

# Cohesion and Business Policy in V4 Countries Case Study

Oldřich  
Hájek

Monografie  
Kolegium  
Jagiellońskiego

JAGIELLOŃSKI  
INSTYTUT WYDAWNICZY





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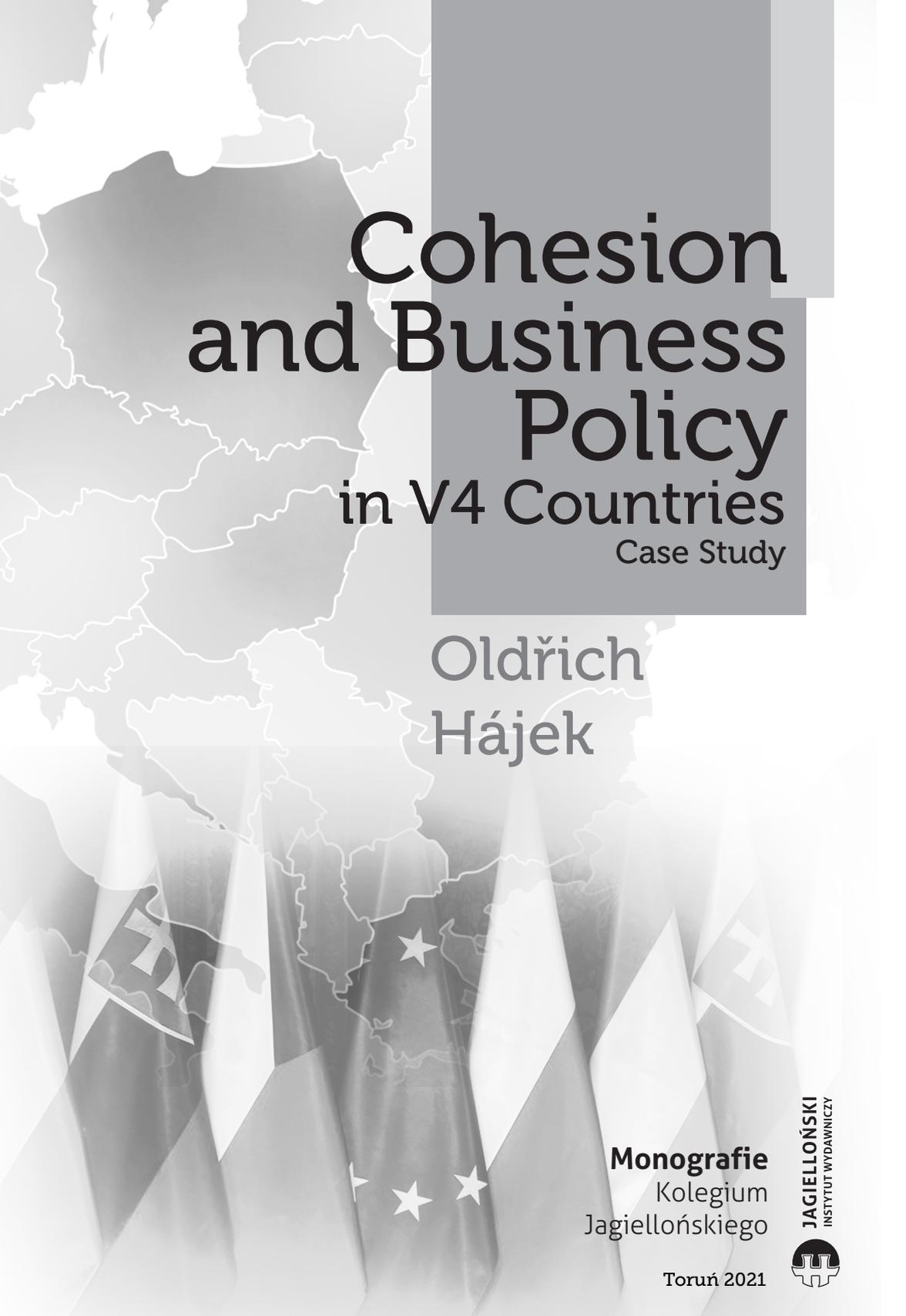
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## in V4 Countries

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# Introduction

*The cohesion policy of the European Union has a relatively long experience with the implementation of its instruments across the V4 countries, i.e. the Czech Republic, the Slovak Republic, Poland and Hungary. These countries joined the European Union together in 2004, and from that date, we can see the experience of European cohesion policy.*

*This experience was reflected in the implementation of several programming periods. During these periods, projects were supported in a number of areas such as education, culture, transport infrastructure, or business development support.*

*Different regions are differently successful in implementing the European Union's cohesion policy on their territory. Some regions are more successful in drawing on funds to support their development, and some are less successful.*

*There may be different factors behind different success rates. The presented monograph aims to present these factors on the example of several monitored countries and their case studies. The greatest attention is paid to the Czech Republic, followed by the example of Slovakia and subsequently also Poland.*

*Thus, the presented monograph responds to current topics and introduces the reader to the actual state of drawing funds from the European Union in individual regions of selected V4 countries.*

Oldřich Hájek  
Jagiellonian College in Toruń, 2021



# **Chapter 1**

Determinants  
of New Business  
Formation.

Some Lessons  
From the Czech Republic



**Abstract:** This chapter pertains to determinants of new business formation. They are related to relevant theoretical concepts dealing with the issue. The Czech Republic in the period 2011–2012 is the area of interest. The spatial approach is used to identify the impact of the determinants on new business formation. Thus, the data are related to 206 Czech microregions. The methods of regression analysis are employed to obtain results. These show the positive impact of agglomeration economies and the quality of entrepreneurial climate on new business formation. Moreover, human capital and the presence of foreign-owned businesses positively influence new business formation. On the contrary, the relationship between unemployment and new business formation is ambivalent. Altogether, the findings support the path-dependency of new business formation with essential implications for entrepreneurship policy. Finally, regression results point out the relevance of spatial spillovers in explaining variation in new business formation.

**Keywords:** entrepreneurship, new business formation, OLS regression, spatial regression, the Czech Republic

## Introduction

Entrepreneurship is firmly embedded in the theory and practice of economic growth and development. Lee, Florida and Acs regard new enterprises as one of the sources of employment and innovations.<sup>1</sup> Wang points out the positive relationship between entrepreneurship, economic efficiency and technological progress.<sup>2</sup> Delfmann, Koster, McCann and Van Dijk connect entrepreneurship with quality of life.<sup>3</sup> Fotopoulos emphasises the importance of entrepreneurship for regional equity and efficiency.<sup>4</sup> Fritsch and Mueller<sup>5</sup> note the importance of entrepreneurship for economic growth. Van Stel and Suddle<sup>6</sup> point out the positive relationship between entrepreneurship and employment growth. Bernat and Korpys,<sup>7</sup> Sobeková, Solík and Sipko perceive entrepreneurship as a strategy for solving unemployment problems of young people. Altogether, demand for knowledge related to the determinants of new business formation arises.

There is vast literature dedicated to the determinants of new business formation. Generally, two strands of research may be distinguished (see, e.g., Lee, Florida and Acs,<sup>8</sup> Andersson and Koster<sup>9</sup>). The first one is focused directly on the decision-making process of new entrepreneurs. Therefore,

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<sup>1</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship: a regional analysis of new firm formation*, *Regional Studies*, Vol. 38, No 8, 2004, pp. 879–891.

<sup>2</sup> S. Wang, *Determinants of New Firm Formation in Taiwan*, *Small Business Economics*, Vol. 27, No 4–5, 2006, pp. 313–321.

<sup>3</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change and new firm formation in urban and rural regions*, *Regional Studies*, Vol. 48, No 6, 2014, pp. 1034–1050.

<sup>4</sup> G. Fotopoulos, *On the spatial stickiness of UK new firm formation rates*, *Journal of Economic Geography*, Vol. 14, No 3, 2014, pp. 651–679.

<sup>5</sup> M. Fritsch, P. Mueller, *The Persistence of Regional New Business Formation-Activity over Time – Assessing the Potential of Policy Promotion Programs*, *Journal of Evolutionary Economics*, Vol. 17, No 3, 2007, pp. 299–315.

<sup>6</sup> A. van Stel, K. Suddle, *The impact of new firm formation on regional development in the Netherlands*, *Small Business Economics*, Vol. 30, No 1, 2008, pp. 31–47.

<sup>7</sup> T. Bernat, J. Korpysa, *Setting up new firms as an opportunity to reduce unemployment*, *Transformations in Business and Economics*, Vol. 12, No 1A, 2013, pp. 381–397.

<sup>8</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and Entrepreneurship...*, pp. 879–891.

<sup>9</sup> M. Anderson, S. Koster, *Sources of persistence in regional start-up rates – evidence from Sweden*, *Journal of Economic Geography*, Vol. 11, No 1, 2011, pp. 179–201.

the determinants of new business formation are identified from these processes (see, e.g., Belás, Bilan, Demjan and Sipko<sup>10</sup>). The second one deals with the determinants of new business formation seen from the spatial perspective. The essence of this approach rests on spatial variation in new business formation rates. Subsequently, the determinants of this variation are searched (see, e.g., Armington and Acs<sup>11</sup>). However, despite the vast literature, the findings on the impact of particular determinants on new business formation are ambivalent. This fact substantiates comparative research on the issue because crucial insights are provided for policy decisions (see, e.g., Sutaria and Hicks<sup>12</sup>).

The main purpose of this chapter is to extend the knowledge on the determinants of new business formation. The spatial approach is followed in the chapter. The analysed determinants were chosen in accord with the recent development of theory. Thus, the determinants related to the theoretical concepts of agglomeration economies, entrepreneurial choice, entrepreneurial climate and evolutionary economic geography were included in the analysis. The text aims to identify the impact of these determinants on new business formation, with the Czech Republic and new business formation in 2011 and 2012 as the case study. The chapter is structured as follows. The first part introduces the theoretical background of the chapter. The second part presents empirical methodology and data. The third part summarises empirical results and findings. The last part provides conclusions.

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<sup>10</sup> J. Belás, Y. Bilan, V. Demjan, J. Sipko, *Entrepreneurship in SME Segment: Case Study from the Czech Republic and Slovakia*, *Amfiteatru Economic*, Vol. 17, No 38, 2015, pp. 308–326.

<sup>11</sup> C. Armington, Z.J. Acs, *The Determinants of Regional Variation in New Firm Formation*, *Regional Studies*, Vol. 36, No 1, 2002, pp. 33–45.

<sup>12</sup> V. Sutaria, D.A. Hicks, *New firm formation: dynamics and determinants*, *Annals of Regional Science*, Vol. 38, No 2, 2004, pp. 241–262.

## Theoretical Background

New business formation is a spatially uneven process (see, e.g., Stam<sup>13</sup>). In this regard, various theoretical ideas have been suggested in the explanation of this phenomenon. Audretsch and Fritsch,<sup>14</sup> Van Stel and Suddle<sup>15</sup> point out the positive relationship between new business formation and agglomeration economies. They claim that pooled labour market, pecuniary externalities, and information and technological spillovers provide benefits for new business formation. Moreover, the discussion about the role of agglomeration economies considers the impact of Marshall-Arrow-Romer (MAR) and Jacobian externalities on new business formation. MAR externalities emphasise the benefits of intra-sectoral spillovers, while Jacobian externalities the benefits of inter-sectoral knowledge exchange (see, e.g., Bishop<sup>16</sup>). A unanimous conclusion on the importance of these two types of agglomeration economies on new business formation has not been found in the empirical literature (see, e.g., Audretsch and Keilbach<sup>17</sup>). However, Delfmann, Koster, McCann and Van Dijk,<sup>18</sup> as well as Fotopoulos,<sup>19</sup> show the positive relationship between specialisation (MAR externalities) and new business formation. Therefore, less diversified economies indicate higher values of new business formation.

The theory of entrepreneurial choice is another influential idea in explaining regional variations in new business formation. The essence of the theory is that a person may choose either wage work or self-employment. The decision is based on comparing wage with expected payoff

<sup>13</sup> E. Stam, *Entrepreneurship, evolution and geography*, in: *The Handbook of Evolutionary Economic Geography*, Edward Elgar, Cheltenham 2010, pp. 307–348.

<sup>14</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm Births in Germany*, *Regional Studies*, Vol. 28, No 4, 1994, pp. 359–365.

<sup>15</sup> A. van Stel, K. Suddle, *The impact of new firm...*, pp. 31–47.

<sup>16</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship: a Spatial Analysis of New Firm Formation in Great Britain*, *Entrepreneurship & Regional Development*, Vol. 24, No 7–8, 2012, pp. 641–660.

<sup>17</sup> D.B. Audretsch, M. Keilbach, *The socialization of entrepreneurship capital: evidence from Germany*, *Papers in Regional Science*, Vol. 86, No 3, 2007, pp. 351–365.

<sup>18</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>19</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

from self-employment (see, e.g., Evans and Jovanovic;<sup>20</sup> Burke, Fitzroy and Nolan<sup>21</sup>). Various factors influence the decision, including human capital, unemployment, foreigner status and employment in a large firm:

- Burke, Fitzroy and Nolan<sup>22</sup> claim that the quality of human capital improves the probability of high-wage employment. Nevertheless, human capital is also connected with the skills to find and use market opportunities (see, e.g., Fotopoulos<sup>23</sup>). Moreover, despite the theoretical ambivalence, empirical literature highlights the positive relationship between human capital and new business formation (see, e.g., Audretsch and Fritsch;<sup>24</sup> Armington and Acs;<sup>25</sup> Lee, Florida and Acs;<sup>26</sup> Delfmann, Koster, McCann and Van Dijk;<sup>27</sup> Fotopoulos<sup>28</sup>).
- Research on the relationship between unemployment and new business formation provides ambivalent results. Unemployed people may be an important source of potential entrepreneurs because their expected payoff from self-employment is likely to be higher than social allowances. On the contrary, unemployment may decrease aggregate demand and cause less business entry (see, e.g., Audretsch and Fritsch;<sup>29</sup> Sutaria and Hicks;<sup>30</sup> Delfmann, Koster, McCann and Van Dijk;<sup>31</sup> Fotopoulos<sup>32</sup>).
- There are some theoretical insights into the relationship between foreigner status and new business formation. It is claimed that for-

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<sup>20</sup> D.S. Evans, B. Jovanovic, *An Estimated Model of Entrepreneurial Choice under Liquidity Constraints*, *Journal of Political Economy*, Vol. 97, No 4, 1989, pp. 808–827.

<sup>21</sup> A.E. Burke, F.R. Fitzroy, M.A. Nolan, *When less is more: distinguishing between entrepreneurial choice and performance*, *Oxford Bulletin of Economics and Statistics*, Vol. 62, 2000, No 5, pp. 565–587.

<sup>22</sup> *Ibidem*.

<sup>23</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>24</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm...*, pp. 359–365.

<sup>25</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>26</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>27</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>28</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>29</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm...*, pp. 359–365.

<sup>30</sup> V. Sutaria, D.A. Hicks, *New firm formation...*, pp. 241–262.

<sup>31</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>32</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

eigners are discriminated in the waged sector (see, e.g., Cowling and Taylor<sup>33</sup>). Consequently, self-employment is the way out of unemployment for them, and it is supported by the willingness to accept higher risk (see, e.g., Bilan;<sup>34</sup> Delfmann, Koster, McCann and Van Dijk<sup>35</sup>).

- Workers employed in a large firm are less likely to start a business (see, e.g., Armington and Acs;<sup>36</sup> Bishop<sup>37</sup>) due to the differences in wage and uncertainty levels (see, e.g., Fotopoulos<sup>38</sup>). Moreover, SME employees have more diverse skills and experience for self-employment (see, e.g., Fotopoulos<sup>39</sup>). Large firms also influence the potential competitiveness of new businesses. Bishop,<sup>40</sup> Lee, Florida, and Acs note the negative influence,<sup>41</sup> while Sutaria and Hicks<sup>42</sup> emphasise the stabilisation effect of large firms.

Several studies embed the research on new business formation within territorial variations in entrepreneurial climate. Armington and Acs,<sup>43</sup> Delfmann, Koster, McCann and Van Dijk,<sup>44</sup> Fotopoulos<sup>45</sup> claim that social climate and entrepreneurial culture influence the decision for self-employment through, e.g., imitation of behaviour. Davidsson and Wiklund<sup>46</sup> point out the relationship between cultural determinants (e.g. values, behaviour) and new business formation. Burke,

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<sup>33</sup> M. Cowling, M. Taylor, *Entrepreneurial women and men: two different species?*, Small Business Economics, Vol. 16, No 3, 2001, pp. 167–175.

<sup>34</sup> Y. Bilan, *Specificity of border labour migration*, Transformations in Business and Economics, Vol. 11, No 2, 2012, pp. 82–97.

<sup>35</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>36</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>37</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>38</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>39</sup> *Ibidem*.

<sup>40</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>41</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>42</sup> V. Sutaria, D.A. Hicks, *New firm formation...*, pp. 241–262.

<sup>43</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>44</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>45</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>46</sup> P. Davidsson, J. Wiklund, *Values, beliefs and regional variations in new firm formation rates*, Journal of Economic Psychology, Vol. 18, 1997, No 3, pp. 179–199.

Fitzroy and Nolan<sup>47</sup> note the importance of lifestyle, e.g. the desire to be one's own boss, and family ties. Altogether, a suitable combination of cultural factors creates an environment supportive for new business formation (see, e.g., Davidsson and Wiklund;<sup>48</sup> Belás, Bartoš, Habáňík and Novák<sup>49</sup>). Consequently, a high share of entrepreneurs in the population may be regarded as a proxy of entrepreneurial climate. Furthermore, this thinking is related to evolutionary economic geography and path-dependency. It is claimed that history matters in new business formation (see, e.g., Fritsch and Mueller;<sup>50</sup> Andersson and Koster;<sup>51</sup> Fotopoulos<sup>52</sup>). Therefore, new business formation is influenced by the entrepreneurial climate created in the past (see, e.g., Fotopoulos<sup>53</sup>).

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<sup>47</sup> A.E. Burke, F.R. Fitzroy, M.A. Nolan, *When less is more...*, pp. 565–587.

<sup>48</sup> P. Davidsson, J. Wiklund, *Values, beliefs and regional...*, pp. 179–199.

<sup>49</sup> J. Belás, P. Bartoš, J. Habáňík, P. Novák, *Significant attributes of the business environment in small and medium-sized enterprises*, *Economics & Sociology*, Vol. 7, No 3, 2014, pp. 22–39.

<sup>50</sup> M. Fritsch, P. Mueller, *The Persistence of Regional...*, pp. 299–315.

<sup>51</sup> M. Anderson, S. Koster, *Sources of persistence in regional start-up rates – evidence from Sweden*, *Journal of Economic Geography*, Vol. 11, No 1, 2011, pp. 179–201.

<sup>52</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>53</sup> *Ibidem*.

## Data and Methods

The methodology of this chapter is based on spatial regression models in common with several other studies (see, e.g., Bishop<sup>54</sup>). All data refer to 206 SO ORPs in the Czech Republic and the territory of Prague (micro-regions hereafter). The data on new business formation cover the period 2011–2012. Explanatory variables are measured either at the end of 2010 or at the beginning of 2011.

### 3.1. Data – Dependent Variable

New business formation is measured by the number of new businesses registered in the official Business Register of the Czech Republic in 2011 and 2012. The situations at the end of 2011 and 2012 are considered for categorising new businesses into microregions. Be it noted that the term “business” includes both legal entities and natural persons with the status of an entrepreneur. The labour-market approach is used to control the different size of microregions (see, e.g., Lee, Florida and Acs;<sup>55</sup> Bishop;<sup>56</sup> Delfmann, Koster, McCann and Van Dijk<sup>57</sup> for the use of this approach). Therefore, the number of new businesses is expressed per 10 thousand economically active people (NEW). Moreover, the variable is log-transformed (LNNEW) to reduce the influence of outliers. The 2011 Census is the source of data on economically active people.

### 3.2. Data – Explanatory Variables

Explanatory variables are defined as follows (see Table 1 for review and expected signs). Population density (DENS) is included in the analysis to explore the role of positive and negative spillovers from agglomeration

<sup>54</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>55</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>56</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>57</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

economies. Several scholars point out the positive impact of population density on the new business formation (see, e.g., Audretsch and Fritsch;<sup>58</sup> Bishop;<sup>59</sup> Fotopoulos<sup>60</sup>). Data for the variable come from the official Czech Statistical Office (CZSO) Public Databases (2010). The entropy measure of diversity (DIV) is added to regression models to identify the relevance of industrial diversity for a new business formation. In this regard, Shannon's entropy function is used (see, e.g., Shannon and Weaver).<sup>61</sup> Consequently, the entropy measure of industrial diversity is defined as

$$DIV = \sum_{i=1}^n I_i * \ln \frac{1}{I_i}$$

where  $I_i$  is the share of the  $i$ th 2-digit NACE-CZ code in SO ORP's employment and  $n$  is the number of 2-digit NACE-CZ codes (see Bishop<sup>62</sup> for this approach). The maximum value of the entropy measure is connected with the highest industrial diversity – equal shares of all industries. The literature is ambivalent about the relationship between industrial diversity and new business formation. Fotopoulos<sup>63</sup> and Delfmann, Koster, McCann and Van Dijk<sup>64</sup> emphasise a positive impact of less diversified economies on new business formation. However, spatial concentration of specialised producer services may be of crucial importance in this regard (see, e.g., Lee, Florida and Acs;<sup>65</sup> Sutaria and Hicks<sup>66</sup>). Data for the entropy measure come from the 2011 Census.

Four explanatory variables are related to the theory of entrepreneurial choice as introduced in the theoretical background:

- The share of people with tertiary education in the population over 15 years of age (TERTIARY) is chosen as a proxy of human capital.

<sup>58</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm...*, pp. 359–365.

<sup>59</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>60</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>61</sup> C.E. Shannon, W. Weaver, *The Mathematical Theory of Communication*, The University of Illinois Press, Urbana 1949.

<sup>62</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>63</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>64</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>65</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>66</sup> V. Sutaria, D.A. Hicks, *New firm formation...*, pp. 241–262.

Fotopoulos,<sup>67</sup> Armington and Acs,<sup>68</sup> Delfmann, Koster, McCann and Van Dijk,<sup>69</sup> and Lee, Florida & Acs empirically show a positive relationship between this proxy of human capital and new business formation.<sup>70</sup> Data for the variable come from the 2011 Census.

- The relationship between unemployment and new business formation is ambivalent. Audretsch and Fritsch,<sup>71</sup> Armington and Acs,<sup>72</sup> and Lee, Florida and Acs find a positive impact on unemployment on new business formation.<sup>73</sup> On the contrary, Fotopoulos,<sup>74</sup> Delfmann, Koster, McCann and Van Dijk,<sup>75</sup> and Sutaria and Hicks<sup>76</sup> do not observe such an impact. Thus, the unemployment rate (UNEMPLOY) is included in the analysis. Data for the variable come from the 2011 Census and official Czech Statistical Office (CZSO) Public Databases (2010).
- The theory of entrepreneurial choice highlights a positive relationship between the share of immigrants in the population and new business formation (see, e.g., Lee, Florida and Acs<sup>77</sup>). However, reliable data of this kind are missing in the Czech Republic. Instead, the share of foreign-owned businesses in the total number of businesses is included in the analysis (FOREIGN). Data for the variable come from the Business Register of the Czech Republic (2010).
- New business formation is also influenced by the presence of large firms. Lee, Florida and Acs,<sup>78</sup> and Armington and Acs<sup>79</sup> note a negative relationship between the size of firms and new business

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<sup>67</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>68</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>69</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>70</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>71</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm...*, pp. 359–365.

<sup>72</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>73</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>74</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>75</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>76</sup> V. Sutaria, D.A. Hicks, *New firm formation...*, pp. 241–262.

<sup>77</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>78</sup> *Ibidem*.

<sup>79</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

formation.<sup>80</sup> Sutaria and Hicks<sup>81</sup> show the opposite relationship. Thus, we include the share of large businesses with more than 249 employees in the population of all businesses in the analysis (LARGE). Data for the variable come from the Business Register of the Czech Republic (2010).

