

Dynamics of regional disparities in Slovakia in 2001 and 2011

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Abstract. This paper is focused on the presentation of developmental tendencies of regional disparities in Slovakia in 2001 and 2011 from the point of view of selected and relevant socio-economic and demographic indicators. To test the divergence hypothesis of the regional disparities at a district level, these are evaluated by using multidimensional analysis of 14 indicators. The overall level and development of regional disparities are measured with the help of the methods of descriptive statistics and multi-criteria assessments (integrated index). The results confirm the hypothesis of divergence development as the basic tendency of regional development in Slovakia. The presented research has documented evident time shortening of significant changes in regions drifting towards divergent development. Rapid and, up to now, unprecedented changes (employment and wages growth, enterprise development, foreign investments increase, etc.), are evident and reflected in the majority of indicators – however, with different impacts on the regional level.

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1. Introduction

In spite of a policy of regional convergence and considerable investments, efforts by the EU to reduce regional disparities (European Parliament, 2007) have had little impact. Thanks to the favourable economic climate (until the 2008 financial crisis) and the direct and indirect impact of accession to the EU, the gap between Slovakia and the more established, more developed EU member states decreased; but regional differences still pose a problem. At present there is no consensus among the experts on whether the rate of disparities between regions within Slovakia is increasing or decreasing, although the majority believes that regional disparities (RD) are increasing. The aim of this research was to test the hypothesis that the level of RD in Slovakia is increasing by analysing relevant socio-economic and demographic data.

The hypothesis of increasing RD was derived from earlier research on RD in central and eastern European countries (Smith, 1998; Bachtler et al., 1999; Dunford and Smith, 2000; Ward, 2002; Heidenreich, 2003) and in EU countries (Bishop et al., 1994; Egger et al., 2005; Paas, Schlitte, 2006; Gaki et al., 2012; Noteworthy Statistics, 2013) which resulted in a general agreement that RD were increasing and this was ascribed to political changes, the economic transition to a market economy, globalisation and integration, and even to the financial crisis. The analyses in the works mentioned above are based on GDP figures and other financial and economic data. Studies by Petrakos (2001) and Ezcurra et al. (2007) confirmed Williamson's (1965) hypothesis that RD initially increases as less developed countries begin to catch up with more highly developed countries, and will remain at a higher level during the early stages of developmental catch-up, before eventually dropping back to their original, lower level. It is assumed that this is what is happening in central and eastern European countries which have recently joined the EU. However some authors (e.g. Boldrin, Canova, 2001; Canaleta et al., 2004; Cibulskiene et al., 2007; Szörfi, 2007) have argued that factors such as an emphasis on a creative and knowledge-based economy, innovation, the complicated transformation process taking place in post-communist countries, access to EU structural

funds, monetary union, etc., will have a greater influence on the convergence process which characterises the second phase of Williamson's curve than the level of national development. These factors did not, of course, exist when Williamson's hypothesis was formulated. As McKay (2002) mentioned, spatial inequalities must be examined and measured because of several reasons, mainly because inequality is important for regional development, a possible increase of poverty, deprivation, and social conflicts.

Identification and measurement of RD are crucial to develop policies to address RD, but such measurements are in practice uncertain, inconsistent, complicated, and easily biased by changes occurring over time. Different EU member states take different approaches to identifying regions eligible for EU regional development assistance (urban quarters, spatial black spots in terms of unemployment, underdeveloped rural areas etc. To implement geographically targeted intervention policies, it is necessary to unite (at least partially) the various approaches, indicators, and characteristics used. Identification and measurement of RD, especially in the context of EU regional policy, should be based on clear definitions of what constitutes regional problems in the broader European context, an understanding of which disparities will be taken into account and what indicators will be used to assess them (Wishlade, Yuill, 1997).

The search for ways to steer regional development should nevertheless also take into account non-economic and non-financial indicators. Guidance and optimisation of regional development schemes depends on a detailed analysis of key domains including the social and demographic factors that often represent a cause-effect relationship in terms of RD.

The issue of choice of indicators for the study of regional disparities (RD) is characterised by two levels. One level includes the search, compilation, identification, selection, expression, and assessment of indicators. The second level uses a wide spectrum of already defined indicators for partial analysis connected with the assessment of the level, aspects, processes, and changes of RD. Mostly, indicators of economic nature were used, while demographic characteristics and indicators of social exclusion and poverty are used less. Here the works of Lipshitz (1986) and Stock and Watson (1989)

are worth mentioning. Such multidimensional and comprehensive approaches (in Slovakian geographical literature, Ira et al. (2005), Korec (2005, 2009), Hurbánek (2008), Rajčáková and Švecová (2009), Matlovič and Matlovičová, (2011), and Veselovská (2015) for instance) are rather applicable to the identification of RD level determinants.

Accelerated social processes distinctly influenced development of the regions and their differentiation as well. Gradual diversification of the socio-economic situation in Slovakia causes not only distinct changes in stratification of society (vertical differentiation), but also an increase in regional disparities in terms of varied socio-economic and demographic characteristics (horizontal differentiation) (Michálek, Podolák, 2001; Podolák, Michálek, 2008).

2. Theoretical Framework

Regional disparity (RD) issues have a long tradition. The beginnings of this research date back to the 19th century. Various economic theories attempted to explain unequal status and development of regions. Regional balance theories (so called neo-classic) had prevailed initially, disequilibrium theories were then adapted more at a later time. The basic difference between theories was predominantly in terms of processes and mechanisms of nivelisation or differentiation (cumulative, concentrating, selective, etc.). Various globalisation trends and integration processes enhance the recent significance of RD research. These tendencies evoked extremely intensive RD increases followed by inflation of troubleshooting and backward territories, regions, and localities (Carnoy et al., 1993; Held, McGrew, 1997; Monfort, Nicolini, 2002; European Parliament, 2007; etc.). Within the context of some divergence trends of globalisation and integration processes numerous noticeable theoretical and empirical works focused on these problems have arisen (Dunfort, 1993, 2009; Armstrong, Wickerman, 1995; Smith, 1998, 2004; Smith et al., 2008; Fujita et al., 1999; Felsenstein, Portnov, 2005; Kanbur, Venables, 2005; Orayen et al., 2005, 2006, 2007; Orayen, Pascual, 2007; etc.).

As a result of the large-scale scope of this problem with differentiated objectives, a quantity of definitions of what regional disparities really are exist.

All definitions see RD as inequality in observed regional units. One group of definitions (OECD, e.g.) understand RD relative closely, mainly as economic, social, or others (usually one-element) differentiations between regions (OECD, 2003). As a result of this, “close view” regional analyses were focused on economic differentiation – economic efficiency and performance of regions observed, well-being differentiation, etc. The other group of definitions interpret (accept) RD as having complex disparities or multiple differences between regions. They specify RD based on the broad spectrum of relevant aspects, phenomena, and processes. Analyses were focused mainly on spatial structure differentiation, relevant feature differences, contrasts of attributes and processes, etc.

