European Economic Integration and FDI Location: The Fifth Enlargement

by

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I dedicate this thesis to my mum and dad.

Abstract

The fifth enlargement of the European Union (EU) involved the accession of ten Central and East European Countries (CEECs). A crucial element of the enlargement was the economic liberalization of the CEECs, for which Foreign Direct Investment (FDI) played an important role. While it is known that FDI increased in the CEECs after accession, relatively little is known about the nature of this investment and about its location determinants. The aim of this thesis is to investigate the location of FDI projects across the main 25 countries and 260 NUTS2 regions of the European Union. The study uses annual panel data from the European Investment Monitor for 1997 to 2010. This gives project-level information on over 35,000 cross-border investments, covering 'greenfield' projects that add to capacity, arising from new investment or expansions.

The thesis has three main contributions. First, the spatial distribution of FDI activity is examined at the country and region level. It reveals the nature and changing pattern of FDI location both before and after the fifth enlargement. Second, the motives for FDI location are investigated at the country-level. Using a conditional logit model it shows that FDI in the 'old' EU is predominantly 'specific-asset' resource-seeking for higher skills, whereas in the 'new' EU it is market-seeking and 'general-asset' resource-seeking for inexpensive unskilled and semi-skilled labour. Further, expansions are not simply about efficiency-seeking, i.e. adding scale for the purpose of achieving greater economies. Third, the role of border effects is examined to see if FDI agglomerates in the CEECs close to the former West-East border. It recognises that the regions alongside the West-East border tend to be 'winners' of EU enlargement, receiving about 82% more FDI projects more than non-border regions. This suggests that national borders continue to shape the spatial distribution of economic activity.

Chapter 1

Introduction

The fifth enlargement of the European Union (EU) was completed in two stages in 2004 and 2007, and it involved the accession of ten new members from Central and Eastern Europe and two small Mediterranean countries. It was a significant step in progress towards European economic and political integration, a culmination of a long accession process and a symbolic reunification of Europe that has long been split into two parts by the Iron Wall. Twelve 'new' accession countries joined the fifteen 'old' EU Member States (EU-15), creating the world's largest Single Market. With the completion of the fifth enlargement in 2007, 105 million new citizens were added to the existing EU's internal market of 380 million people. Although the fifth enlargement added relatively little in the GDP terms (extra 5% to the EU-15 GNP and 10% in purchasing power parity terms; Landaburu, 2007), it strengthened the voice of the EU on the geopolitical scene and greatly augmented the size of the Single Market.

The fifth enlargement was exceptional in terms of its scale, and its nature made it an unprecedented event in the history of the EU. The lengthy and complex accession process resulted in the admission of twelve 'new' Member States, and never previously had the EU negotiated accession with twelve candidate countries simultaneously. Up until the fifth enlargement, the maximum number of countries to join the EU in a single wave of enlargement was three. The added challenge of the fifth enlargement was the heterogeneity of the candidate countries in terms of their population and economic size, culture, history and economic development. The ten accession countries of Central and Eastern Europe included the 2004 entrants of the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia, and the 2007 entrants Bulgaria and Romania. In addition Cyprus and Malta also joined as part of the fifth enlargement. The Central and Eastern European Countries (CEECs) that acceded to the EU as part of the fifth enlargement were the former communist and transition economies that even prior to the disintegration of the Soviet Union faced significant challenges to integration with the market economies of Europe. The economic and political background of the CEECs made the nature of the fifth enlargement different to all previous ones.

Following the symbolic fall of the Berlin Wall and the collapse of the communist regime in CEECs in the late 1980s, these countries soon expressed their intention to join the EU with the signing of the Europe Agreements and submitting of formal applications for membership in the early to mid-1990s. However, the legacy of the socio-economic systems of CEECs made the process of their rapid integration into the EU difficult. The collapse of communism initiated the process of transition that involved the restructuring of their economies from a centrally-planned to a market economy. It also revealed the urgency of a complex reform of an institutional system to support the candidate countries in achieving stability of institutions guaranteeing democracy, the rule of law and human rights protection, emphasising the complexity of the pre-accession. Although for most CEECs the pre-accession process took around a decade to complete, the process of reform has had wide-scale implications for the economic performance of the CEECs.

The pre-accession reforms of political, institutional and economic systems of CEECs coincided with a growth of inward foreign direct investment (FDI) to these countries. At the beginning of the 1990s, the inflows of FDI to CEECs were negligible but have grown fast in absolute and relative terms thereafter. The economic literature attributes the growth of inward FDI in the CEECs to structural reforms and the prospect of EU accession (e.g. Bevan *et al.*, 2004; Bevan and Estrin, 2004; Landaburu, 2007). Bevan *et al.* (2004) recognise that institutional quality in general enhances FDI inflows, but admit that complementarities as well as potential conflicts exist between policy reform and the attraction of FDI. In another paper, Bevan and Estrin (2004) find that the prospect of the EU membership is an important determinant of inward FDI in CEECs, recognising that the process of EU accession negotiations is "an important political and economic signal" (p. 776). Despite this recognition of a link between EU membership and the size of FDI inflows, in fact relatively little is known about the impact of the fifth enlargement on inward FDI and its location within the enlarged EU.

While FDI is not a new phenomenon, the dramatic rise in foreign investment activity has only been recorded since the beginning of the 1980s. Foreign Direct Investment (FDI) is defined as the cross-border transfer of capital through which a firm significantly expands its production capacities outside its national borders. Alongside other options such as exporting, licensing and franchising, FDI is one of the strategies that permits a firm to enter a foreign market. Through the process of FDI a multinational enterprise (MNE) is created - an entity that owns production facilities in more than one country. The OECD (2009) recognises that "FDI is a key driver of international economic integration (...) and can provide financial stability, promote economic development and enhance the well being of societies" (p. 3), provided the right policy framework is in place. As illustrated in Tables 1.1 and 1.2, since the beginning of 1980s the global size of the FDI stock has increased substantially both in absolute terms and relative to the world GDP, while the growth rates of FDI activity have tended to exceed that of nominal GDP.

Table 1.1: Selected Indicators of FDI and GDP: Current Prices

Item	Value at current prices (billions of US dollars)							
	1980	1985	1990	1995	2000	2005	2008	2009
FDI inflows	54	56	208	343	1415	997	1819	1222
FDI outflows	51	62	242	362	1241	904	1999	1171
FDI inward stock	698	990	2081	3426	7511	11739	15680	18428
(share of GDP)	5.81	7.46	9.22	11.26	22.88	25.27	25.28	31.30
FDI outward stock	548	902	2093	3769	8008	12564	16519	19589
(share of GDP)	4.58	6.84	9.30	12.43	24.49	27.17	26.79	33.49
GDP	12043	13286	22604	30455	32858	46506	62095	58944

(source: UNCTAD, 2010, `http://unctadstat.unctad.org`).

Table 1.2: Selected Indicators of FDI and GDP: Annual Growth Rates

Item	Annual growth rate (percent)				
	1991 - 1995	1996 - 2000	2001 - 2005	2008	2009
FDI inflows	22.5	40.0	5.2	-15.7	-37.1
FDI outflows	16.8	36.1	9.2	-14.9	-42.9
FDI inward stock	9.3	18.7	13.3	-13.9	14.5
FDI outward stock	11.9	18.4	14.6	-16.1	17.1
GDP	5.9	1.3	10.0	10.3	-9.5

(source: UNCTAD, 2010; `http://unctadstat.unctad.org`).

Swiftly rising levels of FDI recorded since the beginning of the 1980s are a sign of accelerating globalisation. Although rising since the early 1980s, the extremely strong growth of world FDI flows occurred in the 1990s (Jones and Wren, 2006). During the last decade of the 20th century the annual growth rate of global FDI inflows equalled 22.5% between 1991-1995 and 40.0% between 1996-2000, considerably exceeding the growth of nominal GDP. The growth of FDI inflows fell to 5.2% over period 2001-2005. Focusing on inward FDI before 2010, at its peak in 2007 the stock of inward FDI reached 18,136 billion US dollars (measured at current prices), which compares to the stock of inward FDI equal to 2,081 billion US dollars in 1990, and represents more than an eightfold increase. Expressed in relative terms, the inward FDI stock amounted to 9.2% of GDP in 1990 but the corresponding figure for 2007 is a substantial 32.0%.

Driven by technological change, global competition and the liberalisation of markets, the OECD (2009) recognises that FDI plays an important role in the process of global economic integration because it creates direct, stable and long-lasting links between economies. By the very nature of its motivation, FDI promotes the creation of a long-term relationship between investing and recipient economies given that the aim of an investor is to obtain a lasting interest in a direct investment enterprise resident in another country (OECD, 2009). As economies become more interlinked, FDI offers the prospect of improved growth opportunities for host countries (Ruggiero, 1996). Importantly, FDI encourages the transfer of technology and know-how between economies, promotes international trade through access to markets overseas and can be a catalyst for economic growth and development (OECD, 2009). An important vehicle for local enterprise development, FDI can contribute to improving the competitive position of both the host (receiving) and the home (investing) economy.

The size of FDI inflows is a useful indicator of the attractiveness of economies. The growth of inward investment implies additional capital injected into the host economy and, thus, is likely to have a positive impact on its economic performance. At the European level, in the absence of a common fiscal policy, the attraction of foreign investment to the EU's less-developed nations and regions is a mechanism to achieve economic and social convergence, alongside the formal instruments of the EU regional policy, such as the Structural Funds and Cohesion Fund. Important for reducing income gap between EU's poorest and wealthiest nations and regions is the role of foreign investment in job creation and its contribution to productivity growth.[1] In its 2010 Communication *'Towards a comprehensive European international investment policy'*, the European Commission (2010) maintains that "overall benefits of inward FDI into the EU are well-established" (p. 3), especially in respect to its role in creating jobs, optimising resource allocation, transferring technology and skills, increasing competition and promoting trade.

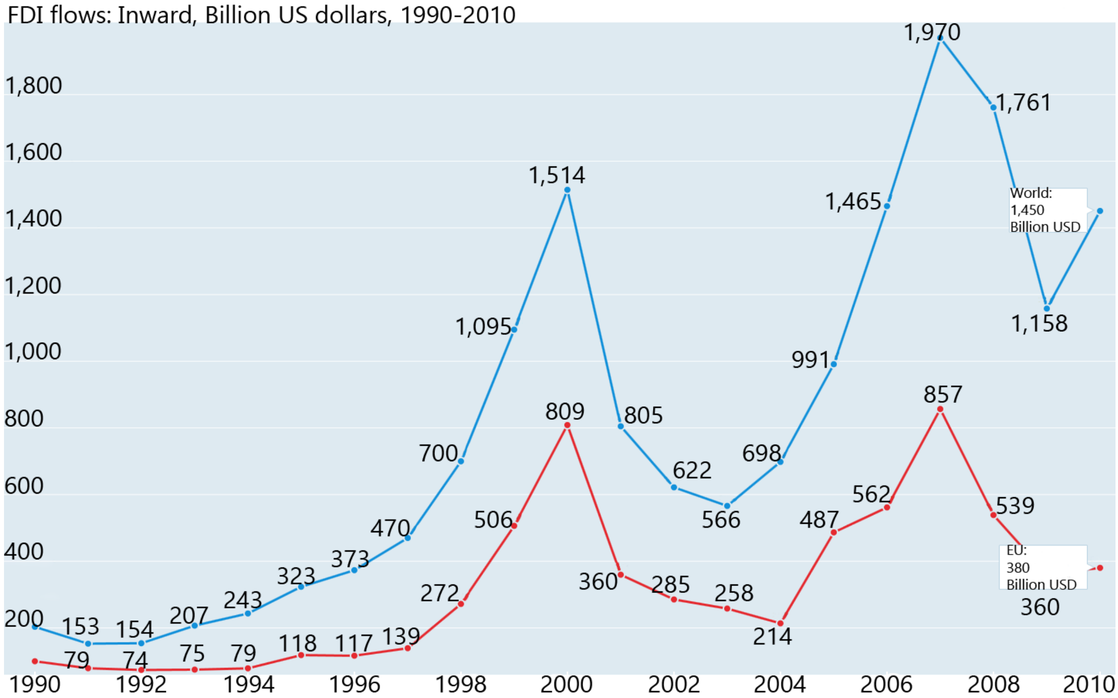
Importantly, when considered as a single host economy, the EU remains the largest global investor and recipient of foreign investment, and the pattern of inward FDI flows to the EU resembles the global pattern in FDI. This is illustrated in Figure 1.1 that compares the size of global inward FDI flow to that of the EU over period 1990-2010.[2] The global FDI inflows start to grow in the early 1990s but for the EU the growth in FDI begins in the mid-1990s. The significant growth rates in inward FDI flows are recorded in the second half of the 1990s, especially over period 1997-2000. Between 1997 and 2007, there is more than a threefold increase in inward FDI flows worldwide

[1] Although academic literature does not offer a definite agreement that foreign investment increases productivity growth, Bijsterbosch and Kolasa (2010) find evidence suggesting that FDI inflows account for productivity growth in CEECs. Javorcik (2004) identifies the role of FDI in boosting productivity among suppliers in upstream sectors but not in the industry in which foreign affiliates operate. Another study of Javorcik (2015) confirms that "jobs created by FDI are good jobs, both from the worker's and the country's perspective" (p. 14) because of the wage premium and more training that the foreign employers offer (worker perspective) and promoting a growth in aggregate productivity (country perspective).

[2] One must be mindful of the evolving composition of the geographic coverage for the EU series: EU-15 until end of 2003, EU-25 from 2004 to 2006, EU-27 as from 2007.

and nearly a sixfold increase in the size of aggregate inward FDI activity in the EU.

Figure 1.1: European Union and Global Inward FDI Flows (millions of US dollars, 1990-2010)



(source: author's own elaboration of the OECD Stats, `http://data.oecd.org/fdi/fdi-flows.htm`)
Note: EU series: EU-15 until end of 2003, EU-25 from 2004 to 2006, EU-27 from 2007.

Following this strong growth of inward FDI flows both globally and in the EU, the peak of FDI activity occurs in 2000. The size of global FDI inflows amount to 1,500 billion US dollars; the EU FDI equals to 800 billion US dollars meaning that EU-15 inward FDI flows account for more than 50% of global inflows. Thereafter, a fall in inward FDI flows is observed, and is most pronounced in the year 2001. After 2001, this decline in inward FDI continues albeit at a slower rate. The positive growth in inward FDI flows globally is restored in 2003, after a reaching a low point of FDI inflows of less than 600 billion US dollars. In the EU, the growth does not materialise until 2004, which is when the first wave of the fifth EU enlargement occurs and ten new Member States join the EU. Interestingly, inward FDI flows to the EU more than double between 2004 and 2005 representing the largest percentage increase since 1990 over a similar time frame. Although this strong growth can partially be attributed to the greater number of countries in the EU, there is a possibility that the fifth enlargement itself makes a positive contribution to increasing FDI activity in that period.

The growth of FDI inflows in the EU continues until 2007 although it is weaker between 2005 and 2006, and relatively stronger again between 2006 and 2007, when the other two CEECs join the EU. The size of inward FDI flow to the EU increases by a factor of four between 2004 and 2007, rising from 213 billion US dollars in 2004 to 856 billion US dollars in 2007. Globally FDI inflows increase nearly threefold in the same period. Following the peak of inward investment activity in 2007, a global economic crisis hits FDI. Between 2007 and 2009, inward investment to the EU shrinks by more than 50%; similarly, but to a lesser degree in percentage terms, inward FDI flows decrease globally. In absolute terms, the decline in global FDI inflows over period 2007-2009 is substantial and amounts to a loss of an equivalent of 800 billion US dollars worth of foreign investment. Finally, inward investment flows start to grow again after 2009. Although the growth of inward FDI flows globally is strong, it is more modest at the European level. In 2010, with its aggregate inward investment flow equal to 380 billion US dollars the EU accounts for 26% of global inward FDI flows.

Beside its role as a source of capital, inward investment is considered as a catalyst for economic growth through the transfer of new technologies and know-how that it entails. Foreign firms bring new technologies, new knowledge, as well as organisational and managerial skills, that local domestic firms can embrace to become more competitive. An improvement in productive efficiency due to technology diffusion and productivity spillovers from foreign firms means that domestic firms are more able to compete internationally and become better integrated in global markets. Although critics emphasise a risk of job destruction associated with increasing competition, the presence of FDI, especially 'greenfield' investment, creates new jobs in the host economy and stimulates employment growth. Importantly, an implication of improving productive efficiency of firms is the increasing efficiency with which the scarce resource are used. A report prepared for the European Commission by Copenhagen Economics (2006) confirms that many European regions benefited from attracting inward FDI and recommends that well-designed regional FDI policies aimed to attract FDI have positive implications on the European economy in terms of enhanced economic growth, the promotion of regional convergence and the catching-up by the least developed regions. Seeing that inward FDI brings benefits to host economies means that there are important reasons to gain a better understanding of FDI, most of all recognise these factors and location characteristics that attract inward investment.

1.1 The Aim of the Thesis

Although the EU accounts for a sizeable proportion of global inward FDI, a significant gap still exists in our knowledge and understanding of the determinants that shape the economic geography of FDI activity in the EU, especially in the period following the accession of twelve 'new' EU Member States in the fifth enlargement. The aim of this thesis is to add to the scarce cross-country evidence on FDI location decisions between the 'old' EU-15 Member States and the ten CEECs ('new' EU-10), and to analyse the spatial distribution of FDI in the EU-25 before and after the fifth enlargement. Although the fifth enlargement represents a significant step towards political and economic integration in Europe, the EU-25 is not a homogenous space. I recognise that significant differences exist between and within countries and regions despite efforts that are made to strengthen the economic and social cohesion within the EU. Importantly, the legacies of the former socialist system in CEECs imply that the characteristics of the 'new' and 'old' EU Members differ sharply, so it is an ideal opportunity to study the impact of economic integration on FDI location. A significant heterogeneity between 'old' and 'new' EU Member States that exists on a number of dimensions may suggest that the motives for investment differ between 'old' and 'new' EU. In as much as the national borders continue to shape the distribution of economic activity, the achievement of the full economic convergence within the EU-25 is likely to be delayed.

In consideration of the issues raised, I conduct a three-part analysis of the impact of the European economic integration on FDI location in the EU-25, focusing on the fifth enlargement. The thesis has three main aims and these define its contributions as follows:

AIM I To examine the economic geography of FDI location at the country and region level in the EU-25, both before and after the fifth enlargement.

AIM II To analyse empirically the motives for FDI location choice in the 'old' EU-15 and 'new' EU-10 countries.

AIM III To estimate the impact of the fifth enlargement on the spatial distribution of FDI activity across the EU-25 regions, with a special focus on the role of borders on FDI location in CEECs in the post-accession period.

Essentially, the first of these presents descriptive statistics of FDI project data in an attempt to reveal the nature and the changing pattern of FDI location in the EU-25 before and after the fifth enlargement. The second aim seeks to address the motives for investment and in particular whether these are mainly market-, resource- or efficiency-based, focusing on how the motives differ between the incumbent EU-15 and the 'new' EU-10 countries. Finally, the third aim analyses the role of borders in shaping the country and regional distribution of inward FDI in CEECs in the post-accession period to verify if all the countries and regions of the 'new' Europe have benefited equally from the fifth enlargement. The overall purpose of the thesis is to offer a comprehensive cross-country evidence on the economic geography of FDI in the EU-25 covering the period of the fifth enlargement. In doing this, I offer an insight into how 'different' is Eastern Europe from Western Europe, reminiscent of Disdier and Mayer (2004), but also how heterogenous the individual EU Member States are.

To the best of my knowledge, these three main contributions of this thesis fill a substantial gap in the academic literature on foreign investment location. Although there exists a considerable amount of research on the determinants of inward investment location, it is often limited to analysing the location of FDI activity in a single country or in a small group of countries. Despite improvements in computational power and project-level data availability, multi-country studies of FDI location choice conducted at a more disaggregated level such as regions remain rare. The notable exception to this is Alegria (2006), who analyses the location decisions of European multinational firms across European countries and regions. The sample considered by Alegria (2006) includes 4,803 foreign investment projects established in 246 NUTS2 regions belonging to the 'old' EU-15 and a full set of ten accession countries that joined the EU in the first wave of the fifth enlargement in 2004.[3] Importantly, the fifth enlargement created the world's largest internal market but little is known about the determinants for FDI location choice in the enlarged EU-25, especially in the post-accession period. In consideration of the conceivable role of the fifth enlargement in altering the economic geography of FDI location in the enlarged EU, the work of Alegria (2006) fails to account for this possibility seeing that it considers a relatively short time of eight years, from 1998 to 2005. Essentially, the time frame from 1998 to 2005 is not sufficient to reveal the changing nature and pattern of FDI location in the EU-25 caused by the fifth enlargement.

Although the objective of the integration process in Europe is to achieve greater economic and social cohesion, I recognise that a significant heterogeneity exists between countries of the enlarged EU-25 and within individual countries, especially considering the economic history of CEECs. In consequence, the national borders and the 'West-East divide' can be factors shaping the spatial distribution of FDI in the EU-25. Admittedly, there exist earlier academic studies that address the question of the role of borders and 'West-East divide' in affecting the location of inward investment activity in Europe but these fail to take account of the most recent post-enlargement period. To be precise, analysing data on 1,843 investments of French multinational firms over period 1980-99 Disdier and Mayer (2004) contrast the structure and determinants of location choices between Eastern (six CEECs) and Western (thirteen 'old' EU Member States).

[3] Rather than consider the location of inward investment in Cyprus and Malta, I study the location of FDI in Bulgaria and Romania, two CEECs that joined the EU during the second wave of fifth enlargement in 2007. Similarly to Alegria (2006), number of countries in my choice set of possible locations equals 25.

In the context of increasing attractiveness of CEECs as a destination for inward investment, to fully capture the dichotomy that exists between 'old' incumbent EU-15 and 'new' accession CEECs it is necessary to examine the location choices in the enlarged EU, both before and after the accession. The role of national borders is the focus of Basile *et al.* (2009), who analyse the location choices of 5,102 affiliates of multinational firms between 1991 and 1999 over a set of 47 NUTS1 regions in five large economies of the 'old' EU-15 (France, Germany, Italy, Spain and the United Kingdom). Importantly, among the countries considered by Basile *et al.* (2009) none is classed as a 'new' EU Member State, despite the increasing FDI flows to these countries.

To better understand the impact of the fifth enlargement on economic geography of FDI in the EU, I investigate the location of FDI projects for a set of twenty-five EU Member States (EU-25) over time period 1997-2010; of these fifteen are the 'old' EU Members (EU-15) and ten are 'new' EU Members from Central and Eastern Europe (EU-10). The three analyses are conducted at country (EU-25) and regional level (260 NUTS2 regions). A detailed analysis of descriptive data on inward FDI to study the economic geography of FDI location in the EU-25 before and after the fifth enlargement (**AIM I**) is conducted at both country and region level. This includes the number of investment projects (absolute performance), project shares, location quotients (relative performance), mean annual FDI over 1997-2003, mean annual FDI over 2004-2010, absolute and percentage change in mean annual FDI. Descriptive statistics are summarised in the form of maps and tables. Although the descriptive statistics do not allow me to make conclusions beyond the data that are analysed or to reach conclusions on hypotheses, this is a value-added exercise that allows an identification of changing patterns of FDI activity before and after the fifth enlargement. Maps enhance the visualisation of patterns that emerge from the data.

Formal econometric analysis is undertaken as part of the subsequent studies. Discrete choice methodology is used to investigate if the motives for investment in the EU-25 are mainly market-, resource- or efficiency-seeking (**AIM II**). Specifically, this study examines how the three motives for FDI location differ between 'old' and 'new' Member States of the EU and seeks to establish whether there exists a significant 'West-East divide' in the location preferences of multinational firms. Random Utility Maximisation (RUM) based conditional logit model is used to analyse the motives that influence the location decisions of firms (**AIM II**). Given that the economic decision of a firm that chooses a single location from among a set of several location alternatives is by its nature discrete means that the conditional logit model remains one of the most popular econometric techniques in studying the location choice decisions of firms (Schmidheiny and Bruelhart, 2011).

Panel data techniques are also employed to examine FDI activity in the EU-25 at the level of NUTS2 regions (**AIM III**). To identify the regions that are the winners and losers of the fifth enlargement, the impact of the EU membership, borders and distance from borders on the size of regional inward investment in CEECs in the post-enlargement period is examined. Specifically, a Least Squares Dummy Variable (LSDV) estimator is used to analyse panel data on regional FDI and a system Generalised Methods of Moments (GMM) estimator is used owing to the modelling concerns such as fixed effects and the endogeneity of regressors.

This thesis uses annual panel data on inward FDI from the European Investment Monitor (EIM) for 1997 to 2010.[4] The EIM is an online information provider, which tracks and records inward investment in Europe. Data is collected for all European countries for each year from 1997. This dataset gives project-level information on a total of 35,105 cross-border investments for the EU-25 and cover all project-based 'greenfield' FDI that adds to capacity, arising from new investment or 'expansions'. It does not include information on mergers and acquisitions, and joint ventures (unless they result in new facilities or new jobs being created), licence agreements, extraction of ores, minerals and fuels, portfolio investments. The EIM provides detailed information on investment projects, including company name, industry, origin country, host country, project type (new, co-location, expansion).

The EIM covers both intra- and extra-EU FDI. Investment originating from inside the EU (inclusive of the 'new' EU Member States) accounts for 46% of the projects. The single largest investing country is the US, where approximately 32% of all projects originated from. The industries captured by the EIM include agriculture, energy, manufacturing, construction, retail and hospitality, transport, services, education and health, and recreation. Among these, manufacturing and services are the most represented industry groups, accounting for 58% and 30% of projects respectively. The EIM data has found applications in recent work (Alegria, 2006; Defever, 2006, 2012) and is a useful source for exploring FDI at the project level.

In this thesis, the scale of inward FDI is measured as the number of individual projects. Admittedly, the use of count data has its limitations as it gives equal weighting to minor and major investment projects.[5] Furthermore, the count data also fails to account for the possibility that an investment is carried out in response to the depreciation of the existing capital stock. Although the EIM dataset captures the scale of investment using financial flows data, owing to commercial confidentiality these data are incomplete and consequently are not used to measure FDI (for example, the value of capital expenditure in the dataset is reported for about 30% of projects). Another

[4] EIM database available at: `http://www.eyeim.com/`

[5] (Crescenzi *et al.*, 2015) recognise that the use of data based on MNE counts exacerbates measurement bias problems.

indicator that also captures the scale of investment - the number of jobs created - is also incomplete and known for about 60% of projects.

To conduct the analysis an original dataset of independent variables is constructed, consisting of data on location factors available at country and NUTS2 regional level. The main choice of location data provider is Eurostat - the Statistical Office of the European Communities. Data is sought for each year over 1996-2010, which offers one year's worth of lagged explanatory data in the regression analysis. The choice of data is informed by the literature on industrial location. The taxonomy of FDI motives identified by Behrman (1972) and formalised by Dunning (1993), but also neoclassical, institutional and New Economic Geography (NEG) theories define the organisation of my location data into the following main categories: market potential variables; resource variables; macroeconomic variables; and industry variables. Data that attempt to gauge the effect of borders, distance from borders and spatial spillovers are used at the regional-level only. Location data are both collected from official statistical sources and constructed by the author specifically for the purpose of the present study. These include indices that capture intra- and inter-industry agglomeration, industrial competition, spatial spillovers, external and internal market potential.

1.2 The Layout of the Thesis

The thesis is structured as follows:

In Chapter 2 I set out a formal definition of FDI and introduce a distinction between 'greenfield' investment, expansions of capacity, and mergers and acquisitions (M&A) as different types of FDI. Afterwards, I discuss the theory of FDI, including the taxonomy of FDI motives of Dunning (1993) and the core-periphery model of Krugman (1991) of the theoretical New Economic Geography (NEG) literature, which are the theoretical frameworks underpinning the formal econometric analysis of this thesis. Neoclassical, institutional and behavioural perspectives on the location of FDI activity are presented in the context of the subsequent data collection. Following the discussion of the theoretical frameworks, I review the empirical literature on the location choice of multinational firms. This review begins with the early studies that focus on FDI in the US, including the contribution of Carlton (1979, 1983) who first applied the conditional logit model to analyse firms' location. Subsequently, I consider those studies that analyse FDI location for a single European country and a set of countries. Finally, I present the empirical literature that examines the border effects.

In Chapter 3 I describe and reflect on the process of the fifth EU enlargement, a period that involved the formal accession negotiations between the twelve candidate countries and the EU. To begin with I discuss the historic nature of the fifth enlargement and present three accession criteria ('Copenhagen Criteria') that define if a candidate country is eligible to join the EU. Afterwards, I provide a detailed account of how the accession process progressed from the submission of the formal applications for EU membership to the first wave of the fifth enlargement in 2004 and its second wave in 2007. I identify key milestones in the accession process that include the selection of the candidates ('Luxembourg Group'), the opening of the accession negotiations, a decision to open the negotiations with the remaining candidate countries ('Helsinki Group'), the identification of the first wave accession countries ('Laeken10') and the conclusion of the negotiations with the first wave countries at the European Council in Copenhagen in December 2002.

In Chapter 4 I discuss the methodology that is used in this thesis to analyse FDI location at the country and regional level. Specifically, I present discrete choice models and panel data models and I identify conditional logit model and the Least Squares Dummy Variable (LSDV) estimator as the chosen econometric techniques used in the empirical analyses that follow. Moreover, I acknowledge the limitations of these two econometric techniques and explain how these can be addressed using a nested logit model and a system Generalised Methods of Moments (GMM) estimator. Afterwards, I discuss the regional classification system NUTS of the Eurostat. Subsequently, I describe the project-level FDI data that I source from the European Investment Monitor (EIM) database and specify information categories on FDI projects that this data covers. Following the discussion of FDI data, I present the results of a detailed analysis of descriptive data on inward FDI that I conduct to study the economic geography of FDI location in the EU-25 at the country and region level (**AIM I**). Finally, I discuss the process of data collection that I do to create an original dataset consisting of data on location factors.

In Chapter 5 I analyse empirically the motives for FDI location choice in the 'old' EU-15 (West) and the 'new' EU-10 (East) (**AIM II**) using conditional logit model. To begin with I interrogate the FDI data on the project-specific dimensions to determine how the distribution of FDI projects between the 'old' and the 'new' EU members is altered as project-specific characteristics change. These characteristics include project type (new investment, expansions, co-locations) and origin category (from inside the EU-27, from outside the EU-27, 'mixed' partners). Afterwards, I present the location data that I use and discuss how this data fits in with the market-seeking and resource-seeking motives of Dunning's (1993) typology. Following the discussion of data, I introduce the econometric models that I employ to study the motives of FDI location in the EU-25, including the extended model with West-East heterogeneity that allows for slope terms to differ and determine whether the motives for FDI differ between the 'old' EU-15 and the 'new' EU-10. The formal econometric analysis that estimates these models also makes an allowance for the project type heterogeneity to establish if motives other than efficiency-seeking drive the behaviour of expansionary investment. Finally, I acknowledge the role of information asymmetries in defining the investment strategies of multinational firms and estimate the regression model depending on the origin of the investor (outside the EU-27 and inside the EU-27).

In Chapter 6 I study the impact of the fifth enlargement on the economic geography of FDI activity across the EU-25 regions (**AIM III**) using the LSDV estimator. Special emphasis of this analysis is on the role of borders to determine whether the national borders continue to shape the distribution of economic activity in the EU-25. To be precise, I aim to examine if foreign investment agglomerates in the CEECs close to the former West-East border. To begin with I introduce a two-country, three-region NEG model developed by Bruelhart *et al.* (2004) that models the spatial consequences of regional integration such as EU enlargement and underpins the econometric analysis of this study. The model is an extension of the core-periphery NEG model of Krugman (1991). Afterwards, I discuss the econometric framework of this study, including details on the regression models used. A formal econometric analysis that follows quantifies the effect of EU membership, borders and distance from borders on the size of regional inward FDI in CEECs in the post-enlargement period (2004-10). The EU membership and distance effects are analysed at the aggregate level for the CEECs, but I also allow for the heterogeneity in the effect across countries. The role of borders on the size of regional inward FDI is examined using a set of border dummies, which introduce an asymmetry between border and interior regions of CEECs. Among the extensions to the main analysis, I define the alternative distance measures to capture the distance effect and use the system GMM analysis to measure the border effect. The role of time fixed effects, and the use of country fixed effects instead of region fixed effects are also considered.

The final chapter of this thesis, Chapter 7, presents a summary and conclusion of the thesis. I summarise the findings of the thesis with regard to the research questions. In consideration of the main findings of this thesis, I reflect on the possible implications in the area of EU's investment policy. This involves looking at the possible main orientation of an EU investment policy in the future and the recommendations for the immediate action in this area. Finally, I consider the strengths and limitations of my work and discuss some ideas for future work. An appendix that follows Chapter 7 consists of data that supports the discussion and analysis in the main part of this thesis.

Chapter 2

The Theory of FDI and Literature Review

2.1 Introduction

The growing importance of foreign direct investment (FDI) and multinational enterprise (MNE) after the Second World War provided an impetus for scholars to formalise the theoretical underpinnings of FDI. Although initially FDI was explained using the theories of capital markets and international trade theory (based on macroeconomic approaches), over time FDI has been treated as a stand-alone theory of MNE (based on microeconomic approaches). Broadly, from a theoretical perspective, a three-tiered hierarchy of 'MNE/exporters/domestics' has emerged in the modelling of FDI decisions (Cieslik and Ryan, 2009), and three questions dominate the literature (Singh and Jun, 1995):

1. Why do domestic firms evolve into international organisations that serve foreign markets?
2. Why do firms choose to locate production in a foreign country rather than opt for serving the market abroad using options such as licensing or exporting?
3. What are the determinants of the FDI location choice?

My review of the theoretical underpinnings of FDI activity starts by looking at the capital market and international trade theories that preceded the emergence of a formal theoretical framework for MNE. Subsequently, the theories of MNE that emphasise market imperfections as a reason for a firm to engage in FDI are discussed. These early theories focus mainly on the decision by a domestic firm to become an international organisation, and why FDI may be preferred to licensing or exporting as a strategy to serve foreign markets. Later, I introduce the economic geography perspective on the international economic activity of MNEs. With its interest in the spatial aspects of MNE activity, the New Economic Geography (NEG) theory complemented the research agendas of international business scholars, who placed more emphasis on the firm-specific determinants of international economic activity. Subsequently, I review the location choice determinants that the neoclassical, institutional and behavioural perspectives consider to be important in the FDI location decision, where the first of these includes the agglomeration economies of the NEG theory (see: Ascani *et al.*, 2012).

Following the discussion of the theoretical frameworks, I review the empirical literature on the location choice of multinational firms. This literature has changed dramatically over time as data on investment and firm location has become widely available and the computational power of technology has increased. The early literature typically focuses on the location of FDI activity in a single country and considers only a limited range of location factors as explanatory variables. Subsequently, with the improvements in data availability and computational power, the analysis of the FDI location choice decisions is feasible within a multi-country set-up or at a more-disaggregated level, such as regions.

The review of the empirical literature begins with the early studies that focus predominantly on FDI in the US. Following this, studies are considered that analyse location for a single European country - firstly, the 'old' European Union (EU) Member States, and secondly, the 'new' EU accession countries from Central and Eastern Europe. Subsequently, attention is turned to the more recent multi-country studies of location. Finally, empirical work is considered that examines the border effects in the spatial distribution of FDI activity. Border regions are likely to play a critical role in the spatial dynamics initiated by regional integration, such as EU enlargement (Resmini, 2003b; Niebuhr, 2008). In particular, the impact of EU integration on the location of economic activity is likely to be most profound alongside the border of two integrating groups of countries, such as the 'old' and 'new' EU.

Although in large part this chapter focuses on reviewing the theoretical and empirical literature on FDI location, a formal definition of FDI is set out in the next section. I use the OECD Benchmark Definition of FDI. Importantly, the definition helps to establish the distinctive features of FDI vis-à-vis portfolio investment. Later I discuss the OECD recommended procedure for calculating FDI flows. I also make a distinction between FDI stocks and flows, and explain what is meant by inward and outward FDI. Although the FDI data used for the purpose of this thesis excludes mergers and acquisitions, I introduce a distinction between 'greenfield' investment, expansions of capacity, and mergers and acquisitions (M&A) as different types of FDI.

2.2 The Definition of FDI

Foreign Direct Investment (FDI) is a term that is used to refer to the cross-border transfer of capital through which a firm expands the production capacities outside its national borders. It is one of the strategies that allows a firm to enter a foreign market. Among the range of other possible strategies one can also mention exporting, licensing and franchising. Through the process of FDI a multinational enterprise (MNE) is created – an entity that owns production facilities in more than one country. According to the OECD (2009), "FDI is a key driver of international economic integration (...) and can provide financial stability, promote economic development and enhance the well being of societies" (p. 3), provided that the right policy framework is in place.

The OECD (2009) provides an overview of FDI concepts – The Benchmark Definition of Foreign Direct Investment – which sets the world standard for correct measurement of FDI activity. A key aspect is that through a cross-border transfer of capital, a resident of one country (direct investor) establishes 'a lasting interest' in a firm (direct investment enterprise) that is a resident of a different country. The motive of the direct investor is 'a strategic long-term relationship' with the direct investment enterprise. The investor exercises a significant degree of influence over the management of the direct investment enterprise, with the numerical threshold of at least 10% of an equity capital of the enterprise being owned by the investor from another country used as a criterion to define 'a lasting interest' (OECD, 2009). Typically, the literature refers to the direct investment enterprise as a 'multinational firm', a 'multinational company', a 'multinational corporation' (MNC) or a 'multinational enterprise' (MNE), although no agreed definition exists for what the above actually constitute (Pazienza, 2014).

In this sense FDI, in addition to being a cross-border transfer of capital, also involves a transfer of management and organisational expertise, entrepreneurship, technology, know-how, cultural norms and values, which Dunning and Lundan (2008) refer to as "the transfer of a package of assets or intermediate products" (p. 7). Through this process 'a strategic long-term relationship' is built. This is feature of FDI is what distinguishes FDI from indirect investment (portfolio investment), which involves only the transfer of capital. Furthermore, only in the case of FDI, the control over the transferred resources remains in the hands of the investor, i.e. there is no change in the ownership. These features underline the crucial difference between FDI and indirect (portfolio) investment. In the former case, the focus of the investor is to exercise a control and influence through which 'the long-term relationship' with the direct investment enterprise is established, which allows profit stream over time to be maximised. For the latter, there is no objective of any 'long-term relationship' and the focus is primarily on the return on assets, which influences the acquisition or sale of the shares.

Jones and Wren (2006) show that the OECD recommended procedure for calculating FDI flows involves summing four components: retained earnings, equity capital, intra-company loans and intra-company borrowing. This procedure is outlined in Table 2.1. The retained earnings are defined as profits generated and kept by the overseas enterprise. Although there is no cross-border transfer of capital involved, these are classified as FDI because the direct investor has a choice between taking the retained earnings made by the direct investment enterprise to their home country or reinvesting them back into the direct investment enterprise (Jones and Wren, 2006). Other flows of capital such as transfers of shares and loans that occur between the direct investor and the direct investment enterprise are also treated as FDI. A situation when the direct investment enterprise borrows money from the host country or from their own resources to supply to the direct investor is considered an outflow of FDI, a disinvestment. A negative inflow of FDI can occur when the value of this borrowing exceeds the receipts in the form of retained earnings, equity capital and intra-company loans. Although the above definition provides a benchmark for calculating the value of FDI flows, Jones and Wren (2006) maintain that the calculation of FDI remains difficult owing to the differences in law and regulations that exist between countries on how to record and measure different individual components of FDI.

Table 2.1: OECD Benchmark Definition of FDI

Foreign Direct Investment	
equals	Retained earnings (i.e. direct investors' share of earnings/losses)
plus	Direct investors' purchase less sales of enterprises' shares
plus	Net increase in long and short term loans, credit and other amounts given by the direct investor to the overseas enterprise
minus	Overseas enterprise borrowing of money from host country or from their own resources in order to give to the direct investor in home country

(source: Walker (1983), Office for National Statistics (1996) and Jones and Wren (2006))

FDI flows can be categorised according to the direction of the flow between the enterprises. Inward FDI flows are the inward direct investments made by non-resident direct investors in the reporting economy. Outward FDI flows are the outward direct investments made by the residents of the reporting economy to external economies. The FDI flows (both financial and income flows) capture a different dimension of FDI activity to that measured by another FDI indicator, FDI stocks. Essentially, data on FDI flows (FDI financial flows and FDI income flows) measure the size of FDI activity within a given time period, while data on FDI stocks (also referred to as FDI positions) measure the levels of investment at a given point in time (OECD, 2009). On the one hand, all cross-border transactions that qualify as FDI recorded during a reference period (e.g. year, quarter, month) make the FDI flows. On the other hand, the value of the stock of

FDI held at the end of the reference period equates to the FDI position (stock). OECD (2009) recognises that FDI data expressed as a ratio to GDP allows for the cross-country comparisons of the relative importance of globalisation for the host economy.[1]

A distinction can be made between different types of FDI according to the choice of the market entry mode. Specifically, the OECD (2009) distinguishes between:

- purchase/sale of existing equity in the form of mergers and acquisitions (M&A);
- greenfield investments;
- extension of capital (additional new investments); and
- financial restructuring.

While mergers and acquisitions imply the purchase or sale of existing equity, 'greenfield' FDI entails an acquisition of a new asset, a new investment altogether. An expansion of an existing capacity (extension) relates to additional new investment and according to the OECD (2009), it is similar to 'greenfield' FDI in terms of its economic impact. Finally, financial restructuring covers all investment made for debt repayment or loss reduction.

2.3 The Theory of FDI and MNE

Ever since the emergence of trade and FDI, scholars have sought to formalise the reasons for firms engaging in FDI activity by developing theoretical frameworks. Although each theory offers an explanation for certain aspects of FDI and MNE activity, there is no complete theory of FDI (Harrison *et al.*, 2000). Casson (1985) maintains that "the theory of FDI is a 'logical intersection' of three distinct theories - the theory of international capital markets, the theory of the international firm, and the theory of international trade" (p. 114). These strands of economic theories, when combined together, should offer an explanation as to why firms will want to engage in FDI, where the production will be located and what the optimal size, ownership and structure of the firm will be.

In fact, prior to 1950, FDI was considered as a subset of portfolio investment, and the theories of capital markets and portfolio investment were used to explain the emergence of FDI (Nayak and Choudhury, 2014). Originally, FDI was seen as an international capital movement only (Kindleberger, 1969), and the interest rate differential

[1] FDI transaction flows expressed as a ratio to GDP measure the degree of globalisation of an economy over the reference period. FDI income flows as a ratio to GDP measure the relative importance of the earnings of direct investment enterprises in the reporting economy. Finally, FDI stocks to GDP measure the degree of globalisation at a point in time, capturing the interdependence of economies.

cited as the most important reason for capital flows, which under the assumption of no risk and uncertainty will flow to the areas that offer the highest return. However, Nayak and Choudhury (2014) note that the interest rate theory fails to account for control, a fundamental difference that distinguishes FDI from portfolio investment. In principle, a higher interest rate in a foreign country may induce an investor to lend money abroad, but there is no reason why this investor would necessarily want direct control over the enterprise that they lend money to (Hymer, 1976).

Another macroeconomic approach for explaining FDI activity is the theory of international trade. Although the theory was developed to explain trade flows, it is also applicable to FDI flows. Traditional trade theories were frequently used to explain FDI until the 1960s when micro-founded theories based on industrial organisation were developed. These theories consider market imperfections as the reason for MNE to engage in FDI and Casson (1987) argued that these microeconomic theoretical approaches had "the potential to become a general theory of the enterprise in space, and as such, to embrace theories of the multi-regional and multi-plant firm" (p. 1). In the remainder of this chapter I consider the attempts of international trade theory and micro-founded industrial organisation theory to explain FDI activity, and assess how well each of these performs. The decision to engage in FDI is a fundamental question to start with, while the theoretical underpinnings of the spatial distribution of FDI are explored when the location factors and New Economic Geography (NEG) models are considered below.

2.3.1 International Trade and FDI

The first attempts to explain the emergence of FDI flows, prevalent up until the 1960s, are the traditional (classical and neoclassical) theories of international trade. Although they were developed to explain trade flows, the application to FDI flows is possible. The earliest of these is the theory of absolute advantage, developed by Adam Smith (1776) in the second half of the eighteenth century. The theory of absolute advantage assumes two countries, two commodities, no transport costs, an immobile factor of production (labour) and constant returns to scale. The prediction of the model is that two countries specialise and concentrate on the production of a good in which they have an absolute advantage. Consequently, trade occurs as countries exchange the surplus from production of the domestic good, bringing benefits from trade for both trading partners.

The weakness of the theory of absolute advantage is its inability to explain international trade whenever a country possesses an absolute advantage in the production of both commodities. This was addressed by the theory of comparative advantage developed by David Ricardo (1821) in the first half of the nineteenth century. Under the same assumptions, Ricardo maintains that comparative advantage in the production of the good is a valid basis for international trade to occur, where the comparative advantage arises due to differences in technology and labour productivity. Even if a country has an absolute advantage in the production of two goods, it can still benefit from trade by concentrating on producing only this good in which it has a comparative advantage.

Although the theories of absolute and comparative advantage offer a rationale for the emergence of trade, the assumptions of both models are simplistic (Harrison *et al.*, 2000). The Heckscher-Ohlin theory of factor endowments, sometimes known as the 'factor proportions theory', is an adaptation of the earlier theories, which alongside labour introduces a second factor of production in the form of capital. Heckscher (1919) and Ohlin (1933) maintain that the comparative advantage in the production of a good arises from differences in relative factor endowments between countries. In consequence, a country with a relative abundance of capital is able to produce capital-intensive goods at the lower cost, enabling it to export the surplus and exchange it for a labour-intensive good. The principle of comparative advantage continues to explain international trade flows in the Heckscher-Ohlin model.

Although the theories of absolute and comparative advantage, and Heckscher-Ohlin model explain international trade, they are perhaps less suited to explaining the emergence of FDI flows between countries, failing to deal with the issue of production outside of national borders. Vernon (1966) proposes a 'product life-cycle', thereby using a microeconomic concept to explain a macroeconomic phenomenon of FDI. The theory recognises the relevance of the neoclassical international trade theories by allowing for the 'natural' location advantages of countries, but at the same time it criticises the usefulness of the neoclassical comparative advantage models, which provide "only a very little way toward adequate understanding" of FDI flows as they neglect the role played by innovation, economies of scale and uncertainty (Vernon, 1966, p. 160).

The product-life cycle model introduces a dynamic picture as it relates the location advantages of countries to the characteristics of product life-cycle that evolve over time, with different stages of production requiring different location factors. In that respect, the theory of Vernon (1966) is perhaps the first attempt to explain the dynamic interplay between international trade and the FDI activity of multinational firms, emphasising the role of markets and their location advantages.[2] The model allows for the technological capacity of countries to improve their location advantages.

In essence, Vernon (1966) specifies three different country types: the 'lead innovation country' (in his model, the US), 'other advanced countries' and 'developing

[2]Dunning and Lundan (2008) argue that the product life-cycle theory performs well in explaining the market-seeking motives of MNEs, yet it does not apply so well to resource-seeking, efficiency-seeking or strategic-asset seeking FDI (see below), which reduces its applicability.

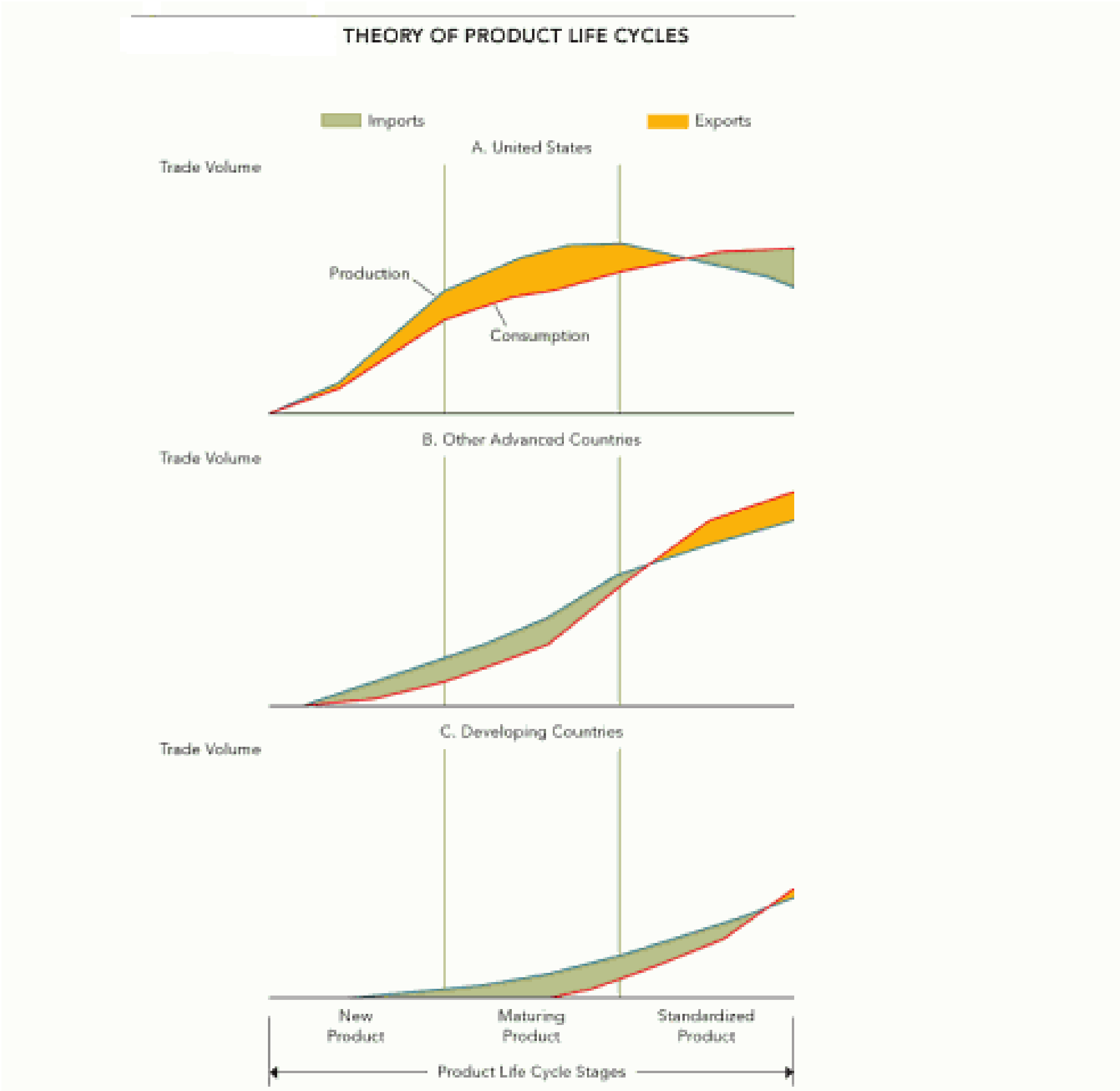
countries'. Moreover, the life-cycle of the product is grouped into three stages: new product, maturing product and standardised product. At the initial stage, the introduction of a product requires highly-skilled human inputs and investment through research and development (R&D). Due to the product being in its innovation stage, there is a degree of uncertainty surrounding it, meaning that location of production close to the innovation hub and home market is of utmost importance. After the innovation stage and once the demand for the product rises there is a move towards a greater degree of standardisation of the production process. Gradually the need for locating the production close to the home market diminishes in importance, in favour of the ability to minimise the costs of value-added activities in any given location. Coupled with higher demand in other markets, this creates additional incentives to set up production activities elsewhere, in the location where the costs of running the plant are lower.

At the final stage of the product life-cycle, the standardisation of the product has reached its 'zenith' and the international market will now be well established' (Jones and Wren, 2006). At this stage of production, cost considerations are deemed to be the most important and there is an added incentive to set up production facilities in developing countries, where the costs of inputs, and in particular labour, are lower. Figure 2.1 provides a graphical illustration of the dynamic interplay between the stages of product life-cycle and the location of economic activity.

2.3.2 Imperfect Markets and FDI

A breakthrough in the theory arrived in the 1960s with the contribution of Hymer (1960, 1976), who made the first attempt to treat FDI activity as part of a stand-alone theory of MNE, as opposed to a strand of international trade theory. In his thesis, Hymer (1960, 1976) expressed dissatisfaction with the prevailing theory of capital movements that assumes that FDI, like portfolio investment, is motivated by the differences in the rates of return between locations. Searching for a more plausible explanation for FDI, Hymer presented two main motivations for firms to engage in FDI. First, a firm engages in FDI to reduce or remove the international competition between firms in the same industry. This is achieved by mergers and acquisitions of firms operating overseas. A second motive for FDI is a firm's desire to increase its returns by utilising its intangible assets and firm-specific advantages abroad. These advantages offset the location advantages enjoyed by incumbent domestic firms in a host country (e.g. knowledge of the market) and provided that the firm-specific advantages are not easily imitated by domestic firms, a multinational firm can profitably exploit its position when competing with local firms in the foreign markets.

Figure 2.1: Product Life Cycle Theory: illustration



(source: Peng, 2008)

Hymer (1968) argues that foreign direct investment activity is the most-effective internationalisation strategy, a way of enforcing market power abroad. In this respect, Hymer moved the traditional approach to FDI, rooted in the classical theories of international trade and finance, into industrial organisation and the study of market imperfections. Together with the work of Kindleberger (1969), the approach to explaining FDI flows using monopolistic advantages and market imperfections theory came to be known as the Hymer-Kindleberger Hypothesis, or sometimes as the 'structural market failure hypothesis'.

Hymer's contribution is rooted in market imperfections and during the 1970s it was further developed, leading to the transaction cost and internalisation theories of FDI (Buckley and Casson, 1976, 1985; Rugman, 1981, 1985, 1986). According to these, Hymer fails to distinguish between two types of market imperfections: the structural type (à la Bain, 1954, 1956) and the transaction cost type (à la Williamson, 1975) (Hosseini, 2005). On the one hand, structural imperfections result from the control of ownership advantages of factors such as proprietary technology, privileged access to inputs, scale economies, control of distribution systems and product differentiation. Essentially, these are endogenous to the firm and arise from barriers to entry to new competition that give rise to monopoly rents (Hosseini, 2005). On the other hand, transaction cost imperfections, also known as natural or endemic imperfections, arise naturally and are assumed to be exogenous to the multinational firm.[3] They occur as a consequence of the market's inability to organise the transactions in the optimal way or whenever it is difficult to predict the behaviour of participants. Furthermore, transactional market failure emerges when the market cannot value the benefits and costs associated with a transaction or when the market is insufficiently large to capture the economies of scale (Dunning, 1988).

