Application of Microeconomic and Macroeconomic Approach to Evaluating Disparities in the Regional Development

*Milan VITURKA – Vladimír ŽÍTEK – Viktorie KLÍMOVÁ – Petr TONEV**

Abstract

The paper presents a new perspective on the issue of evaluating developmental disparities. The created methodology of the microeconomic evaluation consists of three main components: business environment quality, use of human resources, and innovation potential of companies. Further, the paper provides information on the results of the methodology being applied to the Czech Republic. Its information relevance was also tested using comparison with the results of macroeconomic analysis based on standard statistical data, carried out within a geographically larger scope of 10 selected new EU member states. Finally, recommendations helpful for the needs of regional policy were formulated.

Keywords: *disparities, business environment, competitiveness, regional policy*

JEL Classification: O18, R11, R12

1. Introductory Notes

The term *disparity*, generally *denoting a difference*, is undoubtedly one of the most frequent terms used in regional policy. In spite of that, it is understood in various ways and we can say that no definitive theoretical and methodological basis for interpretation has yet been formulated. Disparities can be considered an inevitable outcome of evolution processes. The most significant part of the evolution, the economic development, is in the market economy the result of market forces connected with a continuous effort of business entities to maintain or enhance their position in the market. Spontaneous activities of businesses follow the merit principle, its logical consequence being the emergence of territorial

* Milan VITURKA – Vladimír ŽÍTEK – Viktorie KLÍMOVÁ – Petr TONEV, Masaryk University, Faculty of Economics and Administration, Department of Regional Economics and Administration, Lipová 41a, 602 00   Brno, Czech Republic; e-mail: viturka@econ.muni.cz; Vladimir.Zitek@econ.muni.cz; Viktorie.Klimova@econ.muni.cz; Petr.Tonev@econ.muni.cz

disparities in the economic development. Sustainable development demands that the arising discrepancies are kept within limits, i.e. that this process is regulated and the solidarity principle is applied. The developmental differentiation of social systems can be characterized as continuous creation and overcoming of differences. The main factor affecting the differentiation of social systems i.e. their "internal" organization is considered to be the progress in science and technology. The sociogeographic organization of society then represents its "external" organization and it is characterized by a hierarchical differentiation of social systems (Hampl a kol., 1996; Hampl, 2005). It is necessary to note, that disparities are closely connected with regional competitiveness, which can be understood as the ability of regions to create high income and provide high employment rate in the conditions of open economy (Kitson, Martin and Tyler, 2005).

The issue of disparity evaluation has been devoted many attention in studies which are usually based on the macroeconomic top-down approach. Out of the well-known institutions we can mention IMD, WEF and OECD (national level) or Cambridge Econometrics, DTI and BAK Basel Economics (regional level). The development of microeconomic bottom-up approaches is especially associated with the work of the American economist M. Porter (ISC, Harvard Business School). Another important source of information is EU regular reports on the social and economic situation in regions and economic and social cohesion.

2. Microeconomic Analysis of Disparities in the Czech Republic

2.1. Primary Theoretical and Methodological Framework

The microeconomic approaches to evaluating disparities are significantly influenced by endogenous models of economic growth which react to the fact that the basic neoclassical model does not allow for a satisfactory interpretation of long-term production growth (for more details, see Buček, Rehák and Tvrdoň, 2010). Endogenous models try to internalize the main influencing factors and they typically work with spill-over effects ensuring individual and social return of investments. We can distinguish two main types: models emphasizing the accumulation of human capital (represented by Lucas's model which assumes that an individual's effort to perfect skills enhances the general level of human capital with positive impacts on other factors of production), and models emphasizing the accumulation of knowledge capital (represented by Romer's model assuming that the effort of businesses to innovate induces other companies to do likewise with positive impacts on the level of social knowledge). In this context, the Cobb-Douglas aggregate production function can be modified and we obtain the following form adapted to the "knowledge economy" (Viturka a kol., 2010):

$$Y = M\ [a,\ z_1,\ z_2]\ .f\ (I,\ L,\ C)\tag{1}$$

where

- Y – level of production (total output);
- M – multidimensional variable with these components: a – general level of technical development, z_1 – macroeconomic and z_2 – regional (territorially bound) factors of competitiveness;
- I – innovation potential;
- L – labour;
- C – capital.

