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CAN DEVELOPMENT AXES BE IDENTIFIED BY SOCIO-ECONOMIC VARIABLES? THE CASE OF CZECHIA

J. Blažek, P. Netrdová: *Can development axes be identified by socio-economic variables? The case of Czechia.* – Geografie – Sborník ČGS, 114, 4, pp. 245–262 (2009). – This article aims to contribute to existing analyses of regional development in the post-socialist countries of Central and Eastern Europe (CEE) by conducting a detailed regional analysis at the municipal (LAU II) level in Czechia. The focus on such a detailed regional level allows for the testing of several hypotheses, for which traditional regional analyses based on NUTS II – NUTS III data were insufficient. First, we investigate whether development axes, as used in planning documents, manifest themselves at a higher level of socioeconomic development. Second, we expect the formation of clusters, exhibiting a higher level of socio-economic development, around strong growth centres, such as the city of Mladá Boleslav. Third, we explore whether increasing differentiation has shifted from the regional level to the microregional/local level during the past 15 years of the post-socialist transformation. To address these hypotheses, we analyze a set of socioeconomic variables with the help of the spatial autocorrelation method, which allows us to generalize the inevitably, highly fragmented patterns found at the local level.
KEY WORDS: development axes – trends of regional development – agglomeration theory – LAU II – spatial autocorrelation.

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Introduction

The post-socialist countries of Central and Eastern Europe (CEE) represent a unique laboratory for testing various hypotheses regarding the behavioural patterns of these societies and economies under radically changed political, economic and social conditions. The question of social and regional differentiation and polarization, as well as a continual effort to identify the main factors driving these two processes, is one of the key issues addressed by the recent research in these countries (e.g. Buček 1999; Kostelecký et al. 2007; Kostelecký, Čermák 2004; Hampl 2004, 2005; Havlíček et al. 2008; Musil, Müller 2008; Novotný 2007; Bachtler et al. 2000; Gorzelak 1996, 1998; Viturka 2005; Horváth 2002; Tomeš 2002). This question is often studied within the context of the convergence/divergence debate stimulated by the classical works of Perroux (1950), Boudeville (1966), Myrdal (1957), Hirschman (1958), Williamson (1965), Krugman (1991), Dunford (1994) and others. Theoretical arguments in favour of both convergence and divergence have been analysed (e.g. Martin, Sunlay 1998) and summarized (e.g. Ezcurra, Rapún 2006). Obviously, some regional development actors in CEE proved not only to be better endowed to succeed under the market conditions, but also to be more active and adaptable than others due to differences in the endowments of particular regions in terms of regional development factors. While "soft" features of regions and localities relate predominately to their individual characteristics, such as talent, education, culture and entrepreneurial spirit (for more see Cooke 2006), the geographic location of a particular region (both its vertical and horizontal geographic position, which is often referred to as the West-East gradient in most of the CEE countries) is considered to be the most important "traditional" factor of regional development.

Consequently, over the past 15 years, increasing differentiation was taking place not only at the level of individuals, professions, and industrial branches but also at the level of municipalities and regions. From this regional perspective, one of the most important general features of post-1989, socio-economic development in CEE has been a dramatic increase in the level of regional disparities (see e.g. Hampl 2007; Blažek 2005; Blažek, Csank 2005).

However, due to data limitations, the majority of studies of regional development trends in CEE have focused entirely on NUTS II, NUTS III and LAU I[1]. These analyses identified basic regional development trends such as the increasing primacy of capital cities, the widening gap between urban and rural areas, the declining performance of old industrial regions, and the emerging relevance of the West-East gradient in the level of socio-economic development. They also compared the scale of inter-regional disparities in CEE with other European countries (e.g. Blažek 2005; Hampl 2007; Blažek, Csank 2005).

Nevertheless, traditional approaches to regional analyses do not enable one to answer the question of whether the operation of key factors of regional development, such as geographic position, economic and social structure (for more see, e.g. Blažek, Csank 2007) as well as of mechanisms described by the spatial clustering/agglomeration theory (Marshall 1920) has translated itself into a higher level of socio-economic development for municipalities located in development axes. This lack of empirical analyses is in contrast with the conventional spatial planning practice, which often automatically assumes positive effects from the large transport infrastructure, located in these axes and connecting the main urban centres to the socioeconomic development of nearby municipalities[2]. However, it is necessary to stress that there are several different conceptualisations of the term development axes. The concept of development axes was introduced into modern planning practice by Boudeville in his theory of growth centres and development axes (Boudeville 1996). Another conceptualization is found in the work of Doxiadis (1970), who dealt with development axes at different spatial levels and who conceives development axes as zones with a high intensity of human mobility, calling them "kinetic fields". According to Hampl, Gardavský and Kühnl (1987), development axes in Czechia exhibit higher intensity of settlement and are equipped with better infrastructure (esp. transport infrastructure). Within this context, we assume that municipalities in the development axes between the capital city of Prague and the regional capitals of Plzeň, Liberec, České Budějovice and the Hradec

[1] However, see Gorzelak (1998) and Gorzelak et al. (1999) for exceptions in the case of Poland.

[2] See, for example, the concept of spatial policy in Poland (Gorzelak 1998), the Regional Development Strategy of the Czech Republic (2006) or the recently (July 2009) adopted document "Policy of Spatial Development of The Czech Republic 2008".

Králové – Pardubice conurbation would be more successful in terms of their level of socio-economic development than municipalities located outside these axes (our first hypothesis).

Second, we also expect the formation of several clusters around strong growth centres, such as the city of Mladá Boleslav, which is home to Škoda Auto's passenger car production facilities. A recent and detailed critical review of the cluster concept in regional development studies can be found in Asheim, Cooke and Martin (2006), who stressed the extraordinary fuzziness of the cluster concept itself. On the one hand, there is a rather broad definition of cluster, coined by Porter (1998), who understands clusters as units spreading over territories and encompassing agents that are different in nature from many interrelated, industrial branches. On the other hand, there are authors who view clusters as territorially confined units, based on the spatial concentration of firms in the same industry. An example of the latter approach can be found in the analysis of the biotech cluster in Uppsala by Waxell and Malmberg (2007) or – in the context of CEE – the analysis of the role of clusters in the revitalization of the old industrial region, centred around the city of Ostrava in Czechia (Skokan 2004, 2005).

