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Cantner, Uwe and Günther, Jutta and Hassan, Sohaib Shahzad and Jindra, Björn

Friedrich-Schiller-University, Germany , Halle Institute for Economic Research, Germany

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Outward FDI from the Central and Eastern European Transition Economies – A Discrete Choice Analysis of Location Choice within the European Union

Uwe Cantner[1,2], Jutta Günther[3], Sohaib S. Hassan[1] & Björn Jindra[3,4]

[1]Friedrich-Schiller-University, Germany; [2]University of Southern Denmark, Denmark; [3]Halle Institute for Economic Research, Germany; [4]University of Sussex, United Kingdom

Abstract: The location determinants of outward foreign direct investment (OFDI) have received extensive attention in contemporary literature, largely from the perspective of advanced economies. Less attention has been focused on OFDI from emerging economies. This applies, in particular, to Central and East European Countries (CEEC). Apart from traditional OFDI motives such as market-seeking, there is a growing debate regarding the relevance of knowledge-seeking as an investment motive for firms from catch-up economies. We apply a conditional-logit approach to assess OFDI location factors at the host country level for a sample of 1,036 firms from 10 CEEC that entered the EU between 1995 and 2010. We find that firms from CEEC primarily target economies characterized by high growth rates and geographic proximity, i.e., often other transition economies within the EU. The impact of market size increases significantly after EU accession, when more firms are located in advanced economies (EU15 countries). In terms of knowledge-seeking, we find that firms from CEEC seem to be primarily attracted by human capital endowment rather than by the R&D intensity of other EU economies.

Introduction

The transition of Central and East European Countries (CEEC) from centrally coordinated to market economies was challenging in many aspects due to a complete transformation of the economic and institutional framework. This transformation, however, was rather quick and led to the subsequent integration of these countries into the European Union (EU). The process of privatization and liberalization triggered major inflows of foreign direct investment (FDI) into CEEC.

During the 1990s, the transition countries became increasingly integrated into the EU via foreign trade and inward FDI. More recently, outward foreign direct investments (OFDI) from CEEC became another way of their economic integration in the EU. Although OFDI initiated from CEEC in the 1990s, it really gathered momentum only after 1997 due to the recovery from the protracted output recession of the 1990s (Svetličič and Jaklič 2003). In the beginning, the majority of OFDI was concentrated within the CEEC region due to strong cultural and historical ties among these countries (e.g., Yugoslavia). More recently, however, CEEC firms have internationalized beyond their own region. Today, other European transition economies and the advanced economies of the EU (EU15: original member states of the EU) countries constitute the main destinations for OFDI from CEEC. However, only a small share of OFDI from CEEC goes outside the boundaries of the EU. According to the EUROSTAT, the share of CEEC amounted only to 0.83% in total extra-EU OFDI (2008 - 2010). Still, OFDI has become a complementary strategy for CEEC firms to internationalize mainly into the EU. Arguably, it does not only provide CEEC firms with opportunities to exploit foreign market potential, but it also provides opportunities for the acquisition of technological and managerial knowledge. The latter might be a precondition for narrowing the development gap and catch-up growth.

OFDI by multinational firms has been growing faster than other international transactions. Global OFDI flows have increased by 17% from 2005 to 2011 (UNCTAD 2008, 2012). Choosing potential locations for OFDI is a crucial decision for firms, and it has received extensive attention in the IB literature since the 1960s. Several studies have investigated the key location determinants or investment motives of OFDI (see, for example, Agarwal 1980, Dunning 1993, and Caves 1996). These seminal studies predominantly focus on OFDI of firms from economies. Given that firms from emerging economies have been growing rapidly in recent years (UNCTAD 2006), a new stream of literature analyzes OFDI location determinants for these countries (e.g., Asiedu 2006, Botrić and Škuflić 2006, Cleeve 2008, Vijayakumar et al. 2010). However, empirical investigations of OFDI from CEEC are rare, with some notable exceptions.

Therefore, this study quantitatively analyzes country-level location determinants of OFDI from CEEC multinational enterprises. We examine the OFDI location choice for a set of firms from the 10 transition economies of the EU[1] (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) for the period 1995 to 2010. In contrast to existing investigations on the subject (see Svetličič 2004, Varblane et al. 2001, Kilvits and Purju 2003, Vahter and Masso 2005), this chapter does not focus on one specific CEEC economy. Rather, it analyzes OFDI location determinants for the complete set of CEEC that joined the EU in 2004 and 2007. In addition, we add to the existing body of

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[1] EU refers to 27 member states of the European Union excluding the new member state of Croatia

evidence by testing for differences in the significance of location factors for OFDI from CEEC firms by differentiating geographical (East-East vs. East-West)[2], sector (manufacturing vs. services) and time dimensions (pre- vs. post EU accession) as well as firm specific effects (firm size). Finally, this study contributes empirical evidence on the debate about the relevance of knowledge or strategic asset-seeking investment motives by firms from emerging economies. Thereby, we take human capital as well as research endowment related knowledge as location factors into consideration.

The remainder of the chapter proceeds as follows. In the next section, we provide a literature overview and derive our hypotheses. In Section 3, we discuss the data. In the ensuing section, we explain the econometric methodology employed for our analysis. In sections 5 and 6, we report and discuss our results, respectively.

Literature review and research hypotheses

Background

A vast literature on IB studies has examined the underlying causes of the international relocation of firms and the corresponding strategies. Thus far, however, there has been little consensus on unified explanations. Earlier works have noted the role of the firm's capacity to differentiate core products across different locations for optimum productions and returns (Vernon 1966). Scholars have further emphasized the role of the ownership advantages (e.g., technological superiority, economies of scales, internalization) of the firms for entry into new markets (Kindleberger 1969, Hymer 1976, Buckley and Casson 1976).

More recently, OLI (ownership, location, internalization), or the eclectic paradigm of Dunning (1977, 1988, 1993), has become somehow the stylized approach for explaining the key motivation of firms' international expansion. Benefits of ownership (technology, management, production process skills and patents), location (new markets with reduced transaction and production costs) and internalization (commercial and organizational competences) are the bases of the OLI paradigm. The eclectic paradigm suggests that firms choose OFDI over other types of internationalizations (e.g., exports, licensing) when the interactions of OLI are most favorable in the host location. Dunning assigns four taxonomies for the investment motives of firms. (1) Market-seeking investments are aimed at entering and exploiting new and large markets; (2) resource-seeking investments are aimed at resources available at host locations for raw materials specific to specific regions or countries; (3) strategic asset-seeking investments are aimed at acquiring new capabilities and resources in the host location; and (4) efficiency-seeking investments are aimed at reducing the costs for the firm with the help of infrastructure available at host locations.

