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DEVELOPMENT POTENTIAL OF NUTS 2 REGIONS IN THE EUROPEAN UNION

Abstract:

Regions belong to basic component of European Union's economics. The Union spends on enhancement of socio-economic level of regions a lot of financial resources. About one third of Union's budget is determined for the regional policy. For implementation of the regional policy the regions on the level NUTS 2 are important. There are 271 NUTS 2 regions in all 27 member countries of the EU. The article is focused on evaluating of the present position of European NUTS 2 regions in the relation to dynamism of their development. For the purpose of this analysis the authors chose several indicators which are focused especially on such socio-economic characteristics considered to be the key indicators of qualitative development and competitiveness of regions. On the basis of the created synthesis it is possible to accept conclusions relevant to position and development of European regions in general as well as to development of individual NUTS 2 regions.

Keywords:

Analysis, economic level, evaluation, NUTS 2 regions, regional gross domestic product

INTRODUCTION

Among particular regions there are big differences in their socio-economic development. In economic theory these differences are called regional disparities. The term "regional disparity" can be defined as differentness or inequality of characteristics, effects or processes that are clearly territorially located. [1] The basic question that arises in this context is if regional disparities tend to increase or rather decrease. In other words, if there is a tendency towards convergence or rather divergence. However, for viewing the regional disparities also the time period in which convergences or divergences arise is important. The convergent theories usually work with longer time periods that the divergent ones. [2] Nevertheless, according to some authors the theories considering spatial development as divergent are predominating. [1] Besides the time point of view the size of the disparities is important too. The existence of certain differences is desirable and necessary because it stimulates economic and social development. But enormous regional disparities have no stimulating effects and they have serious social and political consequences and so they are more often considered to be a negative phenomenon. [2]

The European Union, especially its policy of economic and social cohesion, deals with the differences among regions as well. The article 158 of the Treaty on European Union says that "in order to strengthen its economic and social cohesion, the Community is to aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favored regions or islands, including rural areas" [3]. The cohesion policy should contribute to the increase of the growth, competitiveness and employment. [4] How should higher competitiveness be reached? Contemporary theories concerned with factors of competitiveness in developed countries connect their competitive advantage primarily with

conditions for development of innovations in businesses. A higher level of innovations also brings a higher added value of products and therefore a higher growth of the living standard. [5] Particularly in the last several decades it has been widely acknowledged that regions are an important element in the transformation to the knowledge society and that they are also a significant driving force for economic growth based on research, technologies and innovations. [6]

While the cohesion policy focuses primarily on reducing the regional disparities (mainly through the support of infrastructure, innovations and knowledge society), the policy of research, development and innovations focuses on creating the conditions that will help regions to reach the knowledge economics. Up-to-date innovation systems leave the linear concept of innovations, where the research and development have to be at the beginning of the innovation process, and convert to interactive concepts of innovations. These new concepts say that innovations are results of interactions among individual participants of the innovation process and new knowledge (research and development) can enter into this process during any of its phases. [7] However, research and development are still important sources of information for launching (especially technical) innovations, and that is why we pay big attention to them in this article.

Research, development and innovations are parts of the priorities of the new strategy Europe 2020 which should replace the Lisbon Strategy for Growth and Jobs from 2000. The new strategy defines five main goals which member states of EU will have to focus on. These goals involve the increase in the investments in research and development, the increase in the employment rate of population aged 20–64, the achievement of the selected climate targets, the decrease in the share of early school leavers and the decrease of the number of people threatened by poverty. In order to meet the above mentioned goals the members of the EU have to accept joint action in such areas as innovations, youth, digital agenda, efficient use of resources, industrial policy, skills and jobs or platform against poverty. [8]

The increase in employment and competitiveness is also closely connected with 'high-tech sector'. High-tech sector is considered to be the key factor for the economic and productivity growth. It is closely related to innovations and it leads to larger market share, creation of new product markets and more efficient use of resources.[9] In accordance with methodology of OECD and Eurostat the individual branches of industry have been divided on the basis of R&D expenditures, added value and total amount of turnovers to four categories: high-tech, medium high-tech, medium low-tech and low-tech manufacturing sector. Services have also been classified in a similar way. The indicators of technology and knowledge-intensive sectors are used not only for the evaluation of the competitiveness of states and regions but also for the evaluation of the utilization of research and development results (or rather the utilization of new knowledge). For the above mentioned reasons we also focus on employment in high-tech and medium high-tech manufacturing sectors and knowledge-intensive services in this article.