McManus (1972), Buckley and Casson (1976) and Dunning and Rugman (1985) develop the transaction cost theory of FDI and argue that the assumptions of perfect competition and perfectly-informed agents are incompatible with FDI activity. According to Norman (2001), the basic idea in the transaction cost model of FDI is that "incomplete contracts and missing markets give rise to the possibility of opportunistic behavior in an arms-length exchange (Williamson, 1975) and so to the preference by the firm to replace external contracts by direct ownership and internal hierarchies" (p. 3). In essence, the transaction cost theory insists on the profit-maximising firm's desire to economise on transaction costs as a factor that influences the choice of institutional involvement of the multinational firm. In the situation when the costs of utilising 'arms-length exchange' exceed the costs incurred from internalising the exchange, establishing a foreign affiliate is the preferred form of involvement of a multinational firm over that of licensing. Iammarino and McCann (2013) consider the transaction cost theory "the most influential set of contributions on the question of 'how' multinational activities are organized" (p. 51).

A theory of FDI that emerged from the market failure argument is the internalisation paradigm. As pointed out by Barclay (2000), it adopted a perspective similar to that of the transaction cost theory, but the focus of the paradigms differ. In the inter-

[3]Essentially, this type of imperfection arises as a result of asymmetric and incomplete information possessed by agents, which in turn give rise to adverse selection and moral hazard problems.

nalisation theory, the emphasis is placed on the process of internalisation of the market instead of the transaction itself. The theory posits that a firm internalises the supply of an intermediate good whenever this market fails. For instance, if the cost of coordinating with the supplier and hence internalising the market of production of intermediate or raw materials is less than the cost of buying such goods in the market, then the firm decides to internalise and control these activities that were previously governed by the market. The internalisation of markets across national borders results in the creation of the multinational firm. An important pre-requisite for internalisation is the existence of an imperfect market (Hosseini, 2005).

Although influential in how multinational activities are organised, the internalisation and transaction cost perspectives remain silent about the spatial patterns of MNE activity and location factors. Iammarino and McCann (2013) admit that "in part, this is the consequence of the emphasis on transactional imperfections, which tend to overlook the structural imperfections related to socio-economic and institutional geographical contexts" (p. 52). However, Iammarino and McCann (2013) recognise that the importance that these theoretical perspectives attach to organisational issues, and opportunity costs associated with internal transactions and external exchanges makes them suitable for identifying and distinguishing between the different economic geographies where MNEs may choose to locate.

2.3.3 The Eclectic Paradigm

The 'eclectic paradigm' combines the transaction cost and internalisation theories with the monopolistic advantage theory of Hymer (1960, 1976), and offers a comprehensive explanation of the magnitude and pattern of international production (Dunning, 1977). Cantwell and Narula (2001) maintain that the paragim offers the leading explanation for the growth of multinational activity that occurred in the 1980s and 1990s. The eclectic paradigm is the first to explicitly model location dimensions in the theoretical framework of FDI activity. Although the eclectic paradigm offers a general framework for establishing the magnitude and pattern of international production, it is not intended to be a theory of FDI *per se* but rather a paradigm that covers a range of explanations for FDI activity of MNEs (Dunning and Lundan, 2008). The eclectic model assumes that the necessary condition for a firm to invest abroad is the fulfillment of three conditions. First, the firm must possess a firm-specific asset that puts it in an advantageous position over indigenous firms ('ownership' advantage). Second, the benefit from employing this firm-specific asset in the production facility in a foreign country has to be greater than the benefit of using it in the domestic market ('location' advantage). Third, to fully exploit the firm-specific asset in the foreign market, the optimal strategy for the firm is to transfer it internally to a foreign affiliation unit rather than rely on licensing and hence overcome market imperfections ('internalisation' advantage).

This is known as the OLI framework, and each of the ownership (**O**), locational (**L**) and internalisation (**I**) advantages have to be present to explain the FDI activity of the firm.[4] Table 2.2 gives examples for the three types of advantages of Dunning's (1977) OLI framework. On the first of these, the firm-specific asset encompasses resources and capabilities that allow the firm to generate income streams and include both tangible assets (such as resource endowments, access to labour and capital) and intangible assets (superior technology and know-how, organisational structure, information). These 'ownership' advantages correspond to the firm-specific advantage of Hymer's (1960; 1976) monopolistic advantage. On the second, a location possesses location-specific characteristics that all firms with production facilities in that location can benefit from, such as resource endowments, political, judicial, financial and institutional system, government incentives, cultural environment.

Table 2.2: Summary of OLI advantages

Ownership-specific (**O**) advantages (internal to enterprise of one nationality)
Size of firm
Technology and trade marks
Management and organisational systems
Access to spare capacity
Economies of joint supply
Greater access to markets and knowledge
International opportunities such as diversifying risk
Location-specific (**L**) advantages (internal to a given location, all firms with production facilities in that location can benefit from)
Distribution of inputs and markets
Costs of labour, materials and transport costs between countries
Government intervention and policies
Commercial and legal infrastructure
Language, culture and customs (i.e. psychic distance)
Internalisation-specific (**I**) advantages (overcoming market imperfections)
Reduction in search, negotiation ad monitoring costs
Avoidance of property right enforcement costs
Engage in price discrimination
Protection of product
Avoidance of tariffs

(source: Jones and Wren, 2006)

[4] According to the eclectic paradigm "the multinational enterprise and foreign direct investment represent a response to high transactions costs by firms with unique assets/capabilities which have value when utilised in production facilities located in foreign markets" (Teece, 1986, p. 27).

In subsequent work, Dunning (1983; 1985; 2008) elaborated on his concept of **O**-advantages further, and classified this into three subgroups: asset-ownership advantages (**Oa**) that arise from proprietary ownership of a specific intangible asset, e.g. know-how related to production management and organisation system; transactional-ownership advantages (**Ot**), which relate to the ability of firms to capture the transactional benefit and minimise the transaction costs to realise the greatest benefit from transaction; and institutional-asset advantages (**Oi**), which include firm-specific corporate norms and values, as well as norms and values of the human and institutional environment in which a firm conducts its activities (Dunning, 2002).

Tolentino (2001) remarks that the eclectic paradigm of Dunning (1977) and the internalisation theory of Buckley and Casson (1976, 1985) and Rugman (1981, 1985, 1986) offer contrasting views on the role played by the **O**-advantages in the existence and growth of multinational firms; i.e. whether the **O**-advantages are exogenous or endogenous. Tolentino (2001) argues that in the eclectic framework the **Oa** advantages arise from endogenous structural imperfections that are created by MNEs to sustain the process of inter-firm competition in the final product market. It means that the **Oa** advantages are endogenous to firms and separable from internalisation. By contrast, the internalisation theory argues that both the **Oa** and **Ot** advantages emerge as a result of internalisation. Therefore, in the view of internalisation theory, the **O**-advantages are exogenous to firms and originate from the process of internalisation.

The differences between the two theories are manifested in their views on the existence and growth of multinational firms. On the one hand, Tolentino (2001) states that "the existence and growth of international production in internalisation theory achieved through vertical and horizontal integration of the multinational corporations across national borders is geared solely to reduce transaction costs or the costs of market transactions (Chandler, 1977a,b, 1980; Williamson, 1971, 1975, 1985; Teece, 1980, 1981, 1987)" (p. 198). On the other hand, the eclectic paradigm asserts that the existence and growth of multinational corporations is a consequence of a process of strengthening **O**-advantages of the firm through overall restructuring and rationalisation of production, for instance, reduction of transaction costs, lowering unit labour costs, improving value-added capabilities of the firm.

To sum up, Dunning's OLI paradigm offers a basis for explaining the patterns of international production and FDI activity and is a simple framework that combines both micro- and macroeconomic perspectives, and accommodates "different theoretical strands under a unifying umbrella" (Iammarino and McCann, 2013, p. 35). As illustrated by Tolentino (2001), the central thesis of the eclectic paradigm is that firms' international economic transactions are determined by the possession of ownership-specific advantages, by the desire of these firms to internalise these advantages and by comparative location-specific advantages of foreign vis-à-vis domestic countries. More desirable **O**-advantages of a domestic country's enterprise (relative to those of another country) give a greater incentive to internalise them, leading to more outward FDI as firms are more inclined to exploiting their **O**-advantages in a foreign market (Dunning and Lundan, 2008). The dynamic application of the paradigm predicts that changes in any of OLI advantages directly cause a change in the inward or outward FDI position of the country (Dunning, 1977).

2.3.4 The Motives for FDI

Building on his 1977 OLI framework and drawing on the work of Behrman (1972), Dunning (1993) developed a taxonomy of four types of MNE activity, where the primary motive underlying the FDI is the distinguishing feature. Importantly, the taxonomy of the four motives for FDI sheds light on why locating production in a foreign country may be preferred to licensing or exporting as a strategy of firms to serve markets abroad. The taxonomy identifies four types of FDI as follows, where the first three are initially identified by Behrman (1972):

1. Market-seeking FDI
2. Resource-seeking FDI
3. Efficiency-seeking FDI
4. Strategic asset-seeking FDI

The 'market-seeking' firms engage in FDI to serve local market demand in the foreign country. In some instances, that market may have been previously served by exports but an increase in the cost of supplying from a distance may have encouraged the 'market-seeker' to locate abroad. Characteristics such as market size and market growth prospects attract market-seeking firms, but they are also encouraged by the presence of the main suppliers, main customers and main competitors in that market. Market-seeking FDI is argued to be the most responsive to cultural differences, given that it occurs when goods are adapted to local tastes and preferences to efficiently serve the local market demand (Dunning and Lundan, 2008; Franco *et al.*, 2008). Market-seeking FDI is demand-side oriented.

The 'resource-seeking' firms invest where they can acquire higher quality resources and/or factors of production at the lower real cost, which is a main motivation for investing abroad. Importantly, access to these resources is a source of comparative advantages for the investing multinational firm, making it more profitable and competitive to operate in the foreign markets. Commonly sought resources include physical natural resources, such as minerals, fuels, metals or agricultural products, inexpensive unskilled or semi-skilled labour, as well as technological capability or managerial and organisational skills. Unlike market-seeking FDI, the 'resource-seekers' are supply-side oriented. In this category, Iammarino and McCann (2013) distinguish between 'general-asset seekers' that aim at host locations' physical resources and cheap labour, and 'specific-asset seekers' that aim to acquire technological capabilities, management and marketing expertise or organisational skills.

The 'efficiency-seeking' firms (also known as 'rationalised FDI') are concerned with promoting the efficiency of the MNE global or regional structure by means of reducing production costs or enhancing the efficiency of the division of labour or the process of specialisation. The benefits are achieved by exploiting economies of scale. Efficiency-seeking multinational firms essentially take advantage of differences in factor costs, factor endowments, institutional arrangements, governmental policies, market structures and consumer demand that exist between markets. Typically, the 'efficiency-seekers' tend to set up production facilities in a limited number of locations, from where they serve multiple markets (Dunning and Lundan, 2008). Efficiency-seeking FDI is often sequential to the resource-seeking or market-seeking FDI activity (Dunning, 2000). In this category, Iammarino and McCann (2013) distinguish between 'global value chain efficiency seekers' that take advantage of international differences in factor costs and endowments between locations at different stage of economic development, and 'scale and scope economies seekers' that take advantage of differences in institutional settings, market and industrial structures, and policies between locations at similar levels of economic development.

The 'strategic asset-seeking' firms (also known as knowledge-seeking FDI) seek investment abroad as a strategy to promote their long-term goals by means of acquiring strategic foreign assets. The long-term strategic objective of these firms is to preserve or improve global competitive position, for example through the augmentation of their global portfolio of physical assets and human competencies (Cuervo-Cazurra and Narula, 2015). Importantly, an engagement in FDI helps to strengthen the **O**-advantages of the firm or alternatively weakening the **O**-advantages of competitors. The strategic asset-seeking motive for FDI may resemble that of efficiency-seeking FDI, given that in both cases MNE restructure their asset portfolio to fulfill their strategic targets (Dunning and Lundan, 2008).

The four motives for FDI can be subdivided into two types. The first three are 'asset-exploiting' in nature since the main objective of MNE is to generate a higher profit stream through the use of existing firm-specific **O**-advantages. The fourth motive for FDI is a situation in which the firm's objective is to add to its existing portfolio of assets. Dunning (1993), who developed the taxonomy, building on Behrman (1972), also linked the four FDI motives to a set of **O**, **L** and **I** advantages of the eclectic paradigm. Importantly, the OLI configuration differs between countries (regions), industries and firms, but equally it differs between individual motives for FDI activity and this is demonstrated in Table 2.3. The purpose of Table 2.3 is to show examples of **O**, **L** and **I** advantages typical for each of four types of multinational firms: 'market-seekers', 'resource-seekers', 'efficiency-seekers' and 'strategic asset-seekers'. Essentially, for each motive for FDI Table 2.3 shows the 'why' of FDI activity, the 'where' of MNE activity and the 'how' of MNE activity. Table 2.3 also reports on the strategic long-term objectives, typical for each type of FDI.

2.4 The New Economic Geography

International business scholars place emphasis on the firm-specific determinants of international economic activity (Dunning, 1998) and "on the unique characteristics of MNEs as organisational entities rather than on the extent and geographical pattern of their foreign activities (Dunning, 2009, p. 21). In other words, these scholars tend to downplay the **L**-advantages of the eclectic paradigm in their studies of the determinants of FDI and MNE activity (Dunning, 2009). The dramatic rise in global FDI activity during the 1980s and 1990s led to the shift of focus away from MNE as an organisational unit towards the spatial aspects of FDI activity, and the impact that globalisation had on the geography of FDI. Towards the end of 1990s, Dunning (1998) recognised that the new research agendas, particularly new economic geography, not only paid more attention to the spatial aspects of FDI activity, but also sought "to incorporate these aspects to into the mainstream thinking about the growth and competitiveness of firms, the relationship between trade and FDI, and the economic structure and dynamic comparative advantage of regions and countries" (p. 46).

Fujita and Krugman (2004) recognise that "the defining issue of the new economic geography is how to explain the formation of a large variety of economic agglomeration (or concentration) in geographical space" (p. 140), where the agglomeration and clustering of economic activity is found to occur at many different geographical levels. The theory relies on four inherent elements that underpin the general functioning of the NEG models and collectively work to explain the spatial agglomeration of industrial location: increasing returns to scale, monopolistic competition, non-zero trade costs and external economies of scale (see: Ascani *et al.*, 2012). Pioneered with the core-periphery model of Krugman (1991), which shows that a country can endogenously become differentiated into an industrialised 'core' and an agricultural 'periphery', the NEG literature combines traditional trade theory with agglomeration economies. Procher (2009) notes that while traditional trade theory explains the for-

Table 2.3: Types of international production - dominant motives

Types of international production	O Ownership advantages: (the 'why of MNE activity)	L Locational advantages: (the 'where' of MNE activity)	I Internalisation advantages: (the 'how' of MNE activity)	Strategic long-term objectives of MNEs
Resource-seeking FDI	Capital, technology, access to markets, complementary assets, size and bargaining strengths	Possession of natural resources and related transport and communication advantage, tax and other incentives	To ensure stability of supplies at right price; to control markets	To gain privileged access to resources vis-à-vis competitors
Market-seeking FDI	Capital, technology, information, management and organisational skills, surplus R&D and other capacity, economies of scale, ability to generate brand loyalty	Material and labour costs, market size and characteristics, government policy (e.g. with respect to regulations and to import controls, investment incentives, etc.)	A desire to reduce transaction costs, buyer ignorance or uncertainty, to protect property rights	To protect existing markets, counteract behaviour of competitors, to preclude rivals or potential rivals from entering new markets
Efficiency-seeking (rationalised) FDI a) Of products b) Of processes	As above, but also access to markets, economies of scope, geographical diversification and/or clustering, and international sourcing of inputs	a) Economies of product or process specialisation b) Low labour costs, incentives to local production by host governments, a favourable business environment	a) As for second category, plus gains from economies of common governance b) The economies of vertical integration and horizontal diversification	As part of regional or global product rationalisation and/or to gain advantages of process specialisation
Strategic Asset-seeking (knowledge-seeking) FDI	Any of first three that offer opportunities for synergy with existing assets	Any of the first three that offer technology, organisational, and other assets in which firm is deficient	Economies of common governance, improved competitive or strategic advantages, to reduce or spread risks	To strengthen global innovatory or production competitiveness, to gain new product lines or markets

(source: Dunning and Lundan, 2008)

mation of industrial clusters using the concept of comparative advantage, NEG breaks some of the assumptions of the traditional theory and affirms that the spatial concentration of economic activity is a result of an interplay between increasing returns to scale and trade costs across space.

The spatial externality concept of 'agglomeration economies' that features in the NEG theory can be traced back to Marshall (1890) and his "informal discussions of 'external economies of scale' " (Johansson and Quigley, 2004, p. 165). According to Marshall (1890), agglomeration engenders economies that are external to a firm, but internal to a small geographical area, or 'locality' (see: Guimaraes *et al.*, 2000). The agglomeration economies refer to the benefits to firms from locating near to each other, creating clusters of industrial activity (Glaeser, 2010). The benefits associated with this type of externality include among others: proximity to the suppliers of intermediate goods or to the customer base, access to more stable labour market and qualified pool of workers, and knowledge spillovers between firms.

The NEG offers a micro-founded approach to spatial economics literature and evidence as to why proximity matters. The theory assumes a market structure that is a monopolistic competition with numerous and symmetric firms, where the goods produced by different firms are imperfect substitutes. Assuming non-zero costs of trade across space, a profit-maximising firm chooses its location from where it can serve most of its consumers. Trade costs are assumed to increase monotonically with distance due to shipping costs and time in transit. Increasing returns to scale at the firm level lead to clustering of firms in a few locations, as a consequence of positive technological externalities such as knowledge spillovers. Importantly, the positive productivity spillovers are assumed to be better transmitted within dense configurations of economic activity rather than within sparse and fragmented ones, recognising that proximity is good for productivity: a fundamental building block of the NEG (Venables, 2006). Venables illustrates that firms locate where productivity is high, increasing local productivity further and contributing to an uneven distribution of economic activity in geographic space, leading to spatial income disparities.

The NEG theory emphasises the role of input-output relations between firms. If the structure of production is vertical, meaning that one or more upstream sectors produce and supply factors of production for one or more downstream sectors, then backward and forward linkages between industries are present (assuming upstream and downstream producers are each subject to increasing returns and trade costs). Surico (2001) notes that the dichotomy of backward-forward linkages was developed by Hirschman (1958). Backward linkages (also known as cost linkages) capture incentives for economic agents, who demand final or intermediate goods, to locate close to suppliers of these goods, which is where the upstream sector is located. Forward linkages (also known as demand linkages) capture incentives for producers of final or intermediate goods to locate close to their consumers, which is where the downstream sector is located. Factors like knowledge spillovers and backward and forward linkages generate 'centripetal forces' (i.e. agglomeration or clustering forces) that lead to a spatial concentration of economic activity in a location.

Once a threshold is reached, an increasing concentration of firms in a location can have a negative impact on the attractiveness of the location, thus generating 'centrifugal forces' of agglomeration. These dispersion forces push the economic activity apart and emerge as a consequence of the negative externalities, such as congestion or immobile factors of production. The interplay between the centripetal and centrifugal forces means that the relation between the spatial concentration of activity in a given location and how attractive it is to a marginal investor resembles an inverted U-shape profile (Arauzo-Carod *et al.*, 2010). Where the relation is positive, the agglomeration forces exceed the dispersion forces. Table 2.4 lists the main types of centripetal and centrifugal forces.

Table 2.4: Forces affecting geographical concentration and dispersion of firms

Centripetal forces	Centrifugal forces
Linkages	Immobile factors
Thick markets	Land rent/commuting
Knowledge spillovers and other pure external economies	Congestion and other pure diseconomies

(source: Fujita and Krugman, 2004)

Although Arauzo-Carod *et al.* (2010) classify the agglomeration economies as one of the neoclassical location factors, a distinction between these is made by Wheeler and Mody (1992), who consider the former a non-ergodic process and the latter one an ergodic process. An ergodic system always returns to its initial state when the initial conditions are reproduced, which is regardless of the developments in the interim period (Wheeler and Mody, 1992). The neoclassical location factors such as market demand variables, supply-side characteristics or geographical features of the location, imply an ergodic system. By contrast, a non-ergodic system exhibits strikingly different and irreversible evolutionary responses to small changes in initial conditions (Wheeler and Mody, 1992). The agglomeration economies imply a non-ergodic system. Both ergodic and non-ergodic systems can result in the creation of spatial clusters of economic activity, but agglomeration economies only arise under a non-ergodic system when a gradual concentration of firms increases the attractiveness of a location (Jones and Wren, 2006).

2.4.1 The Classification of Agglomeration Externalities

Boschma and Frenken (2011) argue that since the seminal paper by Glaeser *et al.* (1992) the literature on agglomeration economies has attempted to determine if the strength of agglomeration externalities and regional growth depend on the sectoral composition of firms in a location. Essentially, the fundamental question is whether a firm benefits more from other local companies of the same sector or from a diverse regional network of industries. Marshall (1890), who pioneered the discussion on agglomeration economies by specifying the advantages from geographical clustering of firms, listed three main sources of benefits for a firm: the existence of close input-output relations between firms (backward-forward linkages), the development of a pool of specialised workforce and positive externalities resulting from spillover effects between firms (e.g. technological or knowledge spillovers).

The agglomeration externalities arising from the knowledge spillovers feature in the New Growth Theory (also known as the endogenous growth theory) developed by Romer (1983, 1986, 1990), which attributes economic growth to technological change and innovation. Jones and Wren (2010) note that knowledge flows between firms in the same sector occur due to its inappropriability (Arrow, 1962b), but only within a limited geographical distance, and since spillovers occur through social interaction and in proximity to a knowledge source (Ellison *et al.*, 2010), then this suggests that they are bounded to small areas where new knowledge is created (Beaudry and Schiffauerova, 2009; Feldman and Audretsch, 1999). Originating from the work of Marshall (1890), Arrow (1962a) and Romer (1986), and later formalised by Glaeser *et al.* (1992) as the Marshall-Arrow-Romer (MAR) knowledge spillover, these occur predominantly within an industry. Subsequently, these intra-industry spillovers came to be known as MAR externalities, also referred to as 'localisation externalities' or 'specialisation externalities'.

On the contrary to the intra-industry knowledge spillover hypothesis, Jacobs (1969) argues that knowledge spillovers occur not only within an industry, but actually span complementary industries since the ideas developed by one sector can be applicable in another one (van der Panne, 2004). As a consequence, a diversified sectoral composition of firms in a location gives rise to urbanisation (diversification) externalities that occur between industries. These inter-industry spillovers are usually referred to as Jacobs externalities. Table 2.5 identifies and summarises the types of agglomeration externalities. The externalities of Marshall (1890) correspond to economies of scale that are external to a firm, but for completeness Table 2.5 discusses those economies of scale that are internal to a firm. Internal economies capture the decreasing average cost as the scale of production increases.

Table 2.5: Classification of the economies of scale:

Type of economy of scale				Example
Internal			1. Pecuniary	Being able to purchase intermediate inputs at volume discounts
	Technological		2. Static technological	Falling average costs because of fixed costs of operating a plant
			3. Dynamic technological	Learning to operate a plant more efficiently over time
External or agglomeration	Localisation	Static	4. 'Shopping'	Shoppers are attracted to places where there are many sellers
			5. 'Adam Smith' specialization	Outsourcing allows both the upstream input suppliers and downstream firms to profit from productivity gains because of specialization
			6. 'Marshall' labour pooling	Workers with industry-specific skills are attracted to a location where there is a greater concentration
		Dynamic	7. 'Marshall-Arrow-Romer' learning by doing	Reductions in costs that arise from repeated and continuous production activity over time and which spill over between firms in the same place
	Urbanisation	Static	8. 'Jane Jacobs' innovation	The more that different things are done locally the more opportunity there is for observing and adapting ideas from others
			9. 'Marshall' labour pooling	Workers in an industry bring innovations to firms in other industries; similar to no. 6 above, but the benefit arises from the diversity of industries in one location
			10. 'Adam Smith' division of labour	Similar to no. 5 above, the main difference being that the division of labour is made possible by the existence of many different buying industries in the same place
		Dynamic	11. 'Romer' endogenous growth	The larger the market, the higher the profit; the more attractive the location to firms, the more jobs there are; the more labour pools there, the larger the market - and so on
			12. 'Pure' agglomeration	Spreading fixed costs of infrastructure over more taxpayers; diseconomies arise from congestion and pollution

(source: The World Bank, 2009)

2.4.2 Core-Periphery Models

As indicated above, a pioneering contribution to the NEG literature is the core-periphery model of Krugman (1991). This shows that a country can endogenously become differentiated into an industrialised 'core' and an agricultural 'periphery'. A simple two-region model with two kinds of production, agriculture and manufacturing, is designed to address an important question of economic geography, specifically why and when activity becomes concentrated in a few locations, leaving others relatively underdeveloped.[5] The importance of the Krugman model is that it initiated a new class of core-periphery type of agglomeration models, some of which such as a two-country, three-region NEG model developed by Bruelhart *et al.* (2004) can be used to study the impact of regional economic integration on industrial location.

Krugman (1991) shows that the emergence of core-periphery pattern of industrial location depends on the transportation costs, economies of scale and the share of manufacturing in national income. Krugman (1991) observes that reasons for the localisation of industries in space are threefold. First, the clustering of firms in a single location offers a pooled market for labour with industry-specific skills that ensures a lower probability of unemployment and labour shortage. Second, localised industrial clusters support the production of non-tradable specialised inputs. Third, knowledge and information spillovers that occur over small areas promote a more efficient production within clusters of economic activity rather than in isolation.

The core-periphery model of Krugman (1991) is a two-region model with two sectors. Agriculture is characterised by a constant returns to scale and intensive use of immobile land. An exogenous distribution of land determines the geographical pattern of agricultural production. Manufacturing is characterised by increasing returns to scale and a modest use of land, implying that manufacturing production is not restricted to areas where land is available. Krugman (1991) shows that the increasing returns to scale imply that manufacturing production takes place at only limited number of sites and non-zero transport costs cause production to locate in areas with a large local market demand. Assuming the demand for manufactures comes from agricultural and manufacturing sectors, Krugman notes that the market is large where other manufacturing firms are concentrated, reinforcing a clustering of manufacturing production in that area.[6] Krugman (1991) explains that this 'circular causation' is created by backward linkages, that is further reinforced by forward linkages (Hirschman, 1958), as *ceteris paribus* the firms want to locate near the consumers of their goods and equally

[5]Economic geography studies the location of economic activity in geographic space and considers the impact of the resulting spatial distribution on the actions of economic agents.

[6]This phenomenon is described by Myrdal (1957) as a 'circular causation' and by Arthur (1990) as 'positive feedback'.

near to the suppliers of their inputs.

An assumption of the Krugman model that helps to generate the core-periphery pattern of industrial location is that it is pecuniary externalities (i.e. market-based) rather than purely technological externalities (non-market based) lead to the emergence of industrial 'core' and agricultural 'periphery'. Table 2.5 summarises the different types of economy of scale above. The model of Krugman (1991) assumes two factors of production, each specific to one sector. Peasants produce agricultural goods and are immobile between regions, but the workers, who are employed in manufacturing, can move between two regions and go where higher real wages are paid. Transportation costs are zero for agricultural output, but the transport of manufactures incurs 'iceberg' type transport costs.[7]

Regional convergence or divergence in the Krugman model depends on the value of the model parameters, such as the share of expenditure on manufactured goods, the elasticity of substitution between products and the fraction of the good shipped that arrives at the destination. As workers move between regions, three forces emerge that determine what happens to the relative real wage between the regions. First, the 'home market effect' promotes regional divergence, since *ceteris paribus* the real wage is higher in a larger market (Krugman, 1980). Second, the existence of 'competition effects' promotes regional convergence as the workers in the region with less manufacturing labour face less competition for the local peasant market. Third, a 'price index effect' promotes divergence as inflows of workers to a region lower the price index in that region and so raise the real wage. The simulations of Krugman (1991) reveal that an economy that is characterised by high transport costs, a small share of manufacturing and weak economies of scale is likely to lead to a pattern of manufacturing activity that depends on the distribution of agriculture, so that there is no core-periphery pattern. Conversely, when the opposite applies then manufacturing agglomerates in the region that emerges as an early-stage manufacturing production centre, leading to a core-periphery pattern.

2.4.3 Agglomeration of Technological Innovation

Although the core-periphery model of Krugman (1991) discusses the agglomeration economies in the context of an industrialised 'core' and an agricultural 'periphery', a parallel can be drawn to the agglomeration of technological innovation. To begin with, technological innovation had been seen mainly as the source of an *ex-ante* advantage that allows firms to expand abroad, but over time the attention shifted to the inter-

[7] 'Iceberg' transport costs imply that only a fraction of a unit of manufacturing goods shipped from one region to the other, arrives at the final destination.

national dispersion of corporate activities as a means of creating of new technological competencies (Cantwell and Piscitello, 2005). Crucially, in a rapidly globalising economy, and particularly within integrated area such as the EU, the technological development effort of the multinational firms lead to an increasing number of linkages between regions within and across national borders (Cantwell and Iammarino, 2000, 2001). The analysis in Cantwell and Iammarino (2001) shows that technological capacity and sectoral specialisation of different EU regional centres and their evolution over time led to a geographical hierarchy of regional centres operating across national borders within the EU. The technology transfer resulted in the differentiation of the core European regions into those characterised by more mature clusters of activity and narrow specialisation patterns, and those which have broadened their specialisation and have shifted towards the fields of high technological opportunities (Cantwell and Iammarino, 2001). Cantwell and Iammarino (2000), who look at the geographical distribution of innovative activity across the UK regions, show that networks for innovation and location choices of multinational firms conform, particularly within the EU, to the geographical hierarchy of centres established across and within national boundaries and that the technological specialisation of foreign-owned affiliates depends on whether the region is a 'higher-order' or a 'lower-order' location.

Technological innovative activity has a strong tendency to agglomerate in few locations because of the benefits that arise from knowledge spillovers, a factor that generate centripetal forces of agglomeration. The accumulation of skills, know-how and knowledge operates within spatially bounded areas, which promotes an emergence of innovation clusters. Through their tendency to establish internal and external networks for innovation the multinational firms, which play an increasing role as creators of innovation, can exacerbate the agglomeration processes of innovative activity (Cantwell and Iammarino, 2001). Essentially, the objective of an investing multinational firm is to increase its global technological advantage from selected foreign sources (Cantwell, 1989, 1992b, 1994) and this leads to reorganisation of their cross-border operations. Importantly, a high degree of economic integration within the EU Single Market that was supported by the removal of non-tariff barriers, the adoption of the Single currency, and the commitments to full economic and monetary integration, has promoted "the reorganisation of operations of both European and extra-EU multinational corporations located in the area to a much greater extent than elsewhere" (Cantwell and Iammarino, 2001, p. 1011). This is supported by Cantwell (1992a), who shows that the interdependencies between geographically separated areas in which multinational firms operate is relatively higher in Europe, leading to far more established intra-firm networks and linkages between foreign-owned affiliates and local firms.

The NEG theory, which implies non-ergodic systems, is suited to explaining the mechanisms behind the formation of spatial clusters of technological innovative activity. Cantwell (1991, 2000) show that the technological change is characterised by path-dependency, meaning that the probability of adoption of specific kinds of technologies are influenced by the past decisions which constraints the limits of existing choices (Cantwell and Iammarino, 2001). The proposition that technological innovation also proceeds as a cumulative process, which tends to 'lock in' to a particular course, is accepted by Cantwell and Iammarino (2001) following a formal empirical analysis. Other hypotheses included the incremental progression of innovation (i.e. firms tend to progressively shift between related sectors), and differentiation of innovation between firms and locations (i.e. the path of technological development that is followed by firms in a location is distinctive and location-specific). The fifth enlargement, which led to the widening of the integration in Europe, and the process of deepening of the integration between the EU Member States (see: Chapter 3) makes it an interesting episode to study the effects of innovation and technology transfer driven by multinational firms, especially if the motive for investment is knowledge-seeking.[8]

2.5 Location Factors

The eclectic paradigm that introduced the concept of three OLI advantages is the first theoretical framework that explicitly models the location dimension of FDI activity. Together with the typology of FDI motives of Dunning (1993), it provides the theoretical underpinnings of the location choice decision of an investing multinational firm. Essentially, the location factors are explored that affect the spatial distribution of FDI activity and determine the choice of a host location. In this manner, the eclectic paradigm offers a clear link between the theories of FDI and MNE on the one hand, and the empirical literature on FDI location choice on the other hand, which is discussed in the subsequent sections of this chapter.

Arauzo-Carod *et al.* (2010) note that the location of FDI activity has mainly been analysed from three theoretical perspectives: neoclassical, institutional and behavioural. The neoclassical perspective emphasises the role of profit- and cost-driving location factors such as agglomeration economies of the NEG theory, while the institutional perspective focuses on the role of judicial and regulatory systems. The behavioural theories highlight the importance of investor-specific preferences in the location choice decision of firms. In that respect, both the neoclassical and institutional theories are based on factors that are 'external' to the firm, while the determinants of

[8]Although technology transfer is a relevant issue to be studied in the context of the fifth enlargement and FDI location, this objective is not formally pursued due to the lack of data to capture innovation on a scale of EU-25 countries and regions, which is a limitation of this thesis.

FDI of behavioural strand are of an 'internal nature' (Arauzo-Carod *et al.*, 2010). Starting with the neoclassical perspective, these theories are discussed in the subsequent sections of this chapter.[9]

2.5.1 The Neoclassical Location Factors

Neoclassical theory supposes that agents are rational and perfectly-informed, and that they optimise by choosing a location that maximises profits or minimises costs. The fundamental neoclassical location factor is market demand; otherwise known as the market potential of a location (Procher, 2009). The most commonly used economic indicators that capture market demand are GDP, GDP per capita, total population or the GDP growth. The GDP and population terms capture the absolute size of the local market. On the contrary, the GDP per capita is a better approximation for the relative purchasing power of the population in the location. Finally, the growth of GDP reflects on the economic performance of the location.

Crozet *et al.* (2004) maintain that when dealing with small geographical units the use of local GDP as a proxy for market demand is problematic. At a disaggregated level such as regions, it is plausible that investing multinational firms are seeking to serve consumers beyond the regional borders of a chosen location. In such circumstances, the market potential variable of Harris (1954) is perhaps a better way to capture the features of a location choice decision. Importantly, Harris' market potential variable assumes that an investing firm not only takes into account the market size (GDP) of a chosen location but also the income in all other locations weighted by the distance to the chosen location. The distance serves as a proxy for the trade costs, which are assumed to be monotonically increasing with the distance. Sometimes, the market potential term accounts for the income level of the chosen location and the inverse-distance weighted sum of incomes of the adjacent regions only, especially in situations when the number of location alternatives is large. This helps to avoid over-complexity of estimation when the number of regions is large.

In addition to demand-side considerations, the optimisation strategy of a rational investor is influenced by supply-side conditions that affect the production costs, and hence profitability. These supply-side characteristics encompass factors such as labour costs, skills, the quality of the labour force and productivity. The manufacturing wage rate is typically used as a proxy for the unit labour costs. Furthermore, the unemployment rate is often included among supply-side variables, although its effect on FDI is ambiguous. Disdier and Mayer (2004) argue that high unemployment can be

[9] Although I give examples of location factors most frequently employed in the formal analytical work, a detailed review of the empirical literature is done in later sections of this chapter.

interpreted as a signal of the availability of a large pool of workers (in which case, high unemployment is a factor that attracts the investment), but it can also be viewed as the sign of rigid labour market and poor quality labour force (a factor that discourages the investment). This causes the expected effect of unemployment on the probability of FDI location to be ambiguous. Finally, education attainment can be used as a measure for the human capital endowment and skills, and proxy for the quality of the regional pool of workers.

The neoclassical perspective highlights the importance of trade costs that are associated with investment and advocates the use of measures such as infrastructure and distance in the location choice analysis. The most commonly employed proxy for the quality of the infrastructure is the extent of road (or rail) infrastructure, normally expressed as the kilometres of motorways (railways) per kilometre squared. By enhancing the distribution of goods and services in the region and facilitating the access to markets, a well-developed transport infrastructure is assumed to attract investment. Although a well-developed transport infrastructure reduces trade costs, Jones and Wren (2006) advise that any interpretation of the infrastructure variable should be treated with caution, given that in addition to the reduction of trade costs, a well-developed infrastructure is associated with high level of urbanisation, and thus a wide customer base and congestion.

2.5.2 The Institutional and Behavioural Location Factors

The institutional theories extend the neoclassical set-up and emphasise the role played by a network of economic relations (i.e. between MNEs and their clients, rival firms, suppliers, public administration and local authorities), as well as the judicial and regulatory system in place. Although "the importance of economic institutions for economic performance and investments is widely acknowledged in the political economy literature" (Ascani *et al.*, 2014, p. 6), there is limited attention in the empirical studies on FDI location to the importance of these factors in shaping the final investment decisions. Ascani *et al.* (2014) distinguish between two channels through which institutional factors influence the operations of multinational firms abroad: direct and indirect. The first emphasises the role of institutions in directly influencing the returns on investment and the associated risk. The second emphasises the impact of institutions on other FDI location determinants such as human capital and infrastructure.

Ascani *et al.* (2014) recognise three dimensions of institutional factors that have a potential direct impact on the location decisions of foreign investors: regulatory market conditions (i.e. labour market and business regulations), the legal environment (i.e. property rights and contract enforcement) and the role of public expenditure in the economy. Poor-quality institutions that are characterised by features such as corruption, poor enforcement and low levels of protection for property rights, are considered by Disdier and Mayer (2004) to be an implicit tax on the investor, which discourage potential FDI inflows. The analysis in Ascani *et al.* (2014) confirms the strong preference that multinational firms attach to the enforcement of contracts. It also shows that a large proportion of investors attach a positive value to the effective business regulation, but fails to confirm that investors prefer more flexible labour markets. Finally, it recognises that a significant preference heterogeneity exists between investors in their valuation of the protection of property rights.

Beyond the three dimensions of institutional framework identified in Ascani *et al.* (2014), other institutional location factors encompass characteristics such as taxes, regional promotion incentive programs and environmental regulation (Arauzo-Carod *et al.*, 2010). The tax rate is one of the most common macroeconomic factors included in the literature on FDI location choice determinants (Jones and Wren, 2006). Devereux and Griffith (1998), who advocate an effective average tax rate as a measure of the impact of taxation on discrete FDI location choices, suggest that while "the cost of capital, reflecting the effective marginal tax rate, is generally not significant in any of the strategic choices (. . .), the effective average tax rate does play an important role in the choice of location" (p. 362). Although higher taxes imply a lower profitability of investment, high-tax locations with better provision of public goods and services may be preferred by multinational firms (Gabe and Bell, 2004). The regional incentive programs can be used to encourage inward investment and these can take different forms: financial incentives (public subsidies), tax incentives (tax breaks and tax holidays), and labour-promotion incentives (Basile *et al.*, 2004). Although used to attract inward FDI, the success of these incentive programs is not clear-cut and may depend on their design.

Finally, the behavioural perspective highlights the role of the preferences of the entrepreneurs in their location choice. The 'internal' nature of the behavioural location factors hinders a formal analysis owing to the difficulty in finding appropriate investor-specific and firm-specific data. As a consequence, the behavioural perspective of FDI location is relatively less studied empirically and is not formally considered in the remainder of this thesis.

2.6 Empirical Literature

Empirical studies of FDI location typically use one of two research designs (Reinert *et al.*, 2010). The first uses aggregate count data on FDI flows into different countries and applies a panel data methodology such as fixed and random effects models, as well as the Poisson model, negative binomial model or zero-inflated Poisson model to examine the correlation between aggregate FDI flows and location factors. The second type of design uses firm-level data to study decisions of multinational firms to set up foreign production affiliates in a specific location, and uses a discrete choice methodology such as conditional, multinominal or nested logit. The first type of study offers an insight into the location characteristics that attract inward investment, but it conceals individual firm-specific attributes that underlie a location decision of a firm that chooses to invest abroad. The second type of analysis offers more valuable information about the location choice decisions of investing multinational firms, but publicly and widely available data on FDI decisions are not widespread.

Looking at the empirical studies of FDI location, what is remarkable is that while there are many studies of inward FDI for the US and UK (for the US: e.g. Little, 1978; Arpan and Ricks, 1986; Glickman and Woodward, 1987; Coughlin *et al.*, 1991; Woodward, 1992; Friedman *et al.*, 1992; and for the UK: e.g. Dicken and Lloyd, 1976; McDermott, 1977; Watts, 1982; Hill and Munday, 1992; Taylor, 1993) - and more recently for other European countries (e.g. Crozet *et al.*, 2004 on France; Kalotay, 2008 on Bulgaria and Romania; Chidlow *et al.*, 2009 on Poland; and Boudier-Bensebaa, 2005 and Kiss, 2007 on Hungary) - there are remarkably few cross-country studies at the European level. With the exception of Alegria (2006), to the best of my knowledge there has been no other attempt made yet to model and understand the determinants of location choices of multinational companies within a set of countries that is as large as the European Union of 25 Member States. The aim of this section is to provide the reader, through selective reference to some of the empirical literature, with a better understanding of how the spatial economics literature has developed over time. This will help to place this study in this strand of economic research and thereby provide the background information needed to understand the study and highlight what is original in what I am proposing to do in this thesis.

2.6.1 Early Empirical Evidence: Location of FDI in the US

The early empirical work on investment location investigates the determinants of location choice of domestic and foreign-owned firms that set-up their production facilities in the United States. A pioneering figure in industrial location research is Dennis W. Carlton (Guimaraes *et al.*, 2002). In his study Carlton (1983) emphasises the fact that business location is a subject of great interest: not only to investors who want to know where it is best to locate their plants, but also to policymakers who want to know how best to attract these investors. Despite all the interest, Carlton (1983) argues that economists at the time knew very little about the factors influencing new business location. Part of the reason for the economists' unfamiliarity with the factors influencing industrial location is, according to Carlton (1983), a lack of data on new business formation.

Although Carlton (1983) does not focus on foreign investment but on new business location as a whole, the innovative aspect of Carlton's research is that he was the first to apply McFadden's conditional logit model to study firms' location, thus opening-up this area of applied location research. The discrete choice modelling approach, which is now the well-established methodology in the industrial location literature, was first employed by Carlton (1979), when he noticed parallels between the location decision of firms and the shopping trip mode and destination decisions of individuals. The latter two of these are used by McFadden (1974), as an example of a consumer choice area that can be analysed using conditional logit methodology.

As noted by Guimaraes *et al.* (2003), in practice the application of conditional logit methodology to model industrial location choice poses problems related to the exact definition of the spatial choice set. Large geographical areas inevitably imply a substantial heterogeneity that exists within them, while the sourcing of data becomes more problematic at more disaggregated levels such as regions. This issue is recognised by Carlton (1983), who attempted to model the location choices of firms looking at individual plants in narrowly-defined industries (i.e. 4-digit SIC code) and narrowly-defined geographical units (Standard Metropolitan Statistical Area - SMSAs). The focus on small geographical units and narrowly-defined industries, in addition to using the multinomial logit methodology, constitutes Carlton's second significant and long-lasting contribution to analysing firms' location choice (Guimaraes *et al.*, 2002).

In his pioneering study Carlton (1983) uses the Dun and Bradstreet data - a firm database, reporting information on location, employment created and four-digit SIC industry code - to model location and the employment choices of new branch plants of manufacturing firms in the US. The main findings of this study suggest that energy costs have a large and negative effect on firms' location decision and that existing concentration of employment (firm agglomeration) promotes subsequent investment. Carlton (1983) argues that a large negative energy cost effect can either be a sign of energy-intensive technology of new firms or that energy is a proxy for prices of other heavily energy-dependent factors of production. As far as labour cost is concerned, this study is unable to precisely measure the wage effect on industrial location. Similarly, the effect of unemployment is ambiguous. The findings of Carlton (1983) also do not support the important role played by public policy in the attraction of investment, as low taxes and state incentive programs do not appear to have a positive and significant effect on the location of firms.

Following Carlton (1983), there are more studies of the regional location of firms in the US that utilise the conditional logit methodology. A study of location decisions for new manufacturing plants in the US by Bartik (1985), just like that of Carlton (1983), uses the Dun and Bradstreet business directory and employs a conditional logit model to analyse the determinants of new manufacturing investment. Bartik (1985) examines how the firm location decision is influenced by unionisation, taxes and other state characteristics. Among the regressors, Bartik (1985) includes labour force characteristics such as wages and education, and the existing level of manufacturing activity to capture agglomeration economies.

The main finding is that a high unionisation rate of workers has a strong negative and statistically significant effect on firm location. High level of taxes - corporation and property taxes - are also found to be a factor that discourages investment; the effect of other taxes, such as unemployment insurance and workers' compensation, is generally found to be ambiguous. Bartik (1985) concludes that existing manufacturing activity has a significantly positive effect on location, while wages have a significantly negative effect. The effect of education and energy prices is found to be inconclusive. Finally, Bartik (1985) formulates and finds support for the 'dartboard theory' of industrial location, where the land elasticity of new branch plants is approximately one. In other words, a state with twice as many potential location sites as another state has a double probability of hosting a new investment, *ceteris paribus* (Coughlin *et al.*, 1991).

One of the first studies to specifically focus on the inward FDI is Luger and Shetty (1985), who analyse the location of new foreign plant start-ups in three separate three-digit manufacturing industries in the US over the years 1979 and 1981-83. The authors make it clear that the small number of observations does not allow them to conduct the analysis at the four-digit industry level, like Carlton (1983). Their article examines the effect that agglomeration economies, urbanisation economies, labour market conditions and state promotional activities have on the location of FDI. The last of these factors is the main object of their attention given the considerable growth in US states' expenditure on the attraction of FDI activities over the course of the 1970s. Luger and Shetty (1985) claim that this growth in spending on FDI promotion is a reflection of the importance attached to the employment creation potential of multinational enterprises.

Using the effort index that is constructed to summarise the variety of programs used by US states to attract FDI and a tax variable to capture the effect of public policies, Luger and Shetty (1985) conclude that public policies do not appear to have a uniform effect on the location of FDI in different industries. Their result is in line with the previous finding in Carlton (1983). The fundamental finding of Luger and Shetty (1985) is that the two most important determinants of new plant location are agglomeration economies, which authors capture by the level of industrial activity in total man-hours, and the wage rate. While the former result is in line with Carlton (1983), the latter is contrary to Carlton (1983) and suggests that labour costs do indeed matter in firms' location decision. While the results of their research correspond with economic intuition, Friedman *et al.* (1992) criticise the study of Luger and Shetty (1985) for producing results with only limited statistical significance given a small sample size (21, 27 and 28 observations respectively for three manufacturing industries considered).

Following Carlton (1983), Bartik (1985) and Luger and Shetty (1985), Coughlin *et al.* (1991) analyse the location of manufacturing FDI in the US over the period 1981-83 using the conditional logit model. Specifically, they model the state-level determinants of the frequency distribution of FDI across the 50 US states. Coughlin *et al.* (1991) note that although their research of FDI location is of "increasing importance to the United States public in general and is of direct relevance to the economic development efforts of individual states" (p. 681), only a handful of studies analyse the location of FDI throughout the US empirically.[10]

Focusing on the manufacturing FDI, Coughlin *et al.* (1991) find that the US states with higher income per capita (a measure of market demand) and higher manufacturing density (a proxy for market demand and agglomeration economies) attract more inward FDI. The characteristics of the labour market are important in that higher wages discourage investment, whereas higher unemployment and higher unionisation attract it. Overall, taxes act as a deterrent of inward FDI location, although more extensive transport infrastructures (which depends on public funding) and larger state promotional expenditure are associated with increased probability of FDI location. Finally, Coughlin *et al.* (1991) find relatively little support for Bartik's (1985) 'dartboard theory' of industrial location with respect to inward FDI.

A focus on the specific origin country of FDI is a distinctive feature of Woodward (1992), who investigates the location decisions of Japanese-affiliated manufacturing investments in the US. Using Japan Economic Institute (JEI) micro data on 540 Japanese manufacturing plants investing in US states over 1980-89, Woodward (1992) analyses the determinants of investment location using a conditional logit model. As highlighted by Woodward (1992), over the course of the 1980s Japanese FDI in the US rose substantially, growing faster than inward investment from any other country. Starting from being the seventh largest inward investor in the US in 1980, Japan became the second largest investor by the end of the 1980s. Furthermore, as argued by Woodward (1992), Japanese investors tend to prefer to build new 'greenfield' plant, as opposed to acquiring existing assets. With greenfield start-ups requiring an explicit location choice, it is worthwhile to understand the rationale behind the location decision.

[10] Among those studies Coughlin *et al.* (1991) mention Little (1978), Luger and Shetty (1985), Glickman and Woodward (1987) and Coughlin *et al.* (1990). Rather than FDI, more studies exist that analyse the location of aggregate economic activity.

The state-level regression estimates in Woodward (1992) suggest that the unionisation rate has a very pronounced negative impact on Japanese industrial location, after controlling for other state attributes. This finding is consistent with the result presented in Bartik (1985). Woodward (1992) also introduces a market size variable that is measured as the state's own income and the sum of the income of all other states, weighted by distance. This variable has a positive and statistically significant effect on Japanese FDI. Woodward (1992) attempts to measure the effect of state promotion activities on location by introducing the promotion effort index previously constructed by Luger and Shetty (1985) and a dummy for the presence of US state promotion office in Japan.[11] The former is found not to have a statistically significant effect on FDI, consistent with Luger and Shetty (1985), but the latter has a positive and statistically significant effect.

Woodward (1992) also runs county-level regressions, in which he introduces variables to capture agglomeration and urbanisation economies. Agglomeration economies are proxied by the existing number of manufacturing plants, while urbanisation economies are captured by population density. Both of these variables have a positive and statistically significant effect on FDI, confirming that Japanese investors are drawn to densely populated areas with existing strong manufacturing base. Woodward (1992) concludes that cities typically create advantageous external economies for locating firms, by offering adequate utilities, good transport and communication links, as well as a base of professional services. The econometric approach used by Woodward (1992), however, is heavily criticised by Friedman *et al.* (1992), who highlight that Woodward (1992) uses independent variables that are measured at one point in time, 1980, to explain the determinants of Japanese FDI location decision over the entire 1980-89 period. Woodward's (1992) argument for following this approach is that most investment decisions are made in the early to mid-1980s period and that a similar approach is used in other studies of this nature. Considering that this approach is not followed in more recent studies of industrial location it clearly points to the progress that has been made.

Friedman *et al.* (1992) study the location choices of Japanese and European multinational companies across US states between 1977-88 and opt for a different approach. They arrange their FDI location data into three distinct sub-periods: 1977-80, 1981-85 and 1986-88, and in the empirical analysis pair these three sub-periods with the 1976, 1980 and 1985 values of independent variables respectively. In the words of Friedman *et al.* (1992), this approach recognises that there exists a lag between the information and final decision of multinational companies to invest such that the 1976 values of independent variables may not be relevant to a plant location decision in 1988. Friedman *et al.* (1992) identify market size, manufacturing wage rate, transportation infrastructure and

[11] In Luger and Shetty (1985), the corresponding index is referred to as the 'effort index'.

state promotional activities as four major factors determining the location of investment in the US. The innovation and originality of the Friedman *et al.* (1992) approach derives from conducting separate analyses of investment location determinants for Japanese and European multinationals, as well as for all investors. The authors draw the conclusion that while the direction of influence and statistical significance of the independent variables for Japanese FDI are consistent with these of the all-country model, the investment determinants are substantially different for European multinationals. Friedman *et al.* (1992) suggest that different estimates can stem from dissimilarities in industrial composition of FDI from these different source areas.

The location decisions of Japanese manufacturing firms in the US is once more the focus of research, this time by Head *et al.* (1995). Just like Woodward (1992), Head *et al.* (1995) focus on the location choices of Japanese firms over the period 1980-89. The methodology is a conditional logit model, and the choice set for investors is US states. Their dataset contains 751 investment decisions in 225 different four-digit manufacturing industries. A distinguishing feature of their paper is that it analyses the effect of four types of agglomeration economies on the probability of subsequent Japanese investment, i.e. agglomeration of US activity, Japanese activity, industrial group ('keiretsu') member activity and border state activity. With the inclusion of the border state agglomeration, Head *et al.* (1995) seek to determine whether the agglomeration effects cross state boundaries and if their magnitude declines with distance.[12] The inclusion of the distance-weighted market power of the other regions, as in Woodward (1992), seems an appropriate approach. Head *et al.* (1995) argue that previous studies have not distinguished between endowment and industry-agglomeration effects. They argue that manufacturing activity (the variable used to capture agglomeration economies in Bartik, 1985) is likely to be correlated with unmeasured location factors, so that the coefficient on manufacturing activity partly captures the effect of unobserved endowments.

The empirical estimates in Head *et al.* (1995) suggest that the location of Japanese investment in the US is significantly influenced by previous Japanese investment in the same industry and/or 'keiretsu'. This, according to Head *et al.* (1995), demonstrates the 'follow-the-leader' strategy of Japanese investors. This result implies that "any benefits received from attracting a single investment will be magnified by an increased probability of attracting subsequent similar investments" (Head *et al.*, 1995, p. 243). As regards the US activity agglomeration economies it turns out to be important, but findings of the study show that Japanese firms do not simply mimic the geographical pattern of US manufacturing plants. Lastly, the estimated magnitude of the border-state activity

[12] This puts into question the analysis of industrial location at a very disaggregated geographical level without taking into account economic activity in neighbouring areas, such as in Carlton (1983).

has up to two-thirds of the attractive power of in-state activity, which in the words of Head *et al.* (1995) discredits the anecdotal accounts of agglomeration effects operating over small geographical areas only.

2.6.2 Location of FDI in the 'Old' EU Member States

While a lot of early location studies are undertaken for the US and generally at the state-level, regional studies of FDI location are also undertaken for some individual European countries. Some of the most prominent examples of early studies of investment location in a single European country include Dicken and Lloyd (1976), McDermott (1977) and Watts (1982) - all carried out with reference to investment location in the United Kingdom. These three key early studies were later referred to by Hill and Munday (1992), who analyse the regional distribution of FDI within the UK. As summarised by Hill and Munday (1992), Dicken and Lloyd (1976) observe the heavy concentration of US manufacturing activity in the South East of England, while acknowledging some shift of investment towards the peripheral regions since the 1940s. A similar trend is noted by McDermott (1977), who notices a greater propensity of foreign manufacturing firms to locate in the UK Assisted Areas during the 1960s. Finally, the analysis of the regional distribution of investment in the 1970s by Watts (1982) also concurs with this location trend, but remarks on the apparent reluctance of foreign firms to locate between the South East and the peripheral regions.