The share of entrepreneurs in the economically active population (ENTREP) expresses the entrepreneurial climate of microregions. In theory, the quality of entrepreneurial climate positively influences the decision to become an entrepreneur. Armington and Acs,<sup>82</sup> Delfmann, Koster, McCann and Van Dijk<sup>83</sup> point out the relevance of this relationship. In addition, the share of entrepreneurs in economically active population is relevant also for evolutionary economic geography and path-dependency. The positive relationship between ENTREP and new business formation is also expected from this viewpoint (see, e.g., Fritsch and Mueller;<sup>84</sup> Anderson and Koster;<sup>85</sup> Fotopoulos<sup>86</sup>). Data for the variable come from the 2011 Census.

Table 1. Variables – expected sign

Variable	Expected Sign
DENS	+
DIV	+ / -
ENTREP	+
FOREIGN	+
LARGE	+ / -
TERTIARY	+
UNEMPLOY	+ / -

Source: compiled by the authors.

<sup>80</sup> Ibidem.

<sup>81</sup> V. Sutaria, D.A. Hicks, *New firm formation...*, pp. 241–262.

<sup>82</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>83</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>84</sup> M. Fritsch, P. Mueller, *The Persistence of Regional...*, pp. 299–315.

<sup>85</sup> M. Anderson, S. Koster, *Sources of persistence...*, pp. 179–201.

<sup>86</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

### 3.3. Methods

Three regression models were computed to explain the spatial pattern of the dependent variable. First, multiple ordinary least square (OLS) regression was run with LNNEW as the dependent variable and DENS, DIV, ENTREP, FOREIGN, LARGE, TERTIARY, and UNEMPLOY as the explanatory variables. Variance inflation factors, Jarque-Bera and Shapiro-Wilk tests, and Breusch-Pagan and White tests were applied to check for the OLS multi-collinearity, non-normality and heteroscedasticity assumptions, respectively. In all instances, test statistics were insignificant at the 10 percent level, providing no evidence of non-normality in the residuals and heteroscedasticity. Variance inflation factors and correlation matrices indicated relatively low correlations among the independent variables (less than 0.5). The only correlation above 0.5 was between the DENS and TERTIARY variables. Nevertheless, the results were not changed after excluding either of these variables. Thus, both variables were retained in the model.

Besides multi-collinearity, non-normality and heteroscedasticity, the OLS results may be biased also by spatial autocorrelation (see, e.g., Anselin and Rey<sup>87</sup>). Moran's test was performed to check for the presence of spatial dependence. Various weight matrix definitions were used in this regard (see Bishop for this approach<sup>88</sup>). The results confirmed the presence of spatial autocorrelation within our data (see Table 2 for selected results), indicating the need to specify a spatial regression model. The methodological approach based on the Lagrangian multiplier (LM) tests was applied (see, e.g., Anselin, Bera, Florax, and Yoon<sup>89</sup>). The results of these tests (see Table 2) led to the choice of spatial lag regression models. In this regard, the spatial autocorrelation was caused by the spatial interdependency of new business formation across neighbouring territories. The essence of this interdependency was analysed using the local indicators of spatial association (LISA)

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<sup>87</sup> L. Anselin, S. Rey, *Properties of tests for spatial dependence in linear regression models*, *Geographical Analysis*, Vol. 23, No 2, 1991, pp. 112–131.

<sup>88</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>89</sup> L. Anselin, A.K. Bera, R.J. Florax, M.J. Yoon, *Simple Diagnostic Tests for Spatial Dependence*, *Regional Science and Urban Economics*, Vol. 26, No 1, 1996, pp. 77–104.

technique (see, e.g., Anselin<sup>90</sup>). Finally, the results of the OLS and spatial regression models were discussed.

Table 2. Spatial autocorrelation – test statistics

Test	Queen contiguity – 1 <sup>st</sup> order		Queen contiguity – 2 <sup>nd</sup> order	
	Value	Probability	Value	Probability
Moran's I	4.50	0.000	5.11	0.000
LM (lag)	21.12	0.000	26.68	0.000
Robust LM (lag)	6.01	0.014	11.42	0.001
LM (error)	16.18	0.000	16.92	0.000
Robust LM (error)	1.07	0.300	1.67	0.197

**Source:** compiled by the authors.

<sup>90</sup> L. Anselin, *Local indicators of spatial association – LISA*, Geographical Analysis, Vol. 27, No 2, 1995, pp. 93–115.

## Empirical Results and Discussion

OLS regression and spatial lag regression results are presented in Table 3. The fit of the models is satisfactory, with the  $R^2$  measures close to 0.7. However, the spatial lag models fit the data better than the OLS model, as indicated by the log-likelihood and Akaike information criterion statistics. The findings confirm the relevance of spatial interdependency in explaining the spatial pattern of new business formation (see also Bishop;<sup>91</sup> Delfmann, Koster, McCann and Van Dijk<sup>92</sup>).

Four explanatory variables are statistically significant at the 1 percent level with expected signs. New business formation is positively associated with population density (DENS). This suggests that agglomeration economies in densely populated areas (e.g. pooled labour market, pecuniary externalities, information and technological spillovers, entrepreneurial infrastructure) contribute to the new business formation (see also Audretsch and Fritsch;<sup>93</sup> Armington and Acs;<sup>94</sup> Van Stel and Suddle;<sup>95</sup> Bishop;<sup>96</sup> Fotopoulos<sup>97</sup>). The relationship stays significant also in spatial lag models. Unlike several other studies (see also Delfmann, Koster, McCann and Van Dijk;<sup>98</sup> Fotopoulos<sup>99</sup>), our results show a positive association between new business formation and industrial diversity (DIV). Thus, the opportunity to combine knowledge from various industries (Jacobian externalities) contributes to new business formation. However, this relationship is statistically significant only in the OLS model at the 5 percent level. The significance is lost in spatial lag models, indicating the relevance of spatial knowledge spillovers.

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<sup>91</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>92</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>93</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm...*, pp. 359–365.

<sup>94</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>95</sup> A. van Stel, K. Suddle, *The impact of new firm...*, pp. 31–47.

<sup>96</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>97</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>98</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>99</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

New business formation is positively associated with the quality of human capital as measured by the share of people with tertiary education in the population over 15 years of age (TERTIARY). Thus, well-educated people take market opportunities for new business formation more efficiently than less-educated people (see also Audretsch and Fritsch;<sup>100</sup> Armington and Acs;<sup>101</sup> Lee, Florida and Acs;<sup>102</sup> Delfmann, Koster, McCann, and Van Dijk;<sup>103</sup> Fotopoulos<sup>104</sup>). The relationship stays significant also in spatial lag models. Moreover, new business formation is also positively associated with the share of foreign-owned businesses in the total number of businesses (FOREIGN). Therefore, the presence of foreigners and their businesses contributes to new business formation in a territory (see also Cowling and Taylor;<sup>105</sup> Lee, Florida and Acs<sup>106</sup>). The relationship stays significant also in spatial lag models. Altogether, the entrepreneurial choice is positively influenced by the quality of human capital and foreigner status.

New business formation is positively associated with the quality of entrepreneurial climate as measured by the share of entrepreneurs in the economically active population (ENTREP). Moreover, the relevance of path-dependency for new business formation is supported in this way (see Fritsch and Mueller;<sup>107</sup> Anderson and Koster;<sup>108</sup> Fotopoulos<sup>109</sup>). Thus, the presence of entrepreneurs in a territory positively influences also new business formation. Subsequently, a self-reinforcing process is created. The relevance of path-dependency is also connected with the positive relationship between new business formation and the share of foreign-owned businesses in the total number of businesses (FOREIGN). Altogether, a vibrant entrepreneurial climate characterised by the spatial concentration of entrepreneurs and foreign-owned businesses positively

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<sup>100</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm...*, pp. 359–365.

<sup>101</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>102</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>103</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>104</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>105</sup> M. Cowling, M. Taylor, *Entrepreneurial women...*, pp. 167–175.

<sup>106</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>107</sup> M. Fritsch, P. Mueller, *The Persistence of Regional...*, pp. 299–315.

<sup>108</sup> M. Anderson, S. Koster, *Sources of persistence...*, pp. 179–201.

<sup>109</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

impacts new business formation. Spatial lag models confirm the significance of these findings.

Table 3. Regression results – OLS regression and spatial lag regression

Variable	OLS regression	Spatial lag regression Contiguity 1 <sup>st</sup> order	Spatial lag regression Contiguity 2 <sup>nd</sup> order
CONSTANT	4.4349** (14.03)	2.9066** (6.17)	2.0764** (4.99)
DENS	0.0001** (3.64)	0.0001** (3.14)	0.0001** (3.70)
DIV	0.7875* (2.00)	0.5555 (1.52)	0.6026 (1.66)
ENTREP	0.0322** (8.10)	0.0274** (7.12)	0.0274** (7.23)
FOREIGN	0.0015** (6.87)	0.0013** (6.45)	0.0012** (6.11)
LARGE	-0.0013 (-0.62)	-0.0003 (-0.13)	0.0000 (0.04)
TERTIARY	0.0141** (3.61)	0.0158** (4.35)	0.0163** (4.50)
UNEMPLOY	-0.0006 (-0.24)	0.0024 (0.97)	0.0027 (1.10)
Spatial coefficient	–	0.3031** (4.37)	0.4382** (4.99)
Observations	206	206	206
Log likelihood	196.902	206.169	207.363
Akaike information criterion	-377.803	-394.338	-396.725
R <sup>2</sup>	0.675 (adjusted R <sup>2</sup> )	0.718 (pseudo R <sup>2</sup> )	0.721 (pseudo R <sup>2</sup> )

Notes: *t* values in parentheses for OLS regression, *z* values for spatial lag regression

\* Statistically significant results at the 5 percent level

\*\* Statistically significant results at the 1 percent level

Source: compiled by the authors.

Two explanatory variables are statistically insignificant in all three regression models. The ambivalent impact of unemployment (UNEMPLOY) on new business formation is confirmed (see Armington and Acs;<sup>110</sup> Sutaria and Hicks<sup>111</sup>). Unemployed people may be an essential source of new entrepreneurs (see also Audretsch and Fritsch;<sup>112</sup> Lee,

<sup>110</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>111</sup> V. Sutaria, D.A. Hicks, *New firm formation...*, pp. 241–262.

<sup>112</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm...*, pp. 359–365.

Florida, and Acs<sup>113</sup>). However, unemployment is also connected with socioeconomic and structural problems, discouraging entrepreneurship (see Bishop,<sup>114</sup> Fotopoulos<sup>115</sup>). Unlike several other studies (see Armington and Acs,<sup>116</sup> Lee, Florida, and Acs,<sup>117</sup> Bishop<sup>118</sup>), the negative impact of the presence of large firms (LARGE) on new business formation is not confirmed in the models. The stabilisation influence of large firms in regional economies is noteworthy in this regard (see Sutaria and Hicks<sup>119</sup>).

The statistical significance of spatial coefficients in spatial lag models indicates the spatial interdependency of new business formation across neighbouring microregions. Therefore, the LISA technique was applied to examine “hotspots” and “coldspots” of new business formation. Figure 1 shows statistically significant clusters of high and low values of new business formation rates. Note that the clusters are derived from the relationship between the LNNEW variable and its spatial lag. Thus, the high-high cluster means high values of both the LNNEW variable and its spatial lag.

Two significant clusters of high-high values may be identified from Figure 1. The first cluster includes the Czech largest city, Prague, and its hinterland. The second cluster is located around the Moravian metropolis, Brno. It is striking that the area of Prague’s cluster is substantially more significant than the area of Brno’s cluster. This finding suggests that the positive impact of the Moravian metropolis is spatially limited and the potential of Brno’s hinterland for new business development low. Figure 1 also shows one spatially extensive cluster of low-low values. This area corresponds to the inner periphery of Northwestern Moravia. It is noteworthy that two outliers of high values may be observed close to the area. These outliers are microregions of the two largest cities of the area (Ostrava and Olomouc). Altogether, the LISA results support the relevance of spatial hierarchy for new business formation.

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<sup>113</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>114</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>115</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

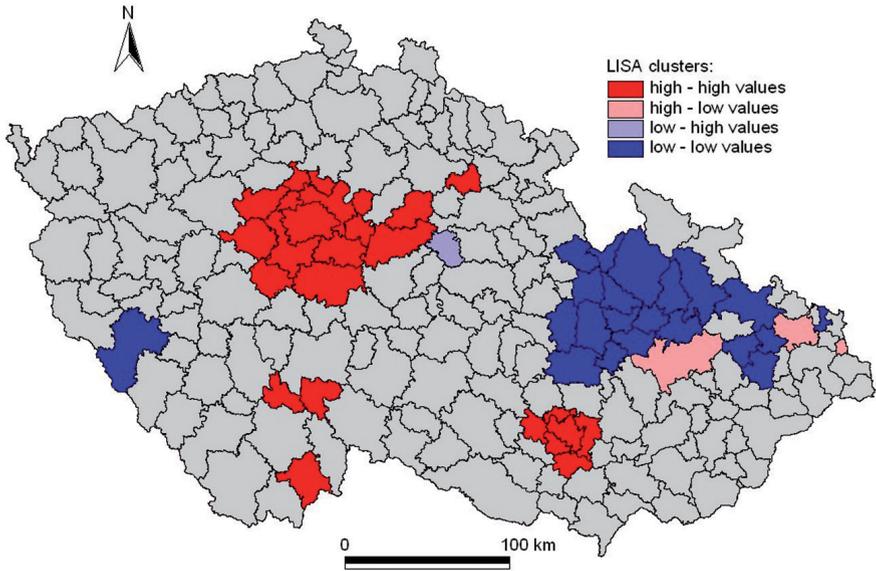
<sup>116</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>117</sup> S.Y. Lee, R. Florida, Z.J. Acs, *Creativity and entrepreneurship...*, pp. 879–891.

<sup>118</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>119</sup> V. Sutaria, D.A. Hicks, *New firm formation...*, pp. 241–262.

Figure 1. LISA results – cluster map (LNNEW); weight matrix – Queen Contiguity, 1<sup>st</sup> order



Source: compiled by the authors.

## Conclusion

The goal of this chapter was to identify the impact of the determinants related to relevant theoretical concepts dealing with the new business formation. The methods of regression analysis were employed to meet the goal of this study. The Czech Republic in the years 2011 and 2012 was chosen as the case study.

Regression results reveal the positive impact of agglomeration economies and the quality of entrepreneurial climate on new business formation. The spatial concentration of people and entrepreneurs creates an environment that is supportive of new business formation. Consequently, a self-reinforcing process arises. Agglomeration economies and the quality of entrepreneurial climate contribute to new business formation. Simultaneously, new business formation creates an environment that is attractive for people and entrepreneurs. Thus, new business formation is path-dependent (see, e.g., Fritsch and Mueller;<sup>120</sup> Anderson and Koster;<sup>121</sup> Fotopoulos<sup>122</sup>). These findings are of political importance precisely because explicit entrepreneurship policy for lagging regions may be inefficient due to the influence of agglomeration economies (see, e.g., Van Stel and Suddle<sup>123</sup>).

Regression results support the ideas related to the theory of entrepreneurial choice. Human capital positively influences new business formation. Thus, human capital is essential for the identification of market opportunities. Moreover, the increasing importance of knowledge in the current economy substantiates this relationship (see, e.g., Armington and Acs<sup>124</sup>). New business formation is positively associated also with the presence of foreign-owned businesses in a territory. This confirms the idea that foreigners are self-employed more likely because of discrimination in the waged sector against them. Finally, regression results point

<sup>120</sup> M. Fritsch, P. Mueller, *The Persistence of Regional...*, pp. 299–315.

<sup>121</sup> M. Anderson, S. Koster, *Sources of persistence...*, pp. 179–201.

<sup>122</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>123</sup> A. van Stel, K. Suddle, *The impact of new firm...*, pp. 31–47.

<sup>124</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

out the ambivalent impact of unemployment on new business formation. Unemployment is not only a source of potential entrepreneurs, but it also decreases demand. Consequently, the entrepreneurial choice is influenced in opposite directions.

Moran's I indicates the presence of spatial autocorrelation in the data. Therefore, spatial lag regression models were computed and compared with OLS regression results. This comparison shows that spatial regression models fit data better than the OLS regression model. Consequently, spatial interdependency is relevant in explaining variation in new business formation. The LISA results point out the decisive influence of the Czech capital city of Prague. Moreover, a large continuous area of low new business formation rates is identified in the inner periphery of Northwestern Moravia. Overall, spatial hierarchy seems to play crucial role in explaining the spatial pattern of new business formation.



# **Chapter 2**

Spatial of the Cohesion  
Policy Project  
in Nationally Delimitated  
Intervention Areas:  
The Case  
of the Czech Republic  
and Poland



**Abstract:** This chapter deals with the topic of monetary support of the European Union cohesion policy to two central European countries, the Czech Republic and Poland. The main area of interest is spatial dispersion of said resources among regions of each country as it is related to particular intervention areas that were delimited in both of them. The idea behind this delimitation is somewhat similar in both countries targeting the economically less advanced areas. However, the results of virtually the same approach are quite different as they are obtained through different implementation of cohesion policy. Poland is rather more successful in targeting economically weakest regions as the government prepared an architecture of operational programmes that allocates a significant amount to the economically weak Eastern Poland ex-ante through regional and multi-regional operational programmes. The Czech government, lacking a similar approach, is far less efficient in targeting economically weak regions. What both countries have in common is the worrying trend to invest prevalently into basic infrastructure in these regions and implementing projects with more considerable added value in economically sounder areas.

**Keywords:** cohesion policy, Czech Republic, European Union, Poland, spatial concentration, regional policy

## Introduction

The European Union cohesion policy is firstly aimed at the support of the underdeveloped regions. As the eligibility to either of the Convergence or the Regional Competitiveness and Employment objective is measured at the NUTS 2 level via the gross domestic product per capita, some countries emerge from this Union-wide comparison as comprised mainly of the underdeveloped regions that occupy a significant amount of their area and also encompass the majority of the population (Barcalente and Perugini,<sup>125</sup> Becker et al.<sup>126</sup>) Such broad delimitation of problem areas does not comply with the proclaimed principle of concentration of the cohesion policy interventions, which should ensure the spatial, topical and expenditure concentration to improve the intervention results, although some (e.g. Farole<sup>127</sup>) propose that economic growth promotion policies should not target particular territories. However, economic growth is not the sole objective of the cohesion policy, which also has a social and an environmental dimension.<sup>128</sup>

The question of delimitation of the intervention areas for the cohesion policy has long been discussed, primarily focusing on the power division between the European Commission and member states. The current practice in programming period 2007–2013 is that the Convergence objective eligible regions are determined by the European Commission ruling (Bachtler and Mendez<sup>129</sup>). Although the following programming period 2014–2020 signifies broad changes in the territorial approach more focused on specific functional types of regions, be it macro-regions

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<sup>125</sup> B. Barcalente, C. Perugini, *The components of regional disparities in Europe*, *The Annals of Regional Science*, Vol. 44, No 3, 2010, pp. 621–645.

<sup>126</sup> S.O. Becker, P.H. Egger, M. von Ehrlich, *Going NUTS: The effect of EU Structural Funds on regional performance*, *Journal of Public Economics*, Vol. 94, No 9–10, 2010, pp. 578–590.

<sup>127</sup> T. Farole, A. Rodríguez-Pose, M. Storper, *Cohesion policy in the European Union: Growth, geography, institutions*, *JCMS: Journal of Common Market Studies*, Vol. 49, No 5, 2011, pp. 1089–1111.

<sup>128</sup> A. Mairate, *The 'added value' of European Union Cohesion policy*, *Regional Studies*, Vol. 40, No 2, 2006, pp. 167–177.

<sup>129</sup> J. Bachtler, C. Mendez, *Who Governs EU Cohesion Policy? Deconstructing the Reforms of the Structural Funds*, *Journal of Common Market Studies*, Vol. 45, No 3, 2008, pp. 535–564.

such as the Baltic Sea or the Danube or smaller sized functional areas centred around cities, urban areas, etc. (Zuber<sup>130</sup>).

The efficiency of the cohesion policy has been disputed (see, e.g. Dall'Erba and Le Gallo,<sup>131</sup> Ederveen et al.<sup>132</sup>) and the convergence of the member states with different outcomes.<sup>133</sup> Bachtler and Gorzelag<sup>134</sup> suggested maximising the effectiveness of the intervention, especially in the Convergence regions, by implementing widespread national policies that would further stipulate the use of eligible funds. In the light of this suggestion, the chapter compares the Eastern European member states, The Czech Republic and Poland, which have taken different approaches to delimitate the intervention areas at the national level and discusses their success in aiming interventions financed by the cohesion policy into said areas.

The chapter's objective lies in evaluating the spatial dispersion of the cohesion policy in the Czech Republic and Poland. Both countries have delimited certain areas that are of particular interest to their respective governments. This raises the question of whether the preferred state areas in the Czech Republic and Poland are sufficiently targeted by the cohesion policy or profit from the European Union's overall support more than other regions.

The chapter is structured as follows. The first part introduces the topics, deals with the delimitation of the areas of interest to both governments and main theoretical findings connected with cohesion policy implementation in both countries. The second part introduces the methodology of the research. The third part summarises the findings for the Czech Republic and Poland. Finally, the last part presents the conclusion and comparison of the Czech and Polish approaches.

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<sup>130</sup> P. Zuber, *Challenges for Efficient Delivery of European Structural and Investment Funds*, European Structural and Investment Funds Journal, Vol. 1, No 1, 2013, pp. 1–26.

<sup>131</sup> S. Dall'Erba, J. Le Gallo, *The impact of EU regional support on growth and employment*, Czech Journal of Economics and Finance, Vol. 57, No 7, 2007, pp. 325–340.

<sup>132</sup> S. Ederveen, H.L. Groot, R. Nahuis, *Fertile soil for structural funds? A panel data analysis of the conditional effectiveness of European cohesion policy*, *Kyklos*, Vol. 59, No 1, 2006, pp. 17–42.

<sup>133</sup> B. Vonjović, Z.J. Oplotnik, *Real convergence in the new eu member states*, Prague Economic Papers, Vol. 1, 2008, pp. 23–39; M. Simionescu, *Testing Sigma Convergence Across EU–28*, *Economics & Sociology*, Vol. 7, No 1, 2014, pp. 48–60.

<sup>134</sup> J. Bachtler, G. Gorzelag, *Reforming EU Cohesion Policy: A reappraisal of the performance of the Structural Funds*, *Policy Studies*, Vol. 28, No 4, 2007, pp. 309–326.

## 1.1. Delimitating the Intervention Areas

Both countries are open economies with a common communist past that strongly supported inter-regional equity. However, significant regional disparities became evident in the countries soon after the collapse of the communist regime, triggering economic changes and a lower level of inter-regional migration (Fidrmuc;<sup>135</sup> Huber,<sup>136</sup> Tvrdoň and Skokan;<sup>137</sup> Bilan<sup>138</sup>). So far, there is little evidence of the convergence process (Grosse;<sup>139</sup> Czyż and Hauke<sup>140</sup>). The accession process to the European Union and subsequent membership status resulted in the flow of resources aimed at reducing regional disparities. However, as interregional disparities increased, both countries set to declare particular areas that should benefit more than others as they are economically and socially worse off.

Poland has taken much the following way concerning the delimitation of the intervention areas, mainly stemming from a rather good compatibility of the Polish administrative structure with the NUTS system, particularly from the correspondence of Polish voivodeships with NUTS 2 units. In the pre-accession period, there was a national delimitation of supported areas on the administrative level of voivodeships (NUTS 2) and powiats (then NUTS 4, now LAU 2). It was abandoned after the European Union accession when Poland fully adopted the delimitation of the economically weak regions by the European Commission at the level of NUTS 2.<sup>141</sup> This, of course, is precisely the case when the whole country is comprised of such lagging regions. A suggestion of delimitation

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<sup>135</sup> J. Fidrmuc, *Migration and regional adjustment to asymmetric shocks in transition economies*, Journal of Comparative Economics, Vol. 32, No 2, 2004, pp. 230–247.

