DOI:10.24193/tras.51E.4
Published First Online: 2017/06/28

STRUCTURAL FUNDING AND INTRASTATE REGIONAL DISPARITIES IN POST-COMMUNIST COUNTRIES*

Jiří NOVOSÁK
Oldřich HÁJEK
Peter HORVÁTH
Jana NEKOLOVÁ

Abstract

The intent of this paper is to provide empirical evidence about associations between structural fund allocation in the Czech Republic's micro-regions for the programming period 2007 to 2013, and intrastate regional disparities by considering the three traditional pillars of sustainable development. The results have mixed evidence, both supporting and not supporting various associations. Economically disadvantaged micro-regions had less structural fund allocation in the economic pillar of sustainable development. To the contrary, socially disadvantaged micro-regions were allocated more structural funds in the social pillar of sustainable development. Therefore, a compensatory effect in sustainable development was observed between economic and social pillars. Results in the environmental pillar were insignificant. The results in this paper provide an ambivalent conclusion regarding the contention that spatial distribution of structural funding actually contributes to a reduction in intrastate regional disparities at the micro-regional level. However, micro regions with better economic conditions, e.g. agglomeration economies, better human capital and patent activities – received more structural funding in total.

Keywords: cohesion policy, regional disparities, sustainable development, the Czech Republic.

Jiří NOVOSÁK
Senior Lecturer, Faculty of Management and Economics,
Tomas Bata University in Zlin, Zlin, Czech Republic
Tel.: 00420-57-603.2848
E-mail: novosak@fame.utb.cz

Oldřich HÁJEK
Senior Lecturer, Faculty of Management and Economics,
Tomas Bata University in Zlin, Zlin, Czech Republic
E-mail: hajek@fame.utb.cz

Peter HORVÁTH
Dean of the Faculty, Faculty of Social Sciences,
University of St. Cyril and Methodius in Trnava, Trnava, Slovakia
E-mail: peter.horvath@ucm.sk

Jana NEKOLOVÁ
PhD Student, Faculty of Management and Economics,
Tomas Bata University in Zlin, Zlin, Czech Republic
E-mail: nekolova@fame.utb.cz

* **Acknowledgements**: The authors are thankful for grant no. 16-22141S provided by the Czech Science Foundation as financial support to carry out this research, and also for grant no. IGA/FaME/2016/010 which provided financial support for this research. Data provision from the Czech Statistical Office (the Zlín Office) is kindly acknowledged.

1. Introduction

Central and Eastern European (hereafter referred to as CEE) countries have undergone profound economic and political reforms since the 1990s (see, e.g., Ezcurra, Pascual and Rapún, 2007). The transition from central planning to a market economy was accompanied by various societal impacts. These include uneven regional development caused by regions having different abilities to capture benefits and avert various losses from reforms (see, e.g., Artelaris, Kallioras and Petrakos, 2010; Barjak, 2001; Smetkowski, 2013; Novák and Netrdová, 2011; Maier and Franke, 2015). In this regard, the success of particular regions was influenced, among other factors, by their agglomeration economies, industrial structure, infrastructure endowment, research and technology, human capital, migration, entrepreneurship and SME development, foreign direct investment, and spatial interactions (see, e.g., Banerjee and Jarmuzek, 2010; Ezcurra, Pascual and Rapún, 2007; Blažek and Netrdová, 2012).

A number of studies have focused on the dynamics of regional development in CEE countries after the fall of communism, providing several important insights. Firstly, Ezcurra, Pascual and Rapún (2007), Artelaris, Kallioras and Petrakos (2010), Smetkowski (2013), Banerjee and Jarmuzek (2010) observed some convergence in economic performance among CEE countries and regions, but also increasing regional disparities in CEE countries. Secondly, metropolitan areas were identified as the main growth areas in CEE countries in the studies by Novák and Netrdová (2011), Ezcurra, Pascual and Rapún (2007), Artelaris, Kallioras and Petrakos (2010), Smetkowski (2013), Czyz and Hauke (2011), Pénzes (2013), and Blažek and Netrdová (2012) while peripheral, often rural, regions lagged further behind in development. Thirdly, Banerjee and Jarmuzek (2010), Artelaris, Kallioras and Petrakos (2010), Czyz and Hauke (2011), and Pénzes (2013) pointed out a higher level of economic performance in western regions of CEE countries than in their eastern counterparts. Fourthly, Barjak (2001), Smetkowski (2013), Pénzes (2013), Novák and Netrdová (2011), and Blažek and Netrdová (2012) emphasized the problems of old industrial regions – declining manufacturing industries, high unemployment and structural disadvantages.

Increasing regional disparities within CEE countries stimulated interest in regional policies in the late 1990s. This interest was further strengthened by the eastern enlargement of the EU in 2004 (see, e.g., Pénzes, 2013) because EU structural funding (hereafter referred to as SF) has become the main source for financing regional development (see, e.g., Wokoun, 2007). SF has decisively influenced both national and regional structural policies (see, e.g., Czyz and Hauke, 2011). Consequently, research on associations between regional disparities within CEE countries on the one hand, and SF allocation on the other, is fully substantiated from the political viewpoint. The crucial question is whether SF allocation is channeled to 'rich' or to 'poor' regions (see, e.g., Blažek and Macešková, 2010 for this question) or, in other words, whether efficiency or equity is the first priority (see, e.g., Bański, 2010). Regarding this, Smetkowski (2013), and Czyz and Hauke (2011) point out the shift in emphasis from regionally balanced development to regional competitiveness.

This paper is embedded in the aforementioned context concerning regional distribution of SF in the Czech Republic in the programming period 2007-2013. Hence, SF is explored in relation to regional disparities among Czech micro-regions. In this regard, Novosák *et al.* (2015) did not find evidence for significantly higher SF in lagging regions. However, SF allocation was not thematically divided in this study. Novosák (2016) tackled this drawback and showed more complex associations between SF allocation and regional disparities when considering only the theme of entrepreneurship and SME development. This paper extends our knowledge of associations by focusing on economic, social and environmental pillars of sustainable development. Moreover, more recent data is used. Fundamentally, the goal of this paper is to provide empirical evidence on associations between SF allocation in the Czech Republic's micro-regions in the programming period 2007-2013 and intrastate regional disparities, considering the three traditional pillars of sustainable development.