Hill and Munday (1992), using the Invest in Britain Bureau (IBB) data on new investment projects and new jobs for the time period 1979-89, find a shift in FDI employment shares away from the South East, with the South West and the North gaining most. However, the authors admit that working with IBB data requires a degree of caution, as in reality figures relate to announced new investment projects and the predicted long-term employment associated with these projects, implying that at times the data may not be a genuine representation of the actual investment and jobs generated, although Jones and Wren (2004) find these data are reliable. Moreover, the IBB data is likely to over-represent those investment projects for which firms actively seek some financial assistance, meaning that inward investment in the South East of England may be relatively under-recorded, considering this region is not eligible for any form of central government financial assistance.

The empirical approach adopted by Hill and Munday (1992) is to regress the dependent variable (either the regional share of new FDI projects relative to the regional share of total employment or the regional share of new FDI jobs relative to the regional share of total employment) on three independent variables: the regional share of total UK Regional Preferential Assistance expenditure, the ratio of regional average male earnings to the UK average and the regional share of spending on road transport infrastructure. Independent variables are lagged one year to reflect the possibility of a delay between regional information being available to investors and the final investment decision being taken. The empirical approach of Hill and Munday (1992) differs to that taken by most of the early empirical US studies of investment, which employ discrete choice models, as they use aggregate regional FDI data.

The results of Hill and Munday (1992) suggest that both regional financial incentives and the road transport system have a positive and statistically significant effect on investment location. The labour cost variable is found to be insignificant. The results, to some degree, echo those of Friedman *et al.* (1992), who at the similar point in time but using a conditional logit model, find that transportation infrastructure and state promotional activities are among the main determinants of FDI location in the US. The studies differ, however, in their prediction regarding the effect of labour costs. In conclusion, Hill and Munday (1992) raise the possibility that the UK regions along with other European regions may engage in competitive bidding for inward FDI. Hill and Munday (1992) also claim that despite growing interest, the data limitations at the time prevented the empirical analysis of the distribution of inward investment across European regions.

The location of Japanese inward investment, which is studied by academics such as Woodward (1992), Friedman *et al.* (1992) and Head *et al.* (1995) in the US, was also of interest in Europe. Taylor (1993) notes that inflows of Japanese investment into the UK experienced rapid growth during the 1980s and he attempts to identify the factors that determine the spatial distribution of Japanese manufacturing plants in the UK over 1984-91. While there are previous studies on Japanese investment in Europe, Taylor (1993) argues that "much of this previous work, however, has been concerned with the question of why Japanese investors have chosen to locate in the EC and why they have chosen to locate in some countries rather than in others (Dicken, 1987; Morris, 1988; Kumar, 1991)" (p. 1209), but without trying to understand what factors actually drove the location choice.

Contrary to Woodward (1992), Friedman *et al.* (1992) and Head *et al.* (1995) who employ a conditional logit model, Taylor (1993) analyses project data as counts and undertakes a multivariate statistical analysis based on the Poisson model to analyse the inter-county variation in the number of Japanese plants locating in each UK county during two separate time periods: 1984-88 and 1989-91. In addition to understanding what factors influence the location decisions of Japanese investors, this study attempts to evaluate the effectiveness of UK regional policy. Recalling the paper by Hill and Munday (1992) as well as early US studies, it is evident that at the time regional policy attracted a fair degree of attention. The dependent variable of Taylor (1993) is the frequency of Japanese manufacturing firms selecting a particular geographical location (UK county) during the time period under consideration. Taylor (1993) explains that with the dependent variable being a non-negative integer the Poisson model seems a suitable technique, highlighting the fact that the non-normal distribution of the dependent variable makes the use of Ordinary Least Squares (OLS) regression unsuitable.[13] Quoting the earlier work of Kumar (1991), Taylor (1993) points to a strong 'follow-the-leader' behaviour of Japanese companies that perpetuates the concentration of Japanese establishments in specific geographical areas. Taylor (1993) argues that this is explained by buyer-supplier linkages.

As mentioned earlier, Taylor (1993) splits the sample into two sub-periods: 1984-88 and 1989-91. The year 1988 saw the abolishment of the Regional Development Grant scheme, which was a significant change to UK regional policy. Taylor (1993) notes that when locating in the UK Japanese firms appear to strongly favour locations with assisted-area status, where these grants are available, with only 24% of firms selecting locations that are not classed as an assisted area. The results confirm that over both time periods Japanese industrial location is strongly influenced by the assisted area status of a location, recognising the success of UK regional economic policy, and a diverse industrial base. The second of these results suggests that good supply linkages together with an appropriately-trained workforce matter to potential investors (Taylor, 1993).

The analysis of the industrial location choices of investors for European countries is not limited to the UK. Guimaraes *et al.* (2000) analyse the regional distribution of FDI in Portugal. They note note that, with few exceptions such as Hill and Munday (1992), most studies of FDI regional location have been conducted for the US. For that reason the empirical study of Guimaraes *et al.* (2000) has become one of the key studies of regional location of FDI for the case of a European country. Guimaraes *et al.* (2000) admit that the modelling of plant location choices requires highly-disaggregated industrial and spatial data and that reliable data on new plant locations are rare, which are two major factors that have hampered research on the location decisions of firms.

Guimaraes *et al.* (2000) use a discrete choice framework to examine the location decisions of foreign-owned manufacturing plants in Portuguese concelhos (regions) over the 1985-92 period. They focus on 'greenfield' investment only, i.e. new start-ups. A factor that the authors consider important for the location decisions of 'greenfield' investment and which becomes a focus of their study is the existence of agglomeration economies. Guimaraes *et al.* (2000) argue that agglomeration economies in the form of the presence of other firms in the same industry and the presence of other foreign

[13] Taylor (1993), however, identifies a potential problem with using the Poisson model, which assumes that each firm's choice is independent of other firms' choices. This assumption is invalidated whenever there is mimicking behaviour by firms.

firms and services, can help multinational enterprises to reduce their information and search costs, and risks associated with investing in an unfamiliar location. The existing industrial clusters of economic activity can signal a set of favourable conditions, such as availability of specialised workforce, intermediate suppliers and natural resources.

Four variables for agglomeration economies are included in the empirical analysis: manufacturing agglomeration economies (total manufacturing employment per kilometre squared), industry-specific agglomeration (share of manufacturing employment in the same three-digit SIC industry), foreign-specific agglomeration (share of total employment in foreign plants) and service agglomeration (share of total employment in the service sector). This resembles the approach taken by Head *et al.* (1995), who emphasise the inadequacies of lumping together different types of agglomeration economies and capturing them with a single variable. Other regional characteristics considered in the analysis are education variables, labour cost, population density and average travel time distance to major economic centres (Porto and Lisbon), as well as Lisbon and Porto dummies. Taxes are not relevant as they are set at a national level in Portugal. Finally, Guimaraes *et al.* (2000) justify their decision for not including local demand variables by arguing that Portuguese concelhos are too small geographical areas for the market served by foreign firms to coincide with their geographical boundaries. Furthermore, Guimaraes *et al.* (2000) suspect that foreign manufacturers that are located in Portugal are actually serving international markets - primary those in the rest of the EU.

The findings of this study suggest that agglomeration economies are a major determinant of 'greenfield' manufacturing investment location decisions, a result that is consistent with Head *et al.* (1995) for Japanese manufacturing firms in the US states. The magnitude of this effect is strongest for service agglomeration, followed by industry-specific agglomeration. Total manufacturing agglomeration also has a positive and statistically significant effect on FDI, but its magnitude is much smaller. Foreign-specific agglomeration is insignificant, which Guimaraes *et al.* (2000) believe is the effect of controlling for locational 'pull' of the largest cities - Lisbon and Porto. The distance to Portugal's main cities proves to be statistically significant, implying travel costs matter for investors. Other variables such as population density or labour costs do not seem to influence the location of investment. Guimaraes *et al.* (2000) conclude that the 'pull' of the largest urban centres and the importance of travel costs suggest a crucial role for public policy, especially in relation to infrastructure investment, which can help to reduce travel time and hence, help to disperse economic growth through the attraction of private investment to new localities.

Count data models are applied by Basile (2004) to examine the determinants of FDI location in Italy over the period 1986-99. A distinguishing feature of the study by

Basile (2004) is that it contrasts the location determinants of 'greenfield' and acquisitions FDI. This is the novelty of his approach in the sense that the majority of the previous studies analyse the location choices of either aggregate investment (e.g. Coughlin *et al.*, 1991) or 'greenfield' plants only (e.g. Guimaraes *et al.*, 2000). Friedman *et al.* (1992) argues that not distinguishing between the mode of investment entry is the main weakness of the study of Coughlin *et al.* (1991) considered above. Quoting Head *et al.* (1995), Basile (2004) argues that with some rare exceptions, such as Ó Huallacháin and Reid (1997), acquisitions are largely ignored in industrial location literature as they play a secondary role in regional industrial development policies, while this mode of entry is constrained by the supply of acquisition candidates. Basile (2004) notes that while 'greenfield' investment has a direct effect on job creation, acquisitions are important for technological and organisational knowledge transfer. In addition, the majority of inward FDI in Italy over the period is in the form of acquisitions (Basile, 2004).

The empirical analysis is conducted for 95 Italian provinces (NUTS 3 regional level). The dependent variable is the number of firms acquired and created by foreign companies in Italian provinces and the random-effects negative binomial model is used to analyse this data. The explanatory variables are grouped into five categories: market demand, agglomeration economies, asymmetric information, infrastructures and local labour market. While the agglomeration economies refer to the total number of manufacturing establishments, asymmetric information relates to the number of foreign-owned manufacturing plants. Basile (2004) adopts a novel approach for measuring market demand, which is approximated using total electrical consumption of firms and households. Basile (2004) claims that this approach helps to accurately measure the role of the Italian underground economy, whose role is normally underestimated when regional GDP is used.

The results show that the determinants of location differ between acquisitions and 'greenfield' investment. Acquisitions are positively affected by both general and foreign-firms agglomeration, with the effect of the latter being stronger, suggesting that the attractive effect of prior foreign investment exceeds that of prior domestic investment (Basile, 2004). Greenfield investment, on the other hand, is influenced by previous foreign manufacturing investment only. This contrasts with Head *et al.* (1995), who find that domestic firms' activity has a positive effect on FDI location, although not as strong as foreign firms' activity. Basile (2004) also shows that for acquisitions the agglomeration effects cross provincial boundaries, while operating over small, within-province distances for 'greenfield' plants. The latter of the results once again contradicts that of Head *et al.* (1995), who find that border-state activity has up to two-thirds of the attractive power of in-state activity.

An extension of the Basile (2004) paper offers an insight into the role of public infrastructure investment for the attraction of investment. The fact that the geographical distribution of FDI in Italy is imbalanced, with a strong concentration in the North-West and sparsely in the Southern provinces of Mezzogiorno, provides a scene for the exploration of this issue. Basile (2004) runs three separate quantitative simulations to investigate how FDI location choices would be affected under three different scenarios: 160% increase in the existing public infrastructure stock in the South (to match that of Milan's province), 80% increase in the existing public infrastructure stock (to match that of an average province) and a modest increase of 10%. Assuming endogenous agglomeration economies are in operation, the results of the simulations confirm that only a substantial change in the attractiveness of the peripheral Southern provinces can succeed in attracting industrial activity. Basile (2004) concludes that growth-stimulating, regionally-diversified fiscal policy is likely to play an important role in the attraction of investment to the most backward areas.

At about the same time as Basile, Crozet *et al.* (2004) study the determinants of location choices of foreign investors in France. A significant contribution of Crozet *et al.* (2004), somewhat linked to and expanded on what is the concluding remark in Basile (2004), is that the effects of European Structural Funds and grants on investment location are examined.[14] As argued by Crozet *et al.* (2004), regional policies are increasingly being used by European, national and regional authorities in an attempt to influence the location of economic activity in favour of the lagging regions, which provides the rationale for exploring the degree to which they succeed in attracting FDI. Crozet *et al.* (2004) have access to a large sample of about 4,000 foreign manufacturing investment projects locating in France over 1985 to 1995. The large dataset allows a detailed analysis of investment determinants according to the industry or the origin country of investor to be conducted. To examine the location choices of investors over all 92 French départements (NUTS 3 level) Crozet *et al.* (2004) employ a conditional logit model and, what is another key contribution of this paper, the nested logit methodology. That confirms the progress that has occurred since Carlton (1983) was writing his famous paper, when the widespread use of conditional logit with its assumption of Independence of Irrelevant Alternatives (IIA) was dictated by the computational power of the existing technology.[15]

In addition to investigating the role of regional policy and grant variables, this study tests for the presence of agglomeration economies. In their study Crozet *et al.*

[14] Specifically considered are Objective 2 and Objective 5b funds, the Community Initiative fund and PAT regional policy grants.

[15] McFadden (1974) recognises that the Independence of Irrelevant Alternatives (IIA) assumption is a major shortcoming of the conditional logit model. Essentially, IIA assumption imposes a uniform pattern of substitutability between alternative locations but does not hold when two location alternatives are considered closer substitutes than other locations. The IIA assumption is considered in more detail in Chapter 4 where I introduce data and discuss the methodology.

(2004) distinguish between three types of agglomeration economies: agglomeration of French firms, agglomeration of origin country firms and agglomeration of other foreign firms. Some 'traditional' neoclassical location factors such as Harris' (1954) distance-weighted market potential, labour cost and distance from host to home country are also included. An analysis on the complete sample of FDI projects shows that all types of agglomeration economies have a positive and statistically significant effect on the location of foreign firms, providing evidence for the positive spillovers between firms. What is remarkable is the fact that the French firm agglomeration appears to affect the location choices of investors more strongly than any other agglomeration. This finding is not consistent with that of Basile (2004) and Head *et al.* (1995). Crozet *et al.* (2004) seek an interpretation of this result referring to a concept of 'informational externalities' (Banerjee, 1992; DeCoster and Strange, 1993). Assuming that French firms have better information than foreign firms on the 'true' comparative advantages of French départements it would imply that it is better for foreign investors to follow the location strategy of their French rivals.

The analysis of the influence of regional policies on location choice shows that community initiative grants and PAT grants (the latter being the main tool of French regional policy) have a positive and statistically significant effect on FDI location but the size of the effect is smaller and largely outweighed by agglomeration economies or market potential. On the other hand, pooled results in Crozet *et al.* (2004) leave no support for the hypothesis of EU Structural Funds having a major role in reshaping the location patterns of FDI. Crozet *et al.* (2004) argue that other empirical studies also find no evidence of the success of EU regional policy in promoting regional attractiveness and economic growth, referring specifically to the publications of Boldrin and Canova (2001), Ferrer (1998) and Martin (1998). Crozet *et al.* (2004) continue their argument saying that the result does not imply that EU regional policy funds are inefficient. What the result might confirm, however, is that EU regional policy is not able to "actually influence or even reverse the 'natural' location patterns of economic activity in Europe" (Crozet *et al.*, 2004, p. 48).

2.6.3 Location of FDI in the 'New' EU Member States

The empirical analyses of investment decisions for the case of a Central and Eastern European Country (CEEC) are a more recent addition to the literature, owing to the fact that until the end of 1980s CEECs were under Communism and received virtually no FDI inflows. Naturally the process of transition and associated market reform dramatically changed the scene and as the economies of these countries opened to the 'West', FDI started to flow in. Further, the process of accession negotiations with the European

Union (EU) helped CEECs to transform their economies. As CEECs gradually became an emerging market - it potentially offered a first-mover advantage - academics have increasingly turned to study FDI in the transition economies.

Resmini (2000) examines the determinants of the size of FDI inflows from the EU to 12 CEECs at the sectoral level over the period 1990-95. Resmini (2000) notes that this early transition period in the first half of the 1990s was characterised by strong growth in the level of EU FDI inflows to CEECs as market reforms and transition towards democracy and a market economy began. Preliminary analysis of FDI data for that period reveals that Germany, Austria and Italy (as of 1995 onwards the three most eastern outposts of the EU-15) are the most active investors in the region. Similarly, the greatest share of FDI, both in terms of number of projects and value of investment, is concentrated in the Czech Republic, Hungary and Poland - three countries that share a common border with at least one of three key investor countries. In that sense, the distance between home and host country appears to be one of the factors driving the investment. Moreover, Resmini (2000) highlights that the Czech Republic, Hungary and Poland are the three countries that were deemed to be the most successful in reforming their economies during the transition.

The dataset that Resmini (2000) uses for the purpose of this research contains approximately 3,000 investment projects that are classified by four-digit NACE sectors. This study concentrates on manufacturing FDI, which in the analysis is grouped into four sectors: traditional sectors, scale-intensive sectors, high-tech sectors and specialised producers. As highlighted by Resmini (2000) manufacturing accounts on average for approximately 65% of total FDI undertaken in CEECs in the first half of the 1990s. The empirical methodology used in this paper is the fixed-effect panel data model. FDI inflows, measured in US dollars, for each sector, country and year is the dependent variable, while variables such as GDP per capita, population, distance, risk, wage differential, the degree of openness and the size of the manufacturing sector relative to GDP are included among the regressors. The inclusion of the risk variable is important not only in respect of the long-term nature of FDI, which makes FDI sensitive to risk perceptions (Resmini, 2000; Singh and Jun, 1995), but also considering the instability of the political and economic system of countries in transition.

The results of the estimations suggest that factors that affect FDI flows vary by sector. This is most evident with respect to wage differentials between the EU and CEECs, which have a negative sign for the case of traditional manufacturing and specialised producers and a positive sign for scale-intensive and high-tech sectors, and are only statistically significant for the latter group. Factors such as openness of the economy and industrial clusters of economic activity matter more for traditional sectors. Resmini (2000) also finds that the host country's progress towards a market economy, alongside with a geographical proximity to the countries of Western Europe, has a strong effect on the size of FDI inflows especially in science-based and capital-intensive sectors. Resmini (2000) concludes that the progress in structural reforms and transforming an economy towards that of a market economy are important preconditions for attracting FDI into the countries in transition.

The volume of FDI inflows into transition economies of Central and Eastern Europe is also the focus of the study by Bevan and Estrin (2004). In particular, this paper considers FDI flows from 18 market economies (the EU-15 with Belgium and Luxembourg considered together, plus Japan, Korea, Switzerland and the US) to 11 transition countries (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic, Slovenia and Ukraine) between 1994 and 2000. Bevan and Estrin (2004) highlight that investment inflows into the CEECs originate predominantly from the countries of continental Western Europe and are highly concentrated in three transition economies - the Czech Republic, Hungary and Poland - an observation made by Resmini (2000). Investment inflows from the major global economies such as Japan, the UK and the US are lower.

The methodology employed in the study is a random-effects panel estimation and the set of variables used in the analysis includes total GDP of both source and host country, the real interest rate differential, the distance between source and host countries, a measure of the openness of the host economy, unit labour costs and a risk term that captures a vector of institutional, legal and political factors. The results of the estimation show that the market size of both origin and host country, proximity and labour costs are the most important factors influencing the size of FDI flows. Despite the fact that Bevan and Estrin (2004) do not examine the determinants of the geographical location choices of investors but only look at the volume of FDI, their work is seen as a crucial reference for EU FDI location, owing to the fact that they examine the effect that the EU integration process has on the size of FDI inflows into CEECs. Bevan and Estrin (2004), referring to the work of Mayhew (1998), argue that the prospect of EU membership for the transition economies may be an important determinant of FDI, since accession negotiations are an important political and economic signal. In essence, the prospective entry into the EU reduces the risk of the CEECs since the Copenhagen Criteria for EU accession (see: Chapter 3) involves an external validation of the quality of both the economic management and institutional development.

Over the period 1994-2000 ten out of eleven transition countries considered in this study formally applied for EU membership and subsequently started their accession negotiations with the EU (see: Chapter 3), and this provides a natural environment for exploring the prospective EU membership and its effect on FDI. On this basis, the eleven countries are grouped into three distinct categories according to how advanced they were in their negotiations. The categories that Bevan and Estrin (2004) use are: the countries likely to join the EU very soon, the countries that will join but only after a longer period, and finally, those countries unlikely to ever join. As part of testing for the EU integration effect Bevan and Estrin (2004) re-estimate the original econometric model, in which they include an announcement dummy. This new variable refers to the Cologne European Council meeting in 1998, which Bevan and Estrin (2004) view as one of the key milestone events in the process of accession negotiations with the transition countries of Central and Eastern Europe. The announcement dummy takes the value of zero for all countries prior to 1998. For 1998 and after, this dummy variable is assigned a value of three for the Czech Republic, Estonia, Hungary, Poland and Slovenia, i.e. Luxembourg Group countries that are deemed to satisfy the Copenhagen Criteria and are allowed to begin the formal accession negotiations.[16] Latvia, Lithuania and the Slovak Republic are excluded from the Luxembourg Group but are evaluated as countries that make good progress and likely to be invited to start the formal negotiations at a later date. Consequently, these countries are assigned a value of two. Bulgaria and Romania are assigned a value of one on the basis that there are judged not to have made sufficient progress to open the accession negotiations. Finally, the Cologne announcement dummy takes a value of zero for Ukraine, which is considered unlikely to enter the EU.

The estimation of the model specification with the Cologne announcement dummy produces results similar to that of the baseline specification. Again, the positive and statistically significant coefficients on both source and host country GDP, as well as the negative and statistically significant effect of the distance variable confirm that the volume of FDI is determined by the gravity factors. This finding, as highlighted by Bevan and Estrin (2004), is consistent with a transaction cost analysis of FDI according to which the flows of FDI are attracted by the larger economies, with the benefits of setting up production abroad diminishing with the distance from the home country. Labour costs have a statistically significantly negative impact on FDI, while capital costs and country risk prove to be insignificant. The Cologne announcement dummy is found to have a positive and significant effect on the size of FDI inflows, in both contemporaneous and lagged formulations of the model, thus confirming the greater likelihood of a country joining the EU, the more attractive a country is in the eyes of the potential investors.

Following the article of Bevan and Estrin (2004) investment in the transition economies of Central and Eastern Europe gained more attention as it has become a more widely explored topic among academics. A study by Boudier-Bensebaa (2005)

[16] Chapter 3 sets out the process of EU enlargement and formally defines the Luxembourg Group countries in the context of the EU enlargement.

focuses on the location of FDI in Hungarian regions and assesses the contribution that agglomeration economies have in attracting FDI into the country. Boudier-Bensebaa (2005) admits that the measurement of agglomeration economies in transition economies is likely to be questionable owing to data collection problems and the relatively short period of transition in the CEECs. In the empirical analysis Boudier-Bensebaa (2005) employ a panel data methodology owing to the difficulty of gathering firm-level data on investment location decisions in Hungary. Boudier-Bensebaa (2005) draws attention to the fact that panel data models were successfully used to examine the determinants of FDI, arguing that they are informative and their great variability allows for several competing hypotheses to be tested.

Boudier-Bensebaa (2005) examines the determinants of FDI stocks in 20 Hungarian counties between 1991 and 2000. The independent variables are lagged one year. A Hausman specification test rejects the use of the random-effects model in favour of fixed-effects panel estimation. Boudier-Bensebaa (2005) admits that the main limitation of the study is that the data do not distinguish between different types of investment mode and different source country of investment. Furthermore, the lack of sectoral industry data is yet another weakness of the study since it is reasonable that the motivations for investing abroad are determined by the specific characteristics of the industry that the investing firm belongs to (Horst, 1972). The results show that the locations with higher labour availability, greater industrial demand, higher density of manufacturing activity and inter-industry agglomeration economies attract investment. There is a positive and significant coefficient on unit labour cost, but when the geographical division between the capital-intensive northern and western regions and the labour-intensive southern and eastern regions is allowed for, the coefficient on this is negative and statistically significant for the latter regions.

Another study worth considering is Kalotay (2008), who reviews the main features of inward FDI into Bulgaria and Romania in the wake of their accession to the EU in 2007. Kalotay (2008) acknowledges that the transition process in Bulgaria and Romania was slow and difficult because of the privatisation process. Combined with economic instability in Bulgaria and Romania in the 1990s, high inflation and the financial crisis in 1997, inward FDI into these countries grew slowly at the beginning of the transition period (Kalotay, 2008). The absence of trade agreements with their neighbours may also have added to political uncertainty. An interesting feature of the pattern of investment into Bulgaria and Romania is the high concentration of investment (almost 75%) in the period after the Thessaloniki European Summit in 2003, which locked 1 January 2007 as the entry date of these countries into the EU. Kalotay (2008) argues that this feature could offer strong support for both the integration with the EU and the announcement about accession to positively impact on the degree of business confidence, leading to increased investment. Kalotay (2008) also claims that the progress in the integration of Bulgaria and Romania with the EU, and the final extension of the EU territory into Bulgaria and Romania, has had a stabilising effect in the Balkans, a region with a long tradition of conflicts.

Kalotay (2008) argues that the evident geographical advantage of Bulgaria and Romania is that they provide a land link between Greece and the majority of the remaining EU Member States. Geographical proximity could be responsible for high level of investment from Greece, which was the second largest investor in Bulgaria and fourth largest investor in Romania over the period of transition (Kalotay, 2008). The largest investor in Bulgaria, with more than a third of inward FDI stock, was Austria, which also held the second position in Romania (Kalotay, 2008). While Kalotay (2008) provides only a general review of the features of inward FDI into Bulgaria and Romania, a study by Hilber and Voicu (2010) actually explores the determinants of FDI location in Romania using a conditional logit model. It is based on the location decisions of 1,540 foreign-owned 'greenfield' plants that were established in Romanian counties over 1990-97. Like Kalotay (2008), Hilber and Voicu (2010) find that there was an initial reluctance on the part of foreign firms to invest in the country after the overthrow of the communist regime in Romania in 1989, which could be attributed to the political and economic instability and the slow start of economic reforms in Romania. According to the data that Hilber and Voicu (2010) use, FDI only increased around 1994, with the start of macroeconomic stabilisation.

Hilber and Voicu (2010) focus on evaluating the contribution that different types of agglomeration economies have on FDI location in a transition country similar to Boudier-Bensebaa (2005). They define four types of agglomeration economies alongside border-county versions of these variables, comprising: industry-specific foreign and industry-specific domestic agglomeration, service agglomeration and economies arising from industrial diversification. They claim that service economies are largely ignored in the location literature, but argue that an easy access to local business services is likely to be particularly important in transition economies, where potential investors face opaque bureaucracies, corruption and unstable institutional systems. They capture industry-specific foreign (domestic) agglomeration using the total number of foreign (domestic) plants in the same industry as the investor per squared kilometre. Since they are unable to distinguish between foreign and domestic service agglomeration, a 'generic' service agglomeration is estimated as total service sector employment per square kilometre. Finally, industrial diversity externalities are captured by the inter-industry version of the Herfindahl index.[17]

The econometric analysis employs a conditional logit model and supports the initial hypothesis of Hilber and Voicu (2010). It confirms that service agglomeration plays an important role in attracting foreign manufacturing firms into Romania. A similar effect is found for foreign and domestic industry-specific agglomeration. While not explicitly referring to any specific study, Hilber and Voicu (2010) note that the positive effect of both service sector and industry-specific agglomerations is a result that is representative of other transition economies. The effect of the inter-industry knowledge spillovers and diversity on FDI is inconclusive, as it depends on whether county-fixed effects are included in the model. The inspection of the effect that border-county agglomeration has on FDI gives only partial support to agglomeration economies crossing the county boundaries since only the border-country domestic industry-specific agglomeration has a significant effect on FDI location. That, in the view of Hilber and Voicu (2010), provides support for the claim that in general agglomeration economies in transition economies are geographically localised. Other variables included in the model show a large degree of variability depending on the specification used, suggesting a potential problem with omitted variable bias.

Chidlow *et al.* (2009) analyse the determinants of investment location in Poland, and support the view that foreign investment made an important contribution to the process of transition in Central and Eastern European Countries from centrally-planned communist countries to the market economies. The benefits associated with the inflow of foreign investment include the inflow of capital, job creation, knowledge spillovers, transfer of technology and increasing trade. Chidlow *et al.* (2009) argue that Poland is a particularly interesting case for studying the investment location choices, as it received the largest share of FDI compared to other transition economies in the region. Nevertheless, the geographical distribution of FDI in Poland is uneven, with the regions in the east being disadvantaged in terms of the amount of FDI that they receive. Chidlow *et al.* (2009) use a sample of 852 foreign firms that established their activity in Poland before 2003, obtaining the primary data on the investment motives using an online questionnaire. They ask foreign investors to assess thirteen motives on a scale of five from ‘very important’ to ‘not sure’, which are then grouped into five different categories, comprising geographical factors, agglomeration factors, efficiency-seeking, knowledge-seeking and market-seeking factors.

Using a multinomial logit model, which takes into account investors’ specific characteristics, Chidlow *et al.* (2009) show that if agglomeration, knowledge and mar-

[17] The Herfindahl index is a measure of geographical industrial concentration developed by Ellison and Glaeser (1997) and captures an extent to which an industry is concentrated in space. It is formally discussed in Chapter 4.

ket factors are the most important motives for firms investing in Poland, then the most preferred location is the capital region of Warsaw. This result is not surprising considering that the Warsaw metropolitan region is the largest market in Poland, with the high concentration of service firms and a highest number of R&D institutions and universities (Chidlow *et al.*, 2009). However, when efficiency and geographical factors are the prime considerations for foreign firms, then locations other than the capital region tend to be chosen. For example, the north-east region is valued by investors on the basis its geography, namely access to the Baltic Sea and proximity to the new EU members of the Baltic States. Chidlow *et al.* (2009) suspect that the efficiency-seeking motives such as input costs and labour availability are dominant motives for labour-intensive FDI, while agglomeration economies and knowledge factors matter more for capital-intensive and high-value added investment. If this is correct then the regional distribution of FDI is likely to further deepen the regional imbalances between the capital and other Polish regions.

Pusterla and Resmini (2007) consider the location choices of foreign manufacturing plants in Bulgaria, Hungary, Poland and Romania between 1995 and 2001. It is a good example of a multi-country study of location in transition countries. Pusterla and Resmini (2007) highlight that since the early years of the transition, CEECs have received an increasing amount of FDI, which "played an active and dynamic role in enhancing the industrial restructuring process and driving the (re)integration of CEECs into the world economy" (p. 836). In this respect, understanding the factors that attract investment into the regions and countries is valuable as it has the potential to channel investment into the more-disadvantaged locations and help to correct regional imbalances. Despite this, Pusterla and Resmini (2007) observe that empirical evidence on foreign firm location choices in Central and Eastern Europe is scarce, owing to data on plant location and on the economic and social characteristics of narrowly-defined locations not being easily available.

Pusterla and Resmini (2007) use data on 2,269 foreign manufacturing projects to examine the determinants of FDI location at the NUTS2 regional level using a nested logit model. Despite each included country being a transition economy, Pusterla and Resmini (2007) argue that they are a heterogenous group. Hungary and Poland advanced much faster in the accession negotiations and were in a position to join the EU in 2004, while Bulgaria and Romania proceeded more slowly and only acceded in 2007. From a different perspective, Bulgaria and Hungary are much smaller economies than Poland or Romania, and the countries also differ in the composition and distribution of FDI that they receive. This heterogeneity between countries provides a rationale for testing different nesting structures of the investors' location decisions, as this choice is in some sense arbitrary (Louviere *et al.*, 2000). The nesting structure that turns out to be most appropriate is Hungary and Poland versus Bulgaria and Romania.[18] This suggests that regions belonging to the EU are seen as more similar to each other than to regions outside of the EU, implying that degree of competition for a potential investor is fiercer within a sample of EU regions and within a sample of non-EU regions than it is between the two groups. Pusterla and Resmini (2007) conclude that the implication of progressing economic and political integration in Europe is that the national borders cease to shape the FDI location choices.

The results of the estimation of the nested logit model on the full sample reveal that the probability of an investment location in a region increases with the concentration of foreign and domestic firms operating in the region. The coefficient on the foreign firm agglomeration term is almost double that of the domestic firm agglomeration. Basile (2004) and Head and Mayer (2004) also establish a relatively greater potential of foreign firm agglomeration economies to attract subsequent investment into a location. The analysis confirms that investors prefer to establish their production facilities in regions with high market potential and easy access to surrounding markets. A negative and significant coefficient on a kilometres of public roads per capita term is explained by Pusterla and Resmini (2007) as a tendency of foreign firms to locate in densely-populated areas, so that urbanisation economies rather than congestion costs matter for investors. With respect to the local input market, the results show that an abundant and cheap workforce positively affects the probability of FDI location in transition economies, while the education level of the workforce does not influence the investment location decision. Lastly, the country risk rating and Special Economic Zones (SEZs) have negative effects. The former suggests that investors locating in a region are not risk-averse and prefer high profit in exchange for higher risk, while the latter that the policies aimed at attracting FDI adopted in CEECs are ineffective (Pusterla and Resmini, 2007).

A valuable insight of Pusterla and Resmini (2007) is the comparison of the factors that affect the investment choices of low- and high-technology foreign firms. While the results are on average unchanged for the sample of low-technology sectors, the high-technology firms show a different pattern of behaviour in their location choices. Importantly, Pusterla and Resmini (2007) show that high-technology multinational companies distinguish between capital, border and other regions, thus implying a different nesting structure. The results of the analysis demonstrate that high-technology sectors are attracted by locations with high market potential and good connectivity to surrounding markets, where they can exploit the benefits of agglomeration with other

[18] This uses an inclusive value parameter (IV), which is a measure of perceived degree of dissimilarity between locations within a nest. It represents a measure of correlation between error terms within a nest. It is discussed in Chapter 4.

foreign firms. Equally these firms are attracted by increased country risk. Finally, the cost considerations alongside with the quality and availability of the labour force, and the potential of exploiting the linkages with the domestic firms do not encourage the location of high-technology firms.

2.6.4 European Multi-Country Studies

As compared to the single-country studies of FDI location, multi-country analyses are a more recent addition to the literature, again linked to the availability of FDI project data. In this context, Disdier and Mayer (2004) make an important contribution to the understanding of the determinants of investment location in Europe. The pioneering nature of their study lies in an attempt to contrast the location choices of firms in Western and Eastern Europe, and to answer the question of how different they are from one another. Using the nested logit methodology, Disdier and Mayer (2004) test whether the decision of an investor has a nested structure: first, investors choose whether they want to locate in the East or in the West (upper-level decision: East-West), and second, they select a country within the nest of their choice in which they want to invest (lower-level decision: a country). Disdier and Mayer (2004) note that since the beginning of the 1990s the CEECs have attracted a growing amount of FDI, which of course coincides with the beginning of transition. They consider the CEECs to be an interesting case study, anticipating that EU enlargement is going to affect the agglomeration and dispersion forces in Europe.[19]

Disdier and Mayer (2004) work with a sample of 1,843 location choices by French multinational firms in 19 countries (13 'old' EU countries and 6 CEECs – Bulgaria, Hungary, Poland, Romania, Slovenia and the former Czechoslovakia). What is remarkable is that a mere 274 projects go to the CEECs, suggesting data truncation. Although the period is 1980-99, FDI in the CEECs was virtually non-existent prior to 1990. The authors use both conditional and nested logit models to conduct their analysis. In addition to analysing the determinants of FDI location on the entire sample of 19 European countries, Disdier and Mayer (2004) estimate the conditional logit model separately for the 13 EU countries and CEECs and provide a commentary on the main differences between 'West' and 'East' samples. First, GDP has a positive and statistically significant effect on FDI location, but a much weaker effect in the EU than in the CEECs. On the contrary, the agglomeration forces are weaker in CEECs, indicating fiercer competition between firms in CEECs (Disdier and Mayer, 2004). The authors maintain that the weaker agglomeration result can be explained by reference to forward and backward

[19]Table 2.4 summarises the agglomeration and dispersion forces, otherwise known as centrifugal and centripetal forces, as discussed earlier in this chapter in the New Economic Geography model.

linkages if affiliates in the CEECs rely on intermediate products from France and other EU countries. The negative effect of distance on FDI is particularly strong in CEECs, which is in addition to higher transport costs associated with location in the East may also reflect the presence of information asymmetries, cultural differences and unfamiliarity with the legal framework associated with investment in the East. Differences between the 'East' and 'West' are also marked in respect of the labour market, as wages exert a stronger negative influence on FDI location in CEECs, implying that labour cost considerations are more important. The unemployment rate has a negative influence on investment location in CEECs but positive in the EU.

In addition to this descriptive view on the differences in FDI determinants in the two regions of Europe, Disdier and Mayer (2004) explicitly test for the relevance of the East-West divide in the process of location choice among European countries. By estimating a nested logit model separately for the time periods 1991-93, 1994-95 and 1996-99 they find a gradual increase in the inclusive value coefficient towards one. While the value of this coefficient consistently falls within a range of zero and one, which implies the validity of East-West nesting structure, an increase towards one over the period considered suggests that the nesting structure becomes less relevant over time. Notably, the inclusive value parameter for the final sub-period is not statistically different from one, indicating the collapse of the nested structure. Disdier and Mayer (2004) conclude that this result demonstrates that over time, as the transition process advanced, the Eastern and Western European countries gradually have become more similar in the eyes of potential investors.

Location choices of Japanese investors, previously analysed by Woodward (1992), Friedman *et al.* (1992) and Head *et al.* (1995) for the US and by Taylor (1993) for the UK, are also examined in the European multi-country setting by Head and Mayer (2004). Unlike Disdier and Mayer (2004), Head and Mayer (2004) consider only a set of Western European countries. The determinants of FDI location are studied in conjunction with location choices of 452 Japanese-owned affiliates that established in nine European countries (Belgium, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain and the UK) over 1984-96. The data used for this study are from the 1996 *Survey of Current Manufacturing Operations of Japanese Firms in Europe*, made available by the Japan External Trade Organisation. Head and Mayer (2004) consider a smaller set of countries than Disdier and Mayer (2004), but they conduct the analysis at a disaggregated regional level in the multi-country setting, comprising 57 NUTS 1 regions, which is a major contribution of this paper. They observe a general trend of Japanese investors locating in the economic core of each country (e.g. clusters of Japanese multinational firms around London in the UK, Paris in France, Milan in Italy and Barcelona in Spain), so that they formulate the hypothesis that market potential is a key determinant of FDI location decision, which essentially is responsible for the formation of the industrial clusters of economic activity.

Starting with the estimation of trade equations that account for exporter and importer fixed effects, distance, common border and common language, equations that subsequently help with estimating Krugman's-type market potential measure, Head and Mayer (2004) then progress to analysing the location choices of Japanese investors using a conditional logit analysis, but unlike Head *et al.* (1995) they use a nested logit model. The results of the conditional logit analysis reveal the absence of a significant and negative wage effect on Japanese FDI location in all econometric specifications. Head and Mayer (2004) find this 'disappointing', although they refer to other examples of empirical work unable to find consistently negative and significant effects of wages, such as Devereux and Griffith (1998) and Head *et al.* (1999). Similarly, the evidence of the effect of unemployment on investment location is inconclusive. Variables such as the corporate tax rate and government-imposed charges contributing to true labour cost (i.e. payroll taxes and pension contributions) both have a negative and statistically significant on location decisions, but none of these results are robust to the inclusion of the country-fixed effects. Government subsidies, captured by an Objective 1 eligibility dummy variable, turn out to be insignificant - a result resembling that of Crozet *et al.* (2004), who do not find any support for the hypothesis of the EU regional policy, proxied by Objective 2 and Objective 5b funds, reshaping the regional patterns of investment in France.

In their empirical analysis, Head and Mayer (2004) also examine the role of three different measures of market demand on FDI location. In the most simplistic case, market demand is captured by regional GDP, which is found to have a positive and highly significant effect on investment. However, Head and Mayer (2004) argue that regional GDP is "hardly an adequate proxy for demand, for few firms would go to the trouble of setting up an overseas factory to serve a single region" (p. 967). This finds an echo in the study by Guimaraes *et al.* (2000) and is cited as the main reason for not including a measure of market demand in the empirical analysis. A second measure of market demand that Head and Mayer (2004) examine is Harris' (1954) distance-weighted market potential. While the overall fit of the model is slightly reduced with the use of the distance-weighted measure of market potential, the coefficient on Harris' market potential is also positive and statistically significant and its magnitude is more than double that of regional GDP. Head and Mayer (2004) claim that this result confirms the relative attractiveness of core regions in Europe - those with a high level of local demand, as well as close to other markets. Head and Mayer (2004), however, recognise the weaknesses associated with using the Harris-type market potential, which essentially does not account for 'border effects' (see below), variations in distance costs and market crowding due to local competition. Head and Mayer (2004) suggest that the measure of market potential proposed by Krugman (1991) is able to handle all three issues. Krugman's market potential has a positive and significant effect on FDI location, and the size of the coefficient lies between that of regional GDP and Harris' market potential. The overall goodness of fit, however, worsen with the use of Krugman's market potential, as compared to the cases when either regional GDP or Harris' market potential measures are used.[20]

In a separate specification, Head and Mayer (2004) also test for the existence of agglomeration effects. Three measures of agglomeration - domestic industry, Japanese industry and network ('keiretsu') - are included in the model, alongside Krugman's market potential. The results of the estimation suggest that all measures of agglomeration economies have a positive and significant effect on the probability of a subsequent location of Japanese firms, with the magnitude of this effect being strongest for 'keiretsu', followed by generic Japanese agglomeration. This finding closely resembles that of Head *et al.* (1995), who obtain similar results in relation to the effect of different types of agglomeration economies on the location of Japanese firms in US states. Head and Mayer (2004) interpret the strong effect of network agglomeration in reference to input-output linkages (Venables, 1996). Head and Mayer (2004) argue that the large coefficient on the 'keiretsu' agglomeration term is a sign that "this type of vertical linkages might offer more solid empirical explanatory power than the simple version of the Krugman (1991) model primarily based on final demand linkages" (p. 968). The coefficient on Krugman's market potential term remains positive and significant, but its magnitude is much smaller.

A further important contribution to our understanding of FDI location determinants in the EU is a study by Alegria (2006). The emphasis of this paper is on examining the differences between location choices of investors at the country-level and regional-level (NUTS2). Alegria (2006) maintains that gaining a better understanding of the location process of multinationals, at both levels, is crucial for policy. He claims that it is the first study to examine the determinants of FDI location choices of all EU Member States at the NUTS2 regional level (excluding Cyprus and Malta). He focuses on intra-European FDI between the 25 Member States of the EU between 1998 and 2005, arguing that intra-EU FDI has not received much attention in the literature. Alegria (2006) sources a sample of 4,803 manufacturing foreign investment projects from the *European Investment Monitor* (EIM) that established in 246 regions of the EU-25. The database considers new creations or extensions and new co-locations of already exist-

[20]The nested logit in Head and Mayer (2004) produces results similar to that of conditional logit and shows that Harris' market potential once more outperforms Krugman's market potential in both the magnitude and overall fit of the model. Head and Mayer (2004) argue that this shows that the downstream linkages emphasised by Krugman (1991) are not the main cause of agglomeration.

ing FDI projects only, i.e. 'greenfield' investment, which enables attention to be focused on a specific entry mode of investment.[21] This supports the claim made by Basile (2004) that acquisitions are largely ignored in industrial location literature, although Friedman *et al.* (1992) disapproves of mixing different types of entry mode of investment.

Alegria (2006) determines whether the sign and strength of agglomeration and dispersion forces differ between the country and regional levels. He observes a tendency for the core-periphery location pattern to be less important between countries, but more important within individual countries of the EU. These suggest that the dispersion forces are dominant at the country-level, but that agglomeration forces are more dominant at a disaggregated geographical level as the core regions within the host countries typically attract significantly more investment projects than the rest of the regions. The methodology employed in this study is the conditional logit model. The set of independent variables include GDP (internal market potential), a Harris-type external market potential, GDP per head, population density, wage, unemployment rate, manufacturing density and foreign agglomeration, as well as corporate taxes and a governance effectiveness index at the national level. All of these variables are lagged one period and logged, but with the exception of governance index which is not a continuous variable. Alegria (2006) emphasises that owing to the lack of comparable sectoral disaggregated dataset for EU Member States and regions, it is not possible to account for the forward and backward linkages of the localisation economies.

In general, the country- and regional-level results of the conditional logit model are similar in both the sign and statistical significance of the parameter estimates. Both internal and external market potential measures have a positive and statistically significant influence on FDI location, while GDP per capita is insignificant. Wages exert a negative and significant effect on investment at both levels of spatial aggregation, but the unemployment rate is insignificant. The previous agglomeration of foreign firms captured by Basile (2004) or Crozet *et al.* (2004) has a positive and statistically significant effect on investment location. Manufacturing density and population density are the only variables that exhibit different behaviour depending on the level of geographical aggregation. The former has a negative but insignificant effect at the country-level but a positive and significant influence on FDI at the level of NUTS2 regions, while population density is insignificant at the country-level and negative and statistically significant at the regional-level. Alegria (2006) concludes that economic integration between countries encourages multinational activity to locate in peripheral locations, but that it agglomerates at the regional-level within countries.

A study similar to that of Head and Mayer (2004) with respect to a set of countries considered is the work of Basile *et al.* (2008). Using data on 5,509 foreign sub-

[21] Mergers and acquisitions, licence agreements and joint ventures projects are not included.

sidiaries that located in 50 NUTS1 regions of 8 EU countries (France, Germany, Ireland, Italy, Spain, Portugal, Sweden and the United Kingdom) over the period 1991-99, Basile *et al.* (2008) analyse the determinants of location choices of multinational firms using the mixed logit methodology. Given that the choice set does not include CEECs, Basile *et al.* (2008) admit that a potential source of bias arises from not including all possible locations into the choice set. However, Basile *et al.* (2008) also remark that in the first half of the 1990s CEECs received relatively low amount of investment. Therefore, they think it reasonable to suppose that the CEECs were not in the choice set of multinational companies investing in Europe in the period 1991-99.

Basile *et al.* (2008) is a key paper on the impact of EU integration on FDI location owing to its specific focus on the role of EU Cohesion Policy in attracting foreign investors from both within and outside of Europe. They argue that an important motivation for the EU regional policy measures, among them the Structural Funds and Cohesion Fund, is that the benefits of economic integration in the EU appear to benefit some regions disproportionately, potentially leading to social and economic disparities within the EU. The aim of the Structural Funds and the Cohesion Fund is to help transform and modernise the structure of relatively poorer regions, and to prepare them for competition within the EU Single Market (European Commission, 1996). As noted by Basile *et al.* (2008) while none of the instruments of the EU regional policy is dedicated to attracting FDI *per se*, foreign firms may still benefit from funds channelled to public investment. Basile *et al.* (2008) highlight that prior to their work there is little evidence on the impact of the EU Structural Funds on the investment location. As examples of cross-country studies, they refer to the work of Breuss *et al.* (2003), who analyse OECD investment in the EU-15 and CEECs over 1986-97, and Hubert and Pain (2002), who look at German FDI in the EU in the 1990s, but note that these studies limit their attention to relatively simple correlations between FDI and the Structural Funds.[22]

The novelty of the Basile *et al.* (2008) approach is that their study is the first to employ a mixed logit model to analyse the location decisions of multinational companies. Mixed logit models (also called random-parameters or error-components logit) are a generalisation of standard logit that allows the parameter associated with each observed variable to vary across individuals and that does not exhibit the 'restrictive' Independence of Irrelevant Alternatives (IIA) property (Revelt and Train, 1998). In mixed logit models, the parameters β are considered to be specific to the individual, handling the unobserved heterogeneity in the valuation of attributes among individuals (Rouwendal and Meijer, 2001) and reflecting the distribution of tastes (Revelt and

[22]Basile *et al.* (2008) admit that there are studies that use more detailed data but that they limit their attention to a single recipient country, listing the study of investment location in French départements of Crozet *et al.* (2004) as an example of a valuable contribution.

Train, 1998). Basile *et al.* (2008) argue that, "the computational burden of simulation techniques has discouraged scholars from applying [the mixed logit] to empirical applications on large datasets" (p. 331). Data on investment is sourced from the *Elios* dataset (European Linkages and Ownership Structure), which was assembled at the University of Urbino and based on Dun and Bradstreet's *Who Owns Whom*. Basile *et al.* (2008) note that while the single largest investor country is the US (25%), the majority of investors are from the EU countries (60%).

The results of the empirical estimation on the full sample of investors reveal that the probability of a foreign firm locating in one region increases with the regional market size and external market potential, with the strength of the agglomeration economies, higher R&D intensity and with lower taxation on labour (Basile *et al.*, 2008). The estimates also suggest that the investors prefer to locate closer to their country of origin, although they caution that this may just pick-up that the majority of investors are from within the EU and so closer to the host region. Most importantly, the results show that the Structural Funds and Cohesion Fund allocated to the EU lagging regions make a significant contribution to promoting the attractiveness of these regions, and in particular for attracting FDI. This is in contrast with Crozet *et al.* (2004), who for French NUTS3 regions find that the EU regional policy measures are ineffective in attracting multinational firms. However, since Crozet *et al.* (2004) look only at a subset of Structural Funds instruments - Objective 2 fund and Objective 5b fund - the results might not be directly comparable.

Interestingly, these EU regional policy tools and other determinants turn out to have different effects when the mixed logit estimation is conducted separately for the samples of European and non-European investors. In essence, while the amount of Structural Funds matters more for the non-European investors, the Cohesion Fund is positive and significant only for European investors. Basile *et al.* (2008) claim that the latter result demonstrates the higher propensity of European multinational firms to locate in Portugal and Spain, which are the largest recipients of the EU Cohesion Fund. Basile *et al.* (2008) argue that the overall estimation results demonstrate that European and non-European investors are undertaking FDI for different reasons. European multinational firms are seeking a combination of low production costs and good market access, which suggests that they re-organise production to serve the EU market, but non-European investors appear to be attracted by rich markets with skilled workers and strategic assets (Basile *et al.*, 2008).

In another paper using the *Elios* database, Basile *et al.* (2009) explore the role played by national boundaries with respect to the location of multinational firms in Europe. The study focuses on 5,102 subsidiaries that located their activity in one of 47 NUTS1 regions of the five largest EU countries (France, Germany, Italy, Spain and the

United Kingdom) during 1991-99. The issue that Basile *et al.* (2009) address is whether within an integrated economic area, such as the EU, national boundaries continue to significantly affect the location decisions of multinational firms. They seek to find out whether the regions within national boundaries are closer substitutes than the regions across these borders. To test this, Basile *et al.* (2009) estimate a nested logit model, where the regions are grouped within individual country nests, and it is examined whether the inclusive value (IV) parameter lies between zero and one. As highlighted by Basile *et al.* (2009), this study can be seen as an extension of Head and Mayer (2004), who also estimate a nested logit model of the location choices in nine European countries, but for a single source only, i.e. Japanese-owned affiliates.

The results from estimating the nested logit reveal that the imposed country-region nesting structure is not correctly specified, since the IV parameters fail to fall regularly within the zero-one interval. Since some of the IV parameters exceed one, this implies that the country-region nesting structure is not consistent with the profit-maximising behaviour of firms, and suggests that foreign investors consider "regions belonging to different countries as closer substitutes than regions within the national boundaries" (Basile *et al.*, 2009, p. 9). In view of this, Basile *et al.* (2009) define a new nesting structure than spans different countries with ostensibly similar geo-economic characteristics: the Northern countries that includes France, Germany and the United Kingdom, and the Southern countries that includes Italy and Spain. The estimation is correctly specified and suggests Spanish and Italian regions are closer substitutes for each other compared to French, German or UK regions, and *vice versa*. Basile *et al.* (2009) argue that this shows that regions have to compete to attract FDI more across rather than within national borders in an economically integrated EU. It supports Pusterla and Resmini (2007), who find that EU integration diminishes the role of the national borders within samples of 'old' and 'new' Member States, although Basile *et al.* (2009) find that national boundaries appear to still play some role in the location choices of non-European investors. Finally, Basile *et al.* (2009) advocate a degree of caution when considering the results of their study, since it examines inward investment in only five countries out of 27 EU Member States, none of which is a 'new' member from Central and Eastern Europe, but which is an avenue for future research.

2.7 The 'Border Effects' of Regional Economic Integration

The analysis of the importance of national borders is part of a separate strand of literature on border effects. Beugelsdijk and Mudambi (2013) compare national borders to "'qualitative discontinuities' in space, that is, points at which spatial heterogeneity changes abruptly" (p.413). Owing to the 'liability of foreignness' described by Hymer

(1976) as the cost of doing business abroad, the national borders are the points in geographic space where spatial transaction costs increase in a discontinuous manner (Beugelsdijk and Mudambi, 2013). Recognising that both international and subnational spatial heterogeneities impact on the location choices of multinational firms, Beugelsdijk and Mudambi (2013) distinguish between discrete border effects and continuous distance effects, emphasising that both subnational and national dimensions are important in understanding the location choices of border-crossing multi-location enterprises and bringing the international business and the NEG perspectives on the FDI location choices together.

In the context of regional economic integration, Obstfeld and Rogoff (2000) refer to border effects as a curious economic phenomena and one of the 'six major puzzles in international economics'. A 'border effect puzzle' was first identified by McCallum (1995), who recognised that the Canadian provinces traded over 20 times more with each other than they did with US states of the same size and distance (Mayer and Head, 2002). Hanson (2001) notes that the proliferation of regional integration arrangements (RIAs), such as the North American Free Trade Agreement (NAFTA) and European Union (EU), has led to a renewed interest in the effects of economic integration and the impact of borders. Importantly, RIAs reduce trade barriers between integrating countries and are likely to augment trade (Crozet and Koenig Soubeyran, 2004) and to alter the economic geography of industrial location (Hanson, 2001). One of the purposes of this thesis is to explore the 'border effect puzzle' of EU integration in the context of the industrial location of FDI, for which the review of the literature reveals a significant gap in the spatial economics literature. Frequently, the border effect is investigated in relation to trade and regional economic activity, but to the best of my knowledge not to FDI.

The pioneering work of McCallum (1995) makes use of data on interprovincial trade flows between ten Canadian provinces and international trade flows between Canadian provinces and US states. Although data on trade flows are available for each pair of the 10 Canadian provinces and 50 US states, McCallum (1995) limits his analysis to 30 US states (20 states with the largest population and all border states). These account for more than 90% of Canada-US trade in 1988, when the Free Trade Agreement (FTA) between Canada and the US was signed. Using gravity model equations, where trade between two countries is assumed to depend on the GDP of exporting and importing countries, the distance between them and the national border, McCallum (1995) shows that *ceteris paribus* trade between two Canadian provinces is more than 20 times larger than international trade between a Canadian province and a US state. In particular, in 1988 the mean trade shares for Canadian provinces are: within-province, 44%; interprovincial, 23%; with the US, 24% and rest of the world, 9%. However, if there were no Canada-US border, the gravity model estimates suggest that interprovincial trade would shrink to 4% and trade with the US would increase to 43% (assuming these continue to account for 47% of all trade). Canada and the US exhibit similar cultures, language and institutions, but notwithstanding this, McCallum (1995) finds that a significant home bias exists in trade related to the national borders.

