THE ECONOMIC PERFORMANCE OF REGIONS IN THE CZECH REPUBLIC

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Abstract

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Regional development in the Czech Republic contributed to the fact that at present none of the regions is significant backward compared to other. Individual regions have shown among themselves certain differences. This applies in particular to the economic performance of regions. This paper introduce results of our research. Main aim of the work was to indentify economic performace affecting factors of regions NUTS 3 in Czech Republic. It was necessary to define quantity of economic performance to meet this goal. We used them to create method of valuating economic performance of regions. We weighed quantities (e.g. GDP, unemployment rate, net disposable income) according to their importance. This procedure was applied to individual regions. We determined the level of economic performance of Czech regions. We present overview of factors and using statistical methods we test their importance to the economic performance of Czech regions.

region, economic performance, factors, indicators, competitiveness

Even though EU area belongs to the richest parts of the world, among regions of European Union (further just EU) exist outstanding differences. Regions dispose of disparate economical, social and geographical condition. The aim of the European regional policy is to decline the social and economical disparity among the regions. The effort is to support the growth of competitiveness, prosperity and dynamic development of the regions. Acc. to Marshall (1920) competitiveness is not a regions' characteristic, but it is created by the competitiveness of companies operating in the regions. Prosperity, thus efficiency, is very often discussed term in relation to the regions. If we understand prosperity of the enterprise as economical efficiency, success, profitability or reinforcement of market position, it is also necessary for the assessment of economic prosperity or efficiency of regions to observe more indicators than just the size of GDP. The most common one is a combination of several economic indicators (Kahoun, 2007; Kupka, 2007; Jansky, 2009).

In the Czech Republic there are very prominent differences in some indicators between Prague and the rest of Czech regions (unemployment rate, average salary). It dramatically deforms the average values of the Czech Republic. This variation has been increasing during the last few years, especially in GDP, average salary and unemployment rate.

A research was focused on the issue of economic efficiency of regions in order to identify the key factors affecting the economic efficiency of regions in the Czech Republic. The operational objective of this research was to create a aggregate index of economic efficiency of regions in the Czech Republic based on indicators of economic efficiency of regions. The research was focused on regions at NUTS III according to Regulation of European Parliament and European Senate (ES) No. 1059/2003 of 26 May 2003 on the establishment of common classification of territorial units for statistics. (Czech Statistical Office, 2012) It is therefore 14 regions. However, in the course of research was eliminated Capital region Prague, because of distorting considerably the results.

MATERIALS AND METHODS

Trade as a source of regionalisation

From the economical theory point of view, we can connect this topic with the economic geography
Economic Efficiency of the Market

Economic efficiency of regions is one of the three key parts of regional competitiveness, apart from innovative efficiency and life quality. Economic efficiency is understood as a general prerequisite and a result of regional competitiveness (Kahoun, 2007). This approach is basically consistent with the assumption of above mentioned theories. Meanwhile Marshall (1920) spoke about company’s competitiveness, which creates the region’s success, Krugman (1991b) arguments by the region’s success as a main localisation factor. On a level of EU, economic efficiency is observed at individual regions NUTS III, from the mid-nineties thanks to gross value added and GDP, indicators of labour market (employment, employees, compensation of employees, worked hours), gross fixed capital formation and net disposable income of households in the regions (Kahoun, 2010).

Kahoun (2007) performs the evaluation of regional economic efficiency thanks to GDP per capita, labour productivity, unemployment rate and gross fixed capital formation per capita. Jánšky (2009) on the other hand lefts apart the unemployment rate as an indicator of economic efficiency and compares economic efficiency of particular regions on the basis of gross domestic product, gross value added and fixed capital formation. Kupka (2007) considers as a fundamental indicator of efficiency of regions the gross domestic product per capita. Further he mentions unemployment rate, foreign investment and number of small and medium sized enterprises.

It results from the above mentioned that when evaluating economic efficiency of regions, the importance is based on GDP completed by others economic indicators.