It can be reasonably expected that successful clusters would also perform well in terms of basic socio-economic variables. We prefer the term "cluster" to the term "growth pole", because we consider "soft" factors to play an important role in contemporary regional development (see e.g. Rumpel 2002)[3]. Evidently, clusters, as well as development axes, can exist (and can be searched for) at different spatial scales such as continental and national scales. This article concentrates on the national scale.

Therefore, in this paper we assume that, in addition to the above mentioned traditional regional development factors, "soft" factors as well as agglomeration/localization economies also play a significant role in the high performance of development axes and clusters[4]. Nevertheless, it is necessary to stress that the theoretical understanding of cluster creation is still limited. For example, Maskell and Malmberg (2007, p. 611) have recently admitted that "the origin of clusters remains largely obscure, in the sense that it is almost impossible to determine ex ante where a cluster in the making will take a root" (emphasis in the original).

Finally, our third hypothesis is that, contrary to the situation at the regional level, where stabilization tendencies have been recently documented, during the 2000–2005 period (see Blažek, Csank 2007), more intense differentiation is still underway at the local/microregional level, as a result of differences in endowments of localities with human and social capital and their abilities to exploit these resources. This hypothesis is in line with one of three scenarios of regional development dynamics outlined by Martin (1997) for the UK.

Czechia is particularly suitable for this case study due to its industrial tradition, its skilled labour force, its relatively high economic openness, and its significant attractiveness for foreign direct investment (Pavlínek 2008, Spilková 2007; all of these factors might stimulate exploitation of the potential offered by development axes and might also stimulate cluster formation). Moreover, Czechia also has an unusually high number of municipalities (more

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[3] For a further discussion on relations between clusters and growth poles see Asheim, Cooke et al (2006).

[4] Although this view was recently challenged by Simmie (2006), who argued that non-competitive industries are more often clustered than competitive industries.

than 6,200 in 2007, in a country with just ten million inhabitants) which allows for detailed regional analyses.

Given the nature of the outlined research, a quantitative approach was applied. Such a detailed analysis requires not only large data sets, it also requires the employment of less frequently used statistical methods allowing data generalization. Consequently, the method of spatial autocorrelation was employed. Therefore, the data used and the methodology applied are presented in the next section, followed by a section explaining the results of the analyses performed.

Data and methodology

The data set of 23 socio-economic indicators for approximately 6,200 Czech municipalities was compiled from three basic sources for the period of post-socialism. The first source is the Population Census, which is conducted in Czechia every 10 years. The second source of data is comprised of current statistics from the Czech Statistical Office. The third source of data consists of unpublished data, available upon request at other government institutions, especially at the Czech Ministry of Finance. A special effort was made to obtain time series for each variable to allow for analysis of trends during the transformation period. In the case of variables derived from the Population Census, we used the 1991 and 2001 data. Correlation and cluster analyses of these 23 variables have been performed to eliminate variables carrying the same or very similar information. Based on these analyses, the final set of variables was reduced to six that were then analysed with spatial autocorrelation statistics (see Tab. 1).

These variables were than analysed with spatial autocorrelation statistics, which enable the measurement of spatial clustering and identification of spatial clusters or axes and spatial outliers in the studied data set (Goodchild 1987; Netrdová, Nosek 2009). The classic test statistic Moran's I, which shares many similarities with Pearson's correlation coefficient, was used (Cliff, Ord 1973). Values of Moran‘s I range from +1 indicating a strong positive spatial autocorrelation to –1 meaning a strong negative spatial autocorrelation, wherein 0 indicates a random pattern. The definition of Moran's I for spatial variable x_i at location i is given below:

$$I = \frac{n\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}(x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}\sum_{i=1}^{n}(x_i - \bar{x})^2},$$

where n is the number of units (in this case municipalities), x_i stands for the value of the observed variable in i-th location, x represents its mean, and w_{ij} is an element of the weights matrix W.

The spatial weights matrix W, indexing the relative position of all locations i and j, is a key concept in spatial autocorrelation analysis. Several criteria might be applied to define W (i.e. "neighbouring"). The most common criteria are binary contiguity (i.e. common boundary) or distance bands from each location (see Anselin 1988; Getis, Aldstadt 2004; Spurná 2008). The selection of criteria for the definition of a spatial weights matrix should respect the

Tab. 1 – Socio-economic variables selected for spatial autocorrelation analyses

Variable	Definition	Unit	Data source	Time period covered
Index of education	sum of secondary educated and triple of university educated normalized by the population older than 15 years	%	Population Census	1991 and 2001
New flats	construction of new flats/houses per capita (3 year average)	number of flats per 1,000 inhabitants	Czech Statistical Office, Town and Municipal Statistics	1998–2000, 2005–2007
Tax revenues	per capita tax revenues paid by small entrepreneurs-physical persons (3 year average)	Thousands of CZK per 100 inhabitants	Database ARIS, Czech Ministry of Finance	2001–2003, 2005–2007
Registered entrepreneurs	number of registered entrepreneurs per capita (3 year average)	number of entrepreneurs per 100 inhabitants	Czech Statistical Office, Business Register	1997–1999, 2005–2007
Unemployment rate	number of unemployed normalized by the number of economically active persons	%	Czech Ministry of Labour and Social Affairs	2001, 2008
Electoral turnout	participation in local government elections	%	Czech Statistical Office	1994, 1998, 2002 and 2006

geographical characteristics of the studied area. In this study, the robustness of the results using different weights matrices (distance-based spatial matrices with fixed cut-offs 5, 10, 15, 20 and 30 km, simple binary queen-contiguity and 10-nearest neighbours) was analysed. On the basis of these analyses, 10 km cut-off was selected as the method best fitting the territorial structure of Czechia and therefore this criterion was used for all analyses.