<sup>136</sup> P. Huber, *Inter-regional mobility in the accession countries: a comparison with EU15 member states*, Zeitschrift für Arbeitsmarkt Forschung-Journal for Labour Market Research, Vol. 37, No 4, 2004, pp. 393–408.

<sup>137</sup> M. Tvrdoň, K. Skokan, *Regional disparities and the ways of their measurement: The case of the Visegrad four countries*, Technological and Economic Development of Economy, Vol. 17, No 3, 2011, pp. 501–518.

<sup>138</sup> Y. Bilan, *Specificity of border...*, pp. 82–97.

<sup>139</sup> T.G. Grosse, *An evaluation of the regional policy system in Poland: Challenges and threats emerging from participation in the EU's cohesion policy*, in: European Urban and Regional Studies, Vol. 13, No 2, 2006, pp. 151–165.

<sup>140</sup> T. Czyż, J. Hauke, *Evolution of Regional Disparities in Poland*, Quaestiones Geographicae, Vol. 30, No 2, 2011, pp. 35–48.

<sup>141</sup> P. Churski, *Problem Ares in Polish regional policy*, Moravian Geographical Reports, Vol. 18, No 2, 2010, 23–32.

of the so-called problem areas at the national level was made in 2008 when the national concept of spatial development was introduced (Korcelli et al.<sup>142</sup>). This delimitation stirred some controversy as it was imprecise and still included much of the total area of the country.<sup>143</sup> Therefore, it is not included in the final version of the document.

According to the architecture of the Polish programme documents, we can regard as problem areas the five voivodeships of Lubelskie, Podkarpackie, Podlaskie, Świętokrzyskie and Warmińsko-Mazurskie, which were given their very own Operational Programme Development of Eastern Poland. These are primarily agrarian regions characterised by a small degree of urbanisation whose economies have not sufficiently changed since the transformation process began in the early 1990s, notwithstanding the pre-accession help or the resources allocated to them in the first period of Polish membership in the European Union.<sup>144</sup> The absorption of structural and cohesion funds resources and its influence on Eastern Poland is mainly researched by domestic authors see, e.g. (Pawełek et al.;<sup>145</sup> Zembaty et al.;<sup>146</sup> Smętkowski<sup>147</sup>) with the conclusion that the Union contribution indeed proves to be beneficial for Eastern Poland; however, it is unable to prevent an increase in interregional disparities within the country. Obviously, the benefits of the cohesion

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<sup>142</sup> P. Korcelli et al., *Ekspercki projekt koncepcji przestrzennego zagospodarowania kraju*, 2008. Available from: [http://www.mrr.gov.pl/rozwoj\\_regionalny/poziom\\_krajowy/polska\\_polityka\\_przestrzenna/prace\\_nad\\_KPZK\\_2008\\_2033/Documents/PE\\_KPZK\\_STYCZEN\\_z\\_ERRATA\\_NA\\_STRONIE.pdf](http://www.mrr.gov.pl/rozwoj_regionalny/poziom_krajowy/polska_polityka_przestrzenna/prace_nad_KPZK_2008_2033/Documents/PE_KPZK_STYCZEN_z_ERRATA_NA_STRONIE.pdf) (referred on 10/04/2015).

<sup>143</sup> J. Szlachta, J. Zaucha, *A new paradigm of the EU regional development in the context of the Poland's National Spatial Development Concept*, 2010. Available from: [http://www.institut-rozwoju.org/WP/IR\\_WP\\_1.pdf](http://www.institut-rozwoju.org/WP/IR_WP_1.pdf) (referred on 10/04/2015).

<sup>144</sup> T. Czyż, J. Hauke, *Evolution of Regional Disparities in Poland*, *Quaestiones Geographicae*, Vol. 30, No 2, 2011, pp. 35–48.

<sup>145</sup> B. Pawełek, R. Huptas, A. Lipieta, *Analiza porównawcza województw Polski ze względu na wykorzystanie środków unijnych z Europejskiego Funduszu Rozwoju Regionalnego w latach 2007–2010*, *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, Vol. 244, 2012, pp. 257–265.

<sup>146</sup> M. Zembaty, P. Tomaszewski, J. Zaleski, *Oczekiwane efekty realizacji polityki spójności Unii Europejskiej na poziomie regionalnym w Polsce*, *Studia Regionalne i Lokalne*, Vol. 44, No 2, 2011, pp. 92–117.

<sup>147</sup> M. Smętkowski, *Wschodnie obszary problemowe i ich trajektorie rozwojowe na przykładzie Polski i Niemiec*, *Studia Regionalne i Lokalne*, Vol. 50, No 4, 2012, pp. 29–53.

policy interventions are not limited to Eastern Poland and, as a whole, have prevented a more serious impact of the recent economic crisis.<sup>148</sup>

As previously indicated, the Czech Republic and Poland approached the topic of the preferred intervention areas for the cohesion policy activities rather differently. The reason lies in the administrative structure of the Czech Republic, which is rather fragmented and combines too many points of view, attempting to adapt to both internal administration needs and European Union requirements (see Jurčík<sup>149</sup>). The regions of the Czech Republic do not fit the NUTS classification as seamlessly as Polish regions, mainly due to the difference in the size and population of the abovementioned countries. The Czech Republic aims for the support to be spent preferably in the disadvantaged regions from the national point of view<sup>150</sup>. Therefore, the government has delimited so-called regions with full state support at the level of districts – LAU 1 and municipalities with extended scopes of power that have a direct counterpart in the NUTS and LAU system. Those regions are smaller than LAU 1 but contain several LAU 2 units (municipalities). The delimitation happened twice during the programming period 2007–2013. The first delimitation was made in 2006 and was valid until 2009. The second one was made in 2009 for the 2010–2013 period.

This delimitation follows the arguments that the economically lagging regions invest less in innovations and related activities. This investment is supported by the regional policy even though the absorption capacity of said regions is somewhat limited in this regard<sup>151</sup> and still more complicated by system issues such a human resources fluctuation in public institutions, public procurement and legislation changes,

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<sup>148</sup> D. Clowes, Y. Bilan, *Tracking Income per Head in Central-Southern Europe*, Economic Computation & Economic Cybernetics Studies & Research, Vol. 48, No 2, 2014, pp. 1–14.

<sup>149</sup> R. Jurčík, *Územní vymezení regionů v České republice ve vztahu k reformě veřejné správy*, XVII. Mezinárodní kolokvium o regionálních vědách, 2014, pp. 526–531.

<sup>150</sup> M. Ferry, I. McMaster, *Cohesion policy and the evolution of regional policy in Central and Eastern Europe*, Europe-Asia Studies, Vol. 65, No 8, 2013, pp. 1502–1528.

<sup>151</sup> C. Oughton, M. Landabaso, K. Morgan, *The regional innovation paradox: innovation policy and industrial policy*, The Journal of Technology Transfer, Vol. 27, No 1, 2002, pp. 97–110.

or political and media interests (Jurčík;<sup>152</sup> Horváth and Machyniak<sup>153</sup>). Research into the absorption capacity of said regions in the Czech Republic was conducted by Smékalová,<sup>154</sup> who focused on entrepreneurship support in Operational Program Entrepreneurship for Innovation. The entrepreneurship support, however, is somewhat exceptional even within the range of cohesion policy as it uses not only the general subsidy scheme but also schemes oriented on loans and guarantees in areas such as start-ups, development of the entrepreneurial environment, or brownfield regeneration (Smékalová;<sup>155</sup> Novosák et al.).<sup>156</sup> As such, the entrepreneurs are shifted from mere beneficiaries to the role of bank clients with all advantages and risks that this process entails (see, e.g. Janda;<sup>157</sup> Belás et al.<sup>158</sup>). Hájek et al.,<sup>159</sup> on the other hand, assessed the overall cohesion policy implementation within all the convergence regions and related operational programmes in the Czech Republic and found no significant evidence of the preferred position of the state-supported regions in comparison with other regions.

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<sup>152</sup> R. Jurčík, *Permissible Public Cooperation in the Field of Public Administration – Opportunity for Enterprises*, Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, Vol. 62, No 6, 2015, pp. 1309–1314.

<sup>153</sup> P. Horváth, J. Machyniak, *Electoral behaviour as affected by the media*, European Journal of Science and Theology, Vol. 10, suppl. 1, 2014, pp. 219–228.

<sup>154</sup> L. Smékalová, *Support of SMEs from Operational Program Enterprise and Innovation*, Littera Scripta, Vol. 5, No 2, 2012, pp. 15–26.

<sup>155</sup> Ibidem.

<sup>156</sup> Ibidem.

<sup>157</sup> K. Janda, *Úvěrová podpora investičních záměrů v České republice*, Acta Oeconomica Pragensia, Vol. 6, No 2, 2009, pp. 3–20.

<sup>158</sup> J. Belás, L. Burianová, E. Cipovová, M. Červenka, *Customers' Satisfaction As The Important Part Of Corporate Social Responsibility Activities*, in: *The Commercial Banking. Finance And The Performance Of Firms In Science, Education, And Practice*, 2013, pp. 47–60.

<sup>159</sup> O. Hájek, J. Novosák, P. Zahradník, P. Bednář, *Regionální disparity a financování regionální politiky – některé poznatky z České republiky*, Politická ekonomie, Vol. 60, No 3, 2012, pp. 330–349.

## Methodology

The research into spatial targeting of the EU allocation in all countries is based on an extensive study of the cohesion policy implementation at the project level in the reference period January 2007–March 2013 except for the technical assistance projects. In addition, as required, the countries publish basic information about individual projects and the beneficiaries of such projects, which created the foundation of comprehensive project matrixes of each state and was complemented by information from other available public resources (see Table 1).

Table 1. Data available in project matrixes and their sources

Attribute	Czech Republic	Poland
Project name	List of Beneficiaries	List of Beneficiaries
Project description	Project database of the Centre of regional development of the Czech Republic	Individual project websites
Project location	Project database of the Centre of regional development of the Czech Republic	List of Beneficiaries
Operational program	List of Beneficiaries	List of Beneficiaries
Beneficiary name	List of Beneficiaries	List of Beneficiaries
Beneficiary location	Registry of economic subjects	Registry of economic subjects
EU allocation	List of Beneficiaries	List of Beneficiaries

*Source: Authors.*

The location of the beneficiary and the project site were of particular interest for this chapter. However, detailing the project's location through the administrative levels of respective countries from NUTS 2 to LAU 2 levels was not always possible, which constitutes a limitation to this particular research. Therefore, this chapter only deals with projects where such identification was possible, which enabled the author to discern

low enough administrative level on which could be determined the location in or outside the state delimited intervention areas. In the case of the Czech Republic, some state delimited regions are LAU 1, others LAU 2 level. Poland specified intervention areas at the NUTS 2 level. If such identification could not be achieved, the project was not considered in further analysis. This is particularly the case of large national projects with no precise specification of the realisation site.

Regarding other perceived project characteristics, the focus was on the institutional sectors, among which the authors distinguished among the private sector, non-profit, non-governmental sector and governmental sector with the distinction of the local and central government. The topical analysis of projects stems from a slightly modified concept of regional competitiveness pyramid, as Lengyel introduced.<sup>160</sup> The basis of the pyramid is created by success determinants which further influence the development factors and directly contribute to regional performance. The fundamental factors, according to Lengyel,<sup>161</sup> are economic structure, social structure, innovative activity, decision centres, regional accessibility, environment, skills of the workforce and regional identity. By combining several of those, this paper differentiated seven topics of investments: efficient public administration and public services, transport infrastructure and services, environmental infrastructure and environmental education, development of business environment, human resources development, social infrastructure and development matters and, last but not least, research, development and innovation.

The obtained data relating to both beneficiary and project, both in nature and location, were classified and processed using descriptive statistics. Furthermore, the graphic outputs detailing the dispersion of Union monetary assistance per capita in municipalities with extended scope of powers of the Czech Republic and in Polish voivodeships were processed in ESRI ArcGIS software.

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<sup>160</sup> I. Lengyel, *The pyramid model: enhancing regional competitiveness in Hungary*, *Acta Oeconomica*, Vol. 54, No 3, 2004, pp. 323–342.

<sup>161</sup> *Ibidem*.

## Results and Discussion

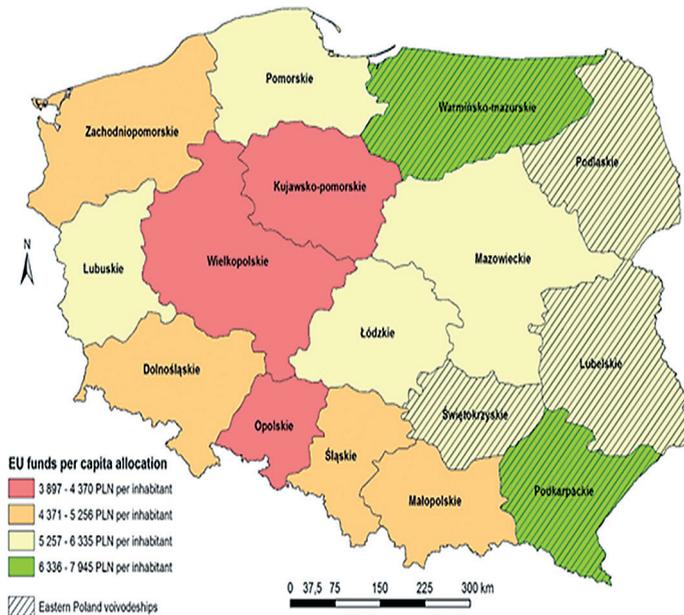
### 3.1. Poland

The interest of the Polish government in targeting the voivodeships of Eastern Poland manifests mainly in the form of the creation of a particular operational programme that is used exclusively for the implementation of the projects within the boundaries of the five eastern voivodeships. Combined with regional operational programmes that each voivodeship eastern or other has for their purposes, this guarantees a certain amount of allocation to be spent in Eastern Poland. Thus, unlike in the Czech Republic, the Polish government has rather firmly secured approximately 10.5% of the total national allocation to be spent in these regions in advance, notwithstanding the other operational programmes aimed at the whole Polish territory.

Within the means of the contracts that were concluded so far, the regions of Eastern Poland obtained an allocation of PLN 56.4 billion, approximately 24% of the entire spent amount within all the operational programmes. The programmes mainly aimed at the areas of Eastern Poland show various degree of drawing the funds. The Eastern Poland programme has already spent circa 95% of the total allocation; within the regional operational programmes, the spending ranges from 80% to 88%.

Per capita conversions of so far spent allocation are depicted in Figure 1, showing that the Eastern Poland voivodeships are pretty well supported as all of them exceed the national average support of PLN 5,671 per inhabitant.

Figure 1. European Union per capita allocation in Polish voivodeships



*Source:* Authors based on the List of Beneficiaries published by the Polish Ministry of Infrastructure and Development.

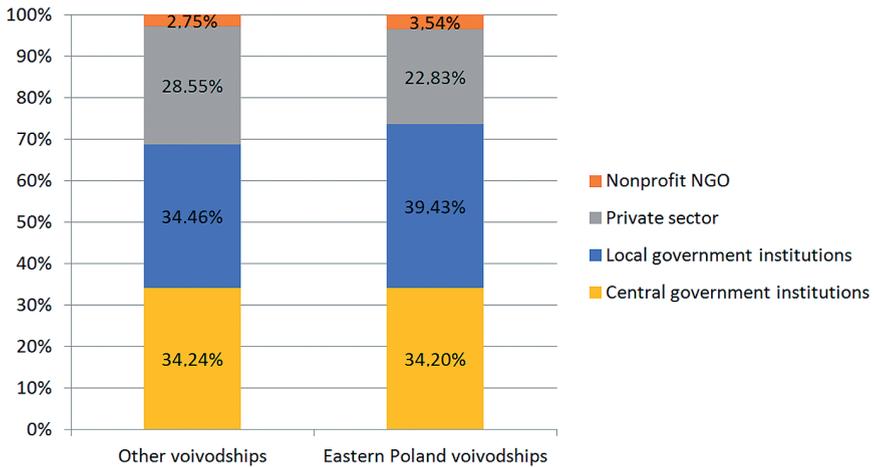
The share of identified sectors on beneficiary activity is visible in Table 2 and their shares in Figure 2. The combined activity of governmental institutions is somewhat higher in Eastern Poland than in more advanced regions calling into question the ability of the non-governmental subjects from economically weak regions to put forward successful applications for financial support. However, the governmental share on the spent amount is not as prominent, presenting an opportunity for more considerable direct support of the private enterprises that are notably more successful out of Eastern Poland in economically more advanced regions. On the other hand, their activity in Eastern Poland voivodeships is smaller, and their share is cut significantly by the local government and very little by the non-profit organisations.

Table 2. Involvement of the four institutional sectors in project implementation (billion PLN)

Institutional sector	Other voivodeships	Eastern Poland voivodeships
Central government institutions	60.15	19.31
Local government institutions	60.54	22.27
Non-profit NGO	4.84	2.00
Private sector	50.16	12.89
Total	175.69	56.47

Source: Authors based on the List of Beneficiaries published by the Polish Ministry of Infrastructure and Development.

Figure 2. The share of the institutional sectors on the amount of the allocation, Poland



Source: Authors based on the List of Beneficiaries published by the Polish Ministry of Infrastructure and Development.

The importance of the small and medium enterprises in Poland is similar to its equivalents in other countries and the Union. However, their significance is somewhat lesser in Eastern Poland, where especially micro and small enterprises create the smallest number of jobs compared to other voivodeships. The overall entrepreneurial activity is also more minor in Eastern Poland.<sup>162</sup>

The support of small and medium enterprises from the European resources in the period of focus seems to be tilted more in favour of the large enterprises than is usual. Outside the Eastern Poland voivodeships, the large enterprises were rewarded 47.5% of the allocation within the private sector. In Eastern Poland, their support was approximately 36%. Thus, in compliance with Gajewski's findings, the investments in Eastern Poland are more explicitly targeting micro and small enterprises than in other voivodeships and especially so at the expense of the large enterprises of Eastern Poland.

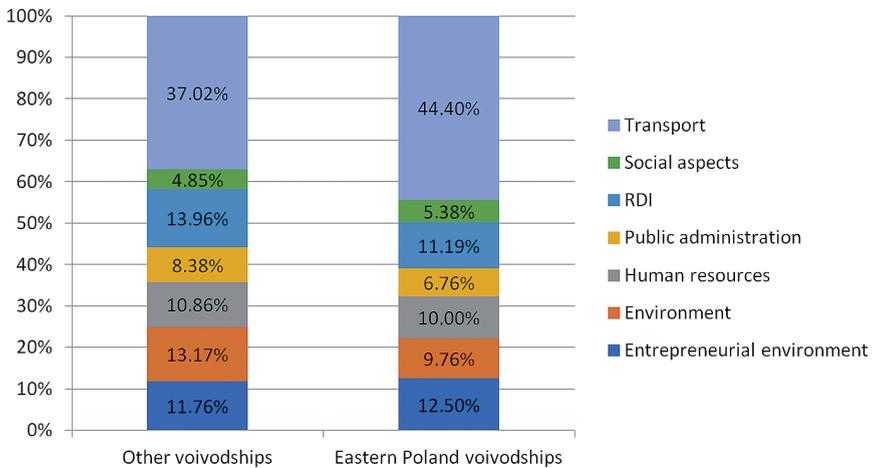
The thematic focus of the structural and cohesion fund investments through all the sectors is illustrated in Figure 3, which cements that Poland focuses strongly on the topic of transport infrastructure and services. The strengthened emphasis on the transport issues in Eastern Poland is of somewhat systemic origin. In the strategic documents, the importance of creating quality infrastructure connecting Eastern Poland with the other parts of the country is often mentioned and strongly encouraged. It even appears in Gajewski's<sup>163</sup> recommendation for strengthening the small and medium enterprises in Eastern Poland. The other thematic categories show a similar share of investments in and outside Eastern Poland. The most significant differences are in the area of environmental issues and RDI investments, which are both somewhat downplayed in Eastern Poland.

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<sup>162</sup> P. Gajewski, *Poziom i dynamika rozwoju małej i średniej przedsiębiorczości w Polsce Wschodniej*, 2011. Available from: [http://www.mrr.gov.pl/rozwoj\\_regionalny/Polityka\\_regionalna/Strategia\\_rozwoju\\_polski\\_wschodniej\\_do\\_2020/Dokumenty/Documents/MSP\\_2810.pdf](http://www.mrr.gov.pl/rozwoj_regionalny/Polityka_regionalna/Strategia_rozwoju_polski_wschodniej_do_2020/Dokumenty/Documents/MSP_2810.pdf) (referred on 10/04/2015).

<sup>163</sup> P. Gajewski, *Poziom i dynamika rozwoju małej i średniej przedsiębiorczości w Polsce Wschodniej*, 2004. Available from: [http://www.mrr.gov.pl/rozwoj\\_regionalny/Polityka\\_regionalna/Strategia\\_rozwoju\\_polski\\_wschodniej\\_do\\_2020/Dokumenty/Documents/MSP\\_2810.pdf](http://www.mrr.gov.pl/rozwoj_regionalny/Polityka_regionalna/Strategia_rozwoju_polski_wschodniej_do_2020/Dokumenty/Documents/MSP_2810.pdf) (referred on 10/04/2015).

Figure 3. Thematic support in Polish voivodeship types



Source: Authors based on the List of Beneficiaries published by the Polish Ministry of Infrastructure and Development.

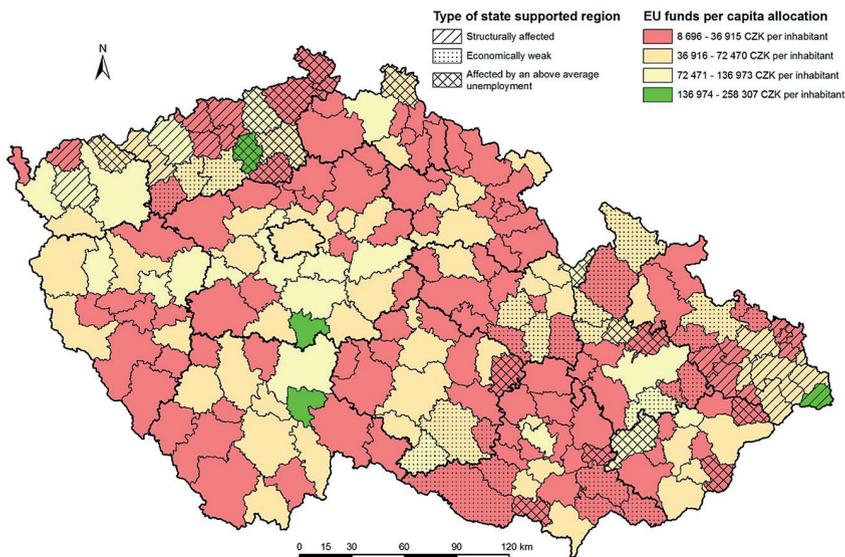
### 3.2. The Czech Republic

The focus on regions with full state support, which were delimited as intervention areas in the Czech Republic, is not as explicitly promoted as in Poland, where the areas of interest acquired their own operational programme. Their position is more evident at the level of individual calls for proposals (see Smékalová for a more in-depth analysis of the Operational Programme Entrepreneurship for Innovation<sup>164</sup>). Altogether the state-supported regions have claimed 30.1% of all allocated resources (CZK 153.1 billion) in the reference period. The rest was spent in the other regions making them notably more successful in terms of the total sum of the awarded allocation. This situation stems from the fact that other regions represent the economically more advanced areas and, as such, attract and absorb a larger share of the allocation, which heavily hints at problems concerning absorption capacity in the state-supported regions.

<sup>164</sup> L. Smékalová, *Support of SMEs from Operational Program Enterprise and Innovation*, *Littera Scripta*, Vol. 5, No 2, 2012, pp. 15–26.

Per capita conversion of the spent allocation is shown in Figure 4, and while there are regions that belong among the state-supported and have attracted a fair share of the European Union resources, the majority of them belong to the below-average supported. Also, generally, the regions which are among the most supported ones lie along the routes of major transport infrastructure constructions. Moreover, among some of the least supported belong especially those economically weak regions located peripherally in a geographical sense, both at the state borders and at the internal borders of the administrative regions of the Czech Republic.