2.1. Concepts and approaches of regional disparities' research

Regional disparities may be understood as the result of differentiated original conditions of regions, their complicated and unequal development, degree of potential utilisation, or their diversified impact of market mechanism as well. Considering this point of view, RD emerge as a complicated problem demanding a multidimensional approach (Wishlade, Yuill, 1997; Molle, 2007; Nijkamp, 2007). The multidimensional and multidisciplinary complex approach – as the basic system assumption – is required, namely for identification of factors and determinants of RD level. Comparability of quantitative (qualitative) methods and explanations (interpretation) of causal relationships are problems of this approach. The reasons for RD research and the applicational relevancy (significance) of obtained results are a very important system basis. One of the main reasons for RD research is a search for disparity within regions – why are some of them backward and what is the impact on system changes to their structures and behaviour. Identification of these negative characteristics refers to a “disparity approach”. Research of relevant differences between the regions heading for (drifting towards) knowledge about their unique, particularity, and ability for effective utilisation of their comparative advantages (to develop “positive functions”) is another

main reason for RD research. From the aspect of these two viewpoints it is possible to speak about a positive or negative character of RD (see Table 1). Positive RD are strong and negative RD are weak features of particular regions. The strong features are usually reflected in comparative and competitive advantages, expressed by unique and valuable sources and abilities of the regions (their population) to utilise them. On the other side, weak features are usually connected with missing sources and abilities to utilise available sources. The disparity approach is focused on the backwardness of the regions and its impact on the current people's situation. Negative disparities have a strong relation with concepts of regional polarisation that stress differences between regions and describe tools leading to regional polarisation. The polarisation theory explicitly talks about market mechanisms that lead to an increase in, and to an adjustment of, RD. According to representatives of this theory there is a need for a state regulation policy, focused on equalisation of disparities or forming barriers for the limitation of regional inequalities.

There are numerous dimensions of RD research – causal, objective, temporal, spatial, impact, etc. In our paper we focus on – from our point of view the most important dimensions – temporality and territoriality. The temporal aspect (analysis of development, changes, and trends in time) is often the basic goal of RD research. Changes in the particular time extent characterises regional dynamics and may reveal the direction of RD development. Territoriality is, for spatially oriented researches, usually the fundamental dimension of RD analysis (see Tab. 2). In spatially focused research, mainly the identification of disparities in particular spatial units (regions) is emphasised. Analysis and evaluation of RD is necessary to be realised only for scale adequate units as

far as this selection significantly impacts the character and level of disparities. In general, the lower the geographic scale (the smaller the geographic unit is) the value of RD will increase. Hučka et al. (2008) identify three types of RD in new EU members (1). The west–east disparity (usually with more developed western territories) seems to be the most evident. Disparities between cities (metropolitan areas) and rural areas (with significantly better conditions in urban areas) are noticeable as well.

Another two aspects of RD research are important as well – the level (depth) of disparities and the convergence–divergence character. The exact result of RD level and basic trends depends on a number of determined factors. Above all, from definition, the used conceptual basis, indicators, heterogeneity or variability measures, temporal aspects, reliability and comparativeness of data, geographical scale and number of analysed units, etc. In dynamic comparisons it is necessary to consider the temporal scope, that allows (in correct selection) the indication of important and interesting features and tendencies.

2.2. Classification and spheres (domains) of regional disparities

Classification of RD is derived from the arrangement of regional differences according to the inequality of features, phenomena, or processes. RD may be classified from the point of view of two significant and related aspects – vertical and horizontal (see Tab. 2). The vertical aspect is derived from the fact that disparities change in agreement with geographic scale. Depending on the different spatial scale the level of RD is changing and with a reduction in spatial scale (in smaller regions) the disparities are increasing. The horizontal aspect is related

Table 1. Essential concepts, approaches, and character of regional disparities (RD)

1. Basic concepts of RD research	1.1. concept of regional equilibrium (neoclassic models)
	1.2. concept of regional inequality
2. Approaches of RD	2.1. disparities approach
	2.2. comparative advantages
3. Character of RD	3.1. positive
	3.2. negative

Source: A. Michálek, based upon cited literature

to RD domains with included material and non-material disparities as well. Most recent researches of horizontal classifications of RD were based on material disparities. Horizontal classification usually estimates three basic types of RD – physical geographic, economic, and social (see Table 2).

Non-material mental disparities are a more recent type of horizontal classification. They have appeared (up to now relatively sporadic in RD research) in respect to socio-economic transformation of the developmental paradigm. Mental disparities lay emphasis upon “soft” localisation factors of regional development, as e.g. the social quality of population, quality of life perception, impact of mass media facilities, psycho-social atmosphere of the regions, etc. The increasing relevance of these (and other) soft localisation factors affect mental disparities that are important for the creation of mental maps. The selection of vertical (spatial) level and horizontal classification of RD research significantly depends on data availability. Spatial units of different levels (with numerous diverse statistics) have particular possibilities in influencing regional development. At the same time, RD should be classified on the base of relevant attributes of various spheres of economic and social life.

3. Selection of indicators

The selection of suitable RD research indicators is broadly discussed in the literature. Based on nu-

merous relevant studies the wide spectrum of indicators and selection approaches is evident. Beside others, the study by Michálek (2013) provides an overview of differentiated methods of indicator selection. The author points out (based on numerous sources and studies) a multifactorial dependency of the correct choice. Most of all from the definition of RD, the followed objective, territorial scale, analysed phenomenon, availability of statistical data, accuracy demands, explanation value of indicators, as well as possibilities of evaluation and interpretation of the results.

Based on the above-mentioned sources and within the context of our paper's orientation, providing indicator's selection process the emphasis was laid upon such attributes as their accessibility, exactness, compatibility, comparativeness, operability, ability of explanation, and interpretability as well.

Each indicator represents (expresses) an essential aspect and disparity level. All of them are statistically verified, important in relation with disparities, comparable with standards of determinative disparities, balanced with selected dimensions characterising disparity, and up to date with rapid changes. Namely the last aspect influenced the priority of selection for those that are able to reflect on the dynamics of RD in Slovakia during one decade with significant changes (2) Some of them have been rarely used in the context of RD analyses thus far. The application of such measures as a material need, index of potential social support, index of migration efficiency, and analysis of their changes represents additional values of the study. According to

Table 2. Dimensions, aspects, classification, and spheres (domains) of regional disparities (RD)

1. Basic Dimensions of RD research	1.1. temporality of RD	1.1.1. time horizon
		1.1.2. temporal dynamics
	1.2. territoriality of RD	1.2.1. administrative or non-administrative
		1.2.2. geographical units
2. Basic Aspects of RD research	2.1. static	2.1.1. level and depth of RD
	2.2. dynamic	2.2.1. convergence or divergence
3. RD classification	3.1. horizontal	3.1.1. type of disparities
	3.2. vertical	3.2.1. geographical scale
4. Spheres (domains) of RD	4.1. physical geographic	4.1.1. - 4.1 ...position, area, relief, climate...
	4.2. economic	4.2.1. - 4.2 ...GDP, income, economic structure...
	4.3. social	4.3.1. - 4.3 ...education, unemployment, housing...