The paper is structured as follows: the second section provides the theoretical framework. The third section presents data and research methods. The fourth section summarizes results that are discussed in the following section. The last section presents conclusions.

2. Theoretical framework

The theoretical framework of this paper rests on the literature dealing with determinants of public funding allocation. The special focus is on SF and regional disparities. In this regard, several comments have been made about public funding allocation and its association to regional disparities. The traditional approach to regional policy emphasizes the use of public funding to achieve balanced regional development (see, e.g., Schout and Jordan, 2007). The largest part of public funding should be, therefore, spent in lagging regions (see, e.g., Churski, 2005). Crescenzi (2009), and Crescenzi, De Filippis and Pierangeli (2015) claim, in this context, that public funding ought to be allocated in order to compensate structural disadvantages of various territories. However, several recent theories of regional growth (e.g., theories of regional endogenous growth, new economic geography) question the efficiency of this approach to regional policy, claiming that spatial concentration could be the preferred strategy to achieve both balanced regional development and also efficiency (see, e.g., Puga, 2002). De Propris (2007) points out, in this respect, a potential conflict between equity-oriented and competitiveness-oriented policies.

The associations between SF allocation and regional disparities have been examined by various authors (see, e.g., Crescenzi, 2009; Schraff, 2014; Crescenzi, De Filippis and Pierangeli, 2015; Bouvet and Dall'Erba, 2010; Kemmerling and Bodenstein, 2006; Dellmuth, 2011). According to these studies, more financial resources were spent in less developed regions, indicating concordance between public funding allocation and balanced regional development. However, the findings of these studies were largely predetermined by the choice of SF, choosing the EU15 countries and the NUTS2/NUTS3 spatial levels of analysis. This is because NUTS2/NUTS3 region eligibility for SF interventions was directly related to their level of development. On the contrary, the focus of this paper is on micro-regions between LAU1 and LAU2 levels in a post-communist country. The eligibility for SF intervention of almost all micro-regions is crucial because of the direct competition for SF among micro-regions. The associations between public funding allocation and regional disparities are less obvious (see, e.g., Novosák *et al.*, 2015; Hájek *et al.*, 2014; Blažek and Macešková, 2010; Czyz and Hauke, 2011). Concurrently, the knowledge of these associations is highly important for any strategy that deals with regional disparities within countries (see, e.g., Novák and Netrdová, 2011). Note that this is a common issue for all post-communist EU countries.

The research on the associations between SF allocation and regional disparities also has various themes. Dall'Erba (2005), and Mancha-Navarro and Garrido-Yserte (2010) note four themes that are highly relevant for thinking about SF allocation and regional disparities. These themes are: entrepreneurial environment and innovations, human capital and equal opportunities, environment, and transport accessibility. The associations between SF allocation and regional disparities may differ according to the thematic field. Thus, among others, Kaufmann and Wagner (2005), and also Crescenzi and Rodriguez-Pose (2011) point out that less developed regions often have insufficient capacity to absorb funds intended for innovations. Likewise, Novosák (2016) notes less financial intervention intended for lagging regions on more progressive themes. However, there is scarce systematic empirical research on the associations between SF allocation and regional disparities in various thematic areas. This paper contributes to this research by focusing on the three traditional pillars of sustainable development.

Spatial distribution of SF is further influenced by other determinants than just regional disparities. These especially include the absorption capacity of the regions, political interests and spatial interactions. Hence, several studies point out the low capacity of lagging regions to absorb SF for at least two reasons – the capacity of regional actors to prepare, submit and administer projects supported by SF, and also the capacity of regional actors to co-finance projects supported by SF (see, e.g., Zaman and Georgescu, 2009; Milio, 2007; Tosun, 2014; Dellmuth and Stoffel, 2012). Crescenzi (2009), and Zaman and Georgescu (2009) note that less developed regions have a weaker negotiating position relative to their more developed counterparts. Finally, Dellmuth (2011) claims that low absorption capacity discourages decision-makers from spending SF in less developed regions, because the failure to absorb SF provides an argument against being funded (see, e.g., Dellmuth and Stoffel, 2012; Zaman and Georgescu, 2009; Milio, 2007).

Several insights may be gained on the associations between SF allocation and political interests from literature. Schraff (2014), and Dellmuth and Stoffel (2012) claim that regions with strong support for certain government parties may be preferred 'to reward loyalty'. However, Schraff (2014), and Dellmuth and Stoffel (2012) also note that SF may rather be allocated to regions with a narrow election victory to 'improve' the position of government parties. Dellmuth (2011), and Kemmerling and Bodenstein (2006) suggest, in addition, that leftist and Eurosceptic regions may receive SF for ideological reasons. Finally, spatial interactions also influence spatial distribution of SF (see, e.g., Crescenzi, 2009; Camaioni *et al.*, 2013). These interactions may either be positive through spatial cooperation or negative through spatial competition and compensation (see, e.g., Camaioni *et al.*, 2013).

3. Data and methods

This section describes the methodology used throughout this study. Firstly, dependent variables are introduced. Secondly, explanatory and control variables are defined. Thirdly, the methods of data analysis are described. All data refer to the so-called administrative districts of municipalities with extended power, and also to the territory of the capital city of Prague (hereafter referred to as micro-regions; 206 units in total). These micro-regions are administrative territorial units in the Czech Republic, corresponding to the areas between level LAU1 and LAU2.

3.1. Data – dependent variables

All dependent variables used in this study relate to SF allocation (in CZK). To this effect, the following steps were completed to obtain these variables. Firstly, a list of projects was compiled, containing those submitted for SF in the Czech Republic during the programming period 2007-2013, which excluded projects submitted under the European Territorial Cooperation objective. The source of information was official data published by the Ministry of Regional Development of the Czech Republic (hereafter referred to as the MRDCR) in October 2015. This also included the location of particular projects (micro-regions). Subsequently, the projects were classified into two groups. The first group involved all projects approved for SF support, while the second group consisted of all projects NOT approved for SF support. Only the first group of projects was used to construct dependent variables. Note that several grant schemes administered by the Ministry of Industry and Trade of the Czech Republic (hereafter referred to as the MITCR), and also by the Ministry of Labor and Social Affairs of the Czech Republic (hereafter referred to as the MLSACR) were spatially disaggregated in order to better tackle spatial distribution of SF.