Figure 4. European Union per capita allocation in Czech municipalities with extended scope of powers



Source: Authors based on the Centre of Regional Development of the Czech Republic and the List of Beneficiaries published by the Ministry of Regional Development.

The share of the four identified sectors on the total allocation is depicted in Table 3 and Figure 5. The difference between Poland and the Czech Republic in the supported areas lies in a more considerable involvement of central government institutions and lesser activity of the local government institutions. More significant differences are in non-supported regions, where the activity of the Polish central govern-

ment is relevantly lower than Czech, giving more space to the local governments but especially to the private sector whose share of investments in the non-supported regions exceeds that of the Czech private sector by 10%. The activity of non-governmental, non-profit organisations is of moderately more substantial importance in the Czech Republic than in Poland. Still, this sector represents the smallest share of allocation primarily due to administrative burden.<sup>165</sup>

Table 3. Involvement of the four institutional sectors in project implementation (billion CZK)

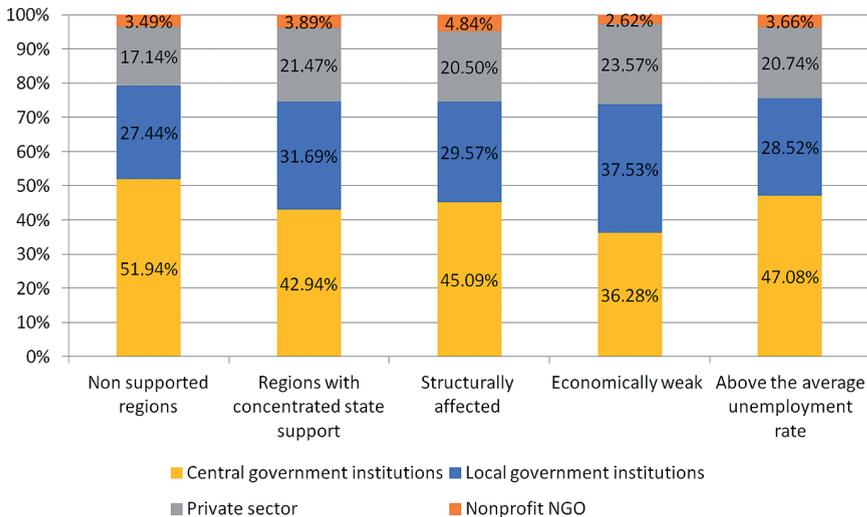
Institutional sector	Non supported regions	Regions with concentrated state support			
		Total	1*	2*	3*
Central government institutions	97.58	48.52	20.74	17.16	10.62
Local government institutions	12.40	5.96	3.39	1.20	1.37
Non-profit nongovernmental organizations	60.94	32.88	14.37	10.78	7.73
Private sector	184.70	65.75	31.62	16.59	17.54
Total	355.62	153.12	70.13	45.73	37.26

\* 1 – Structurally affected regions, 2 – Economically weak regions, 3 – Regions with above the average unemployment rate

Source: Authors based on the Centre of Regional Development of the Czech Republic and the List of Beneficiaries published by the Ministry of Regional Development.

<sup>165</sup> M. Dąbrowski, *Structural funds as a driver for institutional change in Poland*, Europe-Asia Studies, Vol. 60, No 2, 2008, pp. 227–248.

Figure 5. The share of the institutional sectors on the amount of the allocation, the Czech Republic



Source: Authors based on the Centre of Regional Development of the Czech Republic and List of Beneficiaries published by the Ministry of Regional Development.

As with Poland, the activity of small and medium enterprises is of interest to the Czech government even though Belás et al.<sup>166</sup> indicate that the entrepreneurs in question do not believe the government understands their needs correctly. They are burdened by a relatively complicated system of taxes.<sup>167</sup> Their share on private sector allocation amounts to 75% and is equivalent in all region types. There is, however, a greater difference between the Czech Republic and Poland, where on average large enterprises are gaining a larger share of financial support in Poland than in the Czech Republic.

The thematic structure of allocation within the regions is shown in Figure 6, indicating some differences between the supported regions and the non-supported regions. The most significant visible distinction is evident in transport issues, which is a very prominent topic within

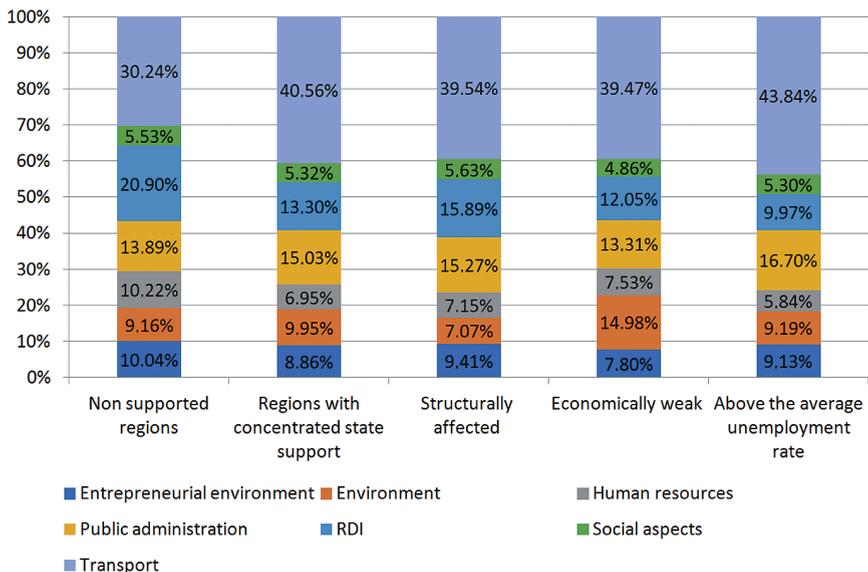
<sup>166</sup> J. Belás, Y. Bilan, V. Demjan, J. Sipko, *Entrepreneurship in SME Segment...*, pp. 308–326.

<sup>167</sup> M. Paseková, J. Strouhal, L. Alver, A. Praulinš, *Comparative analysis of tax systems: Some evidence from CEE countries*, in: *Proceedings of World Academy of Science, Engineering and Technology*, Vol. 77, 2011, pp. 840–846.

the state-supported regions, especially at the expense of research and development projects. Other thematic differences are primarily minor, perhaps except for the human resources investments, which are slightly larger in non-supported (e.g. economically stronger) regions where infrastructural projects are perhaps of minor importance.

The differences between the Czech Republic and Poland are moderate, manifesting mainly how voivodeships outside Eastern Poland focus more strongly on transport issues. Approximately the same share of support is absent in the research, development and innovation support compared to the Czech Republic. Furthermore, the support of effective public administration is of less importance in Poland. In general, the excess share of resources targets the direct support of the entrepreneurial environment.

Figure 6. Thematic support in types of Czech municipalities with extended scope of powers



Source: Authors based on the Centre of Regional Development of the Czech Republic and List of Beneficiaries published by the Ministry of Regional Development.

## Conclusion

This chapter deals with the topic of spatial dispersion of the European Union resources allocated by means of the cohesion policy financial instruments to the Czech Republic and Poland, particularly with their distribution among regions that are declaratorily targeted by the respective governments. There are significant differences in definitions of those areas as the Czech Republic targets economically weaker regions with the prospect of improving their situation just as Poland does. However, they delimitate these areas on vastly different administrative levels. In the Czech Republic, those regions are delimited on the LAU1 level corresponding to national districts and on the level of municipalities with extended scopes of power corresponding to no NUTS unit directly but containing several LAU2 units. In Poland, the intervention areas fully correspond with NUTS 2 units, which conform to the Polish self-governing voivodeships.

While these approaches are different on the spatial level, they do not significantly differ in the nature of targeted areas which are economically the weakest parts of respective countries. It is necessary to say that the means to delimitate these areas differ in both countries. Still, the results are not similar in both countries. These areas have a lesser share of allocation of the EU resources spent in the reference period in the Czech Republic rather than in Poland. The results of the Czech Republic are somewhat ambiguous as the regions with the full state support are not so apparently promoted in the operational programmes documents as the leading beneficiaries from the cohesion policy except for a single operational programme targeting the entrepreneurs. The Polish situation is much more optimistic for the targeted economically weak voivodeships as they already belong to the most supported category. Moreover, there are yet resources reserved exclusively for Eastern Poland that are still to be spent within the frame of Operational Programme Development of Eastern Poland and the regional operational programmes out of which each targets single voivodeships. Considering the systematic approach the Polish government has chosen, it is prudent

to say their goals concerning the support of Eastern Poland will most likely be met more adequately than in the Czech Republic. The approach that allocated a certain amount of national cohesion policy allocation ex-ante to supported regions is rather encouraging in terms of certainty of the potential beneficiaries and the local governing bodies. There is, however, also a worrying finding that concerns the thematic dispersion of the Union support among the economically vulnerable and relatively more robust regions that is noticeable in both countries. The economically weaker regions are the site of implementation to the significantly different thematic structure of projects that we could describe as connected with the basic infrastructure. The activities of higher added value are implemented prevalently in economically more vital regions. Given this situation, the easing of interregional disparities within both countries seems unlikely.



# **Chapter 3**

The Changing  
Determinants  
of New Business  
Formation  
in the Czech Republic



**Abstract:** This chapter is concerned with the connection between new business formation rates and their theoretically substantiated regional determinants, using regression modelling. The dynamics of new business formation is evaluated by comparing the influence of regional determinants in two time periods – 2001–2002 and 2011–2012. The Czech Republic is the area of interest. Empirical results indicate the coexistence of persistent and changing influences of regional determinants on new business formation. Furthermore, the quality of the entrepreneurial environment, industrial diversity and population change have a persistent and positive impact on new business formation. There is also a positive connection between agglomeration economies and new business formation. Moreover, the increasing influence of agglomeration economies is indicated. In addition, the presence of foreigners is not a statistically significant determinant of new business formation in the 2001–2002 models. Nevertheless, the importance of this determinant is increasing. Also, it is suggested that unemployment vulnerability has a negative impact on new business formation but has an increasing importance on entrepreneurship in disadvantaged regions. Finally, spatial interactions are an inevitable part when considering the determinants of new business formation.

**Keywords:** entrepreneurship, new business formation, determinants of new business formation, regression analysis, the Czech Republic

## Introduction

The discussion on the relationship between entrepreneurship and economic development is historically embedded (see, e.g., Acs et al.). Acs et al.<sup>168</sup> distinguish two periods of this discussion. The first period, efficiency-driven, attributes the decisive importance of economic development to large firms. The second period, innovation-driven, beginning in the 1970s, emphasises the strengthening role of small and medium enterprises – quite to the contrary. Several reasons are given to explain this shift. The first reason, the importance of economies of scale has been weakened in more uncertain global markets since the 1970s. Secondly, technological change and flexibility have become crucial factors of economic development. Thirdly, the service sector share of developed economies has significantly grown (see, e.g., Acs et al.,<sup>169</sup> Baptista et al.<sup>170</sup>). All these reasons favour small and medium enterprises that are perceived as the new engines of economic development. Consequently, there is more interest in forming new businesses.

Traditionally, politicians speak about the positive association between new business formation and economic development. There are clear favourable impacts of new business formation on employment, competitiveness and innovation (see, e.g., Acs;<sup>171</sup> Fritsch<sup>172</sup>). Note that this idea is the sole essence of entrepreneurship policies. Acs<sup>173</sup> points out more complex relations between new business formation and economic development. These relations might be either positive or negative,

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<sup>168</sup> Z.J. Acs, S. Desai, J. Hessels, *Entrepreneurship, Economic Development and Institutions*, Small Business Economics, Vol. 31, No 3, 2008, pp. 219–234.

<sup>169</sup> Ibidem.

<sup>170</sup> R. Baptista, V. Escária, P. Madruga, *Entrepreneurship, Regional Development and Job Creation: The Case of Portugal*, Small Business Economics, Vol. 30, No 1, 2008, pp. 49–58.

<sup>171</sup> Z.J. Acs, *How is Entrepreneurship Good for Economic Growth*, Innovations, Vol. 1, No 1, 2006, pp. 97–107.

<sup>172</sup> M. Fritsch, *The Effect of New Business Formation on Regional Development. Empirical Evidence, Interpretation, and Avenues for Further Research*, in: M. Fritsch (Ed.), *Handbook of Research on Entrepreneurship and Regional Development*, Edward Elgar, Cheltenham 2011, pp. 58–106.

<sup>173</sup> Z.J. Acs, *How is Entrepreneurship...*, pp. 97–107.

either direct or indirect (see, e.g., van Stel and Suddle;<sup>174</sup> Fritsch<sup>175</sup>). New job creation resulting directly from the new business formation is one direct positive effect. Job loss resulting from increasing competition and productivity is regarded as a direct negative effect. Indirect effects include increasing productivity, more innovations, introducing those innovations, opening new markets, and structural changes (see, e.g., van Stel and Suddle;<sup>176</sup> Fritsch<sup>177</sup>). Moreover, all the direct and indirect effects might be time-lagged, complicating the reasoning (see, e.g., van Stel and Suddle<sup>178</sup>). Accordingly, scholarly literature is not unanimous about the impact of new business formation on economic development. Nevertheless, Fritsch<sup>179</sup> speaks about sufficient evidence on the positive impact of new business formation on economic development. Research then becomes highly relevant on the determinants of new business formation.

This chapter reflects how relevant these issues are and evaluates the connection between new business formation rates and their theoretically substantiated determinants at the sub-national level. The area of interest is the Czech Republic and its regions. Moreover, this chapter concerns the dynamics of new business formation in the Czech Republic, comparing the importance of specific determinants in two time periods – at the start of the first and second decades of the 21<sup>st</sup> century. There are many studies that deal with this issue in the United States and Western Europe (see, e.g., Armington and Acs;<sup>180</sup> Lee et al.;<sup>181</sup> Sutaria and Hicks;<sup>182</sup> Anderson and Koster;<sup>183</sup> Bishop<sup>184</sup>). Research on the determinants of new business formation in post-socialist countries is, on the contrary, quite

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<sup>174</sup> A. van Stel, K. Suddle, *The impact of new firm...*, pp. 31–47.

<sup>175</sup> M. Fritsch, *The Effect of New Business Formation...*, pp. 58–106.

<sup>176</sup> A. van Stel, K. Suddle, *The impact of new firm...*, pp. 31–47.

<sup>177</sup> M. Fritsch, *The Effect of New Business Formation...*, pp. 58–106.

<sup>178</sup> A. van Stel, K. Suddle, *The impact of new firm...*, pp. 31–47.

<sup>179</sup> M. Fritsch, *The Effect of New Business Formation...*, pp. 58–106.

<sup>180</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>181</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>182</sup> V. Sutaria, D.A. Hicks, *New firm formation...*, pp. 241–262.

<sup>183</sup> M. Anderson, S. Koster, *Sources of persistence...*, pp. 179–201.

<sup>184</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

scarce (see, e.g., Lafuente and Vaillant;<sup>185</sup> Fritsch et al.;<sup>186</sup> Smékalová et al.;<sup>187</sup> Hájek et al.;<sup>188</sup> Belás et al.;<sup>189</sup> for some exceptions). This chapter contributes to this scarce, limited knowledge. Its goal is to evaluate the changing influence of theoretically substantiated determinants on new business formation in the Czech Republic from May 2001 to April 2002 and from May 2011 to April 2012. The chapter is structured as follows: the second section introduces the theoretical framework. The third section presents data and research methods. The fourth section summarizes empirical results that are discussed in the following section. Finally, the last section gives a conclusion.

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<sup>185</sup> E. Lafuente, Y. Vaillant, *Regional Differences in New Firm Formation: Evidence from Romania*, Centre for Entrepreneurship & Business Research Working Paper Series No 1, 2010, pp. 1–36.

<sup>186</sup> M. Fritsch, E. Bublitz, A. Sorgner, M. Wyrwich, *How Much of a Socialist Legacy? The Re-Emergence of Entrepreneurship in the East German Transformation to a Market Economy*, *Small Business Economics*, Vol. 43, No 2, 2014, pp. 427–446.

<sup>187</sup> L. Smékalová, O. Hájek, J. Belás, J. Macháček, *Perception of Small and Medium Entrepreneurship in the Czech Republic*, *Journal of Competitiveness*, Vol. 6, No 4, 2014, pp. 41–49.

<sup>188</sup> O. Hájek, J. Nekolová, J. Novosák, *Determinants of New Business Formation – Some Lessons from the Czech Republic*, *Economics and Sociology*, Vol. 8, No 1, 2015, pp. 147–156.

<sup>189</sup> J. Belás, V. Demjan, J. Habánik, M. Hudáková, J. Šipko, *The Business Environment of Small and Medium-Sized Enterprises in Selected Regions of the Czech Republic and Slovakia*, *Ekonomie a management*, Vol. 18, No 1, 2015, pp. 95–110.

## Theoretical Framework

The thesis of a positive relationship between new business formation and economic development was mentioned in the introduction to this chapter. Moreover, new business formation is a regionally uneven process. Some regions are more successful in forming businesses, which increases development potential. Therefore, interest in assessing determinants of new business formation is relevant for both scientific and political reasons (see, e.g., Wagner and Sternberg<sup>190</sup>). Note that the influence of these determinants differs across regions. Consequently, there is no one-size-fits-all solution for entrepreneurship development (see, e.g., Wagner and Sternberg<sup>191</sup>).

Research on determinants of new business formation has been embedded in several theoretical frameworks. Agglomeration economies are the first framework of our interest. Audretsch and Fritsch<sup>192</sup> and Van Stel and Suddle<sup>193</sup> point out the positive relationship between agglomeration economies and new business formation. This is based on mechanisms such as the market size, market growth dynamics, a pooled labour market, pecuniary externalities and knowledge spillovers. Note that the idea of knowledge spillovers is based on the assumption that new knowledge is not entirely commercialized by its developer. Thus, market opportunities arise from the knowledge that is not utilized (see, e.g., Audretsch et al.<sup>194</sup>). The industrial structure of regional economies further influences new business formation because some industries are more dynamic in new business formation than others. Moreover, the importance of industrial structure is also related to considering the influence of regional special-

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<sup>190</sup> J. Wagner, R. Sternberg, *Start-Up Activities, Individual Characteristics, and the Regional Milieu: Lessons for Entrepreneurship Support Policies from German Micro Data*, *The Annals of Regional Science*, Vol. 38, No 2, 2004, pp. 219–240.

<sup>191</sup> *Ibidem*.

<sup>192</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm...*, pp. 359–365.

<sup>193</sup> A. van Stel, K. Suddle, *The impact of new firm...*, pp. 31–47.

<sup>194</sup> D.B. Audretsch, D. Dohse, A. Niebuhr, *Cultural Diversity and Entrepreneurship: a Regional Analysis for Germany*, *Annals in Regional Science*, Vol. 45, No 1, 2010, pp. 55–85.

ization and regional diversification. Fotopoulos<sup>195</sup> and Delfmann et al.<sup>196</sup> note the positive impact of regional specialization on new business formation because of the strong agglomeration economies in one industry. The alternative viewpoint postulates that regional specialization contributes only to imitation behaviour. Regional diversification is therefore preferred. It is claimed that regional diversification develops diversified and complementary knowledge that is supportive in the search for and utilization of market opportunities (see, e.g., Audretsch et al.<sup>197</sup>).

The theory of entrepreneurial choice is another theoretical framework relevant for explaining regional differences in new business formation (see, e.g., Evans and Jovanovic<sup>198</sup>). Spatially, this framework is related to considering the quality of the entrepreneurial environment. Thus, an individual's decision to become an entrepreneur is influenced by the environment around them; simultaneously, such decisions contribute to changing the entrepreneurial environment. At the heart of the theory of entrepreneurial choice is a potential entrepreneur choosing between two employment strategies – wage-work and self-employment (see, e.g., Verheul et al.<sup>199</sup>). The final decision is based on comparing potential wage income and income from self-employment (see, e.g., Evans and Jovanovic<sup>200</sup>; Burke et al.<sup>201</sup>) regarding the theory of an individual's utility maximization (see, e.g., Verheul et al.<sup>202</sup>). Moreover, evaluating an individual's utility is moreover influenced by various determinants related to both the individual's personality and the individual's entrepreneurial environment. These determinants may be summarized as follows:

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<sup>195</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>196</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>197</sup> D.B. Audretsch, D. Dohse, A. Niebuhr, *Cultural Diversity...*, pp. 55–85.

<sup>198</sup> D.S. Evans, B. Jovanovic, *An Estimated Model...*, pp. 808–827.

<sup>199</sup> I. Verheul, S. Wennekers, D. Audretsch, R. Thurik, *An Eclectic Theory of Entrepreneurship: Policies, Institutions and Culture*, in: D.B. Audretsch (Ed.), *Entrepreneurship: Determinants and Policy in a European-US Comparison*, Springer, Berlin 2002, pp. 11–81.

<sup>200</sup> D.S. Evans, B. Jovanovic, *An Estimated Model...*, pp. 808–827.

<sup>201</sup> A.E. Burke, F.R. Fitzroy, M.A. Nolan, *When less is more...*, pp. 565–587.

<sup>202</sup> I. Verheul, S. Wennekers, D. Audretsch, R. Thurik, *An Eclectic Theory...*, pp. 11–81.

- Scholarly literature often cites human capital as a determinant of new business formation. Lee et al.,<sup>203</sup> Bishop<sup>204</sup> and Anselin et al.<sup>205</sup> point out the positive relationship between the quality of human capital and new business formation. Bishop<sup>206</sup> and Fotopoulos<sup>207</sup> give the rationale for this relationship: the quality of human capital, proxied for instance by the level of education, positively influences an individual's ability to perceive, evaluate and exploit entrepreneurial opportunities. However, there is also the other side of the coin. Namely, better educated and skilled individuals tend to have higher wages. For these people, starting your own business might be accordingly connected with risking income loss. Consequently, entrepreneurship is not necessarily the most attractive life strategy for them.
- Scholarly literature also often cites unemployment as another determinant of new business formation. However, the impact of unemployment on new business formation is somewhat ambiguous. Unemployed people, including foreigners, might be perceived as a comprehensive source of potential entrepreneurs. In this case, the income from entrepreneurship is higher than social assistance for the unemployed. Entrepreneurship is then a way of escaping unemployment (see, e.g., Cheng and Li<sup>208</sup>). Nevertheless, unemployment also reduces purchasing power and the size of internal markets. Unemployment, therefore, indicates some structural disadvantage in regional economies. Then, potential entrepreneurs might be discouraged from entering the market (see, e.g., Audretsch and Fritsch,<sup>209</sup> Delfmann et al.,<sup>210</sup> Fotopoulos<sup>211</sup>).

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<sup>203</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>204</sup> Ibidem.

<sup>205</sup> L. Anselin, A. Varga, Z.J. Acs, *Local Geographic Spillovers between University Research and High Technology Innovations*, *Journal of Urban Economics* Vol. 42 No 3, 1997, pp. 422–448.

<sup>206</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>207</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>208</sup> S. Cheng, H. Li, *New Firm Formation Facing Cultural and Racial Diversity*, *Papers in Regional Science*, Vol. 91, No 4, 2012, pp. 759–774.

<sup>209</sup> D.B. Audretsch, M. Fritsch, *The Geography of Firm...*, pp. 359–365.

<sup>210</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>211</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

- An individual's decision to start a new business is further influenced by his/her degree of risk aversion, individualism and dissatisfaction with the current labour market position. Scholarly literature evaluates potential entrepreneurs' characteristics and their impact on new business formation. These characteristics include, among others, gender, age, marital status, ethnic status and nationality (see, e.g., Cowling and Taylor;<sup>212</sup> Delfmann et al.<sup>213</sup>). Audretsch et al.<sup>214</sup> emphasize the positive impact of cultural/social diversity on new business formation. They claim that the accumulation of a pool of culturally/socially diverse knowledge and skills enhances the likelihood of exploiting market opportunities. Note that an inferior position in the labour market because of gender, age, language, or cultural differences may push people to start a new business.
- Scholarly literature also shows how employment history is another determinant of new business formation (see, e.g. Stam<sup>215</sup>). For example, Bishop,<sup>216</sup> Armington and Acs<sup>217</sup> claim that employees of large firms are less likely to start a new business than employees of small firms, reflecting the fact that employees of small firms are better equipped with entrepreneurship skills. A more diversified workload and imitative behaviour in small firms are of importance in this regard. Moreover, small-firm employment is more susceptible to economic fluctuations than large firm employment (see, e.g., Fotopoulos<sup>218</sup>). However, Sutaria and Hicks<sup>219</sup> note that large firms may also have stimulating effects on regional entrepreneurship because they are embedded in the local economy.

