Investigaciones
Regionales

The Geography of Multinational Corporations in CEE Countries: Perspectives for Second-Tier City Regions and European Cohesion Policy

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ABSTRACT: The largest regional disparities in CEE countries are between capital and non-capital city regions. MNCs invest in these regions for various reasons, contributing to regional development exogenously. In this paper we analyse location decisions of FDI investments in the period 2003-2010. We find that the most important location factors for FDI are market accessibility, strategic assets, institutional quality and agglomeration, in the post-crisis era even more than before. Presently, second-tier city regions are not capable of offering all these factors simultaneously. For improving their opportunities and contribution to European cohesion and convergence, more substantial and direct investments are needed. Without these, the recently suggested competitiveness opportunities of second-tier city regions are difficult to obtain.

JEL Classification: R38; R58; R12.

Keywords: Greenfield FDI; CEE regions; location factors; competitive advantage.

La geografía de las corporaciones multinacionales en los países del centro y este de Europa. Perspectivas para regiones con ciudades de segundo nivel y la política de cohesión europea

RESUMEN: Las mayores disparidades regionales en los países del centro y este de Europa se observan entre las regiones con las capitales y el resto. Las empresas multinacionales invierten en estas regiones por distintas razones, contribuyendo de manera exógena al desarrollo regional. En este artículo, analizamos las decisiones de localización de las inversiones directas extranjeras entre 2003 y 2010. Encontramos que los factores más importantes de las inversiones extranjeras son la accesibilidad del mercado, las ventajas estratégicas, la calidad institucional y aglomeración, más aún en la época después de la crisis. En la actualidad, las regiones con ciudades secundarias no son capaces de ofrecer todos estos factores al mismo tiempo. Para me-

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jorar sus oportunidades y contribuciones a la cohesión y convergencia europea se requieren mayores inversiones. Sin *éstas*, las oportunidades de competir mencionadas anteriormente para las regiones con ciudades secundarias serían difíciles de obtener.

Clasificación JEL: R38; R58; R12.

Palabras clave: Inversión «Greenfield»; regiones del centro y este de Europa; factores de localización; ventaja competitiva.

1. Introduction

When identifying growth opportunities for Europe, one cannot overlook the regional patterns of its composite member states. The difference in growth opportunities between Western and Central Eastern (CEE) countries and regions is obvious but complex (Dogaru *et al.,* 2011; Maroccu *et al.,* 2012, and Capello *et al.,* 2008). Western European regions identify themselves through internationally competitive cities like London, München, Paris, Barcelona or Amsterdam. Such places became landmarks for their surrounding regions and function in larger-scale city-regions. They distinguish themselves through competitive advantages in innovation capacity, labour market efficiency and productive economic specializations (Annoni and Dijkstra, 2013). Policy makers in these places strive for better quality of life —the ultimate goal of competitiveness (Gardiner *et al.,* 2004). In this view, they develop strategic innovative regional and urban development plans which target continuous employment, sustainable environment and accessible housing schemes, public amenities, qualitative and affordable education and healthcare or cultural enhancement and harmonization. But all these objectives are generally supported by a healthy business environment, embedded in a regional knowledge economy with knowledge-intensive specializations and sound institutions as well as good functioning multilevel governance structures (Barca *et al.,* 2012). Strong financial sectors support entrepreneurship. Qualitative transport infrastructure increases accessibility and supports a good position in international trade networks. Highly qualified human resources drive the development of top sectors and in combination with other factors lead towards a service economy.

Central Eastern European regions are part of more recent member states characterized by former communist regimes —such as regions in Poland, Czech Republic, Slovakia, Hungary, Romania or Bulgaria—. These countries used to be centralized economies where the capital city was the most important location of decision and development (Gorzelak *et al.,* 2012, and Müller *et al.,* 2005). Besides some secondary city regions that focus on industrial specialization, university capacity or touristic centers, the rest of the regions in these countries largely remained agricultural-based economies. Building on their basic industrial composition heritage, these countries and their regions developed only little beyond their former profile. However, due to their entry in the EU and its trade benefits, as well as their strategic geographic location, low levels of wages and taxes or even natural resources, they increasingly

become an attraction for international corporations mostly for production and medium-low service functions. Frequently, the major landmarks are at national level and in capital city regions.