From the perspective of a cause and its consequence, we can say that the developmental differentiation of social systems determines the sociogeographic organization of the society. However, this process is modified by the inertia of hierarchical structures formed in the axis of the local – microregional – mesoregional – macroregional/national – global/supranational levels. Developmental disparities arise at all of the mentioned levels; however, our regional perspective focuses on the mesoregional and the microregional levels (the z_2 component and L and I aggregate factors of the production function). The microregional level is represented by "nodal" regions with the polarity of the centre and the surrounding area integrated by nodal processes, especially commuting; therefore the economic integration at this level is associated with creating regional labour markets – integration on the basis of labour interactions. At the higher, mesoregional level, there is the polarity of the mesoregional centre (the development pole) – subordinate microregions. The degree of economic subordination is determined by the growth dynamism of the development pole; the total subordination increases with its higher administrative functions (in the Czech Republic this concerns mainly regional capitals, which are in the position of development poles of national significance). Then the economic integration is carried out on the basis of territorial division of labour and its typical feature is the spread of developmental effects from the development poles along development axes – integration on the basis of production interactions. As far as the macroregional level is concerned, it differs from the previous level by the concentration of political and administrative functions in the macroregional centre, which transforms the polarity into the form of the capital (the most important development pole of supranational significance) versus subordinate mesoregions. The concentration of political power also stimulates the concentration of management functions of large companies, which consequently affects the processes of economic integration – integration on the basis of managerial interactions. The highest level of integration is the global integration with the polarity of development poles of global significance – subordinate macroregions. Here, the process of economic integration is carried out on the basis of commercial relationships and its most significant

institutional manifestation is the creation of supranational economic organizations – integration on the basis of trade interactions. The described polarization and integration processes are mainly accentuated by the core-periphery theories, moreover, they are implicitly included in neoclassical (see the concept of external savings) and institutional theories. Above all, they correspond to reality; therefore, we can consider them the most significant factors of space organization of economy.

T a b l e 1

Basic Determinants of Space Organization of Economy

Hierarchical level	Polarization	Integration	Key structures
Global	development poles of global significance	development axes of supranational significance	international organizations, TNC
Macroregional	development poles of supranational significance	development axes of national significance	state administration, company headquarters
Mesoregional	development poles of national significance	development axes of regional significance	territorial administr., big business
Microregional	development (nodal) centres	nodal regions	employers, employees

Note: TNC – transnational corporations.

Source: Authors' research.

The developmental differentiation of social systems significantly affects the efficiency of measures aimed at reducing negative disparities. It is advisable to optimize these measures in correspondence with the principles of hierarchical differentiation. Concerning the support for the economically lagging regions by means of regional policy, the main issue is to distinguish the underlying causes of the emergence of negative disparities. These disparities can be divided into those conditioned by hierarchy, i.e. determined by the degree of significance of the regions ("well-founded disparities") – their regulation would be contrary to the principles of sociogeographic territorial organization – and those conditioned by development, i.e. determined by the character of the economic development of regions ("unfounded disparities") – their regulation is socially justifiable by the solidarity principle.

2.2. Application of Primary Theoretical and Methodological Framework on the Example of the Czech Republic

The above mentioned modified production function is just primary theoretical framework for identification of the underlying causes of the emergence of regional disparities and their evaluation. In this respect, the main information relevance is carried by the territorially bound factors component, expressed by a complex indicator of business environment quality (BEQ). The BEQ represents an aggregate result of a long-term regional accumulation of various influences generated by

activities of both entrepreneurial and non-entrepreneurial entities. Such approach meets the practical needs as an appropriate supply represents the main field in which regions compete endeavouring to provide the best possible conditions for business activities. Our methodology is based on the identification of the most significant factors reflecting investment preferences of companies, especially companies in fields of processing industry and higher market services. BEQ factors and their individual degrees of significance were established on the basis of an extensive analysis of international research studies of investors' location preferences (e.g. the study of the Netherlands Economic Institute and Ernst & Young, 1993), emphasis being laid on the development of the knowledge economy. The results were adapted to the conditions of the Czech Republic (see Viturka a kol., 2003). The selected BEQ factors have been divided into six main groups:[1]

● business factors providing information on the market environment of single regions, including the potentials of foreign and domestic demand;

● labour-related factors providing information on the general level and quality of the regional supply of workforce;

● infrastructure-related factors providing information on technical capabilities of individual regions to be integrated in the world economy (transport and communication networks);

● regional and local factors providing information on the level of development of the business and knowledge base;

● price-related factors providing information on the level of demand and supply in regional markets of territorially bound factors of production (labour market and property market);

● environmental factors providing information concerning the quality of life with significant relations to business environment.

