Analysis of the Disparities Between the Regions of the Czech Republic

Jaroslav Jánský

College of Polytechnics, Jihlava

Abstract

The aim of this paper is to evaluate the development potential of the regions of the Czech Republic. The evaluation of regional development is based on the assessment of regional disparities through the application of development potential indexes. These indexes are used for analysing the environmental and social and cultural conditions in the regions of the Czech Republic, as well as for ranking the regions in terms of quality of life. For the calculation of the development potential indexes, multivariate analysis-factor analysis methods were applied to identify the variables that have the strongest influence on a region´s overall evaluation.

Keywords: Region, development potential index, differentiation of natural conditions, quality of life

Introduction

The strategy for sustainable development in the Czech Republic is divided into three pillars, namely the environment, social and economic. The strategic targets under the environmental pillar are focused on the removal or the elimination of the disparities between regions, but also between the municipalities within each region. This is achieved in coordination with the strategies under the social and economic pillars. Regional development is further influenced by a range of factors that have an impact on quality of life (Vaďurová and Mühlpachr 2005; Hampl 2007).

The issue of the evaluation of disparities in the socio-economic and socio-geographic development of social systems has been covered in various papers. The results show that the extent of the regional disparities is not yet a major problem, but that the long-term trend is alarming because most of the indicators are of a divergent character (Kutscherauer 2011). However, a new perspective on the evaluation of development disparities respects the socio-economic and socio-geographic differentiation of social systems (Viturka 2010). The global recession had an impact on the economic performance of the regional economies. The dynamics within the regions started to stagnate, which resulted in the economic performance of the regional economies being spread out further across the EU (Suchý, Kološta and Kožiak 2015). The socio-economic indicators of regional inequalities include: registered rate of unemployment; registered rate of unemployment among women; average monthly wage; number of job applicants (referred to 1000 economic active inhabitants); and the registered number of long-term job applicants (referred to 1000 economic active inhabitants) (Bucher 2014).

Competitiveness, in relation to the overall socio-economic level of a region, is perceived as the capability of a region to succeed in competition with others (Wokoun and Krejčová 2013). At the municipal level, one of the approaches for determining disparities is the level of information provision to residents living in the area of the municipality (Bachman 2010). Within this context, attention should also be given to comparing the limited means extended to regions under regional policy (Hána and Macešková 2010). Feřtrová and Tmelová (2011) conducted spatial analysis at the municipal and micro-regional level of the structure of unemployment, whereby it was found that a combination of economic factors (on the labour market) and social factors (with regards to the labour force) disproportionately affected certain socio-demographic groups of inhabitants.

The data on the estimated regional price levels in the Czech Republic are taken from published research outcomes, which are complemented with additional microeconomic data on the incomes of workers and retired people (Bajgar and Janský 2015).

The Czech Republic covers an area of 7.9 million hectares, of which 4.3 million hectares is farm land and 2.6 million hectares are covered by woods. The landscape structure is as follows: mountains 12%, highlands 34%, plateaus 50% and lowlands 4%. The areas dedicated to agricultural and non-agricultural purposes is fairly balanced for the whole Czech Republic, but the ratio varies substantially within the regions, which affects the quality of life in the regions (Jánský and Kupčák 2008; Jánský 2011; Jánský 2015).

The aim of this paper is to evaluate the development potential and rank the regions of the Czech Republic. This evaluation is based on the application of calculated development potential indexes, which include an assessment of the role of diverse environmental and social and cultural conditions, for the assessment of regional disparities. Economic performance indicators are also used. The development potential indexes are used to quantify environmental and social and cultural conditions in order

to rank the regions. The economic performance indicators are subsequently incorporated to generate a comprehensive development potential index.

Materials and Methods

Development potential indexes were used to assess the development potential of Czech regions. The impact of environmental and social and cultural conditions on quality of life were evaluated through it.

To create the indexes, multidimensional analyses in the form of factor analyses were conducted. The analyses enabled the identification of those variables that have the biggest impact on the overall situation (Hebák 2005). The variables (indicators) identified and selected through the factor analyses were divided according to subindex solutions. The most suitable variables were chosen from these factors to define the index by which the regions were to be ranked. These variables were then normalized according to the relation $\dfrac{x_i - \bar{x}}{s_x}$ (Dufek and Minařík 2009). The steps that followed only took these normalised variables into account. They were subsequently weighted. As a result, partial indexes for each region were obtained. A minus sign was used to identify a variable with a negative impact. For the generation of the development potential index it was also important to take into consideration the different levels of the analysed regions.