Although they were first studied with reference to international trade, the border effects of economic integration are found to shape the location of industrial activity within countries (Hanson, 2001). The pioneering study on the impact of regional economic integration on the spatial distribution of economic activity within a country is Hanson (1996), which examines how integration between the US and Mexico affected the location of industrial activity in the US. Hanson (1996) maintains that frontier regions, such as border areas and port cities, have low-cost access to foreign markets and consequently emerge as natural production sites, making them "natural laboratories in which to study economic integration" (p. 942). Using data on economic activity in US-Mexico border city pairs, Hanson (1996) finds that export-manufacturing growth in Mexican border cities makes a significant contribution to the expansion of manufacturing employment in US border cities. Specifically, a 10% increase in Mexican export manufacturing activity results in 3.8% manufacturing employment growth in the US border cities. Non-manufacturing US employment is not affected by the expansion of Mexican export manufacturing. Hanson (1996) insists that the growth of export manufacturing production in Mexican border cities essentially makes US border cities a natural production site for complementary manufacturing activities and argues that the stagnation of US-wide manufacturing employment growth is a sign that a large part of US manufacturing production is relocating to the border regions near Mexico.

In a subsequent paper, Hanson (2001) examines US and Mexican border-city pairs to see if economic integration between the US and Mexico contributes to the expansion of industrial activity along the US-Mexico border. At the level of summary statistics, Hanson (2001) finds that economic activity in the US relocated to cities in proximity to the US-Mexico border and notes that growing employment in US border cities coincides with a rapid expansion of export assembly plants ('maquiladoras') in Mexico's border cities. Hanson (2001) builds upon his earlier analysis and in addition to the impact of export manufacturing in Mexico's border regions on the employment growth in US border cities, he considers the impact on employment growth in US interior cities and on average wages in US border cities. This analysis is conducted for a period 1975-97. The results show a strong and positive correlation between the expansion of export manufacturing in Mexican border cities and employment growth in US border cities, but no statistically significant effect on US interior cities or wages in the US border states.[23] Nevertheless, Hanson (2001) finds a specialisation pattern in US border cities according to city size. Specifically, while smaller US border cities appear to serve the role of transportation and distribution hubs, the larger cities are bases for manufacturing operations. Importantly, in concluding, Hanson (2001) notes that the approach of the paper "could be replicated for European cities, where the process of economic integration is more advanced and we would expect binational regional production networks to be more developed" (p. 286), which recognises the applicability of the methodology to studying the effect of EU integration.

The effect of economic integration within Europe on the location of industrial activity is a focus of Overman and Winters (2006), who study the impact of the UK accession to the European Economic Community (EEC) on the spatial distribution of UK manufacturing. Establishment level production data is combined with trade data on seaports and airports to examine if the accession altered manufacturing activity and re-distributed it towards ports that are close to EEC Member States. Broadly, Overman and Winters (2006) investigate three questions concerning the UK EEC accession: a) did it re-orient UK trade by origin and destination country and did it re-orient the pattern of trade by UK port; b) did it change import competition, export and intermediate market access and did this vary by geographical area; and c) did it result in a re-distribution of manufacturing activity in the UK? In an earlier paper, Overman and Winters (2005) study the geography of UK international trade and find that EEC accession re-oriented UK trade towards ports in the South-East of Britain that are closer to EEC countries, although they recognise that this re-orientation was not uniform across all industries. Using UK trade data by port and commodities over 1970-92, Overman and Winters (2006) examine the employment and location of manufacturing establishments, and the allocation of international trade by British port. They find that UK accession to the EEC changed the composition of UK trade and altered the ports through which trade entered and exited the UK, benefiting ports in the South and East of Britain most, although this depends on the composition of trade.[24] For up to a third of manufacturing industries the sectoral employment responded negatively to increasing import competition and positively to improved intermediate good and export market access.

The impact of European integration on the internal geography of trade is a focus of Lafourcade and Paluzie Hernandez (2005), who use a gravity model to study an asymmetry between the border and interior regions of France and Spain. Specifically, Lafourcade and Paluzie Hernandez (2005) concentrate on the trade performance of French and Spanish border regions relative to the performance of interior regions

[23] The latter is consistent with an elastic labour supply.

[24] To illustrate this, ports on the Thames and in Kent are strongly, positively influenced by trade with France; the ports of East Anglia trade more with Scandinavia; Sussex and Hampshire with France and Belgium; but London ports are less dependent on trade with neighbouring European countries.

and analyse export and import flows at the disaggregated level of NUTS3 regions.[25] The time span considered is 1978-2000 for France and 1988-2000 for Spain, encompassing several political milestones of EU integration, such as the 1986 Single European Act, the 1990 Schengen Agreement and the Maastricht Treaty of 1992. Lafourcade and Paluzie Hernandez (2005) argue that it is possible to examine the changes in the regional allocation of trade that is a consequence of the EU accession of Spain in 1986. Controlling for size, proximity and other location characteristics, the analysis reveals that French border regions trade on average 62% more with neighbouring countries than their interior counterparts, but Spanish border regions do not appear to have an advantage over interior regions in trade with neighbours. Lafourcade and Paluzie Hernandez (2005) consider FDI as one of the channels through which regional economic integration can affect the pattern of trade within countries. They find that all French regions benefited from the trade-creating effect of inward FDI, and that the location of foreign affiliates from neighbouring countries led to positive trade differentials.[26] The average trade-creating effect of inward FDI in France amounts to 12.7% on average, and is larger for imports (15.0%) than for exports (10.5%). Although the trade-creating effect of inward FDI is not significantly larger for border regions than their interior counterparts, Lafourcade and Paluzie Hernandez (2005) recognise that inward FDI explains a significant part of the trade advantage of French border regions.

Bruelhart *et al.* (2004) argue that in the context of EU enlargement in 2004, Europe's economic 'centre of gravity' is shifting eastwards. The research question is how changes in the relative market access resulting from the Eastern enlargement of the EU is likely to affect the spatial geography of economic activity in the peripheral regions of the 'old' EU Member States. Using market potential measures based on Harris (1954), Bruelhart *et al.* (2004) examine the impact of these on regional GDP per capita and regional manufacturing employment. The simulation results show that the market access effects of EU enlargement in 2004 is likely to be small for GDP per capita, i.e. on average increasing incomes by 0.93% in the Objective 1 peripheral regions of incumbent EU Member States and by 0.65% in non-Objective 1 peripheral regions. However, the simulated effect of the EU enlargement on manufacturing employment is much larger, i.e. 32.7% for Objective 1 regions and 23.4% for non-Objective 1 regions. Crucially, Bruelhart *et al.* (2004) find that the economic impact of enlargement differs depending on the geographic location of a region relative to the 'new' EU Member States, being strongest

[25]The export and import flows are for 94 continental French NUTS3 regions over the period 1978-2000 and 48 Spanish NUTS 3 regions over 1988-2000.

[26]The question of trade-creating impact of inward FDI could not be formally analysed for Spanish regions owing to data availability. For France, only a time period of 1993-2000 is considered.

for the regions close to the 'new' EU.[27]

The implications of EU enlargement on the internal geography of economic activity are also studied for 'new' EU countries. Crozet and Koenig Soubeyran (2004) examine Romania, and argue that it is an interesting country to study given that at the beginning of the 1990s economic activity tended to cluster in Eastern regions. Looking at the annual growth rate of the urban population share for 41 regions within Romania over the period 1991-97, Crozet and Koenig Soubeyran (2004) find that access to the Romanian market is not a statistically significant determinant of urban population growth. Conversely, population growth is driven by access to the markets of the EU and the CEECs. In that respect, economic integration is found to favour the spatial concentration of economic activity in the border regions that possess significant market access advantage (Crozet and Koenig Soubeyran, 2004).

A broader study that examines the impact of deepening integration between the EU-15 and CEECs is Niebuhr (2005), who considers the spatial distribution of economic activity in two integrating groups of countries over the period 1995-2000. With a focus on border regions, Niebuhr (2005) asks whether the benefits of integration are higher for internal border regions owing to their favourable market access and whether external border regions in the CEECs are in danger of lagging behind due to their peripheral position.[28] Niebuhr (2005) analyses the effects of integration that arise from changing relative market access and declining trade barriers, where the benefits of EU integration are captured by increasing regional income per capita. A simulation analysis considers reductions in border impediments from reduced travel time, and reveals significant heterogeneity between the regions of the enlarged EU from improved market access. A greater benefit of EU integration is realised by the CEECs rather than incumbent EU-15 countries, which suggests that EU integration promotes economic cohesion and convergence between 'old' and 'new' EU Member States. However, the simulation results suggest that regions in peripheral CEECs (e.g. Bulgaria, Lithuania and Romania) achieve a modest growth of market access and GDP per capita, and that the benefits are stronger for regions in the core CEECs (i.e. Czech Republic and Slovenia). The border regions are found to achieve higher integration benefits compared to their non-border counterparts, while significant per capita income gains are found for external border regions. Niebuhr (2005) admits that the positive income effects of EU integration that arise due to improved market access are small in magnitude.

The spatial implications of EU enlargement on regional industrial location are

[27]The simulation analyses of Bruelhart *et al.* (2004) find that the effect of EU enlargement on GDP per capita is six times stronger in the most affected Objective 1 region (Burgenland, Austria) compared to the least affected one (South Yorkshire, UK). For manufacturing employment, the difference is seven-fold.

[28]Niebuhr (2005) defines internal border regions as those that share a common border with a foreign EU country. Conversely, external EU regions are those that are located alongside the external EU border.

the focus of Resmini (2003a). Based on the CEECs of Bulgaria, Estonia, Hungary and Romania, Resmini (2003a) seeks to understand what types of region are the winners or losers from the EU integration process. Special attention is given to border regions and how likely they are to be affected by integration. Resmini (2003a) notes that location theory has traditionally considered the border regions to be disadvantaged in terms of their attractiveness, considering their peripheral position within a country. The paper hypotheses that the regions most likely to benefit from enlargement and increased growth prospects are regions in accession countries that directly border the 'old' EU or other accession candidate countries. Conversely, the regions bordering countries not involved in EU enlargement are expected to suffer from enlargement, with the internal regions being only marginally affected.

The econometric approach of Resmini (2003a) is a two-stage model. In the first stage, the determinants of manufacturing regional employment are analysed, and in the second stage, the growth rate in regional manufacturing employment and factors that drive this are analysed. Explanatory variables such as distance to the nearest EU border crossing and distance to the capital city, both relative to that of other regions, are included. Within a heterogenous set of border regions those bordering the EU-15 countries have better growth prospects, since proximity to the EU appears to have stimulated a catching-up process, which compensates for their peripheral position with respect to the capital cities. Distance from the EU-15 penalises economic activity in regions bordering other candidate countries currently negotiating accession. Overall, the study finds that "regions bordering the EU-15 and external border regions have better prospects for growth than regions bordering other candidate countries and internal regions, other things being equal" (Resmini, 2003a, p. 220).

A focus on the effects of economic integration with the EU on the regional pattern of industrial location is once again considered in Resmini (2007). Like in the earlier paper, Resmini (2007) concentrates on the countries of Bulgaria, Estonia, Hungary and Romania in the 1990s, a period when these countries underwent transition and a process of economic and political integration with the EU that reoriented their economies towards the 'West' and the EU. Resmini (2007) notes that while international trade theory predicts increasing concentration of economic activity and increasing specialisation of national and regional economies as a by-product of integration, it is not known whether this is true for the CEECs. Referring to Campos and Coricelli (2002) and Landesmann (2000), Resmini (2007) acknowledges that the transition process resulted in sectoral changes in employment and produced a more even distribution of manufacturing activity across regions. A factor that Resmini (2007) claims was responsible for changing industry concentration is FDI. Furthermore, the results of the econometric analysis confirm that, "on average, economic integration with the EU has changed patterns of industry location in transition countries" (Resmini, 2007, p. 758), as distance to the EU border exerts a negative and statistically significant effect on regional manufacturing employment. There is only a weak effect of the distance to the former Soviet Bloc border - a variable that tries to account for the existence of the legacies from the past.

In conclusion, Resmini (2007) confirms that European integration has led to spatial decentralisation of employment in Bulgaria, Estonia, Hungary and Romania, as in the 1990s industries in these countries moved away from 'autarkic' industry location centres (capital cities and internal regions) to a number of other locations offering a better access to EU markets. This trend also implies a change in regional industrial specialisation, as previously 'peripheral' border regions start to attract manufacturing activity on the basis of its proximity to the EU markets. The relocation of industry in the 1990s, however, also has a negative side, as it appeared to deepen the divide in the economic development between the western and eastern parts of the countries considered. Resmini (2007) explains that the eastern regions, which are closer to the former Soviet Bloc, become the losers of the changes in industrial patterns, as they emerge as locations with greater concentration of labour-intensive industries. Resmini (2007) is unclear as to whether the continued economic integration with the EU will be able to reverse the unfavourable trend of growing divide between western and eastern regions.

A novel approach to studying border effects is adopted by Brakman *et al.* (2012), who analyse the population effects of EU integration along national borders. Two kinds of integration events are considered by Brakman *et al.* (2012) that change market access: five EU enlargements and the introduction of the euro currency.[29] Brakman *et al.* (2012) note that central to their paper is, "the notion that cities and regions that are close to the border are most affected by these changes in EU integration, as they are especially confronted with changes in market access, whereas the effects for cities and regions further away from the border are more subdued" (p. 41). The hypotheses of Brakman *et al.* (2012) are: (a) cities and regions in close proximity to a national border that was affected by EU integration experience growth in population share; (b) border integration effects differ for large and small border regions; (c) border integration effects are stronger for EU enlargement than for the euro; and (d) border integration effects diminish as distance to the national border increases. Brakman *et al.* (2012) allow for a general negative border effect and a positive border effect associated with EU integration. The border regions are defined as those regions that are affected by an EU integration episode and contiguous to the EU land border. Border cities are those cities that are located within

[29]The EU enlargements are: 1973 (Denmark and the UK joined); 1981 (Greece); 1986 (Portugal and Spain); 1995 (Austria, Finland and Sweden); 2004 (eight CEECs, Cyprus and Malta); and 2007 (Bulgaria and Romania). The reunification of East and West Germany in 1990 is also considered as a policy event that affected the continental national land borders in a sample period.

a maximum road distance of 70 kilometres to the affected land border.

Brakman *et al.* (2012) employ a difference-in-difference approach to compare the population share growth in European border areas (treatment group) and other European non-border areas (control group). The estimation results confirm that the population share growth is -0.21% per annum for border cities and -0.31% a year for border regions (Brakman *et al.*, 2012). The EU enlargement episodes are found to add about 0.15% per annum to the population share growth in border regions and cities; which is insufficient to offset the negative general border effect. Brakman *et al.* (2012) confirm that the positive EU integration border effect associated with EU enlargement applies to both incumbent EU Member States and accession countries, but applies for a limited distance and time period, of a maximum of 70 kilometres and for up to 30 years. It is stronger for large cities and regions. A positive border effect associated with the adoption of the Single Currency is not found. Overall, the paper finds support for each of its four hypotheses.

Germany is an interesting case study for looking at the border effects, where almost 20 years after the fall of the Berlin Wall and the reunification of formerly separated West and East Germany, a significant heterogeneity in economic performance exists between federal states on both sides of the former border (Spies, 2010). Referring to the size of inward FDI to Germany over period 1997-2005, Spies (2010) note that only 10% of all investing multinational firms chose to establish their foreign affiliates in East Germany, half of which located in Berlin. Also, in per capita terms, East German federal states significantly lagged behind their Western counterparts in attracting foreign investment. The conditional and nested logit model estimation confirmed that the common border worked to the advantage of the Western federal states in attracting investment from France and the Netherlands. It also confirmed that investors from the UK, the US and Switzerland were strongly attracted by the industry clusters of firms from the same country, emphasising the importance of agglomeration economies and network effects. As argued by Spies (2010), the importance of networks partly explains the weak performance of East Germany in attracting multinational activity, which also lacks the adjacency to strong investing countries. Among the policy recommendations, Spies (2010) considers the promotion of industry clusters and targeting of FDI from emerging markets such as Russia and Poland to help East Germany overcome its 'lock-in'.

2.8 Conclusions

This chapter has reviewed developments of a theoretical and empirical nature underpinning the study of FDI. The intensification of FDI activity during the 20th century coincided with attempts by scholars to formalise the reasons for a firm to engage in FDI and emerge as a MNE. Starting as a strand of international trade theory, but also discussed in the context of the theory of international capital markets and the theory of the international firm, FDI activity was treated as part of a micro-founded stand-alone theory of MNE. Essentially, there are three questions: (i) Why do domestic firms choose to serve a market abroad? (ii) Why is FDI preferred to exporting or licensing? (iii) What factors determine the FDI location choice? A key theoretical framework that formalises FDI is the eclectic (OLI) paradigm of Dunning (1977), which specifies three necessary conditions that a firm must fulfill to emerge as a multinational firm. An ownership-advantage arising from a firm-specific asset that is best utilised in a foreign rather than domestic market (the location-advantage) and that it is optimal for the firm to transfer internally to a foreign affiliation unit rather than rely on licensing (the internalisation-advantage). Following this 'eclectic paradigm' Dunning (1993) developed a taxonomy of four types of MNE activity: market-, resource-, efficiency- and strategic asset-seeking. The motivation to engage in FDI differs between these four types of FDI, and it represents a theoretical underpinning for my applied research in Chapter 5.

To complement this theoretical formalisation of FDI, numerous attempts have been made by researchers to study inward investment activity empirically. Starting with simple studies of FDI location in a single-country and for a limited number of observations, gradually over time the studies of FDI location choices have become more sophisticated, growing to consider multiple countries and disaggregated spatial units such as regions, and considering a specific entry mode of FDI or origin country of the investor. In the context of the spatial economics literature, a pioneering figure is Carlton (1979), who first applied the conditional logit model methodology to study the location choice decisions of new firms, and that is now a well-established modelling technique in the context of industrial location. Data availability has often hampered the multi-country study of FDI location choice. In the early 1990s, Hill and Munday (1992) admitted that the empirical analysis of the distribution of FDI activity across European regions, despite growing interest, was not possible. A few years later, Guimaraes *et al.* (2000) argued that modelling of plant location choices required highly disaggregated industrial and spatial data and that reliable data on new plant locations was rare. In 2007 Pusterla and Resmini (2007) admitted that the empirical evidence on FDI location in CEECs was scarce, owing to the unavailability of plant-level data on investment projects and location data for narrowly-defined spatial units.

Although over time, spatial economics research has become more elaborate, considering more FDI projects, more location alternatives and more disaggregated spatial units, to the best of my knowledge studies that consider EU-wide inward investment location choice are rare. A notable exception is Alegria (2006), who analyses the location decisions of European multinational firms locating in the EU-25 between 1998 and 2005. Just like Alegria (2006), my research is at both the country-level and regional-level, and it focuses on the location choice decisions of MNEs at the level of EU-25 countries and 260 NUTS2 regions. Unlike Alegria (2006), my research is not restricted to intra-EU FDI and includes FDI projects originating from outside the EU. Another key paper in a multi-country setting is Disdier and Mayer (2004), who study the determinants of FDI location for a sample of 19 European countries, of which 13 are 'old' EU countries and 6 are CEECs. Importantly, it attempts to contrast the location choices of investors in Western and Eastern Europe, seeking to explore how different is Eastern Europe. Estimation of a conditional logit model on a full sample of countries is followed by estimations on the restricted samples of 'West only' and 'East only' countries.

With regard to the impact of the EU integration process on FDI in transition economies, Bevan and Estrin (2004) is an important contribution. Although Bevan and Estrin (2004) do not examine the determinants of FDI location choices but only consider the aggregate volume of FDI, their work offers valuable insights into the effect of EU integration on the size of FDI inflows into the CEECs. Essentially, Bevan and Estrin (2004) establish that the attractiveness of CEECs to investors increases as the EU accession negotiations advance and as the prospect of EU entry becomes more probable. The authors believe that the prospective EU entry reduces risk due to meeting the Copenhagen Criteria for accession. Another study, by Kalotay (2008) demonstrates that a high inflow of FDI into Bulgaria and Romania coincided with 'locking' their accession date, recognising a strong and positive impact of the EU accession announcement on inward FDI. In the context of the impact of the EU on FDI location, some studies examine the impact of the EU policies on the location choices of multinational firms. Regional policy is the focus of Crozet *et al.* (2004) who find that the Objective 2 and 5b funds do not affect the location of FDI in France, and of Basile *et al.* (2008), who show that the Structural Funds and Cohesion Fund successfully promote the lagging regions of the EU, helping to attract inward FDI.

The literature on border effects explores the impact of national borders on the spatial distribution of economic activity. Beugelsdijk and Mudambi (2013) compare national borders to 'qualitative discontinuities' in space, where spatial heterogeneity changes abruptly. The 'border effect puzzle', captured by the theoretical core-periphery model of Krugman (1991) and first formally identified by McCallum (1995) with respect to Canadian-US trade flows, has an application to the location of inward investment, although the literature review reveals that econometric research on the impact of border effects on FDI activity is rare. The simulation results of Bruelhart *et al.* (2004) show that the economic impact of EU enlargement on economic activity in the peripheral regions of the 'old' EU differs, depending on the geographic position of that region relative to the accession countries, and is likely to be strongest in locations that are relatively close to the 'new' EU. Basile *et al.* (2009) explore whether national borders continue to significantly affect the location decision of MNEs within an integrated economic area such as the EU. Although they find that national borders continue to have an impact on the location choices of non-European MNEs, generally the borders become more 'blurred' as integration deepens, implying that regions compete for inward FDI with other regions more across rather than within their national border. This supports the conclusion of Pusterla and Resmini (2007) that economic and political integration in Europe mean national borders cease to shape FDI location choices.

Finally, the impact of EU enlargement on the spatial distribution of industrial location in the CEECs is the focus of Resmini (2003a), who attempts to identify the winners and losers of the EU integration for regions in Bulgaria, Estonia, Hungary and Romania, giving special attention to border regions that are traditionally viewed as disadvantaged by their peripheral location. Resmini (2003a) presumes that border regions adjacent to the 'old' EU and other accession countries are expected to gain from EU enlargement, but border regions adjacent to non-EU countries are expected to suffer, while interior regions may be only marginally affected. The analysis confirms that distance from the EU border has a negative and statistically significant effect on manufacturing employment, whereas a weak effect is detected for the distance from the former Soviet block border. In another study, Pusterla and Resmini (2007) find that during the 1990s, the European integration process re-shaped the spatial distribution of economic activity in Bulgaria, Estonia, Hungary and Romania, leading to a shift of industry employment from 'autarkic' centres, such as capital cities and internal regions, to other locations that offered better access to EU markets. Conversely, the eastern regions closer to the former Soviet block became losers, as they retained mainly labour-intensive industries.

Importantly, Beugelsdijk and Mudambi (2013) bring the international business and economic geography perspectives together by arguing that in the context of border-crossing multi-location enterprises, discrete border effects at the national level and continuous distance effects at the subnational level both impact on the location choice decisions of these firms. The hypothesis that is tested in this thesis is that the western border regions of the accession countries are the 'winners' of the fifth enlargement and that the foreign investment activity agglomerates close to the former West-East border because of the location advantage of these regions, i.e. the relative proximity to the core of the EU Single Market. This ties in with the observation of Resmini (2003a, 2007) that the economic activity in the CEECs shifted away from the 'autarkic' centres towards other locations that offer better access to the EU markets. This is reminiscent of the spatial patterns of economic activity discussed by the core-periphery models of the NEG theory, emphasising the complementarities between the international business perspective, which offers more insight into the national dimension of FDI location, and the NEG perspective, which explains the formation of industrial clusters at the sub-national levels. This thesis will explore both discrete border effects and continuous distance effects.

Overall, while the subsequent empirical work focuses on FDI location in the CEECs in relation to EU enlargement, the broad and expansive literature review on FDI location shows that many issues are relevant to this. These are multi-country dimensionality (e.g. Alegria, 2006), an 'West-East' divide in the motives for FDI (e.g. Disdier and Mayer, 2004), country- and region-level determinants of investment (e.g. Alegria, 2006), the impact of EU integration and enlargement on FDI location (e.g. Bevan and Estrin, 2004; Kalotay, 2008), the impact of EU regional policy (e.g. Crozet *et al.*, 2004; Basile *et al.*, 2008), border effects and the pattern of FDI activity (e.g. Basile *et al.*, 2009; Pusterla and Resmini, 2007; Resmini, 2003a), and the winners and losers from EU integration (Resmini, 2003a).

Chapter 3

The Process of EU Enlargement

3.1 Introduction

The fifth enlargement of the European Union (EU) occurred in two waves in 2004 and 2007. It was an unprecedented event in the history of the European Community since its establishment with six founding members in 1957. The enlargement added ten new countries to the existing fifteen Member States in a first wave on 1 May 2004 and a further two new Member States in a second wave less than three years later on 1 January 2007, resulting in a political and economic union of 27 independent countries. The accession of ten former communist countries from Central and Eastern Europe and two Mediterranean countries added to the cultural diversity of the 'old' EU of fifteen Member States (EU-15). While the 'new' EU Member States did not participate in the initial creation of the European Community, they share many of the same historical and cultural roots as the 'old' EU Member States.

The fifth enlargement was "the culmination of a long accession process leading to the reunification of Europe" (European Commission, 2007, no pagination) that has long been split into two parts by the 'Iron Curtain'. The symbolic fall of the Berlin Wall on 9 November 1989, which marked the disintegration of the communist regime in Central and Eastern European Countries (CEECs), was the beginning on the path towards European reunification. After the CEECs recovered their liberty in 1990s, it soon became apparent that EU accession was the priority objective for these countries (Landaburu, 2007). Between March 1994 and June 1996 ten CEECs submitted EU membership applications. The Mediterranean countries of Cyprus and Malta submitted their applications in June 1990. From the date that the applications for EU membership were submitted it was a long process, which took ten years or so to complete. The candidates had to undergo a complex process of screening exercise and formal accession negotiations. Naturally, within this time frame there were also internal EU developments that impacted on the progress of preparing for enlargement.

The purpose of this chapter is to describe and reflect on the process that preceded the fifth EU enlargement in 2004 and 2007, which resulted in the addition of twelve 'new' EU Member States. The intention is to give the reader a detailed account of how the accession process progressed, starting from the submission of the formal applications for EU membership to EU accession. In the context of subsequent analysis of FDI in the enlarged EU, a reflection on the accession process helps to understand the complex interplay between integration and the perception of accession countries by the foreign investors, seeing that the preparation for EU membership entailed building a stable institutional and judicial systems, aligning the national laws with that of the EU and ensuring a fully-functioning market economy in the candidate countries.

I start this chapter by explaining why I think the fifth EU enlargement was an event unprecedented in the history of the EU. Subsequently I discuss the process that prepared the EU for the accession of Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia. Although in the context of the empirical analysis, the time frame starting from 1997 is most relevant, I focus on the period that began with the meeting of the European Council in Copenhagen in June 1993, which set out the ground-rules for the accession negotiations with the candidate countries. I discuss the EU enlargement process in detail up to the European Council in Copenhagen in December 2002, which marked the end of the accession negotiations with ten candidate countries and formally announced that the first wave of the fifth enlargement of the EU would take place on 1 May 2004. Finally, I also consider the internal developments within the 'old' EU-15 that preceded and coincided with the accession process of the 'new' Member States to the EU.

3.2 Unprecedented Enlargement

The first wave of the fifth enlargement was exceptional in the sense that ten 'new' countries simultaneously joined the European Union, thus representing a two-thirds increase in the number of EU Member States. Together, the two waves of EU enlargement of 2004 and 2007 resulted in the addition of 105 million citizens to the existing EU-15 of 380 million people. However, while total EU population increased by nearly 28% (and 19% for 2004 wave only), the 2004 enlargement added a mere 9.5% to the existing level of EU-15 GNP (in PPP terms). Landaburu (2007) notes that if GNP at current exchange rates was considered, total GNP of the EU increased by only 4.6% with the 2004 enlargement. The collapse of Communism in the CEECs started the transformation process from centrally-planned economies towards fully-functioning market economies. It also revealed the need to undergo complex reform of the entire institutional and judicial system. To support the impressive reform effort undertaken by CEECs, in 1989 the EU created PHARE programme (Poland and Hungary: Assistance for Re-structuring their Economies) aimed at promoting the reform process in CEECs through economic assistance. Initially, PHARE provided funds to Poland and Hungary only, but shortly afterwards this was extended to cover all CEECs undergoing the transformation process, becoming the largest assistance programme in Central and Eastern Europe (Christoffersen, 2007d).

Temprano-Arroyo and Feldman (1999) recognise that during the socialist period the command economies of the CEECs faced considerable trade barriers in the EU, including import quotas and high tariffs. The beginning of the transformation process in the early 1990s, however, saw the gradual reorientation of all CEECs towards the democracies of the EU, leading to the removal of long-standing import quotas, granting of trade preferences and conclusion of cooperation agreements with those countries, which promoted the economic and political transformation in the region (Christoffersen, 2007d). The reorientation of CEECs towards the EU led to Europe Agreements (i.e. bilateral association agreements) between European Community and ten CEECs.[1] For Temprano-Arroyo and Feldman (1999), the Europe Agreements were "more ambitious than the Association Agreements the EU had previously concluded with other countries" (p. 744), since in addition to the standard trade liberalization component they covered aspects such as political dialogue, movements of workers and services, capital flows and various forms of economic, financial and technical cooperation. In that respect CEECs differed significantly from the two Mediterranean countries of Cyprus and Malta which also joined the EU during the fifth enlargement in 2004, and that signed their Association Agreements with the European Economic Community (EEC) in 1972 and 1970 respectively.

The reform process aimed to transform the CEECs into functioning market economies and the trade integration between the EU and the CEECs played a role in the attraction of FDI, which at the beginning of 1990s was virtually zero. The close relationship between CEECs and the EU quickly revealed fact that the membership of the EU was a priority for these countries. As discussed by Landaburu (2007), the accession of CEECs into the EU contributed significantly to the attraction of FDI into the region, which in effect was the pre-condition for economic growth. The conclusion of Europe Agreements with the ten CEECs implied the recognition by the EU of the aspiration of these countries to one-day join the Union. Thirteen potential candidate countries (ten CEECs, plus Cyprus and Malta, but also Turkey) called for the adoption of the set of formal criteria for EU membership.

[1] In chronological order, between December 1991 and June 1996 Europe Agreements were signed with Hungary, Poland, Romania, Bulgaria, Czech Republic, Slovakia, Estonia, Latvia, Lithuania and Slovenia.

3.3 The Criteria for Entry and Assistance

An early principle of the Treaty of Rome (1957) was that any European country could join the European Community. The Copenhagen Summit of June 1993 reinforced that principle by agreeing that any European country can accede to the European Union regardless of its level of economic development. To assess the thirteen potential candidatures for EU membership the European Council in Copenhagen defined a set of more specific accession criteria to gauge the readiness of a candidate country to join the EU. These criteria, or the 'Copenhagen Criteria' as they are known (after the 1993 Copenhagen European Council meeting), are that a candidate country must:

- possess a stable institutional set-up that guarantees democracy, the rule of law, provision and protection of human rights, as well as the respect for and the protection of minorities (the 'political criterion');
- posses a fully-functioning market economy and the capacity to sustain the competitive pressures and market forces within the Single Market of the EU (the 'double economic criterion'); and
- be able to assume the obligations of the membership by accepting the *acquis communautaire* of the EU, including the adherence to the aims and objectives of the political, economic and monetary Union (the 'legislative criterion').[2]

Later, the Madrid European Council of 1995 expanded on the third Copenhagen Criterion by announcing that a country wanting to accede to the European Union must implement all necessary adjustments to its administrative and judicial structures to be able to successfully adopt, implement and finally effectively enforce EU's *acquis communautaire*. The Copenhagen European Summit also remarked on the EU's 'absorptive capacity' to accept new member states being an important consideration for both the EU and the candidate countries.

Christoffersen (2007d) notes that the European Council in Copenhagen of 1993 demonstrated that the prospect of CEECs joining the EU was no longer a question of 'if' but of 'when'. In particular, the presidency conclusions stated:

> "the associated countries in Central and Eastern Europe that so desire shall become members of the European Union. Accession will take place as soon as an associated country is able to assume the obligations of membership by satisfying the economic and political conditions required" (European Council in Copenhagen, 1993, p. 13).

[2]This refers to the cumulative body of European Community laws. All *acquis communautaire* must be adopted, implemented and enforced before the country is allowed to join the EU.

Following the Copenhagen Summit of June 1993 a more formal 'structured relationship' was established between the CEECs and the institutions of the EU as part of the pre-accession strategy aimed at bringing these countries closer to the EU. This 'structured relationship' was defined in detail and formally approved at the European Council in Essen in December 1994 as a part of the 'Essen Pre-Accession Strategy'. It was acknowledged that this 'structured relationship' between the EU and the associated countries should serve as a tool preparing for accession. The objective of the 'Essen Pre-Accession Strategy' was to set up the broad strategy for continuing the integration between the associated countries and the EU. For that reason, a series of short- and medium-term measures was formulated that would help the potential candidates prepare for integration in EU's internal market.[3] Consequently, the formal request was put to the European Commission to prepare a white paper that would outline the measures that the associated countries would need to adopt to align their legislation with that of the EU Single Market. Subsequently, the 'White Paper on the Internal Market' was presented at the European Council in Cannes in June 1995.

In essence, the EU-CEECs 'structured relationship' approved in Essen involved holding meetings between these two parties on matters of common interest.[4] According to Christoffersen (2007d), the purpose of these meetings was to serve a purely psychological and pedagogical function to the potential new EU candidates. Furthermore, it was agreed that training in community law should be offered to the officials from the associated countries since it was argued that "the success of future accession negotiations would depend very much on the capacity of officials in the candidate countries to fully understand community law and practices" (Christoffersen, 2007d, p. 28). As decided in Essen, the presidency of the European Council should issue the timetable for the number of meetings with the CEECs at the ministerial level. It was agreed that heads of state and government of the associated countries should be invited once a year to the meetings at the margins of the European Council, and twice a year the meetings of foreign ministers of the EU member states and the candidate countries should convene (Sajdik and Schwarzinger, 2011). Furthermore, the regular meetings of the other ministers should be held in order to discuss the matters of the pan-European importance.

To facilitate the provision of targeted assistance to the associated countries, the Commission's 'White Paper on the Internal Market' proposed the new instrument TAIEX (Technical Assistance and Information Exchange). TAIEX, which became op-

[3]Briefing No 24 of the European Parliament (1994): 'Pre-Accession Strategy for Enlargement of the European Union' specified that these short- and medium-term measures included trade protection instruments, state aid policy, competition and internal market issues.

[4]These included energy, environment, foreign and security policy, home and justice affairs, culture and education.

erational from 1996, was a EU-funded programme whose objective is to facilitate and fund visits between EU public sector officials and their counterparts in pre-accession countries. By supporting the exchange of the officials, TAIEX offered expert advice, tailored to the individual needs of the candidates, on the application, implementation and enforcement of the EU legislation (Christoffersen, 2007b). The Essen European Summit and the 'Essen Pre-Accession Strategy' were very important milestones towards the future enlargement of the EU. The European Council in Essen in December 1994 recognised that one of the priority areas was:

> "ensuring the lasting peace and stability of the European continent and neighbouring regions by preparing for the future accession of the associated countries of Central and Eastern Europe and developing in parallel the special relationship of the Union to its other neighbours, particularly the Mediterranean countries" (European Council in Essen, 1994, p. 8)

3.4 Membership Applications

The year that immediately followed the Essen European Council meeting turned out to be crucial for the future shape of the EU. In addition to the fourth EU enlargement on 1 January 1995, when Austria, Finland and Sweden joined, the same year also saw a significant number of EU membership applications from the CEECs. Strictly speaking, between March 1994 and June 1996 ten CEECs submitted their accession applications.[5] Coupled with the fact that Cyprus and Malta both submitted their membership applications in 1990, the EU now had thirteen formal accession applications to consider.[6] Table 3.1 records the date of EU membership application submission alongside the date of signing of Europe Agreement/Association Agreement for the candidate countries.

Although a substantial number of accession applications were received, according to Christoffersen (2007d) much of the EU's attention between 1995 and 1997 was devoted to the internal development and institutional debate. The main focus was on a treaty to implement essential amendments to the previously-ratified Treaty of the European Union (i.e. the Maastricht Treaty) that was signed in 1992, and the Treaties establishing the European Community. The aim of this new treaty was to foster the integration process and implement the necessary reforms of the EU's institutional framework in the run-up to enlargement (Christoffersen, 2007d). These negotiations resulted in signing of the Amsterdam Treaty in 1997.

[5] In chronological order, the EU membership applications were received from Hungary, Poland, Romania, Slovakia, Latvia, Estonia, Lithuania and Bulgaria, Czech Republic and Slovenia.

[6] Turkey has held the associated country status since 1963 and submitted the formal EU membership application in 1987.

Table 3.1: Signing of Europe Agreement/Association Agreement and application for accession: dates

Country	Signing of Europe Agreement or Association Agreement	Date of application for accession
Bulgaria	01.03.1993	14.12.1995
Cyprus	19.12.1972	03.07.1990
Czech Republic	06.10.1993	17.01.1996
Estonia	12.06.1995	24.11.1995
Hungary	16.12.1991	31.03.1994
Latvia	12.06.1995	13.10.1995
Lithuania	12.06.1995	08.12.1995
Malta	05.12.1970	03.07.1990
Poland	16.12.1991	05.04.1994
Romania	08.02.1993	22.06.1995
Slovakia	06.10.1993	27.06.1995
Slovenia	10.06.1996	10.06.1996

(source: European Commission, 2007)

Despite the intensive EU-internal negotiations on drafting of the Amsterdam Treaty, progress was still made with respect to the future enlargement. During the European Council in Madrid in December 1995, it was confirmed that accession negotiations with Cyprus and Malta would start six months after the end of the intergovernmental conference on Amsterdam Treaty (European Council in Madrid, 1995). This was a decisive statement seen as a strong and firm assurance that the EU was willing to 'open its doors' towards the two Mediterranean candidates. Sajdik and Schwarzinger (2011) emphasise that the declarations of the Madrid European Council left the CEEC candidates with the hope that their preliminary accession negotiations could coincide with the negotiations of Cyprus and Malta. Importantly, the Madrid Summit requested the European Commission to prepare its opinion on the membership applications of all candidate countries and be ready to present this after the conclusion of an intergovernmental conference on the Amsterdam Treaty. The Commission was also asked to produce an overall (or 'composite') paper on enlargement and to undertake a detailed analysis of the potential effects of future EU enlargement, focusing in particular on the expected financial implications.

A year and a half after the European Council in Madrid, in July 1997, the European Commission published its opinion on each candidate's membership application. This considered the ability of individual candidate countries to assume the obligations of EU membership and their readiness to start the accession negotiations. A single and detailed report, *'Agenda 2000: For a Stronger and Wider Union'*, was published covering all aspects of the accession negotiations and enlargement process. The document proposed a new financial framework for the time period 2000-06, with a special attention given to the reform of the Common Agriculture Policy (CAP) and regional policy (Structural and Cohesion Funds) in the context of an enlarged EU. The reform of the regional policy was required given the much lower average economic development of the candidate countries.[7] Similarly, in the context of the prospective EU enlargement a reform of CAP was regarded as a matter of urgency. It was widely acknowledged that extending the CAP in its current form to all applicant countries would have considerable implications for the budgetary position of the EU. The relatively high share of the agricultural sector in the ten candidate CEECs (7.0% of total GDP versus 1.7% in the EU-15 in 1996) and the high agricultural employment (22% of total employment versus 5.1% in the EU-15 in 1996) highlighted the important role played by agriculture in the social-economic structure of all CEECs (Pezaros, 1999).

Given that regional policy and the CAP were the most important policies of the EU, absorbing about 85% of the EU budget and contributing significantly to the economic and social cohesion within the EU (Pezaros, 1999), a strategy for reforming both of these policies was necessary for the fifth enlargement to take place. Accordingly, *Agenda 2000* proposed the creation of two pre-accession instruments: the Special Accession Program for Agriculture and Rural Development (SAPARD), concerned with agriculture and rural development, and the Instrument for Structural Policies for Pre-Accession (ISPA), concerned with the improvement of infrastructure and the environment.

3.5 Selection of the Candidates: The Luxembourg Group

The European Council in Amsterdam in June 1997 officially confirmed that "the way is now open for launching the enlargement process in accordance with the conclusions of the Madrid European Council" (no pagination). This preceded by a few weeks the formal presentation of *Agenda 2000* and the publication of the European Commission's opinions on membership applications, which gave a 'green light' for the negotiations to begin. In the lead-up to the Commission presenting its opinion, debate had already begun among the EU Member States on which candidates should be permitted to start the accession negotiations. There were two contrasting views. On the one hand, there was a 'regatta model', which envisaged that the accession negotiations should start with all candidate countries. On the other hand, a 'wave approach' suggested opening

[7] Landaburu (2007) highlights that at the time of their EU accession in 2004, approximately 92% of the populations of 'new' EU Member States lived in regions where GNP per capita was less or equal to 75% of the average of the enlarged EU of 25 countries (EU-25), while more than two-thirds lived in regions where GNP per capita was less than 50% of EU-25 average.

accession negotiations with selected candidates based on an assessment of their readiness for membership. The dominant view among the EU-15 and within the European Commission was that the latter approach was the better.

The Czech Republic, Hungary and Poland were generally considered the 'strongest' candidates for accession: the Czech Republic and Hungary due to the perception that they had made most progress on economic reform; and Poland due to its size and significance to the region and its historical importance in the ending of the communist rule in CEECs (Christoffersen, 2007d). Cyprus and Malta were also other strong candidates owing to the promise that had been made at the Madrid European Council, although Malta had decided to freeze its EU membership application after the general elections on 26 October 1996.[8] The Commission's evaluation of the degree of compliance with the Copenhagen Criteria was based on the information provided by the candidates, supplemented with data from organizations such as IMF, OECD, OSCE and Council of Europe. As a result, it recommended that accession negotiations should be opened with Cyprus, Czech Republic, Estonia, Hungary, Poland and Slovenia.

To justify its selection of the candidates for the opening of negotiations with some and rejection of others, the Commission decided that the Political (Copenhagen) Criterion had to be fulfilled before the negotiations could begin, whilst the Economic Criterion had to be fulfilled from the time of entry (see: section 3.3). Such reasoning justified the elimination of Slovakia from the first wave, where the government was accused of a breach of constitution in respect to human rights and minorities' protection. The evaluation of the candidates' compliance with the Economic Criterion led to the rejection of Bulgaria, Latvia, Lithuania and Romania from the first wave on the basis that these countries were 'not yet sufficiently economically developed' (Sajdik and Schwarzinger, 2011). The rationale was that there was no purpose in the opening of the negotiations with any country, which in the medium-run might not be able to join the European Union due to the economic considerations.

Christoffersen (2007d) remarks that the Commission's opinions were well received among the EU-15, especially among the countries that supported the view that negotiations should start only with the limited number of candidates. However, countries such as Denmark, Sweden and the United Kingdom argued that the 'wave approach' to enlargement could take away the pressure for reform in the countries that were not recommended for the start of negotiations by the Commission. Austria and Denmark proposed the solution that the second group of countries should be permit-

[8] 'The European Council reiterates that the accession negotiations with Malta and Cyprus will commence, on the basis of the Commission proposals, six months after the conclusion of the 1996 Intergovernmental Conference, and will take its results into account' (European Council in Madrid, 1995). The Labour Party of Malta replaced the Nationalist Party in the new government and chose to freeze Malta's application for EU membership but not completely withdraw it.

ted to go through the screening exercise. This was a preparatory phase of negotiations that involved a detailed examination of the chapters of the *acquis communautaire* in order to identify where national laws had to be amended to be consistent with EU laws. Although it was not intended that the negotiations should be opened simultaneously with all countries, the rationale for allowing all candidates to go through the screening process was to speed up the preparations for future negotiations (Andrews, 2000).

The European Council in Luxembourg in December 1997 officially confirmed that negotiations should begin with six candidates on 31 March 1998. These were Cyprus, Czech Republic, Estonia, Hungary, Poland and Slovenia, which became to be collectively known as the 'Luxembourg Group'. This meant that the 'wave approach' won over the 'regatta model'. However, it was formally decided that all eleven candidates would be invited to the launching of the accession process on 30 March 1998 and that Bulgaria, Latvia, Lithuania, Romania and Slovakia would go through the screening process in parallel with the Luxembourg Group. One of the conclusions of the presidency was that all candidates were destined to join the European Union on the basis of the same criteria (European Council in Luxembourg, 1997b). Moreover, the Luxembourg Summit decided that starting from the end of 1998 the Commission would submit regular reports to the Council, reviewing the progress of CEECs applicant states towards accession, essentially assessing the progress in adopting the *acquis* and fulfilling the Copenhagen criteria.

In response to the launching of the enlargement process by the Luxembourg European Council, a decision was made to increase pre-accession aid substantially under the existing programme of community aid to the CEECs, PHARE. The pre-accession priorities of PHARE were 'institution building' (30% of funds channelled for this purpose) and investment related to the adoption and application of *acquis communautaire* (70% of funds). The characteristic aspect of the fifth enlargement, which distinguishes it from the previous enlargements, was that part of the EU budget was channelled into assisting the candidates with adoption of *acquis communautaire* even before the enlargement took place. The explanation for this lies in the much lower level of economic development of the candidates.[9] An instrument for achieving tangible and sustainable results with respect to institution building, the 'twinning' programme, was launched in May 1998. It provided a platform for collaboration between public administration and semi-public organizations in the Member States and candidate countries. In practical terms, the EU-15 seconded teams of experienced civil servants, who were responsible for familiarising themselves with local working practices and were expected to form

[9]By the time accession negotiations started in 1998, GDP per capita in most candidate countries was below 30% of EU-15 average (Vassiliou and Christoffersen, 2007). In all previous enlargements the EU budget remained intact until the enlargement.

views of the scope for improvements, and in cooperation with the local partners drive the reform process towards the desired result.

3.6 Opening of the Accession Negotiations

In early 1998 the EU adopted its Negotiations Framework, setting out the guiding principles for accession negotiations. This was formally presented to the six Luxembourg Group candidates at the opening of their accession negotiations on 31 March 1998. The framework re-stated the basic principle that "accession implied the full acceptance by the applicant countries of the actual and potential rights and obligations derived from accession to the Union system and its institutional system (the *acquis*)" (Christoffersen, 2007b, p. 46). This signalled the requirement for the accession candidates to implement the EU *acquis communautaire* prior to enlargement and to enforce it from the time of entry. The Negotiation Framework mentioned the principle of differentiation, whereby negotiations with the candidates would be conducted separately and according to the individual merits of each state, but based on the same set of criteria.

Essentially, 31 March 1998 marks the formal opening of the accession negotiations with the Luxembourg Group, although admittedly the initial progress of the negotiations with Cyprus, Czech Republic, Estonia, Hungary, Poland and Slovenia was limited (Christoffersen, 2007b). What followed the opening of the accession negotiations almost immediately was the analytical examination, i.e. 'screening', which checked for the compliance of national laws of candidate countries with the *acquis communautaire*. For the purpose of the screening, the *acquis communautaire* was broken down into chapters, each corresponding to and covering a specific policy area.[10] The *acquis communautaire* screening is only a preparation step for the enlargement negotiations and does not constitute a formal part of the actual negotiations.

This screening process with the Luxembourg Group started in April 1998, and as promised at the Luxembourg Council the remaining candidates were also invited to participate in the screening, although arguably in a less intensive manner (Sajdik and Schwarzinger, 2011). Given that nearly 100,000 pages of legal texts had to be gone through this left the experts skeptical as to whether the process could be completed

[10]The negotiations in the fifth enlargement were based on the following chapters: 1: Free Movement of Goods; 2: Free Movement for Persons; 3: Freedom to Provide Services; 4: Free Movement of Capital; 5: Company Law; 6: Competition Policy; 7: Agriculture; 8: Fisheries; 9: Transport Policy; 10: Taxation; 11: Economic and Monetary Union; 12: Statistics; 13: Social Policy and Employment; 14: Energy; 15: Industrial Policy; 16: Small- and Medium-sized Enterprises; 17: Science and Research; 18: Education and Training; 19: Telecommunications and Information Technologies; 20: Culture and Audio-visual Policy; 21: Regional Policy; 22: Environment; 23: Consumer and Health Protection; 24: Justice and Home Affairs; 25: Customs Union; 26: External Relations; 27: Common Foreign and Security Policy; 28: Financial Control; 29: Financial and Budgetary Provisions; 30: Institutions; and 31: Other.

by the end of 1998. Essentially, the formal accession negotiations on each individual chapter could only begin after the screening of that chapter had been completed and both the EU and the candidate country had defined their negotiation position.[11] Thus, the screening exercise was only finalised with the Luxembourg Group in July 1999.

In accordance with the decisions of the Luxembourg European Council, the Commission prepared and presented in November 1998 the first Progress Reports ('Regular Reports') on all applicant countries and their progress towards accession. In addition to the individual country reports, the Commission also produced a composite paper that provided an overall assessment and general conclusions. Sajdik and Schwarzinger (2011) note that these reports were awaited by Bulgaria, Latvia, Lithuania, Romania and Slovakia in the hope that the Commission would recommend their advancement into the Luxembourg Group. However, the reality was disappointing as no reference was made to the possibility of the group of the negotiating candidates to be extended. In the second half of 1998, the pro-European Nationalist Party of Malta regained power and reactivated its membership application, which was suspended in 1996. The Commission was asked to review its opinion on the Malta application, but it refrained from making any firm recommendation.[12]

3.7 The Helsinki Group

Having been involved in the less-intensive version of the screening exercise, it was decided to start the full screening with Bulgaria, Latvia, Lithuania, Romania and Slovakia in early 1999. Given the relative good track record of reform in these countries, the screening was broadly finalised by the end of 1999. In the second half of 1999 the European Parliament elected a new President and Commission, so that while in theory this had only a limited role in the accession process, in practice it was an important factor (Christoffersen, 2007a). It made the enlargement a priority, creating the post of a Commissioner for Enlargement, reflecting the complexity and political importance attached to the prospect of the fifth enlargement (Christoffersen, 2007b).

The composite paper on the annual Progress Reports in 1999 reflected a new attitude of the Commission towards enlargement (Christoffersen, 2007a). It was aware that the prospect of the end of the screening process with Bulgaria, Latvia, Lithuania, Romania and Slovakia, initially seen as an important incentive for the internal prepara-

[11] The negotiation position for the chapter under consideration set out the 'action plan' for the adoption and implementation of *acquis communautaire* of that chapter.

[12] The Commission argued that owing to the two-year freeze of Malta's application, it readiness for EU membership differed considerably from that of the other candidate countries. The Commission decided to hold on and produce a detailed report on the state of Malta's preparedness for accession to be submitted alongside the regular progress reports on the other applicant countries towards the end of 1999.

tion for accession, could demotivate these countries from carrying out further reforms unless the EU made 'a new offer'. In that sense, the Commission recognised the risk of "tensions that may arise if negotiations are postponed too long" (European Commission, 1999, p. 30). It also acknowledged that most candidates not included in Luxembourg Group "made great effort to accelerate their legislative alignment in order to be admitted to negotiations" (p. 30). Having concluded that Bulgaria, Latvia, Lithuania, Romania and Slovakia fulfilled the political Copenhagen Criterion and were ready to take the measures to comply with the Economic Criteria, the European Commission recommended the opening of negotiations with these remaining candidate countries in 2000.[13] The composite paper did not state the target date for the entry, but it considered it possible to conclude accession negotiations with more-advanced countries by the end of 2002 (European Commission, 1999).

The European Council in Helsinki in December 1999 formally approved a decision to open accession negotiations with Bulgaria, Latvia, Lithuania, Malta, Romania and Slovakia in February 2000. On the account of the ending of the Finnish presidency, this group of candidate countries would be from then on referred to as the 'Helsinki Group'. The Council highlighted the importance of the principle of differentiation, whereby each candidate country would be judged on its own merits, and which influenced the decision on which chapter of the *acquis communautaire* should be opened with each country during the phases of the enlargement negotiations. Importantly, it also enabled more-advanced countries of the Helsinki Group to catch-up with the negotiations with Cyprus, the Czech Republic, Estonia, Hungary, Poland and Slovenia of the Luxembourg Group, while allowing other applicants to proceed at their own pace. A key declaration of the Helsinki European Summit in December 1999 was that "the Union should be in a position to welcome new member states from the end of 2002" (European Council in Helsinki, 1999, no pagination).

3.8 The Nice Treaty and the 'Road Map'

Portugal took over the presidency of the EU in the first half of 2000 and after the Helsinki Group had opened their negotiations with the EU on 15 February 2000 it faced the challenge of coordinating these negotiations with the two groups of countries. Although the Helsinki Group started the accession negotiations nearly two years after the Luxembourg Group, most countries from that group set themselves an ambitious

[13] Malta, which had reactivated its application for EU membership in 1998 and had started the screening process in May 1999, was invited alongside Bulgaria, Latvia, Lithuania, Romania and Slovakia to join the negotiation process already underway with Poland, Hungary, the Czech Republic, Estonia, Slovenia and Cyprus since March 1998 (European Parliament, 2000).

target date for their EU accession.[14] Nevertheless, following the progress made in the enlargement process under the Finnish presidency, the year 2000 was characterised by a slowdown in the accession negotiations (Christoffersen, 2007a). The priority of the EU, both under Portuguese and French presidency, was the drafting of a new treaty, which later became known as the Nice Treaty.[15] It laid the foundations for the institutional change in the enlarged the EU, but before the Nice Summit at the end of 2000 the Commission presented alongside the annual Progress Reports a strategy paper that it referred to as the 'Road Map'. This outlined the schedule for the accession negotiations in the coming eighteen months and it became a guidance tool for the subsequent Presidencies. The 'Road Map' proposed that most chapters in the negotiations should be closed in 2001, with only those remaining with major financial implications for the EU budget left to the first half of 2002, making the prospect of concluding the accession negotiations by the end of 2002 a realistic target. However, it was not clear whether the Helsinki Group would adhere to the 'Road Map' and conclude negotiations by the end of 2002 alongside the Luxembourg Group (Sajdik and Schwarzinger, 2011).

The Nice European Summit in December 2000 endorsed the 'Road Map' and confirmed that the strategy contained in the 'Road Map', coupled with the completion of the institutional reform, should allow the EU "to welcome those new Member States which are ready as from the end of 2002, in the hope that they will be able to take part in the next European Parliament elections [in June 2004]" (European Council in Nice, 2000, no pagination), reaffirming the commitment of the EU to the objectives set by the Helsinki European Council in 1999. In the first half of 2001, the accession negotiations showed substantial progress as the 'Road Map' set of priorities were adhered to (Christoffersen, 2007a). The Sweden presidency and European Commission pushed for the progress in the accession negotiations with the Helsinki Group candidates by inviting them to specify the chapters they were ready to negotiate on. Sajdik and Schwarzinger (2011) note that despite the fact that the 'Road Map' strategy was 'tailor-made' for the Luxembourg Group, the Helsinki Group made impressive progress in their accession negotiations, catching-up with the first group.