The main territorial units used for the interpretation of BEQ evaluation were regions representing the mesoregional hierarchic level (NUTS 3 and/or kraje).[2]

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[1] The group of business factors comprises the factors of closeness to markets (3 primary indicators, factor weight 9%), concentration of significant companies (2, 9); supporting services (3, 5) and presence of foreign companies (2, 4); the group of labour-related factors contains the factors of workforce availability (4, 10), workforce quality (8, 9) and workforce flexibility (2, 3); the group of infrastructure-related factors contains the factors of road and railway quality (12, 6), information and communication technologies (6, 6) and closeness to international airports (3, 3); the group of local factors contains the factors of business and knowledge base (24, 11) and the assistance of public administration (11, 3); the group of price-related factors is represented by the factors of real estate prices (5, 7) and the price of labour (3, 6); the group of environmental factors comprises the factors of urban and natural attractiveness of the territory (9, 5) and the environmental quality of the territory (8, 4). To sum up, the BEQ evaluation is based on 92 indicators for 206 basic space units.

[2] The necessity to use artificial administratively defined regions has been brought about by the availability of statistical data. However, all Czech regional capitals represent development poles with BEQ above average and a consequent integration potential, which considerably reduces the possible distortion of corresponding analyses.

Because of their considerable heterogeneity, regional values were established by aggregation of partial values of their microregions (administrative districts of authorized municipalities of 3rd degree), weighted by the number of their inhabitants. The used system of evaluation consists of five generalized qualification degrees from the best 1st degree (excellent) to the worst 5th degree (unfavourable). Microregional values of BEQ represent weighted sums of the corresponding values of 16 factors in total which were obtained as follows: initial classification of microregions according to the values of primary indicators, the general classification respecting all primary indicators of the given factor and the subsequent transformation of the evaluation results into generalized degrees.

The character of the units significantly corresponds to the character of nodal regions (in total, these are 206 regions including the capital Prague). Values of BEQ were established using detailed analyses related to years 2006 – 2008 (extraordinarily 2004). The main advantage of the described approach in contrast to the usually used disaggregation of macroeconomic indicators is its considerably higher explanatory capacity, with a more direct link to programme objectives of regional policy. The information relevance of the created methodology has been newly verified using the following hypotheses:

1. BEQ values at regional level have strong connections to the level of GDP (verification of relationship to the socioeconomic organization of the society).

2. BEQ values correspond to the population size of microregions as the main indicator of their significance (relationship to the sociogeographic organization of the society).

The above mentioned first hypothesis has been verified – the value of the correlation coefficient between BEQ and GDP exceeds 0,95. The results show that, with the exception of the completely different Prague region consisting (rather illogically) of the area of the capital itself only, the differences in the level of BEQ between the remaining regions are not very significant. With respect to this fact we can conclude that the issue of disparities in the Czech Republic mainly concerns the relationship between Prague or more precisely Prague together with Středočeský region and the other regions.[3] Obviously, there are bigger differences in the availability of specific BEQ factors in individual regions (see Viturka, 2007). This leads us to the conclusion that the differences between regional centres are of higher information relevance as far as the general attractiveness for business is concerned, and the differences in the degree of regional availability of the factors are more important as far as the specific attractiveness for particular business entities is concerned.

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[3] Connecting Prague and Středočeský region into one "natural" region would give us a unit whose BEQ total value would be about 1.90 and would thus be nearly 1/3 better than a regional average.

T a b l e 2

Aggregate BEQ values in regions NUTS 3

| Region	Total BEQ	Centre BEQ	Population in thous.	GDP per inhab. (in thous. of Euro)
Pražský	1.16	1.16	1 188	23.3
Středočeský	2.65	2.03	1 175	10.5
Jihočeský	2.86	1.98	630	10.0
Plzeňský	2.77	1.68	554	10.5
Karlovarský	2.90	2.19	304	7.9
Ústecký	3.05	2.35	823	9.0
Liberecký	2.79	2.02	431	9.0
Královéhradecký	2.86	1.88	550	9.4
Pardubický	2.94	1.81	508	9.3
Vysočina	3.02	2.16	512	9.3
Jihomoravský	2.78	1.54	1 133	10.1
Olomoucký	3.19	2.37	640	8.2
Zlínský	3.29	2.43	590	9.0
Moravskoslezský	3.27	2.33	1 249	9.2
Czech Republic	*2.74*	*1.16*	*10 287*	*11.1*

Notes: Population at the 2006, GDP values for 2006 (1 EUR = 28, 34 CZK). Data of the Středočeský region centre concern Mladá Boleslav microregion.