Source: A. Michálek, based upon cited literature

the majority of authors, dealing with RD analyses, a number of indicators should be balanced. Thus, the number of indicators was optimised, to be not very small and not very high. A small number of indicators may on one-side confuse the real situation. A high number limits the clarity and transparency of evaluation and interpretation.

Based on the knowledge presented in the quoted studies, it is obvious that the study of RD level and development requires not only attention to the choice of evaluation of the indicators but also an integrated approach and further elaboration of the assessment methods concerning the effects of individual indicators on the development of RD. Indicators used in this analysis were selected by respecting the generally valid and strict criteria (more details in Michálek, Podolák (2013) and Madajová et al. (2014)).

The most important indicators of RD include social factors. Dunford (2009) argued that they were central to any analysis of RD, because they directly reflected the level of economic development, the living conditions of the population, and the social climate of regional societies. Hence, the disparities in the social sphere include several important aspects and are characterised by a comparatively broad spectrum of indicators, which identify the different social conditions in regions and RD as such.

The RD status and development in Slovakia were assessed using the analysis of partial indicators covering the relevant (socio-economic and demographic) dimensions of RD and using comprehensive integral indicators, which synthesise selected indicators and express the overall level of RD.

Eight indicators represent the socio-economic domain. *Unemployment rate* is the symptom of economic prosperity of a region, it has an impact on income and situation of individuals and it points to the rate of social disparities. Unemployment, especially in the long term, is a large problem, not only of the labour market, but also of regions.

At present, *income* is one of the most marked forms of inequalities, and the cause of increasing discontent in some regions. Regions with a low level of wages are often stricken by negative phenomena, such as social dependency, low purchase power, poverty, social exclusion, etc.

Material deprivation is an important socio-economic indicator which points to the level of pover-

ty in society. It captures the population group whose survival depends on benefits from the state. Material deprivation is the situation when people's income is below the life minima and the citizen cannot ensure or increase his income through their proper efforts.

Firms with over 20 employees and their involvement in production of GDP, employment, and increased competitiveness of the country is nowadays important both in Slovakia and in Europe in general, largely linked to international property and capital. Due to their share in production, employment, and wages, they constitute an important factor in the economic development of regions and their competitiveness.

Independent self-employed persons (per 100 thous. inhab.) constitute an important part of the labour market and economy in general, and particularly that of their region, because their work activity is normally bound to the region where they live. Hence their number and proportion is especially important in lagging and marginal regions with scarce jobs.

Composition of households reflects the socio-economic level of the population, which invests a great part (with some exceptions) of its work activity and income into the improvement of their housing and household quality. Three selected indicators (*households with central heating, a car, and with a computer, hereafter PC*) capture the important needs of current life.

The demographic domain is represented by six indicators. The distinct increase in *extramarital fertility* values is one of the basic manifestations of the changed reproduction pattern of the entire population. It is evident that these manifestations are socially and regionally differentiated. Extramarital fertility is prevalent in the case of young women with low education and income levels, typical e.g. for Roma women. High extramarital fertility has become a synonym of marginality and social exclusion.

Index of potential social support – intensive population ageing process, accompanied by an increasing number and share of the elderly population and the social consequences of this phenomenon can be measured by the index of potential social support (Dlugosz and Kurek 2009), reflecting potential inter-generational assistance. The regions with higher values are characterised by an increased elderly

population with social consequences for regional development.

Education level has an impact on almost all spheres and areas of social life. It is a kind of cross-sectional indicator (in our study we use the proportion of population with only basic education in the adult population), with significant impact on the level of social status, and it interacts with other indicators of demographic behaviour, both on the level of prevention and consequences.

Population's spatial movement indicators can point to the attractiveness of some territorial units. People try to improve their social situation by migration. One of the possible and most often described way of a more detailed expression of the migration effect on population distribution is the *migration efficiency rate* (for details see for example Podolák (1995), and others).

Indicators of *life expectancy at birth* are also ones with high explanation value. It is the most frequently used global characteristic for the evaluation of death rate. Regarding the differentiation of death rate of males and females the individual values are quoted separately.

The high values of the majority of the used regional indicators reflect the positive situation of the region. But there are some indicators (de-motivating) as far as their high values reflect negative development – namely unemployment rate, material deprivation, extra-marital births, and the used form of index of education.

4. Data and methods

Data for administrative districts of Slovakia in two time cross-sections of the years 2001 and 2011 were used. Basic information about the development of the relevant dimensions of RD was obtained from the descriptive statistics supplemented by box plots. These, along with the method of cartograms, represent an appropriate method for the visualisation of basic changes in the development of RD in Slovakia. The overall level of RD in given units is expressed by the integrated index (II) calculated by applying the data normalisation method, namely the min/max data transformation technique. This approach was chosen for various reasons. First of

all, with respect to the facts, which may modify the results of individual multi-criterion methods. Unlike the sum of orders method (accompanied by a considerable loss of information because it is not quite possible to establish by how much one district is better than another), as well as the point method (considering absolute variability), the data normalisation method takes into account the relative variability of individual indicators. It means that in order to reach a good total performance, a district must be excellent in all indicators. If a point method is applied, similar results could be attained with an especially extreme value of a single indicator, hence the results would be biased. Among the data normalisation approaches, the min/max data transformation technique was preferred before the z-score standardisation, because one of the goals of the paper is not only a computation of the integrated indicator (and inter-regional comparison), but the mutual comparison of individual partial indicators in space and time as well. The values of 14 particular indicators of regional disparities quoted in different measures were standardised into one unified scale <0-1> allowing for the estimation of their impact on regional differentiation in Slovakia.

The value X_{io} (the value of indicator i in a district o) had to be adjusted by the effect of the nature of individual indicators. Indicators which maximise (the higher its value the better – for instance, *average monthly wages*) were standardised according to:

$$Z_{io} = (X_{io} - X_{min}) / (X_{max} - X_{min}) \quad (1)$$

The standardised value for an indicator which de-stimulates (the higher its value the worse – for instance, *unemployment rate*) was calculated as:

$$Z_{io} = (X_{max} - X_{io}) / (X_{max} - X_{min}) \quad (2)$$

X_{max} = the top value in the set of the given indicator

X_{min} = the bottom value in the set of the given indicator

Normalised indicator values Z_i in district o were then aggregated into a synthesised variable Y_o based on:

$$Y_o = \frac{1}{n} \sum_i^m Z_{io} \quad (3)$$

5. Results - development of regional disparities in 2001-2011

The position of partial indicators in the system of regional districts of Slovakia in 2001 and 2011 is shown in Fig. 1a) and b). It is obvious that the high value of regional differentiation has been confirmed both in socio-economic as well as demographic indicators. While in 2001 (Fig. 1a) it was mainly *the index of migration efficiency, index of potential social support, index of independent self-employed persons, but also the average monthly wages, PC in the household, the index of extra-marital births, and life expectancy at birth – males*, in 2011 (Fig. 1b) deepening of RD are apparent compared to 2001.