Despite the impressive speed of enlargement negotiations under the Swedish presidency, a threat to the EU enlargement came after the rejection of the Nice Treaty in the Irish referendum. This was seen as a serious obstacle on the way to the next enlargement. The negative result of the treaty referendum in Ireland did not prevent the

[14]Target entry dates for the second group of countries were as follows: Latvia and Malta - 01/01/2003; Lithuania and Slovakia - 01/01/2004; Bulgaria believed it could join the EU by the end of 2006; Romania - 01/01/2007 (Sajdik and Schwarzinger, 2011).

[15]The Nice Treaty was approved at the Nice European Council in December 2000. The issues covered by the treaty included the weighting of votes in the European Council and the distribution of seats in the European Parliament in the enlarged EU of 27 Member States.

Göteborg European Council in June 2001 signalling to the candidates its commitment to enlargement by reassuring the applicants that "the enlargement process is irreversible" and that "the ratification process for the Treaty of Nice will continue" (European Council in Göteborg, 2001a, p. 2). It was confirmed that provided progress was sustained, the completion of negotiations would be achievable by the end of 2002, allowing the new members to participate in the European Parliament elections in 2004. Belgium took over the presidency of the EU in the second half of 2001, and despite facing the difficulty of opening the more-critical chapters it generally adhered to the strategy set out by the 'Road Map'. A significant achievement of the Belgian presidency was the publication of a strategy paper *'Making a Success of Enlargement'*, which for the first time named ten countries that should be in the position to finish their negotiations by the end of 2002, on the basis of steady progress being maintained. The group of ten countries were known as the 'Laeken10', comprising Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia.

The Laeken European Council in December 2001 reinforced its commitment to enlargement by declaring that: "The European Union is determined to bring the accession negotiations with the candidate countries that are ready to a successful conclusion by the end of 2002, so that those countries can take part in the European Parliament elections in 2004 as members" (European Council in Laeken, 2001b, p. 3). Importantly, for the first time, it named individual candidate countries that were deemed to be on course to conclude the accession negotiations by the end of 2002:

> "The European Council agrees with the report of the Commission, which considers that, if the present rate of progress of the negotiations and reforms in the candidate States is maintained, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic, the Czech Republic and Slovenia could be ready. It appreciates the efforts made by Bulgaria and Romania and would encourage them to continue on that course." (p. 3)

This meant that the prospect of EU accession of these countries was highly probable. At the same time, the Laeken Summit encouraged Bulgaria and Romania to continue maintaining their efforts in the accession negotiations to be able "to open negotiations on all chapters with those countries in 2002" (European Council in Laeken, 2001b, p. 3).

3.9 The Decisive Phase of the Negotiations

The year 2002 was critical for the success of the accession negotiations. Owing to the achievements of Swedish and Belgian presidencies in 2001 and their adherence to the 'Road Map' priorities, the negotiations entered their decisive stage, with the budget-related aspects next on the agenda. The priority schedule for the first half of 2002 under the Spanish presidency included the provisional closure of the chapters such as agriculture, regional policy, financial and budgetary provisions and institutions. Moreover, the Spanish presidency faced the task of aligning the Financial Framework for 2000-06 with the current working hypothesis of EU enlarging in 2004 with ten 'new' EU Member States.[16] The Spanish presidency generally adhered to the high expectations of the 'Road Map' (Sajdik and Schwarzinger, 2011). The administrative and judicial systems of the candidate countries were assessed at the Sevilla European Council in June 2002, which decided that the final list of acceding countries would be determined at the meeting of the European Council in October 2002. The Sevilla Summit envisaged the continued drafting of the Treaty of Accession, with this being ready for signing in spring 2003 (European Council in Sevilla, 2002c). It was confirmed that a second referendum on the Nice Treaty would be held in Ireland in autumn 2002, the ratification of which was a condition for enlargement taking place within the scheduled timescale.

Denmark took over the presidency of the European Union in second half of 2002, and had the task of concluding the negotiations within the following six months, which was regarded as a matter of credibility (Christoffersen, 2007c). It set out a detailed action plan, which assumed the conclusion of negotiations on all chapters, except for those linked to finance and institutional questions before the Brussels European Council meeting in October 2002, when the final list of acceding first wave countries was going to be determined. A period of extensive budget negotiations followed the European Council in Brussels and finished with the Copenhagen European Council in December 2002, which formally brought the negotiations with the first wave of countries to a close. The recommendation of the Commission was to finish the negotiations with Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia (the 'Laeken10' countries) by 2003, which was endorsed in Brussels.[17]

At the Brussels meeting the EU-15 discussed the possibility of postponing the enlargement date from the previous target date of 1 January 2004 to 1 May 2004. The reason for this was for both financial and legislative considerations.[18] Meanwhile, while the final list of new member states was drawn up, the second referendum on the Nice Treaty in Ireland approved the new treaty, thus clearing the way for the Eastern enlargement of the EU. What followed were weeks of intensive negotiations with the

[16]The previous hypothesis, in operation since the common Financial Framework for 2000-06 was agreed in Berlin in 1999, assumed an enlargement in 2002 with six new members only.

[17]For the purpose of defining the final list of new entrants in Brussels in October 2002, the Commission was asked to present its annual Progress Reports earlier than in previous years: in early October rather than late November. The Commission met this obligation, submitting the Progress Reports and Strategy Paper on 9 October 2002.

[18]Provided the conclusion of negotiations with ten candidates at the end of 2002, this left very little time for drafting and signing of the final Accession Treaty, as well as national referenda.

ten candidates, crowned by success at the Copenhagen European Council in December 2002. This Council formally announced that the fifth enlargement of the EU would take place on 1 May 2004, when ten new countries - Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia - would join the EU. The Copenhagen Summit also endorsed a new Road Map for Bulgaria and Romania, with the view that these countries would join in a second wave of the fifth enlargement on 1 January 2007. The declaration *'One Europe'* promised that the negotiations with Bulgaria and Romania "will continue on the basis of the same principles that have guided the accession negotiations so far, and that each candidate country will be judged on its own merits" (European Council in Copenhagen, 2002a, p. 4).

After formal approval by the European Parliament, a Treaty of Accession was signed by the EU Member States and the ten acceding countries in a ceremony in Athens on 16 April 2003. The final decision on accession was made by the citizens of the acceding countries in national referenda.[19] The results of the national referenda are reported in Table 3.2 and they show that in all accession countries a majority voted in favour of joining the EU, with the lowest support for EU membership recorded in Malta (54%) and the strongest support in Slovakia (92%). This paved way for the historic EU enlargement on 1 May 2004.

Following the European Council meeting in Copenhagen, Bulgaria and Romania continued accession negotiations for two years until their conclusion on 14 December 2004. The European Council meeting in Brussels immediately followed the end of the accession negotiations and confirmed that negotiations with Bulgaria and Romania were concluded and that the EU looked forward to welcoming these as members from January 2007. The Treaty of Accession was signed on 25 April 2005 in Neumünster Abbey in Luxembourg. Bulgaria and Romania entered the EU in the second wave of Eastern enlargement on 1 January 2007, thus bringing to a close the fifth enlargement of the European Union. It represented "the incredible sum of many individual efforts and achievements" (Sajdik and Schwarzinger, 2011, p. 152) and according to Rasmussen (2003) it marked the opening of a new chapter in European history.

3.10 1986-2004: Internal Developments in the 'Old' EU-15

The long and complex accession process that brought the twelve 'new' Member States into the EU did not happen in isolation. Internal developments within the 'old' EU-15 deepened the economic and political integration within the EU and occurred in parallel

[19]Cyprus was the only country from the group of 10 'new' EU countries that decided not to hold national referendum on the Accession to the European Union. Bulgaria and Romania, which joined in 2007, also chose not to hold a national referendum.

Table 3.2: EU Accession Referendum in CEECs: Results

Country	% in favour of accession	Date of referendum
Malta	54%	08/03/2003
Slovenia	90%	23/03/2003
Hungary	83%	12/04/2003
Lithuania	91%	10-11/05/2003
Slovakia	92%	16-17/05/2003
Poland	77%	07-08/06/2003
Czech Republic	77%	13-14/06/2003
Estonia	67%	14/09/2003
Latvia	67%	20/09/2003
Cyprus 1/	...	...
Bulgaria 1/	...	...
Romania 1/	...	...

(source: D@dalos Chronology)
Notes:
1/ No referendum on the Accession to the European Union was held in Cyprus, Bulgaria and Romania.

to the accession of the 'new' Member States, making it difficult to disentangle the effect of the 'widening' versus the 'deepening' of European integration. Equally, there was an interplay between the accession process of the CEECs and what was happening within these countries internally.

Throughout this chapter I referred to the accession process of the CEECs with the EU but technically speaking the EU did not come into existence until 1 November 1993. It was created by the Maastricht Treaty (formally, the Treaty on European Union) that was signed on 7 February 1992 in Maastricht, the Netherlands, by the twelve members of the European Economic Community (EEC). The Maastricht Treaty was a milestone in the political and economic integration of Europe. Upon entering into force on 1 November 1993, the Maastricht Treaty renamed the EEC as the European Community (EC) and embedded it as one of the three pillars of the EU.[20] The Maastricht Treaty also introduced a concept of European citizenship, which gave every citizen of the Union the right to move and reside freely within the territory of the Member States, and the right to vote in the municipal elections in the Member States where they reside.

The year of signing the Maastricht Treaty also coincided with the creation of the Single European Market (SEM). An objective of establishing the SEM was formulated in the Single European Act (SEA) that was signed on 17 February 1986 in Luxembourg and on 28 February 1986 in The Hague. The SEA came into force on 1 July 1987 and

[20]The other two pillars of the EU included common foreign and security policy, and police and judicial cooperation in criminal matters. The European Community pillar also included the European Coal and Steel Community (ECSC) and the European Atomic Energy Community (Euratom).

it set the objective of establishing the SEM by 31 December 1992. The SEA was the first major revision of the 1957 Treaty of Rome that established the EEC, the ESCS and the Euratom. With its provisions, the SEA was the start to the creation of the world's largest trading bloc. Compared to the later treaty changes (e.g. the Maastricht Treaty), with its economic goals the SEA was not controversial and European business strongly favoured the proposal to create the SEM, especially because the Member States were becoming increasingly dependent on the intra-EEC trade (McCormick, 2008). The SEA significantly reduced barriers to trade within the EEC by introducing the four freedoms, a building block of the SEM. The four freedoms allowed the free movement of goods, services, capital and labour. Therefore, the SEA can be seen as a first attempt at creating Europe without borders and a first commitment by Member States to create a 'European Union'.

An important step towards the creation of borderless Europe was the signing of the Schengen Agreement on 14 June 1985, which led to the creation of Europe's borderless Schengen Area. Initially, the Schengen Agreement was signed by five of the ten Member States of the EEC (Belgium, France, West Germany - later Germany - Luxembourg and the Netherlands). The Schengen Agreement, which McCormick (2008) argues provided for "the fast-track removal of border controls" (p. 99), proposed the gradual abolition of border checks at the common borders of the signatories, with an ultimate goal of allowing free movement of persons between countries within the Schengen Area. In 1990 the Schengen Agreement was supplemented by the Schengen Convention, which proposed the abolition of internal border controls and the introduction of a common visa policy. The Schengen Agreement came into effect in March 1995.

Year 1995 also saw the widening of the integration within the EU, with the accession of Austria, Finland and Sweden on 1 January 1995. A national referendum on joining the EU was also held in Norway but the majority voted against the membership. These four countries were previously involved in the negotiations on the creation of the European Economic Area (EEA), which intended to extend the terms of the SEA to the seven members of the European Free Trade Association (EFTA) (Austria, Finland, Iceland, Liechtenstein, Norway, Sweden and Switzerland). These negotiations were completed in February 1992 and the EEA came into existence in January 1994. However, following the Swiss referendum in December 1992, which turned down the EEA membership, only six EFTA countries became members of the EEA upon its entry into force.

Deepening of economic integration within the EU was achieved by the creation of the European Monetary Union (EMU), also known as the eurozone. The foundations for the EMU were laid by the Maastricht Treaty, which proposed the creation of the

Single currency, the euro. The five convergence criteria (i.e. Maastricht convergence criteria) that the EU Member States were required to comply with prior to adopting the Single currency were outlined in the Maastricht Treaty. The five criteria focused on inflation, long-term interest rates, exchange rate stability, government budget deficit and government debt-to-GDP ratio. In 1997 the Growth and Stability Pact was agreed, a framework designed to ensure price stability and fiscal responsibility, defining rules and penalties for eurozone members for breaches of the deficit and debt rules. The aim of the Stability and Growth Pact was to impose a fiscal discipline to facilitate and maintain the stability of the EMU.

In 1998 the European Central Bank (ECB) was established in Frankfurt am Main, Germany, with the responsibility as part of the European System of Central Banks for setting monetary policy for the eurozone countries and managing their foreign exchange reserves.[21] In 1998 it was decided that 11 of the EU-15 Member States fulfilled the Maastricht convergence criteria, and on 1 January 1999 the euro was formally launched as the national currency of these countries.[22] The euro coins and banknotes were finally introduced into circulation on 1 January 2002 in twelve of the EU-15 Member States.

The introduction of the Single currency was important in achieving economic integration within the EU. At the same time, greater political integration was achieved through the signing of Amsterdam Treaty in 1997 and Nice Treaty in 2001. The 1997 Amsterdam Treaty, which entered into force on 1 May 1999, made amendments to the 1992 Maastricht Treaty, abolishing a number of national vetoes in the European Council and replacing them with the Qualified Majority Voting (QMV).[23] It also gave increased powers to the European Parliament, and formally incorporated the Schengen Agreement into the treaties. Importantly, the Amsterdam Treaty prepared the EU for the future accession of the 'new' Member States. (McCormick, 2008) argues that the Amsterdam Treaty "was less important than either the SEA or Maastricht" (p. 113) in that it was designed to implement institutional and political changes ahead of the fifth enlargement and hence, "focused on consolidation rather than innovation" (p. 113). Saryusz-Wolski (2001) compares the outcome of the Amsterdam Treaty negotiations to "the adjustment of existing structures to the sufficient degree" (p. 57) rather than "the fundamental reform of the institutions" (p. 57). More comprehensive reform of the institutional structure and decision-making in the EU in preparation for the fifth enlargement was achieved through signing of the 2001 Nice Treaty, which entered into

[21] The predecessor of the ECB, the European Monetary Institute (EMI) was created in 1994. The EMI oversaw the coordination of the monetary policies of national central banks.

[22] The eleven countries included Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain. Up until 2002, the euro only existed as a virtual currency.

[23] The QMV was first introduced by the SEA in 1987.

force on 1 February 2003 following two referenda in Ireland.

3.11 Conclusions

The in-depth discussion of the EU fifth enlargement process in this chapter has identified a number of important milestones. A European Council meeting held in Luxembourg in December 1997 decided that accession negotiations would begin with Cyprus, Czech Republic, Estonia, Hungary, Poland and Slovenia (the 'Luxembourg Group'), and these commenced at the end of March 1998. The other six candidates were invited to participate in the 'informal' screening process, but it was not until the Helsinki European Council of December 1999 that Bulgaria, Latvia, Lithuania, Malta, Romania and Slovakia (the 'Helsinki Group') were invited to open their accession negotiations with the European Union. Their negotiations commenced in February 2000. Accession was a long drawn-out process and it was not until 2007 that all twelve countries acceded.

The EU has tended to emphasise its commitment to enlargement, but the prospect of this only became likely after the European Commission published a strategy paper *'Making a Success of Enlargement'* in November 2001. For the first time this named the ten countries that were on course to conclude their accession negotiations by the end of 2002, comprising Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia (the so-called 'Laeken10'). The European Commission's recommendations were formally approved at the Laeken European Summit in December 2001 and the declaration of the first wave of enlargement was made at the European Council in Copenhagen in December 2002, where it was confirmed that they would join the EU on 1 May 2004. This reaffirmed the commitment to continuing accession negotiations with Bulgaria and Romania. In May 2004 Cyprus, Malta and eight former communist countries from Central and Eastern Europe joined the EU, but the fifth enlargement was only completed two years later with the accession of Bulgaria and Romania in January 2007.

The CEECs that joined the EU in 2004 and 2007 are the former communist countries that upon the start of their political integration with the EU were in the process of transition towards the market economy. The transition process involved a set of deep structural reforms, such as privatisation, price liberalisation, financial liberalisation, trade liberalisation, industrial restructuring and law reform. In many countries these reforms coincided with the sudden acceleration of inflation, steep and fast decline in output, and fast rise in unemployment but the CEECs overcame the first stage of the transitional recessions by 1995 (Podkaminer, 2013). Importantly, the preparation for accession provided the CEECs with substantial and consistent incentives for reform and ensured that the process of political, institutional and economic reform in the CEECs continued beyond the 'shock therapy' stage of transition. Falcetti *et al.* (2005) show that the progress in market-oriented reforms is linked to higher cumulative growth across transition countries, and that "the new EU members on average have enjoyed higher cumulative real growth than other transition countries since 1989" (p. 1).

In the context of inward FDI, the accession process of 'new' Member States coincided with the reconfiguration of inflows of FDI to the EU (see: Figure 1.1 in Chapter 1). This is well illustrated in the case of the CEECs, which at the beginning of the 1990s attracted virtually zero inward FDI but have experienced growing inflows of FDI since. As set out by the Copenhagen criteria, before joining the EU the candidate countries were required to build a stable institutional set-up that guarantees democracy and rule of law, and have a fully functioning market economy with a capacity to sustain the competitive pressures of the European Single Market. Essentially, the process of meeting the criteria and the determination of the candidates to join the EU helped to build an environment beneficial for prospective investors and arguably, may have significantly contributed to the increasing recognition of the 'new' EU as a destination for inward FDI. It is this that is subsequently explored in this thesis.

Chapter 4

Data and Methodology

4.1 Introduction

The theory of FDI emphasises that the location of FDI activity is influenced by factors that are both 'external' (neoclassical and institutional perspective, where the former includes the agglomeration economies of the New Economic Geography (NEG) theory) and 'internal' to the firm (behavioural perspective). This chapter focuses on the 'external' location factors and discusses the data that are collected and constructed to understand the determinants of FDI location in the European Union (EU). These are informed by theoretical perspectives on location factors. Importantly, to conduct the empirical research I construct an original dataset on location factors available at both the country and NUTS2 regional level. The theory of FDI motives of Dunning (1993) provides a logical framework for the purpose of organising these data. Specifically, to account for the neoclassical profit and cost-driving factors a distinction is made between variables that are important to the market-seeking and resource-seeking FDI respectively. Furthermore, macroeconomic variables account for institutional factors, while industry variables capture the agglomeration factors of the NEG theory. A separate category of variables is defined for distance and border factors that are used in the regional analysis and that do not formally belong to these theoretical perspectives.

Although the 'internal' location factors that encompass investor-specific preferences are likely to impact on the location of investment activity, the preferences of investors are often unobservable and difficult to model empirically. Furthermore, detailed firm-level data to account for investor-specific preferences is less readily available. Admittedly, in my research it is possible to indirectly account for investor-specific 'internal' location factors by distinguishing between different types of investors, such as investment originating from within and outside of the EU, new investment and expansions. Alongside data on location factors, I discuss the project-level data on FDI that are sourced from the European Investment Monitor (EIM). The EIM data gives information on cross-border investment projects across Europe. An analysis is undertaken of the spatial distribution of inward investment activity at the country and region level by examining the features of the FDI data, such as the number of FDI projects, share of FDI projects and the location quotients. The impact of the fifth EU enlargement on mean annual levels of FDI before and after the EU enlargement in 2004 are also examined. The analysis of these helps to understand which of the countries and regions of the EU are the 'winners' and 'losers' of the fifth EU enlargement.

The rest of the chapter is organised as follows. The next section discusses the methodology that is used to analyse FDI location at the country and region level. Section 4.3 provides information on the regional classification system NUTS and the concept of a region. Section 4.4 describes the FDI data, presenting a preliminary analysis of spatial distribution of FDI activity within the EU. Section 4.5 discusses the data on location factors that are collected. Finally, conclusions are drawn in section 4.6.

4.2 Methodology

In modelling the FDI location decision the convention of a three-tiered hierarchy of 'MNE/exporters/domestics' has emerged (Cieslik and Ryan, 2009). Firstly, a firm makes a decision as to whether to serve a foreign market. Secondly, if a decision to supply a foreign market has been taken, the next step is to determine the best strategy to do so. The firm can choose from a range of possibilities, such as exporting, licensing, collaborative agreement and FDI. Lastly, if a firm decides to undertake FDI, it has to choose a location of its production facilities. Typically, studies focus on the one particular node of this decision making process, with research on the determinants of FDI location choices usually being conditional on MNEs having already decided to invest abroad. In this thesis I focus on the last node of the decision tree, so that it is assumed that the investing multinational firm has already decided to invest abroad, and in particular in an EU country. The subsequent analyses consider the determinants of the location choice of the firm, both at the country and region level. The analyses employ two different methodological approaches. First, a discrete choice methodology is used to study the probability of inward investment location in country j, and second, panel data methodology is used at the NUTS2 region level to analyse the count data on regional FDI.

4.2.1 Discrete Choice Models

The discrete choice model is well established as the prevailing empirical method underlying industrial location studies (Guimaraes *et al.*, 2003). Importantly, the economic decision of a firm studied in theoretical models of industrial location choice is by nature discrete (Crozet *et al.*, 2004): from among a set of several location alternatives the firm chooses one location. McFadden (1974) developed discrete choice models based on the microeconomic theory of firm behaviour and Carlton (1983) was the first to apply the discrete choice methodology to model the firm location choice in the Random Utility Maximisation (RUM) setting of discrete choice models. Although industrial location modelling has improved significantly since the McFadden-Carlton seminal works (de Propris *et al.*, 2005), the conditional logit model remains a commonly used econometric technique in studying the location choice decisions of firms. Guimaraes *et al.* (2003) maintain that the popularity of this methodological approach is explained by the fact that the econometric specification of the conditional logit model is obtained directly from the RUM framework of McFadden (1974). The model assumes that firms maximise their utility by choosing a single location that provides the highest profit from a set of available alternatives:

$$\Pi_{ij}^{*} = \max \pi_{ij}; j = 1, \ldots, L, \tag{4.1}$$

where firm i chooses location j as it yields the greatest profit among a set of L different locations:

$$\pi_{ij} > \pi_{il} \forall l \neq j (l = 1, \ldots, L). \tag{4.2}$$

The profit function can be decomposed into a deterministic part (V_{ij}) that is assumed to depend linearly on the observable attributes of location (X), and a stochastic part (ε_{ij}), which accounts for the investor-specific idiosyncrasies and any unobservable characteristics that affect investors' location choice:

$$\pi_{ij} = V_{ij} + \varepsilon_{ij} = \beta^{'} X_{ij} + \varepsilon_{ij}. \tag{4.3}$$

Hence, profit maximisation implies that the probability of firm i investing in location j is simply the probability that locating the production in location j generates greater profit for firm i than any alternative location:

$$P_{ij} \equiv Pr(\pi_{ij} \geq \pi_{il}) = Pr(V_{ij} + \varepsilon_{ij} \geq V_{il} + \varepsilon_{il}) = Pr(V_{ij} - V_{il} \geq \varepsilon_{il} - \varepsilon_{ij}) \forall l \neq j (l = 1, \ldots, L). \tag{4.4}$$

Although the real profit yielded by alternative locations cannot be observed, what is observed is the actual location choice of each firm and the characteristics of the alternative locations (Crozet *et al.*, 2004).

If the error terms are assumed to be independently and identically distributed (*iid*) across firms and locations, and follow an Extreme Value Type I distribution, the probability of firm i choosing location j is:

$$P_{ij}^{CL} = \frac{exp(V_{ij})}{\sum_{l=1}^{L} exp(V_{il})} \forall l \neq j(l = 1, \ldots, L), \tag{4.5}$$

which is known as the conditional logit model (McFadden, 1974). Utilising this formula for the probability of investing in each location, the coefficients on location attributes are estimated by maximum likelihood (Crozet *et al.*, 2004). McFadden (1974) demonstrates that the log-likelihood function with these choice probabilities is globally concave in parameters β, which makes the estimation by maximum likelihood procedure relatively easy (Train, 2003).

The major shortcoming of the conditional logit model is the Independence of Irrelevant Alternatives (IIA) assumption, which imposes a uniform pattern of substitutability between alternative locations. If the IIA assumption holds, the ratio of probabilities of a firm selecting any two locations j and l, $\frac{P_{ij}}{P_{il}}$, is only attributable to the characteristics of these two locations j and l, and is independent of the attributes of a third location in the choice set. However, as emphasised by Head *et al.* (1995), unobserved heterogeneity that affects the uniform perceptions of the substitutability between locations and make some choices closer substitutes than other choices in the eyes of certain investors, leads to the violation of IIA and results in biased estimates. The famous red-bus-blue-bus-problem discussed by Train (2003) illustrates the reasons why the IIA assumption may not hold. Basile *et al.* (2009) maintain that in order to mitigate the problem of the IIA, the use of a nested logit model provides a partial solution.[1]

Although the limitation of the conditional logit model when the IIA assumption does not hold across all location alternatives is recognised, in my empirical analysis I do not employ the nested logit model owing to the computationally-intensive nature of this technique. Admittedly, this is a weakness of the econometric approach in the study of the motives of FDI location choice but it is largely beyond my control.

[1]The nested logit model allows for some correlation between errors within mutually exclusive groups (nests), while maintaining the hypothesis of no correlation across nests, implying that IIA assumption holds across the nests but not within them (Basile *et al.*, 2009).

4.2.2 Panel Data Models

To analyse FDI activity in NUTS2 regions, panel data techniques are employed. I decided against using conditional logit model at the regional-level owing to a large number of observations as the estimation of the conditional logit model is computationally burdensome. The dependent variable is the regional number of FDI projects, although the EU-25 regional share of FDI is also considered. This is a balanced panel data with a cross-sectional dimension of 260 NUTS2 regions and a relatively short time dimension of fourteen years. Cameron and Trivedi (2005) maintain that increased precision in estimation is a major advantage of panel data owing to combining or pooling several time periods of data for each individual, or in this case each region, that produces a greater number of observations.[2] For a valid statistical inference, a possible correlation of regression model errors for a region over time needs to be controlled for, in addition to heteroskedasticity of error terms (Cameron and Trivedi, 2005).

A general linear panel data model allows for a variation of the intercept and slope over both regions and time:

$$y_{jt} = \alpha_{jt} + x_{jt}\prime\beta_{jt} + u_{jt}, \quad j = 1, \ldots, L, \quad t = 1, \ldots, T. \tag{4.6}$$

Cameron and Trivedi (2005) recognise, however, that this model specification is not estimable since the number of parameters to be estimated exceeds the number of observations. This calls for additional restrictions to be imposed on how intercept α_{jt} and slope β_{jt} are allowed to vary over both the cross-sectional and time dimension.

The most restrictive model is a pooled model that assumes constant coefficients: intercept α and slopes β:

$$y_{jt} = \alpha + x_{jt}\prime\beta + u_{jt}. \tag{4.7}$$

Assuming that the model is correctly specified and that independent variables are uncorrelated with the error, this model specification can be consistently estimated using pooled OLS estimator. Cameron and Trivedi (2005) admit that it remains likely that the error term is correlated over time for a given individual (region), leading to downward biased standard errors and inflated t-statistics. In consequence, pooled OLS estimator is inconsistent in the presence of individual fixed effects.

A variant of the pooled OLS model allows for a variation of intercepts across

[2]The definition of an 'individual' in the panel data context refers to a cross-sectional unit dimension and in my framework corresponds to NUTS2 regions. The subscript for a cross-sectional regional dimension is j; the subscript for a time dimension is t.

regions and over time (α_j and γ_t), while slope terms continue to be constant (β):

$$y_{jt} = \alpha_j + \gamma_t + x_{jt}\prime\beta + u_{jt}. \tag{4.8}$$

Alternatively, equation (4.8) can be written as:

$$y_{jt} = \sum_{A=1}^{L} \alpha_A d_{A,jt} + \sum_{B=2}^{T} \gamma_B d_{B,jt} + x_{jt}\prime\beta + u_{jt}. \tag{4.9}$$

where L regional dummies $d_{A,jt}$ equal one if $j = A$ and zero otherwise, $(T-1)$ time dummies $d_{B,jt}$ equal one if $t = B$ and zero otherwise (Cameron and Trivedi, 2005). An inclusion of a constant term requires that one regional dummy is dropped in addition to dropping one time dummy. This method of controlling for unobserved individual heterogeneity is referred to as the Least Squares Dummy Variable (LSDV) estimator, which Roodman (2009b) considers as "an intuitive first attack on the fixed effects" (p. 102).[3] The LSDV estimator extracts the individual heterogeneity of the error by entering dummies for each region.

Other techniques that are suited to handle individual fixed effects include a within estimator (otherwise known as a fixed effects estimator) and first-differences estimator. The within transformation eliminates individual fixed effects (α_j) by demeaning the data, producing the fixed effects model that measures the relationship between region-specific deviations of regressors from their time-averaged values and region-specific deviations of the dependent variable from its time-averaged value:

$$y_{jt} - \bar{y}_j = (x_{jt} - \bar{x}_j)\prime\beta + (\varepsilon_{jt} - \bar{\varepsilon}_j), \quad j = 1, \ldots, L, \quad t = 1, \ldots, T. \tag{4.10}$$

The unobserved region fixed effects can also be removed by first differencing the data. The region-specific one-period changes in the dependent variable are then regressed on the region-specific one-period changes in regressors in the first-differences estimator:

$$y_{jt} - y_{j,t-1} = (x_{jt} - x_{j,t-1})\prime\beta + (\varepsilon_{jt} - \varepsilon_{j,t-1}), \quad j = 1, \ldots, L, \quad t = 1, \ldots, T. \tag{4.11}$$

Although both the within estimator and first-differences estimator produce consistent estimates of β in the fixed effects model, the weakness of both techniques is their inability to identify parameter estimates on time-invariant variables.[4] In that respect, the LSDV approach is superior.

[3] Alongside idiosyncratic shocks, fixed effects are one of the orthogonal components of the error term.

[4] In the analysis of regional FDI activity I include a time-invariant dummy variable for capital cities. Seeing that neither the within estimator nor the first-differences estimator is able to identify parameter estimates on time-invariant variables justifies my decision for not employing within and first-differences estimators in my analysis.

For a statistical inference to be valid, the usual assumption is that error terms are identically and independently distributed (*iid*). However, in the panel data set-up it is plausible that observations within group j are correlated in some unknown way, inducing correlation in ε_{jt} within j, whilst observations across groups j and l remain uncorrelated. This requires the use of panel cluster-robust standard errors, which are clustered on the cross-sectional unit dimension of the panel data. While clustering corrects for the correlation in individual errors, the 'robust' option implies that the errors are also adjusted for heteroskedasticity (Cameron and Trivedi, 2005).

Although the LSDV estimator appears to be the most appropriate empirical method owing to its ability to identify coefficients on time-invariant variables, it is not a flawless technique. Following on the observations of Nerlove (1967), Nickell (1981) established that in the presence of endogenous explanatory variables such as serially and spatially lagged dependent variables, the LSDV estimator produces biased parameter estimates on endogenous explanatory variables due to their correlation with the fixed effects. The bias of the LSDV estimator is referred to as the 'Nickell bias', where the size of the bias is inversely related to time dimension ('T') of the panel data. A Monte Carlo study by Judson and Owen (1999) shows that biases of as much as 20% remain even when the time-series dimension is as large as 30 observations ($T \geq 30$).

Perhaps the most appropriate estimators that handle important modelling concerns such as fixed effects and endogeneity of regressors, while avoiding the 'Nickell bias' in panels with wide individual-dimension ('N') and short time-dimension ('T'), are the difference and system generalised method of moments (GMM) estimators (Roodman, 2009a). The flexible GMM framework is able to accommodate short, unbalanced panels with serially and spatially dependent variables, fixed effects and multiple predetermined and endogenous explanatory variables (Roodman, 2009a), which explains the growing popularity of GMM estimators, also in the spatial econometrics context. When written in vector form, a generalised dynamic model in space and time is:

$$y_t = \tau y_{t-1} + \delta W y_t + \eta W y_{t-1} + x_t \beta_1 + W x_t \beta_2 + x_{t-1} \beta_3 + W x_{t-1} \beta_4 + z_t \theta + \nu_t, \qquad (4.12)$$

where a set of endogenous explanatory variables consists of the dependent variable lagged in time (y_{t-1}), the dependent variable lagged in space (Wy_t) and the dependent variable lagged in space and time (Wy_{t-1}) (Elhorst, 2012).

GMM estimators use the assumptions about the moment conditions of the random variables to derive an objective function and provide population moment conditions. Data are used to compute the analogous sample moment conditions and parameter estimates are derived by finding the parameters that make the sample moment conditions as true as possible, through means of minimizing an objective function. By defining and solving a set of moment conditions that need to be satisfied for the values of the parameter estimates to be unbiased and consistent, a set of exogenous variables that are correlated with the endogenous explanatory variable but uncorrelated with the error term is obtained (Elhorst, 2012). The Arellano and Bond (1991) difference GMM estimator first differences the data to eliminate the fixed effects and uses lagged variables in levels to instrument the differenced equation. Typically, difference GMM estimator instruments $\Delta y_{i,t-1}$ with $y_{i,1}$ up to $y_{i,t-2}$ (GMM style instruments) and $x_{i,1}$ up to $x_{i,t-1}$ (standard IV style instruments) (Elhorst, 2012). The system GMM estimator by Arellano and Bover (1995) and Blundell and Bond (1998) augments difference GMM and simultaneously estimates differenced and level equations, where lagged variables in levels continue to instrument the differenced equation, whilst lagged differences are used to instrument equation in levels. Typically, $\Delta y_{i,1}$ up to $\Delta y_{i,t-2}$ and $\Delta x_{i,2}$ up to $\Delta x_{i,t-1}$ are used to instrument $y_{i,t-1}$ (Elhorst, 2012).

Since $y_{i,1}$ is the only instrument available for the first-differenced equation for period $t = 3$, but both $y_{i,1}$ and $y_{i,2}$ can be used as instruments in the first-differenced equation for period $t = 4$ (Bond, 2002), the model is overidentified when the time dimension exceeds three ($T > 3$). The validity of the overidentifying restrictions can be checked using the Sargan (1958) test and the Hansen (1982) *J*-test. In view of the instrument proliferation that arises as the time dimension of the panel data goes up, Roodman (2009a) advocates the use of the difference-in-Hansen test for the validity of instrument subset. This computes the increase in the Hansen *J*-test when a subset of instruments is added to the estimation set-up. Although there is no precise guidance on the 'correct' instrument count (Mehrhoff, 2009; Roodman, 2009a), as a rule of thumb the number of instruments should be less than or equal to the number of cross-sectional units to avoid finite sample bias caused by overfitting (Roodman, 2003).

The consistency of the difference and system GMM estimators relies on the assumption of no serial autocorrelation in the error terms and therefore, it is imperative to check for second-order serial autocorrelation in the first-differenced residuals, which essentially implies no autocorrelation between the error terms in the levels equation (Elhorst, 2012). The Arellano and Bond (1991) test is used for second-order autocorrelation in the first-differenced errors. Second-order autocorrelation in the first-differenced residuals implies that $y_{i,t-2}$ is no longer a valid instrument in the first-differenced equation, but $y_{i,t-3}$ and longer lags remain available as instruments (Bond, 2002).

In a spatial context Monteiro and Kukenova (2009) and Jacobs *et al.* (2009) demonstrate that the system GMM estimator reduces the parameter bias on the spatially lagged dependent variable (spatial lag). The system GMM estimator offers increased efficiency and less finite sample bias compared to difference GMM estimator

(Elhorst, 2012) and as argued by Sun *et al.* (2010) it is the best estimator to deal with the joint problem of serial and spatial endogeneity. A two-step robust system GMM estimator applies Windmeijer's (2005) finite-sample correction for the two-step covariance matrix.

4.3 The NUTS Regions

The Statistical Office of the European Communities, Eurostat, seeks to provide the EU with high-quality and harmonised statistical information, which is compiled and disseminated to the EU Member States for a range of purposes. Eurostat also publishes European regional data that covers a range of economic, socio-demographic and structural business statistics. The NUTS ('Nomenclature of Territorial Units for Statistics') provides a reference classification used by Eurostat for the collection and harmonisation of the regional statistics, as well as for any regional-level data analysis. A 'region' is "a tract of land with more or less definitely marked boundaries, which often serves as an administrative unit below the level of the nation state" (Eurostat, 2010, p. 3). However, as noted by Eurostat (2010), despite regions having an identity made up of specific features like landscape, climate, language, ethnic origin or history, the boundaries based on these features are often 'fuzzy'. For that purpose the frontiers of the region are typically determined by natural, historical and administrative boundaries.

At the beginning of the 1970s Eurostat set up the NUTS classification as "a single, coherent system for dividing up the European Union's territory in order to produce regional statistics for the Community" (Eurostat, 2010, p. 5). It provides a harmonised hierarchy of regions in the EU Member States. The NUTS classification sub-divides a Member State into NUTS1 regions, where each NUTS1 region is further sub-divided into NUTS2 regions, and these in turn into NUTS3 regions. The national level is sometimes referred to as the NUTS0 level. The NUTS classification gained legal status in 2003, being previously managed under a series of 'gentlemen's agreements' between the EU Members and Eurostat. A minimum requirement of three years for each NUTS breakdown was imposed. A first regular amendment was the replacement of the 2003 NUTS version by the 2006 version on 1 January 2008.[5] All regional data collected below follow the 2006 NUTS revision of regional classification (4.5). In addition to the amendments, regulations determine the upper and lower population size thresholds for the NUTS regions, as shown below.

By its nature the EU is diverse, made up of 27 countries (EU-27) as of 2010. Some countries are very small (e.g. Malta with a population of about 400,000 in 2010) and

[5] More recently, the second regular amendment formalized the 2010 NUTS regions from 1 January 2012, and as of 1 January 2015 the 2010 NUTS is replaced with the 2013 NUTS regions.

Table 4.1: NUTS regions: population size thresholds

Level	Minimum	Maximum
NUTS1	3,000,000	7,000,000
NUTS2	800,000	3,000,000
NUTS3	150,000	800,000

(source: Eurostat, 2010)

some very large (Germany has about 82 million citizens). Under the 2006 revision, six Member States are so small that they consist of one NUTS2 region only.[6] At the other end of the spectrum Germany has 39 NUTS2 regions. Table 4.2 presents the differences between the EU-27 Member States with respect to the number of NUTS regions and their population size. In total, there are 97 NUTS1 regions, 271 NUTS2 regions and 1,303 NUTS3 regions in the EU-27 (Eurostat, 2010). The regional analysis below considers 260 regions, excluding some regions owing to data availability and lack of inward investment to these NUTS2 regions.[7] Furthermore, due to FDI dataset limitations I am unable to distinguish between FDI projects that locate in Inner and Outer London, which means a single NUTS1 region is used for London. Strictly speaking this implies that the regional analysis consists of 259 NUTS2 regions and one NUTS1 region.

While the size of the regions differs between countries, a regional analysis is still a good option if the disparities in size between countries are large. Artige and Nicolini (2005) emphasise the benefits of using the disaggregated-level data stating that "a lot of interesting characteristics or changes are simply hidden at more aggregate levels" (p. 3), meaning that the national data hides a lot of regional variation within a country. Moreover, analysing data at a more disaggregated-level significantly boosts the number of observations and increases the power of statistical tests.

4.4 FDI Data

The data on the location of FDI investment is sourced from the Ernst and Young *European Investment Monitor* (EIM) database.[8] This is an online information provider, which tracks and records cross-border investment in Europe. Data is collected for all European countries that were EU members at 2010 for each year from 1997 to 2010, but excluding Cyprus and Malta, for which data were not collected prior to 2004 (Defever, 2012). Each project is recorded individually and identified by the project type: new invest-

[6]These are Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta.

[7]These are Cyprus, Ciudad Autónoma de Ceuta, Ciudad Autónoma de Melilla, Guadeloupe, Martinique, Guyane, Réunion, Malta, Região Autónoma dos Açores, Região Autónoma da Madeira.

[8]The EIM database is obtainable from: `http://www.eyeim.com/`. The EIM data is used in Alegria (2006) and Defever (2006, 2012).

Table 4.2: NUTS regions in the EU: cross-county comparison

	Number of regions			Average population size of regions (in 1,000)		
	NUTS1	NUTS2	NUTS3	NUTS1	NUTS2	NUTS3
Belgium	3	11	44	3,542	966	241
Bulgaria	2	6	28	3,830	1,277	274
Czech Republic	1	8	14	10,334	1,292	738
Denmark	1	5	11	5,461	1,092	496
Germany	16	39	429	5,142	2,109	192
Estonia	1	1	5	1,342	1,342	268
Ireland	1	2	8	4,357	2,178	545
Greece	4	13	51	2,798	861	219
Spain	7	19	59	6,411	2,362	761
France	9	26	100	7,092	2,455	638
Italy	5	21	107	11,875	2,827	555
Cyprus	1	1	1	784	784	784
Latvia	1	1	6	2,276	2,276	379
Lithuania	1	1	10	3,376	3,376	338
Luxembourg	1	1	1	480	480	480
Hungary	3	7	20	3,352	1,437	503
Malta	1	1	2	409	409	205
Netherlands	4	12	40	4,095	1,365	410
Austria	3	9	35	2,772	924	238
Poland	6	16	66	6,353	2,383	578
Portugal	3	7	30	3,536	1,515	354
Romania	4	8	42	5,387	2,693	513
Slovenia	1	2	12	2,018	1,009	168
Slovakia	1	4	8	5,397	1,349	675
Finland	2	5	20	2,663	1,065	264
Sweden	3	8	21	3,049	1,144	436
United Kingdom	12	37	133	5,082	1,648	458
EU-27	97	271	1,303	5,119	1,832	381

(source: Eurostat, 2010)

ments, new co-locations and expansions. This is narrower than the OECD definition in Chapter 2, but it reflects the purpose of the database, which is to capture 'productive' investments that involve some new capacity. A 'co-location' is a new function that is co-located near an existing activity under the same ownership, while an 'expansion' is a project that increases capacity at an existing function. Overall, 67% of projects are new ('greenfield') investments, 27% are expansions and 6% co-locations.

The EIM is a commercial database that is mainly used by economic development agencies. The main sources for the data are national investment agencies, newspapers, and financial information providers (such as Reuters). The data are believed to be representative of this investment, and include a good number of smaller investments (where the job size is known, about 30% of projects have no more than ten associated jobs). It excludes information on mergers and acquisitions and joint ventures (unless they result in new facilities or jobs), licence agreements, extraction of ores, minerals and fuels, and portfolio investments. In addition to project type, the EIM data provide information on a range of other characteristics of projects and this is shown in Table 4.3. The categories cover the company name, date and host location of investment, the origin of parent company, the industry of the investment project, number of jobs and investment scale.

The information on the industrial coverage is given by the NACE code, sector name and industry group categories. The industry groups covered by the EIM dataset include agriculture (0.17% of projects), energy (1.03%), manufacturing (57.97%), construction (0.53%), retail and hospitality (1.95%), transport (7.63%), services (29.90%), education and health (0.34%) and recreation (0.49%).[9] The two digit NACE codes are reported for all projects, with the exception of pharmaceuticals, automotive assembly and automotive components sectors, for which three digit NACE codes are reported. Furthermore, for all projects a short description of activity is provided. The EIM covers both intra- and extra-EU FDI, where FDI originating from the EU (inclusive of the 'new' EU Member States) makes approximately 46% of all projects. Adding the remaining countries in Europe, the European FDI accounts for 51% of projects. The single largest investing country is the US, where approximately 32% of all projects originated from.

Although applied studies on FDI location extensively employ the count of investment projects as a measure of inward FDI, Crescenzi *et al.* (2015) acknowledge that this count variable exacerbates measurement bias problem because the variable based on the count of FDI projects gives equal weighting to major and minor investment projects. Furthermore, Crescenzi *et al.* (2015) note that investment carried out in some sectors may be a response to the depreciation of the previous investments, which a simple count variable is unable to account for. The use of data on investment scale to capture the size of inward FDI makes it possible to control for the magnitude and 'relevance' of investment, i.e. major versus minor project. Despite the validity of arguments used by Crescenzi *et al.* (2015) to highlight the inadequacy of count data to appropriately measure inward FDI, in this thesis I do not capture FDI using the financial flows data. Although I consider it to be a limitation of the methodological approach, the investment scale in the EIM database is known for only about 30% of projects, owing to commercial confidentiality, and for this reason is not used as a dependent variable. The jobs, which can be considered another measure of investment scale, are known for about 60% of projects. Of the other categories, missing entries are also found for start-up date, origin city and origin state; however, my analysis does not utilise this detailed information.

The EIM dataset does not report NUTS2 region information *per se*, but it is possi-

[9] Table A.4 in the Appendix offers more detailed breakdown on the industrial coverage of the EIM dataset.

Table 4.3: Categories of EIM database

Database Category	Description
(A) Company Name	
Company Name	Name of company undertaking the investment
Parent Company Name	Ultimate parent company (in the case of joint ventures, all parent companies are listed)
(B) Date	
Year	Investment project announcement year
Week	Investment project announcement week
Financial Year	Investment project announcement financial year (from 1 April Year 1 to 31 March Year 2)
Announcement Date	Date when investment project was announced in press/press release
Startup Date	Actual or estimated launch of operation (month/year)
(C) Location	
City Location	City/Town of country receiving the investment
NUTS3 Name and NUTS3 ID	EU classification of third tier regional level of country receiving the investment. NUTS3 ID reported in EIM database does not correspond to NUTS3 code under the official NUTS classification.
RDA Name and RDA ID	Name and ID of Regional Development Agency covering investment location (if not available national development agency or country name is reproduced)
NUTS1 Name and NUTS1 ID	EU classification of first tier regional level of country receiving the investment. NUTS1 ID reported in EIM database does not correspond to NUTS1 code under the official NUTS classification.
NUTS0 Name and NUTS0 ID	Name and code of country receiving the investment
(D) Origin	
Origin City	City of origin of parent company
Origin State	State of origin of North American parent company
Origin Country	Country of origin of parent company (in the case of multiple parent companies, which originate from different countries, all countries are listed)
Origin Global Region	Global region in which parent company is based (in the case of multiple parent companies, which originate from different global regions, all global regions are listed)
(E) Employment	
Employment	Number of jobs created
Employment Band	Number of jobs created coded into employment bands
(F) Expenditure	
Expenditure	Value of investment (typically reported in the national currency of the recipient country)
Capital Expenditure	Value of investment (reported in millions USD)
(G) Industry	
SIC NACE Code	Sector classification by NACE industry code
Sector Name	Sector name by NACE industry code
Industry Group	Based on Standard Industrial Classifications UK 1992
Project Type	Project type of investment (new, new co-location, expansion)
Activity	Project activity or function category
Activity Description	Description of the investment project
(H) Extra	
Additional Classifications	Biotech, nanotech and renewable investment projects

(source: Ernst & Young/Oxford Intelligence, 2009) ble to establish this based on the published NUTS3 region data. An additional difficulty is that the recorded NUTS3 region name does not always correspond to the actual region label under the NUTS territorial breakdown. Therefore, in a limited number of cases, identification of the correct NUTS2 region was obtained using the available city location information. For smaller cities this implied the need to perform Internet-based searches of information on an individual FDI project to confirm the geographical location of the investment and hence the NUTS2 region. Furthermore, the information in the EIM dataset makes it impossible to distinguish between investment projects locating in Inner and Outer London (UKI2). Despite these imperfections, the EIM data provides comprehensive information on cross-border investment projects in Europe, offering a disaggregated panel data set that contains information on 35,155 individual projects. These kind of data are increasingly used in studies of FDI location (Wren and Jones, 2011). In the following sections I use the data to examine FDI in the 'old' and 'new' EU Member States. This is both in absolute terms (number and share of projects) and relative to output using location quotients.

4.4.1 Inward FDI by Regional Groups

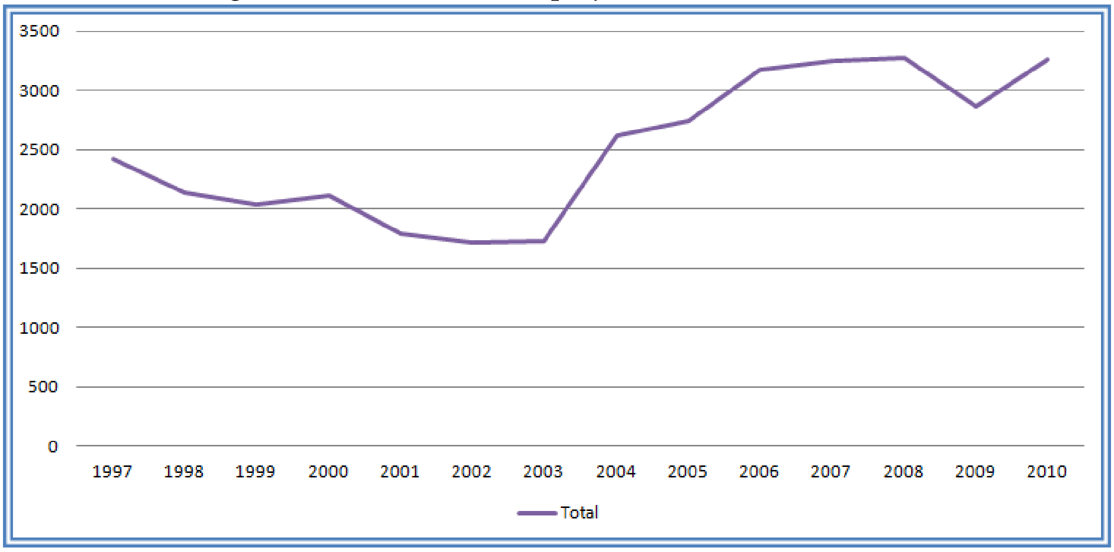
The database covers 35,155 FDI projects in all EU-27 countries over period 1997- 2010. In analysing this I include Cyprus and Malta, which acceded in 2004, but for which the FDI data were not recorded prior to 2004. However, this is of no real significance, as these countries received virtually no 'productive' FDI prior to 2004 and the analysis below shows they also received very little FDI after EU membership.

Figure 4.1 shows that there is strong variation in FDI in the EU-27 over time.[10] In 1997, which is the year when the EIM started recording FDI, a total of 2,421 investment projects were carried out in the EU-27. There is an overall downward trend between 1997 and 2003, falling from 2,421 to 1,730 projects. After this time, a dramatic increase in the number of projects is observed, which is particularly marked in 2004 when there is a year-on-year increase of about 900 FDI projects. In the following years, the number of projects continues to rise, but more gradually. It reaches a maximum of 3,270 investment projects in 2008, although declining to 2,869 in 2009, which can arguably be attributed to the global economic downturn. In the following year, inward FDI in the EU-27 rises again, reaching 3,260 projects in 2010, about the same as 2008.

The distribution of investment projects is highly unbalanced between the 'old' and 'new' EU Member States. For the purpose of this section, I define three regional groups: the EU-15, EU-10 and EU-2. This follows the terminology used in the EU literature and I consider those 15 countries that joined the EU prior to 2004 as the 'old'

[10]The figures are reported in Table A.1.

Figure 4.1: Number of FDI projects in EU-27, 1997-2010



(source: EIM dataset, author's own elaboration)

Member States, using an abbreviation the 'EU-15'. The countries that accede in 2004 and 2007 are regarded as the 'new' Member States and termed as either the 'EU-10' (2004 entrants, including Cyprus and Malta) or the 'EU-2' (2007 entrants).[11] Table 4.4 summarises the included countries and accession date for each of these (see: Chapter 3).

Table 4.4: EU Member States - regional groups

Subgroup	Joined	Countries
EU-15	founding members	Belgium, France, Germany, Italy, Luxembourg, Netherlands
	1 January 1973	Denmark, Ireland, United Kingdom
	1 January 1981	Greece
	1 January 1986	Portugal, Spain
	1 January 1995	Austria, Finland, Sweden
EU-10	1 May 2004	Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia
EU-2	1 January 2007	Bulgaria, Romania
EU-27	N/A	EU-15+EU-10+EU-2

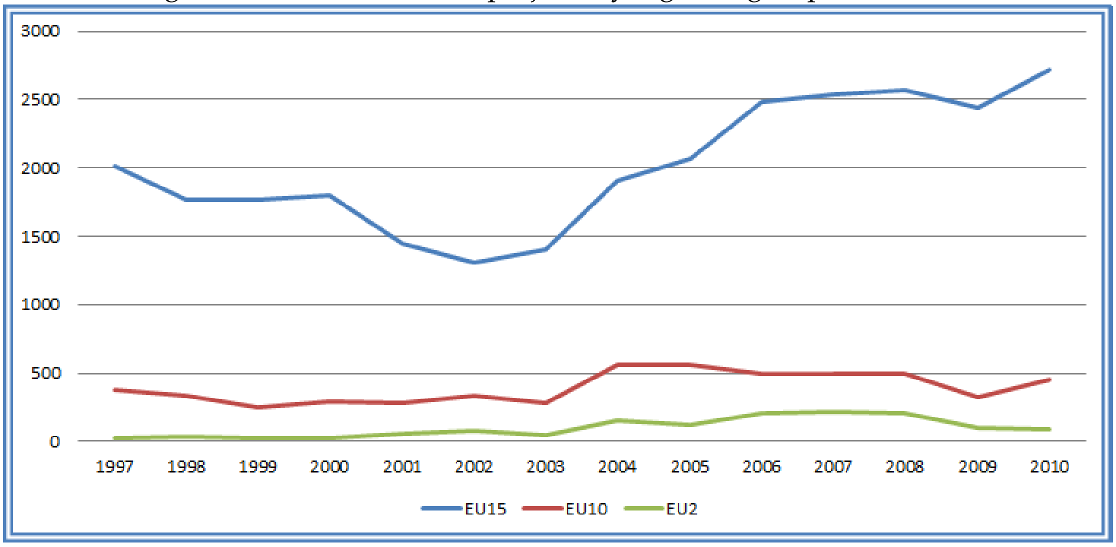
(source: author's own elaboration)

Figure 4.2 shows the trend in inward FDI project numbers for the 'old' (EU-15)

[11] Later in the thesis, Cyprus and Malta are dropped from the analysis and the term EU-10 is adopted to apply to all accession countries, both in the first and second waves.

and 'new' (EU-10 and EU-2) Member States between 1997 and 2010. The 'new' Member States of the EU account for only a small proportion of the total number of projects when compared with the 'old' EU-15.