Although the eclectic paradigm is the basis of a large number of studies, it predominantly focuses on the powerful ownership characteristics of the firms.[3] Cantwell (1989) provides an alternative perspective on firms with weaker ownership characteristics that internationalize to other locations, arguing that firms may also relocate their

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[2] In this study, OFDI from CEEC to other CEEC is termed East-East and OFDI from CEEC to advanced economies (EU15) is termed East-West

[3] See Faeth (2009) for a review on literature

production activities in locations offering learning opportunities. In this way, firms can improve their weaker capabilities by absorbing dispersed knowledge in locations attributed with high levels of technological and knowledge activities. The endogenous knowledge-related location factors of the host location (e.g., innovative activities, knowledge spill-overs) lead to continuous technology creation and diffusion among firms, activities from which foreign entrants can benefit. Therefore, in addition to the taxonomies of Dunning, firms can adopt knowledge-seeking internationalization strategies to enhance or create new capabilities (Cantwell and Janne 1999, Pottelsberghe and Lichtenberg 2001).

The conventional IB theory has largely focuses on the international dispersion activities of firms from advanced economies, while firms from emerging economies are considered essentially different from their peers due to several economic and political factors (Ramamurti 2012). These firms are latecomers in the global business, lack technology, branding and internalization capabilities, and rely mainly on their home-country specific factors of production (Buckley et al. 2007, Child and Rodrigues 2005, Deng 2004). Despite their weaknesses, however, these firms are becoming more competitive globally by upgrading their value-added activities (Mudambi 2008).

Along these lines, scholars have questioned the applicability of the IB theory for the internationalization of new global players. On one hand, these firms exploit markets (mostly other emerging economies) as their counterparts. On the other hand, it is suggested that these firms are more likely to seek knowledge, especially embedded in the advanced economies (Mathews 2006, Child and Rodrigues 2005, Luo and Tung 2007). Therefore, in addition to capturing new markets and exploiting at-hand knowledge, these firms can also augment their existing capabilities by learning new and advanced technological and managerial skills in locations where more advanced knowledge is accessible and by absorbing available localized knowledge. Against this background, the location determinants of their OFDI location activities are likely to be affected by their relative global positioning in technology, expertise and commercial branding.

The empirical evidence on the OFDI location activities of the multinational enterprises is largely concentrated on firms from advanced economies (see for a review Blonigen 2005) while there has been comparatively little attention given to firms from emerging economies. Most of the studies concerning OFDI motives of emerging economies focus on emerging giants such as India, China, Russia and Brazil (e.g., Tolentino 1993, Yeung 2000, Andreff 2003, Deng 2004), other East Asian economies (e.g., van Hoesel 1999) and Latin American economies (e.g., Chudnovsky and López 2000), whereas little attention has been given to firms from the CEEC (e.g., Kalotay 2004).

Firms from the CEEC have characteristics similar to those of other emerging economies that are identified as latecomers in the global competition and as being technologically backward. However, because the CEEC are located in close proximity to the EU15, such location provides us an empirical testing ground to examine the extent to which their OFDI location activities are driven by market-seeking and knowledge-seeking objectives.

Location determinants

Market-seeking OFDI

Market-seeking location choice is motivated by the firm's desire to save existing markets at the local, national or regional level or to serve new markets (Culem 1988, Dunning 1977, 1988). A number of empirical investigations have identified a positive influence of the host-country market size and growth on OFDI location activities (e.g., Agarwal 1980, Wheeler and Mody 1992, Taylor 2000, Chakrabarti 2001). Only scant empirical evidence examines the importance of market-seeking on OFDI location activities of CEEC multinationals. A qualitative study conducted by Svetličič and Jaklič (2003) on 180 multinational firms from the Czech Republic, Estonia, Hungary, Poland and Slovenia identified the particular role of market-size and -growth with respect to location activities within the European continent. The study further noted the role of geographical proximity regarding the regional concentration of OFDI activities. Accordingly, the authors concluded that OFDI activities of CEEC multinationals follow traditional market-seeking patterns. However, the study considered a shorter time-series, which limited the scope of the analysis, especially with respect to capturing post-EU membership effects on OFDI location determinants. Moreover, the investigation was limited to firms from a small group of CEEC. Varblane et al. (2001) and Svetličič and Burger (2007) find similar roles regarding market-size for firms in CEEC with respect to OFDI. Although the CEEC-based empirical evidence has determined the role of market-size on OFDI location activities, it seems important to differentiate between market size and market growth in the given context as the advanced economies of the EU are associated with larger and more dynamic markets, whereas the CEEC consist of stable and high economic growth. This information is of particular relevance in our research setting where the study examines, for the first time, the OFDI location determinants of the firms in the advanced economies of the CEEC. Therefore, we posit

> *H1: Other things being equal, market size of a host country increases the location probability of CEEC firms.*
> *H2: Other things being equal, market growth of a host country increases the location probability of firms in the CEEC.*

Knowledge-seeking OFDI

Knowledge is considered a core competence and a fundamental source of a firm's organization (Grant 1996). Empirical literature supports the argument that firms expand abroad in search of knowledge or in an effort to enhance already acquired skills (Cantwell and Jane 1999, Bhagat et al. 2002, Chung and Alcácer 2002). With respect to firms from emerging economies, scholars have proposed the increased relevance of knowledge-seeking OFDI, especially for their investments in advanced economies (Child and Rodrigues 2005, Mathews 2006). According to Loewendahl (2001), advanced economies are capable of providing knowledge-related benefits due to their highly local innovation systems and research infrastructure. Empirical evidence supporting this view is based on studies

focusing on R&D location and re-location activities in countries with advanced knowledge bases (e.g., countries with higher R&D spending and skilled labor). Cantwell and Janne (1999) observe that firms go to leading technical centers located abroad not only to catch up but also to increase their knowledge diversity. In regards to firms from emerging economies, it has been suggested that these firms are more likely to locate their affiliates in countries that are more R&D intensive, that have a more skilled and educated labor force, and that possess higher quality infrastructure (Chung and Yeaple 2008, Luo and Tung 2007, Kedia et al. 2012). To date, there is only limited evidence regarding the knowledge-seeking activities of the firms. Chung and Alcácer (2002) investigate knowledge-seeking FDI inflows in the United States for the period 1987 to 1993 and find that firms use knowledge-seeking investments to source technical diversity and that such knowledge-seeking behavior is particularly pronounced for investments from technically laggard nations. Based on such findings, one can assume that firms from technologically lagging CEEC may seek new knowledge or augment their ownership capabilities in host countries that are attributed with high levels of knowledge activity. However, measuring the level of knowledge, especially at the country level, is a complex phenomenon. Researchers, nonetheless, have examined several knowledge-related national characteristics of host countries that are important for firms' location activities, e.g., the availability of highly skilled labor, the number of educational institutions, and research endowments (Crone and Ropers 2001, Gorg and Ruane 2001, Chung and Alcácer 2002). Thus we test for CEEC

