featured 720 persons by 31. 3. 2011. This difference rapidly changes with time depending on the duration of their unavailability. The cause is usually a participation in a retraining course, long-term illness or prison sentence.

The proportion of the unemployed indicator was calculated according to all three options. Each option was evaluated from the perspective of the 5 highest and 5 lowest values achieved for each five-year-age group. Based on the comparison of the results obtained and after a consultation with a specialist from the regional branch of the Labor Office in Ostrava the overall assessment of the similarity of the age structure for the municipality used the results obtained through the option No. 3. The results are presented in the following tables:

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Table 1. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 15-19 compared to the number of the productive inhabitants in the age group 15-19.

High Value (%)		Low Value (%)	
Pazderna	15,0	Bílá, Horní Tošanovice, Hrčava, Vojkovice, Kunčice p. O.	0,0
Horní Domaslavice	9,8	Bruzovice, Kaňovice, Ropice, Smilovice, Nižní Lhoty	0,0
Dolní Tošanovice	9,5	Bukovec, Lhotka, Malenovice, Morávka,	0,0
Nýdek	6,7	Hnojník, Žermanice, Krásná, Soběšovice	0,0
Košařiska	6,7	Horní Tošanovice, Vyšní Lhoty, Vělopolí	0,0

Source: own calculation

Table 2. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 20-24 compared to the number of the productive inhabitants in the age group 20-24

High Value (%)		Low Value (%)	
Vělopolí	23,1	Žermanice	0,0
Horní Lomná	22,6	Bílá	0,0
Hrčava	16,7	Pazderna	4,2
Sviadnov	15,1	Vyšní Lhoty	4,7
Soběšovice, Střítež, Sedliště	14,5	Hnojník	5,0

Source: own calculation

Table 3. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 25-29 compared to the number of the productive inhabitants in the age group 25-29.

High Value (%)		Low Value (%)	
Dolní Tošanovice	41,7	Soběšovice	0,0
Nižní Lhoty	20,0	Řeka	0,0
Krásná	18,2	Janovice	1,8
Žermanice	17,2	Dobratice	3,2
Hrčava	16,7	Dolní Lomná	3,8

Source: own calculation

Table 4. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 30-34 compared to the number of the productive inhabitants in the age group 30-34.

High Value (%)		Low Value (%)	
Bílá	30,4	Pazderna	0,0
Žabeň	15,8	Nošovice	0,0
Bruzovice	15,5	Hrčava	0,0
Kaňovice	11,4	Hukvaldy	1,4
Žermanice	10,7	Horní Domaslavice	1,4

Source: own calculation

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Table 5. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 34-39 compared to the number of the productive inhabitants in the age group 34-39.

High Value (%)		Low Value (%)	
Horní Lomná	17,2	Žermanice	0,0
Bocanovice	16,7	Pazderna	0,0
Vělopolí	13,6	Smilovice	1,5
Krásná	11,5	Ropice	1,7
Střítež	11,3	Nošovice	2,1

Source: own calculation

Table 6. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 40-44compared to the number of the productive inhabitants in the age group 40-44.

High Value (%)		Low Value (%)	
Bílá	33,3	Žermanice	0,0
Nižní Lhoty	20,0	Košařiska	0,0
Hrčava	16,1	Soběšovice	2,3
Kaňovice	14,3	Vendryně	2,4
Staré Hamry	14,3	Hukvaldy	2,4

Source: own calculation

Table 7. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 45-49 compared to the number of the productive inhabitants in the age group 45-49.

High Value (%)		Low Value (%)	
Bílá	25,0	Smilovice	0,0
Nižní Lhoty	19,0	Horní Tošanovice	0,0
Žermanice	18,8	Bocanovice	0,0
Dolní Tošanovice	18,2	Bruzovice	1,7
Horní Lomná	17,2	Dolní Domaslavice	2,0

Source: own calculation

Table 8. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 50-54 compared to the number of the productive inhabitants in the age group 50-54.

High Value (%)		Low Value (%)	
Dolní Tošanovice	25,0	Hrádek	3,6
Horní Lomná	22,2	Pržno	3,7
Nižní Lhoty	22,2	Krmelín	3,8
Hrčava	20,8	Vendryně	4,0
Staré Hamry	20,0	Bocanovice	4,2

Source: own calculation

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Table 9. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 55-59 compared to the number of the productive inhabitants in the age group 55-59.

High Value (%)		Low Value (%)	
Horní Lomná	18,2	Hrčava	0,0
Sviadnov	17,7	Bocanovice	3,6
Hukvaldy	15,9	Smilovice	4,1
Pstruží	15,9	Mosty u Jablunkova	4,2
Nižní Lhoty	15,4	Vělopolí	4,3

Source: own calculation

Table 10. The municipalities of the Frýdek-Místek district with the high and low value of the indicator The share of the job seekers in the age group 60-64 compared to the number of the productive inhabitants in the age group 60-64.

High Value (%)		Low Value (%)	
Kaňovice	8,0	Kunčice p.O.	0,0
Košařiska	6,9	Staré Město, Bukovec, Fryčovice	0,0
Vojkovice	6,5	Paskov, Pazderna, Horní Lomná	0,0
Staré Hamry	6,4	Frýdlant n.O, Hrčava	0,0
Staříč	6,1	Žermanice, Frýdek-Místek, Řeka	0,0

Source: own calculation

The cluster analysis divided the municipalities in Frýdek-Místek into several levels. The analysis identified three groups of the municipalities. The following municipalities are similar in terms of the percentage of the share of the unemployed in all the five-year- age groups.

1. Bílá, Dolní Tošanovice, Horní Lomná, Nižní Lhoty, Hrčava

2. Hukvaldy, Staříč, Krásná, Dolní Lomná, Frýdek-Místek, Pržno, Střítež, Ostravice, Sviadnov,   Staré Hamry, Vojkovice, Kaňovice, Bukovec, Soběšovice, Horní Tošanovice, Lhotka, Baška, Staré Město, Sedliště, Lučina, Ropice, Košařiska, Žermanice

3. Brušperk, Palkovice, Jablunkov, Třinec, Bystřice, Fryčovice, Milíkov, Písek, Nýdek, Nošovice, Řepiště, Vendryně, Krmelín, Návsí, Písečná, Smilovice, Hnojník, Kunčice pod Ondřejníkem, Raškovice, Vyšní Lhoty, Morávka, Dobratice, Komorní Lhotka, Hrádek, Janovice, Řeka, Dolní Domaslavice, Kozlovice, Dobrá, Frýdlant nad Ostravicí, Čeladná, Paskov, Třanovice, Pstruží, Malenovice, Pražmo, Bruzovice, Vělopolí, Žabeň, Bocanovice, Horní Domaslavice, Pazderna.

The results, due to the methodology of calculating when the cluster analysis includes the values for the unemployment by five-year-age groups (obtained by the Variant 3), show only the assignment of those district municipalities with similar age structure. There is an issue in the cluster 1 represented by the small municipalities Bílá, Dolní Tošanovice, Horní Lomná, Nižní Lhoty a Hrčava where often extreme (remote) indicator values of the share of the unemployed appeared.

Due to the method of the cluster analysis it is not possible to unambiguously sort the other two clusters according to the degree of issues they present in any labor market. This can be done e.g. in the case of partial analyses of the selected results by five-year-age groups which have been identified in the municipalities of Frýdek-Místek with the lowest and highest levels of unemployment in each of the five-year-age group.

Another analysis of the variance values of the indicator of the share of the unemployed by five-year-age groups in the villages from the five-year averages for the group for the district was implemented. The modified results of the analysis excluded those territorial units which had not reached the required parameters.

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5 Conclusion

The assessment of the age structure of the unemployment in the small municipalities of Frýdek-Místek revealed several facts:

• The results obtained by the individual variants are very similar, the derived indicators are in many cases identical. Therefore it is advisable to work with the total number of job-seekers, not just with the available ones.

• The level of the unemployed of 15-19 years of age is low. It is due to the low representation of the unemployed people in this age group and the high proportion of the people in this age group in the denominator. This condition is directly linked to the methodology of the calculation of the proportion of the unemployed.

• The level of the unemployment in the age group 20-24 and 25-29 is higher due to the issues with the entry of young people into the labor market.

• The level of the unemployment among the people in the age group 50-54 and 55-59 is higher than the level of the unemployment in the age group 40-44 and 45-49 years, probably due to lower willingness of the employers to provide jobs.

• The level of the unemployment among the people in the age group 60-64 is low due to their low representation and also because this is a large age group in the denominator, which is directly linked with the methodology of the calculation of the share of the unemployed. This indicator should not be used because of the inconsistencies.

• At the municipal level, there are in some age groups extremely high values, they are found mainly in small municipalities with a small number of people in the specific age group and often a small change in the number of the unemployed will cause large fluctuations on the level of partial share of the unemployed by age. Therefore we recommend using the age unemployment indicators only for the territorial units with more than 200 residents in the specific age group (a change of one candidate then causes a change of less than 0,5 p. p.). This proposal is based on the analysis of the deviations of the pointer for the value of the share of the unemployed by five-year-age groups in the small municipalities from the five-year averages for the group for the district and from the results of the modified analysis, when those territorial units which had not reached the required parameters were excluded.

6 Acknowledgement

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FROM SECTORS TO REGIONS – ASSESSMENT OF COMPETITIVENESS SUPPORT OF FIRMS FROM STRUCTURAL FUNDS

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Abstract
There has been much discussion on how regional policy should be set. Some theories and experience speak for a policy based on the specific characteristics of regions, in some countries; however, it is recognized by the sector-based approaches. The present article aims to assess the European Union support in terms of differences in the adjustment of aid in sectors in different regions. We assume that regional policy should support those sectors in regions that are competitive. This means across the board should not only be supported selected sectors but the policy must respect specific situation of sectors in various regions. Empirical analysis is based on evaluation of support in two selected countries of Central and Eastern Europe - the Czech Republic and Slovakia. Specifically, the paper provides an analysis of competitiveness support of companies and distribution of this aid by sectors and regions. Conclusions of empirical research indicate significant differences in sectoral and territorial distribution of aid, despite the fact that there are two neighbouring countries with similar support setting and with common history, which joined the European Union at the same time.

Keywords
Regional policy, Structural Funds, Innovation support, Industrial policy

JEL classification
H50, R58, O25, O38

1   Introduction

Support of competitiveness is among the traditional instruments of economic policy. There are a lot of ways how this support can be implemented, both through the national and regional level (Smith, 2000; Jaumotte and Pain, 2005; Šipikal, et al., 2010). One of the most common ways (but also one of most controversial), are schemes aimed at supporting directly firms. Also in this case, there are different ways how to do it. Most typical are provision of finance, technology and training assistance. Almost all countries have schemes for stimulating and supporting private R&D or other technology development in SMEs (Batra and Mahood, 2003). However, the empirical evidence is quite mixed about their effectiveness and benefits. Any project selection is related to "picking the winners" and government abilities to do it properly (Storey, 1994; Almus and Czarnitzki, 2003). Specially, the government tend to support projects with high chances to succeed. Logically, these projects often do not need public support to be successful (Wallstein, 2000).

Moreover, In the EU countries that have a significant proportion of underdeveloped regions, a large part of such schemes implemented directly within the EU's cohesion policy. Given that cohesion policy has other goals than just promoting competitiveness, there may arise a classic dilemma of efficiency vs. equality of support policies. Support does not have to be directed where it will be most effective, but it also has to support the least developed regions. Similar situation could arise within supported regions where the support could go to the most developed of them (Klimová and Žítek, 2015).

To better understand the possible effects of policies, it is important to study empirical distribution of support. The aim of this article is to empirically analyze the distribution of measures used to promote competitiveness for private companies in two similar countries - the Czech Republic and

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Slovakia. We will explore how the problem of picking of winners could be seen at sectoral levels. We will also examine how these differences vary across supported regions.

2   The selection of sectors

Support from cohesion funds always deal with the dilemma of effectiveness and solidarity. One stream argues that development interventions should be space-neutral and factors simply encouraged moving to where they are most productive (Barca, McCann and Rodriquez Pose, 2012) other support the place based argument (Barca 2009). In practice, this dilemma often leads to the selection of regional or sectoral intervention schemes. Although cohesion policy funds are not earmarked to sectors, a large part of the resources ends up being allocated to sectoral programmes that lack place-based setting. This is particularly the case for the resources – about two thirds of the whole budget – which are managed by the central administrations (Barca, 2009). This is also the case of European supporting programmes in the Czech and Slovak Republic. Both analysed programmes are managed by central administrations. Moreover, the development of companies does not depend only on dynamic development of particular sectors, but is also influenced by regional specific context (Rehák, 2008).

Sectoral support tends to favour powerful regions and sectors as it might have been if integrated regional support were implemented. On the other hand, however, it allows influencing the support of strong sectors that have good lobby in government institutions. Problem of picking of winners deals also with question if to support the growing or declining sectors. In many cases, the states tend to support strong traditional industries which could face the "lock in" problem. Another problem is related to tendency to support the strongest sector to improve already existing technological advantage in the region. This could lead to selection of projects that do not require support.

3   Methodology and data

In order to obtain relevant comparison of policies in two neighbouring countries, we have chosen to analyse two similar measures of innovation support in Slovakia and the Czech Republic. We are working with all projects supported during the programming period 2007 – 2013 within selected measures. There were only projects of state assistance analysed, not schemes de minimis.

In Slovakia, an intervention of the Operational Programme Competitiveness and Economic Growth will be analysed, particularly the measure 1.1. Innovation and Technology Transfers, namely Sub-measure 1.1.1 Support for Introducing Innovation and Technology Transfer (state aid scheme to support the introduction of innovative and advanced technologies in industry and services). Six calls for grant applications for firms were analysed. The calls were announced in years 2008, 2009 and 2010, 2011 and 2012 (KaHR-111SP-0801, KaHR-111SP-0902, KaHR-111SP-1001, KaHR-111SP/LSKxP-1101, KaHR-111SP-1101).

In the Czech Republic, a measure under the Operational Programme Business and Innovation will be explored, particularly 4.1 Increasing the innovative performance of firms, the sub-measure "Innovation – Innovation Project". Within this measure were evaluated 4 calls for grant applications for firms in the Czech Republic. The calls were announced in years 2007, 2008, 2009 and 2010(Innovation – Innovation Project Call I, II, III and IV). The last call has been subsequently extended in years 2011 and 2013.

A database of approved projects was established that was filled by different characteristics (year of establishment, legal form, number of employees, etc.) from the Register of Financial Statements of the Ministry of Finance of the Slovak Republic, Orbis Database and the Statistical Offices of the Czech and Slovak Republic. The information about the aid amount and beneficiaries from the grant agencies were used (Czechinvest in the Czech Republic and Slovak Innovation and Energy Agency in Slovakia). In the analysis of two very similar measures of innovation support will be evaluated the total amount of support in the Czech Republic of 821 588 884.79 Euros and in Slovakia of 365 483

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003,69 Euros that were approved during the programming period 2007 - 2013. Overall, in the Czech Republic approved in 1269 projects that represent 930 companies and in Slovakia 400 projects in 371 companies.
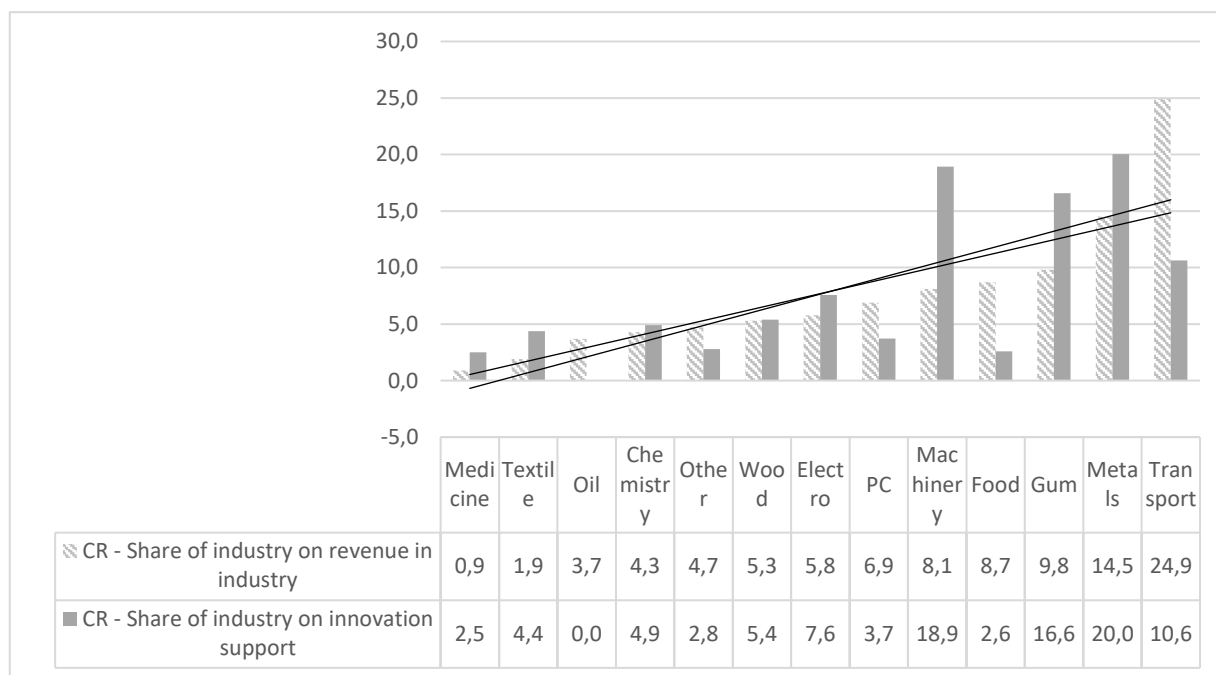
We need to stress that rules and selection procedures were very similar in both investigated countries. Both schemes were oriented on technology transfer to support innovation. Both had similar criteria for evaluation, based primarily on project quality. No regional specific criteria were applied.

The dataset containing all projects was evaluated in order to find the differences in support among different sectors and compared to the strengths of these sectors in both evaluated countries.

4 Sectoral distribution of aid

When we look at the overall distribution of aid by sectors, the Czech Republic supports roughly followed the sector size, while in Slovakia the differences were much more pronounced. More detailed results are shown in Figures 1 and 2.
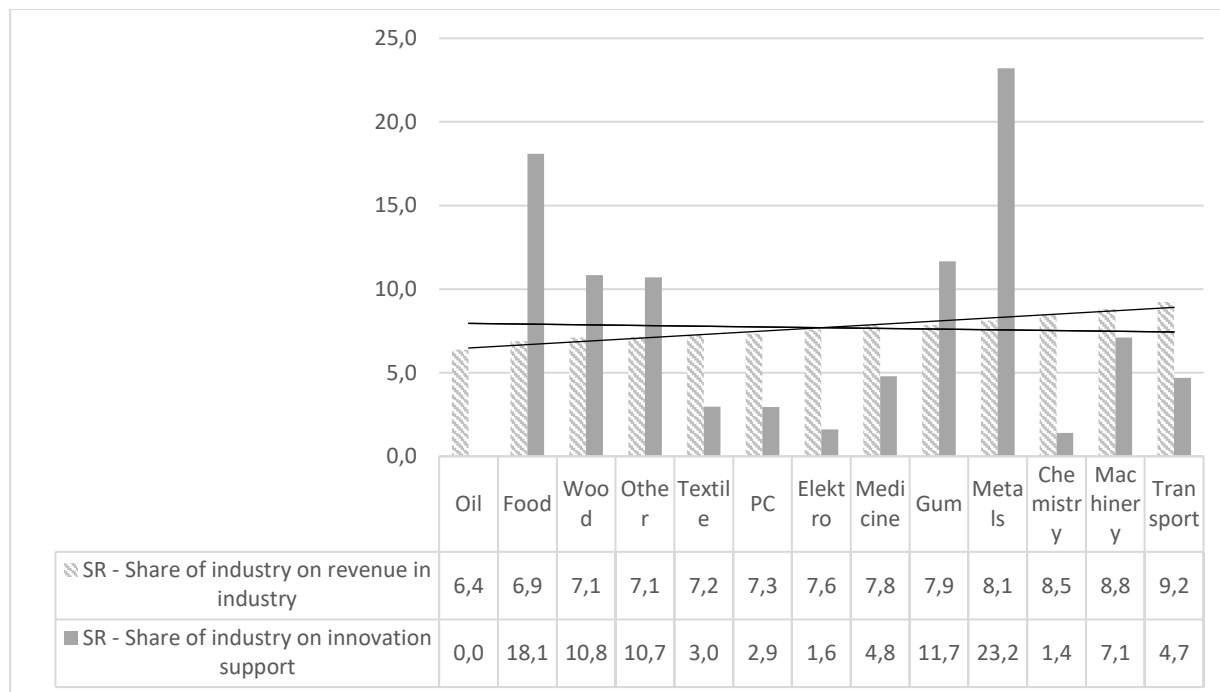
In the Czech Republic dominates support of metals and machinery, that proportion is significantly higher than the actual proportion of the volume of production. On the other hand, compared to the size of output it is faltering Food processing sector and Manufacture of transport vehicles.

	Medicine	Textile	Oil	Chemistry	Other	Wood	Electro	PC	Machinery	Food	Gum	Metals	Transport
CR - Share of industry on revenue in industry	0,9	1,9	3,7	4,3	4,7	5,3	5,8	6,9	8,1	8,7	9,8	14,5	24,9
CR - Share of industry on innovation support	2,5	4,4	0,0	4,9	2,8	5,4	7,6	3,7	18,9	2,6	16,6	20,0	10,6

Fig. 1. Sectoral aid distribution in Czech Republic for whole programming period 2007-2013 (Source: own calculations – the lines represent trendlines)

On the contrary, the Slovak Republic is food processing stronger supported than its share of production. Overall, better are supported of traditional sectors such as wood processing and mechanical engineering. Conversely, lower amount of aid went to high-tech sectors. Low level of support was given to electrical engineering industry, production of transport vehicles and the production of PCs. It is also interesting that these sectors were the most growing sectors in the period of 2008 -2013.

One of the mentioned differences may occurs when comparing support of traditional or declining sectors compared to new emerging sectors. If we correlate the growth of particular sectors (from 2008 to 2013) with share of sector´s support, the correlation is -0,23 i.e. for Slovak Republic. So it looks like support is slightly more oriented on less growing or declining industries.

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	Oil	Food	Wood	Other	Textile	PC	Elektro	Medicine	Gum	Metals	Chemistry	Machinery	Transport
SR - Share of industry on revenue in industry	6,4	6,9	7,1	7,1	7,2	7,3	7,6	7,8	7,9	8,1	8,5	8,8	9,2
SR - Share of industry on innovation support	0,0	18,1	10,8	10,7	3,0	2,9	1,6	4,8	11,7	23,2	1,4	7,1	4,7

Fig. 2. Sectoral aid distribution in Slovak Republic for whole programming period 2007-2013 (Source: own calculations)

If we look at a more detailed analysis by sectors at double digit NACE classification, the results can be seen in Table 1. In the Czech Republic are dominant sectors of 2X, while in the case of the Slovak Republic is support more diversified. Particularly interesting is the fact that in many businesses supported in Slovakia the industry is not the main activity. Main sectors were trade (NACE 46) and construction (NACE 41), although projects were primarily focused on manufacturing activity. This suggest that large part of the support went to companies where manufacturing is not a primary activity of the company. But also traditional sectors related to agriculture (manufacture of food and beverages) are relatively more supported in Slovak Republic.