Figure 4.2: Number of FDI projects by regional groups, 1997-2010



(source: EIM dataset, author's own elaboration)

In terms of absolute project numbers, the 'old' EU Members exhibit a declining trend in FDI, from 2,010 projects in 1997 to 1,310 projects in 2002. In subsequent years FDI increases again, with the most dramatic year-on-year rise of over 500 projects occurring in 2004. A maximum of 2,715 projects in the EU-15 is recorded in 2010. In terms of FDI shares, for nearly all years between 1997 and 2010 the percentage share of inward FDI of the EU-15 countries varies between 75% and 85% of total number of EU-27 projects. The temporal variation in the absolute project numbers for the 'new' EU countries, i.e. EU-10 and EU-2, is much lower than for the EU-15 Member States. For the EU-10, the number of projects ranges from 246 projects in 1999 to 560 projects in 2005. The most marked year-on-year change for the EU-10 occurs in 2004, when total FDI rose from 277 to 558 projects, which coincides with the accession of these countries. The years 2004 and 2005 are nearly identical with 558 and 560 projects, and between 2006 and 2010 the number of projects for the EU-10 remains relatively stable, ranging between 450 and 500 projects. For the 2007 entrants, Bulgaria and Romania (EU-2), the total number of FDI projects generally shows an upward trend in Figure 4.2. From about 30 FDI projects a year over 1997-2000, the number of projects then increases, with the greatest year-on-year increase in 2004 when a total of 155 projects were carried out. The peak of FDI activity in the EU-2 also coincides with the year of their accession in

2007, with a total of 213 projects. This number hardly changes over 2006-08, after which it shows a dramatic decrease to 105 projects in 2009. The fall in project numbers for the EU-2 continues into 2010 but the year-on-year change between 2009 and 2010 is much smaller.

Table 4.5 shows that the percentage share of total inward investment projects differs substantially between the EU-10 and EU-2 countries. The average annual project share of the EU-10 countries is about 15%, although it ranges from as low as 11% in 2009 to as high as 21% in 2004 (the accession year). For the EU-2 countries, the average share of total projects is at a low of 1.3% in 1997, reaching a maximum level of 6.6% in 2007. After 2008, the shares for Bulgaria and Romania fall dramatically reaching an average level of approximately 3% over 2009-10. To complement the discussion on the project numbers and project shares, the time period 1997-2010 is split into three sub-periods in Table 4.5: 1997-2003, 2004-06 and 2007-10. The first of these precedes the fifth enlargement; the second captures the period between the first and second wave of the enlargement; and the last looks at the period between the end of the enlargement and the latest available data. Table 4.5 shows that the FDI project shares for the 'new' Member States (EU-10 and EU-2) are the highest over the time period 2004-06, suggesting that in these years investing in the 'old' EU countries becomes relatively less attractive. However, in the years following the 2007 enlargement, the attractiveness of the EU-10 countries appears to be reduced, as project shares fell markedly. While the project shares over 2007-10 also fall for the EU-2 in relation to 2004-06 period, this change is small relative to that experienced by the EU-10. Evidently, the investment attractiveness of the 'old' EU-15 rises relative to the 'new' entrants in the most recent time period.

Table 4.5: Project numbers and shares by regional groups and sub-periods

Subgroup	1997-2003	2004-2006	2007-2010	1997-2010
EU-15	11,502	6,457	10,266	28,225
	82.39%	75.52%	81.19%	80.29%
EU-10	2,149	1,612	1,768	5,529
	15.39%	18.85%	13.98%	15.73%
EU-2	309	481	611	1,401
	2.21%	5.63%	4.83%	3.99%
Total	13,960	8,550	12,645	35,155
	100.00%	100.00%	100.00%	100.00%

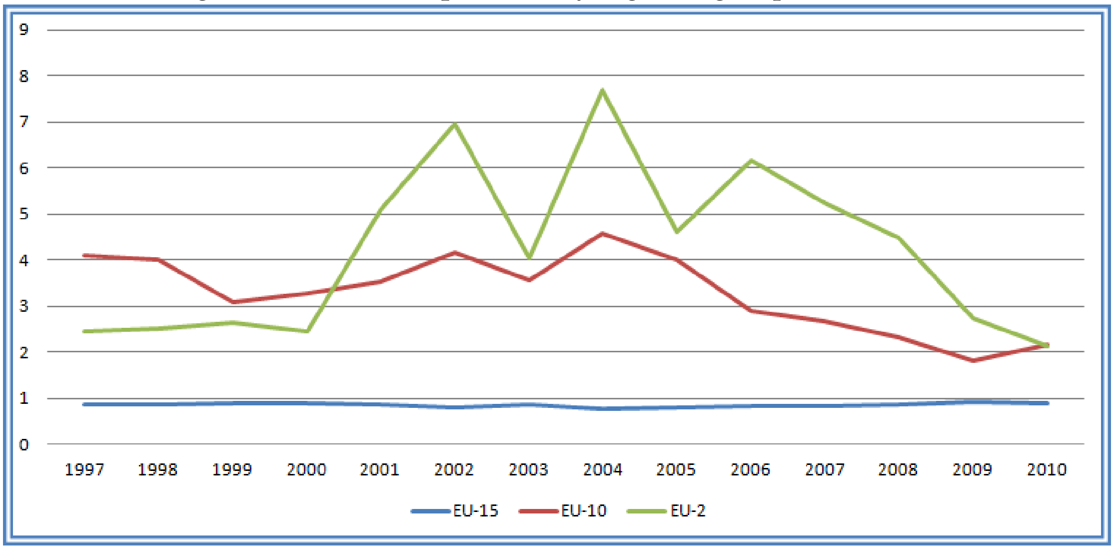
(source: EIM dataset, author's own elaboration)

While the number of FDI projects might be a reasonable measure for the attractiveness of a country to investors, it is not without flaws, as *ceteris paribus* larger economies are expected to receive more inward FDI. As a means to account for this location quotients are used across regional groups (EU-15, EU-10, EU-2). A location quotient accounts for the economic size of the host economy is defined as:

$$\text{Location quotient}_{\text{GROUP}} = \frac{\frac{FDI_{GROUP}}{\sum_{j=1}^{27} FDI_j}}{\frac{GDP_{GROUP}}{\sum_{j=1}^{27} GDP_j}}, \tag{4.13}$$

where GDP is a measure of the economy's size.[12] These are plotted in Figure 4.3. A ratio of unity indicates that a location receives as much investment projects as would be 'expected' based on its GDP relative to the combined EU-27 GDP. A location quotient greater than one implies that a location receives more inward investment than the size of its economy would suggest ('over-performance'), and conversely ('under-performance').

Figure 4.3: Location quotients by regional groups, 1997-2010



(source: EIM dataset, author's own elaboration)

Over the period 1997-2010, the location quotients are reasonably stable, at between 0.77 and 0.92. This implies that the 'old' Member States attracted fewer FDI projects than the share of their combined GDP in total EU GDP would suggest. The minimum value of the location quotient for the EU-15 is recorded in 2004, when the EU-10 countries joined the EU, falling from 0.86 to 0.77 in 2004. This is despite an increase in the absolute number of FDI projects in the EU-15. The implication is that the 'old' EU members attracted a lower share of the investment projects at the EU enlargement, and were a relatively less attractive destination for inward investment as compared to

[12]The EIM database is used for the FDI project count and Eurostat is the source for the GDP data.

the pre-accession period. However, after the enlargement the location quotient for the EU-15 starts to grow, reaching a maximum of 0.92 in 2009.

The location quotient figures for the 'new' EU-10 and EU-2 members are greater than unity throughout the period, indicating that the accession countries 'over-perform' and attract larger share of inward FDI than might be anticipated based on their economic size. The location quotients are also more volatile, ranging from 1.82 to 4.58 for EU-10 and from 2.14 to 7.70 for EU-2. The location quotients for the EU-10 vary over period 1997-2003, but trend upwards, indicating that these countries become relatively more attractive to inward investment prior to the enlargement. They reach a maximum value of 4.58 in 2004, which coincides with the year of their accession. Following the fifth enlargement in 2004, the location quotient figure for the EU-10 members falls, reaching a minimum of 1.82 in 2009. The largest year-on-year decline is recorded in 2006, when the location quotient figure declines from 4.01 to 2.91. The final value of location quotient in 2010 is 2.17.

While the location quotients for the EU-10 exhibit a generally increasing trend before 2004 and decreasing after 2004, it is significantly more erratic for the EU-2 members. The location quotient is stable at around 2.5 until 2000, after which it grows substantially, reaching a peak of 6.96 is reached in 2002. Generally, the location quotient pattern for EU-2 is volatile over 2000-06, and the highest value of the location quotient is recorded in 2004, the year of the first enlargement wave. Although the EU-2 countries did not join the EU at this time, it is likely that the accession of the first wave signalled the likely accession of the EU-2. Over 2006-10, the relative attractiveness of the EU-2 decreases as these countries attract less inward investment relative to their economic size. It is important to remember that a fall in the location quotient is a result of an interplay of two forces: decreasing FDI project shares and increasing GDP shares. It is possible that the decline in location quotient figures are predominantly attributable to the increasing economic size of the EU-2 around the time of their EU accession in 2007. The location quotient figure for the EU-2 continues to decline until 2010 when it reaches a minimum of 2.14, roughly equal to a corresponding figure for the EU-10 members.

4.4.2 Inward FDI by Country

The analysis of the project numbers and the location quotients according to the EU-15, EU-10 and EU-2 provides a good overview of the heterogeneity of the countries that joined the EU in different waves of enlargement. However, it does not reveal the dissimilarities of the countries belonging to a single regional group, and this is explored in Table A.1. This shows the distribution of FDI projects in the EU-27 by country and year over the period 1997-2010. The EIM database records information on 35,155 investment projects that located in the 27 EU Member States between 1997 and 2010, which is a mean of 93 projects per country per year and 1,302 per country. However, there are considerable disparities between the EU-27 countries. The UK is the main destination for FDI, attracting 8,343 FDI projects between 1997 and 2010 (an average of 596 projects per annum), while Luxembourg gets only 90 projects. FDI for Cyprus and Malta is known only from 2004, but these receive only 50 projects between them.

To explore the country-level heterogeneity in inward FDI, location quotients are calculated for individual countries using (4.13), and reported as line and pie charts in the Appendix Figures A.1 to A.9. To ensure the clarity of presentation the data are smoothed using moving averages for project numbers and location quotients, which takes into account the first lag value, the actual value and first lead value. Since the data are erratic this enhances the identification of trends, but to identify the project size at a specific point in time the actual figures are given in Tables A.1, and any discussion of the trends identified by line and pie charts in Figures A.1 to A.9 is supported by these data.

The countries are allocated to three groups, as presented in Table 4.6. I no longer consider Cyprus and Malta that received little inward FDI. Given the exclusion of these from further analysis, for simplicity I refer to the remaining 'new' EU countries collectively as the EU-10, rather than make a distinction between those that joined in 2004 and 2007. This new definition captures the ten CEECs. Although I treat all the 'new' EU-10 members as a single group, I choose to split the EU-15 countries into 'major' and 'minor' recipients of FDI. The 'major' EU-15 recipients are the strong and average performers that receive more than 1,000 investment projects over period 1997-2010. The 'minor' EU-15 recipients are all remaining EU-15 countries that receive fewer than 1,000 projects over the same period.

Table 4.6: EU-25 Member States - country groups

'Major' EU-15 recipients	'Minor' EU-15 recipients	'New' Member States
United Kingdom	Sweden	Poland
France	Italy	Hungary
Germany	Austria	Czech Republic
Spain	Denmark	Romania
Belgium	Portugal	Slovakia
Ireland	Finland	Bulgaria
Netherlands	Greece	Lithuania
	Luxembourg	Estonia
		Latvia
		Slovenia

(source: author's own elaboration)

Examination of the data identifies three major recipients of FDI among the EU-25: these are the United Kingdom (a total of 8,343 projects), France (6,022) and Germany (3,491). Fewer but still a significant proportion of projects is received by Spain (2,124) and Belgium (1,812). After Spain and Belgium the next two major recipients of FDI are among the 'new' EU-10 countries: Poland (1,613) and Hungary (1,413). Another group of three countries that receive more than 1,000 investment projects over period 1997-2010 consists of Ireland (1,270), Netherlands (1,242) and the Czech Republic (1,152), but all remaining countries receive fewer than 1,000 projects. The performance of Romania (931) is comparable to that of Sweden (982) and Italy (812). A number of countries attract approximately 500 projects: these include Denmark (568), Slovakia (529), Bulgaria (470) and Portugal (422); Austria receives more (696). Finally, there is a group of countries that attract few FDI projects. These are Finland (251), Lithuania (239), Estonia (234), Latvia (181), Slovenia (118), Greece (100) and Luxembourg (90). The EU-15 countries receive 80% of all investment projects, of which 69% locate in the 'major' EU-15 recipients and 11% in the 'minor' EU-15 recipients.

The United Kingdom, France and Germany are by far the leading recipients of inward FDI to the EU-25, given that their combined share in EU-25 FDI equals 51% (they receive 17,856 out of 35,105 projects). This implies that these three countries capture approximately 73% of all projects received by the 'major' EU-15 recipients. However, there is a significant degree of over-time variation in the size of inward FDI received by these countries. A clear drop in inward FDI to the United Kingdom (top destination for inward FDI in the EU-25) occurs in 2002. Alongside Ireland, the United Kingdom is one of the two countries of the 'major' EU-15 group that receive less FDI in 2010 than in 1997; other countries that exhibit a similar pattern include Hungary and Latvia of the CEECs category. Unlike the United Kingdom, France and Germany receive substantially more FDI in 2010 than in 1997, meaning that they significantly narrow the gap with the United Kingdom. A definite upward trend in inward investment to Germany from 2004 onwards is interesting considering its proximity to the 'new' EU countries that acceded to the EU in 2004. Although the size of inward FDI to Germany in 2004 (163) is much lower than that received by France (490), by 2010 Germany (560) catches up with France (562).

Although total FDI figures identify the leading destinations for foreign investment in Europe in absolute terms, they fail to account for the economic size of a country. This is precisely the aim of the location quotient, which expresses the size of inward FDI relative to the economic size of the host country. Although in absolute terms the size of inward investment hosted by the United Kingdom is outstanding by comparison to other EU countries, with the location quotient figure ranging from 1.20 to 2.20 its performance relative to the economic size is no longer exceptional. France attracts approximately as many investment projects as expected based on its economic size (location quotient equals unity), but Germany 'under-performs' (0.45). Among the 'over-performing' countries, Ireland attracts my attention. With a location quotient figure in excess of one throughout the period 1997-2010, the value of location quotient for Ireland in 1997 equals 7.60 but it declines rapidly, reaching 1.92 in 2003. Thereafter, it oscillates around two. Another 'over-performing' country among the 'major' EU-15 recipients is Belgium, whose location quotient is stable over time and fluctuates around two. The 'under-performing' 'major' EU-15 recipients include Germany, Netherlands and Spain, whose location quotient figures tend to be less than unity.

Approximately 78% of the inward FDI to the 'minor' EU-15 recipients is captured by Sweden, Italy, Austria and Denmark but combined together these countries account for less than 9% of the EU-25 FDI. It is remarkable that in as much as Italy is considered one of the largest economies of the EU-25, it receives relatively little FDI and is classed as the 'minor' EU-15 recipient. The low point for Italian economy is year 2003, when only 23 projects choose to locate in Italy. The location quotient figure for Italy averages 0.17 over period 1997-2010 meaning that Italy attracts only 17% of projects relative to how much investment it is expected to receive based on its economic size. The relative performance of Greece is weaker, whose average location quotient figure over period 1997-2010 equals 0.16. In relative terms, this places both Greece and Italy among the two weakest performers. Greece also attracts little FDI in absolute terms and alongside Luxembourg receives least inward investment among the 'old' EU-15 Member States. Although Luxembourg receives little FDI in absolute terms, relative to its economic size the performance of Luxembourg is better than that of Greece and Italy given that its location quotient occasionally exceeds unity. Importantly, I recognise that Austria 'over-performs' in attracting FDI over period 1998-2002 but 'under-performs' in 1997 and over period 2003-2010. Given that the four countries neighbouring Austria joined the EU in 2004, it is plausible that Austria lost a share of FDI at the expense of the accession countries. On the whole, the 'minor' EU-15 recipients tend to 'under-perform' in attracting FDI as their respective location quotient figures often fall below one. With an average location quotient of 1.05, Sweden is the only country among the 'minor' EU-15 recipients that over the period 1997-2010 attracts more inward FDI than expected relative to its economic size.

Among the accession countries, the four largest economies (Poland, Hungary, the Czech Republic and Romania) account for 74% of inward investment to the CEECs; their combined share in the total EU-25 inward investment equals 15%. The pattern of over-time variation in inward FDI to Poland (the largest recipient of FDI among the CEECs) resembles that of the United Kingdom, in that Poland starts from a high level in 1997 but a drop in investment occurs in 2002. The FDI activity in Poland picks up thereafter and the increase in FDI coincides with the accession of Poland to the EU in 2004. Between 2003 and 2004 the inward FDI to Poland grows at a fastest rate and the largest number of investment projects is attracted by Poland in 2005 (180). By contrast, the size of inward investment to Romania starts from a low level in 1997 (in 1997 Romania receives 18 projects; Poland receives 142) but it rises sharply from 2000 onwards, reaching a peak in 2007 when Romania attracts 150 FDI projects (by comparison, Poland attracts 146 projects in 2007). The peak in inward FDI to the neighbouring Bulgaria occurs in 2006 when Bulgaria attracts 68 projects. This implies that the peak in FDI activity in Bulgaria and Romania occurs around the time of their accession to the EU in 2007. Other CEECs that receive largest inflow of FDI around the time of their EU accession include Estonia, Hungary and Slovakia that attract most investment projects in 2004, and the Czech Republic (largest inflow in 2005).

Among the 'new' EU-10, the majority of countries receive more inward investment than expected by their respective economic size. The only 'new' EU-10 country that temporarily 'under-performs' is Slovenia before its EU entry in 2004. The size of inward investment to Slovenia is very low before 2004 (an average of three projects per annum over the period 1997-2003) but it is higher after the accession in 2004 (an average of fourteen projects per annum over the period 2004-10). The leader among 'over-performing' accession countries is Estonia, which in 2001 receives sixteen times more investment than it is expected judging on its economic size. Admittedly, the location quotient for Estonia declines thereafter, reaching a minimum of 1.69 in 2007 but it remains to be defined as an 'over-performer'. Other highly performing 'new' EU-10 countries include Bulgaria (maximum location quotient equals 12.70 in 2004) and Slovakia (9.88 in 2004). The relative performance of Hungary, which in 1998 attracts ten time more investment projects than expected by its economic size, is characterised by a declining trend. At its lowest point, the location quotient figure for Hungary reaches a minimum of 2.87 in 2009. However, the average location quotient for Hungary over 1997-2010 remains high at 6.24. Poland, which alongside Hungary is the largest recipient of inward FDI among CEECs in absolute terms, performs less favourably in relative terms. To be precise, the location quotient figure for Poland fluctuates around two.

To summarise, heterogeneity exists in the amount of FDI going to different EU-25 Member States. Although the 'old' EU-15 countries receive the majority of investment in absolute terms, when it is expressed relative to economic size their superior performance in attracting FDI is no longer evident. In particular, the location quotients usually exceed unity for most 'new' EU-10 Member States in most years. On the other hand, the relative performance of the 'old' EU-15 countries is varied. Some 'over-perform' as hosts of inward FDI, most notably Ireland, but others receive far fewer investment projects than might be expected, i.e. Greece and Italy. Interestingly, for a lot of the accession countries that joined the EU in 2004 and 2007, the peak of their inward investment activity occurs around the time of their EU entry.

4.4.3 Economic Geography of FDI by Country

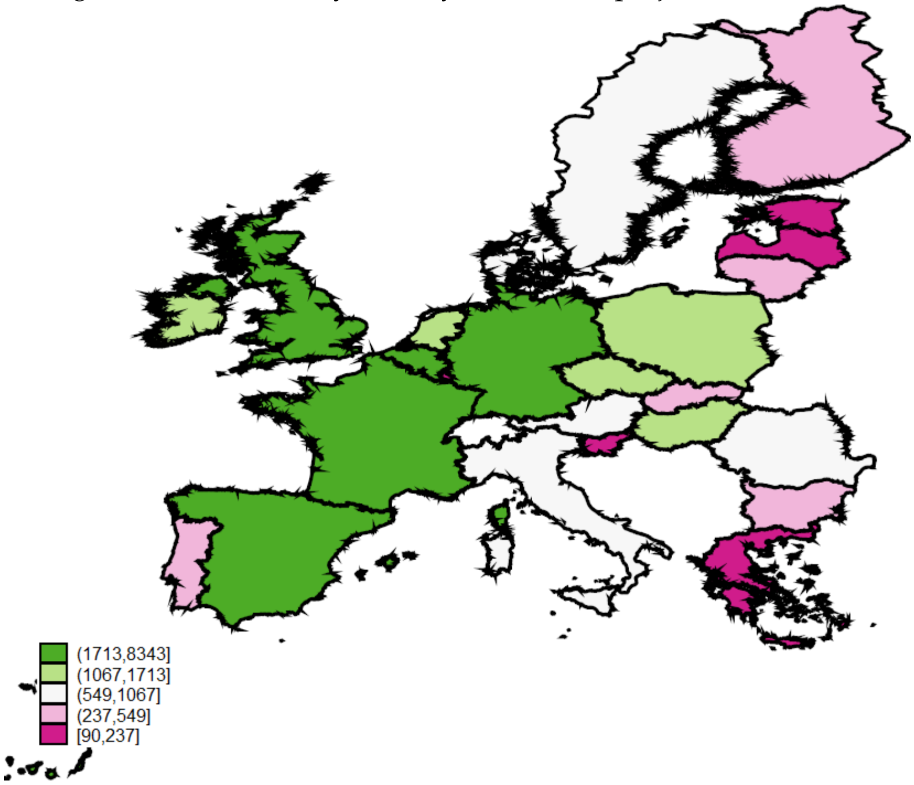
In this section I undertake a visual inspection of the pattern of inward FDI in the EU-25 countries using maps. A full examination of the economic geography of FDI location requires an econometric analysis, but it is believed that there is added-value in looking at the descriptive statistics of FDI data and illustrating the spatial distribution of FDI.[13] This enables the spatial pattern of FDI location across the EU-25 to be identified, before a formal empirical analysis is conducted. These are based on the number of investments in each country, based on the FDI data that is sourced from the EIM. Unless otherwise stated, the classes are based on quintile FDI amounts.

Figure 4.4 shows the number of FDI projects in each country over the period 1997-2010. It shows the heterogenous performance of EU countries in attracting FDI. It reaffirms the findings of section 4.4.2 in that the major recipients of FDI in the EU-25 are (in descending order): the United Kingdom, France, Germany, Spain and Belgium. None of these countries belongs to the 'new' EU-10 category. The lowest quintile includes five relatively small economies (in ascending order): Luxembourg, Greece, Slovenia, Latvia and Estonia. The best-performing recipients of FDI among the 'new' EU-10 are the Czech Republic, Hungary and Poland, which belong to the fourth quintile. The remaining countries of the fourth quintile include the Netherlands and Ireland. Overall, it mainly reflects country size, so that the large economies of the EU-25 belong to the highest quintile and the small economies to the lowest quintile.

To examine the impact of the fifth enlargement on the size of inward FDI and its location within the EU, the mean annual number of FDI projects in the EU-25 countries is calculated for two periods: 1997-2003 and 2004-10 (i.e. before after the 2004 EU enlargement). These data are graphed in Figures 4.5(a) and 4.5(b). The discussion that follows focuses on the five quintile classes before and after the enlargement. In fact, the country composition of the quintiles is broadly unchanged between periods 1997-2003 and 2004-10, and it closely resembles the quintile composition for total FDI series that was discussed earlier. The composition of the highest quintiles remains the same in both periods, comprising the United Kingdom, France, Germany, Spain and Belgium. The leading FDI recipient, the United Kingdom, receives an average of 533 projects per annum before the enlargement and 659 afterwards. Again, the spread between the lower and upper bounds is greatest for the highest quintile. Owing to greater

[13] All maps used in this section are based on a template sourced from GISCO. All files are available at `http://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units`.

Figure 4.4: Total FDI by country: number of projects (1997-2010)



(source: GISCO NUTS2006, ©EuroGeographics for the administrative boundaries, author's own elaboration)

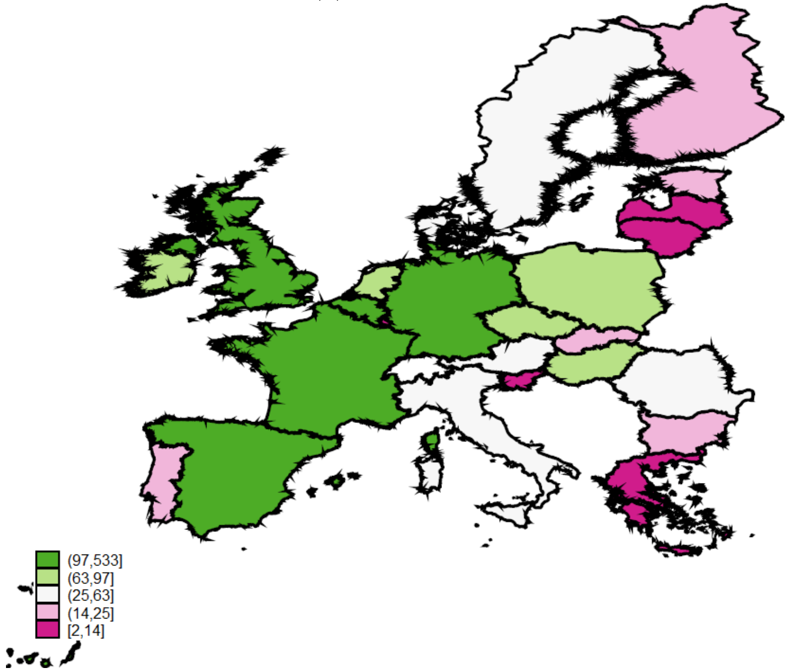
size of inward FDI after 2004 the quintile lower and upper bounds shift up for all five quintiles.

The composition of the fourth quintile features Czech Republic, Hungary, the Netherlands and Poland in both periods. Ireland, which was in the fourth quintile country prior to 2004, drops to the middle quintile after 2004, and is replaced by Romania, which was in the middle quintile. In addition to Ireland and Romania, the other countries that move between quintile classes are Austria (it drops from the third to second quintile), Estonia (from the second to the lowest), Lithuania (from the lowest to the second) and Slovakia (from the second to the middle quintile). From this perspective, Romania, Slovakia and Lithuania are the three countries that improve their relative position as recipients of inward FDI after the fifth enlargement in 2004, in that they move to a higher quintile. On the other hand, the relative performance of Ireland, Austria and Estonia worsens as they fall to a lower quintile.

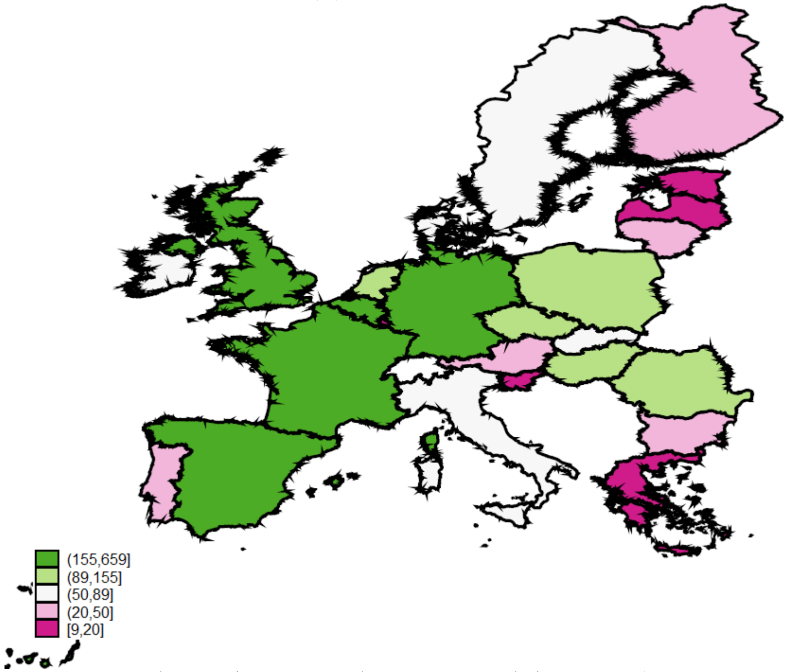
As a second analysis, the change in the mean annual FDI is examined. The rela-

Figure 4.5: Mean FDI per annum by country

(a) 1997-2003



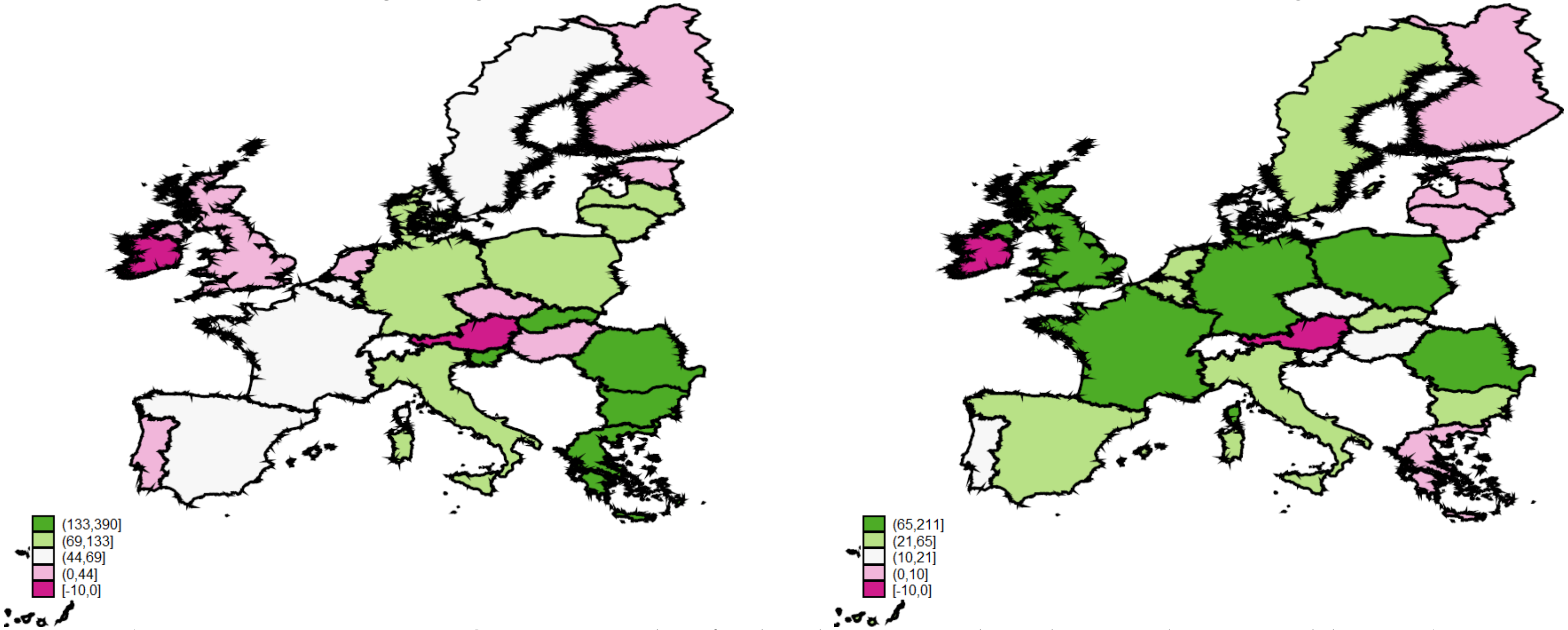
(b) 2004-2010



(source: GISCO NUTS2006, ©EuroGeographics for the administrative boundaries, author's own elaboration)

Figure 4.6: Change in mean FDI per annum by country (1997-2003 and 2004-2010)

(a) Percentage change (b) Absolute change



(source: GISCO NUTS2006, ©EuroGeographics for the administrative boundaries, author’s own elaboration) tive and absolute changes in the mean annual FDI between the pre- and post-accession periods (i.e 2004) are mapped in Figures 4.6(a) and 4.6(b). As changes are now analysed the classes are defined differently. The bottom class is now all countries for which the change is negative, while the countries that experience a positive change are split into four classes. It means the countries that have a negative change in FDI are easily distinguishable. It is important that both the percentage and absolute change figures are consulted as the percentage change is 'inflated' whenever the starting point is low. For instance, if Greece and the United Kingdom were both to get an extra ten FDI projects per year, the percentage change is significantly higher for Greece because it starts from a much lower base.

The maps reaffirm that Austria and Ireland are the countries that experience a negative growth rate in FDI. In the case of Figure 4.6(a) it shows that the negative growth rate is strongest for Ireland, which loses 9.6% of inward FDI after 2004, which equates to a decline in mean annual FDI in magnitude of 9.1 projects per year - a substantial loss. All the remaining EU-25 countries gain more investment after the enlargement. In descending order of the percentage increase in mean annual FDI, these are Slovenia (390%), Romania (312%), Slovakia (198%), Bulgaria (170%) and Luxembourg and Greece (both 133%). The lowest gainers in ascending order are Hungary (12.8%), Estonia (22.9%), the United Kingdom (24%), the Czech Republic (27%), the Netherlands (27.1%), Finland (43.7%) and Portugal (43.9%).

The examination of the absolute change in Figure 4.6(b) supports the concern raised above. Although the percentage change in FDI in the United Kingdom is weak, it gains an average of 126 projects per annum after 2004 and is in the highest quartile of the distribution. The other countries in the top quartile are France (a gain of 211 projects), Germany (160), Romania (81) and Poland (69). The bottom quartile in ascending order are Estonia (3.4), Luxembourg (5.1), Greece (5.7), Finland (6.4), Latvia (6.7) and Lithuania (9.6). It is evident that the composition of quartile classes of the absolute change distribution differs significantly from that of the percentage change distribution. On the one hand, Greece and Luxembourg have the highest percentage change in FDI but low absolute changes, while the United Kingdom does the opposite. On the other hand, a group of countries such as Romania (strong growth), Estonia and Finland (weak growth) do not move between the classes, regardless of whether the absolute or percentage change distribution is considered. It appears that Romania, with the percentage change of 312% and an absolute change of 81 projects is the country that gains most, even though it did not join the EU until 2007.

4.4.4 Economic Geography of FDI by Region

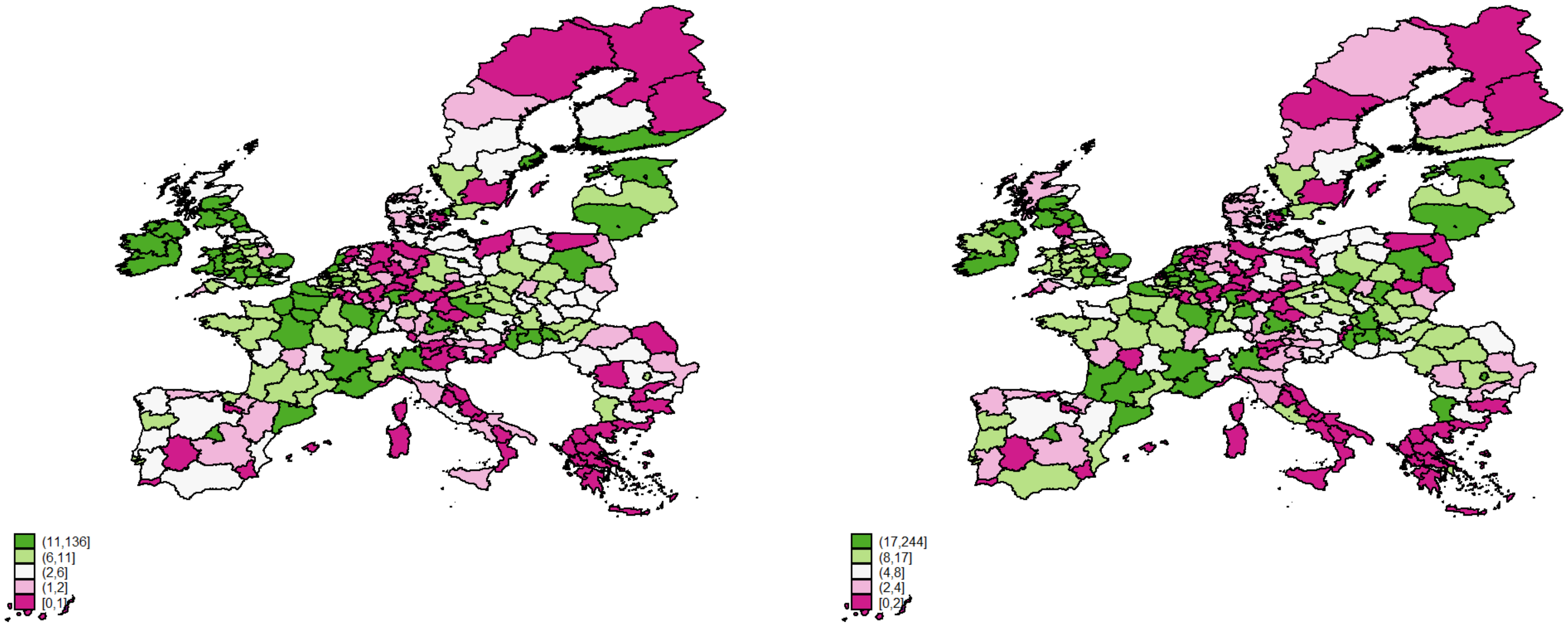
The national data hide a lot of regional variation within a country (Artige and Nicolini, 2005) and to broaden the analysis the spatial distribution of investment activity in the EU-25 is analysed at the NUTS2 region level. As in the previous section, the mean annual number of FDI projects for 1997-2003 (Figure 4.7(a)) and 2004-10 (Figure 4.7(b)) is examined to contrast the pre- and post-enlargement performance of regions. These maps use quintile classes, and show that non-negligible differences exist in the number of inward FDI projects that the regions receive. To assess country performance in attracting FDI I previously identified countries that moved between classes, but in the case of the 260 regions I focus on those that received a lot of FDI before and after 2004, and those that received a small amount. I also systematically group regions into categories such as 'old' EU-15 and 'new' EU-10 regions, capital city regions and border regions, and examine what percentage of regions in the respective categories increase or decrease their FDI flows after 2004. The relative (Figure 4.8(a)) and absolute (Figure 4.8(b)) regional change in the mean annual FDI between the pre- and post-enlargement periods are also shown on maps to identify the 'winners' and 'losers' of enlargement.

Over the period 1997-2003, the largest recipient of FDI is London with 136 projects per annum, which is a NUTS1 region, while the second strongest performing region is Southern and Eastern Ireland, which includes Dublin and has an average of 75 projects per annum. Other large recipients of FDI between 1997 and 2003 are Ile-de-France, with Paris (68 projects per annum), Cataluna, with Barcelona (64) and Kozep-Magyarorszag, with Budapest (38), which is the best performing region of the 'new' EU-10 countries. The list of largest recipients of FDI after 2004 is similar, and includes London (244), Ile-de-France (184), Rhone-Alpes, with Lyon (78), Southern and Eastern Ireland (70) and the capital region of Spain, Comunidad de Madrid (67), which is followed closely by Cataluna (65). Again, the 'new' EU-10 region that receives largest FDI flow after 2004 among CEECs is Kozep-Magyarorszag (44). This demonstrates that the regions hosting capital cities often make the top end of the FDI distribution and tend to receive a substantial amount of FDI, but often capital cities are chosen as the hosts of company headquarters within the respective countries.

Some capital regions do not perform so well. The three weakest performing capital regions include Attiki, with Athens, Luxembourg (Grand-Duche) and Zahodna Slovenija, with Ljubljana, which each failed to achieve more than nine projects per annum throughout the period 1997-2010. However, on the whole Greece, Luxembourg and Slovenia receive small amount of inward FDI. There is also a tendency for the capital region to emerge as the top destination for inward investment in their respective countries, which holds for most of the EU-25 Member States with the exception of Bel-

Figure 4.7: Mean FDI per annum by region

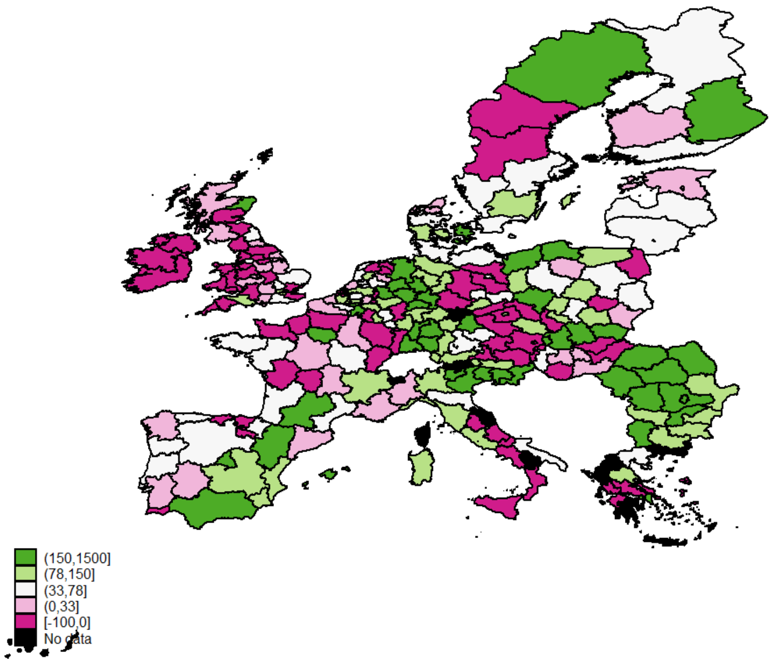
(a) 1997-2003 (b) 2004-2010



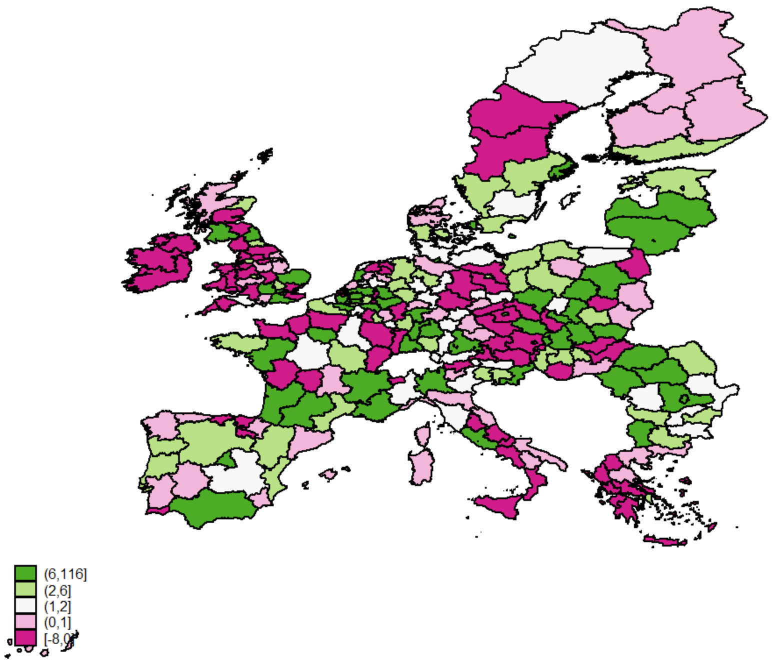
(source: GISCO NUTS2006, ©EuroGeographics for the administrative boundaries, author's own elaboration)

Figure 4.8: Change in mean FDI per annum by region (1997-2003 and 2004-2010)

(a) Percentage change



(b) Absolute change



(source: GISCO NUTS2006, ©EuroGeographics for the administrative boundaries, author’s own elaboration) gium, Germany, Italy, Slovakia, Slovenia and Spain.[14]

The three Baltic countries of Estonia, Latvia and Lithuania perform favourably well as destination for inward investment when a comparison is made with other NUTS2 regions rather than countries.[15] Another 'new' EU-10 country that performs well is the Czech Republic, where most regions are in the fourth and the highest quintile./footnoteIt is worth noting that alongside Slovenia, the Czech Republic is the westernmost country of the 'new' EU-10, which may have contributed to its inward FDI. Although I consider the regions that belong to the two highest quintiles as the strong performers in attracting FDI, the lower and upper bounds of the top quintile are wide apart, suggesting strong heterogeneity in annual FDI between regions in this class. The highest quintile of the mean annual FDI distribution for 1997-2003 period ranges from 11 to 136 projects, but for 2004-10 these are 17 and 244 projects.

A lot of regions receive few investment projects. In the pre-enlargement period, 20% of the 260 NUTS2 regions receive at most one project per annum. After 2004, 20% of regions receive at most two projects per annum. The weakest performing regions of the lowest quintile include regions of Greece (with the exception of capital region, Attiki) but also the regions of the Italian Mezzogiorno and northern Finland and Sweden. Even though Germany is a major host of inward investment in the EU-25, it is astonishing that a substantial proportion of German regions belong to the lowest quintile of the FDI distribution, so its regional performance is much weaker. This highlights that variations at the regional level may be hidden at the country level.

To determine the degree to which the performance of regions improves after the enlargement in 2004, the percentage (Figure 4.8(a)) and absolute (Figure 4.8(b)) change in mean annual FDI per annum are examined. A small number of regions feature in the 'No data' category. This is because these regions do not receive FDI before 2004, so their percentage change in mean FDI cannot be calculated. Table 4.7 shows that for the EU-25 as a whole, nearly 70% of regions increase their FDI flows, nearly 23% experience a decrease in FDI, while 8% of regions see no change in FDI. In numerical terms, this translates to 59 out of 260 EU-25 regions experiencing a decline in mean annual FDI per annum, and further 20 regions seeing no change.[16]

[14]In Belgium, the NUTS2 Region de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest 'loses' to Prov. Antwerpen; in Germany, Berlin is outperformed by Darmstadt, with Frankfurt am Main; in Italy, Lazio, with Rome attracts less FDI than Lombardia, with Milan; and in Spain, between 1997 and 2003 Cataluna, with Barcelona attracts more FDI than the capital region of Madrid, although it is outperformed by Madrid in the period 2004-10. In Slovenia, two regions, Vzhodna Slovenija and Zahodna Slovenija, show a similar performance in attracting FDI. Finally, in Slovakia the capital region Bratislavsky kraj performs worse than its neighbouring region Zapadne Slovensko, with Nitra.

[15]Estonia, Latvia and Lithuania are each a single NUTS2 region owing to their small population size. Therefore, all three are classed as capital regions.

[16]Nine of these regions do not receive a single investment project throughout the period 1997-2010.

Table 4.7: Before and after 2004: regional FDI to the EU-25 regions

Region type	Number of regions	Number of regions: FDI↑	Number of regions: FDI ↓	Number of regions: FDI ¬Δ	Share of regions: FDI↑	Share of regions: FDI ↓	Share of regions: FDI ¬Δ
EU-25 regions	260	181	59	20	69.62%	22.69%	7.69%
'Old' EU-15 regions	206	137	50	19	66.50%	24.27%	9.22%
'New' EU-10 regions	54	44	9	1	81.48%	16.67%	1.85%
Capital regions (EU-15)	15	13	2	0	86.67%	13.33%	0.00%
Capital regions (EU-10)	10	10	0	0	100.00%	0.00%	0.00%
BORDER regions (EU-10)	12	9	3	0	75.00%	25.00%	0.00%
BORDER regions (EU-10) (excluding the Czech Republic)	8	8	0	0	100.00%	0.00%	0.00%
BORDER regions (EU-15)	14	8	4	2	57.14%	28.57%	14.29%

(source: author's own elaboration)

The proportion of regions that have higher FDI inflows after 2004 equals 66.5% for EU-15 regions and 81.5% for EU-10 regions. This means that on the whole, the likelihood of growth in FDI inflows in the post-accession period is higher for the regions of the accession countries. As far as the capital regions are concerned, FDI inflows to the capitals of the EU-15 are generally higher after 2004, with the exception of the Dublin and Vienna regions, where FDI inflows are lower. This equates to 87% of the capital regions of the EU-15 receiving more inward FDI after 2004. In contrast, all of the capital regions of the EU-10 see increased level of inward FDI in the post-accession period.

Table 4.7 also singles out a set of border regions within the 'new' EU-10 and the 'old' EU-15 Member States, which are contiguous to the (former) West-East border that prior to the fifth enlargement in 2004 separated the EU (i.e. EU-15) and the non-EU (i.e. EU-10) countries. Within the group of EU-10 border regions, three quarters increase the size of investment after 2004. This proportion is lower than it is for the EU-10 regions as a whole, although it would seem plausible that the proximity to the markets of the EU-15 would lead to a substantial growth of investment after the accession. Upon closer examination of the maps (i.e. Figure 4.8(a) and Figure 4.8(b)), I identify a cluster of border regions within the Czech Republic with negative (or non-positive) FDI growth rates. By drawing these regions out of the definition of a border region, I find that FDI inflows increase in all border regions within the 'new' EU-10 in the post-accession period. In that respect, the economic geography of inward FDI to the regions of the Czech Republic differs from that of other EU-10 countries.

The ratio of regions where FDI is higher after the enlargement in 2004 to regions where it is lower is less favourable for the EU-15 border regions, and is equal to 2:1. From a total of 14 border regions of the EU-15 contiguous to the West-East border, eight regions receive more FDI after 2004, four receive less FDI, and in two regions the size of the inward FDI does not change between pre- and post-accession periods. The four EU-15 border regions that 'lose' inward FDI after 2004 include Burgenland and Oberosterreich in Austria, and Brandenburg - Nordost and Brandenburg - Sudwest in Germany. Among the eight EU-15 border regions that attract more FDI after 2004, Friuli-Venezia Giulia region in Italy starts from a low base and achieves a percentage increase in mean FDI per annum equal to 1500%. In absolute terms, this translates to an extra two projects per annum. Across the border in neighbouring Slovenia, inward FDI to Vzhodna Slovenija and Zahodna Slovenija regions increases by a factor of 12.5 and 3 respectively, resulting in an addition of more than six projects per annum in Vzhodna Slovenija and more than four projects per annum in Zahodna Slovenija.

The regions that gain the most FDI projects after 2004 in absolute terms include the French capital region Ile-de-France, that gains an extra 116 FDI projects per year, followed closely by London (108). After Rhone-Alpes (45) and Comunidad de Madrid (44), in fifth position the Romanian capital region of Bucuresti-Ilfov attracts 32 projects per annum more after 2004, which is the largest absolute increase for the 'new' EU-10 (a more than fourfold increase). This demonstrates a strong turnaround in investor confidence regarding some CEEC regions. With the exception of the five regions of the Czech Republic, three regions of Hungary and two regions of Poland, all of the remaining regions of the CEECs receive more FDI after 2004. All but one region in Bulgaria, all Romanian, Slovakian and Slovenian regions, more than double the number of inward investment projects after 2004.

Last but not least, an observation can be made about distance. Consider Bialystok, the regional capital of NUTS2 region Podlaskie in north-east Poland, and Cluj-Napoca, the capital of the Nord-Vest region in Romania. Both are located about 600km away from the West-East border. Over 1997-2003 both received broadly similar mean annual FDI levels and all but one project were manufacturing investment. Over 2004-10 investment inflows to these regions diverged substantially. While FDI in Podlaskie contracted, Nord-Vest experienced an average gain of 12 FDI projects per annum, which equates to a 654% increase in its FDI. Although both regions have a similar position relative to the West-East border, a lot more inward FDI chose to locate in the westernmost region of Romania rather than easternmost region of Poland. The three most represented sectors in Nord-Vest Romania after 2004 were automotive components, electronics, and machinery and equipment. Although all three sectors represent manufacturing investment, the Nord-Vest region also attracted some service sector FDI after 2004, which with the exception of a single service sector project Podlaskie struggled to achieve. What makes this result more surprising is that while Podlaskie became part of the EU in May 2004, Nord-Vest did not formally join until January 2007. This suggests that the effect of EU membership and distance from the West-East border on FDI location may not be homogenous across the CEECs.

4.5 Data Collection

The FDI data are project-specific information (i.e. case-specific), but for the purpose of carrying out the empirical analysis it is essential to supplement the EIM data with location-specific information (i.e. alternative-specific). As the set of location choices encompasses EU Member States, the main choice of location data provider is Eurostat - the Statistical Office of the European Communities. Data were collected on a range of location factors that potentially influence the decision to invest at both the national and region level (NUTS2). Data were sought for each year over 1996-2010, giving a year's worth of lagged explanatory data in the regression analysis. However, the gradual process of EU enlargement means the availability of the statistical data tends to be shorter in time span for the 'new' Member States than for the 'old' Members, so that it is incomplete for some countries, particularly at the regional level. The purpose of this section is to describe the data. To facilitate this, the discussion is organised around five categories, as suggested by the review of Chapter 2:

1. Market potential variables
2. Resource variables
3. Macroeconomic variables
4. Industry variables
5. Additional variables

The first two correspond to motives of FDI identified by Behrman (1972) and formalised by Dunning (1993), and capture profit and cost-driving neoclassical factors. The third captures location factors from the institutional perspective, and the fourth focuses on the agglomeration economies of the NEG theory. A fifth category encompasses those regressors that are not formally considered within the theoretical literature on location, but that are used to examine the regional spatial distribution of FDI activity. This is how the location data are organised in the empirical analyses. Information on the variables is summarised in tables at the end of each section. Three auxiliary dummies ('dummy: wage rate', 'dummy: Bulgaria-Romania' and 'dummy: Herfindahl index') are mentioned briefly and these are created for the purpose of dummy variable adjustment. This data cleaning technique popularised by Cohen and Cohen (1975) as a missing-indicator method involves plugging in an arbitrary value (most frequently, zero) for all missing data and including an auxiliary dummy variable in a regression model.

4.5.1 Market Potential Variables

A decision to invest in a foreign country is often driven by market-seeking motives. Multinational firms are attracted to a location if it is where they can secure new markets and profit from a high demand for their products and services. Among the market potential controls I include: total real GDP as the size variable and a measure of internal market demand; real GDP per capita to gauge the richness of the local population; population density to measure the degree of urbanisation and hence the size of the consumer base; and real GDP growth to assess the state of the economy. In the context of inward investment to the EU I also include a dummy variable for EU membership, capturing the motivation of MNEs to invest in the EU for access to the Single Market. I also include an East dummy to capture location preferences between the 'old' and 'new' EU and a 'new' EU dummy to capture the preferences to locate in the 'new' EU countries after the accession. Finally, in addition to the controls on internal market potential, adjacent market GDP and a peripherality index are constructed to capture external market potential. I now discuss these variables in greater detail, and a summary of the variables is given in Table 4.8.