METHODOLOGY OF EVALUATION

The aim of this article is to assess the economic performance of 271 regions on the level NUTS 2 in member states of the EU (EU-27). For similar comparisons the indicator of gross domestic product (per capita) is usually used, alternatively this indicator can be complemented by other characteristics. The evaluation presented in this study is based on the synthesis of selected available indicators (excluding GDP) which can be considered the key prerequisites for or aspects of the economic level of the regions and which according to authors emphasize the principles of knowledge economy. (Therefore the indicators have qualitative dimension to a considerable extent.) The source of the data is Eurostat [10].The selected indicators are the following:

- disposable household income (The wealth of households creates the base of regional development and it is a result of prosperity of economic entities.)
- unemployment rate (It is a structural indicator that indirectly corresponds with the economic level of the region.)
- expenditures on research and development (As they are related to GDP, it is a common indicator used for comparisons.)
- employment in research and development (It complements the previous indicator. The

share of employment in this sector is the indicator of knowledge economy development.)
- employment in knowledge-intensive services
- employment in high and medium high-technology manufacturing sector (Together with the indicator of employment in knowledge-intensive services it expresses the orientation of economy to perspective and growing sectors with high added value.)

These selected indicators can be characterized by this way:

- *Expenditures on research and development*

This indicator expresses the total annual expenditures on research and development as a percentage of the gross domestic product (GERD). The expenditures include expenditures of the government, businesses, higher education institutions and private non-profit organizations.

- *Employment in research and development*

The indicator expresses the percentage of the employees in research and development vis-à-vis the total employment. Such employees include both researchers themselves and other employees (technical and economic staff and others) of research institutions.

- *Employment in knowledge-intensive services*

The indicator of the employment in knowledge-intensive services expresses the proportion of employment in these fields to the total employment. The NACE (rev. 1.1) fields which are among the knowledge-intensive services are fields with codes 61, 62, 64, 65, 66, 67, 70, 71, 72, 73, 74, 80, 85 and 92. These are for example water, air and space transport; financial services; telecommunications; activities concerning real estates and computer technology; machinery, equipment and product renting; research and development; education; health and social care; veterinary activities; and recreation, cultural and sporting activities. [11]

- *Employment in high and medium-high technology manufacturing sector*

The data shows the employment in high and medium-high technology manufacturing sectors as a share of total employment. The NACE (rev. 1.1) fields which are among the high or medium-high technology manufacturing sectors are fields with codes 30, 32, 33 or 24, 29, 31, 34, and 35. These are for example the manufacture of pharmaceuticals and chemicals, office machinery and computers, television and communication equipment, aircraft and spacecraft, electrical machinery, motor vehicles or transport equipment. [11]

- *Unemployment rate*

The International Labour Organization (and the Eurostat methodology [12]) defines an unemployed worker as someone who is older than 15, actively seeking work and able to start a job immediately or within 14 days. The unemployment rate is generally the most available indicator, as it is followed closely by all member states. Its static values, and their changes, are interesting not only for research but they are also important for the implementation of an economic policy.

- *Disposable household income*

Eurostat statistics differentiate between two kinds of income – the primary and the disposable income. The disposable income was chosen for the analysis as it more suitably expresses the real purchasing power of the population. The disposable income includes all incomes after taxation and deduction of insurance fees, further it includes accepted social transfers. [13]

We considered adding several other indicators to this analysis (e.g. households with access to the internet at home or students in tertiary education) but these indicators had to be excluded in the end because of non-availability of needed data in all regions.

The above mentioned indicators have been included in the evaluation. Within the framework of the analysis values of each indicator have been divided into five groups (highly above-average, above-average, average, below-average, highly below-average).

Consequently, the synthesis has been carried out. The value of the composite indicator of the j-region (E_j) is determined according to this formula:

$$E_j = \frac{\sum_{i=1}^{6} w_i \cdot F_i}{\sum_{i=1}^{6} w_i},$$

where w_i is weight of the i-indicator (the weight has been set for each indicator) and F_i is value of the i-indicator (1–5).