Several sectors are supported heavily in both countries and they are mainly related to machinery and automotive sector. The most supported sectors both in Slovakia and the Czech Republic are NACE 25 - Manufacture of fabricated metal products, except machinery and equipment, NACE 28 - Manufacture of machinery and equipment and NACE 22 - Manufacture of rubber and plastic products.
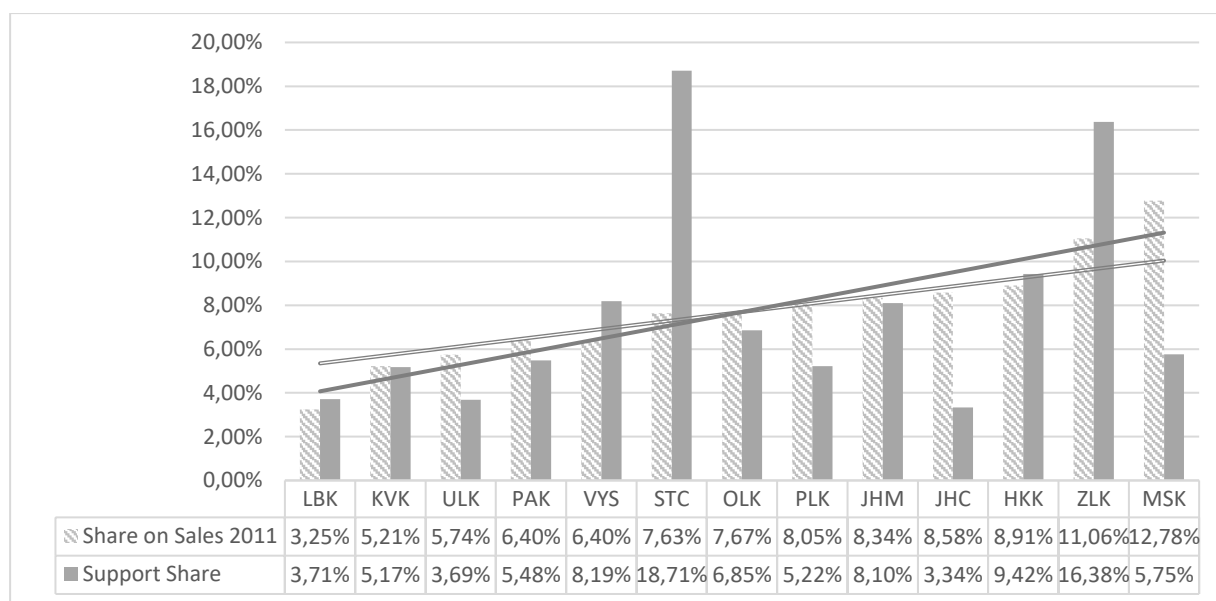
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Table 1. The most supported sector on ČR and SR

TOP sectors ČR		TOP sectors SR	
NACE code in EUR	Total sum	NACE code	Total sum in EUR
28	152 152 437,22	25	51 795 166,93
25	135 144 608,57	46	39 682 335,63
22	79 504 579,03	11	24 860 757,72
27	60 756 277,70	22	21 977 702,25
29	55 026 440,18	10	18 762 481,61
23	53 653 581,98	28	17 111 991,55
20	39 491 211,23	31	12 888 399,10
13	32 720 457,90	41	12 719 068,48
30	30 297 378,14	16	11 786 920,73
26	29 907 828,66	21	11 535 253,00

Source: own calculation. (NACE codes : 10 - Manufacture of food products,11- Manufacture of beverages 13 - Manufacture of textiles, 16 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials, 21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations 22 - Manufacture of rubber and plastic products ,23 - Manufacture of other non-metallic mineral products 25 -Manufacture of fabricated metal products, except machinery and equipment, 26 - Manufacture of computer, electronic and optical products , 27 - Manufacture of electrical equipment, 28 - Manufacture of machinery and equipment n.e.c., 29 - Manufacture of motor vehicles, trailers and semi-trailers, 30- Manufacture of other transport equipment , 31- anufacture of furniture, 41 – Construction of buildings 46- Wholesale trade, except of motor vehicles and motorcycles)
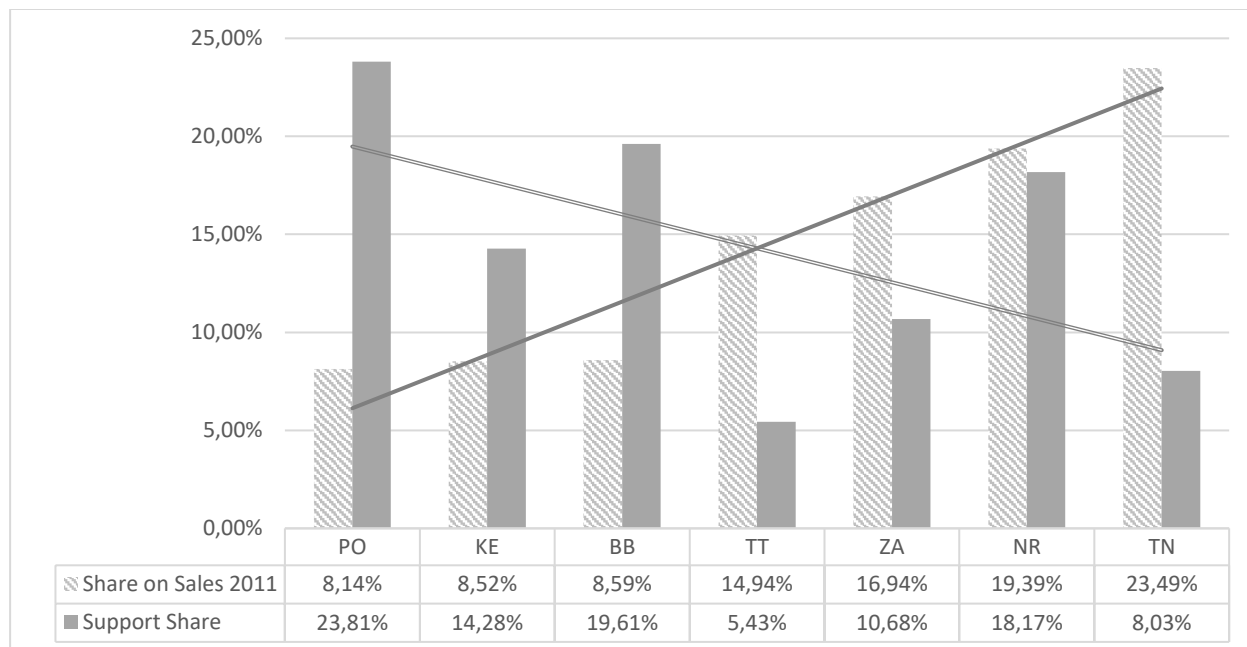
5   Regional dimension

The sectoral dimension of support is only part of overall picture to understand the distribution of the aid. We look more closely on how certain sectoral support is distributed among particular regions. We analyse two of the most supported sector in both countries – manufacture of machinery and equipment (NACE 28) and Manufacture of fabricated metal products, except machinery and equipment 25). These sectors are one of most traditional sectors. The figures 3 and 4 show detailed distribution of support in NACE 25 among different regions.

	LBK	KVK	ULK	PAK	VYS	STC	OLK	PLK	JHM	JHC	HKK	ZLK	MSK
Share on Sales 2011	3,25%	5,21%	5,74%	6,40%	6,40%	7,63%	7,67%	8,05%	8,34%	8,58%	8,91%	11,06%	12,78%
Support Share	3,71%	5,17%	3,69%	5,48%	8,19%	18,71%	6,85%	5,22%	8,10%	3,34%	9,42%	16,38%	5,75%

Fig. 3. Sectoral aid distribution in Czech Republic for NACE 25 projects for whole programming period (Source: own calculations)

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Compared to this, the correlation for Slovak republic is -0,58, so this indicate totally opposite distribution. The more lagging regions got much higher total amount of support compared to their share. So selection procedures lead to totally different sectoral - regional distribution of support compared to Czech Republic.

	PO	KE	BB	TT	ZA	NR	TN
Share on Sales 2011	8,14%	8,52%	8,59%	14,94%	16,94%	19,39%	23,49%
Support Share	23,81%	14,28%	19,61%	5,43%	10,68%	18,17%	8,03%

Fig. 4. Sectoral aid distribution in Slovak Republic for NACE 25 projects for whole programming period (Source: own calculations)

Very similar results apply also for NACE 28 sector. The correlation coefficient was 0,08 in Czech Republic and -0,35 in Slovak Republic. However, in both countries the most supported regions were the ones with low proportion of this sector. The highest amount of support went to Prešov region (43,48% of all support compares to less than 7% share of total sales in the industry. In Czech Republic, the highest amount of support went to three regions with very small share of sector on Total Sales – Zlínsky, Královohradecký and Karlovarský region.

6   Conclusion

We analysed sectoral distribution of public support for private companies in two countries – the Slovak and the Czech Republic. Despite these countries used similar support measures, the empirical results differ. In the Czech Republic, sectors are more supported according to their performance with higher attention to high-tech sectors. In Slovakia, support is much more diversified; less developed regions with lower economic activity and lower level of sectoral performance were supported. Despite of technology transfer as main goal of the investigated supporting scheme, many projects were supported in companies whose do not have production as their main activity. Regional dimension also plays an important role. Different regional distribution of support was identified in both countries. In Slovakia, the support of less developed regions seems to be more important in terms of support by sectoral performance. In Czech Republic, the results were more in line with the rules of the scheme that were aimed at support the best projects regardless the sector´s or region´s share on total sales in the country.

Despite of similar procedures and goals of the support schemes, the support was distributed in a different way in the two very similar countries. This shows the great importance of the interconnection of specific regional and sectoral characteristics which can significantly affect the success of the provided support. Further research should concentrate on these characteristics that may

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open the question of effectiveness or efficiency of the aid. The support could compare also to the different indexes measured innovation potential (as e.g. in Hlaváček, 2016) to see if the support is more oriented to such a regions.

7 Acknowledgement

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MIGRANT REMITTANCES – GROWING PHENOMENON IN GLOBAL ECONOMY[1]

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Abstract

Currently, we experience growing international migration, which surely influences both the destinations as well as migrants' origins. One of the consequences of emigration on source countries is flow of financial remittances from migrants to their families in origins. The research area although receives more and more attention from the researchers, is still relatively under-researched, not much is known on the heterogeneous effects of emigrants on remittances flow, and the effects of remittances on economies. Yet, the impact of migration on remittances seems to be very important part of globalization process and possible source of growth in developing and poor countries. Through remittances, migrants transfer funds, information, ideas and practices. Remittances link societies of origin and destination by processes of mobility and exchange and they are consist of financial and non-financial part (e. g. ideas and values). Growth of remittance flows is accelerating in last decades and it is higher than official developing assistance. This tentative paper tries to review existing literature on the topic and offers first descriptive evidence on trends in migration and remittances across the world countries.

Keywords

Remittances, migrants, transfers, developing economies.

JEL classification

J61, O19

1   Introduction and motivation

In the current years we are witnessing growing migration, especially from developing counties (e. g. MENA[2]) to Europe. In general, migration flows could be a source of labour force, information transfer, innovations and other economic consequences for both countries – sending and also receiving. There is sizable literature, which is focused on studying migration determinants. Older studies highlight, that key determinant of migration is maximization of income (Hicks, 1932; Stasjaad, 1962; Harris and Todaro, 1970; Borjas, 1989; Mayda, 2010). According to these authors, potential migrant compare his incomes in native country with expected discounted incomes in receiving country. After substracting potential costs of migration he choses the option with the highest expected outcomes (Harris and Todaro, 1970). Regarding migration costs, there are two types of the costs – direct (costs of transport, purchasing or lease of the flat or house) and psychological costs of migration (e. g. loss of ties with family and friends, loss of the fatherland etc. (Massey, 1993). The costs of migration are traditionally proxied by the distance between countries. If the net expected income in receiving country minus costs of migraiton is higher than incomes in origins, person will make a decision and migrate to the new destination.

However, making of migration decisions is not depending only on one person, but it can concern also all members of the family (or household). In this case, decision to migrate depends on maximization of discounted revenues of all members of household (Stark and Yitzhaki, 1985).

As mentioned, by its decision to migrate emigrants affect both destinations and origins. Remittances are one of impacts of migration. Remittances are sent to country of origin by migrants and their growth is impressive in recent years. There are also other ways the international migrants affect their home country economies, such as increased flow of international capital such as foreign direct investments (FDI), portfolio investments and official development assistance. In this paper, I focus on the role of migrants on flows of remmitances to their home countries, and on description of their economic effects.

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[1] PRELIMINARY DRAFT, PLEASE DO NOT CIRCULATE OR CITE.
[2] Middle-East and North Africa countries.

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Andersen and Christensen (2009) investigated how migration and remittances may affect consumption of households in case of Nicaragua. Using panel data analysis, they confirm, that member of household, which receives on average 1 000 USD in remittances, spending on average 150 USD more on consumption expenditures, than person, who obtain no remittances. There is strong and positive impact of number of Nicaraguans (immigrants) in USA. Very important role play also their education. There is assumption that more educated workers are able to earn higher amounts of money and part of their budget they are able to send back to their fatherland. In this study, there was confirmed hypothesis, that brain – drain is not so harmful for Nicaraguan economy. Using their data was founded that remittances have no impact on investments in Nicaragua.

Remittances are very important for inflows of the capital into the developing economies and it form quite big part of their GDP (Anghel, Piracha and Randazzo, 2015). It is documented on cases of following countries: Ukraine, Romania, Tajikistan, Moldavia, Serbia, Hungary, Armenia and Azerbaijan. Remittances received by local household have strong effect in elimination poverty in mentioned countries. There is discussed question, if remittances are used for financing consumption of households or they are invested into the human capital (which would be more effective in long run). From this perspective, there exists heterogeneity between observed countries. E. g. in Albania is no influence of remittances on higher level of education, but in case of Tajikistan remittances had positive impact on education, especially education of girls and women. In this study is discussed the question of the social remittances (e. g. ideas transmission, gender equality), but they are more difficult to quantitative research, due to worse measurement than financial remittances.

There are also some determinants, which affect remittances. Docquier, Rapoport and Salomone (2011) founded, that key determinants in sending remittances into developing countries are number of emigrants living foreign, common language between sending and receiving country, skill level (human capital) and GDP of destination country. These determinants they tested on wide panel of developing countries.

Remittances should have positive effect on investments of entrepreneur in Moldavia, which confirmed Culiuc (2006). Remittances are the second strongest factor in determination investments in Moldavia. Other researched determinants of investments had not so strong influence on forming investments in this country.

As mentioned, there exist heterogeneity and disparities in sending remittances between sending countries and of course receiving countries. It was documented only on limited samples of countries (very often in case of 1 country) with exception of study Docquier, Rapoport and Salomone (2011). Therefore, it is appropriate to investigate heterogeneity in receiving remittances on wide sample of countries and compare results each other. It should be interesting make comparative analysis according the influence nationality and education on remittances in developing countries, which are sent to the fatherland of migrant. It can help to research impacts of emigration, which was not so much investigated (compared with impacts of immigration).

For these analyses should be used unique actualized panel dataset of authors Adsera and Pytlikova (2015). Data was collected from OECD and Eurostat databases and contains migration flows and stocks of migrants in 42 OECD countries; however it is necessary to merge mentioned dataset with data on remittances, which are published by World Bank and IMF.

2   Remittances facts

Remittances can be defined as households' income received from abroad, sending by international migrants employed in foreign country (Yang, 2011). Remittances are usually sent in small amounts with quite high frequencies, because of the reason higher charges. There are some organizations, which mediate sending remittances – the most important are Western Union and MoneyGram and they have networks of agents, where remittances should be initiated. Formal channels also include international banks and credit unions. Remittances should be used especially for financing consumption or investments. In general, low income household usually use remittance inflows on

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consumption expenditures, however, for higher income households or families is better to spend finances, which obtained on remittances, on investment (as mentioned also on investments into human capital). Many studies argue that remittances are positively correlated with small household investments and small business investments in variety of developing countries (e. g. China, Pakistan). In studying remittances should be reflected unobserved factor – unobservable business talent of some household members. If they obtain higher remittances, they are able to invest them more effective.

It is necessary to distinguish, if remittances are sent by higher or lower educated workers. More educated workers usually earn higher wages, so they can send more percent from their income to their families. From this perspective heterogeneity exists across the nationality of migrants, which send remittances, not only according aggregated data, but also according individual data. Remittances form significant part of migrant's earnings. It will be mentioned in following part of the paper.

What are the reasons to sending remittances? There are a few motives. Docquier and Rapoport (2006) formulated model, in which defined basic reasons. Altruism, compensation of services, insurance, loan payment and investment are included into the model. As mentioned, welfare effect of remittances in country of migrant's origin depends very strong on how remittances are used. Remittances send through altruism are very often spent only on consumption expenditures of households (Stark, 1995). Small entrepreneurs use remittances for investment into the physical capital and members of households for investments into the human capital. It is better way of remittances utilization for developing countries. Remittances and migration can be understood as a failure of origin economy, and potential migrants are pushed from the native country, but on the other hand, it can acts as equilibrating mechanism, which can help to eliminate differences between sending and receiving economies.

The economic, social and cultural implications of remittances, both for sending and receiving countries, are enormous. For example, changes to the population and to family structures, as well as reorganization of the labour market are some visible signs of the movement of individuals which sending and receiving countries experience in different directions. In countries of origin, levels of poverty, inequality, and household expenditure decisions are some of the channels through which the flow of migrant's transfers discloses its effects on growth and development (Anghel and Piracha, 2015).

There are not only benefits in receiving remittances. Remittances can substitute income or wage generated in national economy and workers in developing economy can rely on remittances compared to relying on own earnings, which can lead to moral hazard and decreasing national productivity. Another impact of migration is brain-drain, which is closely tied with remittances. In general, people, who are better featured by human capital, migrate to destinations, where they can find better labour market opportunities, than in their origin country. On the one hand, it means outflow of human capital to foreign, but these people send higher remittances to their origin and it can support other members of households in native economy (e. g. education, investments). On the other hand, effect of obtained remittances in origin economy is not as high as outflow human capital effect (Anghel and Piracha, 2015).

3   Remittances – factors, trends and overview

According World Bank (2015) remittances are key instrument and source of development of developing economies. The main factors, which influenced remittances in recent years, are uneven recovery in developing countries, oil prices, development in Russia and Ukraine, stricter migration controls and conflict driving migration flows. Massive recovery in the United States increased sending remittances in recent years. Remittance into the Mexico, Salvador, Guatemala, and Honduras grew up with house construction, employment in services (including hotels and restaurants). On the other hand, low recovery in Europe decrease remittance flows into developing countries. E. g. remittances into Latin America decreased due to high unemployment in Spain, where live a lot of Latin-America migrants. Also remittances to Maghreb countries decreased with European crisis in

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recent years. Decreasing oil prices and economic sanction have negative influence on Russian economy. Armenia, Georgia, Kyrgyz Republic, and Tajikistan are strongly dependent on remittance from Russian Federation and therefore these countries experienced sharp decrease in obtaining remittances in 2014. Also depreciation ruble influenced sent remittances from Russia, especially into the Central Asia countries. The recent depreciation of the euro against the dollar is reducing the dollar value of remittances. For example, from November 2014 to January 2015, remittances to Morocco rose by 9.6 percent in euro but fell by 2.6 percent in dollars. Currency movements also had an important impact on the value of remittances (World Bank, 2015). Recently, there are two conflicts, which influence migration and thus also sending/receiving remittances. Ukraine and conflicts in MENA and Sub-Saharan Africa cause larger migration (refugees) flows to Europe and neighbouring countries (World Bank, 2015).

Remittances are growing phenomenon in the global economy. Table 1 presents 15 largest receiving and sending countries ranked by absolute magnitude. The largest remittance-receiving countries in 2013 are India and China, which received approximately 70 000 and 60 000 millions USD. It should be assumed, because Chinese and Indian are the largest nations in the world and many of their native inhabitants migrated to new destinations.

Table 1. Top 12 remittance recipient and sending countries (millions USD).

Recipient economies (2013)		Sending economies (2012)	
India	69 969	United States	51 093
China	60 000	Russian Federation	31 648
Philippines	25 351	Saudi Arabia	29 493
France	22 863	Switzerland	28 598
Mexico	22 282	Kuwait	15 935
Nigeria	21 000	Germany	15 392
Egypt, Arab Rep.	17 469	France	12 404
Pakistan	14 626	Luxembourg	10 976
Germany	14 496	Qatar	10 842
Bangladesh	13 776	Italy	10 754
Vietnam	11 000	Netherlands	10 674
Belgium	10 566	Spain	10 458

Source: Own adaptation from theWorld Bank database.

Remittances are interesting also from the other view – from the perspective of sending economies. In the Table 1 are top 12 countries, from which remittances are sent. List of sending countries contains besides the most developed countries in the world, also oil-exporting countries. The most often used indicator of economic level of all countries is GDP. Figure 1 presents received remittances as a percentage of GDP. Remittances form substantial part of domestic product of developing countries; however they are very small (with low GDP) in the most cases.

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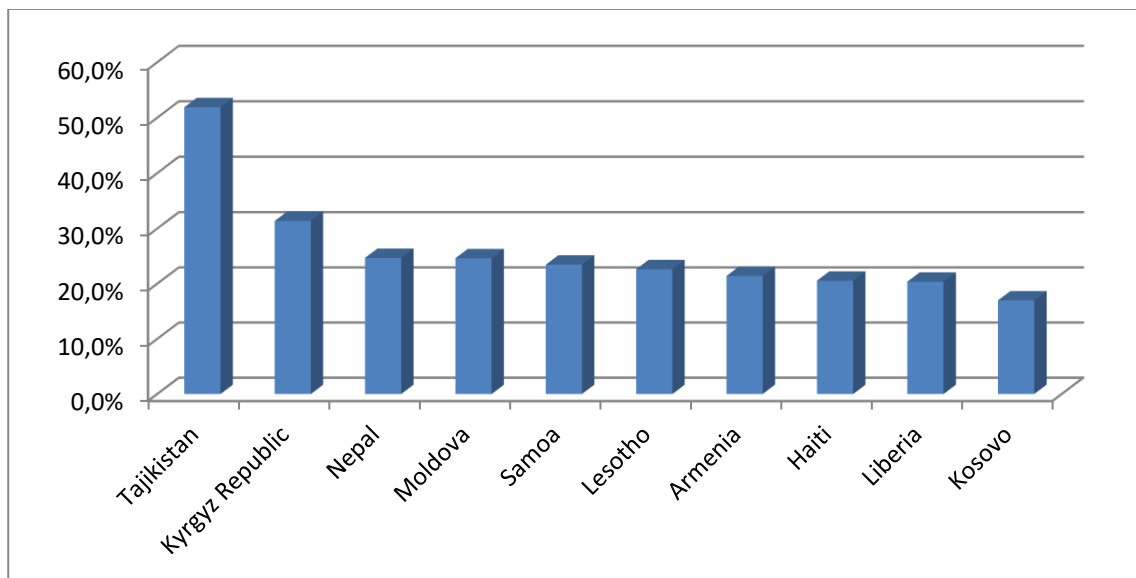
Fig. 1. Remittances as a percentage of GDP – recipient countries, 2013, (Top 10), (Source: Own adaptation from the World Bank data)

4   Conclusion

Remittances are not new phenomenon in world economy; however their growth is recently enormous. For many poor countries, remittances represent and will continue to represent the main source of capital. Conclusions from a many studies show that remittances form a large part of the GDP in various countries, for instance in most of the Eastern European and MENA countries remittances constitute a substantial percentage of their GDP. Remittances can help households in poor countries to eliminate poverty; however, impacts of remittances should be mixed. Some studies conclude, that remittances can substitute own workers earnings and incomes in remittances receiving economy. It can decrease their productivity. There is large discussion about impacts of remittances; many papers show positive and many paper negative effects of remittances – it depend on researched context. They have wide spectrum of utilization in receiving economies – from financing households consumption, through small entrepreneur investments, to investments for developing of human capital.

This preliminary paper offers basic view on remittances as a source of capital and other impacts to sending and receiving countries. Recently, we are finishing with collecting data on remittances and migrants characteristics, which allow us to run panel data analyses, and compare heterogeneity between countries according e. g. education. This paper will serve as literature search and descriptive part of new study.

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ECONOMIC POLICY IN CONTEXT OF INCOME INEQUALITY GAP: CASE STUDY OF CZECH REPUBLIC IN 2005-2015

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Abstract:
The aim of this present paper is to characterize impact of economic policy, especially social policy, on reducing income inequality. There is emphasized context between one area of social policy and income inequality gap here. Through this income inequality gap we can measure success of redistribution function of economic policy that means the success of social policy in reducing income inequalities in society. The development and the amount of income inequality gap are dependent on combination of Income tax of individuals and mandatory contribution. The income inequality and income inequality gap is measured by the method of non-weighted average absolute deviation on data for Czech Republic from years 2005-2015. The analysis of income distribution will be made in deciles based on empirical data of Statistics on income and living conditions from the Czech statistical office. The text after Introduction is organized subsequently: the second part explains the theoretical approach of income inequality, income inequality gap, method of non-weighted average absolute deviation and economic–social policy generally and specifically in the case of Czech Republic. There is highlighted role of particular tools of economic-social policy that could contribute to reducing income inequality and widen income inequality gap in economy. The third part contains the conceptual framework of empirical analysis and results of income inequality in context of functioning of economic-social policy and the Conclusion highlights some major conclusions of detailed analysis made in previous chapter.

Keywords:
Income inequality, Economic-social policy, Method of non-weighted average absolute deviation.

JEL classification:
C13, D31, I39, O15.

1 Introduction

Income inequality was and also is a natural part of every economy and its society. Income inequality in essence means that different people or different groups of people will reach different income and this income dispersion determines how much the great range of individual income in society at the economy is. (Turečková and Kotlánová, 2014)

One of the tasks of economic policy especially via social policy is to reduce income inequality. Economic policy could influence gross money incomes through minimum wage and social incomes (not only in context of subsistence minimum) or it could influence difference between gross money incomes and net money incomes through mandatory contributions and income taxes. The aim of this article is to analyse the role of economic policy, especially part of social policy, in affecting income inequality through income inequality gap. This gap is calculated as difference between values of indexes expressing level of income inequality measured from gross money income and net money income of Czech households on deciles level in the period of years 2005–2015.

There is in this article used new, alternative and relatively simple method for measuring, expressing and analysing income inequality which is denoted Method of non-weighted average absolute deviation. This method can expand the existing portfolio of methods for measuring and expressing income inequality between households in society next to well-known methods how to measure income inequality. Among them traditionally belongs Lorenz curve, Gini coefficient, Coefficient of income inequality S80/S20 (or Quintile share ration or S80/S20 Ratio), Atkinson index, Theil index, Robin Hood index and Variation coefficient. For more information about these methods

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see for example Atkinson (1970), Dalton (1920), Lapáček (2007), Litchfield (1999), Schutz (1951) or Wolff (2009). Analysis of income inequality through this mentioned method will be based on empirical data of Czech Statistical Office in the chosen period of time for Czech Republic.

The rest of the article is structured as follows: the next section provides same theoretical approach to economic (social) policy in context of influence of income inequality. There is given information about used data and methodology, there are also introduced method of non-weighted average absolute deviation and "term" income inequality gap. Section 3, Empirical analysis of development of income inequality gap in Czech Republic in years 2005-2015, contains the analysis of the income inequality and income inequality gap in Czech Republic using the method of non-weighted average absolute deviation on data on gross and net money incomes. There are also mentioned changes in economic – social policy during analysed period of time in context of development of income inequality and income inequality gap and there is provided discussion about redistribution function of economic policy. Finally the Conclusion concludes some general comments.