Factors influencing economic efficiency of regions

When observing economic efficiency of regions, a combination of several factors has a big importance. Influence of these factors creates the distinctness among the regions. Individual authors (Kupka, 2007; Viturka, 2007; Wokoun, 2008; Chlad and Kahoun, 2001) devide theses factors into particular groups according to the parameter. We can observe demographic, technologic, structural, economic, ecologic and other factors.

For instance Kupka (2007) states as factors influencing economic efficiency of regions in the Czech Republic a population aging (variance of age structure of the population in different regions), migration (permanent or long-term and short-term, i.e. for commuting to work), the educational structure (at the same time the structure of the quality of labor supply in the labor market), the position of the region and settlement structure (agglomeration or rural area, peripheral region), industrial infrastructure (such as industry structure of industrial buildings and equipment), transport infrastructure (water supply facilities, sewage networks and waste water treatment plants), the environment and political science factors.

As factors that cause inter-regional differences in the attained level of GDP per capita, ranks Viturka (2007):

- economic structure expressed by the share of employment in agriculture, industry, construction, market and non-market services in total employment (this group of factors is closely linked with the trade theory. Trade leading to specialization directly affects the economic structure Krugman (1991c).),
were ranged according to values from the lower individual regions, a point system was used. Regions
net disposable income of households per capita has creation per capita was given importance of 0.3,
to unemployment rate and gross fixed capital formation was given a higher importance to this indicators. Because of the fact,
rate of GDP , a registered unemployment rate and that mentioned indicators are determinant for the
importance to this indicators. Because of the fact, various years often changes monitored factors and

In order to evaluate aggregate indicators at individual regions, a point system was used. Regions
were ranged according to values from the lower to higher for each indicator; these values were further devided thanks to quartile. The first group
of regions separated by lower quartil obtained 1 point, second group 2 points, third group 3 points and fourth group 4 points. In this way the points
were multiplied by rate of given indicator for each region. The general evaluation of economic efficiency of regions was obtained as a sum of points.
Furthermore at each region there were specified factors, which are, according to experts, influencing economic efficiency in the Czech Republic.

Multiple regressive model was applied on these data, where the explicative variables are factors and explained variable is aggregate indicator of economic efficiency, always for each region. In order to increase number of observation of explicative variables, there were used data from previous years, 2008–2010. Panel data were used.

Based on testing of the statistical significance of parameters, model was adjusted by removing statistically insignificant parameters until there was seen an improvement in the model. The statistical significant factors are the output of this model that affects the economic efficiency of regions in the Czech Republic. In order to stipulate individual factors and indicators, a regional statistics of the Czech Statistic Office were used. Amount of usable information was limited because of the changes in observed information in particular region during the various years.

RESULTS AND DISCUSSION

On the basis of performed analysis and thanks to evaluation of economic efficiency method in regions, an economic efficiency in individual regions in the Czech Republic was analysed during the period 2008–2010. The results are stated in the Tab. I.

As it is seen from a Tab. I, a highest economic efficiency was in the year 2008 at South Moravia Region, in 2009 and 2010 at Pilsen region. On the other hand the lowest economic efficiency was seen at Olomouc, Liberec and Karlovy Vary Region.

The operational objective of the survey was to identify the factors related to the economic efficiency of regions in the Czech Republic. These factors were for needs of further processing devided into three groups:
• the organizational structure of the economy (agriculture, industry, services, education),
• demographic and socio-economic factors,
• others.

Thus defined factors were tested econometrically, using the least squares method. We observed panel data, which included thirteen regions in the period 2008–2010. So we took advantage of 39 observations. Unfortunately there were not available comparable data in both time series and among regions for a longer period of time.

Especially in regional yearbooks in the individual years often changes monitored factors and
indicators, or there is a change in methodology for their calculation. Differences are also among the regions, when the regions do not follow the same factors and indicators. When analyzing and processing data, therefore it was necessary to deal with many problems. By testing of the parameters' importance, we get the following estimation of parameters (Tab. II).