In addition to the classical Moran's I, whose single value for the entire study area can be interpreted as a global statistic of spatial autocorrelation, capturing the average characteristics of the studied area (Unwin 1996, Fotheringham 1997, Fotheringham et al. 2000), its local equivalent, called LISA (local indicator of spatial association), was also used (see Anselin 1995). The local Moran indicates the presence of local spatial clusters or axes and can be visualized with GIS (Anselin 2003, Anselin et al. 2004). While global Moran's I measures the general degree of clustering over the entire territory under study, LISA indicates existing clusters or axes. A permutation procedure was used to assess the significance of the global and local Moran's I statistics against a null hypothesis of no spatial autocorrelation (Anselin 2003, Anselin et al. 2004). Computations of all spatial autocorrelation analyses were performed with the software package GeoDa 0.9.5-i. To compare the results obtained with the application of different distance-based spatial matrices for LISA cluster maps (i.e. 5, 10 and 20 km cut-offs) see figures 2, 3 and 4[5].

The strength of this method can be demonstrated with a comparison to a traditional cartogram, elaborated on the same hierarchical level (i.e. municipal level – LAU II, compare figures 1 and 2 or figures 6 and 7); alternatively, the results obtained with the spatial autocorrelation method can be compared with results from the frequently used method of "generalization" – the aggregation of unemployment data at the microregional level (206 units, figure 5) or even at the NUTS III level.

Regional analysis at the municipal level (LAU II)

In the first step, both basic statistical measures (the coefficient of variation weighted by the population of each municipality) and the global spatial autocorrelation, measured with Moran's I, were calculated for all six of the selected variables. The results are summarized in Table 2.

A significant increase in variation, measured by the coefficient of variation, was recorded in only two of the examined variables (new flats and electoral turnout), while a slight decrease of variation was found in the four remaining variables (index of education, tax revenues, registered entrepreneurs and unemployment rate). Varied results were also obtained, in terms of global spatial autocorrelation as measured with Moran's I. An increase in spatial autocorrelation (i.e. a stronger tendency towards the clustering of similar values), as envisaged by our hypothesis, was recorded in the cases of the following variables: the index of education, new flats, tax revenues and registered entrepreneurs. In addition, in the case of the first three variables (education, flats, taxes) the increase of Moran's I was very high, indicating a tendency for the spatial clustering of municipalities exhibiting either low values or high values of the studied phenomena (the index of change for these variables is 1.85, 1.71, 2.07 respectively). At the same time, spatial autocorrelation of the unemployment rate and electoral turnout decreased, though rather slightly (the index of change for these two variables is 0.82, 0.88 respectively).

In the next step, local Moran's values were visualised in the form of cluster maps (LISA maps), which show the significant locations by one of the four types of spatial association: i) locations where high values are surrounded by high values, ii) low values surrounded by low values, both indicating positive spatial autocorrelation, iii) high values surrounded by low values and iv) low values surrounded by high values, representing negative spatial autocorrelation. High (resp. low) means values above (resp. below) the average.

In the case of the unemployment rate, in both analysed years (2001 and 2008), large areas exhibiting either low or high values of unemployment were identified (see Figure 2). Most importantly, the shape of the areas with low unemployment is similar to what we expected, i.e. the shape of these areas forms axes connecting Prague with major regional capitals in Bohemia (the western part of Czechia), especially with Plzeň, Liberec and České Budějovice. At the same time, the development axis between Prague and Ústí nad Labem (the regional capital of the old industrial Ústecký region in Northern Bohemia) manifested itself only partially. Surprisingly, the axis between Prague and Brno (the two largest Czech cities) also manifested itself only partially in terms of unemployment data, as municipalities on a sizeable section of this

[5] Due to limited space only some maps could be reproduced. All remaining LISA cluster maps referred to in the text are available at: http://www.natur.cuni.cz/~spurna/.

Tab. 2 – Statistical measures for the variables used

Variable	Coeff. of variation at the first available year	Coeff. of variation at the latest available year	Moran's / at the first available year	Moran's / at the latest available year
Index of education	44.5	37.5	0.136	0.252
New flats	98.4	137.0	0.101	0.173
Tax revenues	78.3	73.6	0.014	0.029
Registered entrepreneurs	27.0	23.4	0.321	0.382
Unemployment rate	56.3	53.6	0.492	0.401
Electoral turnout	18.8	25.4	0.138	0.121

Note: The coefficient of variation is weighted by the population of each municipality. All values of Moran's / are statistically significant at the 1 % significance level.

axis do not exhibit the envisaged low rate of unemployment. Unexpectedly, unemployment data also fail to support the envisaged positive effects of the axis between Prague and the Hradec Králové – Pardubice conurbation. The overall picture suggests the manifestation of moderate positive effects of development axes in Moravia as well. However, due to the generally weaker economic performance of Moravia, when compared to Bohemia, which is accompanied by higher unemployment rate, the municipalities located within these axes are merely reaching average values of unemployment in Moravia, compared to the below-average values in Bohemia. A prime example of this axis can be found in the belt between Brno and Olomouc which was hardly discernible in 2000 but which clearly manifested itself in 2008. In Moravia, in addition to this axis, there is only one cluster showing a very low unemployment rate – the one around Zlín (the regional capital, which is home to traditional entrepreneurial spirit as well as to the Baťa shoemaker). Consequently, the unemployment data generally support our hypothesis about the positive effects of development axes on the socioeconomic development of relevant municipalities.

In terms of the index of education, spatial autocorrelations for 1991 and 2001 (census years) yielded basically similar spatial patterns with clusters formed by major cities and their hinterlands (for both maps – see note 5). However, three new clusters with high levels of education emerged: Ostrava (the third largest Czech city and a traditional centre of heavy industry), Hradec Králové (the regional capital of the Královéhradecký region) and Mladá Boleslav (an important centre of automotive manufacturing). At the same time, a relative worsening of the educational structure was recorded in the following regions: the Ústecký region (a typical old industrial region), the Karlovarský region and partially in the Plzeňský, South Moravian and South Bohemian regions as well. Nevertheless, neither the manifestation of development axes, nor the deepening of microregional variation envisaged by our hypotheses was observed.