2   Theoretical background

The economic policy is a government policy of national economy in the whole. Economic policy contains specific rules and individual measures through which the government manages, controls and regulates all activities and operations in national economy of the particular country. Institutional framework for this regulation and control of the economy is anchored in legislation. The reason for the implementation of the economic policy is striving for remedy of imperfect market functioning (ie. market failures) or, conversely, its deformation. (Vorlíček and Vostrovská, 2005)

The aim of the government's economic policy is to (I) safeguard economic balance (stability), (II) ensure optimal economic growth and (III) solve social problems of redistribution. These goals fulfill government through (I) stabilization, (II) pro-growth and (III) social policies.

For the content relevance of this present article and analysis there will be focus on the social policy in more detail in chapter below.

2.1   Economic policy in context of income inequality gap: social policy in Czech Republic

Economic policy and social policy are two autonomous policies with relative autonomy and strong interconnected links. For successful social policy of the state is required successful economic performance. (Potůček, 2005) This means that there must be effective economic policy which produce sufficient amount of special goods and services which are the basis for financing social policy. (Vorlíček and Vostrovská, 2005)

Social policy in the Czech Republic has a redistributive character. Social policy is mainly based on the principle of solidarity and has protection, redistribution and prevention functions. (Duka, Duke and Kohoutová, 2013) The aim of social policy is to positively influence people's living conditions. (Potůček, 2005) Krebs (2015) argues that social policy is perceived as a set of activities, tools and measures which purpose is the response to unfavorable social conditions such as old age, illness, disability or unemployment and poverty. In practice, it means also a system of social benefits and social incomes and system of health and social insurance. The goal of social policy is to create dignified conditions of life for all people in the economy (in the state). As Arnoldová (2012, p. 41) says: *"... every individual has from his/her birth the right to receive income that is necessary for satisfying his/her basic life needs. It is provided from birth, regardless if he/she may or may not work and regardless of his/her financial situation. Its level corresponds to the definition of poverty, which the society receives."* Here is meant minimum income what is claimable benefit, which guarantees each social state. In the Czech Republic there are two basic categories: subsistence guaranteed basic income and the minimum wage. (Arnoldová, 2012)

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Krebs (2015) assumes that the social system in the Czech Republic is based on three fundamental pillars: (I) social insurance system, (II) the state social support and (III) the system of state social assistance. System of state social assistance is not relevant for purpose of this paper.

The social insurance system in Czech Republic is divided into 2 insurance areas: health insurance and social insurance. Health insurance is insurance against sickness from which is payed the necessary medical care in the scope provided by law. In the Czech Republic it is based on three principles: (I) of compulsory payments from earned income, (II) of free choice of state health insurance company and (III) responsibility to be insured. (Matoušek, 2008) In the Czech Republic, health insurance is paid by the employees and also by employers (4.5% pays every month from his gross wage employees and next 9% pays employers).

Social insurance is one of the pillars of social security in the Czech Republic. Via social insurance is made a financial fund for solving future social situations. A premium rate for employers is 25% of the assessment base (2.3% for health insurance, 21.5% for pension insurance and 1.2% for the state employment policy). The employee pays 6.5% of the assessment base. Social insurance has two parts: pension and sickness insurance that are based on the insurance principle, this means that it is a regular payment of the contribution – insurance premium. It is mandatory for employees, self-employed persons have voluntary participation. Revenue from insurance premiums is important revenue to the state budget. From sickness insurance is provides 4 types of state cash benefits: sickness benefit, maternity benefit, attendance allowance, compensatory benefits in pregnancy and maternity. (Hejkal, 2004) Through these contributions to mandatory social security schemes it is possible (for national economic authorities) to influence a difference between gross and net money income and affect income inequality gap which is explained below.

This income inequality gap is also dependent on the Tax bonus to child (in Czech Republic from 2009). Tax bonus to child is paid to people who apply the tax privilege for dependent child (children) and then get into a "negative tax duty". Rather then they pay state income tax, they may conversely get extra money from state. (Lošťák and Pelech, 2015)

The last area in which income inequality gap can be affected is Income tax of individuals (Natural persons) that is direct tax and is set by Act No. 586/1992 Coll. on Income Taxes, as subsequently amended. The basis for taxation is "Super-gross wage" that is wage or salary increased by amount of health insurance and social insurance (9% and 25%). (Vančurová and Láchová, 2014) The area of income taxes provides the widest scope for influencing income inequality in society. The development of Income tax of individuals is shown in Table 1:

Table 1. Income taxation of individuals, 2005-2015

Year	Taxation
2005	Tax base 0-109,200 - 15%; 109,200-218,400 – 16,380+20% over 109,200; 218,400-331,200 – 38,220+25% over 218,400; 331,200 and more – 66,420+32% over 331,200
2006 - 2007	Tax base 0-121,200 - 12%; 121,200-218,400 – 14,544+19% over 121,200; 218,400-331,200 – 33,012+25% over 218,400; 331,200 and more – 61,212+32% over 331,200.
2008	15% from the tax base reduced by the non-taxable portion of the tax base and amounts deductible from the tax base
2009 - 2010	15% from the tax base
2011 - 2012	15% from Super-gross wage
2013	15% from Super-gross wage + solidarity levy 7% if monthly income above 103,536 CZK
2014	15% from Super-gross wage + solidarity levy 7% if monthly income above 103,768 CZK
2015	15% from Super-gross wage + solidarity levy 7% if monthly income above 106,444 CZK

Source: Act No. 586/1992 Coll. on Income Taxes, as subsequently amended.

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The state social support includes state social support benefits as child allowance, parental allowance, housing allowance, maternity grant and death (funeral) grant. State through social policy and via payment of these benefits takes over the responsibility for unfavourable social situation in families and its citizens. (Paulusová and Vašíčková, 2014) Social incomes have relatively very rapid growth and there can be recognize increasing share of them on total cash income of Czech households. According to Nečadová (2011, p. 64) social incomes in the Czech Republic represent about 20% of all households' revenue. The largest proportion of all social incomes has pension benefits - 73% of all social income, followed by state social benefits - 13%, health insurance benefits for about 8%, the benefits of social assistance and unemployment allowance for about 3%. Social support benefits form part of the social income so this is a way how could economic national authorities influence a gross money income.

A specific social income is pension that is paid from the pension insurance in the Czech Republic. Pension insurance is compulsory for all economically active persons over 18 years. From this basic pension insurance is paid (old age) pension in all variants, invalidity, widow's and widower's and orphan's pension. The average old age pension was from 10,500 - 12,300 crowns (CZK); the average amount of invalidity pension was about 9,600 to 12,500 (depending on the degree of disability). Widow's pension ranged between about 6,000 – 7,000; widower about 10,000 to 11,000 and the orphan's pension about 5,000 – 5,700; all for period of time 2008 - 2014. (ČSÚ, 2014)

2.2 Data

From a methodological perspective, the work is based on secondary data gained by Czech Statistical Office (ČSÚ, 2016), concretely from the Catalogue of Products: Household Income and Living Conditions; Households total by net money income per person – deciles; Household composition and per capita annual income (%, CZK). This statistic provides data on decile scale and summary of all categories of income in Czech Republic. For purpose of this paper is especially important data about Gross money income, Social income, Contributions to mandatory social security schemes, Income tax and Net money income. All necessary defined terms are explained, for example, in Methodological notes of Household Income and Living Conditions. (CSÚ, 2014)

The covered period includes years 2005-2015 because of missing credible data which is not available for a longer period. It is necessary to emphasize that the Statistics on Income and Living Conditions are published for one year, for example for 2006, but in statistical tables are presented data for year before, i.e. for 2005. Our paper is written for period of year 2005-2015 but empirical analysis is done for years 2004-2014.

The software used was MS Excel. All calculations and graphical analysis is author´s own.

2.3 Method of non-weighted average absolute deviation

Method of non-weighted average absolute deviation (shortly method of average deviation) reflects the degree of variability, defined as the arithmetic mean of the absolute deviations of individual values of observed indicators from the ideal value. This value chosen here understands the value for the ideal distribution of income in society, ie. the value of expressing absolute equality in income for each inhabitant. (Turečková, 2015b) In general absolute deviation is constructed on the basis of this formula 1:

$$d_i = |x_i - (x)| \tag{1}$$

where: d_i presents the absolute deviation from i-th indicator; x_i presents the i-th indicator (particular variable); (x) is the ideal value.

Own value of non-weighted average absolute deviation that presents a value of income inequality (Income Inequality Index) (d_{II}) we obtained from the formula 2:

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$$d_{II} = \frac{\Sigma_{i=1}^{p} d_i}{n_i} \qquad (2)$$

where: n_i presents the number of values of i-th indicator that we have available.

Value of non-weighted average absolute deviation (d_{II}) can have values from 0 to 100, ie. $d_{II} \in (0; 100)$. If value is lower (the more close to 0) then less income inequality is between the richest and poorest households in society. Perfect income equality in the society would occur in a situation where value would come out zero. (Turečková, 2015a)

The great advantage of using this method is its mathematical-algebraic procedure for calculating the coefficient expressing the degree of inequality directly adapted to the data format in which are data of income distribution provided by statistical organizations. The eligibility and relevance of this (alternative and new) method, method of non-weighted average absolute deviation, was checked in empirical analysis in Turečková (2016).

2.4 Income inequality gap

Income inequality gap is author's term to express difference between index values of income inequality counting from Gross money income (d_{II}^{GMI}) and Net money income (d_{II}^{NMI}). Income inequality gap (GAP_{II}) can be calculated by the simple equation (3):

$$GAP_{II} = d_{II}^{GMI} - d_{II}^{NMI} \qquad (3)$$

Income inequality gap is a value that expresses "activities" of economic policy which are used by national economic authorities to mitigate income inequality in the society.

The aim of economic policy and all national authorities should be reduce income inequality between all social groups of people. It could be done mainly through social policy and its tools and can be achieved in many ways: (I) providing social income, (II) determining contributions to mandatory social security schemes and (III) fixed income tax. First one affects the gross money income while the other two have impact on difference between gross and net money income. And this impact of economic policy via contributions to mandatory social security schemes and income taxation can be "measured" through income inequality gap. If the income inequality gap has low value, it means that the difference between gross and net money income is small and economic policy is in this area not considerable and vice versa. If we are assuming that the goal of economic policy is to reduce income inequality, it is desirable to minimalize this income inequality gap.

Income inequality gap takes values from zero to the higher limit defined as value of the variable d_{II}^{GMI}; $(GAP_{II}) \in (0; d_{II}^{GMI})$ when $GAP_{II} = 0$ means that there is no difference between gross and net money income and there are not any mandatory contributions or income taxations. On the other side, when GAP_{II} is as large as variable d_{II}^{GMI} it indicates that national authorities through its instruments are trying to reduce income inequality and the distribution of net money incomes between households is steady – uniform. From this point of view more active economic (social) policy mean higher value of income inequality gap or increase of the gap over time. Providing social income (state social support benefits and other social subsidy) can be projected directly into decline of the index value expressing income inequality.

3 Empirical analysis of development of income inequality gap in Czech Republic in years 2005-2015

There were calculated values of 3 indicators based on equations (1), (2) and (3). Two of them (value of income inequality counting from Gross money income and value of income inequality counting

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from Net money income) are used for expressing income inequality gap. The development of amounts of each indicator is shown below in Table 2. For both values of income inequality indexes is true that their value is decreased (by about 1 index point) which is good because income equality gets better improves.

Table 2. Income inequality indexes and Income inequality gap, 2005-2015

Index/Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
d_{II}^{GMI}	16,46	16,20	16,14	15,75	15,73	15,55	15,67	15,48	15,39	15,70	15,50
d_{II}^{NMI}	14,68	14,45	14,24	13,95	14,06	13,97	14,06	13,87	13,76	14,04	13,79
GAP_{II}	1,79	1,75	1,90	1,80	1,66	1,58	1,61	1,61	1,63	1,66	1,72

Source: Statistics on Income and Living Conditions, own calculation.

Income inequality gap did not change during analyzed 11 years distinctly. In context of theoretical approach explained in chapter above we can assume that there were no significant and clear efforts to influence income inequality on net money income level from the side of national-economic authorities. There were no change in health insurance and social insurance, tax bonus to child was implemented in 2009, resp. in 2008, because of the time difference in statistics. The unwanted decrease in the income inequality gap after 2007 can be explained by the introduction of a "one" Income tax of individuals and its positive increase via implementation of Super-gross wage from 2011and solidarity levy from 2013.

The graphical development of all three indicators is shown in Figure 1. The positive trend of decreasing income inequality on gross and also net money income level can be explained (outside the natural mechanisms involved in the economy) via system of social incomes which is analyzed in more detail below.
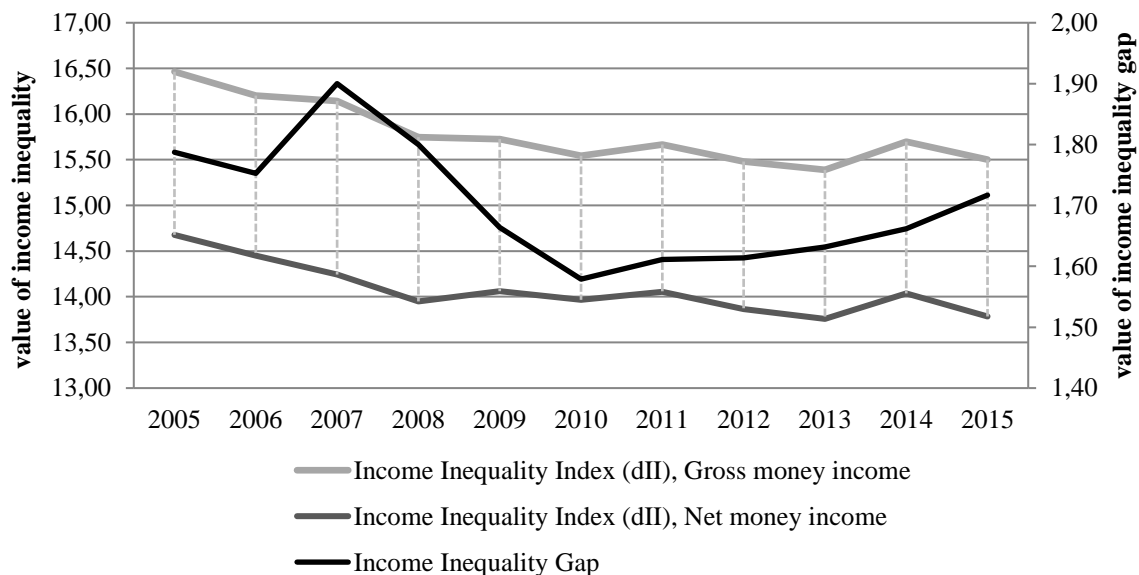
Fig. 1. Development of both Income inequality indexes and Income inequality gap during years 2005-2015
(Source: Statistics on Income and Living Conditions, own calculation.)

Table 3 is showing mandatory contribution in CZK per person and per particular year in all 10 deciles of Czech households. In context of income inequality and economic-social policy it is necessary to emphasize that for two poorest groups of the population have reduced mandatory contributions, reducing the difference between gross and net money income. Also the difference between absolute

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mandatory contribution of group of the poorer population and group of richer population increased to the detriment of the richer group. Change of mandatory contribution in 2005 and 2015 shows active economic – social policy in its redistribution function when the total sum of mandatory contribution of poorest group decreased about 910 CZK while in the richest group increased about 15,000 CZK. This amount of change of mandatory contribution responds to decomposition of household in Czech economy: the wealthier the household, the more money payed. Income inequality gap should be affected in positive way development of ratio between mandatory contribution of poorer group and richer group of citizens. In 2005 it was 0.5% and in 2015 it was 0.3% which also indicates the appropriate redistributive function of economic-social policy.

Table 3. Mandatory contribution in CZK per person and deciles, 2005-2015

Mandatory contribution (CZK per person)/deciles	lowest 10%	second 10%	third 10%	fourth 10%	fifth 10%	sixth 10%	seventh 10%	eighth 10%	ninth 10%	highest 10%
2005	4017,0	10602,0	11483,0	9918,0	11011,0	14974,0	20813,0	28672,0	39484,0	85561,0
2006	5165,3	10724,0	12595,9	12083,1	13240,4	15109,2	21658,3	30506,1	41572,7	91054,2
2007	4446,0	9883,0	11010,3	11114,7	12924,8	16216,7	21985,1	29349,8	44266,0	93952,7
2008	5816,0	12679,8	12989,9	13176,6	15184,2	18272,9	24729,7	33716,4	49009,6	101359,6
2009	4219,8	10214,5	11264,2	11845,6	14351,7	19270,0	25078,5	33860,2	48911,5	91091,3
2010	3688,7	10059,8	10707,4	11430,8	13690,3	16750,1	24314,4	32016,8	45670,8	87197,7
2011	2559,8	9334,4	10976,3	11825,2	13345,0	17405,5	23883,9	32672,9	47150,5	86621,7
2012	2784,2	10359,2	11823,8	12452,6	14119,3	17691,1	23731,8	33260,2	48292,5	90510,3
2013	2721,9	9918,3	11669,1	12844,2	13960,1	17799,6	21880,0	32928,9	47705,1	91936,0
2014	2743,5	9908,0	12101,2	12490,5	14634,8	18839,6	24097,6	33983,6	49265,8	96886,0
2015	3107,1	10420,2	13270,9	12028,2	16468,7	19025,6	26708,9	35906,1	52213,5	100305,6
Change (in %)	-22,7	-1,7	15,6	21,3	49,6	27,1	28,3	25,2	32,2	17,2
Change (in CZK)	-909,9	-181,8	1787,9	2110,2	5457,7	4051,6	5895,9	7234,1	12729,5	14744,6
Average	3751,7	10373,0	11808,4	11928,1	13902,7	17395,8	23534,7	32443,0	46685,6	92406,9

Source: Statistics on Income and Living Conditions, own calculation.

Note: Mandatory contribution is a sum of contributions to mandatory social security schemes and income tax of individuals reduced about tax bonus to child (from 2009).

4   Conclusion

The target of this article was to analyse the role of economic policy, especially part of social policy, in affecting income inequality through income inequality gap in 2005–2015. It was calculated that this gap acquire values from 1.58 (2010) to 1.9 (2007). This income inequality gap is affected by tools of economic, especially social policy, concretely via income taxation of individual person, contribution to mandatory social security schemes and tax bonus to child (analyzed variable). Social policy also contributes to general decline of income inequality in the society through various types of social income.

Negative development of income inequality gap in years 2008-2010 could be explained through economic recession and its impact on three analysed explanatory variable (indicators). From 2010 income inequality gap grows which is "good" news because it means that the income inequality calculated from net money income is lower than the income inequality calculated from gross money income. Behind this growth could be, principle of super-gross wage, solidarity levy and implementation of tax bonus to child. Also partial changes in mandatory contribution per person contributed to a better redistribution of income in society especially for low-income groups of inhabitants. That is why we can assume that economic (social) policy in post-recession time contributed to the reduction of income inequalities in the Czech Republic.

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The results of the presented analysis are the groundwork for a further theoretical and practical research of the role of social policy in affecting income inequality in society.

5   Acknowledgement

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MACROECONOMIC POSITION OF THE MORAVIAN-SILESIAN REGION: NON-PARAMETRIC APPROACH

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Abstract
The aim of this paper is to discuss a position of the Moravian-Silesian Region among Czech NUTS 3 regions and to estimate possible association between selected variables. Our analysis is based on the Czech Statistical Office´s regional data. Using selected macroeconomic indicators like the number of population, gross domestic product, the unemployment rate we examine development of the macroeconomic position of the Moravian-Silesian Region during the period 1995-2012. The presented paper also deals with a non-parametric approach to some macroeconomic indicators among the regions within the Czech Republic. A set of macroeconomic indicators such as GDP per capita, the unemployment rate, net migration, the number of applicants on one unfilled job vacancy or number of registered businesses per capita show macroeconomic performance and we tried to estimate possible associations between these variables. The Kendall´s coefficient of concordance was applied.

Keywords
Kendall´s coefficient of concordance, Moravian-Silesian Region, NUTS 3, Regional disparities

JEL classification
J64, R11, R12.

1 Introduction

The economic performance and regional competitiveness are important factors of the development of regions. A competitive region is attractive (attracts investments, knowledge and its characteristic feature is the location of companies and immigration). A competitive region could have better economic performance and a process of real convergence could be started up. The process of real convergence is observed both at the national and regional level and the most frequently used indicator is the gross domestic product per capita, respectively its rate of growth. Generally, if the growth rate of GDP for countries or regions with lower GDP per capita is higher than that in advanced economies or regions, there exists a gradual convergence. Since the beginning of the transition process in the New Member States it was clear that the objective of post-communist countries will be to achieve the economic level of Western European economies within a certain timeframe. Looking at regional data, however, we find that the process of real convergence does not take place in all regions with the same intensity. For this purpose it is necessary to characterize what phenomena and processes exist in regions and which comparison has any rational sense. We applied the development of population, the development of gross domestic product (GDP), respectively GDP per capita as the main indicators of these inequalities.

The Moravian-Silesian Region was established pursuant to the Constitutional Act No 347/1997 Coll., as of January 1st, 2000 and it is one of 14 NUTS 3 regions in the Czech Republic. In compliance with the CR Government Decree No 707/1998 it represents a statistical territorial unit NUTS III and, at the same time, a statistical unit NUTS II – the Moravia Silesia Cohesion Region. The aim of the paper is to evaluate the position of this region among Czech NUTS 3 regions.

The paper is structured as follows: (i) in the first part, based on review of literature, the paper deals with some general aspects of regional development in the Czech Republic; (ii) the second part deals with method that was applied; (iii) third part of the paper focused on empirical results - we deal with the main trends in the development of the selected indicators that determine a position of the Moravian-Silesian Region among Czech NUTS 3 regions and we also computed the Kendall´s coefficient of concordance for five variables. The last part concludes.

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2   Previous research

After a deep recession in the early 90s, which was caused by the transition process, the Czech economy experienced significant economic growth, especially after 2003. Among factors that had positive effects on better economic performance belong the systemic changes like the privatization, price liberalization and trade liberalization, combined with the deep structural changes. This development was also supported by massive flow of foreign direct investment, the restructuring of the banking system or changes in the territorial and commodity structure of exports.

Integration of New Member States in the European Union, which are without exception despite years of economic growth below the average of the original EU Member States (EU-15) – measured by GDP per capita in PPS – has stimulated a debate about a timeframe in which they will eliminate or reduce this difference. Moreover, we must take into account that the catching-up process was not conducted with the same intensity in all regions and it was even suspended for a time in some countries. The Czech economy is considered a representative example where the catching up process was affected by the economic crisis in last years of the 90s (1997 and 1998). Moreover, a pace of the convergence process was relatively slow during this period.

Catching up process was rapidly accompanied by increasing regional imbalances. In this context, there is a certain parallel with Portugal and Spain, which underwent similar experience in the 80s and 90s (Barrios and Strobl, 2009). This phenomenon was due to dynamic growth of rich metropolitan regions, whose economic growth remarkably affects the catching-up process of the whole country (Paas and Schlitte, 2006). The greatest dynamic in the period under review has been demonstrated by the capital city of Prague, whose increase of performance was equal to nearly twice the value for the Czech Republic. The metropolitan character of the region with a markedly different economic structure allows for significant acceleration of growth, which can continue even in the next period (Ministry for Regional Development of the Czech Republic 2006). On the other hand, it is necessary not to confuse convergence at the national level with regional convergence (e.g. regional disparities among Czech regions). Dunford (1993), Landesmann and Römich (2007), Tvrdon and Verner (2011), Hanclova (2012), Tvrdon (2012), and Tvrdon and Skokan (2011) deal with the problem of regional disparities in the Eastern European countries or the Czech Republic and some of them conclude that regional disparities tend to increase during periods of economic recession and decrease during periods of economic growth, suggesting their cyclical nature.

3   Methodology and data

The Kendall´s coefficient of concordance is a non-parametric (distribution-free) rank statistic proposed by Kendall and Smith (1939) as a measure of the strength of the associations between three or more variables. The Kendall´s coefficient of concordance is the natural extension of Spearman´s rho and Kendall´s tau coefficients for two variables to measure association between three or more variables.

Suppose we have random samples of n multivariable observations measured on at least an ordinal scale and drawn from any continuous multivariate distribution with k ≥ 3 variables.

The Spearman rank correlation coefficient can be used to give an R-estimate, and is a measure of monotone association that is used when the distribution of the data make Pearson's correlation coefficient undesirable or misleading. As with any other hypothesis test, for Spearman's test you take a sample, work out the test statistic from the sample and compare it to the critical value appropriate for the sample size, the required significance level and whether the test is 1- or 2-tail.

Row sums of ranks, Ri, is defined as:

$$R_i = \sum_{j=1}^{m} r_{i,j}$$
(1)

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where rij is the rank of i-country by rank number j.

The mean value of total ranks, R, is defined as:

$$R = \frac{1}{2}m(n+1) \tag{2}$$

where n is the number of countries and m is the number of variables.

The sum of squared deviations, S, is defined as:

$$S = \sum_{i=1}^{n}(R_i - R)^2 \tag{3}$$

The Kendall´s coefficient of concordance (W) can be obtained the following formula (Legedre, 2005):

$$W = \frac{12S}{m^2(n^3-1)} \tag{4}$$

We can also compute the Kendall´s coefficient of concordance according an alternative approach which is defined by Hudec et al. (2007):

$$W = \frac{12}{r^2(n^3-n)}\sum_{i=1}^{2}A_i^2 - 3\frac{n+1}{n-1} \tag{5}$$

Where r is the number of variables, n is the number of countries, Ai is the sum of ranks for the each country. W may vary from 0 to 1 and we shall call it the coefficient of concordance. W value +1 means perfect positive correlation, W value close to zero means no correlation. Moreover, the smaller the correlation coefficients the more likely the data points will be scattered on the graph. Without considering scatter plots, t-test significance analysis, and slope analyses it is easy to misinterpret correlation coefficients.