The impact of the last three indicators mentioned became less intensive and, on the other side, RD from the point of view of the *number of firms with over 20 employees and a car in the household* became more evident.

Analysing the most significant changes in the last 10 years, it is necessary to distinguish two aspects:

- general change of situation – in the sense of pointing out the indicators that were characterised by a significant decline on the level of districts;

- deepening of regional disparities – in the sense of identification of those indicators, with the highest impact on regional differentiation during the time period observed.

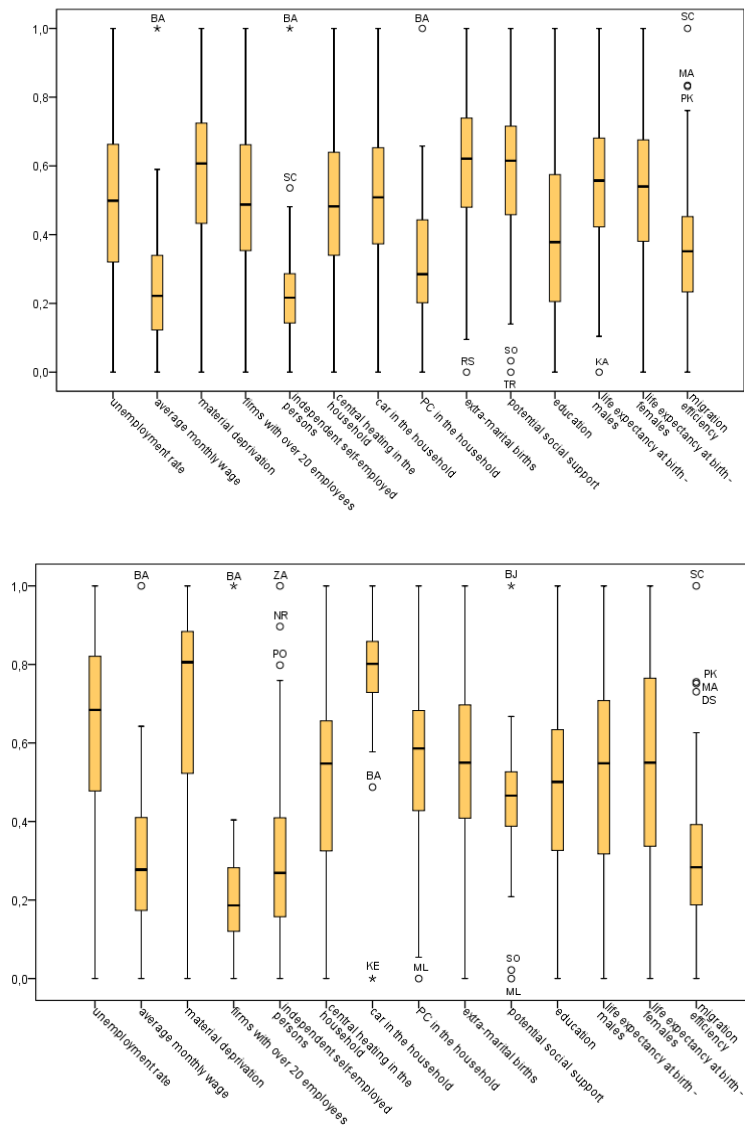


Fig. 1a), b). Impact of partial indicators on regional differentiation in 2001 and 2011
Source: Based on authors' calculations

It should be emphasised that a qualitative shift, indicating improvement of situation in Slovakia, was observed in the majority of indicators. Indicators of independent self-employed persons, extra-marital births, migration efficiency, and partly also potential social support and firms with over 20 employees are the only exceptions. On the other hand, indexes of independent self-employed persons, firms with over 20 employees, average monthly wage, and a car in the household (from economic indicators), as well as the index of potential social support and migration efficiency influenced the depth of inter-regional differences the most during the time period observed.

According to the effects of individual indicators on the RD level in Slovakia in the last ten years the indicators were classified into several groups:

A - Indicators which contributed to RD in recent 10 years:

Indicators tending to increase variability with a distinct effect on RD. The following indicators reflected a distinct increase of spatial variability including remote to extreme values: *independent self-employed persons per 100 thousand inhabitants, migration efficiency index, and number of firms with over 20 employees.*

The *independent self-employed persons per 100 thousand inhabitants* indicator has contributed the most to the deepening of differences between individual regions of Slovakia. Decreases in mean values and the rate of kurtosis, along with the increasing variation range (indicating the increase of heteroge-

neity of the set) in the studied period are evident. The box plot (Fig. 2) clearly shows both the widening interval within which the studied units move and a prolongation of the box of the graph with 50% of all Slovakian districts. Apart from differences between regions, the best and the worst situation regarding the given rate also increased. Along with the increasing diffusion of data, the box plot points to the change in number and spatial distribution of remote cases. Fig. 2 demonstrates the decrease of homogeneity, changes of position for individual districts, and an overall deepening of RD.

Indicators with a tendency for variability increase albeit with less influence on regional differentiation. Development of the distribution of individual values in the frame of the whole set of investigated measures for the last 10 years in this group clearly shows increases of variability, though without increasing the frequency of remote and extreme cases (Fig. 3). The representative of this category is *average monthly wages* plus the indicators of *extra-marital birth rate* and *life expectancy of females at birth*.

Regarding the average monthly wages, the shape of the box plot (Fig. 3) suggests that at the beginning of the study period individual districts of Slovakia were much more homogeneous, while the degree of variability is higher. However, simultaneously, the differences between the value of once extreme (now “only” remote) observation (district of Bratislava) and the remaining districts attenuated. Statistically speaking, this indicator is the one that improved most distinctly (a considerable increase in average

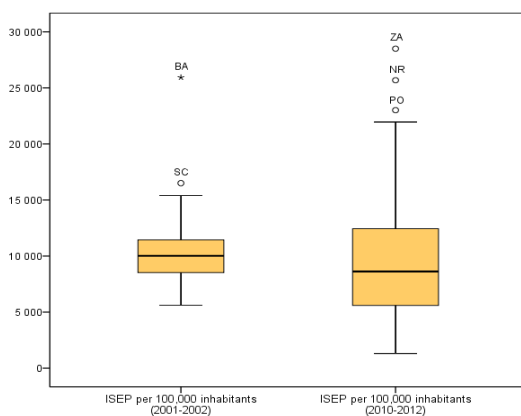


Fig. 2. Box plot of indicators that most contributed to the deepening of regional differences in Slovakia in the course of the study period