> *H3: Other things being equal, the research endowments of a host country increase the location probability of CEEC firms.*
> *H4: Other things being equal, the availability of skilled labor in a host country increases the location probability of CEEC firms.*

Data

Our firm level data are drawn from the AMADEUS database (online edition 2012). We define foreign ownership in our research context as a firm based in one of the 10 CEEC (Poland, Lithuania, Latvia, Estonia, the Czech Republic, the Slovak Republic, Hungary, Romania, Bulgaria or Slovenia) that is either a direct shareholder (with a minimum of 10% equity) in a firm located in one of the other EU countries or the ultimate owner (with a minimum of 25% indirect ownership) in a firm located in one of the other EU countries. Accordingly, we have identified a sample of 1,036 foreign affiliates (OFDI projects) in the EU that have a foreign and/or ultimate owner from the 10 CEEC that entered between 1995 and 2010.

Within the sample, the Czech Republic (33.5%) and Poland (29.6%) own, by far, the highest shares of foreign affiliates, followed by Estonia (7.7%), Lithuania (7.1%) and Slovakia (6.1%) (see Annex Table A1). In contrast, we find relatively few foreign affiliates for Bulgaria (1.4%) and Romania (1.5%), which entered the EU in 2007. We also find few foreign affiliates for the fairly advanced EU new member states of Slovenia (3.1%) and Hungary (5.1%). Approximately 58% of the foreign affiliates are located in other CEEC of

the EU, and only approximately 42% are located in EU15 countries. The biggest single destination countries are Great Britain (19.5%), Slovakia (18.3%) and Germany (10.5%).[4]

It should be noted that almost all foreign affiliates based in Slovakia have Czech owners. In turn, foreign affiliates based in the Czech Republic are, by and large, owned by Slovakian firms. Basically, every fifth foreign affiliate within the sample can be attributed to FDI between those two countries (the Czech Republic and Slovakia), which separated in 1993. However, the descriptive statistics already reveal that a high share of OFDI from CEEC goes to neighboring EU states, a fact that highlights the role of geographic proximity in general.

During the observation period (1995 to 2010), there is not much variance in the rate of entry[5] (see Annex Table A2). However, we do observe slightly higher rates of entry between 2004 and 2007, which, again, slows down after 2007 most likely due to the economic crisis in Europe at the time. Entry rates indicate a slight push of OFDI from CEEC as a result of accession to the EU in 2004/2007.

Approximately 51% of the parent firms within the sample belong to the manufacturing sector (including other producing industries), and 49% belong to the service sector.[6] By linking information about the sector of the parent firm (in the home country) and the affiliate (in the host country), we can differentiate between horizontal OFDI (within the same sector) and vertical OFDI (from one sector to another) (see Table 1).

Table 1 Share of horizontal and vertical OFDI in the sample

Industrial Classification	Share in total sample (in %)
Manufacturing (parent) – Manufacturing (affiliate)	8.35
Manufacturing (parent) – Services (affiliate)	36.90
Service (parent) – Manufacturing (affiliate)	3.76
Services (parent) – Services (affiliate)	50.99
Total	100

Source: Own calculations based on AMADEUS database (2012)

Consistent with several international OFDI studies, we find that OFDI activities are dominated by horizontal investments (e.g., Brainard 1997). However, this is almost exclusively accounted for by within service sector investments (51%), while a relatively small share (8%) is related to horizontal OFDI within the manufacturing sector. Another

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[4] Within the sample, Great Britain accounts for almost 50% of all CEE OFDI in the EU15 group. In addition, it seems that this is almost exclusively driven by Polish firms investing in Great Britain.

[5] It is noted that entry rates are based on the year of incorporation of the foreign affiliate. In addition, there is a downward bias for earlier, as we do not observe firms that exited during the period of observation.

[6] The statistical classification of economic activities in the EU is generally referred to as NACE, is the European equivalent of NAICS (North American Industrial Classification System), consisting of up to four digits of industrial classification. We have used the first two digits of NACE (Revision 2) to divide our sample into respective sectors.

large part of the investments is related to vertical OFDI from the manufacturing sector to the service sector (37%). The smallest share is vertical OFDI from the service sector to the manufacturing sector (4%).

Estimation approach

Traditional empirical investigations of location determinants would resort to the bi-lateral flows or stocks of OFDI, for example, in the context of gravity modelling. However, these measures have been subject to some criticism in recent literature. Therefore, we take an alternative approach to test our hypotheses by modelling the relevance of different location factors in the context of the firm's OFDI location decision from a given set of countries (EU). Specifically, we model the location choice of each firm by using a random utility maximization approach, an approach that is widely used in industrial location choice (Guimarães et al. 2004). Although this approach cannot take into consideration the intensity of investment approximated by annual stocks and flows of OFDI, firm-level location data reflect the individual decision-making behaviors of firms and are not affected by financial biases.

Against this background, we assume a simplified model for the decision-making process of a firm with regard to international location choice in light of the existing literature (Devereux and Griffith 1998, Basile et al. 2008). It assumes that a firm (investor) first makes a decision about serving the foreign market. Second, the firm decides on the means of investment, that is, whether to serve the foreign market through licensing, alliances, joint ventures or foreign direct investment. The firm then decides about the potential location for its future activities through the most relevant type of investment, in our case, OFDI.

Our analysis is restricted to the final stage of this process, which is location choice for OFDI of CEEC firms within the EU. In our analysis, locations are countries rather than regions or provinces within countries. We assume that the selection choice of a particular country by a CEEC firm depends on the potential profits associated with the host country compared to other alternative countries. Subsequently, we also assume that the profit of the firm is affected by country-specific factors. Moreover, we assume that country level determinants of FDI apply uniformly across all countries within the EU.