Dogaru *et al.* (2014) note that there is regional convergence among Central and Eastern European countries and between CEE and Western European countries. However, regional disparities within the CEE countries have yet prevailed over the past years (Ezcurra *et al.,* 2007; Niebuhr and Schlitte, 2009; Rodríguez-Pose and Ezcurra 2010; Kallioras and Petrakos 2010, and Chapman *et al.,* 2012). In the wake of EU enlargement, capital city regions started taking different development paths and grew with a faster rhythm than the other regions in CEE countries. Nevertheless, recent evidence by Dijkstra (2013), Dijkstra *et al.* (2013) and ESPON (2012) suggests that non-capital city regions or regions containing so-called secondary cities show better growth figures over the last years. Arguably, both agglomeration diseconomies in the largest cities and untapped potential and knowledge intensive specializations in cities other than the capitals (like in München in Germany, Milano in Italy, Eindhoven in The Netherlands, and Barcelona in Spain) may contribute to this finding (Camagni *et al.,* 2014, Angoletti *et al.,* 2014, Camagni and Capello, 2014). It is argued by Thissen *et al.* (2013) that besides endogenous agglomeration forces, linking up with specialized international knowledge networks and the embedding of international knowledge, trade and FDI networks in local knowledge intensive environments (of firms, universities and governmental agencies) may foster growth opportunities in second tier city regions relatively more than in capital regions. Still, the applicability of these findings in CEE countries remains uncertain. Endogenous growth opportunities may be limited in CEE countries because of less knowledge-intensive specializations, less learning experiences, culturally different evolved social capital and institutional constraints (Rodríguez-Pose *et al.,* 2013, 2014). Besides this, several studies have pointed to differences with respect to embeddedness in international networks and industrial restructuring as the reason for regional disparities in the CEE countries (Heidenreich and Wunder, 2008, and Chapman and Valentina, 2011).

The degree in which regions in CEE countries are able to attract and embed foreign investments, and particularly what role capital and secondary city regions may play in this, has not received much attention. This is mainly due to data limitations. Concerning regional development, Malecki (2002), Frenken and Hoekman (2006) as well as Tracey and Clark (2003) have drawn attention to the potential importance of global networks as sources of goods and knowledge in shaping firm competitiveness in a particular area. This issue becomes more prominent as regional positions in knowledge, trade and FDI networks are regarded as important attributes of smart specialization strategies of European regions, aiming at future cohesion (Thissen *et al.,* 2013). Barca *et al.* (2012) argue why place-based development strategies in European Union in relation to international network positions may be determining for future cohesive development. In spatially blind approaches it is argued that agglomeration in combination with encouraging people's mobility not only allows individuals to live where they expect to be better off but also increases individual incomes, productivity, knowledge and aggregate growth. From this perspective, spatially blind

policies are also seen as «people-based», representing the best approach to improving inhabitants' lives. Consequently, development intervention should be space-neutral, and factors should be encouraged to move where they are most productive. In reality, this is primarily in large cities. In contrast, the place-based approach assumes that the interactions between institutions and geography are critical for development, and many of the clues for development policy lie in these interactions. To understand the likely impacts of a policy, the interactions between institutions and geography, therefore, requires explicit consideration over specifics of the local and wider regional context. In Europe, all urban regions may inhabit such unique development features (Barca *et al.,* 2012, p. 140).

This article aims at testing whether the position of CEE regions in international networks of multinational corporations (MNCs) attributes to regional development potentials and future competitiveness and cohesion. We are especially interested in the position of capital city regions versus second tier city regions in networks of foreign direct investments. Despite the suggested advantages of second tier city regions and the fact that most CEE regions experienced productivity growth in manufacturing industries, the CEE capital city regions are converging at a faster rate due to their networked, service oriented economies (Dogaru *et al.,* 2011). Reasons for this matter may be related to international (FDI) network positions. The present analysis focuses on the location decisions of MNCs investment in the NUTS-2 regions of CEE countries. Overall, the number of alternative locations is larger for MNCs than for domestic firms when making an investment decision. In addition, MNCs are expected to select the foreign investment locations that best fit the characteristics of the investment project and yield the largest benefits for the firm. This applies to greenfield FDI that does not face constraints from existing capital instalments or prior investments (unlike mergers and acquisitions). Hence, the location decisions of MNCs clearly reflect the particular competitive advantage of certain regions and provide a meaningful way to compare the attractiveness of different regions for particular sectors and functions. We hypothesize that competitive advantages of regions may be in market accessibility, labour cost advantages, strategic assets, natural resources, institutional quality and agglomeration, in the post-crisis era even more than before. Section 2 discusses more detailed the motivations for location of MNCs in regions. Section 3 then introduces both the data used for empirical testing and a classification of capital and second tier city regions in CEE countries. Section 4 provides an overview of the empirical results and discusses the findings. Section 5 presents conclusions and discusses what our results suggest for competitiveness, cohesion policy and place-based development strategies.

2.   Motivations for MNCs to invest in CEE regions

As Brienen *et al.* (2010) and Burger *et al.* (2013) summarize, the literature on FDI generally acknowledges that an increase in FDI is beneficial for home activities through the acquisition of skills and technology from abroad, when foreign employment does not replace national employment. However, for host countries and regions,

the location decision of MNCs is also important, as FDI can boost a host country's prospects for (regional) economic development through effects such as the creation of employment, growth of the capital stock, and the promotion of exports. As the FDI literature on economic geography, international business, and international economics suggests, investments by MNCs are attracted by favorable economic location factors. Moreover, as MNCs expanding internationally into new geographical markets encounter uncertainty, the imitation of past behavior by other MNCs can stimulate investments.