The evaluation is carried out both as static, when data for 2006 were used, and dynamic, when the change (index) between 1999 an 2006 is calculated. On this basis it is possible to divide the regions in accordance with their economic

development as well as their development trends.

Another important contribution of this article is the linking of the evaluation based on the synthesis of the above mentioned indicators with the values of regional GDP per capita. Besides the elementary calculation of the correlation coefficient it is possible to present the relation of the composite indicator (that which is – as has been said above – based on the qualitative characteristics compatible with knowledge economics) to the economic performance expressed through GDP per capita. Therefore, the regions can be divided according to their economic performance as well as the core of its essence. For the purpose of this comparison all values of indicators on the level NUTS 2 were expressed as percentages of the EU27 average value. Subsequently, the composite indicator E_j is calculated for each region NUTS2 (in %), where F_i is the value of the i-indicator in %.

■ RESULTS

In accordance with the methodology the data for all NUTS2 regions in the EU27 have been found out. If some data were not available, this fact has been taken into consideration within the calculation of the composite indicator (E_j). After calculating this indicator for each region, it was possible to compare:

- the position of the individual regions in the context of the static values of the composite indicator (2006) and the dynamic values (change between 2006 and 2000),
- the relationship between the values of the composite indicator and regional GDP (both of them were used as a percentage of EU27 average in 2006).

■ STATIC AND DYNAMIC VALUE OF THE COMPOSITE INDICATOR OF THE ECONOMIC LEVEL OF REGIONS

On the basis of the above mentioned comparison it is possible to divide the regions into four categories according to their situation (see figure 1):

- developed regions with a positive developmental trend (the value of the static indicator is between 1.0 and 3.0, the value of the dynamic indicator is between 1.0 and 3.0) – 60 regions,
- developed regions with a negative developmental trend (the value of the static

indicator is between 1.0 and 3.0, the value of the dynamic indicator is between 3.1 and 5.0) – 56 regions,

- underdeveloped regions with a positive developmental trend (the value of the static indicator is between 3.1 and 5.0, the value of the dynamic indicator is between 1.0 and 3.0) – 106 regions,
- underdeveloped regions with a negative developmental trend (the value of the static indicator is between 3.1 and 5.0, the value of the dynamic indicator is between 3.1 and 5.0) – 37 regions.
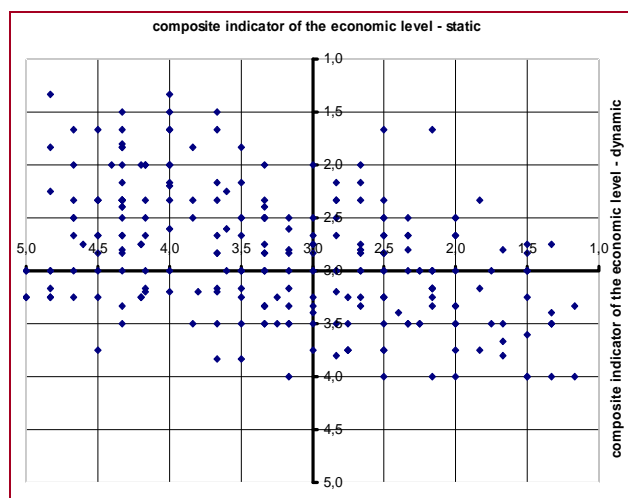

Figure 1 Static and dynamic value of the composite indicator of the economic level of the regions
Source: Eurostat (data), the authors' research (methodology and calculation)

■ THE RELATIONSHIP BETWEEN THE VALUES OF THE COMPOSITE INDICATOR AND REGIONAL GDP

The correlation analysis confirmed quite a close connection between these two indicators. The correlation coefficient for all regions is 0.73, after elimination of two regions with extreme values (Inner London and Luxembourg) it is even 0.78.