Results and discussion

The creation of the development potential index for environmental conditions in Czech regions

In total, 58 indicators were identified for the evaluation, of which 21 were used for the calculation of the development potential index through factor analysis. The selected indicators were as follows:
- non-investment costs into environmental protection (CZK/inhabitant)
- economic contribution from environmental activities (CZK/inhabitant)
- waste production (tonnes/inhabitant)
- investments into environmental protection (CZK/inhabitant)
- air and climate protection (CZK/inhabitant)
- waste water management (CZK/inhabitant)
- other waste (CZK/inhabitant)
- protected areas (m^2/inhabitant)
- non-forested land (m^2/inhabitant)
- non-agricultural land (ha./inhabitant)
- forested land (ha./inhabitant)
- water areas (ha./inhabitant)

- built-up areas (m²/inhabitant)
- other areas (m²/inhabitant)
- agricultural land (m²/inhabitant)
- vineyards, hop-fields (m²/inhabitant)
- gardens, fruit orchards (m²/inhabitant)
- meadows (ha./inhabitant)
- arable land (ha./inhabitant).

Table 1 shows the rankings for all the Czech regions (Ranking 1) and all Czech regions except the capital city of Prague (Ranking 2) on the basis of the calculated development potential indexes (Indexes 1 and 2) respectively.

Index 1 consisted of four indicators that were normalised and weighted according to expert opinion in order to obtain the partial development potential index for environmental conditions. The indicators used were: investments into environmental protection (in CZK/inhabitant - weight 0.35); non-investment environmental protection costs (in CZK/inhabitant - weight 0.3); non-agricultural land (in ha./inhabitant - weight 0.25); and meadows (in ha./inhabitant - weight 0.1) (Jánský et al. 2012).

The weights accorded to the indicators by experts for all three forms of calculated development potential indexes were verified over a long period of time in cooperation with selected representatives from the regions, mayors of municipalities in micro-regions, as well as representatives from other institutions. This specifically involved four micro-regions across three regions of the Czech Republic, namely the micro-regions of Podluží (South Moravian Region), Hranicko (Olomouc Region), Běleč and Lučina (both in the Pilsen Region). The verification process resulted in two sets of weightings, which is indicative of the complexity and diversity of the opinions during the set up, and therefore in two indexes and rankings.

Table 1: Development potential index for environmental conditions

Region	Index 1	Ranking 1	Index 2	Ranking 2
Capital of Prague	088562	2	-------------	-------------
Central Bohemia	0.10722	5	0.25132	5
South Bohemia	0.22408	3	1.29472	1
Pilsen	0.21608	4	0.28363	4
Karlovy Vary	0.07226	6	-0.49668	10
Ústí nad Labem	0.91889	1	0.22248	6
Liberec	0.01550	7	-0.82168	13
Hradec Králové	-0.08714	8	0.73030	2
Pardubice	-0.20377	10	-0.30899	8
Vysočina	-0.48466	12	0.09626	7
South Moravia	-0.09142	9	0.40584	3
Olomouc	-0.59321	14	-0.67024	12
Zlín	-0.49484	13	-0.53188	11
Moravia and Silesia	-0.48461	11	-0.45507	9

Source: Author

Index 2 evaluates all the regions with exception to Prague. The following normalised indicators were used and weighted: arable land (in ha./inhabitant – weight 0.25); economic contribution from environmental protection activities (in CZK/inhabitant – weight 0.4); water areas (in m^2/inhabitant – weight 0.35).

The creation of the development potential index for social and cultural conditions in Czech regions

In total, 55 indicators were identified, of which 12 were applied to the calculation of the development potential index through factor analysis. The selected variables were as follows:

- Density of population (inhabitants/km^2)
- Share of urban population
- Education structure-high school education with leaving exam
- Tertiary education structure
- Employment rate
- Economic activity rate
- Unemployment rate
- Average monthly wages in agriculture
- Disposable income in households (CZK/inhabitant)
- Paid-out social allowances (CZK/inhabitant)
- Average old-age pension (in CZK)
- Number of flats built per 1000 inhabitants