Foreign direct investments (FDI) are long-range investments in a country other than the country in which the foreign direct investor is based. Firms internationalize if the competitive advantages gained from operating abroad are high enough to cover the additional costs and risks that are associated with this action. Following Dunning's OLI paradigm, Brienen *et al.* (2010) argue that firms decide to invest abroad when they have market power, given by the ownership (O) of products or production processes, a location advantage (L) in placing their plant in a foreign country rather than their homeland, and an advantage gained from internationalizing (I) their foreign activities in fully owned subsidiaries rather than carrying them out through market transactions (trade) or networked relationships with other firms (licensing and franchising).

From the perspective of the internal organization of the MNC, FDI can be horizontal and vertical (Barba Navaretti and Venables, 2004, Iammarino and McCann, 2013). Horizontal FDI are investments in which a firm duplicates a number of its own activities abroad that are carried out in the home country. The main trade-off faced by firms for this type of investment is between the increased sales (market access), strategic advantage and lower transportation costs that are gained by operating abroad versus the foregone internal economies of scale and disintegration costs. Vertical FDI are investments in which a firm decides to geographically disperse its activities by function, whereby some of these functions are now carried out abroad. In this case, the main trade-off is between the lower factor costs associated with investing abroad versus the increased trade and disintegration costs. In relation to the distinction between horizontal and vertical FDI, Brienen *et al.* (2010) and Burger *et al.* (2013) distinguish between four reasons of firms to internationalize the production process, which stress the location aspects of FDI.

1. *Foreign-market-seeking FDI.* Firms will supply their goods or services to foreign markets and possibly enhance third markets from this location. In most cases these markets are previously served through exports from the domestic market. This type of FDI is usually a form of horizontal investment, whereby (emerging) markets are served by a local affiliate. Except for market size, accessibility and infrastructure also play a key role.

2. *Efficiency-seeking FDI.* Firms are trying to reduce their costs of production related to labor, machinery and materials. Differences in the costs of production factors across regions can make a firm decide to geographically separate its tasks. These lower production costs abroad are often associated with labor market and trade circumstances —lower wages, taxes and trade costs as well

as the availability of grants and subsidies in a host country—. This type of investment is most often vertical FDI.

3. *Resource-seeking FDI.* The firm invests abroad to procure certain resources at lower costs than those in their original market. In this case, the availability of natural resources, the presence of a good infrastructure (to secure physical supply), and local partners to obtain knowledge and exploit these resources are relevant reasons to place investments abroad.

4. *Strategic asset-seeking FDI.* The firm aims at purchasing assets of foreign firms to foster their long-term strategic objectives, sustaining and advancing the firm's international competitiveness. This FDI category is determined by the requisite of firms to obtain assets and knowledge ranging from specific technological capabilities to management or marketing expertise. This type of investment features both horizontal and vertical FDI.

In short, it can be expected that horizontal FDI will be drawn to locations with good market access, while vertical FDI will be drawn to places with lower factor costs. A distinction in functions of investments (R&D, production, sales, etc.) will be informative as well, as this is closely related to the motivations for their location choice.

Two more important explanations for regional attractiveness (for FDI) should be mentioned for CEE regions. First, good institutions, legal frameworks and trust among citizens and government may be of key importance (Rodríguez-Pose 2013). For practically all regions in CEE countries, the recently developed key indicator of «quality of government» scores particularly low (Charron *et al.,* 2014). Still, variation across regions in CEE countries may pose important attractions to firms (re) locating activities abroad. Second, agglomeration patterns are more polarized in CEE countries compared to West-European countries. CEE country regions also exhibit marked different sectoral structures compared to West-European regions (Van Oort *et al.,* 2014) and FDI seems to foster productivity and vertical spillovers more than in Western European countries (Lipsey, 2006). It is therefore important to test for agglomeration (productivity) magnitudes and composition explicitly.

3.   Data and variables

In this article, we concentrate on Greenfield FDI in 49 NUTS-2 regions in 6 CEE countries. Information on Greenfield FDI is provided by the Financial Times fDi Markets database. This project-level data was gathered primarily from publicly available resources such as formal media sources, financial information databases, industry organisations, and publications of companies. Overall, our database comprises 7,284 investments belonging to 3,465 different MNCs in 6 CEE countries (Poland, Czech Republic, Slovakia, Hungary, Romania and Bulgaria) between January 2003 and December 2010[1]. Most Greenfield investments in the CEE countries originated

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[1] For 52 investments (0.7%), we were unable to obtain the region in which the investment was made. Hence, these investments were omitted from the database. See Burger *et al.* (2013) for a more elaborate description of the European database on Greenfield investments.

from within the European Union, EFTA (71%) and North America (16%), aiming at low-tech manufacturing (21%), medium-tech manufacturing (19%), and commercial services (17%).

By using Eurostat's taxonomy of metropolitan regions, the NUTS-2 regions were grouped into one of the following three categories (Dijkstra, 2009, Chapman and Valentina, 2012; see Appendix A):

- Capital city regions: NUTS-2 regions around the capital city. In the analysed CEE countries, these capital city regions are also the ones which are best embedded into international markets (Fratesi, 2012).
- Regions with a second-tier city: NUTS-2 regions with at least one second-tier city. Second-tier cities are the largest cities in the country, excluding the capital. In the CEE countries, there is a maximum of 5 second-tier cities per country.
- Other regions: regions with a smaller city and non-metropolitan regions. Smaller city-regions are NUTS-2 regions with at least one urban area of 250,000 inhabitants. These larger urban zones include major cities and are adjoining travel-to-work areas. Non-metropolitan regions are NUTS-2 regions without at least a 250,000 inhabitant urban zone.