Finally, the path dependence theory of evolutionary economic geography is another concept relevant to research on the determinants of new business formation (see, e.g., Fritsch and Mueller;<sup>220</sup> Anderson and

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<sup>212</sup> M. Cowling, M. Taylor, *Entrepreneurial women...*, pp. 167–175.

<sup>213</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>214</sup> D.B. Audretsch, D. Dohse, A. Niebuhr, *Cultural Diversity...*, pp. 55–85.

<sup>215</sup> E. Stam, *Entrepreneurship, evolution and geography...*, pp. 307–348.

<sup>216</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>217</sup> C. Armington, Z.J. Acs, *The Determinants of Regional...*, pp. 33–45.

<sup>218</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>219</sup> V. Sutaria, D.A. Hicks, *New firm formation...*, pp. 241–262.

<sup>220</sup> M. Fritsch, P. Mueller, *The Persistence of Regional...*, pp. 299–315.

Koster;<sup>221</sup> Fotopoulos<sup>222</sup>). As mentioned above, an individual's decision to become an entrepreneur is influenced by the entrepreneurial environment surrounding them. This environment consists of cultural, social, economic and institutional elements such as values, opinions, norms, traditions, capital availability, governance and others (see, e.g., Malecki;<sup>223</sup> Davidsson and Wiklund;<sup>224</sup> Wagner and Sternberg;<sup>225</sup> Devereux et al.;<sup>226</sup> Brühlhart et al.;<sup>227</sup> Delfmann et al.;<sup>228</sup> Belás et al.;<sup>229</sup> Belás et al.<sup>230</sup>). These elements are very stable, changing only slowly in time. Therefore, the determinants of new business formation are also changing slowly, resulting in persisting regional disparities in new business formation (see, e.g., Anderson and Koster;<sup>231</sup> Fotopoulos<sup>232</sup>). Overall, the quality of the entrepreneurial environment measured by new business formation influences new business formation in subsequent years. Spatial spillovers may strengthen this persistence (see, e.g., Anderson and Koster;<sup>233</sup> Fotopoulos<sup>234</sup>).

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<sup>221</sup> M. Anderson, S. Koster, *Sources of persistence...*, pp. 179–201.

<sup>222</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>223</sup> E.J. Malecki, *Entrepreneurship in Regional and Local Development*, International Regional Science Review, Vol. 16, No 1–2, 1993, pp. 119–153.

<sup>224</sup> P. Davidsson, J. Wiklund, *Values, beliefs and regional...*, pp. 179–199.

<sup>225</sup> J. Wagner, R. Sternberg, *Start-Up Activities...*, pp. 219–240.

<sup>226</sup> M.P. Devereux, R. Griffith, H. Simpson, *Firm Location Decision, Regional Grants and Agglomeration Externalities*, Journal of Public Economics, Vol. 91, No 3–4, 2007, pp. 413–435.

<sup>227</sup> M. Brühlhart, M. Jametti, K. Schmidheiny, *Do Agglomeration Economies Reduce the Sensitivity of Firm Location to Tax Differentials*, The Economic Journal, Vol. 122, No 563, 2012, pp. 1069–1093.

<sup>228</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>229</sup> J. Belás, Y. Bilan, V. Demjan, J. Sipko, *Entrepreneurship in SME Segment...*, pp. 308–326.

<sup>230</sup> J. Belás, Y. Bilan, P. Novák, J. Sipko, *Selected Aspects of Quality of Business Environment in Segment SME. A Case Study from Slovakia*, in: E. Pastuszková (Ed.), *Proceedings of the 7<sup>th</sup> International Scientific Conference Finance and Performance of Firms in Science, Education and Practice*, Tomas Bata University in Zlin, Zlin 2015, pp. 68–80.

<sup>231</sup> M. Anderson, S. Koster, *Sources of persistence...*, pp. 179–201.

<sup>232</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

<sup>233</sup> M. Anderson, S. Koster, *Sources of persistence...*, pp. 179–201.

<sup>234</sup> G. Fotopoulos, *On the spatial stickiness...*, pp. 651–679.

## Data and Methods

The goal of this chapter is to evaluate the changing influence of theoretically substantiated determinants on new business formation in the Czech Republic in the periods from May 2001 to April 2002 (hereafter referred to as the period 2001–2002) and from May 2011 to April 2012 (hereafter referred to as the period 2011–2012). Multiple regression modelling was used to meet the goal. New businesses were defined as both legal entities (firms) and physical entities, with the status of an entrepreneur. All variable values were assigned to the so-called administrative districts of municipalities with extended power (hereafter referred to as MEPs). These districts are administrative-territorial units corresponding to the areas between LAU1 and LAU2 levels.

The dependent variable of all regression models is the number of newly established businesses in the periods 2001–2002 and 2011–2012, divided by 10,000 economically active people to account for the different size of MEPs (NEW\_BUSS). This definition follows the so-called labour-market approach, which perceives all economically active people as potential entrepreneurs (see, e.g., Delfmann et al.<sup>235</sup>). There is an alternative, the so-called ecological approach, which uses the number of businesses as a denominator. However, this approach is biased by different average sizes of businesses. Therefore, scholarly literature prefers the labour-market approach (see, e.g., Bishop<sup>236</sup>). Two techniques were used to reduce the impact of outliers. First, the Empirical Bayes smoothing technique was applied to solve the problem of spurious outliers. These are MEPs, where the extreme rate is likely due to a small economically active population (see, e.g., Anselin et al.<sup>237</sup>). Secondly, the dependent variable was logarithmically transformed to correct the excessive positive skew (LN\_NEW\_BUSS). The data were obtained from the official Statistical Business Register of the Czech Statistical Office (hereafter referred to as SBRCOS) concerning the situation in 2002 and 2012.

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<sup>235</sup> H. Delfmann, S. Koster, P. McCann, J. Van Dijk, *Population change...*, pp. 1034–1050.

<sup>236</sup> P. Bishop, *Knowledge, Diversity and Entrepreneurship...*, pp. 641–660.

<sup>237</sup> L. Anselin, Y.W. Kim, I. Syabri, *Web-Based Analytical Tools for the Exploration of Spatial Data*, *Journal of Geographical Systems*, Vol. 6, No 2, 2004, pp. 197–218.

The choice of explanatory variables was motivated by using the theoretical framework from section 1. All explanatory variables relate to the years 2000 and 2010, or to the beginning of the years 2001 and 2011, to avoid the problem of endogeneity. The variables are defined as follows:

- The first explanatory variable is population density (DENSITY). This variable is often used as a proxy for agglomeration economies. Densely populated areas benefit from their market size, pooled labour market, pecuniary externalities and technological and information spillovers. Moreover, the impact of population dynamics is evaluated by the second explanatory variable, namely, population change between the years 1996 and 2000, and 2006 and 2010 (POP\_CHANGE). The data for both variables were obtained from the Czech Statistical Office (hereafter referred to as CSO).
- The Theil index for eleven NACE1 industries is the third explanatory variable. The relationship between industrial diversification of regional economies and new business formation is evaluated using this variable. The Theil index (IND\_DIVERSITY) is defined as:

$$TI_i = - \sum_{j=1}^n s_{ij} \times \ln s_{ij} \quad (1),$$

whereby  $s_{ij}$  expresses the share of employment in industry  $j$  in MEP  $i$  (see, e.g., Audretsch et al.<sup>238</sup>). Note that the higher the  $TI$ , the more diversified the MEP's economy. The data for the variable was obtained from the census of population and housing in the Czech Republic in the years 2001 and 2011 (hereafter referred to as Census 2001 and Census 2011).

- The three further explanatory variables relate to the theory of entrepreneurial choice. Firstly, the quality of human capital is expressed as the share of people with tertiary education in the population older than 15 years of age (EDUCATION). Secondly, the unemployment rate is expressed as the number of unemployed people per 100 economically active people (UNEMPLOYMENT). Thirdly, national/ethnic diversity is expressed as the share of the six most common

<sup>238</sup> D.B. Audretsch, D. Dohse, A. Niebuhr, *Cultural Diversity...*, pp. 55–85.

national/ethnic minorities (Germans, Poles, Russians, Slovaks, Ukrainians, and Vietnamese) in the total population (NATIONALITIES). The data for the three variables were obtained from Census 2001 and Census 2011.

- Finally, the last variable – the share of employers and self-employed people within all economically active people (ENTREPRENEUR) – was included as a proxy of the quality of the entrepreneurial environment. The data for the variable were obtained from Census 2001 and Census 2011.

The conceptual approach of this chapter considers mutual interactions between the seven explanatory variables. Therefore, principal component analysis (PCA) was used to form new variables for inclusion into statistical models. The multicollinearity problem was solved in this way. Six components were extracted by PCA and rotated by varimax with Kaiser normalization. This number of components is suitable for retaining the crucial information from the theoretical framework. The rotated solutions for the periods 2001–2002 and 2011–2012 are given in Tables 1 and 2. The components are interpreted by examining their loading on the original explanatory variables.

Table 1. PCA coefficients (Varimax rotation with Kaiser normalization); 2001–2002

Variable	Component's coefficients					
	1	2	3	4	5	6
DENSITY	0.929	-0.084	-0.046	0.198	0.128	0.001
EDUCATION	0.839	-0.027	0.338	-0.229	-0.090	0.160
ENTREPRENEUR	0.116	0.076	0.208	-0.306	-0.154	0.906
IND_DIVERSITY	0.137	0.071	0.961	0.063	-0.066	0.165
NATIONALITIES	0.050	0.005	-0.070	0.198	0.967	-0.131
POP_CHANGE	-0.081	0.993	0.064	-0.023	0.004	0.059
UNEMPLOYMENT	0.032	-0.027	0.070	0.914	0.227	-0.291

Source: Own elaboration based on the CSO and Census 2001 data.

Table 2. PCA coefficients (Varimax rotation with Kaiser normalization); 2011–2012

Variable	Component's coefficients					
	1	2	3	4	5	6
DENSITY	0.941	-0.023	0.001	0.091	0.168	-0.040
EDUCATION	0.761	0.213	0.289	-0.321	-0.058	0.230
ENTREPRENEUR	0.079	0.221	0.264	-0.236	-0.154	0.891
IND_DIVERSITY	0.134	0.204	0.938	-0.030	-0.056	0.224
NATIONALITIES	0.114	0.005	-0.052	0.079	0.981	-0.117
POP_CHANGE	0.082	0.924	0.217	-0.226	0.009	0.200
UNEMPLOYMENT	-0.051	-0.207	-0.029	0.945	0.087	-0.195

*Source:* Own elaboration based on the CSO and Census 2011 data.

The first component (AGGLOMERATION) is strongly associated with population density and education. We regard just these factors as crucial for the presence of agglomeration economies. The second component (POPCHANGE\_QUALITY) is strongly associated with population change, with the other variables influencing the quality of this change. The third component (INDDIVER\_POTENTIAL) primarily relates to the potential created by more or less diversified MEPs' economies. The fourth component (UNEMPLOY\_VULNER) indicates how MEPs are vulnerable to unemployment. The fifth component (FOREIGNERS) characterizes the MEPs with a high share of foreigners. Finally, the sixth component (ENTREP\_ENVIRON) is understood as the quality of the entrepreneurial environment. There is expected to be a positive relationship between the first, second, fifth and sixth components on the one hand, and new business formation on the other hand, in accordance with conclusions from previous research. Scholarly literature has found the influence of the third and fourth components on new business formation as ambiguous.

Multiple regression analysis was used to reveal the influence of the above-mentioned components (determinants) on new business formation in the Czech Republic in the periods 2001–2002 and 2011–2012. Note that MEPs' PCA component scores were computed by standardising the original variables and then entered into a regression analysis as

predictors. Firstly, two cross-section OLS regression models were estimated to determine the effects of particular components on new business formation in the period 2001–2002 (Model 1) and 2011–2012 (Model 2). The OLS regression models had the form:

$$y_i = \alpha_0 + \sum_{l=1}^L \alpha_l COMP_{li} + u_i \quad (2),$$

where  $y_i$  was LN\_NEW\_BUSS in MEP  $i$ ,  $COMP_{li}$  was the explanatory variable  $l$  in MEP  $i$ , and  $u_i$  was the error term. Traditional regression assumptions were checked by referring to the residuals from the fitted models. Shapiro-Wilk and Jarque-Bera tests were used for the normality assumption, and White's test was used for the homoscedasticity assumption. There was no evidence that the normality assumption was violated. However, the regression diagnostics indicated the presence of heteroscedasticity in the residuals. To correct for this heteroscedasticity, robust standard errors were calculated (White's corrections).

Spatial autocorrelation is another concern for biased and inconsistent OLS estimates. Therefore, the presence of spatial autocorrelation was tested using Moran's I and Lagrange Multiplier tests based on the residuals of the OLS regression models (see, e.g., Anselin et al.<sup>239</sup>). These tests confirmed the presence of spatial autocorrelation in our data. To control this effect, spatial regression models were developed. Following the methodology suggested by Anselin and Florax<sup>240</sup> and Anselin et al.<sup>241</sup>, among others, Lagrange Multiplier test statistics were used to form decisions based on the specification of spatial regression models. Thus, the spatial lag models were estimated in the form:

$$y_i = \alpha_0 + \sum_{l=1}^L \alpha_l COMP_{li} + \rho W y_i + u_i \quad (3),$$

where  $\rho$  was a spatial autoregressive coefficient,  $W$  was a spatial weights matrix,  $W y_i$  was the spatial lag term for MEP  $i$ , and the other notation is as stated above. The generalized method of moments with heterosce-

<sup>239</sup> L. Anselin, A.K. Bera, R.J. Florax, M.J. Yoon, *Simple Diagnostic Tests...*, pp. 77–104.

<sup>240</sup> L. Anselin, R.J. Florax, *Small Sample Properties of Tests for Spatial Dependence in Regression Models: Some Further Results*, in: L. Anselin, R.J. Florax (Eds.), *New Directions in Spatial Econometrics*, Springer, Berlin 1995, pp. 21–74.

<sup>241</sup> L. Anselin, A.K. Bera, R.J. Florax, M.J. Yoon, *Simple Diagnostic Tests...*, pp. 77–104.

elasticity consistent (White's corrections) standard errors was applied. Row-standardized first-order queen contiguity weights were used for calculation purposes. Note that the Kelejian-Anselin test did not reveal the presence of residual spatial autocorrelation.

The robustness of findings was further explored using panel regression models that included observations from 2001–2002 and 2011–2012 periods. A new variable (PERIOD) was defined as a dummy variable with a value of "1" if the observation was related to the period 2011–2012. Moreover, interaction terms between the PERIOD variable and the components were added into the models that checked how important particular components changed between the two periods. Thus, the panel regression models were estimated in the form:

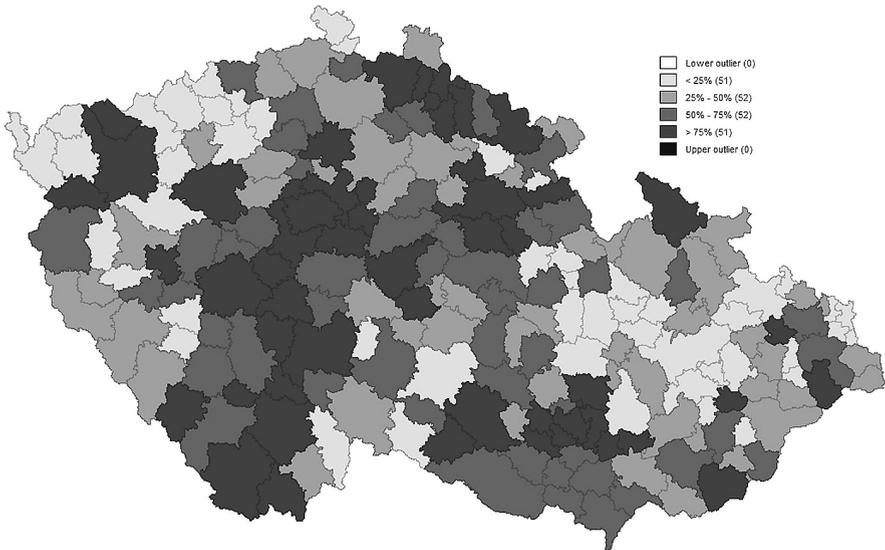
$$y_{it} = \alpha_0 + \sum_{l=1}^L \alpha_l COMP_{lit} + \beta_1 PERIOD_{2011-2012,t} + \delta_m INTERACTION_{mit} + u_{it} \quad (4),$$

where  $y_{it}$  was LN\_NEW\_BUSS in MEP  $i$  and time period  $t$ ,  $COMP_{lit}$  was the explanatory variable  $l$  in MEP  $i$  and time period  $t$ ,  $PERIOD_{2011-2012,t}$  controlled the fixed effects of the year of observations,  $INTERACTION_{mit}$  was the interaction term  $m$  in MEP  $i$  and time period  $t$  and  $u_{it}$  was the error term. Note that panel regression models were estimated using OLS with heteroscedasticity consistent (White's corrections) standard errors.

## Empirical Results

Figures 1 and 2 provide introductory information about spatial differentiation of new business formation at the MEP level. Figure 1 (period 2001–2002) demonstrates the presence of spatial clusters of high and low new business formation rates. The largest agglomerations (e.g. Prague and Brno agglomerations) belong to the former type of spatial clusters. However, high values are also indicated for some peripheral border territories. On the contrary, low business formation rates are typical for the so-called structurally affected regions in parts of north-western Bohemia, northern Moravia, and for the inner periphery near the Bohemia-Morava borders.

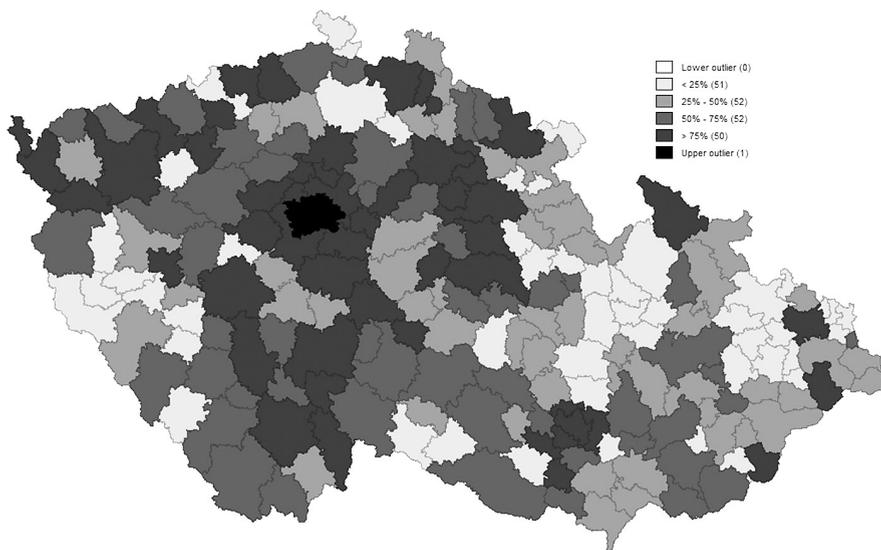
Figure 1. New business formation in the period 2001–2002 (LN\_NEW\_BUSS); MEPs



Source: Own elaboration based on SBR CSO and CSO data.

Some changes can be noticed in Figure 2 (period 2011–2012). Firstly, the position of the largest agglomerations was strengthened. Secondly, while the low values of structurally affected regions in northern Moravia remained unchanged, new business formation rates of structurally affected regions in north-western Bohemia increased significantly. The value of Moran's I, statistically significant at the 0.01 level, provides further support for the existence of spatial clusters of high and low new business formation rates (see Table 3).

Figure 2. New business formation in the period 2011–2012 (LN\_NEW\_BUSS); MEPs



Source: own elaboration based on the SBR CSO and CSO data.

Table 3. Moran's I for new business formation rates (LN\_NEW\_BUSS); MEPs

	2001–2002	2011–2012
Moran's I	0.3354**	0.2908**

Note: \*\* significant at the 0.01 level

Source: Own elaboration based on the SBR CSO and CSO data.

Cross-section regression model results are summarized in Table 4. Note that the results of OLS regression models and also spatial lag regression models are included in Table 4. The regression coefficient estimates indicate a positive and statistically significant connection between agglomeration economies, the quality of the entrepreneurial environment and also the quality of population change on the one hand, with the new business formation on the other hand in each model except the quality of population change in the 2011–2012 spatial lag regression model. This is in accord with expectations. The positive relationship between the share of foreigners in the population and new business formation was confirmed in the 2011–2012 models but not in the 2001–2002 models. Moreover, the positive relationship is only statistically significant in the OLS regression model. Unemployment vulnerability has a negative influence on new business formation in all these models. However, this influence is only statistically significant in the 2001–2002 models. Finally, the regression coefficient estimates indicate a positive and statistically significant connection between the potential industrial diversity and new business formation in all models.

The value of Moran's I is positive and statistically significant at the 0.01 level in both OLS regression models, indicating the presence of spatial autocorrelation in the OLS residuals. This is supported by a positive and statistically significant spatial autoregressive coefficient in both spatial lag models, suggesting that there is a spatial dependence among new business formation rates. Thus, new business formation in an MEP is influenced by the characteristics of neighbouring MEPs. When comparing OLS with spatial lag regression results, some additional insights might be gained. Firstly, the quality of population change is not statistically significant in the 2011–2012 spatial lag regression model. Residential suburbanization seems to be necessary in order to understand this

finding because spatial interactions increase based on an individual's decision to locate a new business in a core MEP and to locate to live in its hinterland. Secondly, the share of foreigners in the population is statistically significant in the 2011–2012 OLS regression model but not in the spatial lag regression model. Therefore, it seems that the share of foreigners positively influences new business formation also in neighbouring MEPs. Labour mobility across administrative borders form spatial interactions of this type. Thirdly, agglomeration economies and the quality of the entrepreneurial environment have spillover impacts on new business formation in neighbouring MEPs.

Table 4. Regression model results

Variable	OLS model		Spatial lag model	
	2001–2002	2011–2012	2001–2002	2011–2012
AGGLOMERATION	0.029** (0.007)	0.066** (0.012)	0.024** (0.006)	0.063** (0.008)
ENTREP_ENVIRON	0.073** (0.009)	0.066** (0.009)	0.064** (0.010)	0.051** (0.010)
FOREIGNERS	-0.011 (0.006)	0.016* (0.008)	-0.007 (0.006)	0.011 (0.006)
INDDIVER_POTENTIAL	0.036** (0.007)	0.054** (0.008)	0.031** (0.007)	0.043** (0.009)
POPCHANGE_QUALITY	0.022** (0.005)	0.027** (0.006)	0.019** (0.005)	0.010 (0.007)
UNEMPLOY_VULNER	-0.037** (0.007)	-0.013 (0.008)	-0.024** (0.009)	-0.007 (0.008)
$\rho$	—	—	0.312* (0.139)	0.470** (0.138)
<i>Adjusted R2/Pseudo R2</i>	0.475	0.494	0.521	0.546
<i>N</i>	206	206	206	206
<i>Moran's I</i>	0.1093**	0.1643**	—	—

Note: \*significant at the 0.05 level; heteroscedasticity robust standard errors in parentheses; \*\*significant at the 0.01 level.

Source: Own elaboration based on the SBR CSO, CSO, Census 2001 and Census 2011 data.

## Discussion

The empirical results of the previous section indicate both a persistent and changing influence of determinants analyzed on new business formation between the periods 2001–2002 and 2011–2012. It appears that the following factors are unchanging over time: the positive impact of the quality of the entrepreneurial environment, of the potential of industrial diversity, and also of the quality of population change on new business formation. The changes relate to the influence of agglomeration economies, the presence of foreigners in the population, and unemployment vulnerability. Firstly, there is an increasingly positive influence of agglomeration economies on new business formation. Thus, large agglomerations were the more favourable location for new business formation in the period 2011–2012. This corresponds to the process of increasing spatial polarization between core and peripheries in the post-communist Czech Republic.