Regressive equation is in a form of:

\[
\text{index} = 2574,73 - 2,3 \times x_1 + 4,7 \times x_2 + 0,000675 \times x_3 - 3925,65 \times x_4 + 0,028 \times x_5 - 0,007 \times x_6 + 0,0476 \times x_7 - 0,1 \times x_8.
\]

The model did not show signs of heterocity (Whit's test) and residues were divided normally. One of explaining variable was number of enterprises in our model. We have chosen this indicator in order to follow better influence of small and medium sized enterprises. In case we used turnover or number of employees, our investigation could have been biased due to big enterprises. Correlation between number of enterprises in industry and number of employees in industry is very strong (0.88). Therefore we can use the number of enterprises without any data misleading because of the particular sector.

If we observe the individual parameters, the negative value in case of population density and population share in economic active age is in conflict with some opinions of experts (For example Chlad and Kahoun, 2011).

There does not exist clear correlation \((0.28 < \text{critical value } 0.376)\) between the city population and density, it can be documented by fractionalism of regions, when the high density of population is balanced by its distribution within all region. This argument can be supported by another correlation, very strong negative correlation \((-0.72)\) between city population share and number of towns. Deconcentration of population declines the region's efficiency. In case of higher density in cities, efficiency is increased. Empirical conclusion presented below is in agreement with above mentioned theories. In case of share of population in productive age on total, it is important for us the correlation of this indicator with economic activity in a given region. Uncorrelation \((0.2 < \text{critical value } 0.316)\) of these quantity can explain us, why

II: Results of testing parameters

<table>
<thead>
<tr>
<th>Factor</th>
<th>coefficient</th>
<th>routing error</th>
<th>t-share</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2574,73</td>
<td>848,853</td>
<td>3,0332</td>
<td>0,00496</td>
</tr>
<tr>
<td>Population density [capita/km²] (x_1)</td>
<td>-2,33526</td>
<td>0,221364</td>
<td>-10,5494</td>
<td>&lt; 0,00001</td>
</tr>
<tr>
<td>City population share [%] (x_2)</td>
<td>4,71892</td>
<td>1,02738</td>
<td>4,5932</td>
<td>0,00007</td>
</tr>
<tr>
<td>Hitech export [mil. Kč] (x_3)</td>
<td>0,000675113</td>
<td>0,000170848</td>
<td>3,9515</td>
<td>0,00044</td>
</tr>
<tr>
<td>population share in the economic age of 15-64 [%] (x_4)</td>
<td>-3925,65</td>
<td>1246,39</td>
<td>-3,1496</td>
<td>0,00369</td>
</tr>
<tr>
<td>Number of industries* (x_5)</td>
<td>0,0283151</td>
<td>0,003797675</td>
<td>7,4577</td>
<td>&lt; 0,00001</td>
</tr>
<tr>
<td>Number of enterprises - construction(x_6)</td>
<td>-0,00708633</td>
<td>0,00339376</td>
<td>-2,0880</td>
<td>0,04538</td>
</tr>
<tr>
<td>Number of enterprises - wholesale,retail (x_7)</td>
<td>0,00476397</td>
<td>0,00150555</td>
<td>3,1643</td>
<td>0,00355</td>
</tr>
<tr>
<td>Number of enterprises - IT (x_8)</td>
<td>-0,101686</td>
<td>0,0233347</td>
<td>-4,7662</td>
<td>0,00005</td>
</tr>
</tbody>
</table>

Source: data ČSÚ, own elaboration

* B-E CZ-NACE
The economic performance of regions in the Czech Republic has a population share has in economic active age negative sign.

The result of the use of multidimensional regression model is the fulfillment of the research's objectives; it means identification of statistically significant factors that affect the economic efficiency of regions in the Czech Republic. City population share in regions, furthermore amount of hitech export, number of industries, and number of enterprises wholesale and retail belongs among these factors. Due to the fact, that investigation was based on trade theories and importance of trade as well as SME coverage in regions, it means that two last factors indicate that empirical results are in accordance with theoretical presumption.