Table 1 shows the number of investments in the period 2003-2010 by CEE countries and these three region types. Capital city regions attract by far most investments in all CEE countries. Second tier city regions appear as particularly attractive destinations for foreign investors in Poland.

Table 1. Number of investments (2003-2010) by destination country and region type

	Capital City Region	*Region with Second-Tier City*	*Other Region*
Bulgaria	436 (52.1)	197 (23.6)	203 (24.2)
Czech Republic	429 (41.6)	234 (22.7)	368 (35.7)
Hungary	534 (44.3)	176 (14.6)	495 (41.1)
Poland	528 (27.4)	1075 (55.9)	320 (16.6)
Romania	742 (47.6)	354 (22.7)	462 (29.7)
Slovakia	198 (32.9)	101 (16.8)	303 (50.3)
Total Investments	**2867 (40.1)**	**2137 (29.9)**	**2151 (30.0)**
Number of Regions	7	17	25

Row percentages in parentheses. Other regions are NUTS-2 regions with smaller city or non-metropolitan regions. A taxonomy of regions can be found in Appendix A.

In terms of functions, most investments were made in production plants (43%), business, sales and marketing offices (23%) as well as building and construction (11%). This study focuses on which functions attract FDI, using information about

the economic activities pursued by MNCs. These functions can be linked to the quality of the investment made and to the various motivations why MNCs have to invest abroad. Building on earlier research by Defever (2006) and Spies (2010), we group the economic functions into four different categories (see Appendix B): upstream activities (i.e., management, headquarters and R&D), construction and utilities, production plants, and downstream activities (i.e., business services, sales and marketing, support functions, and logistics). Table 2 displays the distribution of the investments across region type. Both upstream activities and services and downstream functions tend to be concentrated in the capital city regions. Production facilities and resource-seeking investments (extraction & energy) are relatively more oriented towards second tier and smaller city regions. Logistics and distribution activities are more evenly spread across the three types of regions.

Table 2. Number of investments (2003-2010) by broad function and region type

	Capital City Region	*Region with Second-Tier City*	*Other Region*
Headquarters	64 (77.1)	10 (12.1)	9 (10.8)
R&D	177 (53.2)	97 (29.1)	59 (17.7)
Construction	487 (58.3)	183 (21.9)	165 (19.8)
Extraction & Energy	67 (28.3)	86 (36.7)	83 (35.0)
Production Plants	486 (16.0)	1146 (37.7)	1410 (46.3)
Business, Sales & Marketing	1157 (70.4)	293 (17.8)	194 (11.8)
Support & Servicing	184 (51.0)	118 (32.7)	59 (16.3)
Logistics & Distribution	245 (39.5)	203 (32.8)	172 (27.7)
Total Investments	**2867 (40.1)**	**2137 (29.9)**	**2151 (30.0)**
Number of Regions	7	17	25

Row percentages in parentheses. Other regions are NUTS-2 regions with smaller city or non-metropolitan regions A taxonomy of regions can be found in Appendix A. A taxonomy of broad functions can be found in Appendix B.

The explanatory variables used in the analysis represent or proxy the motives of foreign firms for investment. Appendix C provides descriptive statistics of the variables used. In the baseline model, only the distinction in capital city regions (reference), second tier city regions and other regions will be used by introducing dummy variables. Multimodal accessibility (by road, air and rail) of regions captures the market accessibility motive of investments. This indicator is highly correlated with other indicators, like market potential and traffic indicators (compare Dogaru *et al.,* 2011). The labour market argument is captured by the wage costs and unemployment rate variables. (Long-term) unemployment may be an (additional) source of cheap labor, but may also reflect an inefficient labour market system where demand does not meet supply (Elhorst, 2003). The strategic assets argument is captured by

the number of patents issued in the regions and the share of the working population with a university degree. The resource seeking argument is captured by the share of mining employment in total employment. Finally, the institutional quality index for European regions is a composite measure concerning corruption, impartial public services, and rule of law. This indicator is highly correlated to sub-national levels of socio-economic development and levels of social trust. It is noted in Charron *et al.* (2014) that the indicator is not correlated with the degree of political decentralization (devolution). The degree of agglomeration in regions is captured by the density of capital stock. All investments in a certain year (2003-2010) are linked to time corresponding indicators. Appendix D provides a correlation matrix of all explanatory variables used, showing that multicollinearity is a limited problem in our analyses.

4. The model

Location choices of multinational corporations are often modeled using discrete choice models (see Crozet *et al.,* 2004; Head and Mayer, 2004; Defever, 2006; Basile *et al.,* 2008 and Schmidheiny and Brülhart, 2011). Probably the most often discrete choice model used is the conditional logit (McFadden, 1974). In our context, this model assumes that each multinational investing in CEE countries is faced with a set of alternative investment regions for the location of its establishment abroad, with each multinational comparing relevant location attributes. Accordingly, each location decision is considered to be the outcome of a discrete choice among a set of alternatives, where it is assumed that a utility-maximizing firm will choose to locate its subsidiary in a region if this decision maximizes the expected future profits from its investment (Long, 1997).