Secondly, the variable relating to the presence of foreigners in the population changed its sign, indicating a positive influence on new business formation in the period 2011–2012. Thus, the importance of foreigners for new business formation increased in the Czech Republic. Finally, note the shift of post-communist Czech Republic among immigration countries.

Thirdly, the negative impact of unemployment vulnerability on new business formation was weakened in the period 2011–2012. Thus, it seems that rapidly growing entrepreneurial opportunities in the early phase of post-communist transformation were exhausted in core MEPs. Moreover, forming new businesses may be seen as an increasingly important way of escaping unemployment in disadvantaged MEPs (see the position of MEPs in north-western Bohemia).

The robustness of the findings was examined by panel regression models that included observations from both periods 2001–2002 and 2011–2012. In addition, interaction terms between the dummy variable relating to the time periods (PERIOD) and the determinants of new business formation were added into the models. The changing importance

of the determinants of new business formation was controlled in this way. Panel regression model results are given in Table 5. The main findings include the following:

- There is confirmation of a positive and statistically significant connection between the quality of the entrepreneurial environment, the potential of industrial diversity, and also the quality of population change on the one hand, with the new business formation on the other hand. Moreover, the interaction terms related to these determinants (Model 2, Model 4 and Model 5) are not statistically significant. Thus, these three determinants have a persistently positive impact on new business formation.
- There is confirmation of a positive and statistically significant connection between agglomeration economies and new business formation. Moreover, the regression coefficient of the interaction term  $AGGLOMERATION*PERIOD$  (Model 1) is positive and statistically significant, thus supporting the thesis that agglomeration economies have an increasing and positive influence on new business formation.
- The relationship between the presence of foreigners and new business formation is not statistically significant in the panel regression model. This is not surprising when considering the signs of the regression coefficients of the  $FOREIGNERS$  variable in the two OLS regression models in Table 4. However, the regression coefficient of the interaction term  $FOREIGNERS*PERIOD$  (Model 3) is positive and statistically significant, indicating a positive impact of the presence of foreigners on new business formation.
- There is confirmation of a negative and statistically significant connection between unemployment vulnerability and new business formation. However, the regression coefficient of the interaction term  $UNEMPLOY_VULNER*PERIOD$  (Model 6) is positive and statistically significant, indicating the increasing importance of entrepreneurship in disadvantaged regions.

Table 5. Panel regression model results

Variable	Model					
	1	2	3	4	5	6
AGGLOMERATION	0.029** (0.007)	0.048** (0.010)	0.048** (0.010)	0.048** (0.010)	0.048** (0.010)	0.048** (0.010)
ENTREP_ENVIRON	0.070** (0.006)	0.073** (0.009)	0.070** (0.007)	0.070** (0.010)	0.070** (0.007)	0.070** (0.010)
FOREIGNERS	0.003 (0.004)	0.003 (0.004)	-0.011 (0.007)	0.003 (0.004)	0.003 (0.004)	0.003 (0.004)
INDDIVER_POTENTIAL	0.045** (0.006)	0.045** (0.006)	0.045** (0.006)	0.036** (0.007)	0.045** (0.006)	0.045** (0.007)
POPCHANGE_QUALITY	0.025** (0.004)	0.025** (0.004)	0.025** (0.004)	0.025** (0.004)	0.022** (0.005)	0.025** (0.005)
UNEMPLOY_VULNER	-0.025** (0.007)	-0.025** (0.005)	-0.025** (0.005)	-0.025** (0.005)	-0.025** (0.005)	-0.037** (0.007)
PERIOD	0.194** (0.011)	0.194** (0.011)	0.194** (0.011)	0.194** (0.011)	0.194** (0.011)	0.194** (0.011)
AGGLOMERATION* PERIOD	0.037** (0.014)	-	-	-	-	-
ENTREP_ENVIRON* PERIOD	-	-0.007 (0.013)	-	-	-	-
FOREIGNERS* PERIOD	-	-	0.027* (0.011)	-	-	-
INDDIVER_POTENTIAL* PERIOD	-	-	-	0.019 (0.011)	-	-
POPCHANGE_QUALITY* PERIOD	-	-	-	-	0.006 (0.008)	-
UNEMPLOY_VULNER* PERIOD	-	-	-	-	-	0.023* (0.010)
<i>Adjusted R<sup>2</sup></i>	<i>0.629</i>	<i>0.619</i>	<i>0.624</i>	<i>0.621</i>	<i>0.619</i>	<i>0.623</i>
<i>N</i>	<i>412</i>	<i>412</i>	<i>412</i>	<i>412</i>	<i>412</i>	<i>412</i>

Note: \*significant at the 0.05 level; heteroscedasticity robust standard errors in parentheses; \*\*significant at the 0.01 level.

Source: Own elaboration based on the SBR CSO, CSO, Census 2001 and Census 2011 data.

Overall, these findings are consistent with the empirical results of the previous section. In addition, the findings suggest that new business formation should be considered in a broader socio-economic context in countries undergoing post-communist transformation. Thus, agglomeration processes, suburbanization, international migration, accumulation and exploitation of human capital all influence new business formation. Note that these processes have a long-term nature that should be considered to develop political strategies focused on new business formation.

## Conclusion

The goal of this chapter was to evaluate the changing influences of theoretically substantiated determinants on new business formation in the Czech Republic in the periods 2001–2002 and 2011–2012. The empirical results indicate that a persistent and changing influence co-exists. Namely, the quality of the entrepreneurial environment, industrial diversity and population change have a positive impact on new business formation in both time periods. There was also a positive connection between agglomeration economies and new business formation. The importance of agglomeration economies increased significantly. The relationship between foreigners present in the population and new business formation was not statistically significant in 2001–2002, but this determinant had significantly greater influence in 2011–2012. Finally, the relationship between unemployment and new business formation was negative in both periods. Nevertheless, entrepreneurship was increasingly crucial in disadvantaged regions.

The empirical results in this chapter point out the importance of the broader socio-economic context in countries undergoing post-communist transformation for explaining MEPs' differences in new business formation. Spatial polarization between core and peripheries, suburbanization, international migration, industrial restructuring, accumulation and exploitation of human capital all influence new business formation. Moreover, the new business formation also has its spatial dimension, namely spatial interactions between neighbouring MEPs created by labour market mobility, spatial spillovers, imitation behaviour and the like. Note that the relevance of spatial interactions was confirmed by a positive and statistically significant spatial autoregressive coefficient in the spatial lag models. Thus, on the whole, spatial interactions are inevitable when considering the determinants of new business formation.

The conclusions of this chapter have important political implications. Firstly, agglomeration economies, population change, the quality of the entrepreneurial climate and industrial diversity are all statistically significant determinants of new business formation. These determinants

are very persistent, and any significant change in any of these factors is a long-term process. Therefore, the impact of policies targeted at new business formation in lagging regions might only be observed in the long-term or possibly never. Secondly, it seems desirable to break the structural disadvantage created by the determinants of new business formation in lagging regions. Thus, the principle of spatial concentration might be considered beneficial when formulating policies targeted at new business formation in lagging regions (see, e.g., Novosák et al., 2013; Hájek et al.,<sup>242</sup> Hájek and Smékalová<sup>243</sup>). Thirdly, the impact of spatial interactions should be considered, e.g., when choosing territories to support.

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<sup>242</sup> O. Hájek, L. Smékalová, J. Novosák, P. Zahradník, *Spatial Coherence of National and European Regional Policy: the Insights from the Czech Republic and Slovakia*, *Politická ekonomie*, Vol. 62, No 5, 2014, pp. 630–644.

<sup>243</sup> O. Hájek, L. Smékalová, *Comparison of Czech and Slovak Public Administration Approach to the Concept of EU Cohesion Policy Implementation for the Programming Period 2014–2020*, in: E. Pastuszková (Ed.), *Proceedings of the 7<sup>th</sup> International Scientific Conference Finance and Performance of Firms in Science, Education and Practice*, Tomas Bata University in Zlin, Zlin 2015, pp. 330–341.

# Chapter 4

Evaluation  
of the Spatial  
Implementation  
of the Operational  
Programme Environment  
in Slovakia



**Abstract:** In the programming period 2007–2013, the implementation of the European Union cohesion policy is carried out through eleven operational programmes within the frame of objectives Convergence and Regional Competitiveness and Employment. The overall European Union resources invested the amount of approximately EUR 11 billion in these programmes, which is distributed under the supervision of the Transport, Construction and Regional Development of the Slovak Republic (formerly only Ministry of Construction and Regional Development of the Slovak Republic). Among these instruments is the Operational Programme Environment, with a total allocation of EUR 1.8 billion. This chapter aims to analyse the attributes of all projects that have been approved from the beginning of the programming period until March 2013. This will enable further to study the spatial characteristics of the evaluated programme and discuss the breakdown of the beneficiaries at different levels of spatial hierarchy or the eventual volume of intervention under auspices of this programme in individual regions of the Slovak Republic. The volume and the direction of the investments concerning the spatial dimension present a new view on implementing the cohesion policy instruments.

**Keywords:** cohesion policy, environment, Slovakia, structural funds.

## Introduction

In the programming period 2007–2013, the resources from the European Union cohesion policy present a significant part of public investments in the Slovak Republic. They are dispersed among 11 operational programmes of the Convergence and Regional Competitiveness and Employment objectives according to the programming principle first introduced in the late 1980s. Implementation of the cohesion policy programmes in the newer member states such as Slovakia supported significantly decentralization processes (Bachtler and McMaster;<sup>244</sup> Begg<sup>245</sup>). In Slovakia, this directly facilitated the emergence of the eight self-governing regions associated in 4 NUTS 2 regions as the Slovak Republic did not intend to adapt its public administration solely to the needs of cohesion policy.<sup>246</sup>

The architecture of Slovakian operational programmes in the 2007–2013 programming period includes ten programmes in the Convergence objective and one within the Regional Competitiveness and Employment objective with a total allocation of approximately EUR 11 billion of European Union resources which are continuously complemented by national and private investments. The most significant difference between the national and European regional policy lies in the spatial concentration of the resources. While the concentration of resources, as stated in the National Framework of the Slovak Republic<sup>247</sup> reflects that except for the Bratislava self-governing region, all others are Convergence Regions.

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<sup>244</sup> J.F. Bachtler, I. McMaster, *EU Cohesion Policy & the Role of the Regions: Investigating the Influence of Structural Funds in the New Member States*, Environment and Planning C: Government and Policy, Vol. 26, No 2, 2007, pp. 398–427.

<sup>245</sup> I. Begg, *Cohesion or Confusion: A Policy Searching for Objectives*, Journal of European Integration, Vol. 32, No 1, 2010, pp. 77–96.

<sup>246</sup> M. Brusis, *The Instrumental Use of European Union Conditionality: Regionalization in the Czech Republic and Slovakia*, East European Politics and Societies, Vol. 19, No 2, 2005, pp. 291–316.

<sup>247</sup> Ministry of Transport, Construction and Regional Development of the Slovak Republic. *Národný strategický referenčný rámec 2007–2013*. [online]. [cit. 28th October 2013]. 2007. Accessible from: <http://www.nsr.sk/download.php?FNAME=1381926411.upl&ANAME=NSRR+07-13+april+2013.zip>.

However, an indiscriminate dispersion of the EU resources would not comply with the concentration principle whose fulfilment has already been called to question.<sup>248</sup>

The regional disparities in Slovakia are subject of continuous growth since the 1990s and an obvious pattern of economically stronger regions being those located in western and north-western parts of the country disrupted only occasionally by largest settlements.<sup>249</sup> Slovakia counters these with a declared concentration of cohesion policy instruments into the so-called growth poles on the level of LAU 2 units (Yuill, Quiogue)<sup>250</sup> that are mentioned in the National Strategic Reference Framework, too.

Delimitation of the growth poles is based mainly on the settlement structure of Slovakia as is described in the Spatial Development Perspective.<sup>251</sup> Within this frame, cohesion growth poles and innovation growth poles are distinguished. There is no detailed description of methods used in delimitating which LAU 2 units were to be growth poles. However, the criteria are stated as follows:<sup>252</sup>

- information about the number of inhabitants,
- information about schools,
- existence of the common municipal and registry offices,
- existence of the building authorities offices,
- general settlement structure information,
- information from the Slovak Spatial Development Perspective.

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<sup>248</sup> R. Crescenzi, *Undermining the Principle of Concentration? European Union Regional Policy and the Socio-Economic Disadvantage of European Regions*, Regional Studies, Vol. 43, No 1, 2009, pp. 111–133.

<sup>249</sup> E. Rajčáková, A. Ševcová, *Regional Disparities in The Context Of Slovak Regional Policy*, in: V. Klímová, (Ed.), *XII. mezinárodní kolokvium o regionálních vědách*, Masarykova univerzita, Brno 2010, pp. 34–41.

<sup>250</sup> D. Yuill, N. Quiogue, *Spatial Targeting under EU and National Regional Policies*, in: *Benchmarking Regional Policy in Europe*, European Policies Research Centre, Glasgow 2005, pp. 1–29.

<sup>251</sup> Ministry of the Environment of the Slovak Republic, *Koncepcia územného rozvoja Slovenska (Slovak Spatial Development Perspective)*. [online]. [cit. 28<sup>th</sup> October 2013]. 2001. Accessible from: [http://www.telecom.gov.sk/index/open\\_file.php?file=vystavba/StatStavSpravaDokumenty/UzemnePlanovanie/KoncepUzemRozvojaSK/ZavaznaCast/kurs2001.PDF](http://www.telecom.gov.sk/index/open_file.php?file=vystavba/StatStavSpravaDokumenty/UzemnePlanovanie/KoncepUzemRozvojaSK/ZavaznaCast/kurs2001.PDF).

<sup>252</sup> Ministry of Transport, Construction and Regional Development of the Slovak Republic. *Národný strategický referenčný rámec 2007–2013*. [online]. [cit. 28<sup>th</sup> October 2013]. 2007. Accessible from: <http://www.nsr.sk/download.php?FNAME=1381926411.upl&ANAME=NSRR+07-13+april+2013.zip>.

There is no indication of previous studies focused on targeting the cohesion policy resources into the growth poles. However, there are studies targeting the national, regional policy resources and cohesion policy resources to the eight self-governing regions. Matlovič and Matlovičová<sup>253</sup> conclude that national, regional policy resources in the decade 2001–2010 were not sufficiently targeting the less economically advanced self-governing regions, nor targeted the most advanced region of capital city Bratislava. According to the same study, structural funds measures were marginally more successful, especially in 2004–2006 when stronger support for eastern and south-eastern self-governing regions was registered. However, the following period was less successful in these terms, although it has not ended yet. Tvrdoň and Kmencová<sup>254</sup> counter these findings by pointing out that the easternmost regions of the Slovak Republic noted the smallest amount of support allocated from the resources of the cohesion policy.

The European Commission<sup>255</sup> declared a somewhat ambiguous attitude towards the Slovakian growth poles while discussing the future Partnership Agreement. While the position paper does not dispute the concept of growth poles themselves, the country was encouraged to evaluate the experience and possibly change the system of growth poles delimitation, which most probably reflects the lack of socio-economic indicators present in their delimitation.

The Operational Programme Environment, which is the main point of interest of this chapter, deals with questions of the environment that is a rather important category in terms of sustainable development, which has suffered with recent strains placed on public budgets.<sup>256</sup> This situation even further emphasized the importance of cohesion policy available resources. It is one of the most extensive operational programmes which

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<sup>253</sup> R. Matlovič, K. Matlovičová, *Regionálne disparity a ich riešenie na Slovensku v rozličných kontextoch*, Acta Facultatis Studiorum Humanitatis et Naturae Universitatis Prešovensis, Folia Geographica, Vol. 53, No 18, 2011, pp. 8–87.

<sup>254</sup> J. Tvrdoň, Z. Kmencová, *Implikácia regionálne disparity vs. Absorpčná schopnosť, Národná a regionálna ekonomika VI*, Ekonomická fakulta TU v Košiciach, Košice 2007.

<sup>255</sup> European Commission, *Position of the Commission Services on the development of the Partnership Agreement and programmes in SLOVAKIA for the period 2014–2020*, 2012. [online]. [cit. 20th October 2013]. Accessible from: [http://ec.europa.eu/regional\\_policy/what/future/pdf/partnership/sk\\_position\\_paper.pdf](http://ec.europa.eu/regional_policy/what/future/pdf/partnership/sk_position_paper.pdf)

<sup>256</sup> Z. Darvas, *The Impact of the Crisis on Budget Policy in Central and Eastern Europe*, OECD Journal on Budgeting, Vol. 10, No 1, 2010, pp. 1–42.

reflects the importance of the environmental pillar, which is emphasized even on the European level. The Europe 2020 strategy has strongly promoted the issues of the environment and set targets of reducing green gas emissions, increasing the use of renewable energies, and increasing energy efficiency. The ability to fulfil the abovementioned goals has already been widely discussed (see, e.g., Oberthür and Roche Kelley;<sup>257</sup> Saikku et al.;<sup>258</sup> Böhringer et al.,<sup>259</sup> discussing the greenhouse gasses, or Klessmann et al.,<sup>260</sup> da Graça Carvalho<sup>261</sup> researching the energy sector implication while Warleigh-Lack discussed the strategy in its environmental implication as the means of delivering quality public policy).<sup>262</sup>

This chapter aims to analyse the implementation of the Operational Programme Environment regarding spatial characteristics of allocation dispersion. This will enable further discussion about the support of growth poles and thematic interventions in individual regions, thus presenting a new view of cohesion policy instruments in practice.

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<sup>257</sup> S. Oberthür, C. Roche Kelly, *EU leadership in international climate policy: achievements and challenges* The International Spectator, Vol. 43, No 3, 2008, pp. 35–50.

<sup>258</sup> L. Saikku, A. Rautiainen, P.E. Kauppi, *The sustainability challenge of meeting carbon dioxide targets in Europe by 2020*, Energy Policy, Vol. 36, No 2, 2008, pp. 730–742.

<sup>259</sup> C. Böhringer, T.F. Rutherford, R.S. Toll, *The EU 20/20/2020 targets: An overview of the EMF22 assessment*, Energy Economics, Vol. 31, No 2, 2009, pp. 268–273.

<sup>260</sup> C. Klessmann, A. Held, M. Rathmann, M. Ragwitz, *Status and perspectives of renewable energy policy and deployment in the European Union – What is needed to reach the 2020 targets?*, Energy policy, Vol. 39, No 12, 2012, pp. 7637–7657.

<sup>261</sup> M. Da Graça Carvalho, *EU energy and climate change strategy*, Energy, Vol. 40, No 1, 2012, pp. 19–22.

<sup>262</sup> A. Warleigh-Lack, *Greening the European Union for legitimacy? A cautionary reading of Europe 2020*, Innovation – The European Journal of Social Science Research, Vol. 23, No 4, 2010, pp. 297–311.

## Methodology

The basis data for the following analysis of the Operational Programme Environment are taken from the Central coordination Body of Slovakia, which publishes the List of Beneficiaries of all operational programmes. This list detailing the projects as of 30<sup>th</sup> April 2013 provided the initial projects' matrix, including information about beneficiaries (name and identification number), projects (project codes and partial titles of projects) and the individual budgets – Union contribution, national budget resources and private contribution as specified in grant contracts. All 655 projects which were listed as of the above-mentioned date are the subject of the analysis. The only exception is technical assistance projects. This amount of projects represents 98.6% of the total allocation of the Operational Programme Environment in 2007–2013 and, as such, provides sufficient data for analysis.

The information in the initial officially published matrix, so far insufficient, was later enhanced by a detailed description of beneficiaries obtained from the Statistical registry of organizations maintained by the Statistic Office of the Slovak Republic. The registry provided information about the SK-NACE category, beneficiary size in terms of the number of employees, the institutional sector and location of the beneficiary within the administrative structure of the Slovak Republic.

Information about projects was expanded by decomposing the unique project codes, enabling the authors to identify the specific priority axes and measures whose resources were used in project implementation. However, the question of the location of projects remained. The necessary information is included in every grant contract and the contract database, a registry Central Register of Contracts, is maintained by the Government Office of the Slovak Republic.

Table 1. Sources of information in matrix of projects

Attribute	Information source
Project title and ID	List of Beneficiaries published by Central Coordination Body
Beneficiary title and code	
Project budget	
SK-NACE of the beneficiary	Statistic Office of the Slovak Republic
Number of employees of the beneficiary	
Institutional sector of the beneficiary	
Location of the beneficiary	
Site of project realization	Central Register of Contracts by the Government Office of Slovak Republic

*Source: Authors.*

After obtaining the necessary information about the project, the matrix has been complemented by information on whether or not the location of both beneficiary and project realization belonged among the growth poles of Slovakia. The total amounts of investment spent were recalculated per capita both in the case of the beneficiary location and in the case of project site location at the level of the Regions (NUTS III) and the districts (LAU 1). The matrix has then been evaluated by the methods of descriptive statistics, mainly by means of cross-tabulation. The spatial dispersion of EU support per capita was depicted using the ArcGIS software at the level of districts.

## Results and Discussion

The evaluation of the implementation of the Operational Programme Environment is conducted with a matrix of 655 approved projects in mind. These were approved of in the period 2007–31<sup>th</sup> March 2013 within 54 separately issued calls for proposals within seven priority axes (see Table 2). The calls for proposals were directed to unspecified beneficiaries and specifically chosen beneficiaries in cases of so-called national projects whose location within the administrative structure of Slovakia was undisclosed or covered the entire country. So far, no projects have been implemented under the priority axis “Building a Flood Warning and Forecasting System”, which was newly added to the third version of the programme document validated by the European Commission in June 2011. Within the other priority axes grant contracts amounting to EUR 1,743 million were concluded with a further EUR 175 million of private co-funding. Concerning the initial allocation of the Operational Programme Environment, this constitutes approximately 96.8% of the total allocation from both European Cohesion Fund and European Fund for Regional Development, which finances the programme. As such, the authors perceive this amount as a sufficient base for analysis. As shown in Table 3, the Operational Programme Environment does not significantly limit the beneficiaries’ spatial location, especially in its most central priority axes. This goes hand in hand with dismissing the idea of preferential treatment of the growth poles as the environmental problems are hardly limited by administrative borders of any kind.

Table 2. Financial share of priority axes on European, national and private resources in approved projects (EUR million)

Priority axis	EU allocation	Slovak Republic Allocation	Co-funding
Integrated Protection and Rational Utilisation of Water	838.10	130.05	49.72
Flood Protection	84.02	12.60	5.09
Air Protection and Minimisation of Adverse Effects of Climate Change	147.98	21.27	44.59
Waste Management	357.14	48.48	76.30
Protection and Regeneration of Natural Environment and Landscape	42.79	7.55	0
Technical Assistance	45.25	7.99	0
Building a Flood Warning and Forecasting System	0	0	0
<b>Total</b>	<b>1515.28</b>	<b>227.93</b>	<b>175.70</b>

Source: Authors' calculations based on the List of Beneficiaries.

Table 3. Limitations of potential beneficiaries

Priority axis	Spatial limitation	Beneficiary limitation
Integrated Protection and Rational Utilisation of Water	No limitations	No significant limitation
Flood Protection	No limitations	Municipalities, waterway management
Air Protection and Minimisation of Adverse Effects of Climate Change	Convergence objective regions	No significant limitation
Waste Management	No limitations	No significant limitation
Protection and Regeneration of Natural Environment and Landscape	Convergence objective regions	Selected central government institutions
Technical Assistance	–	Managing authority, intermediate bodies
Building a Flood Warning and Forecasting System	Convergence objective regions	Slovak Hydro-meteorological Institute

Source: Programme Document and Programme Manual of Operational Programme Environment.

Relatively less strict restriction of beneficiary profile within the Operational Programme Environment is reflected in the high share of private-sector beneficiaries visible in Table 4. However, the support is still predominately aimed at the public sector caused mainly by the notable activity of the cities, municipalities and associations of these public sector subjects. The central government is represented by state-owned corporations and public institutions involved in water management and environmental protection.