The random utility maximization framework has been used as a basis for studying many firm-level discrete choice problems since the work of McFadden (1974). This framework takes into consideration the assumption that the evaluation of a decision maker among available alternatives can be represented by a utility function and that decision makers choose the alternative with the highest utility. In our analysis, national level location choice is a discrete choice problem where profit (utility) maximizing firms choose locations from a distinct set of countries. Given that our analysis is based on choices between 26 European countries, i.e., a comparatively small set of alternatives, we employ a conditional logit econometric technique for our location choice analysis. This technique relies on the assumption that each location is a discrete choice made among different alternatives. The coefficients are estimated using the maximum likelihood procedure.

Applying the model specified by Guimarães et al. (2004) at the country level, we assume the existence of j choices among EU countries with j=1,....,j and N investors with i=1,.....,N. Thus, the profit derived by investor *i* by locating in country *j* is given by

$$\pi_{ij} = \beta' z_{ij} + \epsilon_{ij},$$

where β is a vector of unknown parameters, z_{ij} is a vector of observed explanatory variables, and ϵ_{ij} is a random term. Thus, the profit for investor i of locating in country j is composed of a deterministic and a stochastic component. The investor will choose the country that will yield him the highest expected profit. If the ϵ_{ij} are independently and identically distributed (iid), it can be shown that

$$P_{ij} = \frac{e^{\beta' z_{ij}}}{\sum_{j=1}^{J} e^{\beta' z_{ij}}}$$

where P_{ij} is the probability that investor i locates in country j. If we let $d_{ij} = 1$ in case investor i picks choice j, and $d_{ij} = 0$ otherwise, then the log likelihood of the conditional logit model as

$$\log L_{cl} = \sum_{i=1}^{N} \sum_{j=1}^{J} d_{ij} \log P_{ij} ,$$

In our model, the expected profit derived by investor I if he locates in country j is given by Specification (I):

$$(I) \; \pi_{ij} = \beta_1 MKTSIZE_{jt_{i-1}} + \beta_2 MKTGROWTH_{jt_{i-1}} + \beta_3 R\&D_{jt_{i-1}} + \beta_4 HRSTO_{jt_{i-1}}$$
$$+ \beta_5 PDENS_{jt_{i-1}} + \beta_6 HEXMFG_{jt_{i-1}} + \beta_7 FDIINF_{jt_{i-1}} + \beta_8 INF_{jt_{i-1}}$$
$$+ \beta_9 PROXIMITY_j + \epsilon_{ij},$$

where dependent variable is a binary variable of location choice (CHOICE) in a particular country among the set of 26 countries (see Annex I Table A3 for a detailed description of variables).

In this basic specification, the parameters β_1 to β_4 constitute the explanatory variables related to our hypotheses. MKTSIZE is the log of GDP per capita and MKTGROWTH is the annual GDP growth rate of country j as the entry of investor i. These two measures represent our proxies of market-size and market-growth respectively, to examine the market-seeking OFDI, as tested by a number of studies (Coughlin et al., 1991, Pusterla and Resimini 2007, Cleeve 2008, Vijayakumar et al. 2010).

R&D is the first proxy of the host country knowledge-base and is measured as the total research endowments (public and private) as a percentage of the GDP of country j as the entry of investors. Higher spending on R&D by a country indicates the priority given to

knowledge creation activities (technological and commercial competences) at the national level (Chung and Alcácer 2002). HRSTO is the skilled labor--human resources employed in the science and technology occupations in country *j*. This represents knowledge-stock of a country and is considered beneficial to foreign investors in terms of technology/knowledge transfer and linkages across firms (Jaffe et al. 1993; Audretsch and Feldman, 1996).

β_5 to β_9 constitute the control variables conventionally associated with the reduction in the transaction costs. PDENS is the number of inhabitants per square kilometer and represents national population density, HEXMFG is the total number of high-tech exports in total manufactured exports, FDIINF is total FDI inflows and INF is the percentage of paved roads out of total roads in country *j* at the entry of investor *i* and represents communication infrastructure. Finally, PROXIMITY is the geographical distance between the capital city of country *j* and the capital city of the country of investor *i*, and $\in_{ij}$ is a random term.

Apart from β_9, all explanatory variables are measured at t_{-1} as the year preceding the entry of investor *i*. By lagging the respective variables, we address a possible endogeneity between the investment of firms and the country specific effects. Additionally, to account for heterogeneity across firms, we estimate, apart from the base line model, a second model that includes interaction terms between selected firm or industry specific effects and the main exogenous variables such that they are consistent with our key hypotheses:

$$(II)\ \pi_{ij} = \ \beta' z_{ij} + \gamma' Sectordum_i * v_{ij} + \delta' Sizedum_i * v_{ij} + \varepsilon' Accessdum_i * v_{ij}$$
$$+ \theta' EU15dum_i * v_{ij} + u_{ij},$$

where β is a vector of unknown parameters; z_{ij} is the vector of the observed explanatory variables specified in Specification (I); γ is a vector of unknown parameters from the interaction with $Sectordum_i$; v_{ij} is a vector that contains a linear combination of all exogenous variables in line with hypotheses (1) and (2), as defined in the Specification (I); δ is a vector of unknown parameters from the interaction between $Sizedum_i$ and v_{ij}; ε is a vector of unknown parameters from the interaction with $Accessdum_i$; θ is a vector of unknown parameters from the interaction between $EU15dum_i$ and v_{ij}; and u_{ij} is a random term.

$Sectordum_i$ represents a dummy variable that equals one if the respective affiliate of investor *i* belongs to the manufacturing sector, and zero otherwise; $Sizedum_i$ equals one if the affiliate of investor *i* has a number of employees above 250, and zero otherwise; $Accessdum_i$ equals one if investor *i* entered after accession of its home country to the EU, and zero if otherwise; $EU15dum_i$ equals one if investor *i* has an affiliate in one of the EU15 member countries, and zero otherwise.

Summary statistics and correlations of the explanatory variables are given in the Table A4 (in the Annex). The variance inflation factor (VIF) is less than 2.5 for each variable, whereas the mean VIF is 2.1. These values suggest that there is no serious multi-collinearity issue. However, we had to exclude host country wages (an appropriate variable to

approximate efficiency-seeking behavior) and patent activity[7] from the Specification (I) due to high correlation as no suitable instrument could be identified.