Source: Authors' research; Czech Statistical Office.

Moving on to the microregional level, we obtain a slightly different picture as a result of the considerable increase in BEQ differentiation. That is why the microregional level of evaluation from the preferences of individual business entities has higher information relevance. However, from a wider economic point of view, this level seems to be too low for the programmatic application of regional policy because of the higher space dimension of the processes of territorial division of labour (see above) and for this reason the mesoregional level is more suitable. The microregional level is essential for the efficient selection of developmental projects which should respect the conditions for development of individual microregions. It is important that the second hypothesis has been verified, too – the average values of BEQ for the established size categories of microregions with relevant limits of 200, 100, 50 and 25 thousand inhabitants are 1.7 – 2.5 – 3.1 – 3.4 – 3.9 respectively. By comparing the real and the theoretically expected BEQ values, we can identify the existing disparities of both negative (negative deviations indicating lagging microregions) and positive (positive deviations using which we can correctly establish axes of economic development) character.

As for the establishment of long-term development priorities of regional policy, the BEQ evaluation can be considered to be the basic step which should be followed by the evaluation of further disparities in relation to competitive regions´ position. This evaluation in agreement with the definition of the regional competitiveness expands the BEQ evaluation by aggregate factors of labour and innovation potential, for which direct linkages to development of entrepreneurial sector are typical.[4]

Figure 1

**Dependence of BEQ on Size of Regions**
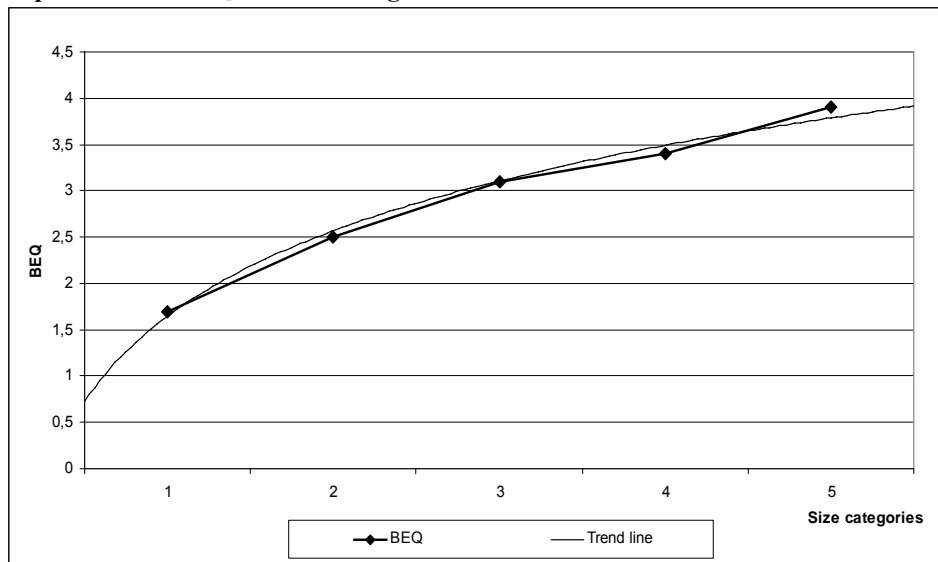
Source: Author's calculation.

The factor of labour is represented by the component of the use of human resources (UHR), which primarily reflects the degree of structural adaptation of regional economies to general and specific development trends. Its socially most sensitive indicator is the microregional unemployment rate, which may be completed on mesoregional level by indicator of economic sensitivity (expressed as a proportion of employment especially in industrial branches which have been losing competitiveness or have been suffering from a general stagnation in the space framework of the EU states) with intensive relationship to structural unemployment. By aggregating results of the partial analyses we obtain the final classification of regions according to the UHR level.

A completely new finding is the fact the UHR component manifests significant links to positive and negative deviations of the real values from the corresponding theoretical values of the BEQ (correlation coefficient –0.63) at microregional level.