Unlike the index of education, the construction of new flats exhibits a significantly less stable pattern. In fact, there are only few clusters with high intensity of housing construction in both analysed periods (average for 1998–2000 versus average for 2005–2007). These nodes are Prague, Brno, České Budějovice and Plzeň (see Fig. 6, 7). But even in these areas, at least one change that is worth mentioning was identified. This change is the remarkable homogenization of clusters around Prague and České Budějovice, exhibiting a high intensity of construction of flats during the second period (2005–2007), which can be interpreted as the result of suburbanization spreading much more evenly than during the previous analysed period (1998–2000). Also, the clusters around České Budějovice and Jihlava (the latter is the centre of the Vysočina region, which has experienced significant FDI inflows) noticeably expanded. Several clusters were also formed in mountaineus areas that are attractive for tourism. Similar to the clusters, the "black spots" (areas with a concentration of low values) also exhibit remarkably low stability over time. Major changes that occurred include the formation of a new extensive black spot in the peripheral hilly area in South Moravia, while a vast black spot north of Olomouc practically disappeared in 2005–2007. Therefore, data on the construction of new housing support our hypothesis regarding the manifestation of clusters but not regarding development axes. An increased value of the weighted variation coefficient supports our hypothesis on growing differentiation at the microregional/local level.

Interesting results were also obtained by analysing the spatial autocorrelation of per capita tax revenues paid by small entrepreneurs-physical persons. The spatial pattern exhibits some features similar to those related to the construction of new flats, i.e. no development axes could be identified, but only few clusters and a larger number of black spots. The largest cluster covers Prague and its surroundings, esp. areas stretching to the south, but clusters also formed around the majority of the regional capitals confirming their economic strength. Several rather extensive black spots also formed along the borders of the Central Bohemian region, which is an observation in line with findings made by J. Musil decades previously (for more recent data on this issue, see Musil, Müller 2008). A relatively similar pattern of black spots was also formed around the second largest Czech city – Brno – exhibiting a shape like "wings". Nevertheless, the largest black spot by far was identified south of Jihlava around the borders of Bohemia, Moravia and Austria.

The analysis of local spatial autocorrelation for the rate of participation in local government elections as a possible proxy for social capital yielded highly fragmented patterns for both 1994 and 2006. Moreover, spatial patterns for both years depart significantly from each other. At least three features are worth mentioning. First, a large black spot of low electoral participation, which was recorded in 1994 and which extended over the Ústecký and Karlovarský regions, was fragmented into several smaller black spots. Second, a large cluster between Prague and Brno became much more internally differentiated, in 2006, than it had been in 1994. Finally and rather surprisingly, a new extensive black spot was formed north of Prague, in 2006. An increase in the weighted coefficient of variation supports our hypothesis about the increasing degree of differentiation at the microregional/local level. At the same time, the electoral data do not support our hypothesis about the manifestation of positive effects of development axes.

Conclusion

The collapse of state socialism and the subsequent building of market-oriented democratic societies triggered many important social and economic processes in CEE. Among these, increasing social and regional differentiation has attracted a lot of attention among experts and decision-makers. However,

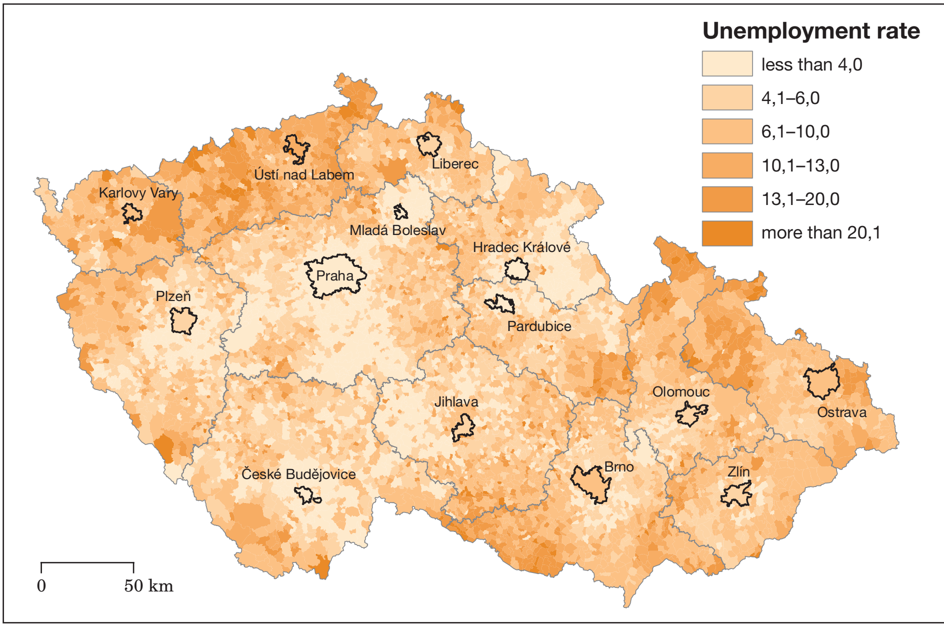

Fig. 1 – The unemployment rate at the municipal level (2008). Names of cities referred in the text are provided in these figures. Source: The Czech Ministry of Labour and Social Affairs.