Both supported and unsupported projects were then thematically classified into one or more categories (see Table 1 for the list of categories). This was achieved by qualitative content analysis of the projects, done by four independent researchers. Thereafter, the categories were linked to the three traditional pillars of sustainable development (see Table 1), which enabled SF allocation to be calculated for each micro-region and each pillar of sustainable development. SF allocation for each micro-region was then divided by its population (annual mean for the period 2007-2015) in order to check the size differences of geographic units. Finally, the log-transformation was applied to reduce the influence of outliers. Altogether, four dependent variables for further analysis were computed:

1. SF allocation for the economic pillar of sustainable development (ALLOC_ECON);
2. SF allocation for the social pillar of sustainable development (ALLOC_SOC);
3. SF allocation for the environmental pillar of sustainable development (ALLOC_ENVI); and
4. SF total allocation (ALLOC_ALL).

Table 1: Categories of themes and pillars of sustainable development – associations

Categories of themes	Pillars of sustainable development
Entrepreneurship and enterprise development	Economic
Further education	Economic
Landscape protection	Environmental
Pre-school, primary and secondary education	Social
Public administration	Social
Public spaces	Social
Reducing contamination	Environmental
Research and innovations	Economic
Social inclusion, health, communities	Social
Tertiary education	Economic
Transport	Not included into the analysis, understood as a special pillar of sustainable development

Source: Compiled by the authors.

3.2. Data – explanatory and control variables

Explanatory variables and control variables used in this study are dated back to 2007 or earlier to avoid the endogeneity problem (see, e.g., Crescenzi, 2009; Crescenzi, De Filippis and Pierangeli, 2015, for this approach). Explanatory variables are related to intrastate regional disparities. In this regard, eight indicators were chosen to construct three indexes of regional disparities – the index of economic disadvantage (INDEX_ECON), the index of social disadvantage (INDEX_SOC) and the index of environmental disadvantage (INDEX_ENVI). The choice of the eight indicators was motivated by influential theories on regional development.

Population density (DENSITY) is the first indicator used in this study. It is understood as a proxy of spatial concentration of socio-economic activities and agglomeration economies (see, e.g., Rodríguez-Pose and Tselios, 2012). New economic geography, as well as other theories, illustrates the importance of this factor for regional development (see, e.g., Krugman, 1998). The indicator refers to the year 2007 and the Czech Statistical Office (hereafter referred to as CSO) is the source of information. The indicator is log-transformed to improve the normality of its distribution.

The share of tertiary educated people in the population above the age of 15 (TERTIARY), the share of people with primary school education or with incomplete primary school education in the population above the age of 15 (PRIMARY), and unemployment as the share of unemployed people in the population aged 15-64 years (UNEMPLOY) are perceived as three indicators related to human capital. A number of studies show the impact of human capital on regional development (see, e.g., Rodríguez-Pose and Crescenzi, 2008; Crescenzi, De Filippis and Pierangeli, 2015). Moreover, human capital plays a major role in theories of regional development, including endogenous growth theories (see, e.g., Lucas, 1990) and others. In this study, the indicators TERTIARY and PRIMARY are calculated as the mean of two values from the 2001 and 2011 Censuses. This is due to the missing data in the period between these years. The indicator UNEMPLOY refers to the mean value for the period 2002 to 2007. All data is taken from CSO statistics.

Patent activity (PATENT) is the fifth indicator used in this study. It is understood as a proxy of innovations that are an essential ingredient for current regional development (see, e.g., Sternberg, 2000). In addition, innovations are embedded in several theories of regional development including regional innovation systems (see, e.g., Tödtling and Trippl, 2005), industrial districts (see, e.g., Becattini, 1991), innovative milieu (see, e.g., Maillat, 1998) and others. In this study, the indicator PATENT was carried out as follows. Firstly, patent applications were compiled from the Industrial Property Office of the Czech Republic (hereafter referred to as IPOCR) in the period 2002 to 2007. Secondly, each patent application was assigned to one or more micro-regions according to the applicant's headquarters (weight 50%; evenly distributed among applicants) and the inventor's home (weight 50%; evenly distributed among inventors). Thirdly, a value for each micro-region was summed up and divided by 100,000 inhabitants of the micro-region. Finally, the indicator PATENT was log-transformed to improve the normality of its distribution.

The share of employers and self-employed people in the economically active population (ENTREP) is the sixth indicator used in this study. It is understood as a proxy of entrepreneurship (see, e.g., Fotopoulos, 2012). In this regard, a number of studies point out the positive relationship between entrepreneurship and regional development (see, e.g., Doran, McCarthy and O'Connor, 2016 for a review). In this study, the indicator ENTREP is calculated as the mean of two values from the 2001 and 2011 Censuses because of the missing data in the period between the two Censuses. Data is taken from CSO statistics.

Finally, the last two indicators are net migration per 1,000 inhabitants (MIGRA) and the coefficient of ecological stability (ECOL_STAB). Net migration, calculated as the mean value for the period 1996-2007, is understood as a proxy of the quality of life (see, e.g., Navarro-Azorín and Artal-Tur, 2015). The coefficient of ecological stability expresses the ratio between environmentally stable and environmentally unstable land-use categories (see, e.g., Buček *et al.*, 2015). This indicator refers to the year 2007. Data is taken from CSO statistics.