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[4] The regional evaluation of an appropriate UHR component is based on five primary indicators (mainly microregional temporal series of unemployment and vacancy indicators and economic sensitivity indicators); IPC component is based on eight primary indicators (mainly related to the share of innovation companies and types of innovation activities, further to relative expenses and employment rate in the field of research and development, and also the space distribution of the most significant innovation companies). However, it is necessary to note that a number of external factors affecting the development of both of these components are already comprised within BEQ factors.

F i g u r e 2
Regional Business Environment Quality (BEQ)
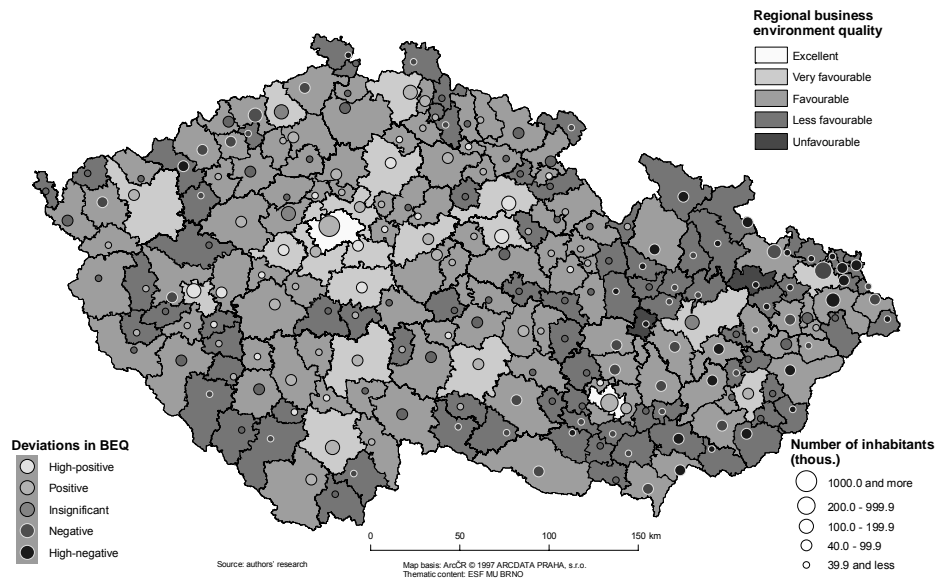
Source: Author's research.

Due to the gradual transition to the knowledge economy, the innovation potential of companies (IPC) is becoming more important for the evaluation of regional competitiveness. The IPC is defined as an aggregate expression of innovation capabilities of companies in a particular region. The basic source of information is standardized innovation survey. During 2004 – 2006 the Czech Statistical Office carried out the fourth survey (ČSÚ, 2008), which were used together with authors' own survey based on the database of the Association of Innovative Entrepreneurship (AIP, 2007). One of strategically significant findings is the fact that technically innovating companies are considerably more successful in international markets and innovation capabilities increase with the size of company. Further, an obvious dependence was confirmed between the distribution of large innovation companies and the BEQ (correlation coefficient 0.62) – in agreement with this finding, only regional capitals and M. Boleslav are recognized as innovation centres of national significance. However, the general links between the IPC and the BEQ are not straightforward (one of possible causes can be the predominating orientation of Czech companies on innovations of lower ranks).

Aggregate results of BEQ, UHR and IPC analyses enable us to carry out a generalized evaluation of regions' competitiveness which will also show the current positive and negative disparities in their economic development (for comparison see Viturka, 2007).[5] The obtained results allowed us to identify regions with an

excellent competitive position (type A), regions with a favourable competitive position (type B) and regions with a less favourable competitive position (type C) and they can also be understood as a perception of their development potential.

The results of the regional competitiveness evaluation including corresponding disparities can be interpreted using the method of development scenarios which are defined for the classified types as following:

Type A – regions with an excellent competitive position: the most suitable platform for this type is a progressive scenario of economic development, its main feature being an offensive entrepreneurial approach from the power position.

Type B – regions with a favourable competitive position: the most suitable platform for this type is a growth scenario of economic development based on selective improvement of economic growth quality.

Type C – regions with a less favourable competitive position: the most suitable platform for this type is an adaptation scenario of economic development, its main feature being the strengthening of the competitive position based on suppressing threats to development.