Results

Descriptive overview

Figure A5 (in the Annex) provides a descriptive analysis of four proxies for our key explanatory variables. The charts compare the dynamics for CEEC and EU15 within the period of observation (1995 to 2010) and show that differences in market sizes (MKTSIZE) remained stable or even increased between the CEEC and the EU15 despite the considerably higher market growth (MKTGROWTH) for CEEC between 1999 and 2008. This suggests that there could be a strong incentive for market-seeking OFDI in both regions of the EU. On the one hand, CEEC more than doubled their income per capita within just 10 years. On the other hand, entering EU15 countries provided access to markets that wee, on average, three times as rich as the CEEC markets.

Considering the dynamics of the knowledge-related variables, we note that within the EU the level and growth of national research endowments (R&D) as well as skilled labor (HRSTO) are higher in the EU15 group. In the CEEC, we observe stagnation in both indicators during the time of observation. Given the increase in GDP per capita in CEEC over the same period, we perhaps also observe a decline in absolute R&D expenditures. From this perspective, knowledge-seeking OFDI would have greater incentive to locate in EU15 countries within the EU.

Estimation Results

Due to missing observations in the explanatory variables over time and across countries, we use data imputation to maximize the number of observations.[8] The resulting sample consists of 951 OFDI projects of CEEC firms. We first estimate the base line model (Specification I) for the whole sample, which corresponds to all location choices of CEEC within the EU (see Column I (EU) in Table 2). Subsequently, we estimate the base line model for the two subsets: a) the 399 foreign affiliates located in the EU15 countries (see Column II (East-West) in Table 2) and b) the 552 foreign affiliates located in the 10 transition countries (see Column III (East-East) in Table 2). In this way, we attempt to isolate differences in the significance of location factors that can be explained by the broad geographic differentiation in the sample. The test statistics of all estimations of the base line model are significantly different from zero, thus allowing us to interpret the coefficients of the estimations.

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[7] Control for frequency of knowledge creation as by used Chung and Alcácer (2002). We have used HEXMFG instead. High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery

[8] The data have been imputed as follows. First, if there was a missing value between two observations, we imputed the missing value by taking the mean between the following and subsequent period. Second, if the time series ended at a certain period (e.g., before 2010), we imputed the missing values by multiplying the last observation with the observation between that period and the year before. Third, because our analysis is from 1995 onwards, the same step was applied for time series starting after 1995.

Table 2 Estimation results for conditional logit base line model and subsets

	Base Line Model (I) EU	(II) East-West	(III) East-East
Market-Seeking			
MKTSIZE	-0.526***	1.903**	-0.376
	(-6.85)	(3.10)	(-1.52)
MKTGROWTH	0.102***	0.194***	0.0685**
	(6.37)	(3.41)	(2.72)
Knowledge-Seeking			
R&D	-0.538***	-0.514**	2.276***
	(-6.05)	(-3.08)	(6.50)
HRSTO	0.445***	0.955***	1.717***
	(9.35)	(7.41)	(8.63)
Control variables			
PDENS	0.000291	0.00109	-0.0362***
	(0.86)	(1.38)	(-7.45)
HEXMFG	0.0292***	0.0764***	-0.121***
	(5.86)	(6.18)	(-8.67)
FDIINF	0.0000155***	0.00000772***	0.00000833
	(15.48)	(4.79)	(0.72)
INF	-0.00652*	-0.0173*	0.0511***
	(-2.39)	(-2.46)	(7.56)
PROXIMITY	-1.559***	-1.078***	-2.799***
	(-28.23)	(-7.26)	(-20.84)
Observations	24,726	5,985	6,072
No. of firms	951	399	552
AIC	4697.6	1331.2	1462.9
BIC	4770.6	1391.5	1523.3
Log lik	-2339.8	-656.6	-722.4
Chi-sq	1143.0	501.2	554.9
Prob>Chi2	0.0000	0.0000	0.0000

Standard errors in parentheses. Significance level: * $p < 0.05$(5% level), ** $p < 0.01$ (1% level), *** $p < 0.001$ (0.1% level)

The estimation of the basic model Specification (I) for the whole sample reveals that MKTSIZE is significant and negative (at the 0.1% level). This implies, in contrast to hypothesis (1), that a large market size significantly lowers the location probability of CEEC

firms within the EU. The effect of MKTSIZE is significant and positive (at the 1% level) in Column (II), whereas its effect is insignificant in Column (III), thus suggesting that for the East-West subset, the investors consider the strength of the hosting economy in advanced economies of Europe where larger markets with stronger purchasing power are located, a finding that is consistent with hypothesis (1). However, results in Column (III) suggest that differences in GDP per capita do not statistically explain significant location choice patterns within the East-East subset. This could imply that the result is mainly driven by differences in the market sizes between the CEEC and the EU15, i.e., CEEC firms are more likely to locate in the advanced economies of the EU that are characterized by large market sizes during the observation period.

Column (II) also shows a significant and positive (at 0.1% level) coefficient for MKTGROWTH. This effect would be in line with research hypothesis (2) that market growth of a host country increases the location probability. Column (II) shows that this effect applies also to explain location patterns between East-West i.e., within the EU15 Group. However, this applies comparatively less significantly for East-East location choices i.e., within CEEC.

We also find a significant and negative (at 0.1% level) effect of host country R&D on location probability (see Column I in Table 2). In addition, we find the same result for East-West location choices, thus implying that CEEC do not target the most R&D intensive countries in the EU or the EU15 group for their investment. Thus far, the evidence does not support research hypothesis (3), which argues that R&D intensity increases location probability. However, this seems to hold if we estimate the specification for the East-East subset as this implies that within the subset of CEEC, the level of research endowments in the host country has a positive effect on location probability.

The situation is considerably different if we consider our second proxy for knowledge-seeking investment as we find a significant and positive (at 0.1% level) effect of HRSTO on the location likelihood of CEEC foreign affiliates. This applies to the whole sample as well as to both subsets (see Columns I-III). Therefore, we can conclude that the availability of human resources in science and technology occupations matters for the location of foreign affiliates owned by firms from CEEC. Thus, we cannot reject research hypothesis (4).