Table 2: Rotated component matrix (PCA, Varimax with Kaiser normalising)

Variable	Component 1	Component 2	Component 3
DENSITY	0.810	-0.362	-0.070
ECOL_STAB	-0.141	-0.088	0.962
ENTREP	0.234	0.809	0.250
MIGRA	0.027	0.686	-0.157
PATENT	0.668	0.221	-0.065
PRIMARY	-0.742	-0.515	0.150
TERTIARY	0.870	0.273	-0.041
UNEMPLOY	-0.153	-0.848	0.154
Explained variance (rotation sums of squared loadings)	31.4%	29.7%	13.4%
Initial eigenvalues	3.336	1.627	0.998

Source: Compiled by the authors; data from the CSO and IPOCR.

Principal component analysis (PCA) was employed to reduce the data dimensionality, to extract the most influential factors as the indexes of regional disparities, and to eliminate the problem of multicollinearity. In this way, three components with an eigenvalue greater than or almost one (the Kaiser criterion) were extracted, which explains almost 75% of the total variance. Table 2 shows the rotated component matrix and factor loadings. The first principal component (INDEX_ECON) is interpreted as relating to important factors of the economic pillar of sustainable development – agglomeration economies, human capital and innovations. The second principal component (INDEX_SOC) is interpreted as reflecting important factors of the social pillar of sustainable development – jobs and unemployment, quality of life and human capital. The third principal component (INDEX_ENVI) is interpreted as relating to the most relevant environmental factor – ecological stability. Lower values mean higher economic, social and environmental disadvantage, respectively. Finally, principal component scores were computed from the original variables and used in further analysis (see, e.g., Crescenzi, 2009; Crescenzi, De Filippis and Pierangeli, 2015 for this approach).

Control variables relate to the absorption capacity of micro-regions and to political interests. Absorption capacity is understood as the capacity of regional actors to prepare, submit, administer and co-finance projects supported by SF (see, e.g., Tosun, 2014; Dellmuth and Stoffel, 2012). This definition is implemented in the following way: the first variable is the total requested SF allocation for projects not supported by SF, according to each inhabitant, and this is log-transformed to improve the normality of distribution (ABSORPTION). The second variable is calculated as the share of projects supported by SF in ratio to the number of all projects submitted for SF support (QUALITY). Moreover, the two variables of absorption capacity are also calculated for the three pillars of sustainable development. Political interests are controlled by a dummy variable GOVERNMENT. The value of '1' is assigned to a micro-region if government parties won more than 50% of votes in the Parliamentary elections in 2006 and 2010. Otherwise, the value of '0' is assigned to the micro-region. Finally, the non-eligibility of micro-regions for the convergence objective is controlled by a dummy variable OBJECTIVE 2. The value of '1' is only assigned to the territory of the capital city, Prague.

3.3. Methods

Associations between SF allocation and intrastate regional disparities are explored using standard methods of descriptive and inferential statistics, and also regression modeling. In this regard, four regression models are estimated either by OLS (ordinary least squares) or by GMM (generalized method of moments), following the approach suggested by Anselin *et al.* (1996) and others. The models are in the form:

$$y_i = \alpha_0 + \sum_{l=1}^{L} \alpha_l \, EXPL_{li} + \sum_{m=1}^{M} \beta_m CONTROL_{mi} + u_{i,}$$

where y_i is SF allocation (ALLOC_ALL, ALLOC_ECON, ALLOC_SOC and ALLOC_ENVI) in a micro-region i; $EXPL_{li}$ is an explanatory variable l in a micro-region i; $CONTROL_{mi}$ is a control variable m in a micro-region i, and u_i is the error term.

Regression assumptions were checked by performing residual diagnostics on the four models. Kolmogorov-Smirnov and Shapiro-Wilk tests were computed to verify the normality assumption, and also White's test to verify the homoscedasticity assumption and Moran's I to verify the presence of spatial autocorrelation were done. The multicollinearity assumption was tested by obtaining Variance Inflation Factor statistics. The diagnostics results did not reveal any violation of the normality and multicollinearity assumptions. The violation of the homoscedasticity assumption was corrected by computing White heteroscedasticity robust standard errors. Finally, spatial autocorrelation was corrected by spatial effects modelling, as suggested by Anselin *et al.* (1996) and others. Therefore, spatial autoregressive coefficients ϱ and λ were computed for spatial lag and spatial error models respectively. Note that row-standardized first-order queen contiguity weights were used for calculation purposes.

4. Empirical results

Figure 1 illustrates spatial distribution of SF among micro-regions in the Czech Republic. Two initial insights may be gleaned from the figure. Firstly, a mosaic spatial pattern of SF allocation is apparent. However, some spatial clusters of both high and low values of SF allocation may be identified. Secondly, the figure indicates the presence of two upper outliers. This is caused by the fact that the most financially expensive infrastructure projects are located in these micro-regions. The factor of very large infrastructure projects should therefore be controlled in regression models. Consequently, a dummy variable LARGE_PROJECTS was defined in this study. The value '1' was assigned to any micro-region where a project with funding of more than 500 million was implemented. Otherwise, the value of '0' was assigned to each micro-region. In addition, the variable was also decomposed according to the three pillars of sustainable development.

Table 3 extends our research by exploring descriptive statistics of SF allocation for the three pillars of sustainable development. The following findings are noteworthy in this regard: firstly, standard deviation values show that SF allocation is more dispersed in the economic pillar (ALLOC_ECON) than in the two other pillars (ALLOC_SOC, ALLOC_ENVI). However, the lower standard deviation value of total SF allocation (ALLOC_ALL) indicates a compensatory effect of the pillars. Secondly, Moran I's values for the three pillars of sustainable development (ALLOC_ECON, ALLOC_SOC and ALLOC_ENVI) are positive and statistically significant. Adjacent micro-regions therefore tend to have similar SF allocation for particular pillars. Moran I's value of total SF allocation (ALLOC_ALL) is nevertheless, statistically insignificant. Hence, a compensatory effect of pillars is again observed in the three pillars of sustainable development.