Because the ranks used in Spearman test are not drawn from a bivariate Normal population, the tables of critical values are worked out differently from those for the Pearson´s product moment correlation coefficient and, hence, have different values.

The null hypothesis should be written in terms of there being no association between the variables. This conveys the purpose of the test: investigating possible association in the underlying population.

Milton Friedman´s statistics is obtained from W using the formula:

$$\chi^2 = m(n-1)W \tag{6}$$

Where, W is Kendall´s coefficient of concordance, n is sample size and m is the number of variables. It is recommended to use a table of critical values when $n \le 7$ and $m \le 20$; otherwise we should test χ^2 statistic using the chi-square distribution.

Then the null and alternative hypotheses are:

H0: variables produced independent rankings of the countries

HA: variables produced dependent rankings of the countries (at least one of the variables is concordant with one, or with some of the other variables).

If the computed χ^2 statistic value does not exceed the critical χ^2 value, we may accept null hypothesis; otherwise we may reject it. In our case it means that four variables are not concordant with one other.

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4   Results

In this paper, we deal with selected indicators and our effort is focused on regional disparities among the Czech regions. We have chosen NUTS 3 region as the key territorial unit. According to Eurostat (2007) the current NUTS nomenclature valid from 1 January 2008 subdivides the economic territory of the European Union into 98 regions at NUTS 1 level, 273 regions at NUTS 2 level and 1324 regions at NUTS 3 level. Below that, two levels of Local Administrative Units (LAU) have been defined. The upper LAU level (LAU level 1, formerly NUTS level 4) is defined only for the following countries: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Slovenia, Slovakia and the United Kingdom. The lower LAU level (formerly NUTS level 5) consists of around 120 000 municipalities or equivalent units in the 28 EU Member States (as of 2013). In the Czech Republic, we can find 14 NUTS 3 region. However, the region of the capital city (NUTS 3 Praha) differs from remaining regions significantly. So we excluded this region from the analysis and we compare only 13 Czech NUTS 3 regions. For our analysis, we have chosen period between the years 1995 and 2012. Data were obtained from the Czech Statistical Office. This period is characterized by several important circumstances: (i) the completion of the process of economic transformation; (ii) entry of the Czech Republic into the European Union; and (iii) the financial and economic crisis.

As stated in Regional Operational Programme (ROP 2011) there are two entirely different types of demographic settlement: large industrial conurbations with a high density of population in the central part of Ostrava-Karviná, and prevailingly agricultural, mountain or sub-mountain areas in the west and south-east which are sparsely populated.
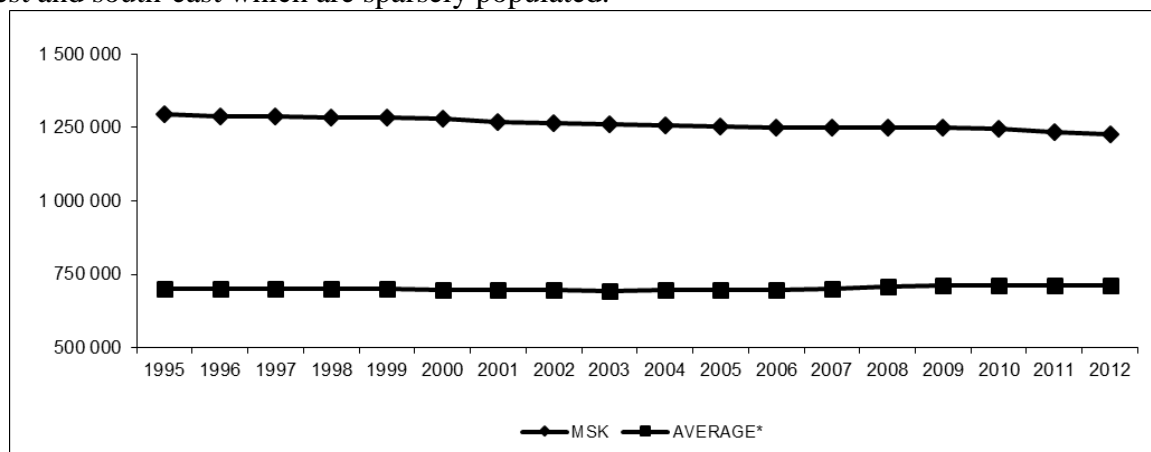
Fig. 1. Development of population in the Moravian-Silesian Region (in persons, *average without region of the capital city);

Source: Czech Statistical Office.

As stated in Regional Operational Programme (ROP 2011) there are two entirely different types of demographic settlement: large industrial conurbations with a high density of population in the central part of Ostrava-Karviná, and prevailingly agricultural, mountain or sub-mountain areas in the west and south-east which are sparsely populated.

Figure 1 illustrates the development of population in the Moravian-Silesian Region (MSK) and the regional average. It shows that the population in this region significantly exceeded the regional average and this region is among three regions with the highest population. On the other hand, the data show that the population in the Moravian-Silesian Region decreased in recent years. Contrary, the average population within Czech regions increased slightly. The main factors of this unfavourable development are (i) the low birth rate; and (ii) high migration with negative balance (ROP 2011). Table 1 shows overall changes between the years 1995 and 2010.

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Table 1. Number of inhabitants changes

	1995	2012	Index (1995=100)
MSK	1 294 580	1 228 251	94.9
Average	701 393	712 738	101.6

Source: Czech Statistical Office.

We used gross domestic product (GDP) at current market prices at the NUTS 3 level for the evaluation and comparison of regional economic performance. Fig. 2 shows development of GDP during the time period 1995-2012. We can see that GDP volume was remarkably higher in the Moravian-Silesian Region in comparison with national average (excluding the region of the capital city). Generally, the economy of the Moravian-Silesian Region had been based on coal mining, metallurgy and heavy engineering. Thus, such structure of the economy had led to significant problems of regional nature during the 1990´ after above mentioned industries declined.
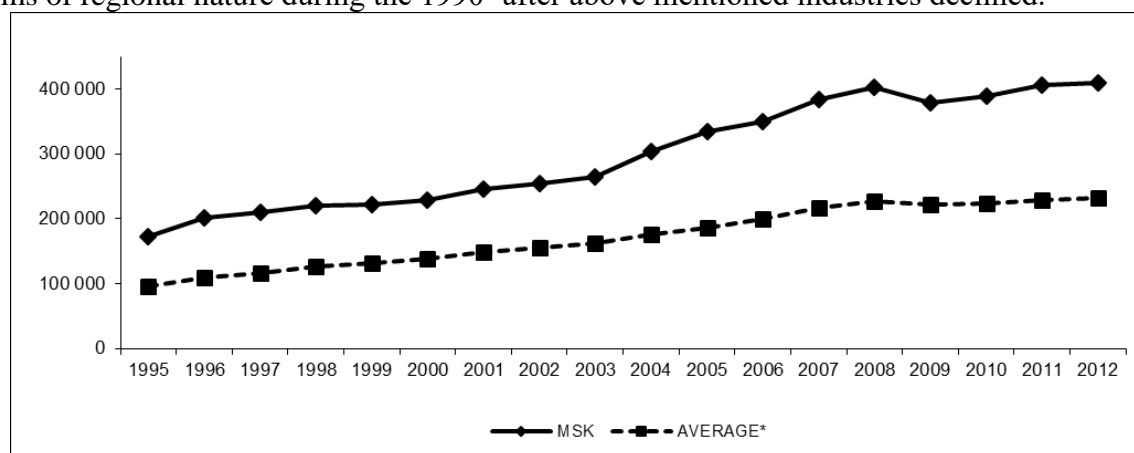
Fig. 2. Gross domestic product (in current prices, million Czech crowns). Note: * without the region of the capital city

Source: Czech Statistical Office.

If we used GDP per capita we can see that strong position of this region disappears. The level of GDP per capita of this region was comparable with the average one. Moreover, Moravian-Silesian Region´s GDP was below the regional average between the years 1997 and 2007. In other words it means the economic performance is weaker in comparison with the regional average (see Figure 3).

As shown in Figure 4, the volume index of GDP per capita is expressed in relation to the regional average set to equal 100. From this figure we can conclude that the gap between high-income region of the capital city Prague and the rest of the country has narrowed during the observed period. This fact, a huge gap between the metropolitan region and the rest of the country, is typical for most European countries.

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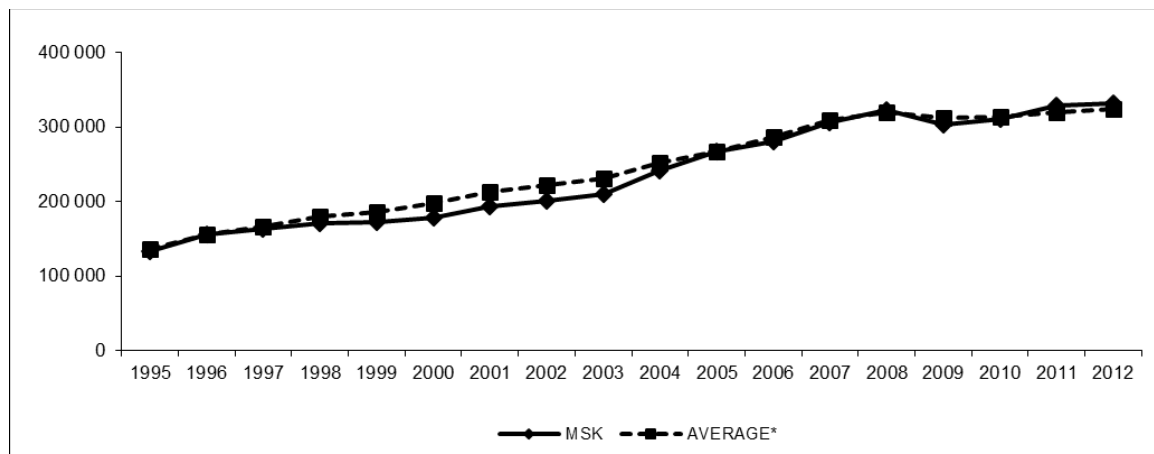
Fig. 3. GDP per capita (current prices, Czech crowns). Note: * without the region of the capital city
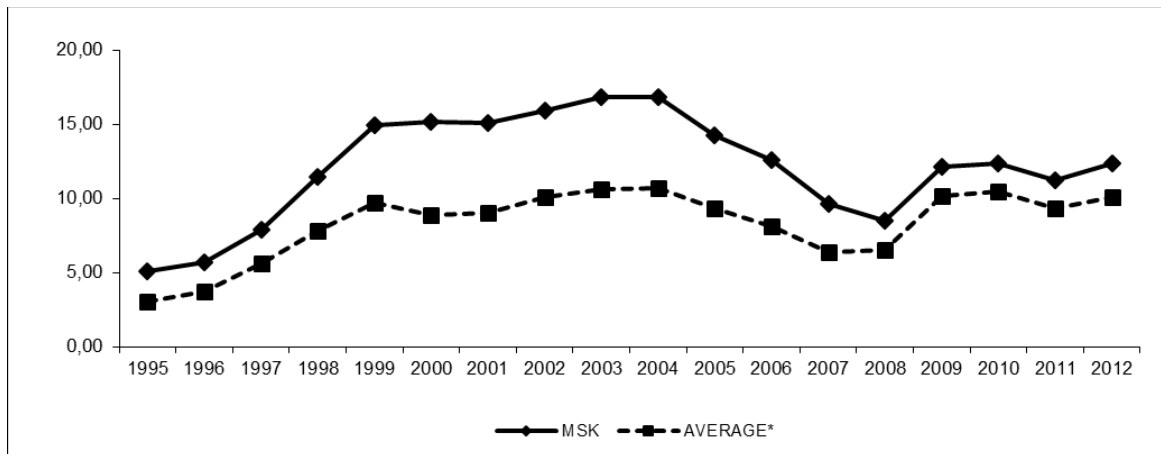
Source: Czech Statistical Office.
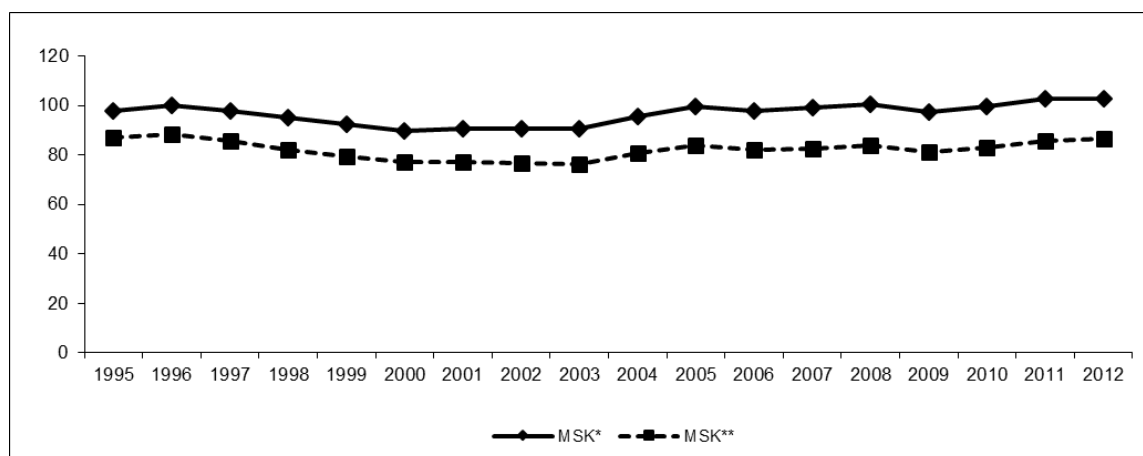
Fig. 4. GDP per capita (Index regional average=100). Note: *without Prague region; **including Prague region

Source: Czech Statistical Office.

Labor market development is closely related to development of economic performance. As seen from the figure 5, both the unemployment rate in the Moravian-Silesian Region and the average one depended on the real GDP development. However, the unemployment rate in the Moravian-Silesian Region was higher than the average one. The purpose is that the Region´s economy has been based on coal mining, metallurgy and heavy engineering. The region has been affected by the structural crisis since the nineties, which resulted in higher number of the job applicants than the average one. However, industry still represents a significant source of employment in the Moravian-Silesian Region. The Moravian-Silesian Region´s unemployment rate increased until 2004. The labor market performance improved between the years 2005 and 2008. However, situation on the labor market has worsened since 2009 as the result of the economic crisis.

Another possible labor market´s indicator that can describe labor market performance is the number of registered job applicants on one unfilled job vacancy. Development of this indicator has copied previous used indicators and we can say that the labor market performance in the Moravian-Silesian Region is worse than average one. However, the gap was not significant during last years as it used to be from 1998 till 2005.

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Fig. 5. Registered Unemployment Rate (%). Note: *without Prague region.

Source: Ministry of Labor and Social Affairs of the Czech Republic.
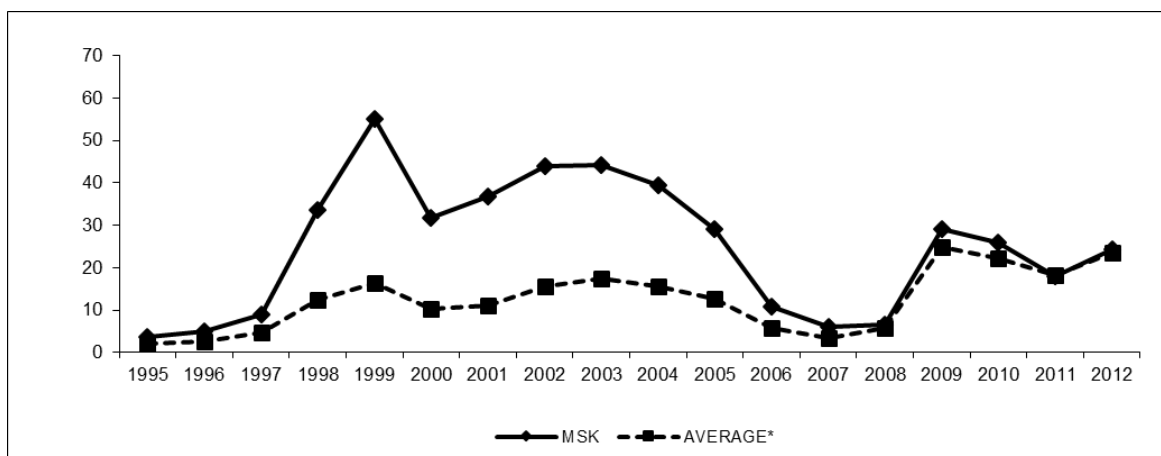
Fig. 6. Number of applicants on one unfilled job vacancy. Note: *without Prague region.

Source: Ministry of Labor and Social Affairs of the Czech Republic.

The second part of this empirical analysis try to find some associations between selected indicators. In our case, we computed Kendall´s coefficient of concordance for five variables for the years 2012: (i) GDP per capita; (ii) unemployment rate; (iii) number of applicants on one unfilled job vacancy; (iv) net migration; and (v) number of registered businesses per capita.

We had five variables and 13 regions (we excluded the region of the capital city Prague). First, we had to rank the values for our five variables separately. In the case of GDP per capita and net migration the highest value was labelled "1" and the lowest value was labelled "13". In the case of the unemployment rate, number of applicants on one unfilled job vacancy and number of registered businesses per capita values the highest value was labelled "13" and the lowest was labelled "1".

According to the theory we expected in examining individual variables that the same values can be found. However, two or more identical values (called "tie") were not found in the case of all variables so we do not need to take the average of the ranks that they would have otherwise occupied.

For statistical significance of Kendall´s W relation was used. We tested the null hypothesis H0: "Computed Kendall´s W does not evidence agreement among rankings (W=0)", against alternative hypothesis HA: "Computed Kendall´s W evidence agreement among rankings (W≠0)."

Value of Kendall´s W was equal to 0.56 for the year 2012 and this value shows us that there may be associations between chosen variables. However, these associations seem to be not strong. We also tested the null hypothesis using $\chi 2$ statistic. Computed $\chi 2$ statistic value (33.83) exceeded the

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critical χ2 value (21.0), so we may reject null hypothesis. In our case it means that four variables are concordant with one other.

5   Conclusion

In this paper we examined the macroeconomic position of the Moravian-Silesian Region within the Czech NUTS 3 regions between the years 1995 and 2012. We used population development and GDP, GDP and the unemployment rate as the key indicators for the evaluation. The main conclusion is that all regions including the Moravian-Silesian Region lagged behind the region of the capital city Prague. Moreover, during the observed period the existing regional disparities narrowed. Although all Czech NUTS 3 regions experienced significant economic growth before the economic crisis and they approached average European level, there still exists a large difference.

The position of the Moravian-Silesian Region has deteriorated. Firstly, the total number of population has decreased as the results of lower birth rate and increased migration. Another factor of this development is significantly worse environmental situation in this region compared to other regions. Secondly, Region´s economic performance worsened at some time. However, this situation has improved in recent years slightly. Thirdly, labor market performance is one of the main problems of this regions and if we look at the unemployment rate development we can see some signs of structural difficulties. However, the Moravian-Silesian Region attracted some remarkable FDI, which helped mitigate the impact of the structural crisis in the region.

Value of the Kendall´s coefficient of concordance implies associations between these variables. Though, concordance seems not to be significant.

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LONG-TERM EQUILIBRIUM OF NUTS 2REGIONS: THE CASE OF THE CZECH REPUBLIC

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Abstract
There are some differences among regions development in the European Union even within the Czech Republic. European Union regional policy targets all regions and cities in the EU in order to support business competitiveness, economic growth, job creation, improved quality of life or sustainable development. Regional policy is carried out by means of three main funds: European regional development fund, Cohesion fund and European social fund. The paper focused on cohesion among NUTS 2 regions within the Czech Republic by means of cointegration approach. The main aim is to find out whether supported regions tend to equilibrium in long-run and their short-run behaviour. Two cases were investigated: whether NUTS 2 regions tend to national level or EU-28 average level. The key indicator was gross domestic product per capita in purchasing power standards during period 2000 and 2014. Severovýchod and Moravskoslezsko regions tend to national level; Jihozápad, Severozápad, Střední Morava and Moravskoslezsko regions tend to EU-28 average in long-run.

Keywords
Cohesin, Cointegration, NUTS 2 regions, Regional policy.

JEL classification
C13, E23.

1 Introduction (style Heading 1)

Each country consists of differently (economical or social) developed regions. The aim of country's or the European Union economic policy is to reduce differences among regions. European Union regional policy supports job creation, economic growth, improved citizens' quality of life, sustainable development.

Nevima and Majerová (2015) dealt with the similar topic. They focused on the real convergence process within Visegrad four countries at the NUTS 2 level by means of β-convergence approach.

This paper focused on reducing differences or in other words cohesion among NUTS 2 regions in the Czech Republic by means of cointegration approach. Cointegration has been very popular method in applied economics since its introduction about thirty years ago (Hjalmarsson and Österholm, 2007). The main aim of this paper is to find out whether supported regions tend to equilibrium in long-run and their short-run behaviour. Long-run equilibrium means whether regional time series trends to national level or EU-28 average level. The cohesion process among regions is measured by means of GDP per capita only.

2 Regional policy and regions

European Union regional policy targets all regions and cities in the EU in order to support business competitiveness, economic growth, job creation, improved quality of life or sustainable development.

Regional policy is carried out by means of three main funds:
- European regional development fund (ERDF),
- Cohesion fund (CF),
- European social fund (ESF).

The European structural and investment funds consist of three previous funds and:
- European agricultural fund for rural development (EAFRD),
- European maritime and fisheries fund (EFF).

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According to Eurostat (2013) there are 276 regions at NUTS 2 level within European Union member countries. NUTS serves as a reference for (Eurostat, 2013):

- the collection, development and harmonisation of the EU's regional statistics,
- socio-economic analyses of the regions,
- the framing of EU regional policies.

NUTS 2 regions are classified into three areas due to receiving funding from the Structural Funds:

- less developed regions: GDP per capita is lower than 75% of EU-27 average,
- transition regions: GDP per capita is between 75% and 90% of EU-27 average,
- more developed regions: GDP per capita is higher than 90% of EU-27 average.

Regional policy provides fundamental investment framework to meet the goals of the Europe 2020 Strategy for smart, sustainable and inclusive growth in the EU.

There are lots of indicators used to measure cohesion at the regional level grouped according to the goal of the Europe 2020 strategy (Eurostat, 2015). The regional gross domestic product in purchasing power standards per inhabitant is used for purposes of this paper.

3   Data and methodology

Annual data of gross domestic product at current market prices by NUTS 2 regions for the Czech Republic and mean value of the European Union countries (hereinafter EU-28) in purchasing power standards per inhabitant from 2000 to 2014 were employed. All of the data were collected from the Statistical office of the European Union – Eurostat and transformed to natural logarithm. The cohesion process among regions is measured by means of GDP per capita only.

Cointegration test is performed followed by error correction model (ECM) to examine the above mentioned aim of the paper. There are many macroeconomic time series which are not stationary at their levels. In general, the cointegration method can be used to avoid so called spurious regression or it can indicates a long-run relationship, i.e. whether some system is in equilibrium in the long-run.

If variables are cointegrated, it indicates there is a long-run relationship or equilibrium. The ECM corrects for disequilibrium in short-run. If two or more series are integrated of order 1, i.e. I(1) and a linear combination of them is integrated of order 0, i.e. I(0), then the series are said to be cointegrated. I(1) means the series is non-stationary at their level (has a unit root) but after first differencing, I(0) series is stationary at level. Cointegration is an econometric technique for testing the relationship between non-stationary time series. (Engle and Granger, 1987), (Arlt, 1997), (Gujarati, 2004), (Koop 2005) or (Cipra, 2008).

First of all, the order of integration must be found out. In other words, there is a need to find out if time series is stationary or non-stationary. The standard methods to test the stationarity of a series are the unit root tests. There are some of these tests, e.g. augmented Dickey-Fuller test, Phillips-Perron test or Kwiatkowski, Phillips, Schmidt and Shin test (Greene, 2012). Hence the most popular test for unit root is applied – augmented Dickey-Fuller test (ADF). It estimates the following regression (1):

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t \tag{1}$$

where Y_t means time series, Δ is the difference operator (i.e. $\Delta Y_t = Y_t - Y_{t-1}$), m is the maximum length of the lagged dependent variable, β, δ, α are coefficients and ε_t is a white noise error term. The null hypothesis tests if time series is integrated of order one, i.e. has a unit root (whether $\delta = 0$) against the hypothesis that is integrated of order zero. (Elliott, Rothenberg and Stock, 1994), (Gujarati and Porter, 2009) or (Cheung and Lai, 1995)

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According to Cheung and Lai (1995) the lag order can affect behaviour of the ADF test; therefore the next step is to specify the lag length (*m*). The lag order can be specified arbitrary or by information criterion, e.g. by the Bayesian information criterion proposed by Schwarz (1978) in spirit by Gujarati and Porter (2009), (2):

$$SC = n^{k/n} \frac{\sum \hat{u}^2}{n} = n^{k/n} \frac{RSS}{n} \tag{2}$$

where *k* is the number of regressors (incl. constant), *n* is the number of observations, $n^{k/n}$ is the penalty factor and *RSS* denotes the residual sum of squares.

According to Johansen's approach, cointegration is based on the determination of *r* cointegration relations in the vector autoregression (VAR) model. Cointegration is confirmed if *r > 0*. (Johansen, 2000) or (Hjalmarsson and Österholm, 2007)

Then the lag order of vector autoregression was found out via the Bayesian information criterion defined by equation (2).