With regard to our control variables, we find that population density (PDENS) has no statistically significant effect on the location probability of firms within the EU or within the East-West subset (see Columns I and II in Table 2). However, we find a negative effect for the East-East sub-sample (see Column III in Table 2), i.e., the location probability is less likely in densely populated CEEC. We also find that the share of high tech exports in total manufacturing exports (HEXMFG) of a host country has a positive effect on the location probability of foreign affiliates within the whole EU as well as within the East-West location sub-sample. In contrast, we find a negative relation for the East-East subset. The results also show a positive effect of total FDI inflows (FDIINF) into the host country on the location probability of firms from CEEC. This finding applies to the EU and the EU15. However, the effect is statistically not significant for East-East location sub-sample. The results indicate that communication infrastructure (INF) has no significant effect on the EU, has a negative effect on the East-West sub-sample and a positive effect on the East-East sub-sample. Finally, we show that geographic proximity (PROXIMITY) has a strong and significant negative effect on location probability. This result applies to the whole sample as well as to

both subsets (see Columns I - III in Table 2), and it confirms the relevance of geographic proximity with respect to OFDI location choice.

Our base line model assumed that the host country specific location factors affect the utility function of CEEC firms uniformly with respect to their location choice. The estimation of three additional specifications (see Columns IV-VI in Table 3) that include interaction terms is intended to relax this restriction with regard to the sector of the foreign affiliate, firm size and time of entry. The specifications are estimated for the whole sample of foreign affiliates in the EU.

Table 3 Estimation results interaction models

	Interaction Models					
	(IV)		(V)		(VI)	
Market-Seeking						
MKTSIZE	-0.666***	(-6.63)	-0.461***	(-5.16)	-0.590***	(-6.47)
MKTGROWTH	0.0896***	(4.41)	0.125***	(6.49)	0.0742***	(3.95)
Knowledge-Seeking						
R&D	-0.477***	(-4.07)	-0.643***	(-6.10)	-0.643***	(-5.26)
HRSTO	0.273***	(5.02)	0.423***	(8.10)	0.442***	(8.34)
Control Variables						
PDENS	0.000177	(0.52)	0.000296	(0.87)	0.000150	(0.42)
HEXMFG	0.0284***	(5.70)	0.0291***	(5.84)	0.0326***	(6.37)
FDIINF	0.0000160***	(15.80)	0.0000156***	(15.58)	0.0000140***	(13.54)
INF	-0.00532	(-1.96)	-0.00631*	(-2.32)	-0.00500	(-1.84)
PROXIMITY	-1.562***	(-28.13)	-1.567***	(-28.26)	-1.599***	(-28.43)
Manufacturing Firms						
MKTSIZE	0.306*	(2.15)				
MKTGROWTH	0.0237	(0.73)				
R&D	-0.179	(-1.06)				
HRSTO	0.428***	(6.12)				
Firms Size (>250)						
MKTSIZE			-0.206	(-1.36)		
MKTGROWTH			-0.0779*	(-2.32)		
R&D			0.317	(1.76)		
HRSTO			0.104	(1.40)		
Post-EU Membership						
MKTSIZE					1.005***	(5.41)
MKTGROWTH					0.267***	(6.28)
R&D					-0.0307	(-0.18)
HRSTO					0.274***	(3.56)
N	24,726		24,726		24,726	
No. of Firms	951		951		951	
AIC	4628.1		4683.5		4626.2	
Log lik	-2301.1		-2328.8		-2300.1	
chi-sq	1177.4		1151.4		1189.4	
Prob < Chi2	0.0000		0.0000		0.0000	

Standard errors in parentheses. Significance level: * $p < 0.05$ (5% level), ** $p < 0.01$ (1% level), *** $p < 0.001$ (0.1% level)

Estimation IV shows that for foreign affiliates in manufacturing, the negative effect of MKTSIZE of the host country is significantly smaller in comparison to the control group. In addition, we find that the positive effect of HRSTO is significantly larger for foreign affiliates in the manufacturing sector in comparison to the control group.

Estimation V shows that for larger foreign affiliates, the positive effect of MKTGROWTH is significantly smaller but still positive. Finally, the results of estimation VI show that for foreign affiliates that entered the EU after EU accession of their home country, MKTSIZE had a significant positive effect in comparison to the control group that entered before EU accession. This implies that we cannot reject research hypothesis (1) that market size has a positive effect on location probability for post-EU membership location decisions within the EU. We also find a significantly larger positive effect of MKTGROWTH as well as HRSTO on location probability, if CEE firms undertook OFDI after EU accession. To test whether coefficients of our key explanatory variables differ *significantly* between East-East and East-West locations, we estimate another specification that has an interaction term between our key variables and a dummy for locations within the EU15 group (see Annex Table A6). The results indicate that, in fact, market size in terms of GDP per capita matters even less for location in EU15 countries. We find the same result for R&D. In contrast, human resources in science and technology occupations matter significantly more for location in the EU15 compared to locations in CEEC.

Discussion

It is widely acknowledged that countries with faster economic growth and larger market sizes attract more FDI (among others, see Asiedu 2006, Cleeve 2008, Coughlin et al. 1991, Head et al. 1999, Pusterla and Resimini 2007, Vijayakumar et al. 2010). Our descriptive evidence indicates a dominance of horizontal vs. vertical OFDI from CEEC into the EU, which is an indicator of market-seeking investment. Consistent with existing evidence for CEEC (Svetličič and Jaklič 2003, Svetličič and Burger 2007, Varblane et al. 2001), we have also found a positive effect of host country market growth on the location probability of firms from CEEC within the EU.

However, in contrast to existing studies, we have found a negative overall effect of host countries' market size on the location probability of CEEC within the EU. Nonetheless, a geographic differentiation of our sample into two sub-sets reveals that firms from CEEC are attracted by the large markets of the advanced European countries and growing markets of other transition economies. This has been of particularly relevant for the fast growing neighboring markets. We should recall that a large portion of OFDI is because the Czech Republic and Slovak Republic had to overcome a new border that separated prior existing economic ties. Our evidence suggests a change in the location choice pattern (with regard to the effect of market size), which was triggered by EU accession and thus offered CEEC better access to new and larger markets.

The literature also suggests that firms expand abroad in search of knowledge or in an effort to enhance already acquired capabilities (Cantwell and Jane, 1999, Bhagat et al. 2002, Chung and Alcácer 2002). Therefore, firms from emerging economies could expand abroad to overcome their technological gap and latecomer disadvantage (Kogut and Chang 1991, Mathews 2006, Luo and Tung 2007). Our results indicate fairly robustly that firms from CEEC seek locations within the EU that offer human resources in science and technological

occupations. The effect is stronger for location decisions within the EU15 compared to locations in the 10 CEEC. This result is a possible indicator that CEEC internationalize to acquire human capital related technology and competences. Recalling that our descriptive evidence exhibited a widening gap in the availability of human resources in science and technology occupations at home in comparison to the EU15, our evidence could indicate that firms from CEEC use OFDI to compensate for a lack of skilled labor at home.