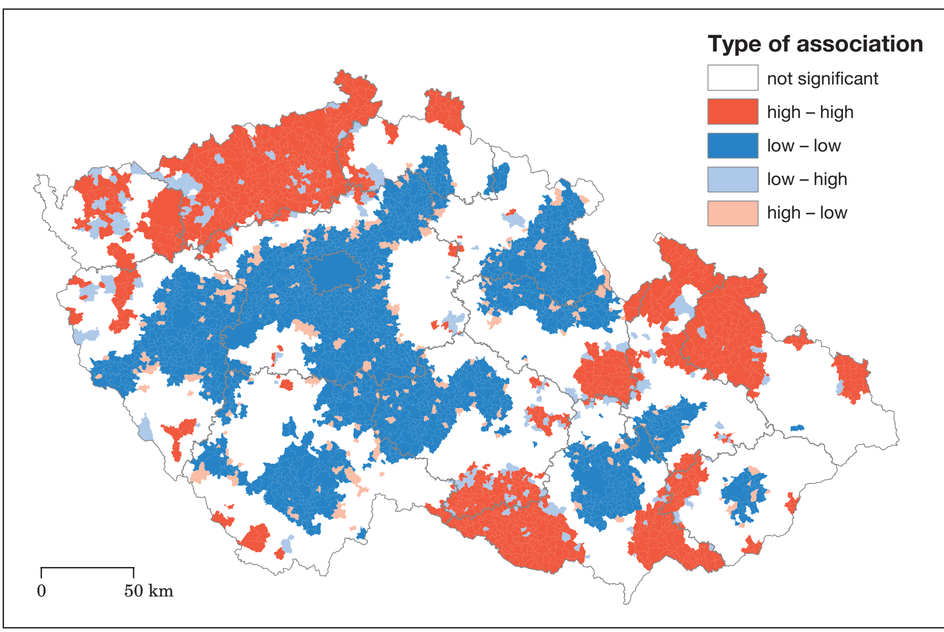

Fig. 2 – The LISA cluster map for the unemployment rate (municipal level, 2008, distance-based spatial matrix with fixed cut-off 5 km). All computations were done with GeoDa 0.9.5-i (Anselin 2003, Anselin et al. 2004). The significance level is 5 %. Inferences are based on the permutation approach with 999 permutations. Source: The Czech Ministry of Labour and Social Affairs.

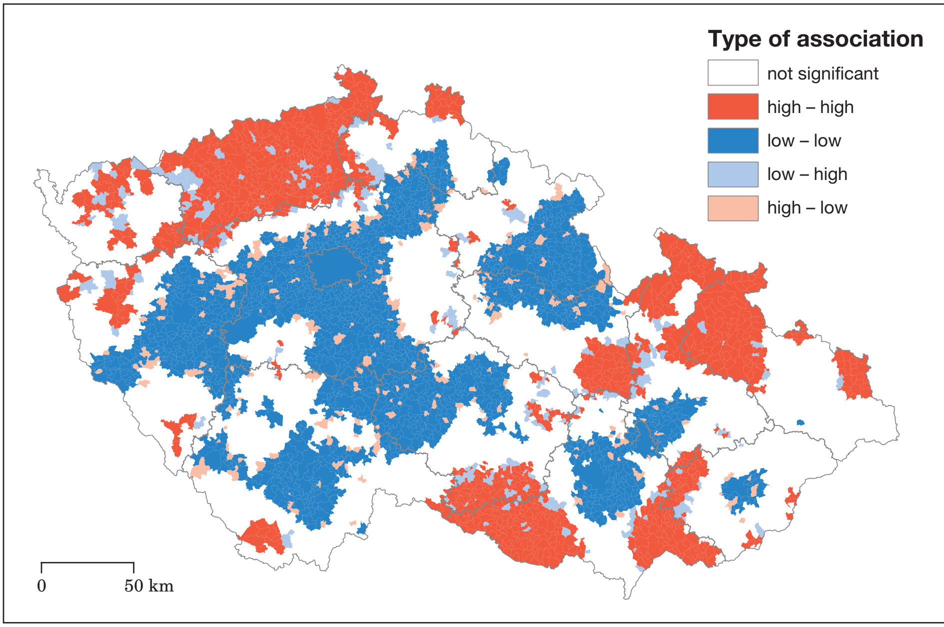

Fig. 3 – The LISA cluster map for the unemployment rate (municipal level, 2008, distance-based spatial matrix with fixed cut-off 10 km). Source: The Czech Ministry of Labour and Social Affairs.

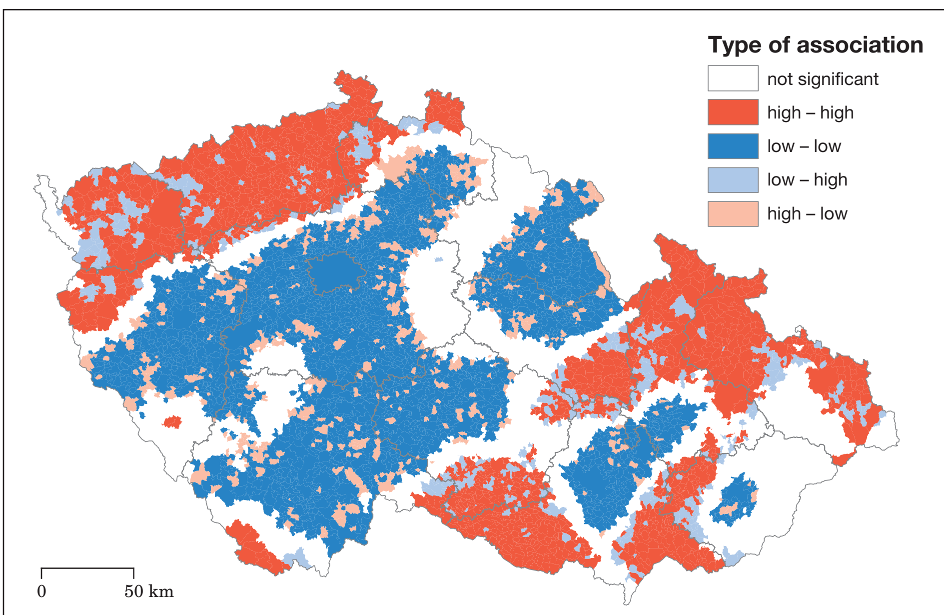

Fig. 4 – The LISA cluster map for the unemployment rate (municipal level, 2008, distance-based spatial matrix with fixed cut-off 20 km). Source: The Czech Ministry of Labour and Social Affairs.