The conditional logit model is subject to restrictive assumptions regarding the substitution patterns across alternative investment locations. This is better known as the independence of irrelevant alternatives (IIA) and violation of this assumption is common to datasets with a large number of alternatives. Not accounting for the violation of the IIA assumption can result in inconsistent and biased estimates. Accordingly, we use a mixed logit estimation, allowing for random taste variation and unrestricted substitution patterns in the discrete choice model (see Defever, 2006 and Basile *et al.,* 2008 for similar empirical strategies in the context of location decision of multinational corporations).

Table 3 presents the outcomes of our models. Among the random terms of the coefficients, a number of variables show significant variation, indicating that the multinational firms tend to value the different location characteristics not uniformly in their location decision. As indicatively suggested by the typology of functions (Table 2 and Appendix B) and the typology of motivations for investment, this is related to the functional division of labor in capital city regions versus that in other types of regions. In column (1), outcomes of a baseline model are presented, where the only explanatory variables are the division of regions containing capital cities, second-tier cities and other regions. The capital city region category is taken as reference.

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Table 3. Mixed Logit Estimates for Location Choices of Multinationals in CEE Regions (2003-2010)

	(1) Baseline	(2) + Market Accessibility	(3) +Labor Costs	(4) +Strategic Assets	(5) + Presence Resources	(6) + Institutional Quality and Agglomeration	(7) Full Specification
Region type							
— Capital city region	•	•	•	•	•	•	•
— Region with second-tier city	−1.417 (0.057)***	−0.404 (0.088)***	−1.388 (0.067)***	−0.265 (0.091)***	−1.682 (0.057)***	−0.836 (0.070)***	0.204 (0.091)**
— Other region	−1.946 (0.064)***	−0.670 (0.082)***	−1.837 (0.073)***	−0.345 (0.091)***	−2.100 (0.062)***	−1.327 (0.083)***	0.009 (0.115)
Ln multimodal accessibility		1.593 (0.083)***					1.056 (0.098)***
Ln unit wage costs			−0.903 (0.230)***				−0.098 (0.245)
Long-term unemployment rate			−0.023 (0.012)**				−0.027 (0.012)**
Ln number of patents				0.454 (0.030)***			0.378 (0.033)***
University degree rate				0.044 (0.005)***			0.022 (0.008)***
Share mining					0.155 (0.013)***		0.101 (0.014)***
Institutional quality						−0.075 (0.067)	0.130 (0.069)*
Ln capital stock density						0.238 (0.024)***	0.075 (0.034)**
Random Parts Coefficients							
— Capital city region	•	•	•	•	•	•	•
— Region with second-tier city	1.223 (0.109)***	1.209 (0.137)***	1.101 (0.146)***	0.849 (0.148)***	1.258 (0.103)***	0.980 (0.158)***	0.543 (0.136)***
— Other region	1.615 (0.108)***	1.532 (0.160)***	1.696 (0.135)***	0.988 (0.225)***	1.638 (0.117)***	1.673 (0.210)***	1.082 (0.187)***
Ln multimodal accessibility		0.475 (0.135)***					0.669 (0.135)***
Ln unit wage costs			1.750 (0.494)***				2.352 (0.305)***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Long-term unemployment rate			0.109 (0.025)***				0.101 (0.023)***
Ln number of patents				0.179 (0.068)***			0.224 (0.048)***
University degree rate				0.073 (0.008)***			0.073 (0.009)***
Institutional quality						0.489 (0.093)***	0.780 (0.066)***
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Number of Observations	350,595	350,595	350,595	350,595	350,595	350,595	350,595
Number of Investment Decisions	7,155	7,155	7,155	7,155	7,155	7,155	7,155
Number of Alternatives	49	49	49	49	49	49	49
Wald Chi-Square	1,181	1,440	992	1,005	1,616	814	955

Robust standard errors in parentheses. Error terms are clustered by parent firm *** $p < 0.01$; ** $p < 0.05$, * $p < 0.10$. • = Reference category. Only significant random components of the coefficients are reported.

Both regions with second-tier cities and other cities receive significant and substantially less foreign investments than capital city regions, confirming earlier research by Dogaru *et al.* (2014). The second model presented in column (2) introduces multimodal accessibility of regions as an indicator of the market access reason of foreign investments. Better accessibility is associated with more foreign investments, as the coefficient is highly significant.