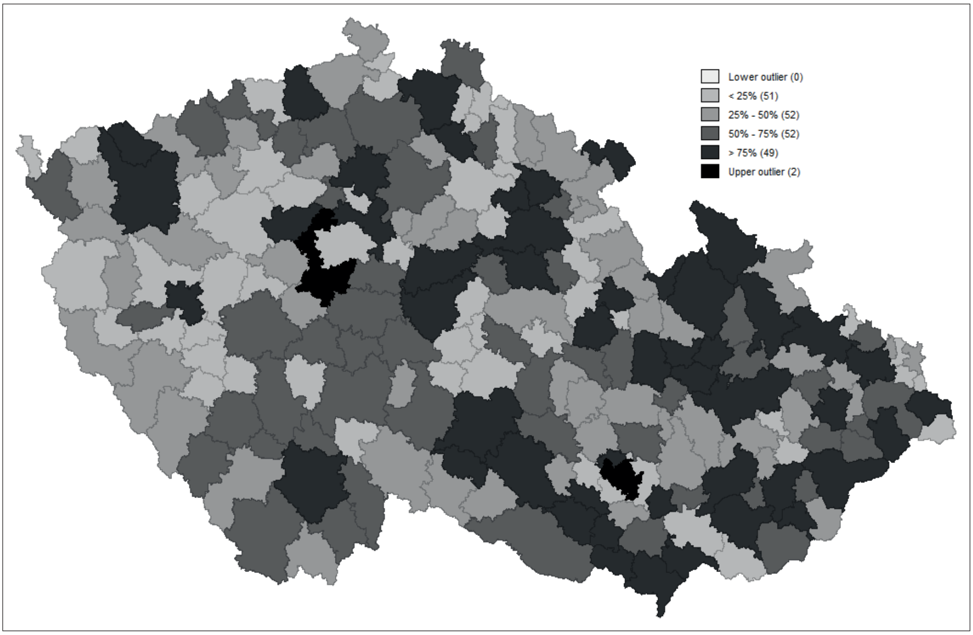

Figure 1. Box-map (hinge=1.5) – SF allocation (ALLOC_ALL); micro-regions

Source: Compiled by the authors; data from the MRDCR, MITCT, MLSACR and CSO.

Table 3: SF allocation (ALLOC_ALL) – descriptive statistics

SF allocation – pillars	Mean	Standard deviation	Moran's I
ALLOC_ECON	9.38	0.624	0.074*
ALLOC_SOC	9.59	0.435	0.098*
ALLOC_ENVI	9.47	0.514	0.193**
ALLOC_ALL	10.62	0.343	0.043

** Statistically significant at the 0.01 significance level;
* Statistically significant at the 0.05 significance level.

Source: Compiled by the authors; data from MRDCR, MITCT, MLSACR and CSO.

Table 4 provides Moran I's values of the three indexes of intrastate regional disparities (INDEX_ECON, INDEX_SOC and INDEX_ENVI). All the values are positive and statistically significant, indicating similar values of the indexes for adjacent micro-regions. This concurs with the above-mentioned findings concerning SF allocation. However, Moran I's values of the three indexes are much higher than those reported for SF allocation (see Table 3). Regional disparities are, therefore, more spatially concentrated than SF allocation. Others have said that SF allocation follows a more spatially balanced location framework than the pattern of regional disparities, and SF cannot fully compensate for micro-regional disadvantages (see, e.g., Crescenzi, 2009 for similar interpretation of results).

Table 4: Intrastate regional disparities – Moran's I

Index – regional disparities	INDEX_ECON	INDEX_SOC	INDEX_ENVI
Moran's I	0.280**	0.644**	0.272**

** Statistically significant at the 0.01 significance level;
* Statistically significant at the 0.05 significance level.

Source: Compiled by the authors; data from CSO and IPOCR.

Table 5 reports correlation coefficients between the measures of SF allocation, and also in intrastate regional disparities. Three associations are statistically significant at the 0.01 significance level. Therefore, the index of economic disadvantage (INDEX_ECON) is positively associated with SF allocation for the economic pillar of sustainable development (ALLOC_ECON), and also with the total SF allocation (ALLOC_ALL). The index of social disadvantage (INDEX_SOC) is negatively associated with SF allocation for the social pillar of sustainable development (ALLOC_SOC). Thus, economically disadvantaged micro-regions have relatively low SF allocation for the economic pillar of sustainable development and for the total SF allocation, whereas socially disadvantaged micro-regions have relatively high SF allocation for the social pillar of sustainable development. These findings further support the contention that SF allocation of the three pillars of sustainable development is compensatory in nature. In addition, the essence of this compensation is revealed – SF allocation for the economic pillar of sustainable development is more often channeled to 'rich', while SF allocation for the social pillar of sustainable development is more channeled to 'poor' micro-regions.

Table 5: Pearson's correlation coefficient – SF allocation and regional disparities

Index – regional disparities	SF allocation – pillars			
	ALLOC_ECON	ALLOC_SOC	ALLOC_ENVI	ALLOC_ALL
INDEX_ECON	0.327**	-	-	0.253**
INDEX_SOC	-	-0.238**	-	0.004
INDEX_ENVI	-	-	-0.097	0.022

** Statistically significant at the 0.01 significance level;
* Statistically significant at the 0.05 significance level

Source: Compiled by the authors; data from MRDCR, MITCT, MLSACR, IPOCR and CSO.

5. Discussion

The preceding section has presented introductory results concerning associations between SF allocation and intrastate regional disparities in the Czech Republic by considering the three traditional pillars of sustainable development. The results indicate that SF allocation for the economic pillar of sustainable development does not favor economically disadvantaged micro-regions, while SF allocation for the social pillar of sustainable development does indeed favor socially disadvantaged micro-regions. Therefore, there is a compensatory nature of SF allocation for the economic and social pillars of sustainable development. Moreover, the total SF allocation is positively and significantly influenced by the index of economic disadvantages. This section discusses the relevance of these results, checking for other factors associated with SF allocation – absorption capacity of regions, political interests and spatial interactions. Therefore, regression models were estimated for four dependent variables – SF allocation for the economic pillar of sustainable development (Model 1), SF allocation for the social pillar of sustainable development (Model 2), SF allocation for the environmental pillar of sustainable development (Model 3), and the total SF allocation (Model 4).