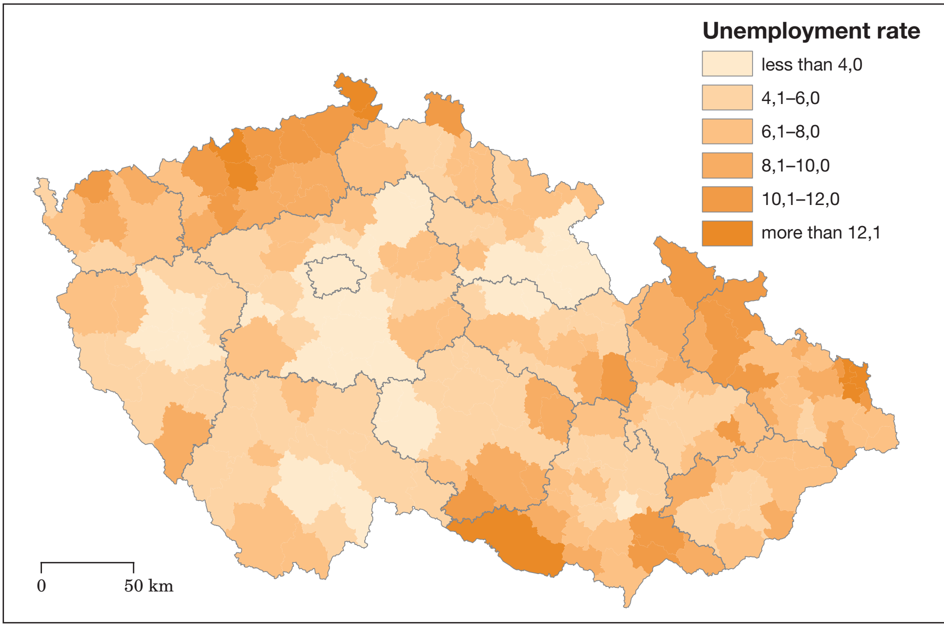

Fig. 5 – The unemployment rate at the micro-regional level (206 units, 2008). Source: The Czech Ministry of Labour and Social Affairs.

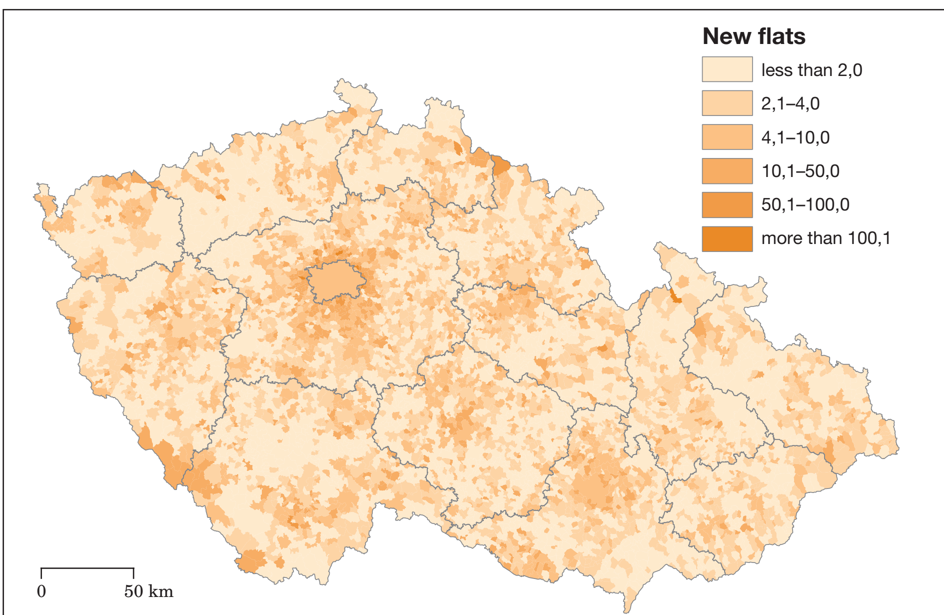

Fig. 6 – Construction of new flats (municipal level, per 1000 inhabitants, average for 2005–2007). Source: The Czech Statistical Office, Town and Municipal Statistics 2005–2007.

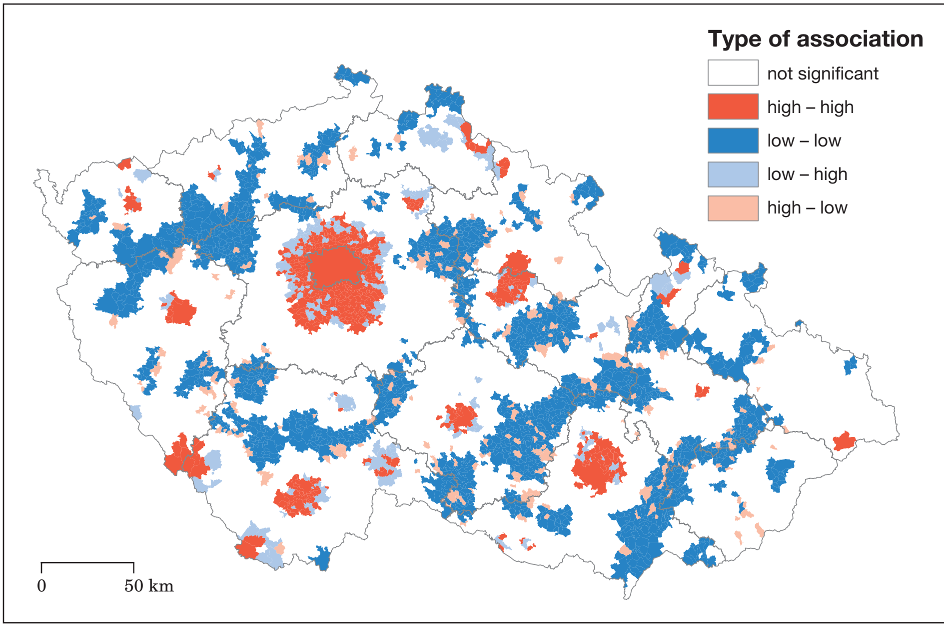

Fig. 7 – The LISA cluster map for new flats (municipal level, 2005–2007, distance-based spatial matrix with fixed cut-off 10 km). Source: The Czech Statistical Office, Town and Municipal Statistics. 2005–2007.