On the basis of the comparison it is possible to divide the regions into four categories according to the essence of their economic level (see figure 2):

- developed regions with characteristics compatible with knowledge economics (GDP > 100 % and dynamic indicator also > 100 %) – 115 regions,
- developed regions without characteristics compatible with knowledge economics (GDP > 100 % and dynamic indicator < 100 %) – 28 regions,
- underdeveloped regions with characteristics compatible with knowledge economics (GDP

< 100 % and dynamic indicator > 100 %) – 10 regions,

- underdeveloped regions without characteristics compatible with knowledge economics (GDP < 100 % and dynamic indicator also < 100 %) – 114 regions.
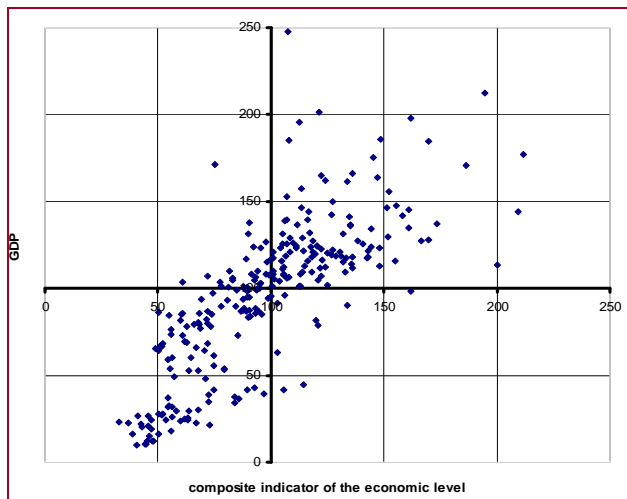

Figure 2 The relationship between the values of the composite indicator and regional GDP (2006)
Note: For better lucidity the regions of Inner London (129.4 %, 382.9 %) and Luxembourg (125.4 %, 305.6 %) were removed from the figure.
Source: Eurostat (data), the authors' research (methodology and calculation)

CONCLUSION

The presented study confirmed the existence of considerable differences in the economic level of NUTS2 regions. It was proved that some regions are in the situation which cannot be called positive from the perspective of the composite indicator. At the same time, it is possible to say that some of them have the right developmental trend.

As regards the evaluation of the relationship between the economic level of regions (expressed by GDP) and the composite indicator (characteristics of knowledge economics) the calculations proved their close connection.

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REFERENCES

[1.] Composite authors. Teorie, identifikace, klasifikace a hodnocení regionálních disparit. Průběžná výzkumná zpráva. Ostrava: VŠB-Technická univerzita Ostrava, 2008.

[2.] BLAŽEK J, UHLÍŘ D. Teorie regionálního rozvoje. Karolinum, Praha 2002. ISBN 80-246-0384-5.

[3.] Treaty on European Union. Official Journal C 191 of 29 July 1992.

[4.] Council Regulation (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999.

[5.] KUČERA Z, PAZOUR M. Srovnání národních inovačních systémů vybraných evropských zemí. ERGO : Analýzy a trendy výzkumu, technologií a inovací. 2009, 04, 02, p. 3-9. ISSN 1802-2170.

[6.] SKOKAN K. Konkurenceschopnost, inovace a klastry v regionálním rozvoji. Repronis, Ostrava 2004. ISBN 80-7329-059-6.

[7.] LUNDVAL B A. National Innovation Systems: Towards a Theory of Innovation and Interactive Learning. Pinter Publisher, London 1992.

[8.] Communication from the Commission Europe 2020 COM(2010) 2020. EUROPE 2020. A strategy for smart, sustainable and inclusive growth .

[9.] MERI T. Regional employment in high-tech sectors. Eurostat: Statistics in focus. Science and technology 102/2007. ISSN 1977-0316.

[10.] EUROSTAT. Regions and cities statistics. Available on: http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction

[11.] EUROSTAT. High-tech industry and knowledge-intensive services. Reference Metadata in Euro SDMX Metadata Structure (ESMS). Available on http://ec.europa.eu/eurostat.

[12.] EUROSTAT. Eurostat regional yearbook 2007. Luxembourg: Office for Official Publications of the European Communities, 2007. ISSN 1681-9306.

[13.] BEHRENS A. Income of private households and gross domestic product in Europe's regions. Statistics in focus, General statistics, Theme 1–7/2003. ISSN 1561-4875.

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