The regression model estimates are given in Table 6. The parameters and model statistics support the findings detailed in the preceding section. At the 0.01 significance level there is a positive and statistically significant impact in the index of economic disadvantage (INDEX_ECON) on SF allocation for the economic pillar of sustainable development (ALLOC_ECON) (Model 1). The impact in the social disadvantage index (INDEX_SOC) on SF allocation for the social pillar of sustainable development (ALLOC_SOC) is, on the contrary, negative and statistically significant at the 0.01 significance level (Model 2). Moreover, model 4 illustrates the compensatory nature of SF allocation for the economic and social pillars of sustainable development. Hence, the impact in the index of economic disadvantage (INDEX_ECON) on the total SF allocation (ALLOC_ALL) is still positive and statistically significant at the 0.01 significance level. Nevertheless, the regression coefficient is lower than the one obtained earlier (Model 1). The impact in the index of social disadvantage (INDEX_SOC) on the total SF allocation (ALLOC_ALL) is still negative but statistically insignificant.

The sign and statistical significance of the estimated coefficients of control variables provide additional insights into understanding the determinants of SF allocation. Firstly, absorption capacity of micro-regions – i.e. the capacity to create (ABSORPTION) competitive (QUALITY) projects – is the crucial factor in determining spatial distribution of SF, regardless of the sustainability pillars. The association between absorption capacity of micro-regions and SF allocation is positive and statistically significant at the 0.01 significance level with one exception. Hence, high SF allocation required for unsupported projects (ABSORPTION) and the high percentage of accepted projects (QUALITY) tend to be prerequisites for high SF allocation. Secondly, the presence of very large infrastructure projects (LARGE_PROJECTS) generally has positive impacts on SF allocation. The impact is statistically significant at the 0.01 significance level for the social pillar of sustainable development (ALLOC_

Table 6: Regression model estimates

Variables	Model 1 (ALLOC_ECON)	Model 2 (ALLOC_SOC)	Model 3 (ALLOC_ENVI)	Model 4 (ALLOC_ALL)
Constant	2.062** (0.587)	5.846** (0.696)	0.694 (1.449)	4.670** (0.877)
Explanatory variables				
INDEX_ECON	0.111** (0.039)	-	-	0.092** (0.027)
INDEX_SOC	-	-0.102** (0.025)	-	-0.020 (0.025)
INDEX_ENVI	-	-	-0.003 (0.019)	-0.018 (0.017)
Control variables				
ABSORPTION	0.603** (0.051)	0.382** (0.055)	0.461** (0.047)	0.484** (0.066)
QUALITY	0.029** (0.004)	0.001 (0.004)	0.034** (0.005)	0.013** (0.004)
GOVERNMENT	0.080 (0.102)	-0.010 (0.098)	-0.066 (0.077)	-0.053 (0.073)
LARGE_PROJECTS	0.306* (0.139)	0.353** (0.083)	0.251 (0.142)	0.410** (0.065)
OBJECTIVE_2	-0.117 (0.210)	-0.056 (0.119)	-0.749** (0.097)	-0.473** (0.143)
Coefficient ρ	-	-	0.231 (0.155)	-
Coefficient λ	-	-	-	0.260** (0.088)
Statistics				
Adjusted R^2/Pseudo R^2	*0.56*	*0.33*	*0.43*	*0.45*
N	*206*	*206*	*206*	*206*
Moran's I (OLS)	*0.795*	*0.554*	*4.273***	*2.911***

** Statistically significant at the 0.01 significance level;

* Statistically significant at the 0.05 significance level;

The heteroscedasticity robust standard errors are in parentheses.

Note: The variables ABSORPTION, QUALITY and LARGE PROJECTS are in the form relating to the pillars of sustainable development.

Source: Compiled by the authors; data from MRDCR, MITCT, MLSACR, IPOCR and CSO.

SOC) and also for total SF allocation (ALLOC_ALL), and is statistically significant at the 0.05 significance level for the economic pillar of sustainable development (ALLOC_ECON). Thirdly, 'Prague' (OBJECTIVE_2) generally has a negative impact on SF allocation. The impact is statistically significant at the 0.01 significance level for the environmental pillar of sustainable development (ALLOC_ENVI), and also for total SF allocation (ALLOC_ALL). Fourthly, the influence of political interests (GOVERNMENT) and spatial interactions seems to be rather insignificant.

6. Conclusion

The goal of this paper was to provide empirical evidence on the associations between SF allocations in the Czech Republic's micro-regions in the programming period 2007-2013 and intrastate regional disparities, by considering three traditional pillars of sustainable development. The main results of this paper may be summarized as follows. Economically disadvantaged micro-regions lag behind in SF allocation for the economic pillar of sustainable development. On the contrary, more SF for the social pillar of sustainable development is allocated in socially disadvantaged micro-regions. These results remain stable after checking the influence of very large infrastructure projects and checking unequal absorption capacities of micro-regions. Consequently, a compensatory effect of the economic and social pillars of sustainable development is observed. However, a positive and significant impact of the economic pillar of sustainable development on the total SF allocation is revealed. Micro-regions with better economic conditions – agglomeration economies, human capital and patent activities – receive more SF in total, in other words. Overall, the results in this paper provide ambivalent evidence in the debate that spatial distribution of SF contributes to reduction of intrastate regional disparities at the micro-regional level.

The results in this paper are relevant in political practice. Firstly, it has been shown that thematic decomposition is important for understanding complex associations between SF allocations to that of intrastate regional disparities. Aggregate figures may mask differences across issue areas, providing incomplete information for political decision-making. This relates to the argument that there is a compensatory effect of economic and social pillars in sustainable development. Earmarking SF for these two pillars may substantially influence regional distribution of SF. Furthermore, the way of defining regional disparities may completely change conclusions concerning associations between SF allocation and intrastate regional disparities.

The results in this paper are further relevant for considering the coherence of regional policies and sector policies, or the links between the goals of regional policies and sector policies. Hence, these results may relate to the discussion about the equity and efficiency goals of regional policies. The question is whether SF is allocated to lagging regions or to the most competitive regions. This paper indicates that the answer is not straightforward and that various results may be obtained depending on the sector policy analyzed. Altogether, these associations should be considered in order to have more congruent policies.