Source: Based on authors' calculations

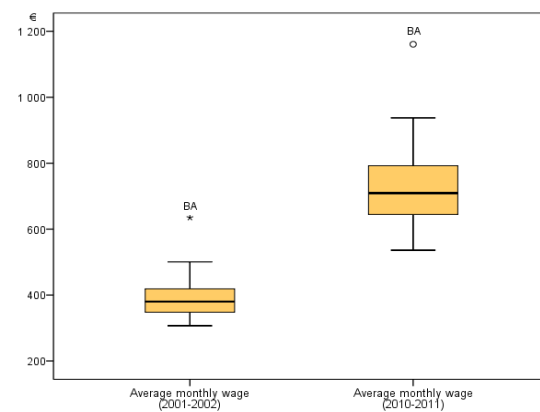


Fig. 3. Box plot of indicator, which experienced an increase of variability during study period

Source: Based on authors' calculations

monthly wages from € 390 to € 720), but it does not mean an improvement in the overall situation. Average monthly wages, as a matter of fact, should not be viewed only from the quantitative point of view as it is influenced by many factors. The increase in average wages, for instance, due to the decrease of other types of income, increased inflation, unfavourable price tendencies, household cost increase, etc., does not necessarily mean improvement in one's economic situation. In the case of wages, the research focused upon the share of districts with below- and over-average monthly wages as the indicator of worsening or improving the overall situation. At the beginning of the study period, none of Slovakia's districts, with the exception of Bratislava, reached what is now the lowest average monthly wages of € 536 per district. The right-sided distribution of an indicator with one remote observation was observed in both periods. Inhabitants in the majority of districts did not earn wages higher than the mean value of the set in a given year. However, the median now draws closer to the arithmetic average as a sign of increasing relative wages and consequently a moderate improvement in situation compared to the preceding period. The district of Bratislava kept its position and no other region of Slovakia has been able to catch up with it in terms of this indicator. Hence, the differences between individual districts increased; nevertheless, there is a slight improvement in comparison to the past.

Indicators with a tendency for variability decrease with an effect on regional differentiation. In-

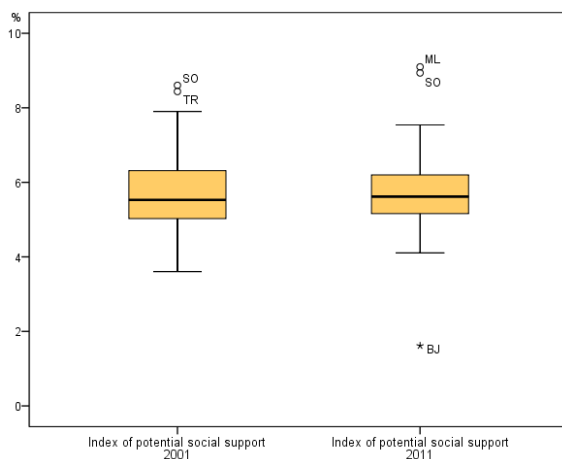


Fig. 4. Box plot of indicator with decreased variability in the course of the study period but with an effect on regional differentiation

Source: Based on authors' calculations

dicators in this group are characterised by increases of remote and even extreme values in the course of the study period: *index of potential social support* and *a car in the household*. However, the remaining observations compared to the preceding period are less variable.

The *index of potential social support* mainly represented the potential of intergenerational help (Dlugosz, Kurek, 2009) that contributed to the deepening of the regional disparity. Differences between remote values of the given measure in districts have become much more significant through the course of the study period. A wider range of the interval within which the individual values move and the more distinct kurtosis of the set indicate a changed situation. In 2011, there were more remote values even on both sides of the investigated set. Other observations concentrate around the mean values. It seems that the situation in several districts (with high values of this index) greatly contributed to the deepening of regional differences.

B - Indicators void of any decisive effect on differentiation in the last 10 years

Indicators that remained unchanged during the course of the study period. This group contains indicators which did not change in the last 10 years in the sense that they did not contribute to deepening regional differences in Slovakia. On the other side though, all classified indicators changed qualitatively meaning the overall situation improved. A typical representative of this category is *unemployment rate* plus indicators of *material deprivation* and *computer in the household*.

In the last ten years, a decrease in the unemployment rate from 20.07% (average of years 2000–2002) to 15.34% (2010–2012) has been observed. At the beginning of the study period, the unemployment rate reached 20% for almost all of Slovakia's districts; now 75% of the districts do not exceed this limit (including 25% of regions with an unemployment rate below 10%). In contrast with the past period, the shape of the box plot (Fig. 5) now displays the right-side kurtosis with a distribution of values for the investigated trait. The majority of districts did not reach the mean value of the entire studied set, i.e. it is lower than 15.34%. However, the variability of values in both sets did not change much. The overall differences between individual regions in terms of unemployment rate lasted. Some com-

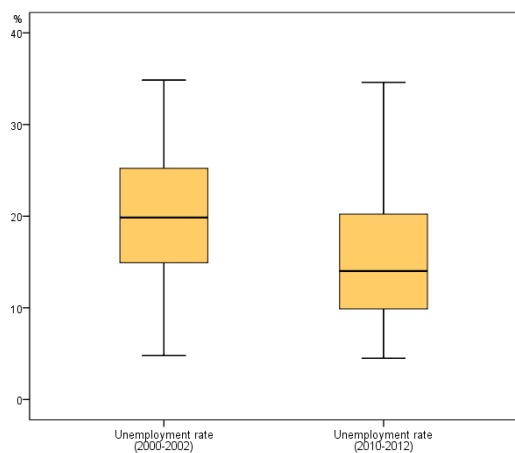


Fig. 5. Box plot of indicator without a distinct change in terms of their effect on regional differentiation of Slovakia
Source: Based on authors' calculations

penetration of mutual differences between districts of western Slovakia and increasing homogeneity has been observed.

Indicators that contributed to the reduction of regional differences. The last group covers indicators in which no substantial effect on regional differentiation in the last ten years was found. They even contributed to the attenuation of differences between districts. These include the *education index* but also *central heating in the household* and *life expectancy of males at birth*.

Education is one of the most important determinants of a population's development viewed from the socio-demographic point of view. It has an impact on all spheres of social life. As seen in the box plot, the share of the population with basic education for adults has considerably decreased after 2001. This fact can be positive as far as this is a de-stimulating variable (index construction, in this case the share of people with only basic education from the adult population). Almost a symmetrical distribution, lower rate of kurtosis, and the size of the box in the box plot graph, which contains half of all values together, suggest an increase of homogeneity in this set. As far as education is concerned, it seems that the overall situation compared with the preceding periods improved in 2011 and differences between districts were diminishing. No major change in this sense was observed in districts with positive values for the given measure: districts with the fewest people with basic education contained the biggest Slovakian cities where universi-

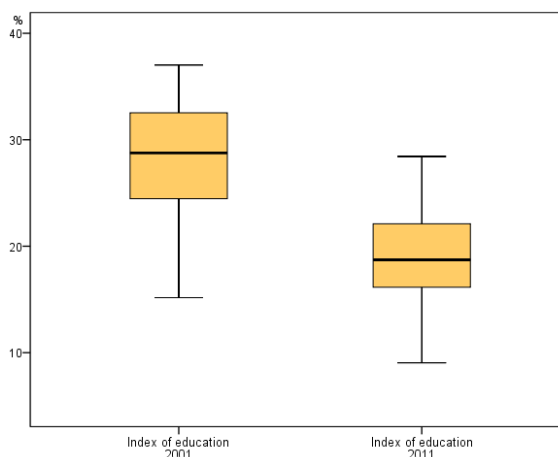


Fig. 6. Box plot of indicator, which contributed to the balance of differences between individual districts of Slovakia during study period
Source: Based on authors' calculations

ties are located. On the contrary, the highest share of the population with basic education was in districts of the south-central part of the country and in eastern Slovakian districts.