Market access (foreign market seeking motivation) is a major reason for investments. Controlled for market access, which is high in the capital city regions, second-tier and other types of regions still receive significantly less investments than capital city regions. The third model in Table 3 introduces labour costs (efficiency seeking) as a motive for investments, proxied by wages and unemployment levels. High wages are negatively related to foreign investments in regions in CEE-countries. Second-tier and smaller urban regions, in particular, have such cost advantages (Dogaru *et al.,* 2014). Controlling for cost advantages, non-capital city regions receive significant less investments than capital city regions. Other advantages of capital regions therefore have to be explored as well. Higher (long-term) unemployment rates attracts less foreign investments. The inefficient labour market argument hampering the attraction of FDI appears more important than the potential (and additional) cheap labour argument. In column (4) in Table 3, the strategic asset motivation for investments is tested. Measured by a larger share of higher educated workforce and the number of patents, it turns out that this argument is a very important explanation for investments in the capital regions compared to regions with second-tier cities and other regions. The variable is highly significant and positive: high scores on these indicators are associated with higher investment levels. Still, after controlling for this motive, second-tier city-regions and other regions receive fewer investments. Model (5) tests for the resource seeking argument —measured as location factor by the share of mining in the regional labour force—. A high share of mining is significantly correlated with more foreign investments, confirming the resource motivation hypothesis. Again, controlled for this, the regions with second-tier cities and the smaller urban regions receive less investment than capital regions.

Having confirmed all four hypothesized motivations for foreign investments in our CEE-setting, we also tested for institutional quality and agglomeration (model 6 in Table 3). Institutional quality did not come out as an individual significant (positive or negative) driving force. Agglomeration (measured by capital stock), does. Economic mass is thus important and probably instrumental for other motives for investments, like market access and strategic asset seeking. In column (7) of Table 3 we present a model in which all explanatory variables are introduced simultaneously. Now, the wage variable is not significantly attached to (less) investments anymore, indicating the little importance of the efficiency seeking argument of investments compared to other motives. All other motivation-based indicators remain significant and of the hypothesized sign. Remarkably, the good-institutions variable becomes significant now in explaining investment attraction: better institutions are associated with more investments.

Controlled for all these factors, model (7) shows that regions with second-tier cities receive relatively *more* investments than capital city regions. Once controlled for all hypothesized motivations, we can remark that smaller urban regions do not receive more investments. In line with ESPON (2012), Breuss *et al.* (2010) and Scherpenzeel (2010), we are inclined to hypothesize that subsidies and region-specific economic and cohesion programmes may be responsible for this favourable outcome for second-tier city regions. It may well be that for future investment potentials, such subsidies and programmes in second-tier city regions should be connected more to several of the motivation factors distinguished in our analyses simultaneously. This may be a severe task, as our models clearly indicate that capital cities and capital city-regions score high on those indicators that attract most investments (market seeking) and the potentially most productive and innovative ones (strategic asset seeking). A simultaneous improvement of critical mass, accessibility (market potential), and strategic asset concentration (universities, R&D) may be too much to demand from second-tier urban regions.

Because FDI is argued to be one of the variables very sensitive to economic shocks (The Economist 2012), the full model 7 in Table 3 is re-estimated for two periods in time: a pre-crisis period (2003-2007) and a (post) crisis period (2008-2010). Table 4 reports the results of this analysis. The general structure of factors influencing locational decisions of multinational investments is similar in both periods. Important for our analysis is to notice that controlled for all factors, the position of regions with second-tier cities does not significantly contribute to the attraction of investments. The labour market arguments (wages and unemployment) are insig-

Table 4. Mixed Logit Estimates for Location Choices of Multinationals in CEE Regions by Period

	2003-2007	*2008-2010*
Region type		
— Capital city region	•	•
— Region with second-tier city	0.040 (0.129)	–0.186 (0.149)
— Other region	–0.044 (0.141)	–0.437 (0.166)***
Ln multimodal accessibility	0.989 (0.134)***	0.726 (0.162)***
Ln unit wage costs	–0.641 (0.350)*	–0.266 (0.360)
Long-term unemployment rate	–0.025 (0.012)**	–0.012 (0.034)
Ln number of patents	0.304 (0.033)***	0.416 (0.049)***
University degree rate	0.025 (0.010)***	–0.006 (0.012)
Share mining	0.098 (0.015)***	0.084 (0.024)***
Institutional quality	0.046 (0.078)	0.142 (0.099)
Ln capital stock density	0.068 (0.041)	0.156 (0.055)***

	2003-2007	*2008-2010*
Random Parts Coefficients		
— Capital city region	•	•
— Region with second-tier city	1.091 (0.162)***	
— Other region	1.256 (0.215)***	0.981 (0.166)***
Ln multimodal accessibility		0.490 (0.192)**
Ln unit wage costs		3.074 (0.369)***
Long-term unemployment rate	0.132 (0.017)***	0.145 (0.046)***
University degree rate	0.065 (0.010)***	0.074 (0.012)***
Share mining	0.096 (0.025)***	
Institutional quality	0.713 (0.071)***	
Ln capital stock density		0.124 (0.063)**
Country Fixed Effects	YES	YES
Number of Observations	226,821	123,774
Number of Investment Decisions	4,629	2,526
Number of Alternatives	49	49
Wald Chi-Square	1,218	663

Robust standard errors in parentheses. Error terms are clustered by parent firm *** $p < 0.01$; ** $p < 0.05$, * $p < 0.10$.
• = Reference category Only significant random components of the coefficients are reported.

nificant in the (post) crisis model compared to the pre-crisis period. Agglomeration (measured by capital stock density) is significantly attached to investments in the (post) crisis period, and not in the per-crisis period. Combined, this suggests that economic agglomeration in larger city-regions provides larger opportunities of attracting investments in post-crisis circumstances, arguably due to the concentration of talent and a diversified economy that may mitigate the worse effects of recession (see for this argumentation Clark, 2009, and Cohen, 2012, p. 349).