The next step in Johansen's approach is to estimate the number *r* of cointegrating vectors by means of two different likelihood ratio tests (Cipra, 2008), (Hjalmarsson and Österholm, 2007), (Johansen, 1991):

- trace test (3):

$$\lambda_{trace}(r) = -n \sum_{i=r+1}^{m} \ln\left(1 - \hat{\lambda}_i\right) \tag{3}$$

- maximum eigenvalue test (4):

$$\lambda_{\max}(r) = -n \ln\left(1 - \hat{\lambda}_{r+1}\right) \tag{4}$$

where *n* is the sample size and $\hat{\lambda}$ is the i:th canonical correlation. The trace test tests the null hypothesis (H₀ hereinafter) of at most *r* cointegrating vectors against the alternative more than *r*. The maximum eigenvalue tests H₀ of *r* cointegrating vectors against the alternative of *r+1*. Tests reject H₀ if $\lambda_{trace}(r)$ or $\lambda_{max}(r)$ are larger than their critical values or significance level.

If *X* and *Y* are non-stationary at their levels but stationary after the first difference, they are integrated of order 1, i.e. I(1). If their linear combination is stationary at levels, i.e. integrated of order 0, I(0), then the series are said to be cointegrated. Equation (5) can present cointegration equation or long-run equation:

$$Y_t = \alpha + \beta X_t + e_t \tag{5}$$

where *Y* means dependent variable, *X* explanatory variable, *e* denotes errors, *α,β* are long-run coefficients, *t* time.

According to equation (5) *e* or error is linear combination of non-stationary series *X* and *Y*. To compute error (5) can be rewritten as (6), (Koop, 2005 or Cipra, 2008):

$$e_t = Y_t - \alpha - \beta X_t \tag{6}$$

Obtained values of error are tested for stationarity, e.g. by means of ADF test. Parameter *β* in equation (6) gives the long-run relationship between *Y* and *X*.

However, in some cases, there is interest to understand the short-run behaviour. The so-called Granger Representation Theorem showing precisely that cointegrated series can be represented by error correction models (ECM) was developed and popularized by Granger (Engle and Granger, 1978). According to this theorem the relationship between variables (*X* and *Y*) can be expressed as

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an error correctiom model equation (7), (also used vector error correction model: VECM) estimated by maximum likelihood (Johansen, 2000):

$$\Delta Y_t = \varphi + \lambda e_{t-1} + \omega_0 \Delta X_t + \varepsilon_t \tag{7}$$

where current changes in *Y* are a function of previous changes in *Y* and *X*, ω gives the short-run impact between ΔY and ΔX; parameter λ denotes the degree to which the series are outside of their equilibrium in the previous time period and φ as intercept. The symbol *e* denotes the error from equation (5) and it can be thought of an equilibrium error, hence, the model is out of equilibrium, if it is non-zero; ε represents ECM disturbance. The absolute value of λ shows us the correction to equilibrium in next period ceteris paribus. Briefly, consider the case $\Delta X_t = 0$, $e_{t-1} < 0$ it indicates the dependent variable is below the equilibrium state, therefore λe_{t-1} should be positive and causes increasing *Y* in next period (Koop, 2005), Cipra (2008).

4 Empirical results

In the Czech Republic there are 8 NUTS 2 regions. Their names, mean values of GDP per capita in PPS, ratios to EU-28 and average growth rates are shown in Table 1.

Table 1. Mean values of GDP per capita and ratios to EU-28, NUTS 2 regions, Czech Republic and EU-28 (in PPS)

Region	GDP per capita (PPS)	EU-28 ratio (%)	Average growth rate (%)	Code
Česká republika	19300	80.1	3.6	CZ
Praha	40687	169.0	3.9	CZ01
Střední Čechy	18027	74.9	2.9	CZ02
Jihozápad	17340	72.0	3.2	CZ03
Severozápad	15173	63.0	2.7	CZ04
Severovýchod	16113	66.9	3.0	CZ05
Jihovýchod	17340	72.0	4.1	CZ06
Střední Morava	15353	63.8	3.8	CZ07
Moravskoslezsko	15807	65.6	4.2	CZ08
EU-28	24080	-	2.4	EU28

Source: Eurostat, own calculation.

According to EU-28 ratio all NUTS 2 region can be classified as less developed regions except Praha region which is classified as more developed region. NUTS 2 order according to EU-28 ratio is as follows: Praha, Střední Čechy, Jihozápad and Jihovýchod, Severovýchod, Moravskoslezsko, Střední Morava, Severozápad.

Other order occurs according to average growth rate: Moravskoslezsko, Jihovýchod, Praha, Střední Morava, Jihozápad, Severovýchod, Střední Čechy, Severozápad.

The carried out augmented Dickey-Fuller test for stationarity indicates at 5% significance level that time series are non-stationary at their levels but are stationary after first difference, hence are difference stationary.

In the case of trending regional time series to national level, the Johansen approach indicates two cointegration equations, i.e. long-run relationship (8) for Severovýchod and (9) for Moravskoslezsko,

$$CZ_t = 0.266052 + 0.993672 \cdot CZ05_t + e_t \tag{8}$$

$$CZ_t = 2.278894 + 0.785821 \cdot CZ08_t + e_t \tag{9}$$

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where *CZ* denotes national level, i.e. Czech Republic and e.g. *CZ05* means Severovýchod region according to Code column in Table 1.

Equations indicate positive long-run relationship between national economy and both regions. Obtained error *e* from (8) and (9) fulfil the stationarity assumptions (integrated of order 0) according to ADF test. Johansen's approach does not indicate equations in other regions or they do not fulfil the assumptions, hence there is no long-run relationship.

ECM is given by equations (10) and (11):

$$\Delta CZ_t = -1.2932 \cdot e_{t-1} - 0.3745 \cdot \Delta CZ_{t-1} + 0.2914 \cdot \Delta CZ_{t-2} + 0.6974 \cdot \Delta CZ05_{t-1} - 0.5169 \cdot \Delta CZ05_{t-2} + \varepsilon_t \quad (10)$$

$$\Delta CZ_t = -1.3578 \cdot e_{t-1} + 1.5458 \cdot \Delta CZ_{t-1} - 0.9113 \cdot \Delta CZ08_{t-1} + \varepsilon_t \quad (11)$$

ECM shows us that indicators are out of the equilibrium in short-run. The coefficient on e_{t-1} indicates the correction to equilibrium in the next year, ceteris paribus. About 1.3% of deviation is corrected each year in Severovýchod region.

In the case of trending regional time series to EU-28 average level, the Johansen approach indicates four cointegration equations, i.e. long-run relationship (12) for Jihozápad, (13) for Severozápad, (14) for Střední Morava and (15) for Moravskoslezsko,

$$EU28_t = 0.0076 + 0.5382 \cdot CZ03_t + e_t \quad (12)$$

$$EU28_t = -3.2837 + 1.3880 \cdot CZ04_t + e_t \quad (13)$$

$$EU28_t = 4.2887 + 0.6087 \cdot CZ07_t + e_t \quad (14)$$

$$EU28_t = 4.9657 + 0.5311 \cdot CZ08_t + e_t \quad (15)$$

where *EU28* denotes EU-28 average level and e.g. *CZ03* means Jihozápad region according to Code column in Table 1.

Equations indicate positive long-run relationship between EU-28 and three mentioned regions. Obtained error *e* from (12), (13), (14) and (15) fulfil the stationarity assumptions (integrated of order 0) according to ADF test. Johansen's approach does not indicate equations in other regions or they do not fulfil the assumptions, hence there is no long-run relationship.

ECM is given by equations (16), (17), (18) and (19):

$$\Delta EU28_t = 0.0191 - 1.5687 \cdot e_{t-1} + 0.2427 \cdot \Delta EU28_{t-1} - 0.0618 \cdot \Delta CZ03_{t-1} + \varepsilon_t \quad (16)$$

$$\Delta EU28_t = -0.1047 \cdot e_{t-1} - 0.2561 \cdot \Delta EU28_{t-1} - 0.4902 \cdot \Delta EU28_{t-2} + \\ + 1.0992 \cdot \Delta CZ04_{t-1} + 0.0576 \cdot \Delta CZ04_{t-2} + \varepsilon_t \quad (17)$$

$$\Delta EU28_t = -0.5420 \cdot e_{t-1} + 0.1778 \cdot \Delta EU28_{t-1} + 0.0833 \cdot \Delta EU28_{t-2} + \\ + 0.1757 \cdot \Delta CZ07_{t-1} - 0.5808 \cdot \Delta CZ07_{t-2} + \varepsilon_t \quad (18)$$

$$\Delta EU28_t = -4.6574 \cdot e_{t-1} + 2.5278 \cdot \Delta EU28_{t-1} + 1.0949 \cdot \Delta EU28_{t-2} - \\ - 1.5056 \cdot \Delta CZ08_{t-1} - 0.9998 \cdot \Delta CZ08_{t-2} + \varepsilon_t \quad (19)$$

ECM shows us that indicators are out of the equilibrium in short-run. The coefficient on e_{t-1} indicates the correction to equilibrium in the next year, ceteris paribus. About 1.6% of deviation is corrected each year in Jihozápad region.

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5   Conclusion

There are some differences among regions development even within one country. European Union Regioanal policy aims to support job creation, economic growth, improved citizens'quality of life or sustainable development. Paper focused on cohesion among NUTS 2 regions in the Czech Republic by means of cointegration approach. The main aim of this paper was to find out whether supported regions tend to equilibrium in long-run and their short-run behaviour. Long-run equilibrium means whether regional time series trends to national level or EU-28 average level. The cohesion process among regions is measured by means of GDP per capita only during 2000 and 2014. Severovýchod and Moravskoslezsko regions tend to national level; Jihozápad, Severozápad, Střední Morava and Moravskoslezsko regions tend to EU-28 average in the long-run. Nevertheless, there are deviations in the short-run.

6   Acknowledgement

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STATUTORY AND EARLY RETIREMENT AGE REGIMES

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Abstract
Statutory retirement age is the most visible parameter of the old-age pension system and one which sets a clear signal for people in making economic decisions. The contribution analyses different concepts of statutory retirement ages under the different welfare regimes. These regimes and models have been heavily influenced by the politics and public choice. Early retirement age regimes became a new phenomenon in the latest half-century, making the retirement more flexible and risky – for the providers. The Czech experience reveals the fiscal risk of the retirement age reforms and of the financial illiteracy of the clients. Actuarial neutrality of the early retirement benefits should decrease the fiscal risk and support the equivalence principle in the Czech pension system. Statutory and early retirement ages play a different role under different pension pillars and products.

Keywords
Public pensions, Private pension savings, Welfare regimes, Statutory retirement age, Early retirement age, Actuarial neutrality.

JEL classification: H55, J32, G22

1 Introduction

The retirement age is a necessary component of every system of old-age pensions – it is an "artificial" age limit for pension entitlement, predestined to become a typical parameter of social policy. This contribution aims at finding typical models of relationships between pension concepts under different welfare regimes and statutory and early retirement ages, taking into account the development of general economic and social conditions. It is a topical issue of the Czech retirement policy.

2 Old-age pension concepts and statutory retirement ages

The statutory retirement age plays the most striking role in the disability concept of old-age pensions, applied in a strict form in the original blue-collar social pension insurance. The old-age pension is understood "only" as a special case of disability pension: it was based on the assumption that there is no point to identify a permanent labour (in)ability of individuals from a given, statutory age, as we may assume disability (presumption of disability). It applied also under the pre-war Czechoslovakia: "An old-age pension is just a disability pension, only it is not necessary to examine the disability." A consistent disability pension concept also excludes overlapping pensions and earnings – if a pension beneficiary was not disabled and manifested it by a working activity, he/she automatically lost pension entitlement.

A disability pension concept also reflected an overwhelming superiority share of disability pensions in the total number of pensions. In Germany, before the First World War, at the retirement age of 70 years in the blue-collar pension ("disability") insurance, the share of disability pensions amounted to 92%; old-age pensions were paid on average for the period of about 7.5 years. The ratio of the average old-age pension and the national average wage in 1891 amounted to 18.2% (Coppola, 2014). The old-age pension was understood as a living contribution, e.g. in a family of children at the countryside.

When introducing the German blue-collar pension insurance, even the retirement age of 65 years was considered, eventually, due to the financial reasons, the age of 70 was preferred; a reduction to 65 years occurred in 1916. In our country, this insurance was introduced in 1926, disability was

assumed at a blue-collar worker from the (retirement) age of 65. In 1926, the average life expectancy of a Czechoslovak man aged 65 was 11.37 years and of a woman 12.02 years.

A merit concept of the old-age pension emerged before the disability concept – in the period of commencement of the state provision of civil servants. Under this concept the old-age pension needs to be "earned": the old-age pension entitlement arises on the basis of working for the relevant number of years or after an appropriate period of insurance. Applying "a presumption of merit" comes from the earned right to retire after a certain number of years of service. Unlike the disability concept, primarily, there is no fixed retirement age, but the vesting period. This does not preclude a pension reduction after fewer years of service. From a logical point of view, this old-age pension concept represents basically transferring the principles of private insurance – working (dis)ability is irrelevant here. The merit concept is also typical for the insurance of white-collar employees.

In our country, the National Insurance Act (1948) unified pension systems and introduced a dual retirement age, depending on the length of insurance: if the vesting period reached 20 years, a person could retire at the age of 60. The retirement age of 65 years was the second alternative, conditioned by the vesting period of 5 years. From 1957 the retirement age of 55 years was introduced for workers in the first category (underground miners and pilots) and women. The world rarity is the differentiation of the female retirement age by the number of children, introduced from 1965: 57 years for childless women, 56 years for women with 1 child, 55 years for women with 2 children, 54 years for women with 3-4 children, and 53 years for women with 5 or more children.

The existence of two retirement ages reflects the combination of the disability and merit concepts of the retirement age in the social insurance system. A higher retirement age (e.g. 65 years) is subject to a short vesting period, which in this respect represents only a "technical minimum" for the entitlement to retire – and, therefore, it is clearly a disability concept of the old-age pension applied in the social insurance system. A lower retirement age (in our country 60 years from 1948) was subject to 20 years of insurance, which in then forthcoming communist regime were not difficult to achieve – therefore, it was a commencement of the transition to the merit old-age pension concept.

Currently, we have two retirement ages in our country:
- 63 years for men, 62 years and 4 months for women without children, ... 58 years and 4 months for women with 5 or more children, subject to a vesting period of 32 years (35 after 2018)
- 68 years, subject to the vesting period of 20 years (15 years without alternative periods).

Today's Czech retirement ages do not reflect a clear concept of old-age pension or a combination of them, not only because of the differentiation of lower retirement age by gender and the number of children, but due to the relatively high vesting period at a higher retirement age. Therefore, we cannot talk about the application of the disability concept and the realization of the merit concept is very complicated. This is mainly the result of mechanical cuts in pension expenditures in the recent past.

Nowadays, a certain combination of disability and merit concepts in the social pension insurance can be found e.g. in Germany, which, in 2016, has the following two retirement ages:
- 65 years and 5 months, subject to the vesting period of 5 years
- 63 years and 2 months, subject to the vesting period of 45 years.

This German combination of two concepts of retirement age has been existing since mid-2014; the lower retirement age increases by 2 months each year. The higher retirement age increases by 1 month for every year. From 2029 Germany shall apply two retirement ages: 67, respectively 65 years. The German version of two retirement ages has – as opposed to the Czech version – at least a certain rational core: putting the emphasis on the vesting period, partially at the expense of the role of the retirement age. And also at the expense of actuarial equivalence, which could apply fully in the social insurance scheme. In general, there should be a single retirement age in the universal pension insurance and, optimally, early retirements should not be tolerated at all. Alternatively, the potential early and later retirements should be provided by an actuarial reduction or increase of the benefit.

In the past 50-70 years, there have been significant changes in the economy as well as the whole society. Currently, old-age pensions are significantly higher on average and they are paid

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considerably longer. In relation to the retirement age, prolonging life expectancy in general and specifically of seniors is essential. The pace of ongoing prolonging life expectancy is now approximately two months every year. Today, nobody explains the existence of old-age pensions by the presumption of disability. The number of old-age pensions' beneficiaries is considerably higher than the number of disability pensions' beneficiaries. In addition, present pension systems are considerably more complicated – they have multiple pillars, generally with different retirement ages. A number of authors write about two groups of primary objectives of retirement systems, instead of the disability and merit concepts of the old-age pensions; pension systems should

- Provide insurance against low income and wealth in old age and offer a mechanism for consumption smoothing across one's life („piggybank" function of pensions), and
- Relieve poverty and redistribute income and wealth („Robin Hood" function of pensions (Barr and Diamond, 2008).

From a conceptual standpoint, it is optimal when these two contradictory functions of old-age pensions correspond to two different pension pillars: social (solidary) pension and earnings-related (insurance) pension.

In terms of terminology, the disability and merit concepts of old-age pensions are based on the history of these pensions. In contrast, the solidary and insurance concepts correspond, in terms of terminology, to the current typology of basic pension systems – in terms of construction of old-age pensions, which also includes the issue of retirement age. It is useful to distinguish between basic pension welfare regimes that are also reflected in the approach to the retirement age.

3   Retirement and retirement age regimes

A number of different pension systems has been developed, which are the result of historical development of economic and social policies in the OECD countries. Several typical systems may be observed among them, which can be considered the application of basic welfare regimes, as defined by Esping-Andersen (1990). Thus, we distinguish liberal, conservative and social democratic welfare regimes. We can expand the range of pension models by a neo-liberal regime that has developed since the 1990s. The choice between these welfare regimes is a matter of public choice. Ideally, each pension system should be based on one of these welfare regimes.

The classical liberal regime rejects any significant state intervention in the social sphere, it does not include any public pensions. Not surprisingly, the old age itself is not harmful. As a model, only a general social assistance benefit provided to all people unable to work, respectively, in-kind benefits (food, accommodation or other services) are acceptable. Currently, the classical liberal pension regime does not exist in any of the OECD countries.

The modern liberal regime already recognizes a special, tested old-age pension; which is not understood (only) as a social assistance benefit. The "Age Pension" in Australia is a model of such a means-tested old-age pension, which provides – together with means-tested supplements and rent assistance – the income exceeding the risk of poverty line used in the EU (60% of median income), even with the poorest seniors! In several developed countries, however, we can find a significant, universal (flat-rate) old-age pension, which is considered an expression of modern liberal pension welfare regime. "Superannuation" in New Zealand, tax-financed and providing income beyond the poverty line according to the OECD (50% of income median) is a paradigmatic flat old-age pension. These concepts of solidary pensions also include a fixed, statutory retirement age. The Australian Age Pension is provided to men and women from the age of 65; from July 2017, this retirement age shall increase every 2 years by half a year up to 70 years (in 2035). The New Zealand Super has a fixed statutory retirement age of 65 years; after its increase from the previous 60 years during the period of 9 years: New Zealand consequently experienced a sharp rise in labour force participation rates among older people over the period 1991-2001 (Hurnard, 2005).

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Conservative pension welfare regimes represent a mix of various retirement concepts – for different social groups. They include both the civil servants' security schemes, social insurance schemes, and originally voluntary occupational pensions. These schemes may reflect the specificities of the given social group, in respect of the risks covered by the social security, as well as its power (influence) status. Retirement ages in these regimes – in general – differ, already with regard to different conditions of life of individual social and professional groups.

The original blue-collar disability insurance included old-age pensions based on the disability concept, with old-age pensions at a low subsistence level. This changed after World War II, e.g. in West Germany, during the pension reform from 1957, the conditions of the basic blue-collar and white-collar old-age insurances were unified, the basic amount of blue-collar pensions was also abolished. Instead of the previous prevailing blue-collar concept of old-age pensions as a tool to remove poverty of old people, a concept of the pension as a replacement of the lifetime average (net) wage was announced, respectively, to be more precise, maintaining the previous standard of living, taking into account the reduced needs in the old age; all this under the assumption of a lifelong gainful activity (45 years). A link of the pension to the paid premiums was strengthened significantly, the merit/insurance concept of old-age pensions won completely also in the blue-collar old-age insurance.

The basic system of social pension insurance scheme in Germany includes today more than 85% of gainfully employed persons. Another 9% of these people are civil servants, with their separate pension system. Some self-employed persons participate in social pension insurance, while others have special social insurance systems and others are intended for a voluntary private Rürup pension. Farmers, miners, railwaymen and sailors have separate systems. Overall, we can distinguish about 10 systems.

In numbers, the disability pension in West Germany was until 1972 the major newly granted pension, only after this year the old-age pension relatively starts dominating. The reform of 1972 introduced a "flexible" statutory retirement age of 63 years for those insured for the period of 35 years – the real effect was non-shortening the old-age pension at this (earlier) retirement; a real average retirement age subsequently dropped by more than two years (Boersch-Supan and Juerges, 2011).

Currently, old-age pensions from the German social insurance are higher than full disability pensions. Generally, it applies that a full disability pension amounts "only" to 30-34% of a previous gross earning (Rodenstein, 2015). In a general sense, a subjective risk is the reason. A basic formula for the calculation of both pensions is the same, however in the case of a disability pension not all years up to the statutory retirement age are added, but only up to the age when early retirement is possible (currently 60 years) and yet a discount for retirement before the age of 63 years at a rate of 0.3% per month continues to be applied; the discount may not exceed a total amount of 10.8%. These reductions can be considered system reductions also with regard to the durations of unemployment, taken into account when calculating old-age pensions.

The construction of the German social old-age insurance is now dominated by the merit/insurance concept of the old-age pension. A pillar or another component providing universal or means-tested pensions is not part of the conservative (segmented) social pension insurance. If pension from the social old-age insurance is insufficient to cover the basic living expenses of old or disabled persons, basically, these persons need to ask social assistance of a general type.

The social-democratic welfare regime is often characterized by the dominance of universal benefits. This characteristic would match the universal (flat-rate) pension as a fundamental pillar of the social-democratic regime. That was also originally in the countries with a social-democratic orientation. In this sense, we could formulate a classic social-democratic pension regime as a model based on a (higher) flat-rate pension.

Modern social-democratic policy is to a certain extent focused on the middle class. Indeed, modern social systems in developed countries, in principle, secure the needs of the poor classes of the population, especially in the old age. Differences are more in the forms and in the degree of utilization of more or less graduated social assistance benefits. If the goal of modern social-democratic policy

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was to provide workers more than a basic universal old-age pension, then that could happen only in the form of earnings-related pensions. The objectives of the social democracy electorate are easiest to enforce by a uniform, universal social insurance. In practice, then by increasing blue-collar pensions to the level of white-collar pensions. However, an essential component of modern social-democratic pension regimes is also a robust solidary pillar. A flat-rate pension with a "supplementary" earnings-related pension can be considered the original social-democratic pension regime.

The Swedish pension reform implemented from 1999, primarily significantly modernized universal social old-age pension insurance by the introduction of the NDC (notional defined contribution) product, supplemented by a robust "guarantee pension", increasing low (and zero) NDC pensions. Modernization of this social-democratic regime consists in putting a stronger emphasis on universal social insurance, and also the introduction of automatism of adapting pensions to demographic and economic development. The existence of quasi-mandatory occupational pensions reflects the situation in the labour market, which social-democratic parties need to respect. Trade unionists are predominantly the voters of these parties.

NDC is a modern system of social insurance, recommended since 2003 by the World Bank as a "core" (main pillar) of the "Pan-European pension system". Solidary pensions and private pensions are two "wings" of this system. NDC assumes the insurance technique of FDC (funded defined contribution) private systems; apart from fully funded financing. The pension saving is the first phase of this social insurance: premiums paid are deposited in a client's personal account and (collectively) appreciated. The second, "pay-out" phase begins by the transformation of the client's account balance to the lifelong old-age pension, according to actuarial principles, taking the expected life expectancy of clients of the respective age into account. The statutory retirement age in the Swedish NDC scheme is set within the range of 61-67 years. The system is transparent and understandable, with automatic stabilizers. This insurance concept of the old-age pension can be identified as state-of-the-art. The statutory retirement age plays a secondary role in it – it is set by the interval, in principle, it is not necessary to speak about early retirement.

The "guarantee pension" is a significant complementary pension pillar in Sweden, the statutory retirement age of 65 years applies here; early retirement is not possible. This fully corresponds to the solidary concept of the old-age pension. In practice, the Swedes retire typically at the age of 65.

The neoliberal welfare regime is based on the hypothesis that the (more or less) mandatory private pension savings or insurance are significantly more favourable than the social pension insurance, already due to a general nature of private enterprise. The investment risk, in principle, is borne fully by clients. The basic pillar of mandatory private pension savings should be complemented by a public solidary pillar.

Thanks to the reform launched in 1981, Chile was an icon of the neoliberal pension regime. According to the original ideas a more significant state regulation was not assumed. The Chilean state had to correct these ideas gradually and significantly. Although the basic scenario of the neoliberal Chilean reform seemed to be relatively simple, the practice was quite different simply because the system is unintelligible for the vast majority of clients. Most Chileans have no idea how much they pay in commissions, how their money is invested, or how their benefits would be determined at retirement. Only one-fifth of the participants have the faintest idea about how much money they held in their accounts, even within plus or minus 20%! Financial illiteracy is a big problem, and not one confined to Chile (Mitchell, 2015). However, the problems rest in the neoliberal pension welfare regime, not in "nation's failure to educate its citizenry about how their pensions work", as she states. High fees of pension companies represent the major problem, the market mechanism had to be replaced by a robust state regulation and, finally, the state pension company is being established anyway. Former Chilean governments paid no attention to different "normal" retirement age of men (65 years) and women (60 years) and the use of different male and female mortality tables by life insurance companies. It is interesting that normal retirement age is reduced by 1 or 2 years for each 5 years of work in certain specified, arduous occupations, with a maximum reduction in the normal

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retirement age of 10 years (Shelton, 2012). A standard solidary pension pillar was introduced in Chile only in 2008; the retirement age here is 65 years.