Table 2: Development potential index for social and cultural conditions

Region	Index 1	Ranking 1	Index 2	Ranking
Capital of Prague	2.91997	1	-------------	-------------
Central Bohemia	0.18221	2	1.39415	1
South Bohemia	0.06944	4	0.22933	4
Pilsen	0.12187	3	0.79481	2
Karlovy Vary	-0.55869	12	0.44133	3
Ústí nad Labem	-1.02827	14	-0.02429	7
Liberec	-0.18943	9	0.14208	5
Hradec Králové	0.06677	5	0.00962	6
Pardubice	-0.12834	7	-0.54445	10
Vysočina	-0.15407	8	-0.68984	11
South Moravian	0.05606	6	-0.09731	9
Olomouc	-0.42299	11	-0.88637	13
Zlín	-0.21086	10	-0.72495	12
Moravia and Silesia	-0.72366	13	-0.04412	8

Source: Author

Under Index 1, all the Czech regions were assessed. Once again, four indicators were normalised and weighted according to expert opinion in order to obtain the partial

development potential index. The indicators were: density of population (inhabitants/km² – weight 0.25); tertiary education structure (weight 0.25); employment rate (weight 0.25); and disposable income (CZK/inhabitant – weight 0.25).

Once again, Index 2 evaluates all the regions with exception to Prague. In this case, the following three indicators were normalised and weighted: economic activity rate (in %age - weight 0.33); disposable income (CZK/inhabitant - weight 0.33); average old-age pension (in CZK - weight 0.33).

The creation of the aggregate development potential index for the regions of the Czech Republic

The aggregate development potential index combines the indexes for environmental, social and cultural conditions with economic performance indicators for the regions.

On the basis of expert opinion two indexes were created, whereby for Index 1 the same weights for all the computed sources was maintained, and whereby for Index 2 the following weights applied: environmental conditions (weight 0.2); social conditions (weight 0.4); economic performance (weight 0.4).

Table 3: Aggregate development potential index (excl. capital city of Prague)

Region	Index 1	Ranking 1	Index 2	Ranking 2
Capital of Prague	-------------	-------------	-------------	-------------
Central Bohemia	1.006924	1	1.170251	1
South Bohemia	0.647463	2	0.52586	2
Pilsen	0.426685	4	0.460468	3
Karlovy Vary	-0.32041	9	-0.28904	9
Ústí nad Labem	0.179918	5	0.173587	5
Liberec	-0.29083	8	-0.18819	8
Hradec Králové	0.080389	6	-0.04862	7
Pardubice	-0.53882	12	-0.59132	12
Vysočina	-0.35361	10	-0.44787	10
South Moravia	0.442592	3	0.455307	4
Olomouc	-0.77758	13	-0.80847	13
Zlín	-0.53429	11	-0.54124	11
Moravia and Silesia	0.031566	7	0.129275	6

Source: Author

Conclusion

The regions were evaluated according to their absolute rank in the respective development potential indexes, whereby the disparities were recorded with an increasing negative index value.

The negative index value indicates the level of existing disparities in terms of the partial indexes (indicators used for the index calculation). From the point of view of social disparity, an acceptable index value is up to -0.5, as emerged from the evaluation in the regions, municipalities in the micro-regions, and in other research work. A higher positive index value means that there are no disparities or that they are very low.

With regards to the environmental conditions, Index 1 indicates how important the impact of Prague is on the overall rankings of the regions. Under Index 2, the highest performing regions are South Bohemia, Hradec Králové and South Moravia. The final value of the index was significantly influenced by the weightings accorded to the specific indicators by experts.

When evaluating the capital city of Prague on the basis of the partial development potential index for social and cultural conditions, Prague significantly surpasses the other regions. In the evaluation of the disparities, it is clear that the position of the capital city of Prague is (as is the case in other capitals in Europe) incomparable to the other regions of the Czech Republic. The research therefore confirms that it is more useful to compare European cities for this very reason.

Regional disparities are considered to be socially undesirable differences in the level of environmental, social and economic development between regions. Regional policy, which targets specific regional problems and addresses potential development areas, is therefore an important support tool for driving improvements in infrastructure, economic growth, and better territorial planning. A precondition for this is a clear statement of priorities and a concentration of means in the regional development strategies of the Czech Republic.

Acknowledgement

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Contact address of the author:

doc. Ing. Jaroslav Jánský, CSc., Department of Economic Studies, College of Polytechnics, Tolstého 16, 586 01 Jihlava/Czech Republic, e-mail: jansky@vspj.cz