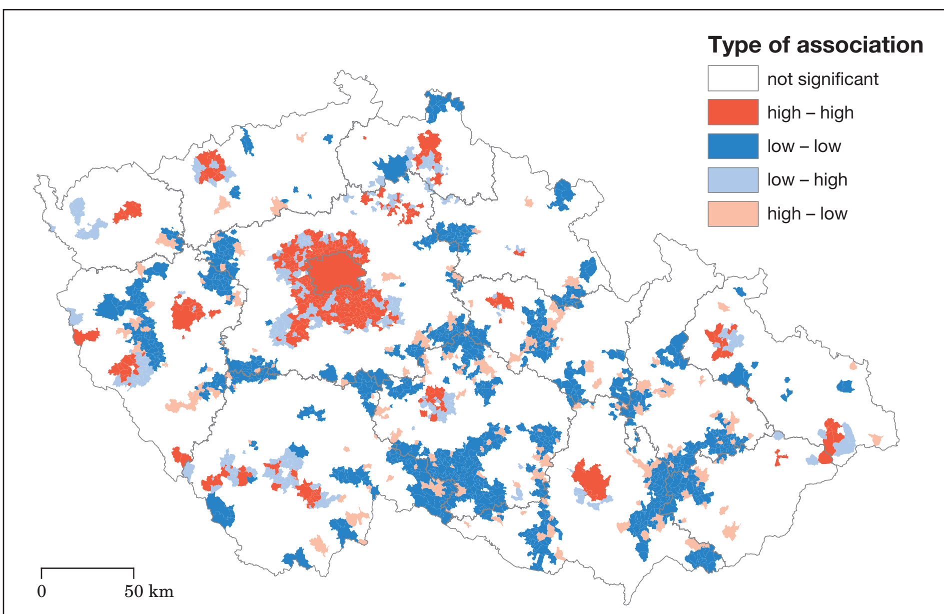

Fig. 8 – The LISA cluster map for tax revenues (municipal level, 2005–2007, distance-based spatial matrix with fixed cut-off 10 km). Source: Database ARIS, Czech Ministry of Finance.

until now this differentiation has been studied predominantly at the NUTS II, NUTS III and LAU I levels, which tend to hide deep intra-regional disparities. Therefore, the basic aim of this article was to conduct an analysis of regional development tendencies at the detailed municipal level (LAU II) in Czechia. Three hypotheses were formulated at the onset of this research. First, that after more than 15 years of operation of traditional as well as "soft" factors of regional development, under market conditions, a higher level of socioeconomic development would be evident for municipalities located within the development axes, connecting main urban centres of Czechia. Second, we expected the formation of several clusters around strong growth centres, such as the city of Mladá Boleslav. Our third hypothesis expected that, after a relative stabilization of regional patterns observed at the NUTS II – NUTS III levels, during the 2000–2005 period, a growing differentiation has been taking place at the microregional/local level, mostly due to differences in "soft" development factors, such as talent, culture, education, and entrepreneurial spirit.

The conducted analyses yielded very different results and none of the hypotheses has been confirmed by all of the selected variables. On the other hand, all stated hypotheses have been confirmed by at least some of the variables. Namely, the analysis of the unemployment rate confirmed the expected positive effects of development axes between Prague and most of the major regional capitals in Czechia. The data on education, the construction of new housing as well as the data on tax revenues paid by small entrepreneurs-physical persons all suggest the formation of well-performing clusters; however, development axes have not manifested themselves via these indicators. The housing data support our third hypothesis about growing differentiation at the microregional/local level. Also in the case of voter turnout in local elections, the drop of Moran's I indicates that the overall level of clustering decreased, in other words, that differentiation at the municipal level has increased. This is in line with the observed increase in the weighted coefficient of variation. Thus, the results of analysis of this variable, serving as a proxy for social capital, support our hypothesis about increasing differentiation at the microregional/local level. Nevertheless, this result should be interpreted carefully, as overall level of participation in local elections fell significantly between the two analysed years. Moreover, the electoral data do not support our hypothesis about the manifestation of a higher level of social capital in development axes.

These varied results suggest that, although development axes have partially manifested themselves, in terms of unemployment rate, the potential of development axes, determined by good accessibility to urban centres, has not, as of yet, translated into a generally higher level of socioeconomic development. The analyses performed demonstrate that most of the selected variables exhibit a nodal structure. Clearly, the level of socioeconomic development of major cities (and of their surroundings) and that of development axes differs considerably. In other words, the regional structure of Czechia is strongly dominated by urban centres and development axes merely play (up to the present time) a secondary role.

Likewise, concerning the hypothesis regarding a shift in regional differentiation from the meso- to the micro-regional/local level, it should be concluded that varied results have been obtained and that no clear tendency towards higher differentiation has been found. A significant increase in variation has been observed only in the case of two variables (the construction of new flats and electoral turnout).

Follow-up qualitative research on at least some of the selected cases could shed more light on the actors and mechanisms, with which the potential of development axes and clusters can be utilized. The number of such studies dealing with CEE countries is still rather limited. Examples include Uhlíř's (1998) analysis of FDI impacts on local actors and the institutional environment in one of the Czech microregions, or Szczepanski and Thomas' (2004) analysis of how key regional development actors coped with the transformation challenges in selected Polish and East German regions.

Our findings have several possible implications for decision–makers. First, since clusters and development axes are often seen as platforms for the mobilization of agglomeration/localization economies, providing firms and other actors numerous advantages (Maskell, Malmberg 2007), targeted public support for the further development of clusters and development axes can help narrow the productivity and competitiveness gap between new member states and the EU 15. Such support could not only take the form of investment into the technical infrastructure in these areas, but could also come in the form of "soft" measures supporting mutual cooperation and learning among relevant actors (cfr. also Smejkal 2008). Second, in light of the fact that large FDI often provides a key impetus for regional economic development in CEE, a selective incentive policy for FDI is needed (see e.g. Uhlíř 1998 or Pavlínek, Janák 2007). The type of FDI attracted is of key importance. Third, CEE has a significantly lower labour mobility than the EU 15 (Čermák 2002). Therefore, more general measures that might contribute to an increase in labour mobility and to greater labour market flexibility would be needed, such as the elimination of rigidities in the functioning of the housing market (for more see e.g. Sýkora 2003) or further improvements in accessibility. Such measures could stretch the spatial extent, at which advantages of spatial agglomeration are available. Finally, important implications can be also derived for physical planning as considerable pressure on land use might be expected in development axes or clusters. Such an approach would be in contrast to the current practice of many Czech municipalities, which often permit an extensive greenfield form of industrial development within their territories.