The above finding would, on the one hand, support existing claims that knowledge-seeking motives are of relevance to firms from transition economies (Svetličič and Jaklič 2003, Kedia et al. 2012). On the other hand, our study generated also a fairly robust result with regard to a negative effect of host countries' research endowments on the location probability of firms from CEEC within the EU in general and within the EU15 in particular. This finding casts doubt on the claim that firms from emerging countries may internationalize knowledge seeking to advanced economies, providing that the advanced economies are more R&D intensive (Chung and Yeaple 2008, Luo and Tung 2007, Kedia et al. 2012). Observing OFDI from CEEC between 1995 and 2010, it seems that location choices in advanced economies of the EU were not at all related to research expenditures. Rather, the evidence suggests the relevance of market-related factors and geographic proximity. The latter finding is also consistent with prior results on OFDI from CEEC (Svetličič and Jaklič 2003, Kilvits and Purju 2003) as well as with the wider literature on OFDI location choice.

Limitations

The study suffers from a number of limitations that should be addressed by future research. First, there are restrictions in terms of the firm level data used in this analysis. To learn more out about the relevance of various location factors within the EU for firms from transition economies, it would be appropriate to control for location choice patterns of other emerging country firms. By so doing, we could isolate significant differences or similarities in location choice between intra-EU and extra-EU investment decisions.

Second, the current study suffers from limitations with regard to host countries as the level of analysis. To exploit the full potential of the location information provided by the firm level data used in the analysis, it seems appropriate to apply a sub-national level of analysis. Unfortunately, a sub-national level of analysis was not possible in this study due to the relatively low number of observations across regions of the EU. However, a sub-national level of analysis would open up the possibility to include the role of agglomeration economies, including knowledge spill-overs, in the analysis. This may be particularly relevant for assessing location factors in connection with knowledge seeking.

Third, future research should address shortcomings with regard to the explanatory variables used in this analysis. This refers to a possible omission variable bias, in particular, with regard to the role of wages. Due to high correlations with other key variables, the variable for role of wages was omitted in this analysis. This could be overcome, however, by identifying a suitable instrument. In addition, R&D intensity measured at a national level suffers from the shortcoming that it is highly dependent on the sector structure of the economy, an issue that can be overcome by using sector-specific proxies. Another shortcoming of the explanatory variables is that they are only host country specific. It could be argued that differences in various explanatory variables between the home and the host

countries could be more insightful in motivating location choice rather than focusing only on host country characteristics.

Finally, our empirical investigation relies upon a conditional logit approach, which is widely used in the industrial location literature. However, conditional logit models are based on the independence of irrelevant alternative assumptions, i.e., that there is no unobserved correlation across countries or firms. An alternative approach for future research may be the application of a mixed logit estimation that is not dependent on this assumption.

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Annex

A1 Distribution of CEEC OFDI projects across source and destination countries within the EU (1995-2010)

Source	Destination																									Total	%
	AT	BE	BG	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	NL	PL	PT	RO	SE	SI	SK		
Bulgaria	1	0	0	0	4	0	0	0	0	0	0	1	0	0	1	0	0	0	2	4	0	0	0	0	1	14	1.4
Czech Republic	9	0	7	0	34	0	0	2	0	5	8	0	4	1	5	3	0	3	7	70	0	5	0	3	181	347	33.5
Estonia	0	0	0	1	0	0	0	0	1	0	2	0	0	1	0	22	1	49	1	2	0	0	0	0	0	80	7.7
Hungary	3	1	1	2	10	0	1	0	0	3	2	0	0	1	3	0	0	0	8	6	0	7	0	2	3	53	5.1
Lithuania	0	0	1	1	0	0	25	0	0	1	1	0	0	0	0	0	0	37	1	7	0	0	0	0	0	74	7.1
Latvia	0	0	0	0	1	0	30	1	0	2	0	0	0	0	0	11	0	0	1	1	0	0	0	1	1	49	4.7
Poland	4	0	0	19	46	4	3	5	0	4	185	0	2	2	1	15	1	4	4	0	0	3	1	0	4	307	29.6
Romania	4	1	4	1	3	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	16	1.5
Slovenia	4	1	1	3	7	0	0	1	0	1	1	0	0	1	0	1	0	1	2	4	1	1	3	0	0	33	3.2
Slovakia	3	0	0	40	4	0	0	1	0	0	2	0	1	1	0	0	0	0	0	8	0	1	0	2	0	63	6.1
Total	**28**	**3**	**14**	**67**	**109**	**4**	**59**	**10**	**1**	**17**	**202**	**1**	**7**	**7**	**11**	**52**	**2**	**94**	**26**	**102**	**1**	**17**	**4**	**8**	**190**	**1,036**	
%	2.7	0.3	1.4	6.5	10.5	0.4	5.7	1.0	0.1	1.6	19.5	0.1	0.7	0.7	1.1	5.0	0.2	9.1	2.5	9.8	0.1	1.6	0.4	0.8	18.3	100%	

Source: Own calculations based on AMADEUS Database (online edition 2012)

A2 Rates of annual entry into the EU by CEEC firms within the sample

Year of entry	Freq.	Percent	Cum.
1995	46	4.44	4.44
1996	57	5.50	9.94
1997	60	5.79	15.73
1998	66	6.37	22.10
1999	64	6.18	28.28
2000	85	8.20	36.49
2001	64	6.18	42.66
2002	72	6.95	49.61
2003	70	6.76	56.37
2004	81	7.82	64.19
2005	88	8.49	72.68
2006	95	9.17	81.85
2007	108	10.42	92.28
2008	42	4.05	96.33
2009	25	2.41	98.75
2010	13	1.25	100.00
Total	**1.036**	**100.00**	

Source: Own calculations based on AMADEUS Database (online edition 2012)