Access to the EU Single Market may be an important driver of a multinational firm's decision to invest in the EU. As countries join the EU, they may become a more attractive destination for inward FDI. This is because firms may locate in the new accession countries as an 'export platform' to take advantage of lower trade costs in the presence of factor price differentials (Krugman and Venables, 1990), or because there are no longer incentives for 'tariff-jumping' (Motta and Norman, 1996), causing firms to co-locate their activities within an enlarged market (Neary, 2002). These are effects directly associated with the accession, and to test this a dummy variable is constructed for 'EU membership' that takes a value of one for all years if a chosen location is within the EU, but zero otherwise. For the group of 'old' EU Member States the EU membership dummy is equal to unity because these countries remained inside the EU throughout the whole period between 1997 and 2010. For the 'new' EU Member States, the dummy is equal to zero prior to their membership and one thereafter.[17]

It is of interest to know if the fifth enlargement has shifted the location pattern of FDI within the EU, for which two dummy variables are constructed. The first is 'East', which is equal to one for the group of 'new' EU Member States before and after their EU accession in 2004 and 2007. Essentially, an East dummy determines how different is the perception of the 'new' EU Member States vis-à-vis the 'old' EU-15. The second is called 'new' EU', which is equal to one for the group of 'new' EU Member States

[17] The rule that I apply to assigning an appropriate value for the EU membership dummy in the enlargement year is to determine if the enlargement occurs within the first or second half of a year.

Table 4.8: Market potential variables: summary

Variable	Description	Source
EU membership	Dummy variable = 1 for location j in an EU Member State; zero otherwise	author's own construction
East	Dummy variable = 1 for a location j in a 'new' EU Member State (joined during the fifth EU enlargement in 2004 and 2007) before or after the fifth enlargement; zero otherwise	author's own construction
'New' EU	Dummy variable = 1 for a location j in a 'new' EU Member State (joined during the fifth EU enlargement in 2004 and 2007) after the fifth enlargement; zero otherwise	author's own construction
Internal market GDP	Total GDP at constant prices, chain-linked volumes, reference year 2005 (at 2005 exchange rates); expressed in millions of euro (country-level analysis) or billions of euro (regional-level analysis)	Eurostat
Income per capita	GDP per capita at constant prices, chain-linked volumes, reference year 2005 (at 2005 exchange rates); expressed in euro (country-level analysis) or thousands of euro (regional-level analysis)	Eurostat
Peripherality index	Distance-weighted external market size index for an individual country j calculated as $\sum_{l \neq j}(\frac{GDP_l}{D_l} \times \frac{1}{\omega})$, where D is within country distance of country l (see: Amiti and Javorcik, 2008) and ω is a distance between the capital of county j and the capital of country l; GDP is measured at constant prices, reference year 2005 (at 2005 exchange rates) and expressed in millions (country-level analysis) or billions (regional-level analysis) of euro	author's own construction; Eurostat (data on land area and GDP), AA Route Planner (data on distance)
Adjacent market GDP	External market size index calculated for an individual region j as $\sum_{ADJACENT\_NUTS2} \frac{GDP_l}{D_l}$, where $l \neq j$ and D is within country distance of country l (see: Amiti and Javorcik, 2008); GDP is measured at constant prices, reference year 2005 (at 2005 exchange rates) and expressed in billions of euro (regional-level analysis)	author's own construction; Eurostat (data on land area and GDP)
Population density	Number (country-level analysis) or thousands (regional-level analysis) of persons per one squared kilometre of land area	Eurostat
Growth rate	Growth rate of real GDP (national currency for country-level data, euro for regional-level data); expressed as % (country-level analysis) or as a fraction (regional-level analysis)	Eurostat

(source: author's own elaboration)

after membership. The aim of including the East and 'new' EU dummies is to investigate how on a global scale of the EU-25 countries recent entrants performed against the incumbent 'old' EU-15 Member States in attracting inward investment. Given the examination of the FDI data in section 4.4 I expect a negative sign on the East dummy but a positive sign on 'new' EU dummy.

Market potential reflects the market size and serves as a proxy for market demand. Pioneered by Harris (1954), who compares market potential to "an abstract index of the intensity of possible contact with markets" (p. 321), the market potential of location j is defined as the sum of market demands in accessible locations l divided by the distances between location pairs j and l, ω: $\sum_{l \neq j}(\frac{GDP_l}{\omega})$. Essentially, the Harris' market potential highlights that investors are not only interested in the internal market demand of a host location but in the external market demand of other accessible markets. The internal market demand of countries and regions is captured by real GDP ('market size') and real GDP per capita ('prosperity'), but the external market demand is captured either by a peripherality index (country analysis) or the adjacent market GDP (regional).

Real Gross Domestic Product (GDP) is frequently used in the literature to control for the internal market demand (e.g. Bevan and Estrin, 2004; Head and Mayer, 2004) and it is captured by the 'internal market GDP' variable. GDP is the value of the final goods and services produced in a country or region, regardless of whether it is attributable to resident or non-resident employed persons.[18] GDP is also an indicator of economic development and when measured at the level of regions, it also picks-up the Objective 1 regions that benefit from the Cohesion and Structural Funds. The GDP data are expressed at constant market prices in euros, where the national currencies are converted into euros using the nominal exchange rate. For the Eurozone members this is the official euro fixed conversion rate. The euro series does not fully account for the price differentials between countries.

Given that the larger economies tend to be major recipients of FDI, a positive sign is expected on the coefficient of the internal market measure. This scale effect is a shortcoming of total GDP measure (Alegria, 2006). This is because the local market demand, and hence market-seeking FDI activity, is greater in larger geographic areas not only because of a higher GDP but because of a larger population. The positive correlation between total GDP and population is the source of the scale effect bias. Furthermore, Head and Mayer (2004) argue that total GDP is not an adequate measure of market demand, especially when considering disaggregated spatial units. To address this weakness I include adjacent market GDP and the peripherality index to capture the

[18]Eurostat defines resident producer units as economic units whose centre of economic interest lies within a country's economic territory.

effect of the external market demand.

Alongside real GDP, I also include real GDP per capita (formally labelled as 'income per capita') to examine how the prosperity of the local market affects the location of inward investment. While GDP is an indicator of economic development, GDP per capita is the proxy for the wealth and living standards of the population. For the purpose of comparability I use the euro-series of GDP per capita, which is expressed at constant market prices. I expect that relatively richer economies receive more FDI projects, so that the sign is positive, although the accession to the EU of less-prosperous countries could lead to a reversal of this.

The country-level measure of external market demand is a modification of the 'peripherality index' of Keeble *et al.* (1981, 1988), which is based on the gravity model. The central assumption is that the potential for economic activity at a location is proportional to the volume of economic activity ('mass') at another economic centre and inversely related to the distance between them (Copus, 2000). All economic centres in a system may affect the potential for economic activity in a location, as in Figure 4.9.

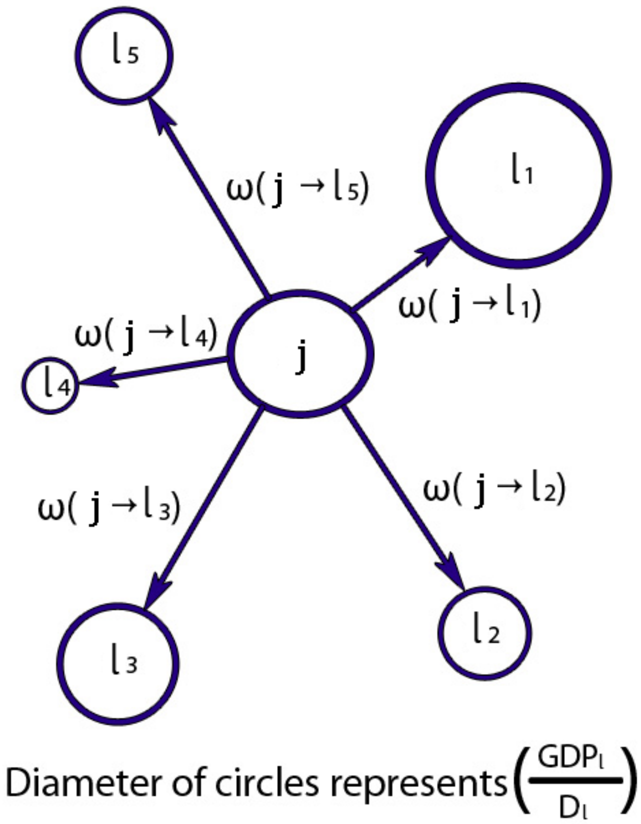
The 'mass' variable proposed by Keeble *et al.* (1981, 1988) is the regional GDP. I adopt a modification of this peripherality index by weighting the 'mass' of an economic centre by its approximate economic size, D. Unlike disaggregated spatial units such as NUTS2 regions, whose size is bounded by minimum and maximum population size thresholds, substantial heterogeneity exists in the economic size of countries. To ensure the comparability of the external market demand measure, it is important to control for the size of an economy as failing to do so results in a disproportionate boost to an external market demand measure for those countries that neighbour other large economies. The term D that weights the economic size of countries is defined as the within location distance and follows the work of Amiti and Javorcik (2008). As in Leamer (1997) it is assumed that the locations are circular, in which case the within location distance term, D, can be thought of as a radius - a distance from the middle point of a circular location to the boundary:

$$D_j = \sqrt{\frac{Area_j}{\pi}}, \tag{4.14}$$

where:
D_j - within province distance of a location j
$Area_j$ - total land area (in squared kilometres) of a location j.

The peripherality index is interpreted as a gravity-weighted measure of external market potential. An alternative interpretation is that it is a GDP-weighted average market distance of each country to its European partners. The economic 'mass', GDP,

Figure 4.9: The concept of peripherality index - illustration



(source: author's own elaboration, based on Copus, 2000)

weighted by size that is represented by diameter of circles in Figure 4.9, ensures that smaller economies add significantly to the size of external market demand of a country j as long as their economic size, GDP is large relative to the geographic size, D. The economic centres contribute relatively less to the size of the external market demand of a country j, as the distance, ω, from that country j increases. Lower values of the index imply more peripheral location. Formally, the peripherality index for an individual country j is calculated as:

$$\text{Peripherality index}_j = \sum_{l \neq j} \left(\frac{GDP_l}{D_l}\right) \times \frac{1}{\omega}, \tag{4.15}$$

where:
GDP_l - total GDP of country l
D_l - within country distance of a country l (see: Amiti and Javorcik, 2008)
ω - distance between the capital of country j and the capital of country l, in kilometres.

The distances in equation (4.15) are obtained using the AA Route Planner. As compared to the application of distances between 'functional centroids' of locations (largest towns or cities) derived from a simplified model of major road and ferry network used by Keeble *et al.* (1981, 1988), the advantage of using the AA Route Planner for estimating the distance between locations is its functionality of balancing between the shortest and the quickest route between two locations. As the distance variable used to calculate the peripherality index is typically the quickest route by motorways, my peripherality index implicitly incorporates the approximate travel time. For each country the capital city is treated as its 'functional centroid'. A shortcoming of the AA Route Planner is that it does not calculate the distance between between Cyprus and Malta and all other EU Member States, so that these are excluded from the peripherality index, but they are small island economies with their own markets.

It is possible to calculate the peripherality index for all 260 NUTS2 regions using the same methodology, but the scope of this task is extremely large.[19] Instead, I use an alternative external market potential of region j that accounts for market demand of adjacent regions. As I deal with small spatial units, I feel it is no longer necessary to account for the distance, ω, between regional city pairs given that I assume that only a set of adjacent regions rather than all economic centres present in the system affect the size of the external market demand for the regions. I continue to use the term D to weight external market demand of a neighbouring region l by its approximate size. The regional market potential that I subsequently refer to as the 'adjacent market GDP' is calculated for a region j as:

$$\sum_{\text{ADJACENT\_NUTS2}} \frac{GDP_l}{D_l}; j \neq l. \tag{4.16}$$

While establishing the set of neighbouring regions for any landlocked NUTS2 region is simple and involves using maps to look for pairs of regions that share a common border, it is often a matter of dispute for the coastal NUTS2 regions. I decided to treat two regions separated by the sea as adjacent if transport links between them are well developed (e.g. the connection of Kent with Nord - Pas-de-Calais region by Eurotunnel) or if they are deemed to have strong links (e.g the Greek mainland and Greek islands). Nevertheless, this is an area subject to dispute and criticism as it is unclear when the links between two regions start and cease to be strong enough to treat them as neighbours. Finally, as mentioned in the earlier sections of this chapter, it is impossible to distinguish between the investment project locating in Inner and Outer London,

[19] To calculate the regional peripherality index for 260 NUTS2 regions requires checking the road distance for a total of 259 + 258 + 257 + . . . + 131 + 130 + 129 + . . . + 3 + 2 + 1 = 33, 670 city pairs.

which led to a decision to merge these NUTS2 regions. This will affect the size of the regional market potential for the NUTS regions of Bedfordshire and Hertfordshire, Essex, Berkshire, Buckinghamshire and Oxfordshire, Surrey, East and West Sussex, and Kent, which neighbour this NUTS1 region.

Among market potential variables, I also include 'population density', which is measured by the number of inhabitants per land area. Population density reflects the degree of urbanisation but also indirectly congestion, so that its effect on the location of FDI activity can be considered from both these perspectives. For the purpose of calculating this, population is defined as all persons permanently residing in the territory of the country, be it nationals or foreigners. Individuals temporarily absent from a territory are included, as are those staying or intending to stay for a minimum duration of one year. As a rule, foreign students and members of foreign armed forces stationed in a territory are excluded from the population count.

The urbanisation perspective emphasises that the more densely populated areas have a location advantage, as the firms serving these markets can profit from a high level of demand that is concentrated in geographical space, reducing transport costs, so that a positive sign is expected. However, from the congestion perspective, population density may exert a negative influence on investment, as at some point the pressure on the transport infrastructure and resulting congestion might outweigh the benefits of agglomeration. Further, in more densely populated areas individuals and firms start to compete for limited land space, pushing up land costs, so that a negative relationship exists. The empirical analysis should determine whether the urbanisation or congestion effect of population density is relatively stronger.

Finally, the impact of economic growth on FDI location choices is considered. The real GDP growth rate (labelled 'growth rate') is calculated based on the GDP series expressed in national currency to eliminate any fluctuations in growth rates that are attributable to swings in exchange rates rather than genuine fluctuations in economic growth. However, data on regional GDP expressed in the national currency are not available, requiring me to use growth rates based on euro-series of GDP instead. I anticipate a positive sign on the growth rate, implying that faster-growing economies attract more investment, but I acknowledge that the relationship between economic growth and inward FDI might be non-linear. On the one hand, less-developed economies that start from a lower level of GDP per capita are likely to achieve higher growth rates, but may not attract more FDI than their more-developed counterparts. On the other hand, negative growth rates are indicative of recession and may deter inward investment.

4.5.2 Resource Variables

While demand-side factors are crucial for market-seeking MNEs, resource-seeking FDI is more supply-side oriented. The main reason for resource-seeking MNEs to engage in FDI is because higher quality resources (factors of production) can be acquired at a lower real cost. These resources include physical natural resources, but also factors such as unskilled and semi-skilled labour, as well as managerial and organisational skills. For this reason it is important to take account of these supply-side factors. Among the resource controls I include motorway density as a measure of physical infrastructure, secondary and tertiary education attainment to capture skills, the unemployment rate to reflect the labour market environment and the wage rate as a labour cost measure. A summary of these variables is given in Table 4.9.

Table 4.9: Resource variables: summary

Variable	Description	Source
Physical infrastructure	Motorway network density, expressed as kilometres (country-level analysis) or thousands of kilometres (regional-level analysis) of motorways per thousand squared kilometres of land area	Eurostat
Secondary education	A percentage (country-level analysis) or a fraction (regional-level analysis) of labour force aged 25-64 with secondary education	World Bank (1995-2009: country-level only), Eurostat (2000-2009: regional-level only)
Tertiary education	A percentage (country-level analysis) or a fraction (regional-level analysis) of labour force aged 25-64 with tertiary education	World Bank (1995-2009: country-level only), Eurostat (2000-2009: regional-level only)
Unemployment rate	A percentage (country-level analysis) or a fraction (regional-level analysis) of total labour force aged 15 and over that is unemployed but currently available for work and actively seeking employment	LaborSta (1995-1998: country-level only), Eurostat (1999-2009)
Wage rate	Hourly compensation cost in manufacturing at constant prices (deflator = price index, 2005=100, based on euro: both country-level and regional-level analysis); original data is expressed in USD and has been converted into euro by applying nominal bilateral EUR/USD exchange rate	International Labor Comparisons (ILC) database of U.S. Bureau of Labor Statistics (BLS), Eurostat (data on bilateral EUR/USD exchange rate)
Dummy: wage rate	Dummy variable = 1 if wage rate is a missing value for a given country j and time t; zero otherwise	author's own elaboration

(source: author's own elaboration)

To capture the effect of physical transport infrastructure on inward FDI, data on motorway density were collected. Formally labelled as 'physical infrastructure', these data are expressed as kilometres of motorways per thousand of squared kilometres of land area. Eurostat collects data on railway network and navigable waterways, but road data is preferred as the road passenger and freight transport by far dominates other inland modes of transport in the EU Member countries.[20] A well-developed road network may be an attribute of a location that a resource-seeking FDI is looking to exploit seeing that it reduces travel time and hence transport costs.[21] Furthermore, an appropriate road infrastructure that is capable of accommodating the existing level of traffic reduces congestion. An inefficient transport network implies a waste of resources, such as money, time, environment, which negatively affects the profits of operating firms. I anticipate that a more dense motorway network attracts investment, implying a positive parameter sign on the physical infrastructure term. However, it is possible that locations with a less-developed transport infrastructure may attract more FDI if it is more difficult to serve this local market from elsewhere in Europe.

Skills of the labour force can provide motivation for investment, although there may be heterogeneity between investors in what skills they are seeking. While some MNEs may be interested in relatively inexpensive unskilled or semi-skilled labour, other firms may seek highly-skilled workers with technological capability or managerial and organisational skills. To capture this heterogeneity I include two measures of educational attainment: 'secondary education' and 'tertiary education'. Educational attainment is defined as the percentage of all persons in a given age group that have completed the education level, which according to Eurostat normally implies a certificate or diploma.[22] The International Standard Classification of Education (ISCED) forms the basis for collecting the data on education and ensures international comparability.[23] Secondary education is an indicator of medium-skills but tertiary education signals high-skills. If low-skill industries invest in the 'new' EU and high-skill industries in the 'old' EU, then a positive sign is anticipated on secondary education and a negative sign on tertiary education in the East, but the opposite for the West.

Unemployment statistics are among the most important indicators with both a social and economic dimension. The 'unemployment rate' is included to capture the interdependencies between labour market and the location of FDI. An unemployed person is defined as anyone aged 15-74 who during a reference week remained without work, but had actively looked for a job in the last four weeks and was able to start

[20] Eurostat (2011) shows that only for the case of three Baltic countries - Estonia, Latvia and Lithuania - does freight transport by rail account for more than 50% of the market in 2000; although this share diminished for all countries between 2000-08 in favour of the increasing freight transport by roads.

[21] Physical infrastructure may be considered a demand factor as it enhances the market potential.

[22] For the purpose of calculating education attainment only the highest education level is considered to avoid double-counting.

[23] Population aged 25-64 with ISCED Levels 3 or 4 are those that are defined as having completed secondary education. Tertiary education attainment implies a completion of ISCED Levels 5 or 6.

work within the next fortnight.[24] The unemployment rate measures the proportion of the total economically active population that is unemployed.[25] The location literature is not conclusive as to whether the effect of unemployment on inward investment is positive or negative. On the one hand, a high unemployment rate may signal a large pool of available labour force and therefore make the recruitment process of workers less costly. On the other hand, foreign firms may not want to locate where the unemployment rate is too high, as it indicates that a location is economically depressed, with low level of market demand. Disdier and Mayer (2004) argue that high unemployment demonstrates labour market rigidities and is undesirable.

Given that resource-seeking FDI wants to acquire resources at a lower real cost, the manufacturing real wage rate is included as a measure of economy-wide labour costs (labelled as 'wage rate'). Labour cost is one of the largest components of production costs and hence one the most important cost considerations for firms. The wage rate is defined as hourly compensation cost in manufacturing and is expressed at constant prices in euro.[26] These wage data are not available for Bulgaria, Cyprus, Latvia, Lithuania, Luxembourg, Malta, Romania and Slovenia, and my strategy is to record the missing data as zero and construct an auxiliary dummy variable for these cases ('dummy: wage rate'). Furthermore, the wage data are not available for NUTS2 regions, requiring me to use country-level wage data in the regional analysis. Although this approach may be criticised, the non-availability of these wage data gives me no other option.

Although average wages differ across industries, given that the majority of the investment projects in the FDI database belong to manufacturing this is a good reason for using manufacturing wage as a proxy for the economy-wide labour cost. Since higher wages imply higher total costs and lower expected profits for firms, on average a negative relationship between the real wage rate and inflows of FDI is expected. However, I acknowledge that some resource-seeking foreign firms may specifically seek for a highly-skilled labour force (for example in high-tech industries) and be prepared to accept higher wage demands of its employees. These firms may actually be attracted to the locations where wages are higher since it is where more highly skilled workers are to be found. Altogether, considering that the 'new' Member States of the EU is where wages are lower, I expect that the countries in the East tend to attract labour-intensive industries. The 'old' Member States of the EU, on the other hand, are expected to be

[24]16-74 in Spain, the United Kingdom, Iceland, Norway and Sweden (between 1995-2001).

[25]Only individuals aged 15-74 are considered for the purpose of calculating the unemployment rate, while to estimate the employment rate and economic activity rate it is total working-age population aged 15 years and over that is taken into account.

[26]Wage data were sourced from International Labor Comparisons (ILC) database of U.S. Bureau of Labor Statistics (BLS), and converted to euros using the nominal bilateral exchange rate.

more attractive to capital-intensive industries, which are seeking for highly-skilled and highly-productive workforce. In consequence, a negative relationship between wages and inward investment is expected in the East, but it is plausible that this relationship may be positive in the West.

4.5.3 Macroeconomic Variables

The long-term nature of FDI fosters a high sensitivity to risk perception (Janicki and Wunnava, 2004). Favourable macroeconomic conditions of a host country characterised by political and macroeconomic stability reduce the risk and uncertainty associated with investing abroad, and undoubtedly attract inward investment. Unlike market demand and resource factors, a more stable macroeconomic and political environment is likely to appeal to most long-term investors. Ascani *et al.* (2014) explain the importance of the institutional set-up for investment, in that it affects the structure of incentives in the economy, and in consequence influences the stability and predictability of market and non-market transactions. The controls to capture the characteristics of the macroeconomic and political system include: the openness to trade, exchange rate, exchange rate volatility, Single currency, corporate tax rate, EU Structural Funds and the political risk. A full list of variables intended to capture the breadth of macroeconomic and political characteristics of the host locations is summarised in Table 4.10.

Firstly, the 'openness to trade' variable measures the degree of integration of a country into the world economy. It captures the dependence of domestic producers on foreign markets (exports) and dependence of domestic demand on foreign supply of goods and services (imports). The openness index is included to gauge whether as economies become more open to trade, they attract increasing FDI inflows. In the case of inward investment, two contrasting theories exist. The first emphasises that trade and FDI are complements, so that more open economies receive more investment, but the other viewpoint is that trade and FDI are substitutes. In accordance with the 'substitute perspective', Walch and Wörz (2012) argue that trade openness discourages FDI as it lowers the relative costs of serving foreign markets through exporting vis-à-vis FDI. Although incompatible with the static perspective of 'MNE/exporters/domestics' convention (see: Cieslik and Ryan, 2009), I tend to support the 'complement perspective' and agree with Conconi *et al.* (2013), who argue that "firms almost never establish affiliates in a foreign market without having first tested it via exports" (p. 22). Assuming that multinational firms have a higher propensity to export and are more likely to engage in trade supports the theory that more open economies receive more FDI. The index for the openness to trade of the host economy is defined as the sum of exports and imports divided by GDP (trade-to-GDP ratio). Given that trade flows are avail-

Table 4.10: Macroeconomic variables: summary

Variable	Description	Source
Openness to trade	Degree of openness to trade of an economy; calculated as $\frac{exports+imports}{GDP}$; expressed as a percentage (country-level analysis) or a fraction (regional-level analysis)	author's own construction; IMF (data on exports, imports, GDP)
Exchange rate	Real Effective Exchange Rate (REER) series for a basket of 36 countries (EU-27 + Australia, Canada, United States, Japan, Norway, New Zealand, Mexico, Switzerland and Turkey); reference year 2005=100 (country-level analysis) or 2005=1 (regional-level analysis)	Eurostat
Exchange rate volatility	Variability of the Real Effective Exchange Rate data; calculated as $\lvert REER_t - REER_{t-1} \rvert$	author's own construction; Eurostat (data on REER)
Single currency	Dummy variable = 1 if the euro is the national currency of a country; zero otherwise	author's own construction
Corporate tax rate	Adjusted statutory rate of corporate income tax; expressed as a percentage (country-level analysis) or a fraction (regional-level analysis)	2011 edition of "Taxation Trends in the European Union", a joint publication of Eurostat and Directorate-General for Taxation and Customs Union
EU Structural Funds	EU Structural policies payments by Member State and Fund (executed payments in million ECU 1979-1998/in million EUR 1999-2009 for country-level analysis; executed payments in billion ECU 1979-1998/in billion EUR 1999-2009 for regional-level analysis) at constant prices (deflator = price index, 2005 = 100, based on euro)	European Commission, Directorate-General for Regional Policy
Political risk	Political risk rating of a country; most risk = 0, least risk = 100 (country-level analysis), most risk = 0, least risk = 1 (regional-level analysis)	The PRS Group, Inc., 1979-2012, East Syracuse, NY, 13057 USA.

(source: author's own elaboration)

able for countries as a whole, this indicator is not available for NUTS2 regions and it is necessary to suppose that trade openness is identical for all regions within the same country.

The exchange rate and its volatility are two indicators that reflect the state of the macroeconomy, and importantly affect the relative production costs in a host country and therefore, final returns to investment. Both indicators are included to assess how the strength of the host country's domestic currency and its movement affect the likelihood of investment in that host country. I utilise the real effective 'exchange rate' (REER) index - a trade-weighted measure of competitiveness against a basket of 36 competitor countries - to measure the exchange rate.[27] Importantly, changes in competitiveness against other countries depends not only on exchange rate movements but also on cost and price trends, which the REER index takes into account. Two versions of the REER index are available, according to whether it is deflated using the consumer price index or unit labour costs.[28] Given that the wage data account for the labour costs, I use the consumer price index measure. A rise in the index implies a loss of competitiveness: an appreciation of the domestic currency.

Although not conclusive, the existing studies tend to support the view that a real appreciation of the host economy's domestic currency leads to less FDI. The rationale is found in the relative wage effect (Klein and Rosengren, 1994). When the domestic currency of the host country starts to appreciate, this raises the relative production cost in the host country vis-à-vis competitor countries as relative labour and capital costs increase. Since the cost of undertaking FDI is higher and the overall rate of return to foreign firms contemplating an investment in this host country falls, the implication of real exchange rate appreciation is a lower likelihood of inward investment. A different viewpoint emphasises the role of a real appreciation in increasing the purchasing power of the economic agents, thus increasing the local market demand for the MNE's products. Although both perspectives are plausible, I believe that a real appreciation of the domestic currency deters FDI, so that the expected sign on the REER index is negative.

Kiyota and Urata (2004) note that while a few studies analyse the effect of exchange rate on FDI, the relationship between exchange rate volatility and FDI is still relatively unexplored. I construct a measure of 'exchange rate volatility', defined as the absolute change in the value of REER index. This supposes that the effect of the exchange rate volatility on investment is symmetric. The existing studies often do not agree on what is the effect of exchange rate volatility on FDI: Cushman (1985, 1988) and Goldberg and Kolstad (1995) find the effect of exchange rate volatility on inward FDI to be positive, but Bénassy-Quéré *et al.* (2001) and Urata and Kawai (2000) identify it as detrimental. Given the long-term nature of FDI and large sunk costs associated with it, I expect investors to be risk-averse and prefer low exchange rate volatility, so that its sign is negative. However, if trade and FDI are substitutes, exchange rate uncertainty may actually stimulate inward investment as multinational firms choose to serve markets abroad through FDI rather than exports.

Linked to exchange rate volatility is the question of how attractive is the Single currency to investing multinational firms and whether it stimulates FDI in the countries

[27] This basket is for the EU-27 plus Australia, Canada, the United States, Japan, Norway, New Zealand, Mexico, Switzerland and Turkey.

[28] These REER indices are also called the relative price and cost indicators, depending on the deflator.

of the European Monetary Union (EMU), which I test using the Single currency dummy variable The benefits of monetary union relevant for prospective investors include the elimination of transaction costs when converting between two different currencies and the lowering of the risk associated with exchange rate uncertainty. The Single currency is expected to stimulate FDI growth when both home and host economies use the euro as their national currencies. Since its introduction in 1999 the euro has established itself as the major international currency, so that it is likely that also the investors originating from outside of the eurozone may be attracted to the eurozone countries. Accordingly, I anticipate a positive estimate on the Single currency dummy, confirming that membership of the EMU and the global presence of the Single currency act as a catalyst for attracting inward investment. I construct a 'Single currency' dummy variable, which takes a value of one if the euro is the official domestic currency of the host location, zero otherwise. The majority of 'old' EU-15 countries formally joined the eurozone in 1999, with the exception of Greece that joined in 2002 after meeting the Maastricht convergence criteria. Among the group of 'old' EU Members, Denmark and the United Kingdom opted out of the Single currency, while Sweden still has not adopted the euro despite no formal opt out clause. Among the group of twelve 'new' EU Member States, four adopted the Single currency before the end of 2010.[29]

Bénassy-Quéré *et al.* (2005) recognise that tax policies are capable of affecting both the intensity and location of inward investment owing to their direct impact on the after-tax investment returns. For multinational firms, perhaps the most important is the corporate income tax rate that directly determines the value of post-tax net profits and this measure of tax is included to capture firms' preferences between high-tax and low-tax location. Given that a fundamental assumption of the conditional logit model is profit-maximisation (see: section 4.2.1 on discrete choice methodology), the corporate tax rate is likely to have a negative effect on location as it lowers the expected return. However, there is a different perspective that emphasises the role of taxes in the provision of public goods and services. Gabe and Bell (2004) argue that high-tax countries may actually attract a lot of investment on the account of having a better provision of public goods and services, although I tend to favour the view that they discourage FDI. The 'corporate tax rate' variable is defined as the adjusted top statutory tax rate on corporate income.

Since MNEs may want to locate in relatively developed host economies, where the provision of public goods and infrastructure are well developed, I consider the role of EU regional policy in attracting inward investment. In particular, I include a measure of the 'EU Structural Funds' payments to individual countries and NUTS2 regions. The

[29]The respective euro adoption dates for 'new' EU that occurred before the end of 2010 are: 1 January 2007 for Slovenia, 1 January 2008 for Cyprus and Malta, 1 January 2009 for Slovakia.

objective of EU regional policy is to reduce disparities in the level of development and to promote economic and social cohesion, so that less-prosperous countries and regions receive more from the EU Structural Funds. As such, the Structural Funds variable is a measure of regional backwardness by definition, and the negative correlation between the size of EU Structural Funds payments per capita and the development of public infrastructure is expected. If multinational firms are discouraged by the poor infrastructure and public goods and service provision, then a negative sign on the Structural Funds variable is expected. Importantly, a country is entitled to receive the Structural Funds only as an official EU Member State.

Assuming that foreign investors are risk-averse, in addition to the state of the economy, they will react to the political risk of a host economy because it affects the predictability and stability of the entire political and institutional set-up of the host country. Quoting Singh and Jun (1995), Resmini (2000) recognises that since inward investment represents a long-term commitment on behalf of MNEs, "political and macroeconomic stability together with transparent legal regulations concerning foreign ownership and profit repatriation all matter to potential investors" (p. 676). Given that an unstable political system is characterised by corruption, inefficient bureaucracy and low levels of protection of property rights, countries that are politically unstable attract low levels of foreign capital and inward investment. Disdier and Mayer (2004) argue that these are the implicit taxes on the investor. I use the 'political risk' rating sourced from the International Country Risk Guide of the PRS Group, Inc., to assess the impact of political stability on the probability of inward investment.[30] The index is available at the country-level only, and constructed using 12 weighted variables on political and social attributes.[31] The scores of the political risk rating are in the range 0-100, with a higher score implying a lower political risk. The mean value of political risk for the EU-15 countries is 85, and the variance equals 32. For the EU-10 countries, the mean value of the index is 76, and the variance is 21. Assuming a preference for politically stable countries, a positive sign is expected.

4.5.4 Industry Variables

The composition of industry and the proximity to other firms in a host economy are reckoned to influence its decision to establish a new foreign affiliate or to expand its existing operations in a foreign market. On the one hand, the spatial externality concept of

[30]Data on the International Country Risk Guide is available at `https://www.prsgroup.com/about-us/our-two-methodologies/icrg`.

[31]The following risk components and percentage weights are used to produce the political risk rating: Government Stability 12, Socioeconomic Conditions 12, Investment Profile 12, Internal Conflict 12, External Conflict 12, Corruption 6, Military in Politics 6, Religious Tensions 6, Law and Order 6, Ethnic Tensions 6, Democratic Accountability 6, Bureaucracy Quality 4, Total 100.

agglomeration economies embraces a range of benefits linked to the clustering of firms in space, which include proximity to the suppliers, access to a qualified pool of workers and knowledge spillovers between firms. These benefits are assumed to operate over small geographical areas, and occur between firms in the same industry (intra-industry agglomeration) and across different industries (inter-industry agglomeration). On the other hand, the proximity to other firms entails an increased degree of competition, especially between firms in the same industry. Industry data on positive and negative agglomeration externalities are not available as 'raw' economic indicators but I construct them using datasets on sectoral employment (EU KLEMS dataset) and project-level inward FDI (EIM dataset). The measures that I construct include foreign and domestic specialisation variables to capture intra-industry agglomeration, the Jacobs term to capture inter-industry agglomeration, and the Herfindahl index to measure industrial competition and concentration. Table 4.11 summarises the industry variables.

Originally developed by Ellison and Glaeser (1997), the 'foreign specialisation' and 'domestic specialisation' variables capture specialisation patterns in industrial activities and aim to pick-up the agglomeration economies and positive spillovers that occur between firms in the same industry over small geographical areas (Guimaraes *et al.*, 2009). Given that the existing literature (Head *et al.*, 1995; Basile, 2004) finds that domestic and foreign firm agglomeration affect inward investment location differently, I construct two specialisation indices that measure agglomeration of domestic and foreign economic activity respectively. The formula used to calculate foreign specialisation is:

$$\text{Foreign specialisation}_{m,j} = \frac{(\frac{FDI_{m,j}}{FDI_j})}{(\frac{FDI_{m,EU}}{FDI_{EU}})}, \tag{4.17}$$

where:
$FDI_{m,j}$ - number of FDI projects in industry m, in country j
FDI_j - total number of FDI projects in country j
$FDI_{m,EU}$ - number of FDI projects in industry m, in the EU
FDI_{EU} - total number of FDI projects in the EU.

The domestic specialisation is calculated as:

$$\text{Domestic specialisation}_{m,j} = \frac{(\frac{EMP_{m,j}}{EMP_j})}{(\frac{EMP_{m,EU}}{EMP_{EU}})}, \tag{4.18}$$

where:

Table 4.11: Industry variables: summary

Variable	Description	Source
Foreign specialisation	Foreign specialisation index calculated as $(\frac{FDI_{m,j}}{FDI_j})/(\frac{FDI_{m,EU}}{FDI_{EU}})$ based on EIM FDI project data to capture foreign industry specialisation in industry m in location j relative to that of EU-average specialisation	author's own construction
Domestic specialisation	Domestic specialisation index calculated as $(\frac{EMP_{m,j}}{EMP_j})/(\frac{EMP_{m,EU}}{EMP_{EU}})$ based on EU KLEMS employment data to capture domestic industry specialisation in industry m in location j relative to that of EU-average specialisation	author's own construction
Jacobs term	Inter-industry agglomeration index calculated as $1/(\sum_m \lvert \frac{EMP_{m,j}}{EMP_j} - \frac{EMP_{m,EU}}{EMP_{EU}} \rvert)$ based on EU KLEMS employment data to capture industrial diversity in location j relative to that of EU-average diversity	author's own construction
Herfindahl index	Industrial concentration index calculated as $\sum_i s_i^2$ based on EIM FDI project data to capture plant employment share in total industry m employment; a measure of industrial concentration in industry m in location j	author's own construction
Dummy: Bulgaria-Romania	Dummy variable = 1 if country = Bulgaria or country = Romania; zero otherwise (EU KLEMS data is unavailable for Bulgaria and Romania)	author's own construction
Dummy: Herfindahl index	Dummy variable = 1 if Herfindahl index is a missing value owing to the lack of FDI projects for a given industry m, location j and time t; zero otherwise	author's own construction

(source: author's own elaboration)

$EMP_{m,j}$ - industry m employment in country j
EMP_j - total employment in country j
$EMP_{m,EU}$ - industry m employment in the EU
EMP_{EU} - total employment in the EU.

The specialisation indices vary across industries and are calculated for 2-digit NACE industries. The larger the value of a specialisation index the more specialised is industrial production, and any value in excess of one implies that a country j hosts a more specialised industry cluster than the EU.[32] The sectoral employment data used for constructing the 'domestic' specialisation index is sourced from the EU KLEMS

[32]Total statistics capture employment and FDI in all 27 EU Member States, including Cyprus and Malta

database.[33] The KLEMS records data for 72 industries up to 2007, and beyond this year I use the Structural Business Statistics (SBS) data for industry employment available through Eurostat.[34] The KLEMS data are not available for Bulgaria and Romania, so that I replace the missing values of domestic specialisation data for Bulgaria and Romania with zero and create an auxiliary dummy variable for these cases ('dummy: Bulgaria-Romania'). Information on FDI activity by industry is used for constructing the foreign specialisation index and it is gathered from the EIM dataset, which for all investment projects records sector name and sector classification by NACE industry code (see: section 4.4 for details).

In principle, the domestic and foreign specialisation indices can be constructed at both the country- and region-levels, but given that some regions receive few or no investment projects the regional-level specialisation index is not feasible. Furthermore, EU KLEMS sectoral employment data is not available for NUTS2 regions. This justifies my decision to construct the specialisation index at the country-level only. To construct the domestic specialisation I utilise the first lag of the EU KLEMS sectoral employment data, but the past two years worth of FDI data to calculate the foreign specialisation to increase the number of observations and better reflect the level of inward investment. Since the EIM dataset records information from 1997 onwards the 1998 foreign specialisation values use the 1997 FDI data only.

Contrary to the specialisation indices that measure the agglomeration economies that arise between firms belonging to the same industry (Marshall, 1890; Arrow, 1962a; Romer, 1986), the 'Jacobs term' captures inter-industry externalities (sometimes referred to as urbanisation economies) that lead to firms agglomerating in space whenever the knowledge used in one industry has applications in other industries (Henderson, 2003). The Jacobs term attempts to quantify the diversity of industrial structure. I construct Jacobs term using EU KLEMS sectoral employment data but again beyond 2007 the Eurostat's Structural Business Statistics data is used. The Jacobs term is:

$$\text{Jacobs term}_j = \frac{1}{\sum_m \left| \frac{EMP_{m,j}}{EMP_j} - \frac{EMP_{m,EU}}{EMP_{EU}} \right|}, \tag{4.19}$$

where:
$EMP_{m,j}$ - industry m employment in country j
EMP_j - total employment in country j

[33] The EU KLEMS is accessed at `http://www.euklems.net`. O'Mahony and Timmer (2009) provide a summary of the EU KLEMS database, which is used to explore EU productivity.

[34] The latest release of the EU KLEMS data for Poland, Portugal and Slovenia was not available for 2007, for which 2006 employment data are used.

$EMP_{m,EU}$ - industry m employment in the EU
EMP_{EU} - total employment in the EU.

Given the lack of data, it is not possible to construct a regional Jacobs term. A negative sign on the Jacobs term is expected to be consistent with a positive effect of inter-industry urbanisation economies on inward investment.

In addition to the positive agglomeration externalities associated with clustering of firms in space, the negative effect of product competition is captured. The 'Herfindahl index' of industry plant size distribution captures the size of individual firms in relation to the industry as a whole. It is a measure of industrial concentration and an indicator of competition. It is calculated as the sum of squared plant employment shares in total industry m employment.

$$\text{Herfindahl index}_{m,j} = \sum_{i=1}^{N} s_i^2, \tag{4.20}$$

where:
s_i - firm i plant employment share in total industry m employment
N - number of firms in industry m.

The Herfindahl index ranges from zero to one, where a value closer to zero implies a large number of small firms, while a value of one implies a single monopolistic producer. An increase in the Herfindahl index indicates an increase in market power and less competition. Given that that foreign investors are expected to be more averse to enter a market in the presence of an incumbent monopolistic producer in the host market I anticipate a negative sign. It is calculated at the country-level for each 2-digit NACE industry, but I decided against constructing it at the regional-level due to the small number of observations. Given that plant employment data is not widely available, in light of a lack of alternative plant employment data sources I choose to use FDI employment data from the EIM dataset.[35] The shortcoming of my approach is that plant employment data is not available for all investment projects recorded in the EIM database (see: section 4.4 for further details). In that view, I choose to impose an arbitrary assumption that all FDI plants for which employment data is not reported generate a marginal employment equal to one. A further complication associated with the Herfindahl index in the context of my FDI data is that the value of Herfindahl index cannot be calculated whenever a country j had not received industry m inward

[35]The EIM data record the sector classification by NACE industry code for each FDI project.

investment in the previous two years.[36] I replace any missing value of Herfindahl index with an arbitrarily small value of 0.0001 and construct an auxiliary dummy variable ('dummy: Herfindahl index'). This dummy equals one if for a given industry m, country j and time t Herfindahl index is a missing value

4.5.5 Additional Variables

A small subset of my explanatory variables is not formally considered by the theoretical discussion on location factors, but rather the aim of these is to facilitate the analysis of the spatial distribution of FDI at the NUTS2 level. Specifically, they account for factors such as national borders, location inertia and contemporaneous spatial dependencies. They are summarised in Table 4.12.

It is plausible that a model that most appropriately captures the features of industrial location choice is dynamic. Specifically, the location choice can exhibit a significant degree of inertia as those regions that receive a lot of inward investment perform well historically, and *vice versa*. Furthermore, the distinctive location patterns can be reinforced and intensified by spatial dependencies and interactions that exist between regions. With the possible intertemporal correlation in the size of regional FDI inflows, lagged dependent variable (LDV) is included. Depending on the dependent variable it is expressed as either numbers or shares of FDI projects.

In the context of small geographic units, such as NUTS2 regions, the agglomeration externalities that occur between firms that locate within industrial clusters in close proximity are likely to cross regional boundaries. Essentially, inward investment to region j may grow as other neighbouring regions start to receive more FDI. Blonigen *et al.* (2007) argue that spatial interdependency between small geographical units has been largely ignored by the empirical FDI literature.[37] Coughlin and Segev (2000) maintain that standard regressions do not account for the spatial nature of geographic data.

To capture the spatial dependence and interactions between NUTS2 regions, I construct the 'spatial lag' term that accounts for the dynamics of FDI location choice in geographical space. Sometimes referred to as a spatially lagged dependent variable, the spatial lag is a measure of spatial spillovers between neighbouring areas, which in the context of my research amounts to contemporaneous correlation between the FDI in one region and that in neighbouring regions (Blonigen *et al.*, 2007; Ledyaeva, 2009). Essentially, the spatial lag assumes that the attributes of neighbouring zones affect an

[36]To increase the number of observations, plant employment data for the preceding two years is taken into account when calculating the Herfindahl index, with the exception of the period 1997-1998. For example, the Herfindahl index for year 2000 is calculated using the plant employment data for the years 1998 and 1999.

[37]Alongside the study of Blonigen *et al.* (2007), notable exceptions include Coughlin and Segev (2000) and Baltagi *et al.* (2007).

Table 4.12: Additional variables: summary

Variable	Description	Source
LDV: LN(number_FDI)	Lagged Dependent Variable; expressed as $\ln(FDI+1)_{j,t-1}$	author's own construction
LDV: LN(share_FDI)	Lagged Dependent Variable; expressed as $\ln(\frac{(FDI+1)_{j,t-1}}{annualFDI_{EU-25,t-1}})$	author's own construction
Spatial lag: LN(number_FDI)	Spatial lag term, which captures spatial dependencies between neighbouring regions; calculated for an individual region j as $\frac{\sum_{\text{ADJACENT\_NUTS2}} \ln(FDI+1)_{l,t}}{\text{ADJACENT\_NUTS2 COUNT}}$ and where $j \neq l$	author's own construction
Spatial lag: LN(share_FDI)	Spatial lag term, which captures spatial dependencies between neighbouring regions; calculated for an individual region j as $\frac{\sum_{\text{ADJACENT\_NUTS2}} \ln(\frac{(FDI+1)_{l,t}}{annualFDI_{EU-25,t}})}{\text{ADJACENT\_NUTS2 COUNT}}$ and where $j \neq l$	author's own construction
Road distance to EU border	Road distance from a capital of region j to the West-East border; expressed in hundreds of kilometres, quickest route is used	author's own construction
Line distance to EU border	Euclidean straight-line distance from a capital of region j to the West-East border; expressed in hundreds of kilometres, shortest route is used	author's own construction
Region count distance to EU border	A count of the number of regions that separate region j from the former West-East border	author's own construction
BORDER	Dummy variable = 1 if a region j is a border NUTS2 region that is located in a EU-10 country and lies alongside the West-East border; zero otherwise	author's own construction
BORDER 01	Dummy variable = 1 if a region j is a border NUTS2 region that is located in a EU-10 country, lies alongside the West-East border or separated from this border by at most one other region; zero otherwise	author's own construction
BORDER 02	Dummy variable = 1 if a region j is a border NUTS2 region that is located in a EU-10 country, lies alongside the West-East border or separated from this border by at most two other regions; zero otherwise	author's own construction
BORDER 11	Dummy variable = 1 if a region j is a border NUTS2 region that is located in a EU-10 country, separated from the West-East border by one other region; zero otherwise	author's own construction
BORDER 22	Dummy variable = 1 if a region j is a border NUTS2 region that is located in a EU-10 country, separated from the West-East border by two other regions; zero otherwise	author's own construction
BORDER 12	Dummy variable = 1 if a region j is a border NUTS2 region that is located in a EU-10 country, separated from the West-East border by one or two other regions; zero otherwise	author's own construction
Capital city ('new' EU)	Dummy variable = 1 if a region j is hosts the capital city of a 'new' EU country, which at time t is officially part of the EU; zero otherwise	author's own construction
Capital city ('old' EU after 2004)	Dummy variable = 1 if a region j is hosts the capital city of an 'old' EU country in 2004 and thereafter; zero otherwise	author's own construction

(source: author's own elaboration)

investor's location decision. Buczkowska and de Lapparent (2014), who study the location choice of newly-created establishments within the Paris metropolitan area, find that the spatial spillovers improve model performance. Their conclusion is that an establishment does not act in isolation in its decision-making process and that other establishments located nearby are likely to influence the location decision. Spatial spillovers become more influential for disaggregated spatial units and they decay with distance (Moreno *et al.*, 2004). I assume contemporaneous spatial dependencies between NUTS2 regions.

I construct two separate versions of the spatial lag term for a single region j using the EIM data on inward investment. The first is for the number of FDI projects in contiguous NUTS2 regions ($\frac{\sum_{\text{ADJACENT\_NUTS2}} \ln(FDI+1)_l}{\text{ADJACENT\_NUTS2 COUNT}}$, where $j \neq l$) and second considers the shares of FDI ($\frac{\sum_{\text{ADJACENT\_NUTS2}} \ln(\frac{(FDI+1)_l}{annualFDI_{EU}})}{\text{ADJACENT\_NUTS2 COUNT}}$, where $j \neq l$). I assume that spatial dynamics between NUTS2 regions are contemporaneous in the sense that inward investment projects that the adjacent regions receive influence FDI to a region in the same year.

To illustrate how I construct the spatial lag term, consider region A, which has three neighbouring regions: region B, region C and region D. Spatial lag (share FDI) for region A is calculated as follows:

$$\text{Spatial lag (share\_FDI)}_A = \frac{\ln\left(\frac{(FDI+1)_B}{annualFDI_{EU}}\right) + \ln\left(\frac{(FDI+1)_C}{annualFDI_{EU}}\right) + \ln\left(\frac{(FDI+1)_D}{annualFDI_{EU}}\right)}{3}. \quad (4.21)$$

After rearranging, equation (4.21) can be written as:

$$\begin{aligned}\text{Spatial lag (share\_FDI)}_A = &\frac{\ln(FDI+1)_B + \ln(FDI+1)_C + \ln(FDI+1)_D}{3} \\ &- \ln(annualFDI_{EU}).\end{aligned} \quad (4.22)$$

The first term in equation (4.22) is exactly the value of the number-version of the spatial lag (i.e. spatial lag (number_FDI) = $\frac{\sum_{\text{ADJACENT\_NUTS2}} \ln(FDI+1)_l}{\text{ADJACENT\_NUTS2 COUNT}}$, where $j \neq l$), and the second term is the value of the difference between spatial lag (number_FDI) and spatial lag (share_FDI). Logarithmic transformation used in the construction of spatial lag is dictated by the use of log-lin model specification in my study of border effects (see: Chapter 6). Seeing that some NUTS2 regions receive zero FDI, it is necessary to add one to the regional count of FDI before I can perform the logarithmic transformation. On the contrary to the regional market potential measure, I do not use the term D to weight the scale of foreign firm agglomeration in neighbouring regions; neither do I take account of the distance, ω. The coefficient on the spatial lag measures how FDI activity in neighbouring regions affect the regional inward investment. I anticipate the effect of spatial spillovers on regional FDI activity to be positive.

A set of three distance variables and six border dummies is constructed to analyse the effect of the EU enlargement in 2004 and the significance of continuous distance and discrete border effects (see: Beugelsdijk and Mudambi, 2013) in shaping the spatial distribution of FDI activity at the level of the regions. The aim is to establish if FDI activity is drawn closer to the former West-East border within the EU in the post-enlargement period. Among the distance variables I distinguish between 'road distance' and 'line distance'. The first is calculated as the shortest road distance (in kilometres) between the capital of region *j* and the former West-East border (prior to the 2004 enlargement). The second is the shortest Euclidean distance, i.e. 'as the crow flies' (in kilometres) from the West-East border. To calculate the road distance, Google Maps are used, while the line measure is obtained using a Distance Calculator.[38] Similar to agglomeration externalities and spatial spillovers, whose effect is regarded to be strongest over small geographical areas and decay with distance (Moreno *et al.*, 2004), it is anticipated that the 'integration effect' weakens with distance, meaning that the strongest impact of EU enlargement is felt close to the former West-East border, so that a negative sign is expected on these.

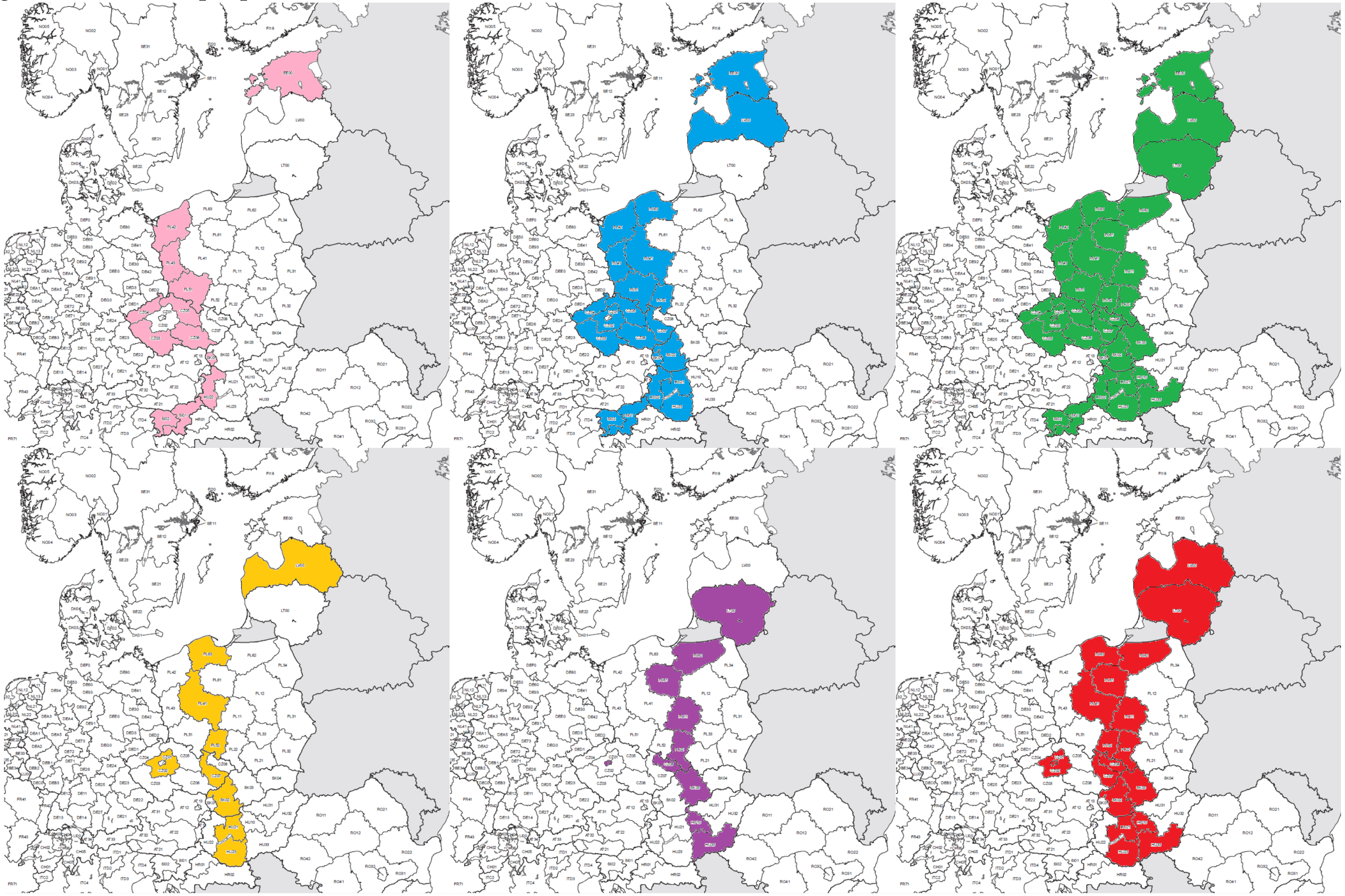
A third distance variable is the 'region count distance'. Essentially, it is an auxiliary measure that counts the number of regions that separate region *j* from the former West-East border. Although I do not explicitly employ this distance measure in the subsequent econometric analyses, it is used as a criterion for defining a set of six border dummies. The border regions are defined for the EU-10 members. The aim of the border dummies is to test the significance of national borders in shaping the spatial distribution of FDI activity among the NUTS2 regions of the accession countries after the fifth enlargement. A full set of six border dummies are presented in Figure 4.10 that shows how the set of the border regions changes according to these six different definitions.