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Shrnutí

MOHOU BÝT V ČESKU NA ZÁKLADĚ ANALÝZY SOCIOEKONOMICKÝCH INDIKÁTORŮ IDENTIFIKOVÁNY ROZVOJOVÉ OSY?

Cílem článku je přispět k poznání regionálního vývoje v Česku detailní analýzou vybraných socioekonomických dat na úrovni obcí. Takto podrobná úroveň sledování by měla poskytnout odpověď na několik výzkumných otázek, které na základě dosud převažujících analýz na úrovni krajů či okresů, případně obcí s rozšířenou působností, nemohly být zodpovězeny. První výzkumnou otázkou je, zda rozvojové osy, se kterými pracují jak některé klasické teorie regionálního rozvoje (zejm. Boudeville) i ekistická škola (např. Doxiadis), ale i strategické plánovací dokumenty (v Česku např. Politika územního rozvoje České republiky 2008 nebo Strategie regionálního rozvoje ČR a analogické dokumenty v dalších zemích) je možné identifikovat pomocí analýzy socioekonomických dat na úrovni obcí. Druhou výzkumnou otázkou je, zda se růstový potenciál center jako je např. Mladá Boleslav projevuje vyšší úrovní socioekonomické vyspělosti i v jejich okolí, resp. zázemí. Třetí otázkou, na kterou v článku hledáme odpověď, je, zda v souladu s hypotézou významných světových geografů (viz např. Martin 1997) by mělo v Česku dojít k postupnému přechodu diferenciace z regionální na mikro-regionální, příp. lokální úroveň. S těmito výzkumnými cíli byl vybrán relevantní soubor socioekonomických indikátorů na úrovni obcí, na které byla následně aplikována metoda prostorové autokorelace, jakožto metoda, která umožňuje generalizovat data, která na úrovni obcí nutně musí vykazovat vysokou míru fragmentace, neboť se jedná o výrazně nekomplexní jednotky.

Provedené analýzy ukázaly, že ani jedna z výzkumných otázek nebyla potvrzena všemi indikátory. Na druhou stranu všechny výzkumné otázky byly potvrzeny alespoň některými proměnnými. Konkrétně, v případě rozvojových os se ukázalo, že význam dobrého vybavení velkou dopravní infrastrukturou a výhodné polohy v sídelním systému se projevil pouze v případě míry nezaměstnanosti (viz obr. 1–5). Míra nezaměstnanosti je tedy v rozvojových osách nižší než v jiných oblastech. Nicméně je třeba zdůraznit, že rozvojové osy identifikované na základě míry nezaměstnanosti mají dosti odlišný tvar ve srovnání např. s rozvojovými osami vymezenými v rámci Politiky územního rozvoje ČR 2008. V našem případě jsou osy na jedné straně daleko širší než je oficiálně předpokládáno, na druhé straně existuje několik os, resp. jejich segmentů, kde se jejich předpokládaný pozitivní efekt vůbec neprojevil. Nejzásadnější je však závěr, že intenzita pozitivního působení rozvojových os na v nich ležící obce je nesrovnatelně nižší než je tomu v případě samotných jader, které tyto osy spojují. Většina socioekonomických proměnných totiž vykazuje výrazně vyšší hodnoty jen ve významných městských centrech či v některých oblastech s rozvinutým cestovním ruchem. Jinými slovy, regionální struktuře Česka výrazně dominují jádra a efekt rozvojových os je jen druhořadý.

Pokud jde o druhou výzkumnou otázku, tj. o existenci vyšší úrovně socioekonomické vyspělosti v zázemí významných center, tuto výzkumnou otázku potvrdily výsledky analýz za proměnné charakterizující vzdělanostní strukturu, intenzitu nové bytové výstavby a daňové výnosy fyzických osob – podnikatelů.

Konečně v případě výzkumné otázky předpokládající pokračující diferenciaci na úrovni obcí byly získány velmi protikladné výsledky a hypotéza byla potvrzena pouze u proměnných charakterizujících novou bytovou výstavbu a účast v komunálních volbách (jakožto jednoho z možných nepřímých indikátorů sociálního kapitálu).

Obr. 1 – Míra nezaměstnanosti na úrovni obcí (stav v březnu 2008)
Obr. 2 – Kategorizace obcí dle výsledků analýzy LISA pro míru nezaměstnanosti (rok 2008, vážící schéma s mezní vzdáleností 5 km). V legendě: typ prostorové asociace: nesignifikantní, vysoké – vysoké (hodnoty), nízké – nízké, nízké – vysoké, vysoké – nízké.
Obr. 3 – Kategorizace obcí dle výsledků analýzy LISA pro míru nezaměstnanosti (rok 2008, vážící schéma s mezní vzdáleností 10 km). V legendě: typ prostorové asociace: nesignifikantní, vysoké – vysoké (hodnoty), nízké – nízké, nízké – vysoké, vysoké – nízké.
Obr. 4 – Kategorizace obcí dle výsledků analýzy LISA pro míru nezaměstnanosti (rok 2008, vážící schéma s mezní vzdáleností 20 km). V legendě: typ prostorové asociace: nesignifikantní, vysoké – vysoké (hodnoty), nízké – nízké, nízké – vysoké, vysoké – nízké.
Obr. 5 – Míra nezaměstnanosti podle obvodů obcí s rozšířenou působností (206 jednotek, rok 2008)
Obr. 6 – Intenzita bytové výstavby (počet dokončených bytů na 1 000 obyvatel, průměr let 2005–2007)
Obr. 7 – Kategorizace obcí dle výsledků analýzy LISA pro intenzitu bytové výstavby (průměr za roky 2005–2007, vážící schéma s mezní vzdáleností 10 km). V legendě: typ prostorové asociace: nesignifikantní, vysoké – vysoké (hodnoty), nízké – nízké, nízké – vysoké, vysoké – nízké.
Obr. 8 – Kategorizace obcí dle výsledků analýzy LISA pro míru daňových výnosů fyzických osob – podnikatelů (průměr za roky 2005–2007, vážící schéma s mezní vzdáleností 10 km). V legendě: typ prostorové asociace: nesignifikantní, vysoké – vysoké (hodnoty), nízké – nízké, nízké – vysoké, vysoké – nízké.

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