The disability and merit concepts of the old-age pension originated as part of conservative pension welfare regimes. A "harder" disability concept was applied in the blue-collar insurance, with the level of old-age pensions substantially lower than it was for disability pensions. Moreover, the structure of the benefit in this case reminded more a social assistance than an earnings-related benefit of social insurance. On the contrary, the merit concept was applied in white-collar systems of social insurance in the private sector, not to mention civil servants' pensions, at which a concept of providing service income even after leaving the active service was originally applied. Those major systems of the conservative pension welfare regime gradually united after World War II, the relative amount of blue-collar pensions increased and in the major social insurance systems, the insurance principle prevailed as a basic principle.

The original disability concept of the old-age pension vanished from blue-collar insurance systems and it appeared in a new form of solidary pension in universal state pensions systems, in the form of a flat-rate and/or means-tested pensions. Solidary pensions are recommended by modern pension theory as one of the (three) basic pension pillars, as an essential complement of universal public insurance pensions (of the NDC form best). A unified statutory retirement age, without a possibility of early retirement is typical for the solidary pensions pillars. In contrast, an actuarial adjustment of the pension amount according to the age of the pension applicant is no problem in the insurance pensions pillar. The statutory retirement age can be defined as an interval. A fixed statutory retirement age, supplemented by the provisions on the scope and terms of early or later retirement represents an older alternative of the interval retirement age (connected with continuous adjusting conversion rates anticipated life expectancy of the individual cohorts). Either way, the statutory retirement age is the most visible parameter of the pension system and one which sets a clear signal for people in making economic decisions (OECD, 2014). The design and concept of the retirement age is of essential significance for both individual pension pillars and the pension system as a whole.

4   Early Retirement Policies

After World War II, under favourable economic conditions, old-age pensions started to grow overall; the retirement upon achieving the statutory retirement age began to be perceived as a standard. In some countries the statutory retirement age for women decreased on the grounds that they could receive pensions at the same time as their husbands, who were 3-5 years older on average (Ebbinghaus, 2000).

Under the conditions of mass unemployment after the first oil shock (1973), the early exit from work of old persons became a tool of (un)employment policy. Both early retirements and disability pensions (softening some conditions for their granting) and, of course, unemployment benefits became the instruments of this policy. „Unemployment benefits or disability pensions provided a common but not always intended 'bridging pension' until normal retirement age. In Germany and Sweden, long-term unemployment benefits covered more than a year before preretirement (or disability) pensions at 60 (later up to three years in Germany, 1¾ year in Sweden), while they lasted for several years until normal retirement in the Netherlands (ages 57½-65) and France (ages 60-65 before 1982). In the Netherlands, the disability insurance, which had introduced favourable labour market considerations for older unemployed workers in 1973, became the major exit pathway at least for women. This has led the government to deplore the 'Dutch disease' and to cut back on disability rules since the late 1980s. Sweden completely closed its old-age disability pathway in 1992 as it had become too popular and costly during the sudden unemployment surge since 1989. In Germany, nearly half of all men and women received a disability pension until the early 1970s (for women lasting until the early 1980s), and since then about one in five new pension has been based on disability grounds, including a new additional pension for the 'severely disabled' at age 61, later already at 60" (Ebbinghaus, 2000). Liberally oriented countries made use of such methods of

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employment policy considerably less (Esping-Andersen, 1990). The US introduced early retirements in the basic public system (OASDI), but with substantial actuarial reduction. The UK preretirement program was short-lived.

Average statutory retirement age in OECD countries dropped by nearly 2 years during the second half of the 20th century to 62.5 for men and 61.1 for women – see Fig. 1. [The OECD uses the term pensionable age, which is defined as the age at which an individual with a full career can first receive full pension benefits in the main pension scheme. The term "full" here means that benefits are "actuarially" unreduced] (Chomik and Whitehouse, 2010). At the same time the human life was getting longer. Life expectancy after reaching the statutory retirement age increased in the period 1960-2000 from 13.4 to 17.3 years for men and from 16.8 to 22.1 years for women on average in the OECD countries. Fig. 1 also contains a projection of the statutory retirement age until 2050, according to the legislation in force at the time of the study, according to which life expectancy after the statutory retirement age reaches 20.3 and 24.6 years, for men and women respectively (Chomik and Whitehouse, 2010). Moreover, the effective retirement age was concurrently considerably influenced by the introduction of early retirement regimes after 1973. The era of a decline in the average statutory and effective retirement age ended in the nineties and in the first decade of our century. After a long period of promoting early retirement, OECD countries have started to implement various reforms aimed at fostering a longer working life.
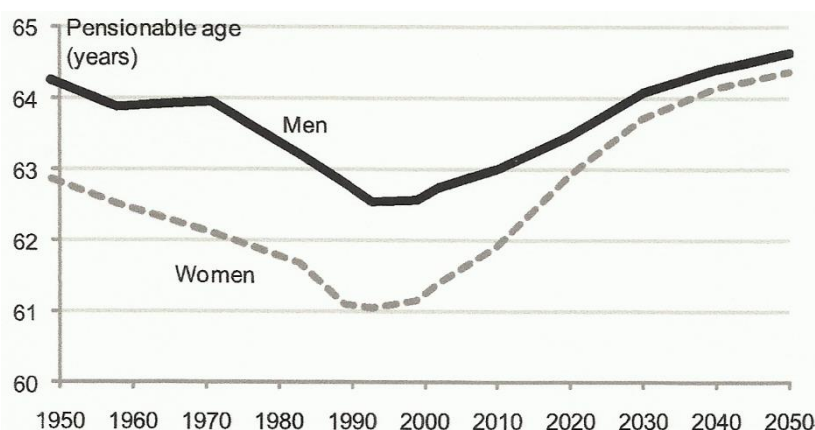
Fig. 1. Average statutory retirement age in OECD countries (Source: Chomik and Whitehouse, 2010)

According to the White Paper of the European Commission pension reforms (also) need to focus on removing unwarranted early retirement options which may apply to all employees or to specific professions. In some countries, the pension insurance system allows people with full contributory periods to retire before the statutory pension age. Some countries are also either reducing the levels of benefits provided by special schemes or closing these schemes. Whenever early retirement options are eliminated, it is important to ensure that the individuals concerned are enabled to work longer or, if this is not possible, can enjoy adequate income security (EC, 2012). Despite a recent reversal of the trend towards early retirement in many countries, the effective retirement age is still, on average, significantly lower than the statutory threshold.

In addition to increases in retirement ages, countries have introduced reforms to reduce incentives to retire early and to increase incentives to retire after the statutory retirement age. 10 OECD countries have mandatory schemes whereby clients contribute to their FDC personal retirement accounts – effectively shifting the risk of them living longer (and receiving a lower pension) – from the state to the individual. Another 4 countries run NDC personal retirement accounts where accumulated contributions and interest are converted into a periodic payment at a rate that depends on life expectancy (OECD, 2011).

In our country, early retirement has been relatively limited by the "small" pension reform. At present, early retirement is only possible at the age of 60 at the earliest, which means that women with more children are not able to retire early at all. In 2013, nearly all early old-age pensions were

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granted no longer than one year prior to the statutory retirement age, while in the period 2009-2011, there was a large majority of pensions granted 2-3 years before the statutory retirement age. The small pension reform caused a flow of early retirements, under the influence of information provided in the media. The reform increased the reduction rate for the assessment of early old-age pension where the period between the pension being granted and the person reaching the retirement age is longer than 360 days. The reduction rates for the calculation base are now scaled by 90 days as follows:

- 0.9% for the period of the first 360 days;
- 1.2% for the period of the next 360 days;
- 1.5% starting from the 721ˢᵗ day.

Increased reduction rate for early retirement more than 2 years before the retirement age to 6% per year is certainly commendable; nevertheless, the reduction rate should also be increased for the first 2 years and, in addition, 6% per year is not a sufficient reduction in actuarial terms, also because the reductions do not affect the basic amounts of the pensions. A fundamental reform of early old-age retirements is a must in our country. The actuarially neutral level of reduction rate for early old-age retirement is roughly 7-8% per year (Queisser and Whitehouse, 2006); based on the 2002 mortality data, the necessary neutral reduction rate might be approximately 7.4% per year – see Fig. 3.
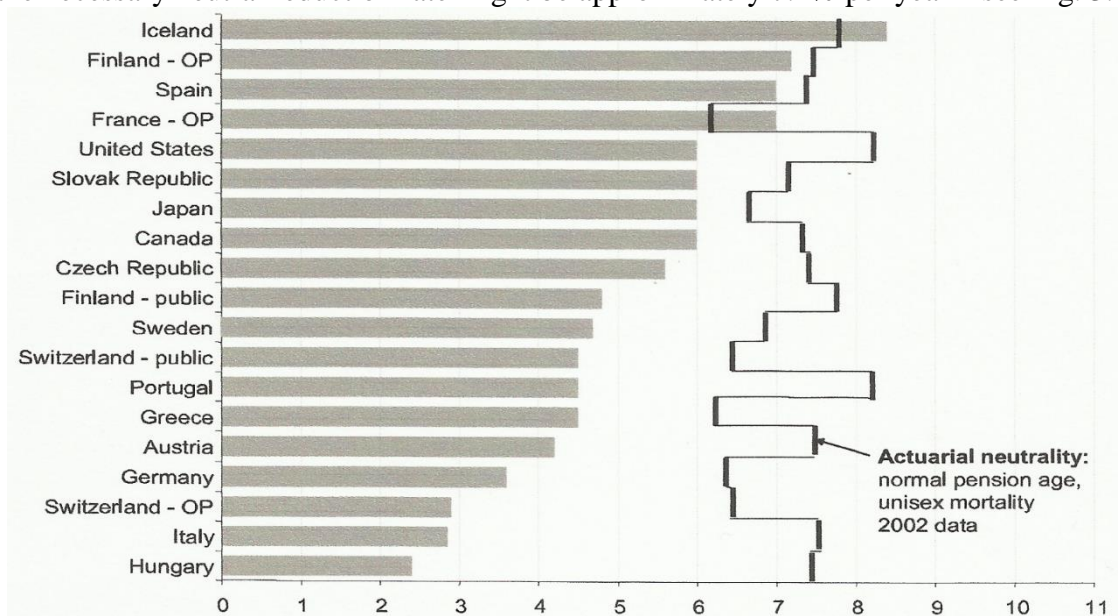

Fig. 3: Reduction of old-age pensions for early retirement, in % per year, 2% discount rate. (Source: Queisser and Whitehouse, 2006)

The MLSA (2014) Actuarial Report simulates the effect of the existing parameters of the Czech "pension insurance" on the generation born in 1965; for most of this generation the statutory retirement age of 65 years shall apply, which also means the possibility of early retirement by up to 5 years. For this cohort, the effective retirement age is being searched, when the individuals shall achieve the best balance between what they get from the system in the form of a pension and what they pay in the system as a premium. Unlike earlier calculations by the same experts, this analysis is not based on standardized individuals, but from specific persons and their expected individual pathways. From the perspective of individuals, a significant utilisation of early and postponed retirements is "effective" for this generation. The authors conclude that for 49% of these people it is "effective" (optimal) to retire before reaching the statutory retirement age and for 43% of the people it is advantageous to serve extra years; the timing of retirement just for the moment of reaching the statutory retirement age is thus effective only for the remaining approximately 8% of those people – for details see Fig. 4. Although the input data and analysis methodology seem to be perfect, on the contrary, the results in Fig. 4 seem quite surprising and difficult to understand. I especially expected from the analysis that the output will include assessing the actuarial neutrality of Czech reduction

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coefficients for early retirement. But the percentages in Fig. 4 do not show that and even were not supposed to show. The problem is, in particular, apparently in the fact that the model used by the MLSA optimizes the retirement age of each individual, with full knowledge of the year of his/her death. As if we all know in advance when we die – and we retire optimally accordingly. In reality, individuals may have certain information about their individual risk and accordingly – at least to some extent – to act. The pension system needs to take this adverse selection into account – and regarding the evaluation of Czech reduction coefficients for early and late retirement, I think that they should increase adequately to reduce significantly the mentioned adverse selection – that is what the actuarial mathematics of private and preferably also social pension insurance is about.

per cent

Difference from statutory age in years
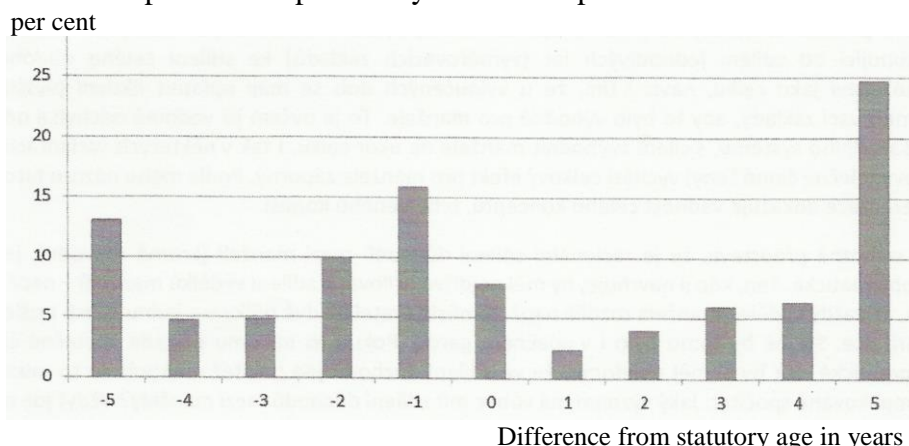
Fig. 4: Percentages of participants with effective retirement age in the given age: Czech 1965 generation. (Source: MLSA, 2014)

In recent years the real retirement ages in our country are significantly different than shown in Fig. 4; the retirement in a year of reaching the statutory retirement age dominates completely. The authors of the MLSA study state the fact of 2012, which was under the influence of the ongoing small pension reform, but even so early retirements by 1 year had a frequency of 30% and the retirement in the year of reaching the statutory age of almost 70%. In subsequent years, a zero difference from the statutory age dominated completely. These facts rather prove that the statutory retirement age is basically the only information that our individuals fully understand. Otherwise, we may rather doubt about the information superiority (and its use) of these individuals (in their deciding about the year of retirement).

The data in Fig. 4 can be taken as an expression of the quality of the entire current Czech "pension insurance" system. In this "insurance", in fact, – in about two-thirds – the flat-rate pension (Beveridge) prevails over the insurance pension (Bismarck). And early retirements do not belong to the flat-rate pension. In addition, in the Czech practice, only the percentage amount of the pension reduces, and not the so-called basic amount of the pension; perhaps even no one has thought that the total pension (paid from one pension pillar) should reduce.

The MLSA report concluded that "from the perspective of adjusting coefficients governing the early or later retirement amount of the pension, a suboptimal setting of these parameters for early retirements is evident. At retirement two years before reaching the statutory age and especially one year before reaching this age, the applied coefficients are too low and the profitability of retirement in this period is relatively high. Meanwhile it applies that when retiring three or more years before the retirement age, the coefficient is higher than it had to be, and its reduction would not substantially increase the incentives to retire at this time... At the coefficient for serving extra years, even a relatively small increase in this coefficient or setting some form of mild progression, has a significant potential to increase the incentive to postpone the retirement until higher age" (MLSA, 2014).

The issue of early retirement in the Czech "pension insurance" requires further research. One of questions is whether it is possible (or to what extent) to optimize deductions and surcharges for early and later retirement at respective progressiveness of Czech public pensions or at respective financing of such pensions. The premium for today's implicit pension insurance should be considerably lower,

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the premium rate from the wage should be by ca. 11% lower (Vostatek, 2016). The calculation of today's premiums for pension insurance as an individual's cost of acquiring the old-age pension is probably a big problem.

Pokorná (2016) carried out a lay advantage test of early retirement for a man born on 5 January 1953, without taking into account the time factor (interest), pension contributions and pension indexation, and concluded that this man (with average nationwide earnings and life expectancy of 20.4 years after reaching the age of 63 years, 46 years of insurance period) receives, in total, by 425 CZK more in the form of old-age pension if he retires one year before reaching the statutory retirement age. A more accurate calculation would have to take the time factor into account, and we can expect the conclusion that the most favourable option is to opt for early retirement as soon as possible, i.e. now after reaching the age of 60 years in Czechia.

At present, Czech insureds are not informed about the advantages of the early retirement; the lack of information in this regard actually causes financial "illiteracy" of the clients. In the US, the general level of awareness in this respect is apparently much higher. Nevertheless, the American OASDI is very similar to the percentage amount of the Czech old-age pension. Upon early retirement (at the age of 62 years at the earliest), the pension is permanently reduced by 5/9% for each month (ca 6.7% per year) up to 36 months, increased by further 5/12% per month (ca 5% per year) for an even earlier retirement. Bonus rate for pensions for longer gainful activity is set at 8% per year, up to the age of 70 years.

Altogether, our retirement age for men and the increase thereof is set at a level comparable to Germany and other Western European countries. The increasing of the statutory retirement age for women, where we still apply an unfounded differentiation based on the number of children brought up, is a highly topical issue and this problem can also be addressed in the context of a broader or narrower pension reform and family policy. Increased retirement age will also result in increased levels of pensions paid to women – thus reducing the gender gap in this regard. Potential strong motivation for early retirement caused by the low reduction rates for early retirement is a crucial weakness and a potential severe risk for the Czech public pensions. It is our duty to further deepen the analysis of Czech retirement and early retirement policy and subsequently significantly increase the level of awareness of the Czech population on the efficiency of the use of early retirements. Even at the cost of a substantial increase in the related fiscal risk.

5   Conclusion

The merit and disability concepts of the old-age pension are reflected in different ways in the role of the statutory retirement age in particular welfare regimes. The strict statutory retirement age, based on the presumption of disability, arose in the context of blue-collar social disability insurance system in Bismarck's Germany, and found the application also in the Czechoslovak blue-collar pension insurance. In the post-war period, the disability pension concept "moved" in solidary pension pillars, which are typical of the liberal, original social-democratic and, ultimately, neoliberal welfare regimes and which can secure old people also at the level exceeding the EU poverty line. In contrast, the merit old-age pension concept applied in the post-war pension reforms fundamentally in earnings-related pension pillars, which are typical for conservative and newer social-democratic welfare regimes. For more than 10 years, the World Bank has been recommending the NDC as a major pension pillar based on the actuarial equivalence and modern pension technique, which includes the statutory retirement age defined as an interval, e.g. 61-67 years. Solidary public pensions with a strict statutory retirement age, e.g. 65 years, are one of two supplementary pension pillars.

After World War II, medium life expectancy of elderly and the entire population starts to grow. Especially, after the first oil shock, the trends to introduce early retirement as a tool to solve the overall high unemployment without adequate actuarial equivalence were applied considerably. These public policies were applied predominately in the countries with conservative welfare regimes. At the end of the last century, this public policy is turning; it puts a greater emphasis on the employment of

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seniors, which also enforces changes in the early retirement policy and separation of the old-age and disability pensions concepts and also in the insurance pillars. Current pension theory recommends the use of early retirement only in these pillars, and only under the rules of actuarial mathematics. The purpose is also to support the extension of seniors' working activities and the interest in higher pensions. In the NDC system, this issue is optimally connected with the automatic projection of population ageing in the amount of pensions in the form of continuous updating of generation mortality tables.

Under the conditions of strongly deformed Czech "pension insurance", the analysis of the optimum retirement age for both individuals and whole cohorts is difficult. Basically, the only intelligible parameter of our "pension insurance" is the statutory retirement age, which is still significantly differentiated by sex and number of children. Previous research projects also indicate that increasing the awareness of people in pre-retirement age is or may be a significant fiscal risk.

6   Acknowledgement

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INDIRECT TAXES AS AN INSTRUMENT FOR PROMOTION OF ECONOMIC GROWTH

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Abstract
The main purpose of this article is to investigate the appropriateness of indirect taxes as an instrument for the promotion of economic growth. From a methodological point of view, the empirical analysis is based on a dynamic panel model, in which the data of selected EU countries in period of 1972 – 2013 is used. The results of analyses are in agreement with economic theory. Direct taxes are an important instrument for promoting economic growth. Economic growth is influenced by indirect taxes but less strongly in comparison with the impact of direct taxes. An excessively high level of tax burden through indirect taxes implies a decrease in economic growth.

Keywords
Economic Growth, Indirect Taxes, Investment, Human Capital

JEL classification
O47, E62

1   Introduction

Tax policy is essential for every country. The importance of tax policy is increasing, especially in the case of the current nineteen members of the Eurozone. Instruments of monetary policy cannot be liberally used in these countries. This implies that economic events can chiefly be solved using instruments of tax policy. One of the major and permanent problems of current developed states is that the economically active population is decreasing while the economically inactive population is increasing. Naturally, this has a negative impact on state budgets, because this situation promotes an increase in the expenditure side of the state budget, while the revenue side of budget decreases. Primarily, the problem is due to the ageing population.

An effective instrument for solving this issue with public finances is taxation. Taxes influence the behaviour of economic subjects and also economic output. Generally, the use of each instrument is connected with specific problems. Lag is a problem which is connected with the use of taxes as an instrument of tax policy makers, see Friedman (1993). Taxes as an instrument of policy makers can only be effective when the following assumptions are confirmed. The real influence of taxes has to be in agreement with theory. The suitability for intervention in the situation must be known in advance. It is necessary to know which sort of taxation is appropriate to be used. The relation between taxes and economic growth is important to investigate in different conditions. This is the reason why the main purpose of this article is to investigate the appropriateness of indirect taxes as an instrument for the promotion of economic growth.

From the point of view of this article, the 13 countries of European Union were chosen for empirical analysis. The main criterion was the availability of data for long time period. Economic growth is a phenomenon which is usually observed in the long run, see for example Acosta-Ormaecha and Yoo (2012). This article used data from the time period 1972 – 2013. The method of dynamic panel analysis was used to explore the relationship between taxes and economic growth. This article follows Vráblíková (2016), Kotlán and Machová (2014) and Acosta-Ormaecha and Yoo (2012). This article differs in the expression of human capital, method of estimation and sample of chosen countries in comparison with the aforementioned articles.

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2   Relationship between taxes and growth

The question regarding the adjustment of taxes is one of the oldest questions in economics. Jean Baptiste Colbert declared that the art of taxation is in plucking the goose so as to gain the largest possible amount of feathers with the smallest possible amount of hissing, see Rothbard (2011). This idea came from the second half of the 17th century and at present it is still current. From the point of view of recent economics, it is necessary to increase the tax burden without taxpayers noticing, see Mueller (2003). This implies the generation of tax illusion.

2.1   Theoretical growth models

The relationship between taxes and economic growth is examined by various scientists. There are many theoretical and empirical studies focused on the relationship between economic growth and taxes. The first studies were based on exogenous growth theory. Later studies have been created within the context of endogenous growth theory. Knowledge is based on the exogenous neoclassical growth model. The production function contains inputs like capital and labour, see Solow (1956) and Swan (1956). The disadvantage of exogenous models is the fact that fiscal policy is effective only in transition between states of permanent equilibrium, see Barro and Sala-i-Martin (2004).

The aforementioned approach was further extended by human capital. The production function is made of physical capital and human capital. The main purpose of this study was to examine whether the Solow growth model is consistent with international variations in standards of living. It was confirmed that convergence of countries is slower in models with human capital, see Mankiw, Romer and Weil (1992).

From the point of view of the one-sector neoclassical model with technological change, the following conclusions were made. Technological progress is sensitive to the rate of interest. An economy with a larger total stock of human capital will experience faster growth. Free international trade can act to speed up growth, see Romer (1990).

2.2   Empirical relationship between taxes and growth

In comparison with indirect taxes, direct taxes generally influence economic growth in more ways, see Stiglitz (1999) and Carey and Tchilinguirian (2000). This means that the impact of direct taxes is stronger than indirect taxes. From the point of view of economic theory, indirect taxes only have an impact through substitutions between leisure time and work. Individual taxes, corporate taxes and property taxes are parts of direct taxes. The most important influence can be found in the case of individual taxes and corporate taxes. Direct taxes have an impact on entrepreneurial behaviour, human capital accumulation and so on. Consumption taxes and value added taxes are contained within indirect taxes. The price of goods or services is increased by these types of taxes. Consumption taxes have an inelastic tax base, and do not have a progressive tax structure.

Empirical studies of the relationship between taxes and economic growth have differing results. This is a consequence of using different methods and various samples of countries. From the point of view of the model of overlooked labour, the following conclusions were derived. Economic growth will increase at the same rate as net investment in capital, see Levine and Renelt (1992). Human capital was defined using two different assumptions, see Capolupo (2000). The first assumption is that the process of human capital accumulation is driven only by the government. The second assumption is that public spending has an input in the process of formation of human capital. It was revealed that output taxation may raise growth rates when their proceeds are used to support education. The increase in growth implies increasing tax revenues, after which the accumulation of

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human capital is be enhanced. The relationship between taxes and economic growth can be positive. But it is only possible up to the level when the social cohesion of society is growing, see Scully (1991). The positive relationship between consumption taxes and economic growth was revealed in the case of European countries, see Alm and El-Ganainy (2013). Consumption taxes can influence economic growth positively through the decline of consumption, leading to an increase in savings, which helps to create investments.