The activities of central government subjects were restricted almost exclusively to Bratislava and Banská Bystrica Regions as these are the main seat of environment-related governmental agencies. Local government activities were dispersed more evenly through the regions, with their activity peaking in Trnava and Prešov Regions. The private beneficiaries are incredibly successful in central Slovakia regions – Nitra, Trenčín, Žilina and Banská Bystrica. In some of them (e.g. Žilina), they partially make up for the inactivity of local government.

Table 4. Share of EU allocation among institutional sectors from approved projects

Institutional sector	Share of EU allocation
Private subjects	45.45%
Central government subjects	9.50%
Local government subjects	45.04%

Source: Authors' calculations based on the List of Beneficiaries.

Out of the entire Operational Programme Environment allocation that has been apportioned to the approved projects from the European Union resources, 45.45% (approximately EUR 688 million) was given to the private sector (refer to Table 4 for shares of individual sectors). This amount was distributed among differently sized enterprises with the largest share of medium-sized enterprises (37%, which corresponds to EUR 255 million), followed by large-sized enterprises (28%). The share of small enterprises is 23%, and micro-enterprises supported amounted to 12%. In terms of spatial distribution, the small and medium enterprise support per capita is most notable in a group of three central Slovakian regions Žilina

(EUR 231 per inhabitant), Trenčín (EUR 185 per inhabitant) and Banská Bystrica (EUR 108 per inhabitant).

Regardless of the institutional or enterprise size, the prevalent thematic focus of all beneficiaries is the environmental infrastructure (see Table 5). This topic is rarely complemented by projects focused on transport infrastructure and services mostly concerned with acquiring newer vehicles more friendly to the environment. The share of human resources oriented projects is altogether marginal. Smaller-sized institutions are somewhat more successful within the public sector, with more than three-quarters of allocation dealt to the public sector.

**Table 5. Share of EU allocation among institutional sectors from approved projects**

The thematic focus of the projects	Total share	Beneficiary size – private sector					Beneficiary size – public sector			
		1*	2	3	4	5	1	2	3	4
Human Resources Development	2.38%	0%	0%	1.65%	6.25%	0%	0%	3.22%	0.16%	0%
Transport Infrastructure and Services	0.59%	0%	2.40%	0.10%	0%	0%	0%	0%	0.69%	7.58%
Environmental Infrastructure	97.02%	100%	97.60%	98.25%	93.75%	100%	100%	96.78%	99.15%	92.42%

\*1 – Microenterprise, 2 – Small enterprise, 3 – Medium-sized enterprise, 4 – Large-sized enterprise, 5 – Unknown size of an enterprise

*Source: Authors' calculations based on the List of Beneficiaries.*

The spatial point of view of the allocation dispersion within the Operational Programme Environment is strongly influenced by the existence of so-called national projects. These are numerous projects whose exact place of the location at the level of LAU 2 – municipality is not detailed in the grant contract following the thesis that the environmental issues are hardly restricted by administrative boundaries. It is equally improbable that most national projects would deal with issues limited by a single municipality. Therefore, the scope of these projects is much larger sized to the area of several self-governing regions or the entire Slovak Republic.

Further analysis of spatial characteristics, as they pertain to sector, location, and size of the beneficiary, revealed interesting facts connected to the relationship between the seat of the beneficiary and the project realization site. It is quite possible to estimate that local government institutions implement the projects within their own boundaries. In this particular data set, 96% of local governments obtained resources that were spent within the boundaries of their own district. The case of central governmental agencies is quite the opposite as 82% of obtained allocation is spent outside of the district in which they are located due to their broad territorial scope. However, an interesting difference occurs between the group of large and the group of small and medium enterprises. Curiously enough, the large enterprises invested more obtained resources (83%) within their residential districts than small and medium enterprises (67%). These findings are, of course, a product of a rather limited and narrowly oriented data set, especially thematic-wise. Their further evaluation of a larger sample may, however, lead to more definite knowledge concerning the influence of the private enterprise size on the distribution of an allocated amount in space and its relation to corporate headquarters location.

Table 6. Financial resources allocated to supported and other regions

Types of Regions	Financial support by the European Union per inhabitant (units: EUR)	
	According to the beneficiary location	According to the project site location
Growth Poles	311	259
- cohesion growth poles	209	315
- innovation growth poles	382	220
Municipalities that are not growth poles	83	234

Source: Authors' calculations based on the List of Beneficiaries.

Tables 6 and 7 indicate that the beneficiaries are located predominantly in those municipalities that are located higher in the settlement hierarchy of the Slovak Republic and, at the same time, are also innovation growth

poles. However, the activities of these beneficiaries are not limited by the boundaries of their own municipalities. Rather the implementation of quite a few of these projects takes place outside in smaller municipalities, including those that are not designated as growth poles, which is indeed quite rare in the Slovak operational programmes as most of them target growth poles preferentially to other municipalities.

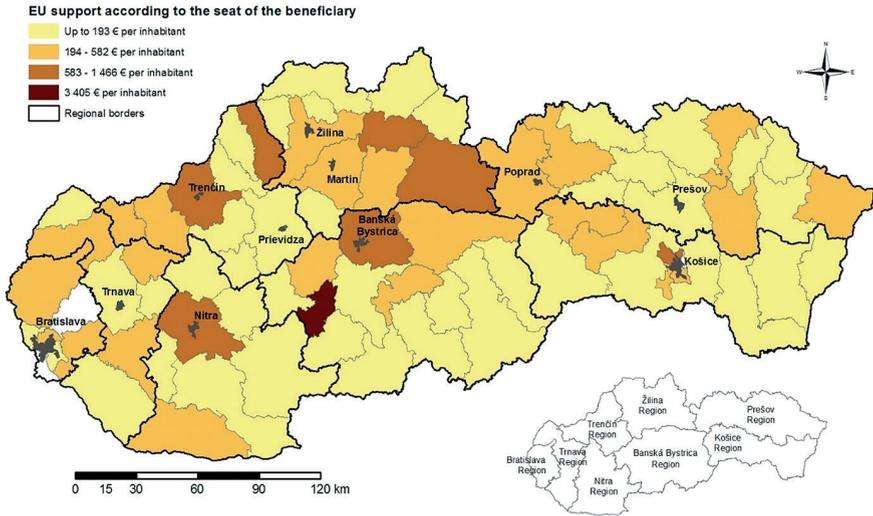
**Table 7. Allocation of EU financial resources with regards to the hierarchy of Slovak settlements**

Municipality categories according to population	Financial support by the European Union per inhabitant (units: EUR)	
	According to the beneficiary location	According to the project site location
Bratislava and Košice municipalities	267	99
More than 50 thousand inhabitants	581	119
20–50 thousand inhabitants	241	172
5–20 thousand inhabitants	364	453
Less than 5 thousand inhabitants	146	270

*Source: Authors' calculations based on the List of Beneficiaries.*

The overall spatial dispersion of the EU support is shown in Figures 1 and 2, which depict allocation per capita from the point of view of the beneficiaries and project site location, respectively. The allocation at the level of Slovakian districts, which are equivalent to the LAU 1 units, is strongly influenced by the location of governmental agencies as far as the beneficiary oriented point of view goes. The most prominent district of Banská Štiavnica in Banská Bystrica Region is the seat of Slovak Water-Management Authority, which gives this region considerable advantage from the point of view of the beneficiaries, even more, pronounced considering the relatively smaller number of inhabitants if compared to other regions where central government agencies are located. The location sites of the projects obtained by the Slovak Water-Management Authority are spread evenly through the country, though many of them having regional rather than local character. Thus, its existence has almost no bearing on the position of the Banská Bystrica district in Figure 2.

Figure 1. Spatial dispersion of the Operational Programme Environment resources with regards to the location of the beneficiaries



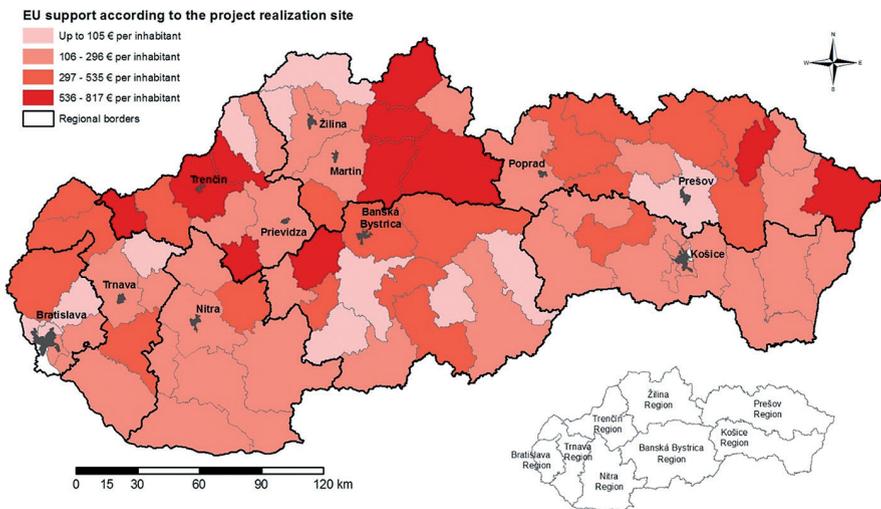
Source: Authors' calculations based on the List of Beneficiaries by the Central Coordination Body.

The spatial dimension of EU support pertaining to project localization sites, as depicted in Figure 2, shows a somewhat different state of affairs. The most prominently featured districts are often those whose areas coincide with areas of national parks. This is particular for the district of central Slovakia and some of the Eastern districts. When the allocation is decomposed according to the individual priority axes of the Operational Programme Environment the prominence of these regions is maintained through several of them but especially in the "Protection and Regeneration of Natural Environment and Landscape" axis. "Integrated Protection and Rational Utilisation of Water" axis support is rather equally distributed among the districts except for the largest cities district of Bratislava and Košice and some of the southern and North-eastern districts. However, those are partially compensated by their prominence in priority axis "Flood Protection", whose largest projects target especially the protection of smaller towns up to five thousand inhabitants which are not likely to be able to make such investments by themselves considering their budgets. Priority axis "Air Protection and

Minimisation of Adverse Effects of Climate Change” shows relatively equal dispersion except for the Bratislava Region and southern district of Nitra and Banská Bystrica Regions. “Waste Management” priority axis project concentrate especially in Eastern Slovakia districts.

According to the realisation site, the overall dispersion of projects shows some white places in the Bratislava Region, which are particularly interesting as there is no compensation for this lack of environmentally oriented projects in the regionally specific Operational Programme Bratislava Region.

Figure 2. Spatial dispersion of the Operational Programme Environment resources with regards to the size of project implementation



Source: Authors' calculations based on the List of Beneficiaries by the Central Coordination Body.

## Conclusion

Operational programme Environment was allocated EUR 1.8 billion, making it one of the most prominent financial instruments of the cohesion policy programming period 2007–2013 within the Slovak Republic. The aim of this chapter was to provide the analysis of the implemented projects under the programme. In accordance with the thematic focus, the projects mainly targeted environmental protection issues with a special focus on water management, which is apart from its own priority axis common focus of most suggested areas of intervention. However, there is a priority axis connected to water management “Building a Flood Warning and Forecasting System”, which recorded no implemented project in the researched period. Due to broader consequences of the environmental issues, this operational programme does not accentuate the spatial areas of growth poles innovation or otherwise.

The basis for the analysis was created by the studied matrix of 655 projects approved of and taken under individual grant contracts within the scope of 54 announced calls for proposals from the beginning of the programme implementation. The total allocation amassed by the evaluated projects is EUR 1,743 million, and EUR 175 million more were supplied by co-funding. This amounts to 96.8% of European Union commitment within both the Cohesion Fund and European Regional Development Fund.

The spatial point of view yielded some interesting observation, such as the identification of beneficiaries who are mainly concentrated in larger cities, e.g. respective capitals of the self-governing regions. These are usually seats of the public sector institutions, which are among pre-selected beneficiary types. From the point of view of implementation site, the medium-sized cities up to 20,000 inhabitants actually profit from project implementation within their boundaries and the smaller towns up to 5 thousand inhabitants benefit from the realization of large projects which their own budgets could not support.

An interesting result was obtained when analysing the dispersion of funds among private enterprises concerning the headquarters location. In this particular operational programme, large corporations tend to invest the money in their residential district more often than small and medium enterprises. While this finding is undoubtedly influenced by the narrow focus of analysed data, at the same time, it presents an interesting question for future research focused either on a more broad scope of operational programmes or on specific operational programmes which target private corporations specifically.

The recommendation stemming from the above-mentioned findings can be aimed especially in terms of more deliberate and sober preparation of the following programming period. The precise and clear listing of the needs of the Slovak Republic should be as timely as possible. It is clear that the late significant addition to the list of programme axes led to lesser utilization of the allocated amount of EU support. The exclusion of the Bratislava Region is another instance that should be reconsidered as it was already noted that the environmental issues are not limited by administrative borders. The problems of the Bratislava Region, which belongs to the economically more advanced NUTS II of the European Union, should be addressed either in the environment-specific or in the region-specific operational programme. The advance of the Bratislava Regions, as it is recorded in the economic field, may very well be accompanied by a set of environmental issues specific to this region. At the lower municipal level, the disregard for the state-determined areas of support can be seen as positive in the case of this operational programme and is desirable for the following period, too.

Considering the allocation of the Operational Programme Environment is almost spent, since 98.6% are already under grant contracts, this programme can be regarded as a successful financial instrument. The positive experience gained from implementing the Operational Programme Environment should provide a suitable starting point for implementing new operational programmes in the 2014–2020 programming period.

# Chapter 5

The Perception of Public  
City Transport in Zlín  
as an Alternative  
to Individual Transport  
by Its Potential Users  
According to the Level  
of Their Business Income



**Abstract:** The growth of transport in big cities often leads in extreme cases to jams and gridlock, and this trend is gradually becoming more frequent in smaller cities such as Zlín. Some of the possible solutions to these issues involve not only improving the technical aspects of the infrastructure but also changing human behaviour. The more frequent use of public transport is one of the possible solutions. However, this will be possible only if a city's inhabitants are more environmentally aware. This chapter reports on research conducted in Zlín in 2007 and focusing on various attitudes of the inhabitants of the Zlín conurbation to public and individual transport. The results do not provide grounds for optimism: most people are not very environmentally aware, and they prioritize their own convenience when using the transport system in Zlín.

**Keywords:** transport system, public transport, individual transport, perception of transport services, Zlín conurbation.

## Introduction

Almost every big city in the world has to deal with the problem of providing an effective transport service, dependent on its geofigureical location. With the development of individual transport, this has become an issue even for mid-sized cities. Transport services usually begin to collapse due to ineffective traffic systems developed in the past and were based on local geofigureical conditions. Because traffic did not play such an essential role in the past, today's urban areas impose many limitations on the development of traffic infrastructure because of the natural conditions and housing built before the modern era. Arterial roads lead through urban districts, and their capacity no longer meets today's requirements. This leads to extreme concentration of traffic, congestion and other negative phenomena on main thoroughfares and at junctions, which slows the development of cities.<sup>263</sup> It also negatively influences the quality of life in cities and their immediate vicinity due to dust, emissions, noise pollution and other factors.<sup>264</sup> The elimination of these negative phenomena is challenging because of the geographical limitations imposed by the built-up parts of conurbations. Optimization of the transport system – predominantly a public transport network – is the main aim for the big European cities such as Berlin<sup>265</sup> and much more for over-crowded Asian mega-cities such as Shanghai.<sup>266</sup>

A functional and sustainable urban transport system cannot exist without a long-term development concept, as can be seen, e.g., in the case of Warsaw.<sup>267</sup> Without such a concept, problems can be expected to multiply

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<sup>263</sup> M.E. O'Kelly, M.A. Niedzielski, *Efficient spatial interaction: attainable reductions in metropolitan average trip length*, *Journal of Transport Geography*, Vol. 16, No 5, 2008, pp. 313–323.

<sup>264</sup> M. Kutz (Ed.), *Environmentally Conscious Transportation*, N.J.: Wiley & Sons, Hoboken 2008.

<sup>265</sup> T. Reinhold, *More Passengers and Reduced Costs: The Optimization of the Berlin Public Transport Network*, *Journal of Public Transportation*. Vol. 11, No 3, 2008, pp. 57–75.

<sup>266</sup> Q. Shen, *Urban transportation in Shanghai, China: problems and planning implications*, *International Journal of Urban and Regional Research*, Vol. 21, No 4, 2001, pp. 589–606.

<sup>267</sup> S. Monkiewicz, *Kierunki usprawnienia komunikacji zbiorowej w najbliższych latach w Warszawie*, *Transport Miejski*, Vol. 23, No 2, 2000, pp. 5–10.

in the future, leading in extreme cases to the complete collapse of the transport system. One study describes a systemic change in Great Britain, which involved integrating urban planning tools with transport concepts. Nevertheless, despite small-scale successes, the change did not lead to significant qualitative changes in systemic planning with synergic effects.<sup>268</sup>

However, the inhabitants of large cities are not concerned with transport systems at a conceptual level. They are the users of the system, evaluating its practical usefulness daily. They are most critical of the situation during morning and afternoon peak times when the transport system tends to be overstretched. On the other hand, they are positive in their evaluation of the afternoon lull in traffic intensity – though it is this period of downtime that tends to present a problem for the managers of transport corporations, planners and economists.<sup>269</sup> One individual generally has very little influence on the system, but in larger numbers, individuals can exercise an influence. For example, a study was carried out examining the working conditions of the parents of school children; it showed that if the working conditions of a statistically significant number of parents change enabling them to accompany their children to school on foot or by bicycle, this has the effect of reducing traffic volumes during peak times.<sup>270</sup>

Reductions in traffic are also brought by the more widespread use of public transport. However, attitudes to public transport are primarily influenced by the level of the fares charged. This dependency is so marked that changes in public transport usage can be modelled simply by extrapolating from the changing level of fares.<sup>271</sup> The above-cited study was carried out using a questionnaire to determine the level of usage of an individual (car) and public transport and showed clearly that when solving transport-related problems, it is essential to seek solutions that do not

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<sup>268</sup> A. Hull, *Integrated transport planning in the UK: From concept to reality*, Journal of Transport Geography, Vol. 13, No 4, 2005, pp. 318–328.

<sup>269</sup> S. Hanson, G. Giuliano, (Eds.), *The Geography of Urban Transportation*, 3<sup>rd</sup> edition, Guilford Press, New York 2004.

<sup>270</sup> N. McDonald, *Household interactions and children's school travel: the effect of parental work patterns on walking and biking to school*, Journal of Transport Geography, Vol. 16, No 5, 2008, pp. 324–331.

<sup>271</sup> J. De Groot, L. Steg, *Impact of transport pricing on quality of life, acceptability, and intentions to reduce car use: An exploratory study in five European countries*, Journal of Transport Geography, Vol. 14, No 6, 2006, pp. 463–470.

cause public transport fares to rise. In view of the constantly rising cost of individual transport, public transport can become increasingly attractive for a broader population segment.

When optimizing bus transport services, it is sometimes found that the costs of running a service through an urban area vary from company to company. These differences are due to the more or less optimum choice of route. The optimum route is the most economical route, and service providers can now take advantage of the increasing availability of GIS-based navigation systems to determine the ideal route.<sup>272</sup> Optimization is thus becoming a major focus of interest for geographers.

This chapter is a case study of a typical representative of a Czech regional urban centre, the city of Zlín. The traffic problems affecting Czech cities are hierarchical in nature. The most serious problems are typically experienced by the two largest and most populous cities – Prague and Brno. These cities' traffic problems are concentrated in their crowded historical centres. Industrialization played a key role in the case of the third biggest Czech city – Ostrava. This process did not lead to a marked growth of traffic in Ostrava's relatively small city centre, but rather to the occupation of huge areas by heavy industry, which considerably complicated the city's traffic system. Smaller Czech towns and cities have only begun to encounter traffic problems in recent years. They generally attempt to keep their historical centres free from traffic. Zlín is not a historical town; nevertheless, it has (rather surprisingly) become one of the Czech urban areas experiencing traffic problems in the last two decades.

Zlín is the largest city in south-east Moravia. It was spared traffic complications for a long time – partly because it is a relatively small city, with 78,100 inhabitants as of December 31, 2007, making it the 12<sup>th</sup> largest city in the country.<sup>273</sup> Zlín is a relatively young city. It does not have any historical town centre because it was only founded at the beginning of the 20<sup>th</sup> century due to the rapid development of the Bata shoe manufacturing empire. The construction of the town was carefully planned and took into account future developments. Up to the end of the 1940s, the town grew quickly but systematically. A large number of public buildings

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<sup>272</sup> K.M. Cubukcu, *Examining the cost structure of urban bus transit industry: does urban geography help?*, *Journal of Transport Geography*, Vol. 16, No 4, 2008, pp. 278–291.

<sup>273</sup> Český statistický úřad, *Český statistický úřad: Městská a obecní statistika*, Český statistický úřad, 2008. (online). Available from: <http://vdb.czso.cz/xml/mos.html> (visit 30.11.2008)

and a traffic system were built. One of the first trolley-bus lines in former Czechoslovakia was opened in Zlín. After the Second World War, the town continued to expand, but Tomas Bata's original strategic plans were dropped due to ideological reasons. This political change was even symbolized by the town's renaming as Gottwaldov (after Czechoslovakia's first communist president, Klement Gottwald). Industrial activities and the urban function of the city were further developed over the following 40 years. Any investments in public buildings, including the traffic infrastructure, were on a relatively small scale. Such issues did not seem crucial at the time. Therefore, the originally planned road along the right bank of the river Dřevnice, whose purpose was to improve the movement of through-traffic and which was planned before 1945, was never built during the communist era. The road was to run alongside this relatively small river (the length of the river is 40 kilometres; its drainage area is 435 square kilometres), which is an eastern tributary of the river Morava and flows through the centre of the city. Even though this important traffic project was never brought to fruition, the traffic infrastructure built during the first era of the development of the Bata company remained more or less adequate until the fall of the communist regime in 1989.<sup>274</sup>

The city's regaining of its original name symbolized a new era, in which the economy of the whole Zlín conurbation began to prosper as a result of new economic freedoms. This subsequently led to a sharp growth in the number of cars and an increase in the volume of daily traffic on the main (and only) east-west road I/49. Due to its specific physical and geofigureical conditions, the Zlín conurbation has the form of a long thin line strung out along an enclosed valley. I/49 is the only arterial road that leads through the valley. The geofigureical character of the Zlín conurbation is the main limiting factor of the development of transport services, as it only allows development within the relatively narrow valley of the river Dřevnice (Hájek<sup>275</sup>).

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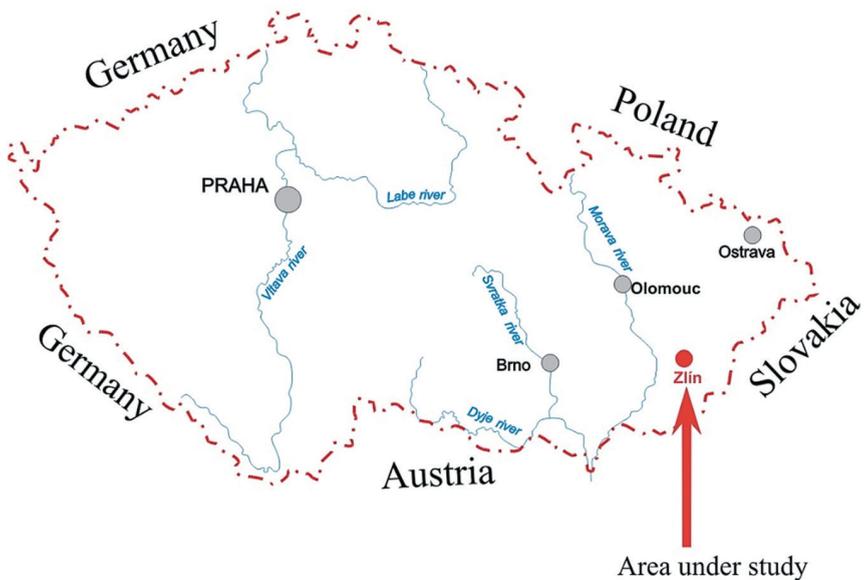
<sup>274</sup> O. Hájek, *Environmental Aspects of Transport Provision in the Zlín Urban Area*, in: T. Siwek, V. Baar, (Eds.), *Globalisation and its Impact to Society, Regions and States*, Ostravská univerzita, Ostrava 2006, pp. 229–234.