A3 Measurements and sources of variables

| Variables	Symbols	Measurements
Dependent Variable		
Choice	CHOICE	Binary variable, location choice from a set of 26 alternative countries within the European Union
Independent Variables		
<u>Market-seeking</u>		
Market-Size	MKTSIZE	Log Annual GDP per capita (000s) of the host country*
Market-Growth	MKTGROWTH	Log Annual GDP growth %age of the host country*
<u>Knowledge-seeking</u>		
Research endowments	R&D	Log Annual total R&D spending as %age of GDP of the host country*
Skilled Labor	HRSTO	Log Human Resource in Science and Technology(000s) in the host country**
<u>Control variables</u>		
Population Density	PDENS	Log People per square km of land area (00s) in the host country*
High-Technology Exports	HEXMFG	Log High-Tech exports as %age of total manufactured exports of the host country*
FDI Inflows	FDIINF	Annual total FDI inflows in alternatives (Mio. $) in the host country*
Infrastructure	INF	Log % of paved roads in total roads of the host country*
Distance	PROXIMITY	Log Euclidean distance in km between capital of home country and the alternative's ***

Source: *World Bank, **Eurostat, ***own calculations

A4 Descriptive statistics of explanatory variables

Variable	Observations	Mean	Std. Dev	Min	Max	1	2	3	4	5	6	7	8	VIF
														2.52
1. MKTSIZE	24726	9.492962	0.9190593	6.802395	11.30467	1								
2. MKTGROWTH	24726	3.640799	2.850488	-17.95	12.23	-0.18	1							1.27
3. R&D	24726	1.35305	0.897347	0.169456	4.13	0.666	-0.225	1						2.59
4. HRSTO	24726	7.16406	1.474153	3.475432	9.936922	0.171	-0.257	0.377	1					2.71
5. PDENS	24726	172.4419	233.0282	16.77	1293.72	0.104	-0.152	-0.129	-0.275	1				2.42
6. HEXMFG	24726	15.36051	13.07781	1.21	71.74	0.356	-0.002	0.192	-0.173	0.673	1			2.5
7. FDIINF	24726	17633.01	32536.87	-30333.7	210085.4	0.44	-0.077	0.292	0.254	0.059	0.118	1		1.59
8. INF	24726	52.28366	26.74736	17.62	175.93	0.184	0.209	-0.024	-0.617	0.262	0.275	0.218	1	2.5
9. PROXIMITY	24726	6.851667	0.6471716	4.023441	8.107297	0.122	-0.012	-0.184	-0.141	0.165	0.207	0.043	-0.046	1.31
														Mean VIF:2.16

Source: Own calculations

A5 Comparative differences of main explanatory variables between EU15 and CEEC
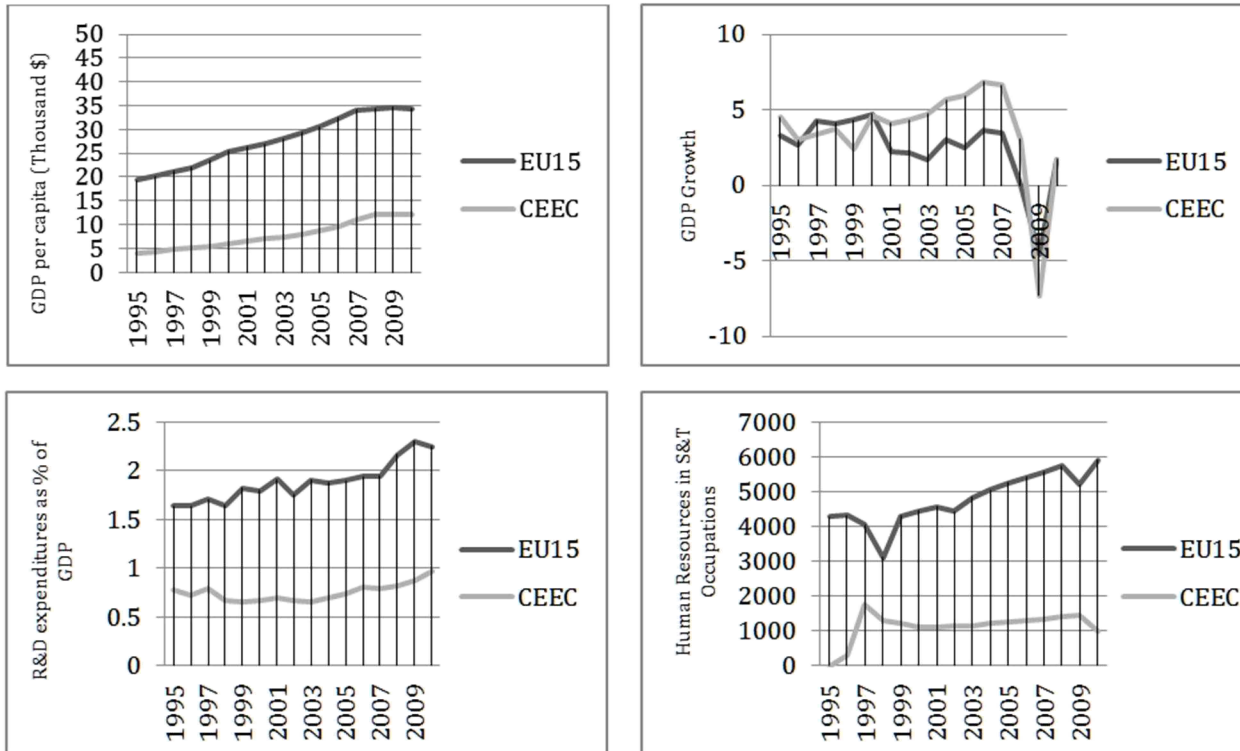
Source: Own calculations based on EUROSTAT and World Bank data (see Annex Table A3)

A6 Estimation results EU15 vs. CEEC locations for EU sample

	Interaction Model
Market-Seeking	
MKTSIZE	-0.767***
	(-5.24)
MKTGROWTH	0.101***
	(5.73)
Knowledge-Seeking	
R&D	0.195
	(0.86)
HRSTO	0.157**
	(2.68)
Control Variables	
PDENS	-0.0000965
	(-0.26)
HEXMFG	0.0287***
	(5.21)
FDIINF	0.0000144***
	(13.55)
INF	-0.00578
	(-1.76)
PROXIMITY	-1.580***
	(-26.36)
EU15	
MKTSIZE	-0.440***
	(-5.47)
MKTGROWTH	0.0582
	(1.37)
R&D	-0.844***
	(-3.57)
HRSTO	0.686***
	(8.02)
N	24,726
No. of Firms	951
AIC	4620.2
Log lik	-2297.1
chi-sq	1132.0
Prob < Chi2	0.0000

Standard errors in parentheses, $^{*}\,p < 0.05$, $^{**}\,p < 0.01$, $^{***}\,p < 0.001$