Finally, the results are useful for understanding the coherence of regional policies formulated at different spatial levels. This is an important issue for post-communist EU countries with respect to the spatial coherence of EU cohesion policy and national regional policies. In this regard, almost complete territories of post-communist EU countries are eligible for funding under the Convergence objective of cohesion policy. Moreover, SF is recently the main source of financing for regional development in post-communist EU countries. However, their national regional policies usually select assisted regions at a lower spatial level rather than considering cohesion policy, reflecting intrastate regional disparities. Consequently, SF allocation in assisted regions is crucial in order to evaluate the spatial coherence of EU cohesion policy and national regional policies.

References

1. Anselin, L., Bera, A.K., Florax, R.J. and Yoon, M.J., 'Simple Diagnostic Tests for Spatial Dependence', 1996, *Regional Science and Urban Economics*, vol. 26, no. 1, pp. 77-104.
2. Artelaris, P., Kallioras, D. and Petrakos, G., 'Regional Inequalities and Convergence Clubs in the European Union New Member-States', 2010, *Eastern Journal of European Studies*, vol. 1, no. 1, pp. 113-133.

3. Banerjee, B. and Jarmuzek, M. 'Economic Growth and Regional Disparities in the Slovak Republic', 2010, *Comparative Economics Studies*, vol. 52, no. 3, pp. 379-403.
4. Bański, J., 'Dilemmas for Regional Development in the Concepts Seeking to Develop Poland's Spatial Structure', 2010, *Regional Studies*, vol. 44, no. 5, pp. 535-549.
5. Barjak, F., 'Regional Disparities in Transition Economies: A Typology for East Germany and Poland', 2001, *Post-Communist Economies*, vol. 13, no. 3, pp. 289-311.
6. Becattini, G., 'Italian Industrial Districts: Problems and Perspectives', 1991, *International Studies of Management and Organization*, vol. 21, no. 1, pp. 83-90.
7. Blažek, J. and Macešková, M., 'Regional Analysis of Public Capital Expenditure: To Which Regions Is Public Capital Expenditure Channelled – to 'Rich' or to 'Poor' Ones?', 2010, *Regional Studies*, vol. 44, no. 6, pp. 679-696.
8. Blažek, J. and Netrdová, P., 'Aktuální tendence lokální diferenciace vybraných socio-ekonomických jevů v Česku: směřuje vývoj k větší mozaikovosti prostorového uspořádání?' (Contemporary Tendencies of the Development of Spatial Pattern on the Local Level in Czechia: Towards Higher Fragmentation of the Spatial Pattern?), 2012, *Geografie*, vol. 117, no. 3, pp. 266-288.
9. Bouvet, F. and Dall'Erba, S., 'European Regional Structural Funds: How Large Is the Influence of Politics on the Allocation Process?', 2010, *Journal of Common Market Studies*, vol. 48, no. 3, pp. 501-528.
10. Buček, A., Habrová, H., Maděra, P., Král, K., Modrý, M., Lacina, J. and Pavliš, J., 'Application of the Czech Methodology of Biogeographical Landscape Differentiation in Geobiocoenological Concept – Examples from Cuba, Tasmania and Yemen', 2015, *Journal of Landscape Ecology*, vol. 8, no. 3, pp. 51-67.
11. Camaioni, B., Esposti, R., Lobianco, A., Pagliacci, F. and Sotte, F., 'How Rural Is the EU RDP? An Analysis through Spatial Fund Allocation', 2013, *Bio-based and Applied Economics*, vol. 2, no. 3, pp. 277-300.
12. Churski, P., 'Problem Areas in Poland in Terms of the Objectives of the European Union's Regional Policy', 2005, *European Planning Studies*, vol. 13, no. 1, pp. 45-72.
13. Crescenzi, R., 'Undermining the Principle of Concentration? European Union Regional Policy and the Socio-economic Disadvantage of European Regions', 2009, *Regional Studies*, vol. 43, no. 1, pp. 111-133.
14. Crescenzi, R., De Filippis, F. and Pierangeli, F., 'In Tandem for Cohesion? Synergies and Conflicts between Regional and Agricultural Policies of the European Union', 2015, *Regional Studies*, vol. 49, no. 4, pp. 681-704.
15. Crescenzi, R. and Rodriguez-Pose, A., *Innovation and Regional Growth in the European Union*, Berlin: Springer, 2011.
16. Czyz, T. and Hauke, J., 'Evolution of Regional Disparities in Poland', 2011, *Quaestiones Geographicae*, vol. 30, no. 2, pp. 35-48.
17. Dall'Erba, S., 'Distribution of Regional Income and Regional Funds in Europe 1989–1999: An Exploratory Spatial Data Analysis', 2005, *Annals of Regional Science*, vol. 39, no. 1, pp. 121-148.
18. De Propris, L., 'Reconciling Cohesion and Competitiveness through EU Cluster Policies?', 2007, *Policy Studies*, vol. 28, no. 4, pp. 327-345.
19. Dellmuth, L.M., 'The Cash Divide: The Allocation of European Union Regional Grants', 2011, *Journal of European Public Policy*, vol. 18, no. 7, pp. 1016-1033.