T a b l e 3

Total Evaluation of Regional Competitiveness of NUTS 3 Regions

Region	Type	Classification group		
		BEQ	UHR	IPC
Pražský, Středočeský	A	1 – 2	1	1
Jihomoravský, Plzeňský, Královéhradecký, Jihočeský, Pardubický, Liberecký	B	2	1 – 2	1 – 3
Zlínský, Vysočina, Olomoucký, Karlovarský, Ústecký, Moravskoslezský	C	3	2 – 3	2 – 3

Source: Author's research.

3. Macroeconomic Analysis of Regional Disparities in Selected New Member States of the European Union

This chapter has been included to provide geographically broader information on the examined issue by presenting the results of a "traditional" analysis" (analysis based on standard statistical data only). The regional analysis focused the central and eastern European countries which entered the Union in 2004 and 2007. The listed states were analysed at the level of NUTS 2. The main objective reason why this level was chosen is the availability of disaggregated national

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[5] The used three-degree evaluation of regional competitiveness purposefully reduces the original five degrees of BEQ, UHR and IPC evaluation (when these were compared the BEQ component was allotted a double weight of significance) and it can be efficiently used for the creation of strategies or conceptions of regional development.

statistical data.[6] There are the following 53 regions at NUTS 2 level: Bulgaria (6), Czech Republic (8), Estonia (1), Lithuania (1), Latvia (1), Hungary (7), Poland (16), Romania (8) Slovenia (1) and Slovakia (4). The objective of the analysis was to assess the economic level of the regions and to use the analysis results to form their typology. Ten various regional indicators were chosen so that the analysis was as complex as possible.

Natural population growth: a basic demographic indicator calculated from the number of the newborn and the number of the deceased per 1000 inhabitants.

Migration: chosen indicator is calculated from the interannual differences of the population of NUTS 2 units after the natural population growth is taken into account.

Regional GDP: undoubtedly the most significant indicator of the economic level of a region (the regional GDP was used in the purchasing power parity per inhabitant).

Labour productivity: applied way to measure labour productivity at regional level is to recalculate the regional GDP to the employed persons in the region.

Disposable household income: the indicator of disposable income includes all incomes after taxation and deduction of insurance fees and accepted social transfers.

Unemployment rate: used in accordance with ILO, which defines an unemployed worker as someone who is over 15, actively seeking work and able to start a job within 14 days.

Employment in agriculture: expresses the percentage of people employed in agriculture vis-à-vis the total employment (the regions with high employment rate in agriculture are generally considered to be less developed).

Employment in knowledge-intensive services: expresses the proportion of employment in selected fields to the total employment (according to NACE, rev. 1.1 the knowledge-intensive services are those with codes 61 – 62, 64 – 67, 70 – 74, 80, 85 and 92).

Employment in research and development (R&D): expresses the percentage of employees in R&D vis-à-vis the total employment.

Expenditures on R&D: the total annual expenditures on R&D as a percentage of GDP.

As the year 2005 is the last one for which all statistical data is available, these values were taken into account for the indicators which do not show any significant fluctuations (employment). For other indicators the average value of the years 2003 – 2005 was used. Using the analysis, the regional synthesis of the development potential was carried out. The methodology is based on the evaluation of the

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[6] The authors also want to point out that there are some limitations to the information relevance of these data as the NUTS 2 units are in most countries created artificially and they do not represent natural functional regions (on the other hand, they allow for an international comparison of the regional development level). Thus generated distortions can be overcome by comparing the results obtained through application of micro- and macroeconomy-oriented approaches to "more natural" regions.

following components: economic components (regional GDP and labour productivity), sector components (employment in agriculture, knowledge-intensive services and R&D), innovative components (expenditures on R&D), social components (unemployment rate and disposable household income), and demographic components (natural population growth and migration). The regions were evaluated with 1 – 5 points for each of the components (the more, the better) according to their position in the intervals set on the basis of the average and standard deviation. As the next step, the aggregation of the partial evaluation results was carried out by calculating the arithmetic average of the points gained for the selected components. The results show the existing disparities in the degree of the socioeconomic development of the regions (see Figure 3).