Although Kupka (2007) consideres as one of the indicators of region efficiency the number of SME, in our approach was number of SME considered as factor of regions' efficiency. This understanding comes from theoretic presumption of internal and external economies of scale.

Evaluation of economic efficiency of regions and degree of regional disparities expresses relatively difficult issue. In first case it was a choice of indicators. In case of big amount of indicators, there can be a very strong correlation among some of them, which leads to misleading of results. Outputs are than less understandable and difficult to interpret. It was important to choose just the significant indicators, which are related to the given issue. The same approach was necessary to apply in case of testing and choosing of individual factors.

The results indicate eligibility of commercially oriented approach. While the number of subjects interested in trade reflects the region involvement in national market, high-tech export proves the success of local products with high value added and thus related operation of local companies on the world market. Since the tendancy of agglomeration is a connection point between economic geography and new theory of international trade, we can consider also in case of this factor, a statistical importance as argument for trade oriented approach.

CONCLUSIONS
Regional competitiveness is especially in intention of European Single Market very frequently discussed topic. Attention of economy policy creators and theorist is focused on determinants and factors of regional economic efficiency. The aim of our article was to stipulate and test key factors in the environment of Czech regional economy. The topic is directly related to trade economic theory, which is considered as a necessary presumption of specialisation and diversification of regions. Theoretical bases predicate, that more successful regions are more interesting for new companies localisation is. Regional efficiency is also a cause and result of local competitiveness. Unbalanced development can lead either to diversification or to divergence of regions, which is in direct conflict with cohesion objectives of EU. From these reasons it is relevant to be interested in the objectives. Evaluation of economic efficiency is complex issue; therfore the indeces that are engaged with their analysis are complex indicators. To calculate our index, according to literary sources was used a macroeconomical aggregate. These factors influenced statistically the presented index: share of city population in regions, amount of hightech export, number of industries, number of Enterprises in wholesale and retail.

The results indicate eligibility of commercially oriented approach. While the number of subjects interested in trade reflects the region involvement in national market, high-tech export proves the success of local products with high value added and thus related operation of local companies on the world market. Since the tendancy of agglomeration is a connection point between economic geography and new theory of international trade, we can consider also in case of this factor, a statistical importance as argument for trade oriented approach.

SUMMARY
The article presents the results of investigation called Identification of factors influencing economic efficiency of regions in the Czech Republic. The aim of this investigation, as the name itself prompts, is to identify the key factors which influence the economic efficiency of regions in the Czech Republic. Based on the study of professional resources, a methodology of evaluation of economic efficiency of regions was created, based on aggregate indicators of economic efficiency of regions. It is composed of GDP per capita in CZK, net disposable income of households per capita in CZK, the registered unemployment rate in% and gross fixed capital formation per capita in CZK. These indicators
were given significance according to the importance assigned to the general indicators. Registered unemployment rate and gross fixed capital formation / capita were assigned a significance of 0.3. GDP / capita gained 0.25 and net disposable income of households / capita obtained 0.15. To evaluate the general characteristics for each region was used scoring method. Regions were scored according to the different indicators. Summary evaluation of the economic efficiency of the region was obtained as the sum of points. Subsequently, for each region there were quantified factors that influence according to experts the economic efficiency of regions in the Czech Republic. These factors were devised into three groups due to the need of further processing, namely the group of organizational structure of the economy (agriculture, industry, services, education), demographic groups and socio-economic factors and other groups. On this data was applied multiple regression model where the explicative variables are factors and explained variable is aggregate index of economic efficiency, for each region. Significant factors that affect the economic efficiency of regions in the Czech Republic are the output of this model. Among these key factors belong the proportion of the city population in region, size of high-tech export, the number of industrial enterprises and the number of enterprises engaged in wholesale and retail.

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