20. Dellmuth, L.M. and Stoffel, M.F., 'Distributive Politics and Intergovernmental Transfers: The Local Allocation of European Union Structural Funds', 2012, *European Union Politics*, vol. 13, no. 3, pp. 413-433.
21. Doran, J., McCarthy, N. and O'Connor, M., 'Entrepreneurship and Employment Growth across European Regions', 2016, *Regional Studies, Regional Science*, vol. 3, no. 1, pp. 121-128.
22. Ezcurra, R., Pascual, P. and Rapún, M., 'The Dynamics of Regional Disparities in Central and Eastern Europe during Transition', 2007, *European Planning Studies*, vol. 15, no. 10, pp. 1397-1421.
23. Fotopoulos, G., 'Nonlinearities in Regional Economic Growth and Convergence: The Role of Entrepreneurship in the European Union Regions', 2012, *The Annals of Regional Science*, vol. 48, no. 3, pp. 719-741.
24. Hájek, O., Smékalová, L., Novosák, J. and Zahradník, P., 'Prostorová koherence národní a evropské regionální politiky: poznatky z České republiky a Slovenska' (Spatial Coherence of National and European Regional Policy: The Insights from the Czech Republic and Slovakia), 2014, *Politická ekonomie*, vol. 62, no. 5, pp. 630-644.
25. Kaufmann, A. and Wagner, P., 'EU Regional Policy and the Stimulation of Innovation: The Role of the European Regional Development Fund in the Objective 1 Region Burgenland', 2005, *European Planning Studies*, vol. 13, no. 4, pp. 581-599.
26. Kemmerling, A. and Bodenstein, T., 'Partisan Politics in Regional Redistribution. Do Parties Affect the Distribution of EU Structural Funds across Regions?', 2006, *European Union Politics*, vol. 7, no. 3, pp. 373-392.
27. Krugman, P., 'What's New about the New Economic Geography', 1998, *Oxford Review of Economic Policy*, vol. 14, no. 2, pp. 7-17.
28. Lucas, R.E., 'Why Doesn't Capital Flow from Rich to Poor Countries?', 1990, *The American Economic Review*, vol. 80, no. 2, pp. 92-96.
29. Maier, K. and Franke, D., 'Trendy prostorové sociálně-ekonomické polarizace v Česku 2001-2011' [Trends in Spatial Socio-economic Polarisation in the Czech Republic 2001-2011], 2015, *Czech Sociological Review*, vol. 51, no. 1, pp. 89-123.
30. Maillat, D., 'Innovative Milieu and New Generations of Regional Policies', 1998, *Entrepreneurship & Regional Development*, vol. 10, no. 1, pp. 1-16.
31. Mancha-Navarro, T. and Garrido-Yserte, R., 'The Evolution of Spanish Regional Policy: 1977-1980', in Cuadrado-Roura, J.R. (ed.), *Regional Policy, Economic Growth and Convergence. Lessons from the Spanish Case*, Berlin: Springer, 2010, pp. 53-79.
32. Milio, S., 'Can Administrative Capacity Explain Differences in Regional Performances? Evidence from Structural Funds Implementation in Southern Italy', 2007, *Regional Studies*, vol. 41, no. 4, pp. 429-442.
33. Navarro-Azorín, J.M. and Artal-Tur, A., 'Foot Voting in Spain: What Do Internal Migrations Say about Quality of Life in the Spanish Municipalities?', 2015, *Social Indicators Research*, vol. 124, no. 2, pp. 501-515.
34. Novák, J. and Netrdová, P., 'Prostorové vzorce sociálně-ekonomické diferenciace obcí v České republice' (Spatial Patterns of Socioeconomic Differentiation in the Czech Republic at the Level of Municipalities), 2011, *Czech Sociological Review*, vol. 47, no. 4, pp. 717-744.

35. Novosák, J., Hájek, O., Smékalová, L., Nekolová, J. and Škarka, M., 'Territorial Cohesion and the Geography of EU Cohesion Policy Funding in the Czech Republic', 2015, *Transformations in Business & Economics*, vol. 14, no 3C, pp. 42-59.
36. Novosák, J., *Intervence pro zvyšování výkonnosti podniků a* územní *soudržnost: implikace pro strategický management* území (Interventions for Improving Firm Performance and Territorial Cohesion: Implications for Strategic Management of Territories), Zlin: Tomas Bata University in Zlin, 2016.
37. Pénzes, J., 'The Dimensions of Peripheral Areas and Their Restructuring in Central Europe', 2013, *Hungarian Geographical Bulletin*, vol. 62, no. 4, pp. 373-386.
38. Puga, D., 'European Regional Policies in Light of Recent Location Theories', 2002, *Journal of Economic Geography*, vol. 2, no. 4, pp. 373-406.
39. Rodríguez-Pose, A. and Crescenzi, R., 'Research and Development, Spillovers, Innovation Systems, and the Genesis of Regional Growth in Europe', 2008, *Regional Studies*, vol. 42, no. 1, pp. 51-67.
40. Rodríguez-Pose, A. and Tselios, V., 'Individual Earnings and Educational Externalities in the European Union', 2012, *Regional Studies*, vol. 46, no. 1, pp. 39-57.
41. Schout, J.A. and Jordan, A.J., 'From Cohesion to Territorial Policy Integration (TPI): Exploring the Governance Challenges in the European Union', 2007, *European Planning Studies*, vol. 15, no. 6, pp. 835-851.
42. Schraff, D., 'Buying Turnout or Rewarding Loyalists? Electoral Mobilization and EU Structural Funding in the German Länder', 2014, *European Union Politics*, vol. 15, no. 2, pp. 277-288.
43. Smetkowski, M., 'Regional Disparities in Central and Eastern European Countries: Trends, Drivers and Prospects', 2013, *Europe-Asia Studies*, vol. 65, no. 8, pp. 1529-1554.
44. Sternberg, R., 'Innovation Networks and Regional Development – Evidence from the European Regional Innovation Survey (ERIS): Theoretical Concepts, Methodological Approach, Empirical Basis and Introduction to the Theme', 2000, *European Planning Studies*, vol. 8, no. 4, pp. 389-407.
45. Tödtling, F. and Trippl, M., 'One Size Fits All? Towards a Differentiated Regional Innovation Policy Approach', 2005, *Research Policy*, vol. 34, no. 8, pp. 1203-1219.
46. Tosun, J., 'Absorption of Regional Funds: A Comparative Analysis', 2014, *Journal of Common Market Studies*, vol. 52, no. 2, pp. 371-387.
47. Wokoun, R., 'Regionální a strukturální politika (politika soudržnosti) Evropské unie v programovém období 2007-2013' (Regional and Structural Policy (Cohesion Policy) of the European Union in the Programming Period 2007-2013), 2007, *Urbanismus a územní rozvoj*, vol. 10, no. 1, pp. 3-7.
48. Zaman, G. and Georgescu, G., 'Structural Fund Absorption: A New Challenge for Romania?', 2009, *Romanian Journal of Economic Forecasting*, no. 1, pp. 136-154.