The conclusion about the negative relationship is common in many articles or studies, see Ojede and Yamarik (2015), Widmalm (2001), Lee and Gordon (2005), Acosta-Ormaecha and Yoo (2012) and so on. The impact of consumption taxes was found to be the lowest in comparison with the influence of other taxes, see Widmalm (2001). The corporate tax rate is negatively correlated with cross-sectional differences in the average economic growth rate, see Lee and Gordon (2005). The effect of an increase in taxes on real GDP per capita is negative and persistent, see Karras and Furceri (2009). Economic growth is influenced negatively by taxes in case of OECD countries, see Kotlán, Machová and Janíčková (2011). The highest impact was revealed in the case of individual taxes, social security contributions and consumption taxes. The influence of corporate taxes was shown to be positive. The impact of value added tax on economic growth is difficult to explore. Results were very sensitive to small change in specification of models. Statistically significant results were not achieved in the case of property taxes.

The following conclusions were revealed in a sample of US states. The results found that property taxes lowered long-run and short-run growth. Sales taxes lowered only long-run growth. Income taxes have no short-run or long-run impact, see Ojede and Yamarik (2012). Another look at the short and the long run effect of tax policy on state economic growth is provided by Atemis (2015). His results show that a 1% increase in state and local taxes coincides with a 0,37% (0,33%) decrease in growth within the state in the short-run and long-run.

The characteristics of articles which are followed by this article are illustrated in figure 1. The following conclusions were made. The negative relationship between taxes and economic growth was found in the time period 2000 - 2011, see Vráblíková (2016). The most negative impact was proven in the case of direct taxes. The negative impact of tax policy was revealed with two or three years lag in the case of OECD countries, see Kotlán and Machová (2014). According to Acosta-Ormaecha and Yoo (2012), increasing income taxes while reducing consumption and property taxes is associated with slower growth over the long run. It was also found that income taxes, social security contributions and personal income taxes have a stronger negative association with growth than corporate income taxes. It was also confirmed that the shift from income taxes to property taxes has a strong positive association with growth, and that a decrease in income taxes while value added and sale taxes are increased is also associated with faster growth. These conclusions were found using 69 countries – high-income, middle-income and low-income countries.

Table 1. Characteristics of important articles

Article	Method of estimation	Sample of countries	Exploring time period
Acosta-Ormaecha and Yoo (2012)	Pooled Mean Group	69 countries	1970 - 2009
Kotlán and Machová (2014)	Arellano-Bond	OECD countries	2000 - 2011
Vráblíková (2016)	Arellano-Bond	14 OECD countries	1970 – 2011; 2000 – 2011

Source: own elaboration

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3   Empirical analysis

Our models are based on the growth model with human capital, see Mankiw, Romer and Weil (1992). Models were estimated in accordance with estimation used in articles which follow. The dynamic model can be written in this functional form (1)

$$y_{it} = y_{it-1} + \sum_{j=1}^{J} \beta_j X_{jit} + \sum_{f=1}^{F} \gamma_f TAX_{fit} + u_i + \varepsilon_{it}; i = 1, \dots, N, t = 1, \dots, T. \tag{1}$$

where i denotes countries and t denotes time. y_{it} is a dependent variable, y_{it-1} is a dependent variable lagged by one year. Regression coefficients (β_j; γ_f) indicate a change of explained variables caused by a unit change of explanatory variable. X_{jit} is a set of j growth variables, TAX_{fit} is a set of f tax variables. ε_{it} is a residual component.

Economic growth (y_{it}) is defined as logarithmic difference on a level of real GDP per capita in USD. This indicator was found in the statistics of the World Bank. The definition of independent variable is provided in the table 2. Mentioned definitions of variables and their relationship with dependent variable are in accordance with articles which follow.

Table 2. View of independent variables

Name of variable	Definition of independent variable	Expected relation with dependent variable	Source of data
Capital accumulations (I_{jit})	Real investments per capita.	($\beta_j > 0$)	World Bank statistics
Human capital (H_{jit})	Index of human capital[1]	($\beta_j > 0$)	OECD library
Total tax quota (T_{fit})	Share of total tax revenue on GDP	($\gamma_f < 0$)	OECD library
Quota of direct taxes (TD_{fit})	Revenue of tax on income, profits and capital gains on GDP (classified by OECD 1000)	($\gamma_f < 0$)	OECD library
Quota of indirect taxes (TI_{fit})	Revenue of taxes on goods and services on GDP (classified by OECD 5000)	($\gamma_f < 0$)	OECD library

Source: own elaboration

From the point of view of sample of countries, 13 countries of European Union were chosen: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Spain, Sweden, and Great Britain. These countries were chosen because of the availability of data for the longest time period (1969 – 2014). During statistics correction some observations were lost. Thus, models contain the time period from 1972 – 2013.

Descriptive statistics of unchanged variables from time period 1969 – 2014 are part of table 3. The number of observations is 584. It is a balanced panel. It is possible to know the differences between minimum and maximum values of the variable. All calculations were performed by E-Views (8).

Table 3. Descriptive statistics of unchanged variables from time period 1969 - 2014

	y_{it}	I_{jit}	H_{jit}	T_{fit}	TD_{fit}	TI_{fit}
Mean	30388.35	6666.82	2.46	36.53	12.99	11.11
Median	28340.04	6089.92	2.56	36.39	12.44	10.97
Maximum	87772.69	20129.89	11.27	50.88	33.19	16.59
Minimum	10904.15	2107.31	-8.87	15.50	2.25	4.34
Std. Dev.	12878.18	2899.49	2.74	6.88	5.52	2.25
Skewness	1.62	1.70	-0.38	-0.59	0.88	-0.23
Kurtosis	7.05	7.09	4.87	3.08	4.30	3.72

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[1]This indicator is made up of three main parts: investment in human capital, quality of this investment and the results of education.

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Jarque-Bera	655.83	687.14	99.68	33.54	116.66	17.81
Probability	0.00	0.00	0.00	0.00	0.00	0.00
Sum	17746797	3893423.	1439.298	21336.41	7586.064	6490.003
Sum Sq. Dev.	9.67E+10	4.90E+09	4378.491	27624.91	17739.90	2954.073
Observations	584	584	584	584	584	584

Source: own calculations

The dynamic panel regression was used for analysis. It important to use homogenous countries, see Barro and Sala-i-Martin (1995). The differences between the observed countries could have negative impact on the results. The condition of homogeneity was approved. The sample of countries contain the selected countries of the European Union. These countries have similar institutional environmenst and production functions. At first, each variable was put into logarithms. The interpretation of the results was made easier by the aforementioned first step. It is possible to compare the regression coefficients. The most important are signs of estimated coefficients. These describe how economic growth is affected by independent variables. The effect can be a sign of positive or negative. Estimated relationships between independent variables and dependent variables are part of table 2.

The dynamic models were estimated using the generalized method of moments. It is an appropriate method for investigating the relationship between economic growth and taxes with different time dynamics. It was the method used by Arellano-Bond (AB). The main principle of this method is the transformation of data into first differences, see Arellano-Bond (1991). The robust estimator White period was used. It is very useful as it means that estimates of parameters standard deviations and test hypothesis are in agreement with autocorrelations, see Baltagi (2008). The explained variable lagged by a year was used as an instrumental variable. The validity of instrumental variable was approved by Sargan test (J-statistics).

The results of estimations are shown in table 4. This was made using two models, a model with tax quota and a model with sub-components of tax quota. It was made because of multicollinearity. Estimated models were statistically significant and every variable was also statistically significant. It was revealed that taxes influence economic growth in these countries positively. Economic growth is influenced the most by direct taxes, and the quantitative influence of direct taxes is stronger than the impact of indirect taxes. It was found that economic growth is influenced positively by direct taxes and negatively by indirect taxes. Other conclusions were also found. Capital accumulation leads economic growth by one year. Total tax quota as an indicator of taxes lags economic growth by one year and the quota of direct taxes and the quota of indirect taxes lag economic growth by two years.

Table 4. The results of estimations

Dependent variable: Economic growth (y_{it})	TQ coefficient (t-statistics)	Sub-components of TQ Coefficient (t-statistics)
Economic growth (y_{it-1})	0.95(41.19)***	0.94(67.56)***
Human capital(H_{jit})	0.02(6.12)***	0.02(7.23)***
Capital accumulations (I_{jit+1})	0.03(2.29)**	0.04(3.04)***
Tax quota (T_{fit-1})	0.05(2.09)**	
Quota of direct taxes(TD_{fit-2})		0.04(3.02)***
Quota of indirect taxes(TI_{fit-2})		-0.02(-1.76)*
Instrument rank	13	13
J-statistics	11.34	10.67
Number of observations	466	466

Notice: t-statistics are adjusted for heteroskedasticity and autocorrelation; standard deviations are calculated using robust estimates; *, **, *** indicate significance levels of 10 %, 5 %, and 1 %, respectively.

Source: own calculations

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4   Conclusion

The main purpose of this article was to investigate the appropriateness of indirect taxes as an instrument in the promotion of economic growth. The relationship between observed variables was analysed by the generalized method of moments using the Arellano-Bond estimator. 13 countries of European Union were selected, which were available for observation during the time period 1972 – 2013.

The signs of the main part of regression coefficients are in agreement with expected signs (see table 2 and table 4). From the point of view of growth variables, it was found that estimated signs are equal to expected signs. In the case of tax variables, it was revealed that estimated signs are equal to expected signs, but only in the case of indirect variables, for similar conclusions see Vráblíková (2016). The result can be a consequence of the construction of tax quota, see Kotlán and Machová (2014) or it can be caused by the sample of countries – most countries selected are high-income countries. The explanation can be that the adjustment of tax burden is at the level when the social cohesion of society is growing, see Scully (2011).

Other conclusions were also found. It was proven that the impact of direct taxes is stronger in comparison with the influence of indirect taxes. These results are in agreement with the conclusions of different articles, see Acosta-Ormaecha and Yoo (2012) and Kotlán and Machová (2014). Taxes influence economic growth with one or two year lag. This is in agreement with the conclusion of other articles, see Kotlán and Machová (2014). This is important information for policy makers. It is necessary to know the effectivity of using policy, i.e. the tax horizon.

From the point of view of tax policy makers, it was proven that taxes are an effective instrument for influencing economic growth. It was revealed that indirect taxes are an appropriate instrument for the promotion of economic growth. Nowadays, adjustments in the tax burden of indirect taxes is fixed to high level. This means that an increase in indirect taxes negatively influences economic growth. The adjustment of the tax burden of direct taxes is on a level where economic growth is not decreased by the increase of direct taxes.

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LOBBYISTS REGISTERS AS THE MAIN MEASURE OF LOBBYING REGULATION?

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Abstract
Already seventy years have passed from the first lobbying regulation and many discussions were held about lobbying regulation until now, still the lobbying regulation is not a wide scale activity nor in most developed countries of the world. Paper deals with the Lobbyists/Lobbying Registers from different point of view: their foundation, who is maintaining the Register, definition of type of subjects required to register and the rules for registration, type of registered activities, different information in registers including the frequency of disclosure and updates, and public availability.
Analysis of Lobbyists/Lobbying Registers is made on the matter of existing lobbying regulations in the countries, both as the legal regulation and internal rules and/or Codes of Behaviour/Ethics. Due to the fact of different setting of lobbying regulatory systems in the countries, the main goal of the paper is to present various models and combination of factors needed for Registers to operate well (minimal standards) and the interesting, new and inspirational measures introduced rather than to present any universal recommendations in the field of lobbying rules.

Keywords
Lobbying, Register of lobbyists, transparency, executive branch, legislative branch.

JEL classification
D72, H0, K19

1   Introduction

Decision-making – in terms of Economic Policy point of view – is a key activity of Governments and Parliaments in the world. And it is the most visible one that attracts the attention of media, citizens, business and taxpayers, and various interest groups as well as. Taking decisions is demanding from the process point of view (current rules, compatibility with decisions in the past, context, role of time etc.), institutional and organizational (including actors/stakeholders, structure, competency and responsibility), and knowledge and information, to name the most important. This became rampant if we adopt the fact of increasing complexity of the world, limited knowledge and understanding of decision-makers about the matter they deal with (both elected and/or designated) and therefore the increasing reliance on expert system and expert knowledge (Giddens 1990). Many decision-makers in the political arena confirm they on one hand are overloaded by many issues, information, but on the other hand have lack of expertise information (Heipertz and Verdun, 2011, p. 88; Innerarity, 2013, p. 73–74; Schendelen 2005).

Lobbyists and interest groups are those who are welcomed because they can bring new, up-to-date, expertise information and very often they really "know the case/issue". In fact, there is always a risk they will present information for their benefit, present biased information, filter and pick-up facts they need to. The close ties between lobbyists and interest groups on one hand, and the politicians, senior civil servants and decision-makers on the other, open up disputes about quality of democracy, questions about representation, decision-making, corruption, as well as bear a lot of speculations. If we accept the role of lobbying in modern societies with all positive and negative aspects, the question is then how to shed a light on the interactions and contacts between the political sphere and the (mostly) business.

One way, how to deal with transparency of lobbying is to introduce any rules for lobbying and lobbyists (see e.g. Vymětal, 2015; Müller et al., 2010; Chari et al., 2007) and the Register of Lobbyists/Lobbying is one specific tool that is introduced. The main goal of the paper is to analyze different aspects of Lobbyists/Lobbying Registers (LLR) in EU countries if they exist – their establishing, main information published in the Register, type and frequency of regular disclosures,

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branches and lobbyists coverage. The paper is organized as follows. Chapter 2 anchors the lobbyist/lobbying registers in the main models of lobbying regulation and in EU countries that have currently adopted and/or introduced any rules in this respect. Third chapter makes detailed analysis of the specific component of lobbyist/lobbying registers focusing on foundation of LLR, basic requirements for registration and the disclosure and penalties.

The analysis of main measures taken in term of lobbying regulation that are mostly expressed in the form of Act and Code of Conduct/Ethic, and its comparison are the core methods used in this paper. Moreover, any special rules and/or practices defining the process of registration, various manuals, FAQ and other materials issued by Registrars were included as well as.

2   Lobbyist/Lobbying Register

Until these days, roughly twenty countries of the world have introduced any rules that can be somehow linked to lobbying and lobbyists. In Europe, there are only 10 countries and the EU institutions that have introduced any rules for lobbyists/lobbying (namely in alphabetic order Austria (2012), France (2009/2010), Germany (1951), Hungary (2006–2010, partly from 2010), Ireland (2015), Lithuania (2000), Netherlands (2012), Poland (2005), Slovenia (2010), United Kingdom (1974 rules in House of Commons, in 2014 bill); EP (1996), EC (1993). Compared to the USA and Canada, the main regulation process was started after 2000, especially the post-socialist countries were in the first wave.

The main problem in terms of lobbying rules is, there is no single pattern/model of regulation applied and there are seven possible meaningful models combining three criteria: 1) form of regulation (direct (lobbyists) or indirect (targets of lobbying)), 2) way of imposition (internally or externally), and 3) the legal liability (law or Codes of Conduct/Ethics) as I have analyzed elsewhere (Vymětal, 2015, p. 753). However the range of especially indirect rules linked with lobbying is used as analyzed in TI Lifting the Lid on Lobbying Project (TI, 2015), the Lobbyist/Lobbying Register goes mostly along with the legal regulation of lobbyist/lobbying, the self-regulation of Parliament (MPs' Code of Conduct) and self-regulation of lobbyists (Code of Conduct/Ethics) – both the mandatory and voluntary registering system can be introduced. The other models do not mostly introduce Lobbyist Register.

Before the deeper analysis of LLR, it is worthwhile to make some clarifications. Although there is no general agreement on the basic definition of lobbying and lobbyists and all jurisdictions use their original definitions, we could not skip this problem (however it deserve a deeper analysis). Basically, the lobbying as the activity is understood as *"oral and/or written [or other form, including electronic] communication with public office holders and/or decision-makers [targets of lobbying] in an attempt to influence decisions"* (Pross, 2007, p. 14, definition extended by the author). From that point of view, lobbyists are one party of the lobbying interaction, and very often the active part of the influence that covers various groups of entities – companies, NGO's, associations, lawyer firms and individuals. In this respect, the range of subjects defined and/or understood as lobbyists is more variable in practice than the definition of lobbying. But those differences and its analysis overreach the purpose of this paper.

3   Main components of the Lobbyist/Lobbying Register in EU countries

The LLR seems to be a feasible measure that can be taken to regulate lobbyists and lobbying activities with the goal to support transparency of decision-making process. How simple it looks like from the first sight, its own anchoring (definition, structure and coverage) can create a significant contribution to the final transparency of lobbying activities and lobbyists.

As mentioned above, out of 28 EU member states 10 countries and the European Parliament and European Commission have or had in the past any rules addressed directly to lobbying and lobbyist. Except Hungary (from 2010), all other analysed countries have introduced the publicly available

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Lobbyists/Lobbying Registers, as well the joint register of EP and EC is. And the Registers differ in many ways, which we analyze below.

Hungarian case is special one. The regulation established a register, but the law was replaced in 2010 and officially there is no register and rules for lobbyists anymore. Thus, there is an online system of amending the legislation that can – in a limited way – shed any information on lobbying activities, but still it is not replacing the register of lobbyist.

All aspects and differences of LLR are for clarity divided in to three groups:
1) foundation of LLR and its institutional setting;
2) basic requirement set for lobbyists registration and information published;
3) regular disclosures and penalties.

3.1 Foundation of registers and its institutional setting

The first group of fundamental institutional setting of LLR includes *form of decision* taken on the register or more precise, the form of decision on the lobbying regulation. There are four basic possibilities – a bill, a governmental rules/decrees, internal rules in Parliament (Codes of Ethics, Codes of Behaviour only), and self-regulation by lobbyists. Six of the countries created register by a bill; three by the decision/internal rules of Parliament (by amendment of the Rules of Procedures and Code of Behavior for lobbyists); EP and EC established register as a result of an agreement as shown in the Table 1. Only Hungary currently has no rules, although they run a register in 2006–2010.

Second aspect, the scope of regulation is important. Here, two important aspects are found – the *branches* covered by the regulation, and the range of lobbyists covered. Frequently the lobbying rules cover the legislative process (therefore mainly MPs and legislative branch, but partly also the governmental phase of legislative process can be included), but the decisions lobbied in executive branch are not automatically included – only half of the countries do so. Especially in the case of adopting, changing or enacting the laws, the executive branch shall play an important role, but can be excluded from the regulation (mostly in the cases of rules established internally in the parliament). There is no rule that countries that adopted rules by a law cover both branches! Moreover, some countries (Austria, Ireland and Hungary till 2010) incorporate as relevant subject lobbied in a limited way the decision taken by local governments also (see Table 1). Rather, the definition of matters/objectives lobbied creates a strong link toward the type/branch of decision-makers. Therefore, definition of what type of decision can be lobbied seems to be crucial.

Subsequently, the *range of lobbyists* covered by rules is a variable in terms of effectiveness of regulation. There are basically three types of lobbyists – professional (consultants) and in-house (corporations and organization (NGOs)) – that are recommended to differentiate in the regulation (OECD 2010). However, 8 countries deal with professional lobbyists (except Germany and Hungary) and only 4 of them also cover in-house lobbyists. Moreover, the registration in France, Netherlands and in EP/EC is voluntarily. The main critique from abroad is linked to the very narrow definition of lobbyists because majority of lobbying sector and the most intensive part is not regulated. The experiences from Australia, Poland and Lithuania show that only 10-15 % of subjects promoting lobbying in practice, is in the Register (see number of registered lobbyist in June 2016 in Table 1).

Third question is *which body* administers, maintains the register and monitors the list of lobbyists and their activities. However it might be logical to keep it in the parliament, due to the fact of aiming the regulation with legislative process and for the second due to the controlling role of parliament over government in parliamentary democracies, only half of the countries do so (four of them set the lobbyist rules as their internal initiative). Three countries left this competence to the ministry and or bodies run by government. Only two registrars declare their position as independent bodies (Slovenia and Ireland).

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Table 1. Fundaments of Lobbyists/Lobbying Registers

Country	Form of regulation	Targets of lobbing (branches)	Lobbyists	What issues can be lobbied?	Who runs the Register	Number of registered lobbyists
Austria	Bill	L, E, partly CS, partly LG	P, i-hC, i-hO	Bills, policies at federal, state and local level	Ministry of Justice	270
France	Rules of Procedure	L	P, i-hC, i-hO	Bills	Office of the National Assembly, Senate Bureau	270 in NA, 95 in Senate
Germany	Rules of Procedure	L	i-hC, i-hO	?	Speaker of the Bundestag	2200
Hungary 2006	Bill	L, E, LG	P, i-hC, i-hO	Bills, G	Supreme Office of Justice	250
Hungary 2010	Bill and Govt Decree	L, E	-	Bills	-	-
Ireland	Bill	L, E, partly CS, partly LG	P	Bills, G	Standards in Public Office Commission	1300
Lithuania	Bill	L, E, partly LG	P	Bills	Chief Official Ethics Commission	35
Netherland	Rules of Procedure	L	P, i-hC, i-hO	Bills	Lower House	95
Poland	Bill	L, E	P	Bills and Governmental Decrees and regulations	Ministry of Interior and Public Administration	380
Slovenia	Bill	L, E, partly CS, partly LG	P	Regulations and documents	Commission for the Prevention of Corruption	65
United Kingdom	Bill	E	P	Governmental drafts of laws, G	Office of the Registrar of Consultant Lobbyists	130
EP/EC	Agreement	L, E	P, i-hC, i-hO		Joint Transparency Register Secretariat	9500

Notes: CS – civil servants and public sector employees, E – Ministers and their secretariats, EB – executive branch, G – governmental/public policies, contracts, agreements, grants, financial assistance, licence, authorisations L – Members of Parliaments, LB – legislative branch, LG – local governments representatives, P – professional lobbyists (consultants), i-hC – in-house lobbyists corporations, i-hO – in-house lobbyists organisations

Source: national regulations on lobbing and webpages of registrars.

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3.2 Requirement set for lobbyists registration and information published

The second group of variables that have impact on efficiency of the register are the conditions and requirements set in order to register and information required to be published in the Register (mostly the publicly available information). Compared to the U.S., there is no minimal financial income and/or expenditure thresholds for mandatory registration, as well as no European country set any explicit number of contacts for registration. Rather, European countries implicitly counts with *ex-ante registration* before the lobbying activities are performed, and it is demonstrated by using the tool of passports (four of the countries (GE, NL, FR, HU (2006-2010)) and EP/EC), ID licence card and last but not least, to be listed in the Register in order to be checked by targets of lobbying before the lobbying contact. Thus, not all European countries set the registration as mandatory system for all lobbyists and some countries (those setting rules internally in the parliament) explicitly declare that registration is voluntary.

There are often *no specific requirements* in Europe set for the lobbyists excluding those that classify them into different lobbyist categories. Implicitly it is assumed all entities that are subject of the regulation should have the legal capacity. Only Lithuania sets specific requirements – the lobbyist cannot be convicted for a crime (art. 3 (4) of LV (2000)) and in Hungary (2006-2010), which required a university degree of lobbyists (Sect. 7(2)(c) of HU (2006)).

The variety of *information listed in register* varies significantly across the European countries. The basic information about lobbyists – the name, address – is published in the registry ordinarily, but Registrars also require more than those one: in the case of companies, the names of directors and management (LV, SL, UK, HU until 2010, EP/EC); description of main activities of the lobbyist (AU), partnerships (UK) and affiliated organisations and number of members (GE), reference to the Code of Ethics (AU, UK, HU until 2010). Four of the countries also collect data disclosing the names of the lobbyists that will perform the lobbying activities in the name of the client and/or employer (AU, LV, NL, PL). In Austria very specifically, professional lobbyists have to register the contracts for lobbying activity with his/her client before they start to perform lobbying activities. No country requires any notice from lobbyists about quitting the lobbying industry – it is completely voluntary. Nearly half of the countries and the EP/EC require the information about the main areas of interest and/or issues the lobbyists focus on. Not all of this data are publicly available. And also, the lobbyists are required to keep the information up-to-date.

Table 2. Information disclosed in the LLR

Type of data/information	Countries
Name and address of the lobbyists and/or lobbying company	AU, FR, GE, HU (2006), IE, LV, NL, PL, SI, UK, EP/EC
Name and the address of the clients	AU, FR, HU (2006), IE, UK, EP/EC
Data on partnership and membership in associations	AU, GE, HU (2006), EP/EC
Main area of lobbying/area if interest representation	FR (Senate only), GE, PL, SI, EP/EC
Name of lobbyists performing the lobbying for company/client	AU, LV, NL, PL
Info about quitting lobbying business	HU (2010), voluntary in LV, PL, SI

Source: national regulations on lobbing and webpages of registrars.

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3.3   Regular disclosures and penalties

The third group of variables is connected with regular disclosures made by lobbyists. There are significant differences across the jurisdictions. First problem is the *frequency of the updates and disclosure*. Half countries require disclosures annually, respectively EP/EC at least once a year, in Ireland three-times a year, two countries four-times a year, and Germany and French Senate quite vaguely "several times a year". Only Netherland does not specifically address any duties in this term.

Second problem is the *content of the disclosures* made by lobbyists. Seven countries and EP/EC require keeping basic information (names, names of directors, addresses etc.) updated, latest during the regular disclosure. Six of the jurisdictions need updated date on clients, four the list of lobbied issues (bills, decisions etc.). Half of countries (AU, FR (lower house), HU (2006), LV, SI) and EP/EC ask for any financial data on lobbying activities and only three of the collect data on gifts an/or donations to the political parties (FR lower house), HU (2006), SI). Surprisingly, data on targets of lobbying influenced and form and manner of lobbying are rather exceptional. The Austrian system requires to up-date all contracts in the registry.

Third category is the *penalty* for non-compliance with the regulation. The financial and criminal penalties can be used. Half of the European countries use the financial penalties, no country (compared to USA and Canada) use criminal penalties for breaching the law. On the other hands, the temporal withdrawal of the lobbyists from LLR and the ban for lobbying activities is used currently in 6 countries and EP/EC – the time varies according to the relevance from 3 months up to 5 years. The Table 3 summarizes varieties of requirements of lobbying disclosure and penalties.