5. Conclusions and discussion

In this paper we were looking for explanations of foreign direct investments in various types of regions in Central and Eastern European countries. Capital city regions attract by far most investments during 2003-2010, especially investments with motivations for market-seeking and strategic asset seeking. Agglomeration economies are also important, indicating that a critical mass is needed to attract (more) investments. This critical mass may well be instrumental for market-seeking and strategic-asset seeking investments as well. Despite recently suggested advantages of

second-tier city regions (less congestion, growth opportunities in niche markets, strategic network connections in value chains, lower costs of living), our findings foresee difficulties in achieving better positions in FDI networks for such cities and regions. As exogenous growth facilitator in regions, FDI «loves agglomeration».

Although agglomeration economies in the capital cities are already developed and their costs (negative externalities) are already high, these cities benefit from the critical size requirement that obviously plays a dominant role in investment decisions. It should be remarked that the capital city regions are a heterogeneous and expanding group themselves. Between 1914 and 2014 there were drastic changes in the number of independent countries in Central and Eastern Europe, implying also a large variation in capital cities. Before 1914 there were five recognized capitals[2], after 1920 this grew to eleven[3], after 1945 it declined to eight again[4], and after 1992 it grew to twenty-one[5]. All differ in size and structure —and not all of them are in the European Union—. In the same vein, second-tier cities differ in structure and sizes. Rotterdam (The Netherlands), Milano (Italy), München (Germany) and Barcelona (Spain) are somewhat at odds in size, agglomeration and functional structure with Timisoara (Romania), Krakow (Poland), Brno (Czech Republic) or Szeged (Hungary). Still, all these cities are marked as second-tier cities (ESPON, 2012). The often suggested functioning of such cities in polycentric urban networks that collective may form a critical mass, is often met with institutional and cognitive barriers between the cities (Davoudi, 2003). For such a strategy to be successful, efforts of local and national governments in working on economic complementarities, infrastructure connections, translocal service provision and a supra-regional strategy is necessary. It requires an adjusted strategy on place-based development, taking into account positions in networks of trade, knowledge and FDI as growth factors both (inter) regionally and (inter) nationally.

In order to create conditions for the economic performance of secondary city regions, strong public interventions are advocated by ESPON (2012), aiming at the creation of integrated, multi-level and participatory governance. These interventions should come, on the one hand, from the cities themselves, and, one the other hand, from the national and European level. Second-tier city regions are supposed to open up their internal structures towards cooperation with other stakeholders, mainly the economic and educational partners (triple Helix). They are also stimulated to open up in territorial sense, towards their surrounding areas, aiming at uniting the functional urban area —economic development needs well organized functional cooperation area to allow agglomeration economies—. The tasks of national governments then is to establish overarching governance reforms to initiate cooperation between local governments within the same urban area and stimulate more regional decentralization: regions with more regional independence in planning would give more power to secondary cities as centres of the regions. However, in CEE countries this decentralization

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[2] Vienna, Belgrade, Bucharest, Sofia, Cetinie (Montenegro).
[3] Vienna, Belgrade, Bucharest, Sofia, Budapest, Warsaw, Prague, Tirana, Tallinn, Riga, Vilnius.
[4] Vienna, Belgrade, Bucharest, Sofia, Budapest, Warsaw, Prague, Tirana.
[5] Vienna, Belgrade, Bucharest, Sofia, Budapest, Warsaw, Prague, Tirana, Tallinn, Riga, Vilnius, Bratislava, Ljubljana, Zagreb, Sarajevo, Podgorica, Pristine, Skopje, Minsk, Kiev, Chisinau.

process has not yet been experienced before at such levels. There is little experience and, more important, institutional and human resources are lacking. In consequence, future decentralization policies should come in well-planned and safe steps in order to avoid unstable public institutional capacity regarding public safety or local healthcare systems especially affecting smaller cities or rural areas within a region.

In the case of the Central East European secondary city regions there is little progress regarding their own efforts and more open and flexible government policies (Parkinson *et al.,* 2014).There is a clear need for more European involvement in redirecting financing to secondary city regions. In this view, cohesion policy should partly shift its emphasis from compensating for deficient regional growth to encouraging secondary growth centres. Additionally, EU guidelines should emphasize the importance of more decentralized regional development.