Overall level of regional disparities. Apart from partial indicators that may modify the regional differences in Slovakia, the assessment of the overall level of RD by means of an integrated indicator (hereafter II) was computed by the data normalisation method. The higher value of II for the district based on all 14 socio-economic and demographic indicators indicates a better position in the system of regional units.

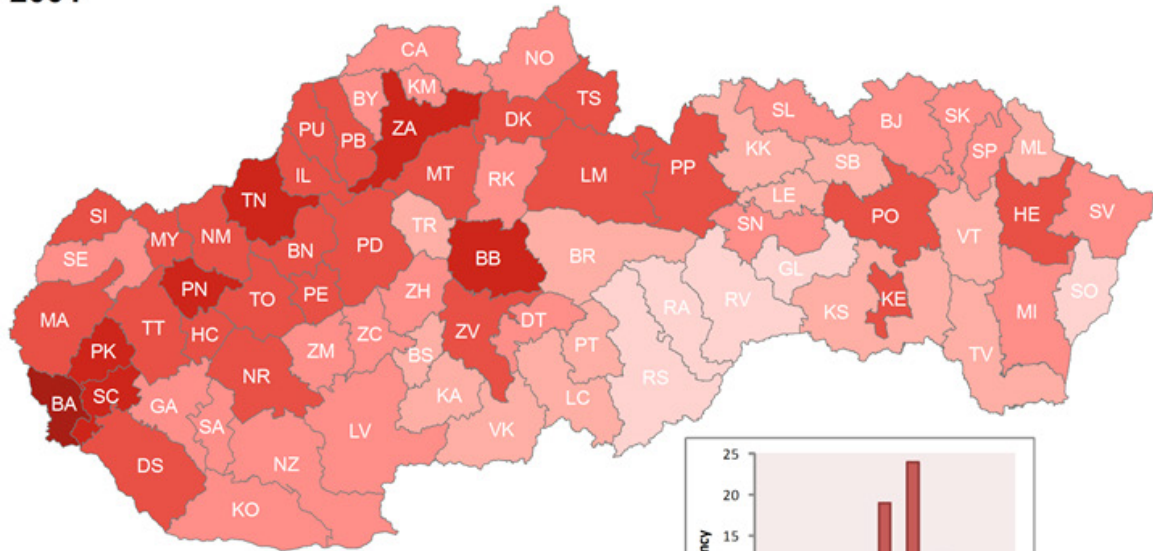
The analysis showed a moderate improvement of the situation (higher values of II now, see histograms in Fig. 7) in terms of overall level of RD in Slovakia during the relevant period. On the other hand, differences among districts are still pronounced and a reduction of regional differentiation is not evident.

Traditionally the weakest were the districts situated in the south of the country. The best values in turn, for all 14 indicators, were found in the district of Bratislava, both now and in the past.

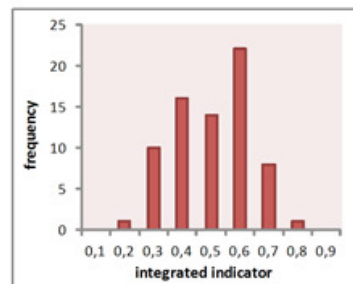
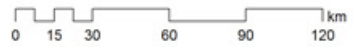
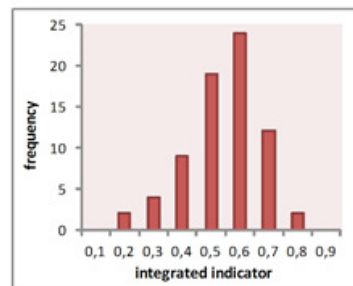
6. Discussion

Due to a favourable economic background and relatively high economic growth during last years, Slovakia (country as a whole) gradually reduced dif-

2001



Value of integrated indicator



2011

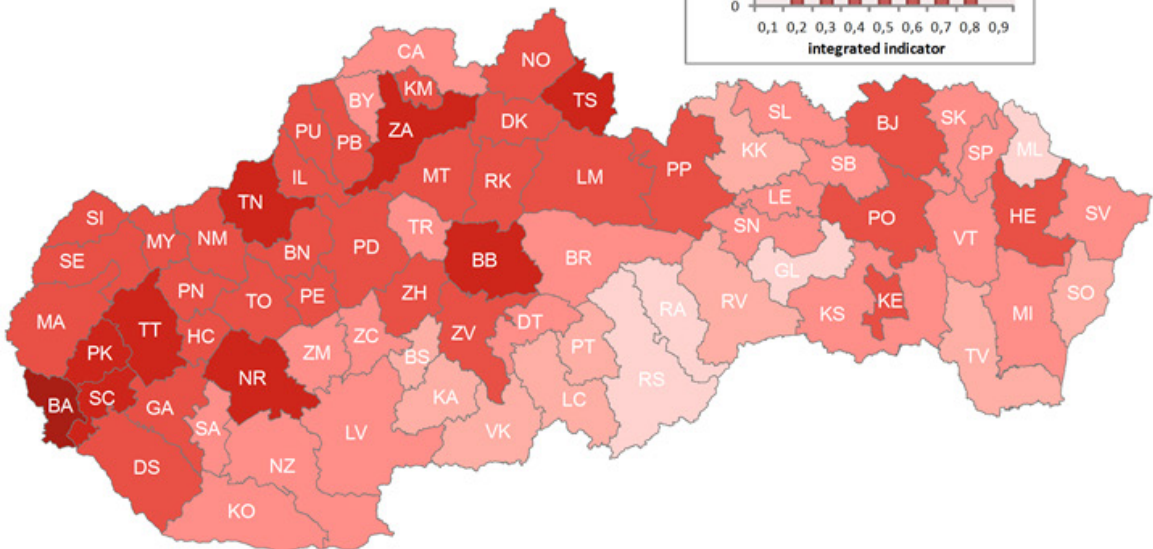


Fig. 7. Change of overall level of regional disparities in Slovakia
Source: Based on authors' calculations