<sup>275</sup> O. Hájek, *Analýza dopravní obslužnosti zlínské aglomerace*, I. Sborník referátů z odborné konference Dopravní obslužnost a technologie ve vztahu k regionálnímu rozvoji, FaME UTB, Zlín 2005; O. Hájek, *Nejproblémovější úseky silniční dopravy ve zlínské aglomeraci*, I. Sborník referátů z odborné konference Dopravní obslužnost a technologie ve vztahu k regionálnímu rozvoji, FaME UTB, Zlín 2015.

The maximum 24-hour car traffic intensity on the main arterial road is over 32,000 cars, as shown by traffic counts on the road and motorway system in 2005. The technical characteristics of I/49 are no longer fit for purpose. It only has one lane in each direction and cannot effectively cater to the above-mentioned traffic volumes. This leads to frequent congestion. A very intensive process of suburbanization, together with further commercial, congress and university development in the city centre, places more demands on the traffic system. The need for an integrated traffic system is growing, and the public authorities cannot react flexibly and effectively. The growth of the conurbation also leads to environmental pollution.

From its very beginnings, Zlín was conceived by its famous town-planners as a "garden city" with substantial potential for the future. However, intensive commercial and residential development is changing the character of the city centre, reducing its initially high quality of life.

Figure 1. Area under study



## Aims and Methods

The aim of this chapter is to report on a study of attitudes towards public transport among Zlín's inhabitants. The question is whether the environmental awareness of the conurbation's people is stronger than in other cities or whether economic interests tend to prevail. Environmental awareness that leads to voluntary limitations to one's requirements with the purpose of maintaining the quality of the environment (see, e.g., Banister;<sup>276</sup> Kutz<sup>277</sup>) is a crucial factor in reducing traffic problems. The study's implications are clear, and the significant advantage of the study's recommendations is that their application does not require any large-scale investments.

The first part of the text outlines the main traffic issues facing Zlín today and classifies these issues according to their importance for the further development of the conurbation. The second part presents the results of a survey conducted among the inhabitants and visitors of Zlín, revealing their attitude to public transport. This survey was conducted in 2007 and was financed by the grant project WB-32-04 "Transport service and technology", implemented in 2004–2008 at Tomas Bata University in Zlín.<sup>278</sup>

The survey aimed to determine the transport habits of the inhabitants of the Zlín conurbation and to assess respondents' evaluation of the local transport situation concerning the quality of life and the environment within the Zlín urban area. The questionnaire was distributed to 268 respondents, of which 38 gave incomplete or otherwise faulty answers, making it impossible to include them in the final analysis. The questionnaires were anonymous.

The selection of respondents was not random from the territorial point of view. The researchers' aim was to cover the entire territory

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<sup>276</sup> D. Banister, *Unsustainable Transport*, Spon Press, London 2005.

<sup>277</sup> M. Kutz (Ed.), *Environmentally Conscious...*

<sup>278</sup> R. Wokoun et al., *Závěrečné výstupy z grantového projektu WB-32-04: Dopravní obslužnost a dopravní technologie ve vztahu k regionálnímu rozvoji*, Univerzita Tomáše Bati ve Zlíně, Zlín 2007.

of the conurbation, and so the data collection points were carefully chosen. Respondents were selected at the major hubs within the transport network of Zlín and the surrounding area: public transport (bus and trolleybus) stops, pedestrian zones, railway stations and the car parks at large shopping centres in Zlín, Otrokovice and Napajedla.

In terms of structure, the respondents represented a quota sample. The main hypothesis tested was that although transport habits are influenced by a range of factors, the strongest of these factors is income, and so the sample of respondents was subdivided according to their declared level of income. The hypothesis stated that respondents' preference for individual (car) transport increases in line with rising income levels – a trend which has been found to exist throughout the world. The quotas were set roughly according to statistics on average incomes in the Czech Republic. The categories were as follows: up to CZK 10,000 per month (76 respondents), between CZK 10,000 and 20,000 per month (101 respondents), between CZK 20,000 and 30,000 per month (37 respondents), and over CZK 30,000 per month (10 respondents). This categorization was based on respondents' declaration of their incomes. To avoid complications during the calculation process, the criterion for categorization was each respondent's average pre-tax monthly income; the number of people in the respondent's household was not taken into account. Age and sex differences were also recorded but proved not to be relevant.

The respondents were asked 12 questions. Most took the form of closed questions, where the respondents had to choose their answers from a set of options. However, some questions were open, and the respondents could express their opinions freely. Despite the large variability of answers to the open questions, they can only be classified into a few categories.

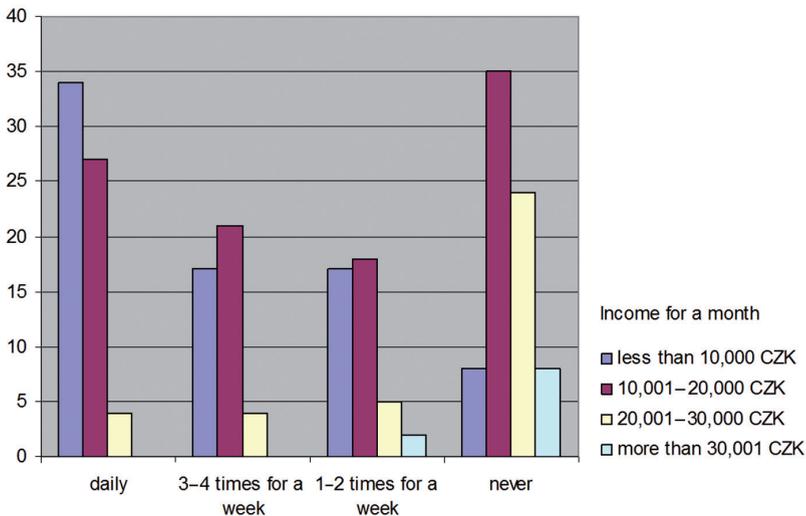
The first question (current transport habits) was closed, requiring respondents to state how often they used public transport and individual (car) transport per week. Questions 2–7 were open and designed to elicit user preferences for individual and public transport. Respondents also answered an open question on what they considered the single main problem affecting transport in the Zlín conurbation. The answers to this question showed a rare degree of agreement: the most problematic aspect was the existence of only one road linking Zlín and Otrokovice.

The results of the survey were plotted in graph form and compared to arrive at conclusions. No sophisticated mathematical methods were used either in the research itself or for the purposes of this chapter. Given the number of respondents, it was considered sufficient to rank them according to their income category; the calculation of correlations would probably have yielded the same results. Selected results, including their presentation in graphic form, are given in the following section.

## Research Results

The following analysis of the survey results conducted as part of the above-mentioned project focuses on the perception of transport services in the Zlín conurbation by its inhabitants. The combined answers to these six questions form the subject of this chapter. The first question concerned the frequency of using public transport in Zlín; the answers are illustrated in Figure 2 below.

Figure 2. How often do you use public transport? (absolute)

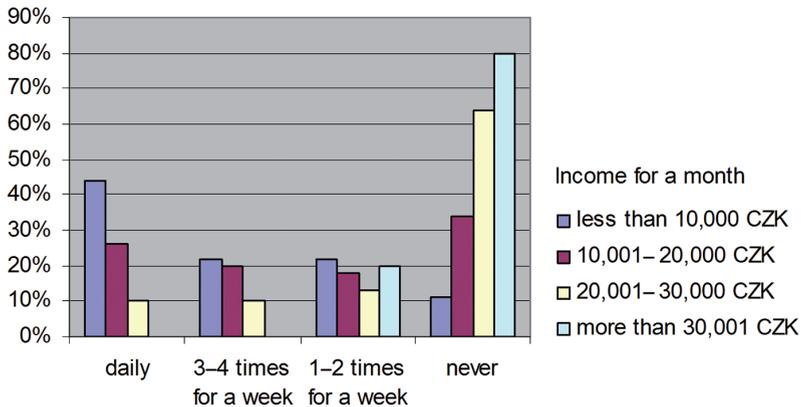


Source: Hájek: own research.

Figure 2 shows data on how often public transport is used by particular income categories. Public transport is used most often by citizens with monthly incomes lower than CZK 10,000; the correlation with income is very distinct in this case. Of all the categories, it is the second group of respondents – with a monthly income between CZK 10,001 and CZK 20,000 – who most often use public transport “not at all”.

There is a lower number of wealthy respondents giving this answer due to the lower absolute numbers of people in this income bracket. The results prove that people with average incomes are no longer entirely dependent on public transport as they were in the past.

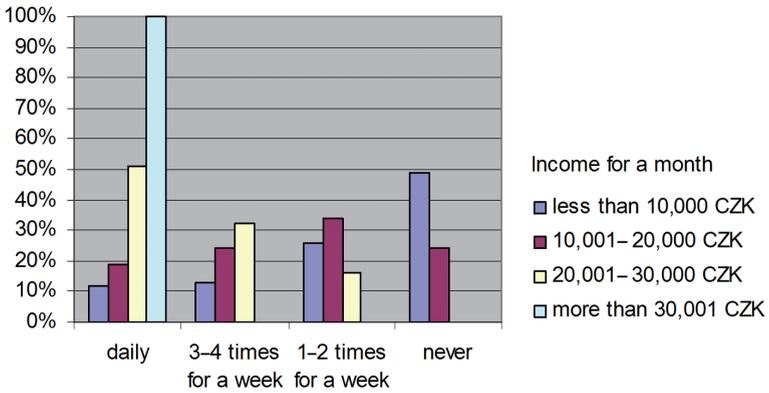
Figure 3. How often do you use public transport? (relative)



Source: Hájek: own research.

To prevent any distortion of data caused by the varying numbers of respondents in different groups, the results have been re-calculated as percentages to express the data in relative terms. The results are presented in Figure 3. The evidence given in this graph is much more accurate than in Figure 2. In this case, the correlation between the income and the frequency of using public transport is much clearer.

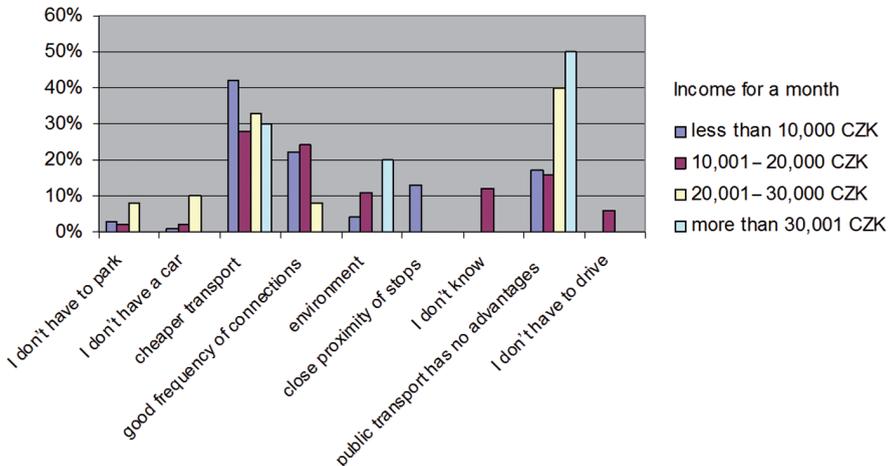
Figure 4. How often do you drive a car?



Source: Hájek: own research.

Figure 4 shows the frequency of car use. Here too, the correlation is in due proportion with the income of the respondents.

Figure 5. Where do you see the advantages of public transport?

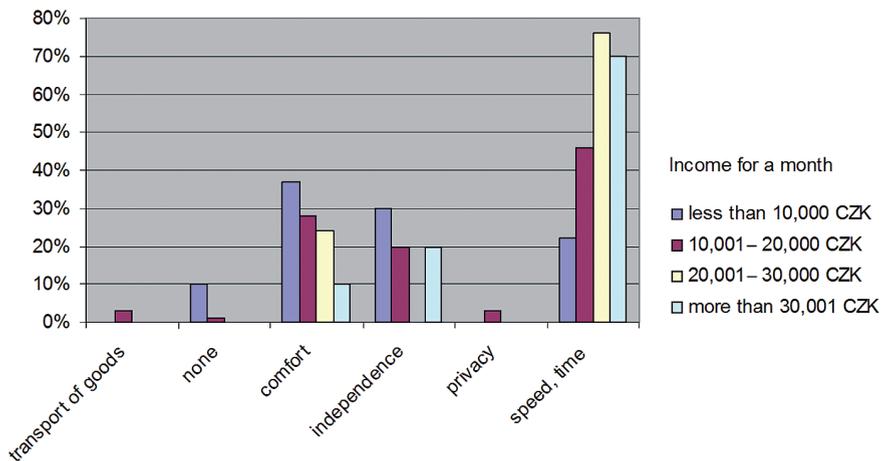


Source: Hájek: own research.

All categories of respondents agreed that the cost of public transport represents a significant advantage when compared with individual car transport. Nevertheless, a relatively large group of respondents do not

see any advantages of using public transport at all. Notably, this answer appears in all income categories, even though it is less frequent in the lower-income category, and almost half of the respondents giving this answer are in the higher income bracket. Environmental advantages were perceived by a very small number of respondents; noticeably, most belonged to the highest income category. It is a pity that the small absolute number in this case (only ten respondents) reduces the value of this evidence.

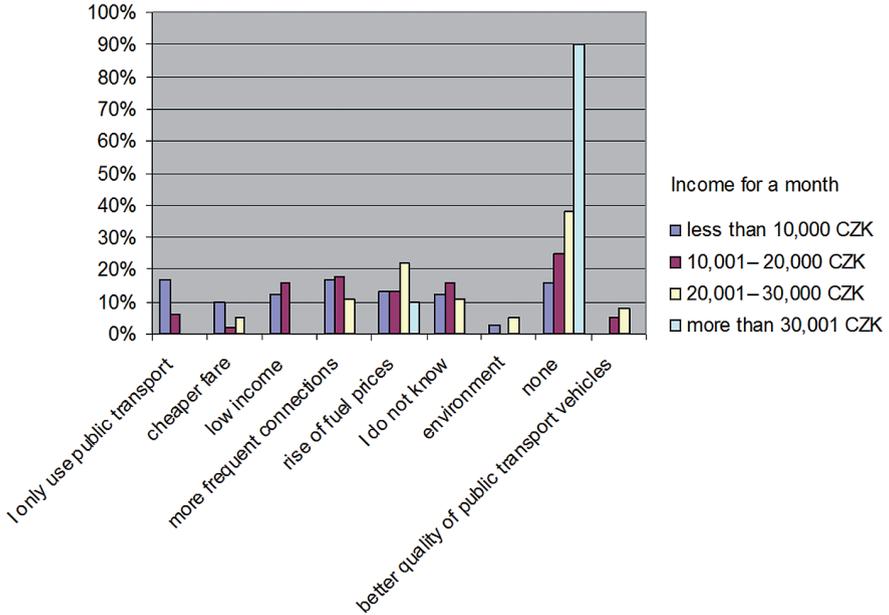
Figure 6. What are the advantages of driving?



Source: Hájek: own research.

Almost all income categories agreed that driving brings independence and comfort, which is precisely what was valued in the early days of car travel in countries all over the world. Respondents greatly appreciated the reduction of journey times and the speed of travel that a car offers. A small group of respondents in the income category below CZK 10,000 did not see any advantage in travelling by car.

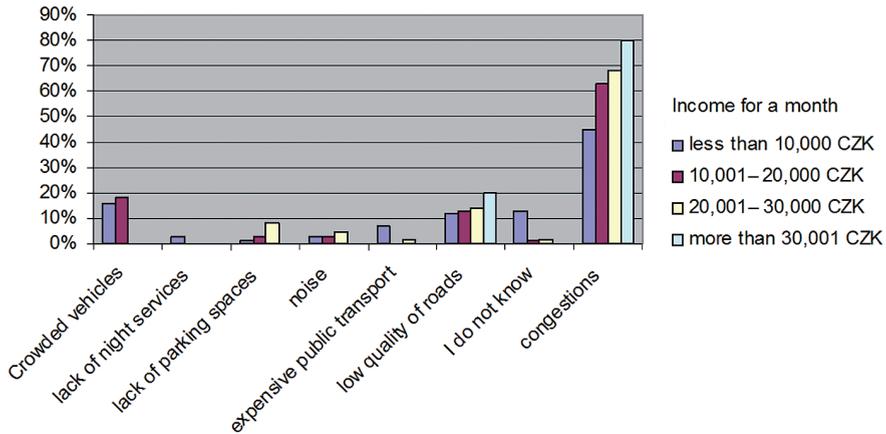
Figure 7. What would motivate you to swap a car for public transport?



Source: Hájek: own research.

None of the answers given here correspond with income. Again, most respondents do not see any reason to swap a car for public transport. We can judge from this that environmental awareness regarding transport issues is minimal among the citizens of Zlín.

Figure 8. What do you perceive as the biggest transport issue in Zlín agglomeration?



Source: Hájek: own research.

Among the crucial traffic problems in Zlín identified by respondents, “crowded vehicles” and “low quality of roads” appeared most often. All categories of respondents without exception claimed that congestion was the major traffic problem in Zlín.

We can summarize the results of the survey as follows:

- Wealthy citizens of Zlín prefer using cars, and they do not use public transport. This finding confirms our expectations.
- People with lower incomes use public transport more often. This is also in accordance with the original hypothesis.
- Swapping public transport for a car is not an exceptional trend even among citizens with an average income.
- Congestion is seen as the major problem in the Zlín conurbation by all inhabitants in all income categories, followed by the poor quality of roads in Zlín and its vicinity.
- The cost of fares seems to be a crucial factor affecting the popularity of public transport. Many respondents who perceive public transport negatively consider the low cost to be its only advantage.
- For the majority of respondents, environmental issues do not represent a reason to use public transport.

- The majority of respondents, even regular users of public transport, were not sufficiently motivated to swap their cars for public transport.
- The quality of public transport vehicles was evaluated as negative.
- By contrast, the frequency of services was evaluated as positive.
- Speed, time and comfort are the major reason for travellers to swap public transport for individual transport.

The results of the survey concerning the preferences of inhabitants of the Zlín conurbation are not very positive. Respondents generally displayed a very pragmatic and materialistic attitude to issues of transportation. Their environmental awareness is not very high and appears, unfortunately, to be at the same low level as in other Czech and Central European cities. Even the persistent pre-war image of Zlín as a garden city plays no role in increasing environmental awareness. The aim of the majority populations of post-communist states is the same: to catch up with more economically developed Western Europe. However, Western European countries experienced a marked increase in car transport during the 20<sup>th</sup> century. The car has become an everyday part of life, and groups of people can now decide how often to use a car or whether to reduce its use from time to time to improve the quality of the environment. Several trends towards the reduction of car traffic have appeared, supporting the idea that car traffic is not, in fact, progress; on the contrary, it takes us back – “back to the Paleozoic”.<sup>279</sup> These days, many Americans realize that the original freedom of movement provided by a car has changed their world. They are forced to use a car even in situations in which it was not needed before. Freedom has turned into a constraint. Therefore, some “enlightened intellectuals” ride a bike to work every day because it is cleaner, healthier and more environmentally friendly.<sup>280</sup>

This idea seems to have little chance of being adopted in the Czech Republic today. A more likely outcome is the continued spread of the slogan “Show me your car, and I will tell you who you are”. A car is more and more a symbol of social status and success, as it used to be in the USA and Western Europe.

The car market in the Czech Republic has not yet reached saturation point, and the country as a whole, including Zlín, can expect further

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<sup>279</sup> J. Keller, *Naše cesta do prvohor*, Sociologické nakladatelství, Praha 1998.

<sup>280</sup> R. Tooley (Ed.), *Sustainable Transport: Planning for Walking and Cycling in Urban Environments*, Woodhead Publishing, Abington 2003.

growth in car ownership in the coming years. Only when owning a car becomes a common thing, as it is in Western countries, will the relationship of Czech society to car transport gradually change. Prague has already reached that level, and other big cities, including Zlín, are due to reach it very soon.

At the moment, most people in Zlín prefer individual car transport. They do not have environmental issues in mind, and financial matters would be the only reason they would consider public transport. Nevertheless, something needs to be done to change the public attitude to car transport. One possible solution is to build cycle lanes, which is just the beginning in Zlín. It is clear that this will not be suitable for everybody. However, Zlín is a relatively small city, in which cycling is probably more widespread than in bigger Czech cities. If money for investment is lacking, including cycle lanes in the city's urban planning documentation would be sufficient. It would be a good indicator that they are planned for the future, which might lead to a move away from cars. Knowing the area's geography, we can assume that cycling would be used frequently in Zlín if there were better conditions than exist today. The maximum distance between most parts of the town is not more than 10 kilometres – an ideal distance for regular cycling.

## Conclusions

In order to be evaluated as adequate, the transport service in the Zlín conurbation would have to satisfy the needs of the city's inhabitants. However, the demand of daily commuters (travelling to work, for shopping and other purposes) for a good transport service leads to increasing volumes of rush hour traffic and thus repeated morning and afternoon congestion. Additionally, the growing number of visitors from neighbouring regions contributes to this issue as they are invited by the municipal authorities to attend various activities, which is a method of city marketing.<sup>281</sup> As a consequence, the transport system is prone to collapse during the busiest periods. Indications of these problems are now visible during large-scale events such as the Barum Rally car race or the local film festival.

The situation in Zlín can be treated in two ways from the point of view of investors. Hardly any investors would locate their activities in the centre of a conurbation that suffers high intensity of traffic (the only exceptions are companies that build and manage shopping centres). By contrast, in the western part of the conurbation (Tlumačov, Otrokovice, Napajedla), the traffic system is very advantageous for investors – a situation which is set to improve further due to the future link-up with the nationwide rapid road transport system on completion of new sections of the R55 road.

The environment is suffering because there is only one main road that leads through the Zlín urban area. The number of cars passing through the town causes a high concentration of emissions, noise and higher accident rates on road I/49. Various noise pollution studies on I/49 show that the set protective limits are being exceeded during both day and night hours.

Due to the high intensity of traffic (more than 32,000 cars per day at the busiest point counted in 2005), the full capacity of Zlín's road network has now been reached. Traffic forecasts indicate that we must expect further growth of traffic intensity at most points that have been measured. Undoubtedly, this will be an effect of the constantly growing demand for

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<sup>281</sup> P. Rumpel, *Teritoriální marketing jako koncept územního rozvoje*, Ostravská univerzita, Ostrava 2002.

individual car transport, the current growth of the Czech economy and the gradual improvement of the capacity of the main roads (I/49, I/55), which will create more traffic. Therefore, it is essential to identify the inadequacies of the transport service in the Zlín conurbation and look for solutions that will help improve the current situation. An ideal solution is to construct the forgotten right bank road.<sup>282</sup>

We can say that environmental awareness among citizens will be radically different when public transport services are inadequate compared to cases when the public transport system works properly. The findings of grant WB-32-04 show that public transport in Zlín, though environmentally friendly, cannot quickly fulfil its role.<sup>283</sup> The shift of many inhabitants from public transport to individual car transport intensifies transport flows in the city and worsens the quality of transport services, meaning that journey times on public transport are longer. That, in turn, causes fewer people to use public transport, and the vicious circle closes in on itself. Attempts by the municipal authorities to improve public environmental awareness could slow if not stop this negative trend. The city will have to take this course if it does not want to rely entirely on investing vast amounts of money into improving the transport system. The low environmental awareness of Zlín's inhabitants confirmed by our research should be a reason to take this course.

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<sup>282</sup> O. Hájek, *Environmental Aspects of Transport Provision...*, pp. 229–234.

<sup>283</sup> R. Wokoun et al., *Závěrečné výstupy z grantového projektu...*

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Oldřich  
Hájek



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