Table 3. Information required in regular disclosures made by lobbyists

Type of data/information	Countries
Frequency of disclosures (times a year)	1x – AU, FR (lower house), LV, PL, SI, EP/EC 3x – IE 4x – HU (2006), UK continuous – FR (Senate), GE
Names of clients	FR (lower house), IE, LV, PL, UK
Matters lobbied (bills, decisions)	HU (2006), LV, PL, SI, EP/EC
Financial data (income, expenses)	AU, FR (lower house), HU (2006), LV, SI, EP/EC
List of institutions and POH lobbied	HU (2006), IE, SI
Form, manner and technique of lobbying	IE, LV, PL, SI
Data on gifts and political parties donations	HU (2006), SI
Financial penalties	AU, HU (2006), IE, PL, UK
Temporal ban on lobbying and withdrawal from LLR	AU, FR, HU (2006), LV, NL, SI, EP/EC

Source: national regulations on lobbing.

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4 Conclusion

The comparative paper shows the varieties of lobbying regulation, focusing more specifically on one measure introduced – the Lobbyists/Lobbying Registers. As presented here above, there is no single pattern that countries introducing lobbying regulation follow. The reasons for differences are many but the most important are the fundamental rules for lobbying activities and institutional background of regulation, and especially how the register was established (within the Parliament, by a law, governmental regulation) and which branches and to what extend are covered. The most significant seems to be the scope of activities registered within the register – what type of lobbyists is subjects of lobbying regulation/register and what information is required to disclose on their activities, including the information on lobbyists clients.

Although lobbying regulation became a topic for many politicians in last decade that was inspired by the anti-corruption fight and/or more transparency in decision-making, many countries stayed in the doors rather than entered this area. The information from the register is very limited, published late and mostly covers the professional/consultant lobbyists only. One of the explanations can be addressed to the prevailing corporativist ties between politicians and umbrella associations. Information on who was the target of lobbying is not common in registers also. The registers itself have many limitations and are the only one measure of the complex system of lobbying regulation. If the register stand as the main measure and is not followed e.g. by legislative footprint as the one of complementary measure, they can be ineffective in term of taking simplified picture of reality of interest representation and influence. In this respect countries are still facing many challenges how to increase transparency in decision-making process and working lobbying regulation.

5 Acknowledgement

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THE OPTIMAL STRATEGY OF THE DEMAND FOLLOWING FIRM

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Abstract
The optimal strategy of a firm in a competitive environment is generally derived from the price of produced good and its market demand. However, the firm usually has to make a decision about its future production and hence its supply at the moment when neither the price nor the market demand is known yet. In this case, firms are often recommended to keep inventory as a "buffer stock" to cover the fluctuations in future market demand. Keeping high inventory as well as providing insufficient supply is penalized by the increased costs which decrease the competitiveness of the firm on the market.

The main goal of this paper is to derive the optimal production strategy of the demand following firm. The optimal production strategy should lead to a firm supply, which could satisfy the demand and will be not connected with keeping too much inventory. The dynamic optimization problem of the firm is solved. As there are different expectations about the growth of the aggregate demand during the phases of expansions and contractions in the economy, the optimal production strategy of the firm varies with the cyclic movement of the demand. The proposed firm strategy is to supply an amount of good according to the last growth of market demand, the change in the consumer confidence and the level of firm inventory. The strategy was tested on the aggregate data of the Czech economy.

Keywords
Optimal strategy, Firm behaviour, Competitiveness, Production, Dynamic decision making, Inventory, Buffer stock.

JEL classification
C44.

1   Introduction

The optimal production strategy of the firm depends on the demand for the produced goods. However, in the moment when the firm is making decision about its target production, the demand for the good is not known and usually also difficult to estimate. The errors in forecasting future demand hence could lead to the firm loss, and further to the decrease of the firm competitiveness. According to Fisher et al. (1994) firms are usually trying to solve this problem by product differentiation or mainly by just-in-time inventory systems, based on the quick response of production on forecasting errors. As Fisher et al. (1994) state, these systems are usually not very efficient. The firm losses are mainly based on keeping to much involuntary inventory or from the lost sales, which are usually neither calculated nor estimated and are caused by insufficient supply. According to Fisher et al. (1994) firms should improve their forecasts by observing the demand indicators and using the systems for tracking forecast errors.

Kahn and McConnell (2002) note that firms are often recommended to produce an extra inventory, which could serve as a "buffer stock" for unexpected fluctuations in demand. As Benjaafar, Kim and Vishwanadham (2004) notes, keeping such inventory especially with various products could be connected with high costs. The importance of considering inventory while defining the firm production strategy was also stated by Blinder and Maccini (1991). The size of an extra inventory is usually determined by keeping a fixed inventory-sales ratio. West (1989) argued that fluctuations in gross national product (GNP) and inventory in US are caused by the demand and mainly cost shocks and on a simple linear-quadratic inventory model performed that keeping plausible constant inventory-sales ratio the cost shocks can be in fluctuations less important. The stylized fact about the inventory, mentioned for example in Kahn and McConnell (2002), is that inventory is behaving procyclically. However, according to Bils and Kahn (1999) the inventory-sales ratio is not constant

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during the cycle. This inventory puzzle is usually explained by variable marginal costs and returns during business cycle.

The goal of this paper is to derive the optimal production strategy of the firm during the business cycle. We consider that the firm is operating in a competitive environment and is a price-taker. For the simplicity, we take the price, average costs and returns as fixed. Hence, we do not take into account the optimization according to the changes in averages costs and returns. We construct the dynamic optimization problem of the firm according to the proposals of Fisher et al. (1994), concentrating on decreasing losses from involuntary inventories and lost sales and building the demand forecast according to the economic confidence indicator. The derived production strategy for the firm includes a different target for the phases of expansion and contraction in the growth of the market demand. The proposed firm strategy is to supply always the maximum from the amount of goods derived according to the last growth in the market demand (this is mainly the case of contraction) and the amount derived from the combination of the last growth of the market demand and the difference in the consumer confidence (to predict the increase in growth mainly in the phases of contraction), this strategy could decrease the losses from the lost sales by not undervaluing the market demand. In the same time, the losses from keeping involuntary inventory are decreased by incorporating the decrease of firm inventory into the target production function. This strategy is further tested on the data of the Czech Republic.

The dynamic optimization problem of the firm is presented in Section 2. The proposed solution of the problem in the phase of expansion and contraction is described in Section 3. The application of the proposed strategy presented on the data of the Czech Republic in in Section 4. Section 5 concludes.

2   The firm optimization problem

We define the optimization problem for the firm entering the market with competitive environment. Thus, the price of the produced goods P is determined by the market and the firm is not capable to change it. For the simplicity, we take the market price of goods constant during time, as well as average costs for production (AC) and returns of the firm.

The variable marginal costs and variable returns could lead in this dynamic model to speculations about the optimal time for production the good and the optimal time to sell it. Indeed it would be convenient for the firm to concentrate on production in times of low marginal costs, accumulate the inventory and sell it in times of high returns. However, this strategy could be applied only for some types of goods. The produced goods has to be durable, the costs of keeping inventory should be lower than the profit gained from postponing the sale, the firm should have an access to capital in times of high production etc. According Fisher et al. (1994), one of the ways to increase the sales is offering new versions of a product. Thus, even durable good produced few periods ago could not be demanded anymore.

The definition of the optimization problem of a firm is in line with general conception as maximization profit with respect to production possibilities. I extended the maximization function for two penalizations - the penalization κ for keeping inventory I_t in time t and the penalization δ for lost sales. Further, I assume that the penalization for the lost sale is much greater that the penalization for keeping inventory, e.g. $\delta \gg \kappa$ because the loss from keeping inventory is only slightly increasing the production costs of goods but lost sales are opening the space for entering the other firms to the market and is thus decreasing the competitiveness of the firm.

The firm's optimization function is defined as

$$\max_{Q_t} \sum_{t=0}^{\infty} [(P - AC)MR_t - \kappa I_t - \delta(D_t - MR_t)],\tag{1}$$

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where Q_t is the production at time t, I_t inventory kept from time t to time $t+1$, D_t the market demand at time t and MR_t the realised sale of the firm on the market at time t. The firm is making decision about its production according to conditions

$$S_t = Q_t + I_{t-1},$$ (2)

$$MR_t = \min(S_t, D_t),$$ (3)

$$I_t = S_t - MR_t,$$ (4)

where S_t is the supply of the firm on the market. Besides these conditions, the firm always knows the phase of the business cycle (expansion/recession) and disposes with the economic confidence about the expected future development of the market demand $CONF_t$ at time t. In addition, we have to remind that in the optimization problem of the firm, the firm is not considering nor calculating that it is influencing the market demand by its production (respectively the wages paid to consumers) and by its supply from previous period. Thus, the market demand for goods is for the firm given exogenously.

3 The optimal production strategy

3.1 Solving the optimization problem of the firm

We can try to search for the optimal solution by derivation the maximization function, using Lagrange multipliers and application Bellman equation. However, we can pretty much simplify the problem with few considerations.

Firstly, the firm is operating in the competitive environment, which implies that its profit is zero. Hence the term $(P - AC)MR_t$ is zero and the maximization function (1) could be transformed into minimization of penalization costs, e.g.

$$\min_{Q_t} \sum_{t=0}^{\infty} [\kappa I_t + \delta(D_t - MR_t)].$$ (5)

The optimal solution will be the case with no penalizations, e.g. the production which will be always equal to immediate market demand. In this case there will be no inventory and no lost sales. However, the firm in the moment of decision about its production does not know the future demand.

Secondly, there are only three possible situations which could happen - the firm will offer the supply which will be either lower, equal or higher than the market demand. In case of lower supply, the difference between the demand and supply (equal to $D_t - S_t = D_t - MR_t$) will be penalised with δ and there will be no costs for keeping inventory. In case of higher supply, the difference between the supply and demand (equal to future inventory I_t) will be penalised with κ and there will be no other penalisation costs. From the assumption $\delta \gg \kappa$ (the penalization for offering lower amount of goods than is demanded is much bigger than penalization for keeping inventory) follows that for the firm is always better to overestimate the market demand that underestimate it. The optimal strategy is than to try to offer the same amount of good which will be demanded or more and the optimal solution should therefore in the most cases satisfy the condition

$$S_t \geq D_t.$$ (6)

Thirdly, as the firm's supply is defined as the sum of immediate production and inventory from the last period (equation (2)), we can easily switch targeting optimal production Q_t^T to targeting optimal supply S_t^T and deduce the optimal production as

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$$Q_t^T = \max(S_t^T - I_{t-1}, 0) \tag{7}$$

The whole problem is than reduced to the problem of estimation future market demand. This unfortunately could not be solved from the firm's optimization problem anymore. If we look back into the definition of this problem ((1)-(4)) we can see that there are only conditions describing the mechanism of the determining and rolling the inventory into new periods, which were already analysed and imply the optimal solution for this problem - producing always on the level determined by (7), corresponding to the target supply equal to immediate market demand.

3.2 Searching for estimation of the market demand

Now we can focus on the way how the firm could estimate the future market demand. This field is obviously open to range of estimations from the adaptive ones, simple ones or estimations based on trend values, probability distributions and other sophisticated methods.

Until now the majority of the theoretical microeconomic concepts about the firm's optimization problem does not include the estimation of future demand and works with the same firm's strategy regardless the phase of a business cycle. Thus, I would like to propose a simple way how to form the estimation demand and take it into consideration in firm's production strategy. This simple strategy could be a starting point for the small firms with limited sources on market analysis and could be further improved by learning and error corrections.

According to the setting, the firm has in the time t only information about market demands from previous years and economic confidence about the future market demand. By searching for the demand estimation we can divide the situation into two cases - the case of expansion and case of contraction of economic activity. The market demand has a long-term growing trend and the phases of expansions and contractions in economy are nowadays not strictly characterised by the increase or decrease of the aggregate demand but rather with the increase or decrease in the growth of the aggregate demand. Thus, we will distinguish the situation in economy according to the growth of market demand into two cases – the case of expansion, when the growth rate is growing, and the case of contraction, when the growth rate is decreasing.[1]

In the phase of contraction the firm expects that the future fall in the growth rate of demand, e.g.

$$growth(D_t) \geq growth(D_{t-1}), \tag{8}$$

where

$$growth(D_t) = \frac{D_t - D_{t-1}}{D_{t-1}}. \tag{9}$$

On the other side, the firm is not sure, if the economy is not already in its downturn and the demand could only stagnate on its value from previous period. Thus, setting the target supply according to the last growth rate of demand could be the safe solution

$$S_t^T = [1 + growth(D_{t-1})] \cdot D_{t-1}. \tag{10}$$

The future inventory will be

$$I_t = S_t^T - D_t = [growth(D_{t-1}) - growth(D_t)] \cdot D_{t-1}. \tag{11}$$

By this production setting the firms' inventory will be during the phase of contraction in each period always increased maximally for the fall in the market demand generated by the fall in growth rate of the demand.

---

[1] The expansion and contraction should not be here misunderstood as an expansion or an contraction as a phase of business cycle, but is strictly distinguishing the growing and decreasing trend in the growth rate of aggregate demand.

In the phase of expansion, the firm expects that the growth rate of market demand is growing. Unfortunately, firm could not use the same strategy as in case of contraction, because setting the target supply to the level of last market demand adjusted for the last value of its growth rate would lead to underestimation of the future demand. Hence the firm has to try to estimate the future growth, but in the same time not to overestimate it too much because it would be connected with penalization costs of keeping inventory. In this moment the firm can invent the simple or more complex strategies built on short-term trend in market demand etc. We would like just to offer one simple solution for the firm, which could be setting the expected growth of future demand as a weighted sum of the target demand following the growth rate of previous period and demand reflecting changes in economic confidence. The influence of sentiment on the economic activity was emphasized by Keynes (1936). Further, due to statistical measurement of economic confidence, the importance of economic confidence for predicting the evolvement of economic activity was also confirmed for example by Acemoglu and Scott (1994), Mueller (1966) or Ludvigson (2004). Thus, we propose to define the target supply as

$$S_t^T = \gamma[1 + growth(D_{t-1})] \cdot D_{t-1} + (1-\gamma)[1 + \beta(CONF_t - CONF_{t-1})] \cdot D_{t-1}, \tag{12}$$

where β, γ are parameters. The future inventory will be the difference in market demand multiplied by the difference between its real and estimated growth rate.

As the optimal strategy of the firm should be to produce the amount of good which will be demanded and always rather more than less this value, we recommend for the firm the following final target supply

$$\begin{aligned} S_t^T = \max\{&[1 + growth(D_{t-1})] \cdot D_{t-1}, \\ &\gamma[1 + growth(D_{t-1})] \cdot D_{t-1} + (1-\gamma)[1 + \beta(CONF_t - CONF_{t-1})] \cdot D_{t-1}\} \end{aligned} \tag{13}$$

and final targeting production

$$\begin{aligned} Q_t^T = \max\{&[1 + growth(D_{t-1})] \cdot D_{t-1} - I_{t-1}, \\ &\gamma[1 + growth(D_{t-1})] \cdot D_{t-1} + (1-\gamma)[1 + \beta(CONF_t - CONF_{t-1})] \cdot D_{t-1} - I_{t-1}\}. \end{aligned} \tag{14}$$

By taking the maximal value from these two strategies we can reduce the losses from underestimation the market demand in different phases of economic activity evolvement. The definition of nonsymetric production function was also used for example by Gualdi et. al. (2015).

4   Empirical testing

4.1   The data

As we do not have for a disposal microeconomic firm data, we have decided to test the optimal strategy at least on the aggregate level. We used the yearly data from the economy of the Czech Republic from 1995 till 2015 (the time span was chosen according to availability of the data for economic confidence):

- *Production (Q_t)*- production of all good and services expressed in current prices decreased by the amount of product taxes and increased by the amount of tax support for this production (source: Czech Statistical Office (ČSÚ));
- *Intermediate_consumption* – the good and services used for intermediate consumption expressed in current prices (source: ČSÚ);
- *GDP* – gross domestic product expressed in current prices (source: ČSÚ);
- *Inventory (I_t)*– the amount of inventory in 31.12. of the reported year, expressed in current prices (source: ČSÚ);
- *Inventory_change* – the change in inventory expressed in current prices (source: ČSÚ);

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- *Economic confidence (CONF$_t$)* – the OECD Standardised business confidence indicator, amplitude adjusted and seasonally adjusted (Long term average=100), (source: OECD).

The following data were used to compute aggregate demand and aggregate supply

$$AD_t = GDP_t + Intermediate\_consumption_t - Inventory\_change_t \qquad (15)$$

$$AS_t = Production_t + Inventory_{t-1} \qquad (16)$$
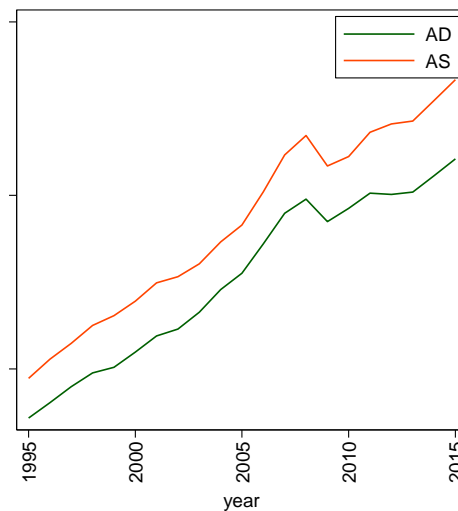
Fig. 1. AD, AS

Fig. 2. The ratio of inventory on the total aggregate supply and production

According to these data, we can compare the aggregate demand and supply in Fig. 1. We can see that the aggregate supply is always higher than aggregate demand. In Fig. 2. The ratio of inventory on total production and ratio of inventory on aggregate supply is depicted. According to the evolvement of both ratios we could not assume that these ratios are constant in time. Moreover, we can see that both ratios were decreasing during the time, decreasing also during the economic expansion before year 2008 and increasing during the period of crises after 2009.

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4.2 Estimation results

The estimation of parameters β, γ from equation (12) were estimated by ordinary least square (OLS) regression from the equation

$$growth(AD_t) = \gamma[growth(AD_{t-1})] + (1-\gamma)[\beta(CONF_t - CONF_{t-1})] + \varepsilon_t, \tag{17}$$

where ε_t assigns the error term of the equation. The estimation of this equation is

$$growth(\hat{AD}_t) = \underset{(0.068)}{0.868}\,growth(AD_{t-1}) + \underset{(0.003)}{0.021}(CONF_t - CONF_{t-1}), \tag{18}$$

where the standard deviations are in parenthesis under the values of estimated parameters. All the estimations were significant on the 1% level of significance, the coefficient of determination was $R^2 = 0.906$. The comparison of the real growth rate with its lagged value (proposed to use in case of contraction) and estimated growth for expansion (from (18)) are presented in Fig. 3. We can see that in case of decrease of the growth rate the lagged value of growth rate is often really higher than the growth rate estimated with respect to confidence, in case of contraction in the growth rate it is opposite.
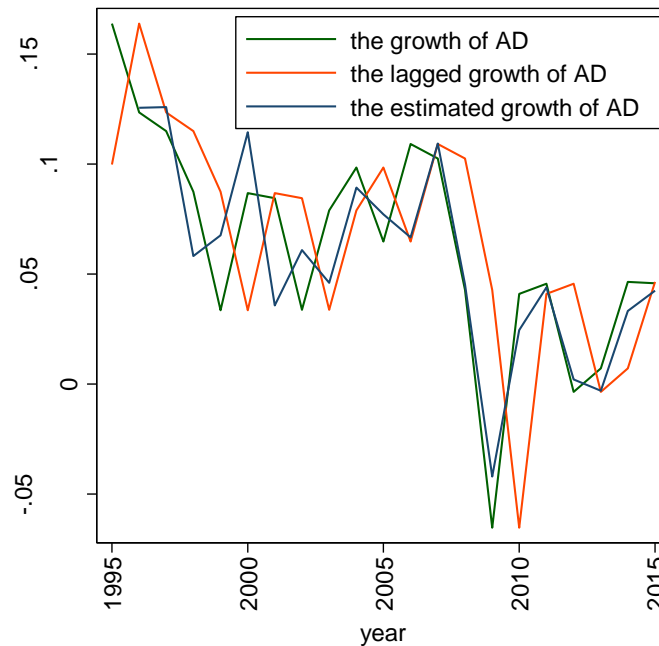

**Fig. 3.** The estimations of the growth rate of aggregate demand

The proposed target supply (13) is calculated as

$$AS_t^T = \max\{[1 + growth(AD_{t-1})] \cdot AD_{t-1}, \\ [1 + 0.868\,growth(AD_{t-1}) + 0.021(CONF_t - CONF_{t-1})] \cdot AD_{t-1}\} \tag{19}$$

The aggregate demand and its prediction for the case of expansion and contraction are presented in Fig. 4. We can see that there are cases when the real aggregate demand was still underestimated, but in lot of cases the first or the second prediction helped to increase the estimated aggregate demand over its real level.

In the last Fig. 5. We can see the real aggregate demand, real aggregate supply and proposed aggregate supply. The actual AS is in all cases higher than real AD, however, according to the

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proposed estimation the "buffer stock" of inventories could be decreased to achieve higher competitiveness.
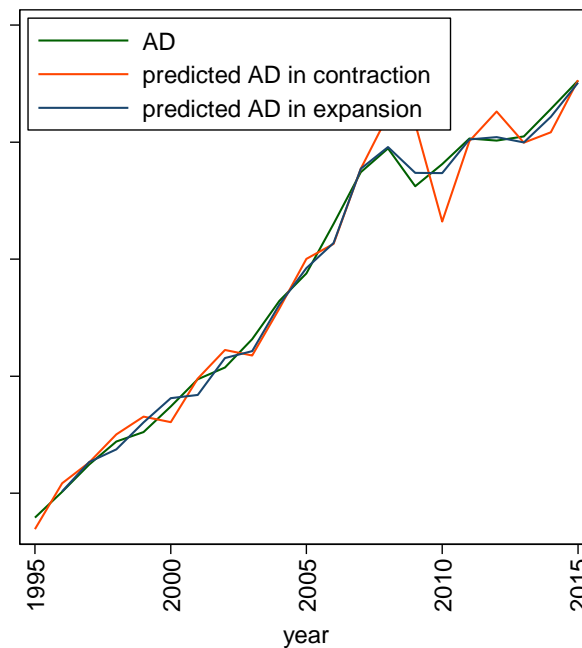
Fig. 4. AD and its predictions
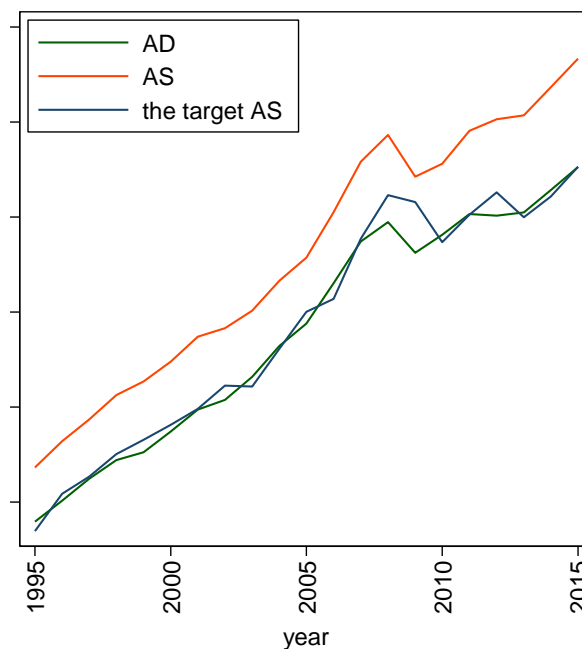
Fig. 5. AD, AS and targeted AS and its predictions

5   Conclusion

The goal of this article was to propose the optimal production strategy for the firm operating in competitive environment. The majority of theoretical works focused on the firm behavior are working with equilibrium on the market when the aggregate demand equals aggregate supply. This equilibrium

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is supposed to be achieved by the equilibrium price. Then the strategy of the firm is directly derived from this equilibrium. However, firms in the moment of decision about their production do not know the future demand for their good and the price adjustment mechanisms could be in some cases sticky. Thus the final realised sale on the market could cause additional costs for the firm - either for keeping involuntary inventory or for lost sales.

We derived in the paper the strategy for the demand following firm which could decrease these losses. We proposed to use different strategy during the phases of expansion and contraction in the growth rate of the market demand. The firm could try to supply the amount of good corresponding to the previous growth of the market demand during contractions, during expansions the target amount of supplied good could be estimated as a combination of the previous growth in market supply and the difference in economic confidence. The final proposed targeting supply is a maximum of these two estimations. This strategy is taking into consideration inventory as well as expansions and contractions in market demand and hence could lead to harmonization of production.

This proposal was in the paper tested on the aggregated data of the Czech Republic. The more detailed estimations on microeconomic data would be beneficial. However, even on the aggregated data, it was observable that the ratio of inventory to the aggregate supply is not constant during the time and vary with the business cycle. The two different target strategies in different phases of market growth were helpful to decrease the error of underestimation future market demand. However, in some cases the estimations were under the real market demand. Thus, the proposed target supply for the firm could be considered as a borderline for the targeting supply and could be just slightly increased to achieve the target supply dominance over the market demand. This increase could be done on the individual level of firm by error corrections. However, setting this borderline could contribute to firms to decrease the amount of "buffer stock" and thus decrease the inventory costs and increase its level of competitiveness on the market.

6   Acknowledgement

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