ferences from more developed EU member states. However, in spite of the regional convergence policy, similar to other post-socialist countries of Central and Eastern Europe, the Slovak Republic is characterised by an internal RD increase. As far as this divergent trend of regional development is the relative dynamic in Slovakia, various problems and justified concerns of the population (mainly in backward regions) rise. The presented research not only approved the hypothesis of significant RD increase, but has manifested evident time shortening of definite changes in regions drifting towards divergent development as well. The analysed decade was from various aspects very important for the Slovak Republic. Numerous crucial features and processes were cumulated and have influenced all aspects of development in Slovakia and its regions. Rapid, and up to now, unprecedented changes (employment growth, enterprise development, foreign investment increase, etc.), were evident and reflected in the majority of indicators – however with different impacts on the regional levels. In comparison with previous studies of RD disparities in Slovakia, in our analysis a significant acceleration of inequality increase is visible. If the increase of RD had continually progressed in the same direction for the whole observed time period, the total regional divergence would be even more significant. However, because of the world financial crisis in 2008, the development trajectory has slowed down significantly and turned in opposite direction in some cases. A separate study, oriented on year-by-year analysis, would be needed to show in what direction and to what extent, but also some other features and processes have contributed to the total level of regional divergence in Slovakia in the observed time period. Naturally, it is possible, that the described dynamics of RD increase will slow down and might probably lead to the delay of RD during the 2012–2021 decade. Adhesion of regional convergence from the state and EU may be, of course, very helpful, but because of numerous reasons the results become evident only after a certain time delay.

In addition, there are evident reserves in realisation of support for backward regions. Financial support is not always directed to regions that need it the most. A significant part of finances was headed for developed regions. Our study confirms this surprising reality – the changes in independent

self-employed persons, number of firms with over 20 employees, average wages, etc. Values of these indicators have significantly increased in the most developed regions of the country. Average monthly wages enhanced much faster in powerful regions with better economic structures and higher shares of qualified people than in less developed regions of Slovakia. Unfavourable economic settings with a production of low appended purchases, low productivity of work, and other negative factors have caused a very slow increase of wages, thus influencing growth of regional income inequalities. Similar changes have been observed also in some other analysed indicators.

The results in this study have confirmed our hypothesis (stated after Williamson) that in less developed countries RD are increasing in periods when they begin to equalise with more developed countries. Namely, in the beginning stages they stay on this increased level for a certain time period, usually depending on the level of their economic development.

At the same time, we have confirmed results of several studies from this region (Dunford, Smith, 2000; Ward, 2002; Heidenreich, 2003) and from other EU members (Egger et al., 2005; Paas, Schlitte, 2006; Gaki et al., 2012), that RD increase is related with significant dynamics of their development, rapid changes of socio-economic progress, globalisation impact and integration to political, economic, financial, and other clusters.

It is possible to suppose that gradual decreasing of differences between countries of Central Europe and more developed EU members, optimisation of regional convergence policy from state and EU as well, may lead to a trajectory change of regional development and, maybe, to the hoped for and targeted RD decrease in Slovakia.

7. Conclusions

Analysis of the status and dynamics in RD in Slovakia based on 14 indicators revealed that indicators of socio-economic as well as the demographic nature are characterised by high regional differen-

tiation. Those that most contributed to the changes of integrated indicator values in the study period were: *independent self-employed persons, firms with over 20 employees, ownership of a car and average monthly wages* (economic indicators), and demographic indicators *index of potential social support* and *index of migration efficiency*. The changes of integrated indicator values may be interpreted as a reflection of still persisting inequality (even deepening) of regional disparities. The analysis also showed that during the period in question the general situation in Slovakia improved (qualitative advance in the majority of indicators). In spite of this, the differences between individual districts still exist. Higher economic growth of the real GDP of Slovakia in the 2001-2008 period, when the growth rate of GDP moved between 3.4% and even 10.4%, led to the improvement of many economic and social conditions, life standard parameters, and life quality for the population at the national level, but it was less important at the regional level. Results attained in this study again confirm the distinct regional differentiation between what is referred to as the problematic macro region in southern and eastern Slovakia and the more advanced western and north-western parts of the county. In turn, assertions by some authors about gradual stabilisation of regional patterns and the weakening of the differentiation tendencies have not been confirmed. Results rather point to the reduction of lagging in all regions of Slovakia behind the EU average but the interregional differences steadily increase. Thus, the divergence hypothesis of the regional disparities at a district level was confirmed. The identified facts do not correspond to the efforts by responsible state institutions and EU bodies to reduce interregional differences. These facts stress the need to pay attention to analytical knowledge based on thorough and long-term research into various aspects of this phenomenon.

An assessment of the level and dynamics of RD in Slovakia showed that the country had not reached the stage of socio-economic development at which the level of RD would be expected to decrease. The reasons for this include (besides others):

lack of a coherent regional policy in Slovakia. EU guidelines indicate that funds should be allocated to weaker regions, but in Slovakia the administration also allocates funds to stronger regions. It

is not altogether clear whether the weakest regions should receive more funding or whether the funds should go mainly to the most advanced regions on the grounds that this would help the weaker regions.

other possible concepts and patterns of regional and socio-economic developments with stress moved from economic growth to qualitative development are presently considered in just a limited extent.

some of the incentives and consequences related to reducing RD will only be apparent at a later stage; some forms of investment (e.g. into transport infrastructure) may not have their greatest impact in the region directly affected; they may also affect other, neighbouring regions.

there is a need for weaker regions to take an active approach to development rather than passively waiting for funds.

changes to planning legislation are sometimes hindered by the developers' lobby, which follows the philosophy that it is easier to coax and cajole local and municipal authorities than impartial experts in higher levels of state and regional administration.

policies will only be implemented after a change on a higher level of state and regional administration, when expert evidence and analyses will be preferred over the political influence and friendship of the key actors.

Notes

1. There are eight post-socialist countries - five from Central Europe and three Baltic that have joined the EU (together with Malta and Cyprus) in 2004.
2. It was an important period, because it was when Slovakia joined the EU (2004) and the euro zone (2009), the financial crisis happened.