F i g u r e 3
Regional Synthesis of the Development Potential
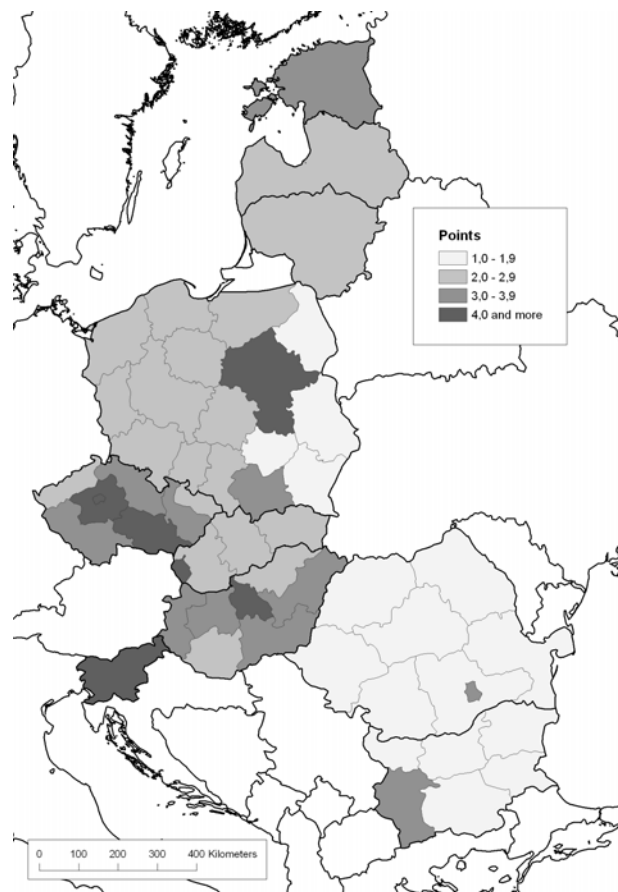
Source: Created by authors on the basis of Eurostat – Regional statistics.

The "best" group consists of majority capitals with Prague in the lead, followed by Slovenia and two Czech regions. The next group contains the most developed non-metropolitan regions of Hungary and the Czech Republic (together with one Polish region), Estonia and metropolitan regions of the least developed countries – Romania and Bulgaria. The third group consists of the remaining Czech and Hungarian regions together with the majority of Polish and Slovakian regions, and Latvia and Lithuania. The "worst" group then contains all non-metropolitan Romanian and Bulgarian regions and four Polish regions. We can conclude that the development potential of individual regions naturally corresponds to the level of their economic development. The obtained results indicate that the more developed countries have entered or are entering the integration stage of economic development, characterized by the diffusion of positive effects from the most developed regions, which strengthens the natural tendencies towards the convergence of the economic standard. As far as the Czech Republic is concerned, the results obtained are not quite identical with the results of the previous microeconomic evaluation of regional competitiveness interpreted from the standpoint of NUTS 2 level. If we leave aside specific Prague region the main exception is the better position of the Jihovýchod region and surprisingly also region Střední Morava (its regions NUTS 3 were in the microeconomic analysis included in worse groups).

Conclusions

The issue of tackling disparities is undoubtedly a component of the traditional regional policy. Therefore, analyses of regional disparities are not losing their importance as their results can considerably contribute to the enhancement of the regional management. With respect to the above mentioned results of research, we can draw the following conclusions:

- developmental disparities arise due to a developmental, and on its basis a hierarchical, differentiation of social systems; logically, it means that the efficiency of their regulation is affected by the degree to which these principles are respected;

- the basic space for the conceptual reduction of socially important developmental disparities is the mesoregional level;

- it is necessary to evaluate disparities of lower order arising at microregional level within the framework of relevant size categories of microregions;

- developmental disparities can be reduced most effectively using programmes focused on BEQ enhancement, development of integration processes and the improvement of endogenous sources use.

As far as the group of new member states of the EU is concerned, we can state that their regional policy is in fact determined by the current regional policy of the EU. Considering the results of the analyses of regional disparities we can conclude that:

- the most significant positive disparities are mainly created by metropolitan regions of capital cities of these countries;

- the most significant negative disparities are mainly created by the most eastern non-metropolitan regions;

- on the whole, regarding the development potential, there is a distinct west-east gradient.

As far as the group of "old" member states is concerned, there is an obvious retreat from the traditionally oriented regional policy (this tendency is naturally reflected in the relevant activities of the EU). The transition to an increased emphasis on competitiveness can be considered the main long-term priority also for regional policy of the new member states. However, it is necessary to consider the risk that divergence tendencies in the regional development could be escalate. All in all, a successful system harmonization of both main regional policy objectives, i.e. "Convergence" and "Competitiveness" will not be easy and will require further regional analyses to be carried out.

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