Our research outcomes confirm that a positive development of second-tier city regions in Europe is not as straightforward as recently suggested. Second-tier city regions do not have an overall central position in networks of foreign direct investment —an important (exogenous) development factor of regions and cities—. Given the simultaneously needed critical mass, knowledge endowments and physical accessibility, especially in post-crisis investment trajectories of multinationals, a networked FDI based development will be difficult. Presently, second-tier city regions, and even some of the smaller CEE capital city regions, are not capable of offering all these factors simultaneously in sufficient quantities. For improving their opportunities and contribution to European cohesion and convergence, more substantial and directed investments are needed. Without these, the suggested competitiveness opportunities of second-tier city regions are difficult to obtain.

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Appendix A. Taxonomy of regions

NUTS-code	Region Type	NUTS-code	Region Type
BG31	Other Region	PL31	Other Region
BG32	Other Region	PL32	Other Region
BG33	Region with Second-Tier City	PL33	Other Region
BG34	Other Region	PL34	Other Region
BG41	Capital City Region	PL41	Region with Second-Tier City
BG42	Region with Second-Tier City	PL42	Other Region
CZ01	Capital City Region	PL43	Other Region
CZ02*	Capital City Region	PL51	Region with Second-Tier City
CZ03	Other Region	PL52	Other Region
CZ04	Other Region	PL61	Other Region
CZ05	Other Region	PL62	Other Region
CZ06	Region with Second-Tier City	PL63	Region with Second-Tier City
CZ07	Other Region	RO11	Region with Second-Tier City
CZ08	Region with Second-Tier City	RO12	Other Region
HU10	Capital City Region	RO21	Region with Second-Tier City
HU21	Other Region	RO22	Region with Second-Tier City
HU22	Other Region	RO31	Other Region
HU23	Other Region	RO32	Capital City Region
HU31	Region with Second-Tier City	RO41	Region with Second-Tier City
HU32	Region with Second-Tier City	RO42	Other Region
HU33	Other Region	SK01	Capital City Region
PL11	Region with Second-Tier City	SK02	Other Region
PL12	Capital City Region	SK03	Other Region
PL21	Region with Second-Tier City	SK04	Region with Second-Tier City
PL22	Region with Second-Tier City		

* Constitutes travel-to-work area of Prague (CZ01)

Appendix B.   Taxonomy of investments by broad functions

Category	Functions
Headquarters	Headquarters
R&D	Design, Development, and Testing Education and Training Research and Development
Construction	Construction ICT and Internet Infrastructure
Extraction & Energy	Extraction Energy
Production Plants	Manufacturing
Business, Sales & Marketing	Business Services Sales, Marketing, and Support
Support & Servicing	Customer Contact Centres Maintenance & Servicing Shared Service Centres Technical Support Centres
Logistics & Distribution	Logistics, Distribution and Transportation Retail

Appendix C. Descriptive statistics of variables included in the regressions

Name	Description	Mean	SD
Region with second-tier city dummy	Takes value 1 if region with second-tier city. Classification based on Dijkstra (2009).	0.35	0.48
Other region dummy	Takes value 1 if region is not capital city region or region with second-tier city. Classification based on Dijkstra (2009).	0.51	0.50
Ln multimodal accessibility	Natural logarithm of number of people that can potentially be accessed by air, rail, and road. Obtained from Spiekermann and Wegener (2006).	16.60	0.40
Ln unit wage costs	Natural logarithm of regional wage costs divided by regional gross value added. Obtained from Cambridge Econometrics.	0.54	0.22
Long-term unemployment rate	Long-term unemployment rate in a region. Obtained from Eurostat.	5.14	3.33
Ln number of patents	Natural logarithm of number of patent applications. Obtained from Eurostat.	1.62	0.98
University degree rate	Percentage of the workforce between 25 and 64 with tertiary (ISCED 5-6) education. Obtained from Eurostat.	19.10	6.53
Share mining	Employment in mining and utilities as percentage of total employment. Obtained from Cambridge Econometrics.	2.62	1.38
Institutional quality	Institutional quality index for European regions by Charron *et al.* (2014).	–1.01	0.62
Ln capital stock density	Natural logarithm of (capital stock / total area in km^2). Obtained from Cambridge Econometrics.	0.51	1.32

Number of observations = 350595. Please note that for all logarithmic transformation we applied an inverse hyperbolic sine transformation (Burbidge *et al.,* 1988) when we had to deal with variables that included observations with zero value.

Appendix D. Correlation table of main variables included in the analyses (N=350595)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
(1) Region with second-tier city	1.00									
(2) Other region dummy	–0.74	1.00								
(3) Ln multimodal accessibility	–0.14	–0.35	1.00							
(4) Ln unit wage costs	0.04	0.07	–0.25	1.00						
(5) Long-term unemployment rate	0.13	0.09	–0.19	0.45	1.00					
(6) Ln number of patents	–0.02	–0.32	0.72	–0.29	–0.16	1.00				
(7) University degree rate	–0.13	–0.27	0.43	0.20	–0.10	0.47	1.00			
(8) Share mining	0.23	–0.04	–0.15	0.07	0.16	–0.33	–0.35	1.00		
(9) Institutional quality	0.04	0.06	0.23	–0.23	0.01	0.43	0.02	–0.41	1.00	
(10) Ln capital density	–0.11	–0.29	0.81	–0.34	–0.18	0.75	0.49	–0.26	0.35	1.00