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References

- Bachtler, J., Downes, R., Hughes, E.H. and MacQuarrie, J.**, 1999: Regional Development and Policy in the Transition Countries. In: *Regional and Industrial Policy Research Paper 36*. European Policies Research Centre. Glasgow, United Kingdom.
- Bishop, J.A., Formby, J.P. and Thistle, P.D.**, 1994: Convergence and Divergence of Regional Income Distributions and Welfare. In: *The Review of Economics and Statistics*, 76(2): 228-235.
- Boldrin, M. and Canova, F.**, 2001: Inequalities and Convergence in Europe's Regions. Reconsidering European Regional Policies. In: *Economic Policy*, 32(6): 205-253.
- Canaleta, C.G., Arzoz, P.P. and Garate, M.R.**, 2004: Regional Economic Disparities and Decentralisation. In: *Urban Studies*, 41(1): 71-94.
- Cibulskiene, D. and Butkus, M.**, 2007: The Influence of Cumulative Causation Process on Regional Divergence in Lithuania during 1995-2003. In: *Jahrbuch fur Regionalwissenschaft*, 27(1): 59-87.
- Dlugosz, Z. and Kurek, S.**, 2009: Population Ageing and its Predictions for 2030 in the Małopolskie Voivodship Compared to Poland and Europe. In: *Moravian Geographical Reports*, 17(1): 2-18.
- Dunford, M.**, 2009: Regional Inequalities". In: R.Kitchin., N.Thrift., eds. *International Encyclopedia of Human Geography*, 9: 236-245.
- Dunford, M., Smith, A.**, 2000: Catching Up or Falling Behind? Economic Performance and Regional Trajectories in the New Europe. In: *Economic Geography*, 76(2): 169-195.
- European Parliament**, 2007: *Regional Disparities and Cohesion. What Strategies for the Future*. Study. Brussels.
- Egger, P., Huber, P. and Pfaffermayr, M.**, 2005: A Note on Export Openness and Regional Wage Disparity in Central and Eastern Europe. In: *Annals of Regional Science*, 39(1): 63-71.
- Ezcurra, R., Pascual, P. and Rapu, M.** 2007: The Dynamics of Regional Disparities in Central and Eastern Europe during Transition. In: *European Planning Studies*, 15(10): 1397-1421.
- Gaki, E, Angelis, V., Dimaki, K. and Koufodontis, N.I.**, 2012: *Economic Crisis and Regional Disparities*. Paper provided by European Regional Science Association in its Series ERSA Conference Papers with Number ERSA12p1158. Available at: <http://www-sre.wu.ac.at/ersa/ersaconfs/ersa12/e120821aFinal01167.pdf>
- Heidenreich, M.**, 2003: Regional Inequalities in the Enlarged Europe. In: *Journal of European Social Policy*, 13(4): 313-333.
- Hurbánek, P.**, 2008: Vývoj priestorovej polarizácie na regionálnej úrovni na Slovensku v rokoch 1996 – 2008 (Development of Spatial Polarisation at Regional Scale in Slovakia in 1996 – 2008 – in Slovak). In: *Geographia Cassoviensis*, 2(1): 53-58.
- Ira, V., Falčan, L., Pašiak, J. and Gajdoš, P.**, 2005: *Podoby regionálnych odlišností na Slovensku (Forms of regional differences in Slovakia – in Slovak)*. Sociologický ústav SAV, Bratislava, Formát Pezinok, 381p.
- Korec, P.**, 2005: Regionálny rozvoj Slovenska v rokoch 1989-2004 (Regional development of Slovakia 1989-2004 – in Slovak). Geografika Bratislava, 227p.
- Korec, P.**, 2009: Regionálna štruktúra Slovenskej republiky a ľudský kapitál jej regiónov (The regional structure of the Slovak Republic and the human capital of its regions – in Slovak). In: Bleha, B., ed., *Populačný vývoj Slovenska na prelome tisícročí, kontinuita či nová éra?* Geografika, Bratislava: 257-279.
- Lipshitz, G.**, 1986: Divergence or Convergence in Regional Inequality-Consumption Variables versus Policy Variables: The Israeli Case. *Geografiska Annaler*. In: Series B, Human Geography, 68(1): 13-20.
- Madajová, M., Michálek, A. and Podolák, P.**, 2014: Úroveň regionálnych disparít na Slovensku a jej zmena v období rokov 2001-2011 (The level of regional disparities in Slovakia and its changes in 2001-2011 in Slovak). In: *Regionálne a priestorové disparity na Slovensku, ich vývoj v ostatnom desaťročí, súčasný stav a konzekvencie*. Bratislava, Geografický ústav SAV, 127-152.
- Matlovič, R. and Matlovičová, K.**, 2011: Regionálne disparity a ich riešenie na Slovensku v rozličných kontextoch (Regional disparities and their solution in Slovakia in the various contexts – in Slovak). In: *Acta Facultatis Studiorum Humanitatis et Naturae Universitatis Prešovensis, Prírodné vedy, Folia Geographica*, 18: 8-89.
- McKay, A.**, 2002: *Defining and Measuring Inequality*. London. Economist Resource Centre.
- Michálek, A. and Podolák, P.**, 2001: Transformation of the Society in Slovakia and its effect on Demographic Behaviour. In: *European Spatial Research and Policy*, 8(2): 23-37.

- Michálek, A. and Podolák, P.** 2013: Theoretical framework for the selection of social indicators characterising regional disparities. In: *Revue Roumaine de Géographie*, 57(2): 119-128.
- Noteworthy Statistics**, 2013: *Regional Disparities in GDP per Capita in the EU after the Financial Crisis*. (LE) London Economics Publication Working Papers and Economic Briefs. Available at: <http://londoneconomics.co.uk/blog/publication/regional-disparities-in-gdp-per-capita-in-the-eu-after-the-financial-crisis/>, DoA: 2.2.2015.
- Paas, T. and Schlitte, F.**, 2006: *Regional Income Disparities: Convergence or Divergence within the EU-25?* HWWA Discussion Paper, 355 Hamburgisches Welt-Wirtschafts-Archiv (HWWA). Hamburg, Germany.
- Petrakos, G.**, 2001: Patterns of regional inequality in transition economies. In: *European Planning Studies*, 9: 359-383.
- Podolák, P.**, 1995: Interregional Migration Pattern in Slovakia – Efficiency Analysis and Demographic Consequences. In: *Geoforum*, 26: 65-74.
- Podolák, P. and Michálek, A.**, 2008: Profile of the Present Slovak Society and its Regional Differences. In: *Social Indicators Research*, 87(1): 157-167.
- Rajčáková, E. and Švecová, A.**, 2009: Regionálne disparity na Slovensku (Regional disparities in Slovakia – in Slovak). In: *Geographia Cassoviensis*, 3(2): 142-149.
- Smith, A.**, 1998: *Reconstructing the Regional Economy: Industrial Transformation and Regional Development in Slovakia*. Cheltenham. Edward Elgar.
- Stock, J.H. and Watson, M.W.**, 1989: New Indexes of Coincident and Leading Economic Indicators. In: Blanchard, O., J., and Fischer, S. (eds). *Macroeconomics Annual 1989*, 4.
- National Bureau of Economy**, 2007: Development and Regional Disparities – Testing the Williamson Curve Hypothesis in the European Union. In: *Focus on European Economic Integration*, 2: 100-121.
- Veselovská, Z.**, 2015: Sociálne nerovnosti a možnosti ich merania (Social Inequalities and Possibilities of Their Measurements – in Slovak). In: *Geographia Cassoviensis*, 9(1): 69-79.
- Wishlade, F. and Youill, D.**, 1997: *Measuring Disparities for Area Designation Purposes: Issues for the European Union*. Regional and Industrial Policy Research Paper 24. Glasgow, University of Strathclyde.
- Ward, T.**, 2002: *Needs of Objective 1 Regions in the Accession Countries and in Existing EU15 Member States in Areas Eligible for Structural Funds*. Final Report. Alphametrics Ltd in Collaboration with Applica sprl. Paris (France), Bruxelles (Belgium).
- Williamson, J. G.**, 1965: Regional inequalities and the process of national development. *Economic Development and Cultural Change*, 13.