The dummy variable BORDER takes the value of one for all NUTS2 regions located in the EU-10 after the fifth enlargement, which meet a strict continuity criterion of being located alongside the former West-East border; zero otherwise. Essentially, the strict continuity criterion is satisfied when the auxiliary region count distance equals zero. The BORDER 01 dummy is a 'medium' definition; the region count distance for this border region equals zero or one. The BORDER 02 is a 'broad' definition; the region count distance equals zero or one or two.

To assess how the size of the border effect changes with distance, BORDER 11, BORDER 22 and BORDER 12 are defined. All three measures exclude those border regions that satisfy the strict continuity criterion but include those regions that are lo-

[38]Google Maps are available at `http://maps.google.com`. Distance Calculator is available at `http://www.daftlogic.com/projects-google-maps-distance-calculator.htm`.

Figure 4.10: Visualisation of border regions as defined by BORDER (pink), BORDER 01 (blue), BORDER 02 (green), BORDER 11 (orange), BORDER 22 (purple) and BORDER 12 (red) dummies



cated further away from the West-East border. The region count measure equals one for the BORDER 11 dummy (one region away from the West-East border) and two for the BORDER 22 dummy (two regions away from the West-East border). The final BORDER 12 dummy includes all regions that are designated as either BORDER 11 or BORDER 22. The differentiation in the definition of a border region enables me to examine if any border effect decays with distance from the West-East border.

Overall, my aim is to determine if asymmetries exists in the spatial distribution of FDI activity in the border and interior regions of the accession countries after the fifth enlargement and whether the enlargement altered the economic geography of FDI within the enlarged EU. Importantly, the fundamental question is whether the border regions of the accession countries are in a stronger position to attract FDI after the EU enlargement owing to their proximity to the core of the European Single Market. The border effect is analysed for the regions of the 'new' EU-10 Member States alongside the West-East border between EU-15 and EU-10 countries.[39] A positive and statistically significant coefficient on the border dummies would confirm that after the fifth enlargement border regions of the accession countries tend to attract more inward FDI than other regions, capturing a shift in the 'centroid' of FDI activity after 2004. The positive sign on the border dummies would also identify the border regions of the 'new' EU-10 countries as the 'winners' of EU enlargement and recognise that a positive and significant border effect shapes the spatial distribution of regional FDI location.

Finally, to account for the distinctive character of the NUTS2 regions hosting national capitals that were identified in section 4.4.4 as the leaders in attracting FDI to the respective countries, two dummies are constructed for the capital regions. The first is called 'capital city ('new' EU)' and the second is called 'capital city ('old' EU after 2004)'. The aim is to capture the performance of the capital regions after 2004. A distinction is made between the capital regions in 'old' EU-15 and 'new' EU-10 to allow for asymmetric responses to the enlargement. The capital regions are not necessarily located closest the West-East border within CEECs and it is of interest to determine if a significant capital region 'premium' in the size of the inward FDI exists in the post-accession period or whether their role diminishes in favour of those regions that are geographically closer to the West-East border.

4.6 Conclusions

The aim of this chapter is to outline the nature of the FDI data that are sourced from the EIM database, along with the other country and regional variables that are collected.

[39] A feasible extension would be to look at the border affected by the 2007 enlargement but this is not done in this thesis.

The chapter also sets out the methodology that I intend to employ to analyse the location of FDI activity in the EU-25 at both the country and regional level. The European Commission NUTS classification underpins the regional analysis and FDI location is subsequently analysed for 25 EU countries and 260 NUTS2 regions.

The chapter outlines the nature of the FDI data and undertakes a detailed preliminary analysis of these data. This reveals substantial heterogeneity between countries and regions of the EU-25 in attracting investment. The distribution of projects is highly unbalanced: 80% of multi-national firms chose to locate in the 'old' EU-15 over the period 1997-2010, although the shares vary over time. Importantly, when the inward investment is measured relative to the size of an economy using a location quotient analysis, the superiority of 'old' EU-15 countries versus 'new' EU-10 in attracting FDI is no longer unambiguous. Location quotients less than unity indicate that as a whole the EU-15 'under-perform', attracting fewer FDI projects than expected based on their economic size. Interestingly, the location quotient for 'new' EU countries that joined the EU in 2004 and 2007 is highest in 2004, which is the year of the first wave of the fifth EU enlargement.

The spatial distribution of investment activity changes over time and it differs before and after the EU enlargement in 2004. I identify that mean FDI per annum for Austria and Ireland is lower after 2004, suggesting that these two countries are the 'losers' of the fifth EU enlargement. By contrast, the largest recipients of FDI in the EU-25 (the United Kingdom, France and Germany) record the largest absolute increase in FDI between the pre- and post-enlargement periods. Among the 'new' EU-10, the largest increase in FDI is recorded by Poland and Romania. However, a number of smaller economies such as Finland, Greece, Luxembourg and the three Baltic countries see little change in mean FDI per annum before and after 2004.

At the regional level, the capital city regions tend to receive more than the mean level of FDI and emerge as the top destination for investment in their respective countries, which holds for most of the EU-25 countries. In that category, the Romanian capital region of Bucuresti-Ilfov is a strong performer that features among the few NUTS2 regions that on average gain more than 30 additional investment projects each year after 2004. It demonstrates a strong turnaround in investors' perception of Romania's suitability as a host for productive investment, given that this country received little FDI before 2004. Other regions that achieve similar growth of inward investment include French regions Ile-de-France and Rhone-Alpes, Dusseldorf in Germany, Madrid in Spain and the NUTS1 region of London.

A remarkable feature of the data is that five out of the eight Czech regions experience negative growth rates of inward FDI, despite their strong position as 'leaders' in attracting inward investment among all accession countries in the pre-enlargement period. Across the border in Austria, a stagnation in FDI characterises the performance of six out of nine Austrian regions too. Furthermore, my analysis of regional FDI underlines the relative importance of distance and national borders, which is illustrated by the performance of the Podlaskie region in north-eastern Poland and the Nord-Vest region in Romania. Although the two regions are positioned similarly relative to the former West-East border and attract similar number of FDI projects before 2004, they exhibit a contrasting performance in the post-enlargement period. It calls for a formal econometric analysis of the motives for FDI location and the impact of distance and borders in shaping the spatial distribution of FDI activity in the enlarged EU-25.

Two main empirical approaches to analysing the data on FDI location were reviewed in the chapter: the discrete choice and panel data methodologies. First, the discrete choice methodology is a well-established empirical technique underlying industrial location studies. It is rooted in the Random Utility Maximisation model that assumes firms maximise their utility by choosing a single location that provides the highest profit from a set of available alternatives. Conditional and nested logit models are often used to analyse discrete choice data on FDI location. I propose to use the conditional logit model to study the motives for FDI location in the 'old' and 'new' EU at the country-level. Second, I propose to use panel data techniques to analyse the economic geography of FDI activity at the level of NUTS2 regions and the role of border effects. These include a LSDV estimator but also the GMM approach that better handles modelling concerns such as fixed effects and the endogeneity of regressors, while it avoids bias in panels with a wide regional-dimension and short time-dimension.

To undertake these analyses the chapter also discusses the construction of the dataset on location factors. These include the neoclassical and institutional location factors at the country and NUTS2 regional level. It involved collecting data on market potential and resources that appeal to demand-side market-seeking FDI and supply-side resource-seeking FDI. Further, I also collected data on macroeconomic and political factors that affect the risk associated with investing abroad, and implying that stable institutional set-up attracts investment. Most of this data is collected from Eurostat. Moreover, I construct a set of industry variables to account for the agglomeration economies of the NEG theory. These controls include intra- and inter-industry externalities. All in all, the discussion of this chapter puts me in a good position to analyse these data in the next two chapters.

Chapter 5

Motives for FDI Location Choice Between 'Old' and 'New' Europe

5.1 Introduction

The fifth enlargement of the EU involved the accession of ten new members from Central and Eastern Europe and two small Mediterranean countries. On 1 May 2004 ten countries, mostly the former transition economies of the Central and Eastern Europe, joined the European Union (EU) with the Union growing from 15 to 25 members. On 1 January 2007 Bulgaria and Romania entered in the second wave, bringing the total number of Central and Eastern European Countries (CEECs) in the EU to ten (see: Chapter 3 for a discussion of the enlargement process). The fifth enlargement of the EU made it the largest single market in the world with a population of 500 million inhabitants. As the largest combined economy in the world, the EU ranks first as the source and destination for foreign direct investment (FDI) flows in the world, accounting for 34% and 42% of global inward and outward FDI stocks respectively in 2012 (UNCTAD, 2013).

Given the status of the EU as a prime destination for FDI, it is surprising that analysis of the motives that drive multinational firms' decisions to locate within the EU is virtually non-existent.[1] While there exist many empirical studies that analyse the determinants of FDI location for individual European countries (e.g. Hill and Munday, 1992 for the UK; Guimaraes *et al.*, 2000 for Portugal; Basile, 2004 for Italy; Crozet *et al.*, 2004 for France; Boudier-Bensebaa, 2005 for Hungary; and Kalotay, 2008 for Bulgaria

[1] One of the main reasons for this has been the lack of data availability to analyse the cross-country location decisions of FDI. Notable exceptions are Alegria (2006) and Disdier and Mayer (2004); the former analysed the location choices of European multinational firms at the country and region level in 25 European Member countries but only from 1998 to 2005; the latter was limited to a sample of French multinational firms that invested in Europe over the period 1980-99.

and Romania), such studies fail to take a broader EU perspective. The aim of this chapter is to fill this research 'gap' and analyse the motives explaining the location decisions of multinational firms investing in the EU.

It is reasonable to suspect that multinational firms view the 'old' EU-15 countries differently from the recent 'new' EU entrants, and that the same location factor may have different impacts on the probability of investment in the 'old' and the 'new' EU. This chapter explores the possibility of a 'West-East divide' (see: Disdier and Mayer, 2004) in the location decisions of foreign investors by explicitly allowing for the heterogeneity in the preferences of investors locating in the 'old' versus the 'new' EU Member States (West-East heterogeneity). For example, assuming international factor price differentials existing between the West and the East, it is plausible that with the entry of CEECs into the EU and the resulting reduction in trade costs in the enlarged EU the 'new' EU Members began to attract multinational firms interested in serving not only the local markets of CEECs but also those of the neighbouring countries, thus becoming export platforms (see: Ekholm *et al.*, 2007). Conversely, for the case of the 'old' EU Members, such market access opportunities may have been exhausted in the past and hence motives other than pure market access may drive FDI location in the West.

The chapter analyses the location of FDI projects in the 25 EU Member States (EU-25) between 1997 and 2010. The countries in the choice set are the 'old' 15 countries that joined the EU by 1995 (EU-15) and the remaining 'new' 10 countries that joined as part of the fifth enlargement in 2004 and 2007 (EU-10). The data is at the individual project level, sourced from the *Ernst and Young European Investment Monitor* (EIM) and discussed in Chapter 4. The EIM data records information for 35,155 inward FDI projects, but the analysis excludes fifty projects that located in Cyprus and Malta and two projects from the Faroe Islands resulting in a total of 35,103 projects.[2] The EIM captures all project-based productive investment but excludes mergers and acquisitions so that the focus of the analysis is on productive investment i.e. excludes asset-augmenting FDI. The theoretical framework for the analysis is the International Business literature, which identifies three motives for asset-exploiting FDI: market-seeking, resource-seeking and efficiency-seeking, discussed in detail in Chapter 2, but also includes macroeconomic and industry variables to control for other country-level factors that affect FDI. Given the project-level nature of the data the conditional logit model is used as the appropriate econometric model to analyse the motives for FDI location choice.

The chapter is organised as follows. The next section discusses the observed

[2]Faroe Islands are an autonomous region of Denmark but are not included in the statistical territory of Denmark. All statistical data for Denmark does not include data on the Faroe Islands or Greenland, another autonomous region of Denmark.

location choices of multinational firms in the EU-25 based on a preliminary descriptive investigation of the FDI data. These choices are analysed from a range of project-specific characteristics such as the project type (new investment or re-investment) and origin region of investor. These characteristics are used later in the analysis chapters to account for the heterogeneity of project types. Section 5.3 outlines the main theoretical framework of the study and discusses it in the context of the data and variables. Section 5.4 presents the econometric framework used in the chapter, including the model specification, and provides a justification for using the discrete choice methodology to analyse the motives for inward FDI location. The results of the econometric analysis are presented in section 5.5 and conclusions are drawn in section 5.6.

5.2 FDI Location: Project-Specific Characteristics

An investigation of the FDI project-level data reveals that the distribution of FDI projects between 'old' and 'new' EU Member States is unbalanced. Table 5.1 shows that over the period 1997 to 2010 the EIM records 28,223 FDI projects in the EU-15 and 6,880 projects in the EU-10, which represents 80% and 20% in the 'old' and 'new' EU respectively. Further analysis by three sub-periods, 1997-2003 (time prior to the first wave of the fifth enlargement in 2004), 2004-2006 (in between two waves of the fifth enlargement in 2004 and 2007) and 2007-2010 (time after the second wave of the fifth enlargement in 2007), reveals that the EU-15 appeared to be a relatively less attractive destination for inward FDI in the period that immediately followed the EU enlargement in 2004, attracting 76% of all projects carried out between 2004 and 2006, as compared to the corresponding figure of 82% for the time period 1997-2003. In the period following the completion of the second wave of fifth enlargement in 2007, the pattern of FDI has returned to that of the pre-enlargement period.

Table 5.1: Project numbers and shares by regional subgroup and by sub-period

Subgroup	1997-2003	2004-2006	2007-2010	1997-2010
'Old' EU-15	11,500 (82.4%)	6,457 (75.6%)	10,266 (81.5%)	28,223 (80.4%)
'New' EU-10	2,458 (17.6%)	2,086 (24.4%)	2,336 (18.5%)	6,880 (19.6%)
All countries	13,958 (100.0%)	8,543 (100.0%)	12,602 (100.0%)	35,103 (100.0%)

(source: author's own elaboration of EIM data.)

The FDI dataset distinguishes between three project type categories: new investments (67% of all projects), expansions (27%) and new co-locations (6%). The difference between expansions and co-locations is that while the former results in an increase in capacity of existing functions at their present location, the latter involves new functions that are co-located at or near an existing activity.[3] Grouping expansions and co-locations together gives a 'broad' measure of the re-investment activities of firms, compared to a more 'narrow' measure if co-locations are excluded. Table 5.2 shows the distribution of FDI projects by project type and regional subgroup, and finds that new investments account for about two thirds of total projects. It also demonstrates that the distribution of projects is unbalanced between the EU-15 and EU-10, supporting the pattern in Table 5.1. The 'new' EU-10 countries receive only 20% of total new investment projects and the East lags further still behind that of the West for re-investments, as only 18.5% of expansions are recorded to take place in the 'new' EU-10 (17% if co-locations are excluded).

Table 5.2: Project numbers and shares by regional subgroup and by project type

Subgroup	New investment	Expansions and co-locations	Expansions	All
'Old' EU-15	18,624 (79.9%)	9,599 (81.5%)	7,834 (83.1%)	28,223 (80.4%)
'New' EU-10	4,699 (20.1%)	2,181 (18.5%)	1,588 (16.9%)	6,880 (19.6%)
All countries	23,323 (100.0%)	11,780 (100.0%)	9,422 (100.0%)	35,103 (100.0%)

(source: author's own elaboration of EIM data.)

Inward FDI from outside the EU-27 may be different in nature to intra-EU FDI because of the larger information asymmetries for the former type of investment. The reduced information asymmetries for international firms operating in the EU facilitate investing in other EU countries, meaning these firms can more easily choose locations within the EU.[4] The EIM data records information on the origin country of the parent company and this data is used to determine the preferences of investors from inside and outside the EU-27 to locate in the 'old' EU-15 versus the 'new' EU-10 countries. Location preferences can also be different when multiple partners are involved, for example due to the potential for risk sharing, so consequently location strategies can differ between single and multiple parent company ownership. It is possible to distinguish between projects with more than one parent company in the EIM data and Table 5.3

[3]The EIM data uses the following categories to describe the FDI functions: contact centre (customer support functions), education & training, headquarters, internet data centre, logistics, manufacturing, research & development, sales & marketing, shared services centre (administrative support functions), testing & servicing.

[4]Defever (2006) studies location choices of non-European firms in the 23 countries of the enlarged EU to focus on horizontal and export platform investments.

gives the distribution of FDI projects by five different origin subgroups, distinguishing between one or more partners from inside and outside the EU and a 'mixed' category where both inside and outside EU countries are involved in the investment.

Table 5.3: Project numbers and shares by regional subgroup and by origin category

Subgroup	inside EU (1 partner)	inside EU ($\geq$ 2 partners)	outside EU (1 partner)	outside EU ($\geq$ 2 partners)	'mixed' partners	All
'Old' EU-15	10,855 (71.8%)	493 (74.4%)	16,369 (87.7%)	77 (74.8%)	429 (78.9%)	28,223 (80.4%)
'New' EU-10	4,267 (28.2%)	170 (25.6%)	2,302 (12.3%)	26 (25.2%)	115 (21.1%)	6,880 (19.6%)
All countries	15,122 (100.0%)	663 (100.0%)	18,671 (100.0%)	103 (100.0%)	544 (100.0%)	35,103 (100.0%)

(source: author's own elaboration of EIM data.)

Table 5.3 shows that FDI from outside the EU is more sizeable than EU-27 FDI, with approximately 53.5% of all FDI projects. There are only 544 projects that have 'mixed' partners (at least one parent company from the EU-27, and at least one parent company from outside of the EU-27) and these account for approximately 1.5% of the sample. Within samples of European and non-European investments, those projects involving multiple parent companies are a small minority, with 663 and 103 projects respectively. Table 5.3 shows that multinational firms originating from inside the EU-27 are more likely to invest in the 'new' EU-10 compared to investors from outside the EU-27 (28% compared to 12% for outside investors). More detailed analysis of FDI data by origin category reveals that around 62% of projects in the 'new' EU-10 are from the 'old' EU-15 countries, 18% are from North and South America (mainly US), 10% are from Asia (mainly Japan) and virtually all of the remaining investment is from elsewhere in Europe (10%), of which 4% is cross-border investment within CEECs.[5]

5.3 Motives for FDI Location: Data

The theories of FDI that were developed to explain the reasons for the emergence and location of FDI can be summarized by the eclectic paradigm of Dunning (1977), as discussed in Chapter 2. Building upon the OLI framework and drawing on the work of Behrman (1972), Dunning (1993) developed a taxonomy of four types of MNE activity, where the classification depends upon the primary motive underlying the investment. The typology of FDI motives provides a logical framework for analysing multinational firms' location decisions and it offers the main theoretical underpinning of this study on

[5] These detailed data are not reported in the thesis but are available on request.

the motives for FDI location choice in the EU-25.[6] The typology identifies the market-seeking motive, resource-seeking motive, efficiency-seeking motive and strategic asset-seeking motive for FDI. The fourth and final motive for FDI, strategic-asset-seeking FDI, is different in nature to the first three types as the primary purpose of the investment is to acquire a new foreign asset rather than to exploit existing assets. Given that the data captures productive investment but excludes mergers and acquisitions, the final motive is of no direct relevance to the research and is not considered further. Importantly, the Dunning typology governs the choice of explanatory variables that is included in the econometric model to analyse the motives for inward FDI location choice in the EU-25.

Market-seeking multinational firms consider FDI as a strategy of serving demand in markets abroad, are demand-side oriented and driven by determinants such as market size and market growth prospects. Market-based determinants of FDI location are seen as the fundamental location determinant as they capture the market potential of the host economy (Procher, 2009) and market-seeking firms are traditionally attracted to those locations as they can benefit from large demand (Alegria, 2006). The variables explaining the market-seeking motives for FDI are grouped together as market potential variables and outlined below (they are explained in detail in section 4.5.1 of Chapter 4).

Among the market potential variables, the EU membership dummy controls for an access to the EU Single Market as a motive for investment. By locating in a host country that is a Member State of the EU, an investing multinational firm gains not only access to the local market of its host economy but also importantly an unlimited access to the European Single Market of 500 million consumers. As a consequence, access to the EU Single Market is likely to be a factor that attracts FDI to individual EU Member States. Investing firms are also likely to consider the actual size of the demand in the other economies of the Single Market (Alegria, 2006) and also to consider EU-wide market access. A measure of external market access is therefore included through a peripherality index, i.e. a gravity-weighted market size measure of external market potential. The index attempts to quantify how central/peripheral a location is and its relative position to the other markets. Alongside measuring the external market potential, the peripherality index is a proxy for transport costs within the EU-25 and complements the EU membership dummy, which indirectly captures the reduction in overall trade costs associated with the removal of internal trade barriers for CEECs within the EU-25 (e.g. tariffs).

Real GDP (labelled as 'internal market GDP') is a proxy for the size of the local market demand, and it is included to control for access to the local market of an indi-

[6] The typology of FDI motives underpinning this study are discussed in length in section 2.3.4 of Chapter 2.

vidual EU-25 host country as a motive for investment. Seeing that the market-seeking FDI is demand-oriented and the size of demand is an important consideration in choosing where to locate, real GDP per capital and real GDP growth rate are also part of the econometric model because both influence the local market demand. Real GDP per capita (labelled as 'income per capita') captures the relative purchasing power in the local market and the real GDP growth rate (labelled as 'growth rate') is an indicator of the sustainability of the economic performance and the economic prospects (Procher, 2009, 2011). Population density indirectly captures the market potential, as it measures the degree of urbanisation and therefore, the size of the consumer base. A more dense population allows a firm to serve a larger consumer market within a given geographical space and may appeal to market-seeking FDI. Lastly, for policy purposes it is of interest to know if FDI has shifted its location within the EU in response to the fifth enlargement due to new market opportunities becoming available. An East intercept dummy captures how different is the perception of the 'new' EU-10 Member States vis-à-vis the 'old' EU-15 and controls for this unobserved East-West heterogeneity.

Resource-seeking multinational firms consider FDI as an optimal strategy of acquiring higher quality resources and/or factors of production at lower real cost, which affects production costs. Resource-seeking FDI is supply-side oriented, for whom access to resources such as physical natural resources, inexpensive unskilled or semi-skilled labour, and technological capability or managerial and organisational skills is the motive for the FDI location choice. Iammarino and McCann (2013) make a distinction between 'general-asset seekers' that aim at host locations' physical resources and cheap labour, and 'specific-asset seekers' that aim to acquire higher skills such as technological capabilities, management and marketing expertise or organisational skills. The access to these resources is also a source of comparative advantage of resource-seeking multinational firms. The resource-based determinants of FDI location are grouped together as the resource variables (see: section 4.5.2 of Chapter 4 for a detailed discussion), and outlined below.

Among the resource variables, motorway density (labelled as 'physical infrastructure') is used as a proxy for the quality of the physical infrastructure, i.e. one of the resources that FDI seeks to benefit from, as it facilitates the transport of goods and leads to a trade cost reduction for firms. A location choice of resource-seeking firms is also determined by the skills of the workforce, which on the one hand may search for higher range skills such as technological capability or managerial and organisational skills ('specific-asset' resource-seeking firms), or for lower and middle range skills on the other hand ('general-asset' resource-seeking firms). The model includes two measures of education attainment of the working-age population (secondary and tertiary) to control for the different skill requirements of these firms. The unemployment rate is included to capture the availability of workforce, as well as its quality. Disdier and Mayer (2004) note that a high rate of unemployment can be interpreted as a signal of the availability of a large pool of workers, but it can also be viewed as the sign of a rigid labour market and poor quality labour force. Finally, resource-seeking FDI often searches to acquire higher quality resources and factors of production at a lower real cost and to capture this the real wage rate in manufacturing is included. Generally, labour costs are one of the largest components of production costs and hence, one of the most important cost considerations for firms. An increase in wages leads to a fall in profit margin for firms, *ceteris paribus*, and therefore the expected effect of wages on inward investment is negative. However, it is also plausible that multinational firms are attracted to high labour cost locations as this is where a highly skilled workforce may be found (Procher, 2011).

The main motivation for efficiency-seeking multinational firms to invest abroad is to promote the efficiency of the MNE global or regional structure. The increase in efficiency is achieved by adding scale for the purpose of achieving greater economies that help to reduce production costs and enhance the efficiency of the division of labour or the process of specialisation. Although it was relatively simple to collect demand- and supply-side factors that may appeal to market-seeking and resource-seeking FDI respectively, it was more problematic for efficiency-seeking FDI. On the one hand, efficiency-seeking FDI takes advantage of differences in the availability and costs of traditional factor endowments in different countries (Dunning, 1993) and in that respect is seen as overlapping with the resource-seeking motive. On the other hand, it exploits economies of scale and scope (Dunning, 1993), and occurs subsequent to market- or resource-seeking motives (Dunning and Lundan, 2008, p. 72). Reinvestments can be measured in two ways: either a 'broad' based measure that includes both expansions and co-locations or a 'narrow' measure that focuses on expansion projects only. It is therefore possible to investigate the efficiency-seeking motive for FDI location by examining the differences between 'greenfield' new investment and re-investment projects.

It is also important to include in the analysis other control variables of FDI location choice that have been dictated by the theoretical underpinnings of the spatial choice literature. Specifically, to account for the institutional perspective on location choice a set of macroeconomic variables are included that consist of openness to trade, exchange rate, exchange rate volatility, a dummy variable for the Single currency, corporate tax rates, EU Structural Funds and political risk. A set of industry variables are also included to control for the positive and negative agglomeration externalities identified by the New Economic Geography (NEG) literature (see: section 2.4 of Chapter 2). These variables are based on an industry level and cover foreign and domestic specialisation, Jacobs spillovers and the Herfindahl index. Again, these variables were discussed in length in sections 4.5.3 and 4.5.4 of Chapter 4.

5.4 Motives for FDI Location: Econometric Framework

The conditional logit model is used to estimate the location choice of FDI (see: section 4.2.1 of Chapter 4) and is a technique that has been frequently used to study the determinants of industrial location (see: section 2.6 of Chapter 2). The conditional logit model is appropriate for a number of reasons. The model focuses on a single node of the three-tiered hierarchy of 'MNE/exporters/domestics' decision-making process (Cieslik and Ryan, 2009), and so is conditional on MNEs having already decided to invest in the EU-25. It accounts for modelling the discrete choice nature of the location decisions of MNEs (Crozet *et al.*, 2004) and links the location choice of a profit-maximising firm to the attributes of the locations.

In the conditional logit model, an individual firm chooses a single location j from a set of of L different locations. For the location j to attract inward investment at time t it must possess a set of attributes such that an investing firm i can accrue a level of profits higher than profits that it would have derived from locating elsewhere: $\pi_{ijt} > \pi_{ilt}; \forall l \neq j$. The profit function is decomposed into a deterministic part (V_{ijt}), which is assumed to depend linearly on the observable attributes of a location (X_{ijt}), and a stochastic part (ε_{ijt}) that captures the investor-specific idiosyncrasies, unobserved heterogeneity and a measurement error.[7] Profit maximisation behaviour implies that locating the production in location j generates the greatest profit for firm i among the set of alternatives:

$$\begin{aligned} P_{ijt} \equiv Pr(\pi_{ijt} > \pi_{ilt}) &= Pr(V_{ijt} + \varepsilon_{ijt} > V_{ilt} + \varepsilon_{ilt}) \\ &= Pr(\beta X_{ijt} + \varepsilon_{ijt} > \beta X_{ilt} + \varepsilon_{ilt}) \\ &= Pr(\beta X_{ijt} - \beta X_{ilt} > \varepsilon_{ilt} - \varepsilon_{ijt}) \\ &= Pr(\beta(X_{ijt} - X_{ilt}) > \varepsilon_{ilt} - \varepsilon_{ijt}), \forall l \neq j, \end{aligned} \tag{5.1}$$

where β is the parameter associated with the location attributes X.

The conditional logit model is used to estimate the following baseline model specification for the 25 countries of the EU over the period 1997 to 2010:

$$y_{ijt} = \beta_1 X_{jt-1} + \beta_2 EU_{jt} + \beta_3 EURO_{jt} + \beta_{4j} country_j + \varepsilon_{ijt}, \tag{5.2}$$

where y_{ijt} is a binary dummy variable that captures the outcome choice for firm i in country j at time t. The dependent variable equals one when location alternative j is

[7] Crozet *et al.* (2004) highlight that "while the real underlying profit yielded by alternative locations cannot be observed, what is observed is the actual choice of each firm and the characteristics of the alternative locations" (p. 31).

chosen by investor i, and is zero otherwise. The right hand side variables X_{jt-1} include market- and resource-based controls that attempt to capture the market- and resource-seeking location motives of inward FDI location, as well as the macroeconomic and industry controls, all of which vary by location alternative. The explanatory variables are lagged one year to account for the possibility that a rational firm selecting a location of its foreign affiliate at time t makes use of location-specific characteristics that were known to it at time $t-1$. However, the EU membership and Single currency dummies are not lagged since EU/EMU membership is announced in advance and the full benefits associated with membership are available to a firm only upon the EU accession/euro adoption and thereafter.[8] To illustrate, if I was to expect the access to the European Single Market to be an important motive for investment, I would expect a surge in FDI to occur around the time of the EU accession and not before. Furthermore, as EU accession and euro adoption are announced in advance, this gives a prospective investor a chance to strategically time their entry. Country fixed effects $country_j$ are included in the model specification. The conditional logit model, where $i = 35,103$ FDI projects, $j = 25$ countries (EU-25) and $t = 14$ years from 1997 to 2010, gives $n = 877,575$ observations across all projects and countries.

To allow for West-East heterogeneity the model can be extended whereby the predictor variables are allowed to differ between the 'old' EU-15 (West) and 'new' EU-10 (East) countries:

$$\begin{aligned} y_{ijt} = \beta_5 East + \beta_6 West \times \beta_1 X_{jt-1} + \beta_5 East \times \beta_1 X_{jt-1} \\ + \beta_2 EU_{jt} + \beta_3 EURO_{jt} + \beta_{4j} country_j + \varepsilon_{ijt}. \end{aligned} \tag{5.3}$$

Model (5.3) is referred to as the West-East heterogeneity model and is used to determine if the motives for FDI location choice differ between the 'old' EU-15 and the 'new' EU-10 Member States. Essentially, this model introduces slope dummies for the West and the East countries, i.e. interactions between West and East dummies and the explanatory variables, and inform on whether an individual variable has a statistically significant effect on FDI location in the West and in the East. Alongside the West-East heterogeneity model, I also estimate the models that allow for the slopes on the predictor variables to differ depending on the project type (project type heterogeneity) and the origin of FDI (origin hetereogeneity). Furthermore, project-specific attributes are explored further as I perform the estimations on the restricted samples.

As a final note, the major shortcoming of the conditional logit model and the major counterargument against its use is the Independence of Irrelevant Alternatives (IIA)

[8] In the model (5.2) above, I draw the EU membership dummy (EU_{jt}) and the Single currency dummy ($EURO_{jt}$) out of the vector of explanatory variables (X_{jt-1}) to emphasise that unlike the remaining right-hand side variables, the EU membership and the Single currency dummies are not lagged one period.

assumption, which must hold for the unbiased and consistent parameter estimates to be produced (see: section 4.2.1 of Chapter 4). If there is suspected correlation across locations that lead to the violation of the assumption of the error terms being independent across both individual firms and spatial choices, the nested logit methodology should be used instead of conditional logit. Admittedly, the estimation of a nested logit model is computationally intensive and may be infeasible in this set-up.[9] However, the defence for using the conditional logit model is that the violation of the IIA assumption becomes less likely when spatial choices are analysed at larger geographical units, which is the case in this study, compared to when the location alternatives get smaller in scale and the unobserved site characteristics are more likely to extend their influence beyond the boundaries of the considered spatial units (Guimaraes *et al.*, 2004).

5.5 Empirical Results

This section discusses the empirical results of the analysis. Initially, I analyse the location attributes that attract and discourage inward FDI in the EU-25 (Table 5.4), before I examine the differences in motives for FDI between the West and the East (Table 5.5). Given that the motives for FDI may differ significantly between project types, I compare new investment and re-investment projects to establish if the efficiency-seeking motive is the primary driver of expansionary investment (Table 5.6). Subsequently, I analyse the motives for FDI location in the EU-15 and EU-10 depending on the project type (Table 5.7). Finally, I compare the motives for FDI that influence the investment decisions of multinational firms from outside the EU-27 and from inside the EU-27 (Tables 5.8 and 5.9).

5.5.1 Location Choice Motives in the EU-25

To begin with the model is estimated on a full sample of countries and all FDI projects in order to investigate the motives for FDI location choice across the EU-25. This is considered the base model and is estimated firstly without the country fixed effects (Table 5.4, column (I)), but these are subsequently added in column (II). Including country fixed-effects controls for the average differences across countries in any observable or unobservable predictors and so greatly reduces the threat of omitted variable bias. Therefore, in all subsequent specifications country fixed effects are included in the econometric model. Columns (III) and (IV) are variations of the base model and offer an insight into the sensitivity and robustness of the base model results, where an interaction term of

[9] Considering the number of cases (35,103 FDI projects) and alternatives (25 EU Member States), the estimation of nested logit model is computationally demanding.

the peripherality index with the EU membership and East dummies is included in (III), and the EU Single currency dummy is excluded in (IV).

The effect of the country fixed effects is investigated first by comparing the results in columns (I) and (II). It is evident that a large part of the market potential variables are affected by the inclusion of the country fixed effects both with respect to the coefficient sign and statistical significance. I notice that the only market potential variable that is not affected by the inclusion of the country fixed effects is the growth rate, whose positive and statistically significant coefficient is consistent across both models. With regards to the remaining market potential variables, the results are mixed. For example, the model without country fixed effects demonstrates that multinational firms prefer markets close to the core but not necessarily within the EU Single Market, however the model with fixed effects suggests that peripheral locations within the EU Single Market are preferred. The size of the market, captured by internal market GDP, has a positive and statistically significant effect on FDI location in column (I), but with country fixed effects included (column (II)) the sign on the internal market GDP is negative. The reverse is observed for income per capita. Population density is negatively signed in both models but it is statistically significant only in column (I).

Given these results, a further explanation is required with respect to the counter-intuitive behaviour and signs on GDP, GDP per capita ($\frac{GDP}{POP}$) and population density ($\frac{POP}{km^2}$). Essentially, these three terms are potentially related, which therefore may constrain the estimates on these. To see this, these terms can be written as follows:

$$(a+b+c)\ln GDP - (b+c)\ln(\frac{GDP}{POP}) - c\ln(\frac{POP}{km^2}). \tag{5.4}$$

Applying the logarithmic properties, the above can be rewritten as:

$$(a+b+c)\ln GDP - (b+c)(\ln GDP - \ln POP) - c(\ln POP - \ln km^2). \tag{5.5}$$

Equation (5.5) simplifies further to:

$$a\ln GDP + b\ln POP + c\ln km^2. \tag{5.6}$$

Given that GDP, POP and km^2 all capture country size it is plausible that the estimates on a, b and c are positive, which in equation (5.4) implies that the signs can be positive (GDP), negative ($\frac{GDP}{POP}$) and negative ($\frac{POP}{km^2}$), and this is what is found when estimating the model without country fixed effects in column (I). It gives some motivation for why some signs can be counter-intuitive. Equation (5.6) is not regressed as these terms are correlated and also difficult to interpret, while intuitive meaning can be given to the terms in (5.4).

Table 5.4: FDI location choice across the EU-25 countries

	Dependent variable: location choice			
Sample:	Full	Full	Full	Full
Column:	(I)	(II)	(III)	(IV)
Market potential variables				
EU membership	0.028	0.259***	-0.380	0.264***
	(0.047)	(0.049)	(0.408)	(0.049)
Peripherality index	0.812***	-5.751***	-5.182***	-3.540**
	(0.033)	(1.493)	(1.535)	(1.413)
Peripherality index * EU * East	-	-	0.181	-
			(0.115)	
Internal market GDP	0.941***	-3.936***	-3.618**	-3.404**
	(0.019)	(1.446)	(1.459)	(1.443)
Income per capita	-0.317***	2.590*	2.365*	2.181
	(0.045)	(1.415)	(1.420)	(1.413)
Population density	-0.251***	-1.268	-1.754	-0.882
	(0.017)	(1.423)	(1.455)	(1.421)
Growth rate	0.026***	0.021***	0.020***	0.020***
	(0.004)	(0.004)	(0.004)	(0.004)
Resource variables				
Physical infrastructure	-0.021	0.456***	0.460***	0.447***
	(0.016)	(0.061)	(0.061)	(0.061)
Secondary education	-0.009***	0.011***	0.011***	0.006**
	(0.001)	(0.003)	(0.003)	(0.003)
Tertiary education	0.016***	0.004	0.004	0.001
	(0.002)	(0.004)	(0.004)	(0.004)
Unemployment rate	-0.013***	-0.012***	-0.012***	-0.014***
	(0.003)	(0.004)	(0.004)	(0.004)
Wage rate	-0.289***	-0.622***	-0.787***	-0.879***
	(0.039)	(0.166)	(0.197)	(0.158)
Dummy: wage rate	-0.365***	-10.888***	-11.513***	-10.783***
	(0.087)	(2.130)	(2.163)	(2.133)
Macroeconomic variables				
Openness to trade	0.005***	-0.001	-0.001	0.000
	(0.000)	(0.001)	(0.001)	(0.001)
Exchange rate	-0.009***	-0.003***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Exchange rate volatility	-0.004**	-0.003	-0.003	-0.002
	(0.002)	(0.002)	(0.002)	(0.002
Single currency	-0.287***	0.200***	0.186***	-
	(0.020)	(0.043)	(0.044)	
Corporate tax rate	-0.025***	-0.010***	-0.010***	-0.011***
	(0.001)	(0.002)	(0.002)	(0.002)
EU Structural Funds	-0.034***	-0.068***	-0.070***	-0.065***
	(0.007)	(0.008)	(0.008)	(0.008)
Political risk	-0.002	-0.003	-0.003	-0.005*
	(0.002)	(0.002)	(0.002)	(0.002)
Industry variables				
Foreign specialisation	0.014***	0.015***	0.015***	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)
Domestic specialisation	0.152***	0.141***	0.141***	0.141***
	(0.006)	(0.006)	(0.006)	(0.006)
Jacobs term	0.012	-0.077***	-0.077***	-0.083***
	(0.009)	(0.012)	(0.012)	(0.012)
Herfindahl index	-1.223***	-1.031***	-1.032***	-1.032***
	(0.030)	(0.031)	(0.031)	(0.031)
Dummy: Bulgaria-Romania	0.585***	7.095**	6.813**	7.145**
	(0.076)	(3.477)	(3.477)	(3.481)
Dummy: Herfindahl index	-1.620***	-1.381***	-1.383***	-1.383***
	(0.038)	(0.039)	(0.039)	(0.039)
Country fixed effects	No	Yes	Yes	Yes
Log-likelihood	-90,322.7	-89,644.5	-89,643.2	-89,654.9
Wald statistic	36,007.3	38,044.7	38,044.7	38,015.9
N	877,575	877,575	877,575	877,575

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

Turning to the resource factors, the inclusion of the fixed effects again changes the results, suggesting their inclusion is of importance with regards to omitted variable bias. Focusing on the results with the fixed effects included (column (II)), the quality of the physical infrastructure captured by the motorway density attracts FDI across the EU-25, while for education there is evidence for the role of secondary education but no compelling evidence for tertiary education. This suggests that in the EU-25 multinational firms seek a workforce with middle skills but are not interested in higher skills. The two remaining variables in the resource category encompass unemployment and wage rates. FDI avoids locations with high levels of unemployment, possibly as such locations are considered to have a rigid labour market and poor quality workforce. As expected, FDI is negatively influenced by labour costs, so that multinational firms are interested in reducing their costs.

With regards to the macroeconomic factors, the model with fixed effects in column (II) does not show a relationship between trade and inward FDI, as the openness to trade index is insignificant. The negative and statistically significant coefficient on the exchange rate is consistent across columns (I) and (II) and demonstrates that the probability of inward FDI is reduced when the domestic currency of a host economy experiences a real appreciation. The real effective exchange rate appreciation implies a loss in competitiveness and discourages FDI whenever the size of the operating costs and willingness to re-export from a location are important considerations for an investing firm. There is however no significant effect, when fixed effects are included, for exchange rate volatility. Columns (I) and (II) offer contradictory evidence on the role of the EU Single currency, but when fixed effects are included the Single currency increases the probability of inward FDI location. It may be more intuitive to expect that the eurozone membership increases the probability of FDI location as investors may want to benefit from the removal of transaction costs and the elimination of exchange rate risks that are associated with the currency, so that the fixed effects model again appears to be the better specification. The size of the corporate tax rate has a negative effect on the probability of location, i.e. locations are preferred when the tax burden is low. Negative effects are also found for the EU Structural Funds payments, showing that EU regional policy fails to attract more FDI (although it is not an explicit objective of the EU regional policy). Finally, the political risk index of a country does not affect the location choices of multinational firms.

The industry variables generally have the expected signs, with positive effects found for foreign and domestic specialisation and a negative sign on the Jacobs agglomeration term, demonstrating that FDI is higher for locations where multinational firms can benefit from specialisation externalities of intra-industry agglomeration (both agglomeration of foreign and domestic firms) and diversification externalities of inter-industry agglomeration. An industrial structure resembling that of a monopoly (Herfindahl index closer to one) discourages FDI, so that market structure also affects FDI location.

In column (III) an extra term is included, the interaction of the peripherality index with the EU membership and East dummies. This interaction term attempts to measure how close to the core of the EU Single Market the multinational firms want to locate in CEECs in the post-accession period. Given that the interaction term is statistically insignificant suggests that the multinational firms are indifferent between core and peripheral locations in CEECs after the accession of these countries to the EU. Furthermore, the EU membership term becomes insignificant. Given that the EU membership term is included in the construction of the interaction term suggests that the two terms may be related and cannot be included in the regression model together. Although all other results remain unaffected by the inclusion of the new interaction term, I choose not to include it in the subsequent model specifications. Finally, in column (IV) the EU Single currency dummy is dropped to check how if it may alter the effect of EU membership on FDI location choice. However, the EU membership dummy remains positive and statistically significant and in comparison with column (II), the results in column (IV) are largely robust.

5.5.2 Location Choice Motives and the 'West-East Divide'

In Table 5.4 it was assumed that the effect of each predictor variable (i.e. the slope coefficients) was identical across all countries. By allowing the slopes to differ between the 'old' EU-15 countries and the 'new' EU-10 countries, the heterogeneity of the preferences of investors locating in the 'old' and the 'new' is investigated. In column (V) of Table 5.5 slope dummies, i.e. interactions between West and East dummies and the key predictor variables, are introduced and they inform on whether an individual variable has a statistically significant effect on FDI location in the West and in the East. In addition, significance information in the square brackets in the table informs on whether the effect is statistically different between the West and the East. These results can then help establish whether there exists a 'West-East divide' in the location choice motives.

In addition to column (V), columns (VI) and (VII) respectively show the estimation results for each of the restricted samples of the EU-15 and the EU-10 countries. Columns (VI) and (VII) therefore show FDI location choice within the West and within the East, i.e. location choice is made conditional on the multinational firm having already made a decision to invest in the West (column (VI)) or in the East (column (VII), but it is not able to explain location 'between' the West and the East. In that respect, the results of the base model estimation within the West and within the East are of no direct interest but are reported for completeness. However, in summary, the results of the estimation within the West (column (VI)) and within the East (column (VII)) largely 'agree' with the West and East effects discussed below in column (V).

In column (V) the East intercept is included alongside the slope terms, and the results show that the CEECs continue to be a relatively less attractive destination for inward FDI compared to their EU-15 counterparts. Multinational investors continue to be attracted to the EU Single Market.[10] The negative sign on the peripherality index in the West suggests that access to the market is unimportant for FDI in the West as peripheral locations are preferred, whereas for location in the East the positive sign suggests access is important and it is consistent with the positive and significant parameter estimate found for EU membership. The size of the internal market and income per capita are not actors that motivate FDI location in the West, whereas in the East investors seek to locate in the more prosperous markets, albeit the negative sign on the GDP term may be an indication of the diminishing marginal returns to the internal market size. In both the West and the East investors are attracted by locations with high growth potential.

For resource-seeking FDI, it is evident that the investors locating in the 'old' EU-15 have a clear preference for well-connected locations with good quality physical infrastructure but that the infrastructure has no effect on location decisions in the 'new' EU-10. There is a marked difference in preferences of investors locating in the West versus the East with respect to the education attainment and skills of the labour force. Specifically, an increase in the education attainment of the working-age population, be it secondary or tertiary education, motivates inward FDI location in the 'old' EU-15. In the 'new' EU-10 education either discourages FDI (tertiary education) or is a factor of no importance (secondary education). This implies that in the 'new' EU-10 skills are not the resource that investing multinational firms are seeking for. This pattern of location choice preferences of multinational firms in respect of education is indicative of the 'specific-asset' resource-seeking for higher skills in the West but possibly the 'general-asset' resource-seeking in the East, where firms seek labour with lower qualifications. The coefficient on unemployment rate is negative and statistically significant in the West suggesting that unemployment is a signal of inflexible labour markets and a poor quality workforce and so FDI avoids such locations, providing further support for the 'specific-asset' resource-seeking behaviour of firms in the West. Finally, wages do not have a statistically significant effect on FDI location choice.

Turning to the macroeconomic variables, openness to trade does not influence FDI location in the 'old' EU-15, but has a significant negative effect in the East so that trade and inward FDI are substitutes in serving the local markets in the East. The

[10] It is not possible to allow the EU effect to differ between the West and the East as there is no variation in EU membership status for the 'old' EU-15 members throughout the period 1997-2010.

Table 5.5: West-East heterogeneity

	Dependent variable: location choice			
Sample:	Full		West only	East only
Column:	(V)		(VI)	(VII)
	West × var	East × var		
Market potential variables				
East	-41.622***		-	-
	(13.111)			
EU membership	0.177***		-	-0.068
	(0.055)			(0.076)
Peripherality index	-3.658**	3.878*[***]	-5.429***	20.810***
	(1.710)	(2.098)	(1.928)	(5.211)
Internal market GDP	0.451	-7.574***[**]	1.684	-6.535***
	(3.358)	(1.971)	(3.401)	(2.058)
Income per capita	-2.664	4.540**[*]	-4.094	3.317*
	(3.375)	(1.796)	(3.417)	(1.909)
Population density	-6.661**	1.650[**]	-8.284**	5.817**
	(3.215)	(2.090)	(3.256)	(2.298)
Growth rate	0.020**	0.025***	0.028***	0.019***
	(0.008)	(0.006)	(0.009)	(0.007)
Resource variables				
Physical infrastructure	0.888***	0.083[***]	0.946***	0.017
	(0.106)	(0.112)	(0.107)	(0.135)
Secondary education	0.012***	-0.018[**]	0.010***	-0.002
	(0.003)	(0.012)	(0.003)	(0.013)
Tertiary education	0.026***	-0.029**[***]	0.026***	-0.008
	(0.007)	(0.013)	(0.007)	(0.014)
Unemployment rate	-0.050***	0.000[***]	-0.057***	-0.012
	(0.006)	(0.007)	(0.006)	(0.008)
Wage rate	0.405	-0.452[*]	0.561	-0.847**
	(0.350)	(0.306)	(0.372)	(0.335)
Dummy: wage rate	6.781	-6.226***	12.599	-4.655
	(11.658)	(1.877)	(11.796)	(3.656)
Macroeconomic variables				
Openness to trade	-0.001	-0.006***[**]	-0.001	-0.006***
	(0.001)	(0.002)	(0.001)	(0.002)
Exchange rate	-0.009***	-0.018***[***]	-0.010***	-0.012***
	(0.002)	(0.003)	(0.002)	(0.003)
Exchange rate volatility	-0.010***	0.008**[***]	-0.009**	0.012***
	(0.003)	(0.004)	(0.004)	(0.004)
Single currency	0.239***	0.729***[***]	0.225***	0.658***
	(0.056)	(0.117)	(0.065)	(0.120)
Corporate tax rate	-0.006**	-0.035***[***]	-0.008***	-0.041***
	(0.003)	(0.005)	(0.003)	(0.006)
EU Structural Funds	-0.043	-0.073***	-0.044	-0.030**
	(0.029)	(0.010)	(0.030)	(0.014)
Political risk	0.000	0.012*	0.003	0.016**
	(0.003)	(0.007)	(0.003)	(0.008)
Industry variables				
Foreign specialisation	0.085***	0.011***[***]	0.092***	0.009***
	(0.005)	(0.001)	(0.005)	(0.002)
Domestic specialisation	0.177***	0.115***[***]	0.160***	0.091***
	(0.010)	(0.009)	(0.010)	(0.016)
Jacobs term	-0.068***	-0.006[**]	-0.033**	-0.023
	(0.013)	(0.024)	(0.015)	(0.035)
Herfindahl index	-0.916***	-0.996***	-0.690***	-0.714***
	(0.037)	(0.050)	(0.040)	(0.064)
Dummy: Bulgaria-Romania	-	18.048***	-	25.408***
		(4.617)		(5.254)
Dummy: Herfindahl index	-1.115***	-1.313***[***]	-0.864***	-1.028***
	(0.048)	(0.057)	(0.052)	(0.076)
Country fixed effects	Yes		Yes	Yes
Log-likelihood	-89,443.5		-59,140.3	-13,537.2
Wald statistic	38,201.3		25,491.0	3,406.5
N	877,575		423,345	68,800

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level;
[***]/[**]/[*] coefficient significantly different at 1%/5%/10% significance level between West and East

variability of the real exchange rate has an opposite effect on location choice in the 'old' versus the 'new' Member States of the EU as it deters FDI in the West but attracts investors to the East. This may appear counter-intuitive at first, however it provides further support for the trade-FDI substitute hypothesis in the sense that a less volatile exchange rate may encourage firms to serve the markets of CEECs by cross-border trade instead of FDI, thus reducing the inflows of inward FDI to the East. The effect of the EU regional policy also differs between West and East, with location choices in the 'old' EU-15 not affected by EU Structural Funds, while in the East EU support is associated with less attractive locations. The political risk rating of a country does not alter FDI location choice in the West, while an improvement in the rating in the East increases the probability of inward FDI. For the remaining macroeconomic factors, their effect on FDI location choice is similar in the 'old' and 'new' EU Member States, but the magnitude of the effect differs (it is significantly greater in the East). The exchange rate appreciation continues to deter FDI location, while the EU Single currency motivates multinational firms to invest. Firms are discouraged by high level of corporate tax rate.

Finally, turning to the industry variables, foreign and domestic specialisation externalities attract FDI in both the 'old' and 'new' EU, but the magnitude of this effect is significantly stronger in the West. The difference in FDI location motives between West and East is noticeable in the preferences towards inter-industry agglomeration, as in the West diversified industries is a factor that attracts inward investment but it is not important in the East. Again, the presence of a concentrated market structure reduces the probability of FDI location in both the EU-15 and the EU-10.

In summary, the findings of this section provide evidence that investment in the EU-15 is predominantly 'specific-asset' resource-seeking as investors are attracted to locations with an educated workforce, low unemployment, good physical infrastructure and are not discouraged by wage demands of the labour force. By contrast, the market-seeking motive appears to attract inward investment to the 'new' EU Member States, as multinational firms choose to invest in the densely populated and rich core markets of the CEECs. Moreover, it is possible that the 'general-asset' resource-seeking attracts FDI to CEECs where the multinational firms avoid locations where workers are highly-skilled. However, it is not possible to establish which of these motives (the market-seeking or the 'general-asset' resource-seeking) matters more for multinational firms that invest in CEECs.

5.5.3 Location Choice Motives and Project-Type Heterogeneity: 'Efficiency-Seeking' FDI

All of the results discussed so far focus on the relative importance of market access and resource seeking motives but not the efficiency-seeking motive given that new investment projects are grouped together with the re-investments. In this section the possibility that location choice motives are fundamentally different between new investment and re-investment projects is explored to determine whether the re-investments are due to efficiency-seeking motives, i.e. adding scale for the purpose of achieving greater economies. A key argument here is that if they were motivated by exploiting economies of scale then it would be expected to find that market-based and resource-based location factors are the same for both types of projects, considering that a random draw of projects chooses to re-invest. If the factors differ between the types of projects then it would imply that the firms are re-investing for other reasons than exploiting these economies.

As shown in Table 5.2, the dataset distinguishes between three different project types: new investments, expansions and co-locations. For the purpose of this analysis two separate definitions of re-investments are considered. The first definition is a 'broad' one, whereby the expansions and new co-locations are grouped together. The second definition is a more 'narrow' one, where expansions but not co-locations are considered as re-investments. The difference between these two project types is that while expansions are defined as increases in capacity of existing functions at their present location, co-locations involve new functions that are co-located at or near an existing activity.

The results of location choice allowing for project type heterogeneity is given in Table 5.6. These results are obtained from the full sample of FDI projects and allow for the slope coefficient on the predictor variables to differ between project types through interacting the variables with the project type dummies. To begin with, the model is estimated where the motives for FDI are contrasted between new investments and the 'broad' measure of re-investments (column (VIII)). Subsequently, the definition is narrowed down to include only expansion projects and these are contrasted with the new investments and co-locations in column (IX), but the main focus is on predominantly column (VIII). Table 5.6 reveals if there is a statistically significant effect for a respective project type and the square brackets show whether the effect is statistically different between project types. Although the motives for FDI differ between types of projects in Table 5.6, there is no allowance for the motives to differ between West and East so that the results in Table 5.6 show an overall effect for the EU-25.

Within the market potential variables, the results in Table 5.6 indicate a different

Table 5.6: Project type heterogeneity

	Dependent variable: location choice			
Sample:	Full		Full	
Column:	(VIII)		(IX)	
	A × var	(B ∪ C) × var	(A ∪ C) × var	B × var
Market potential variables				
EU membership	0.188***	0.449***[***]	0.234***	0.347***
	(0.057)	(0.083)	(0.054)	(0.099)
Peripherality index	-5.019***	-4.235***[***]	-5.869***	-4.687***[***]
	(1.497)	(1.499)	(1.498)	(1.500)
Internal market GDP	-3.624**	-3.587**	-4.193***	-4.090***[**]
	(1.449)	(1.449)	(1.450)	(1.450)
Income per capita	2.227	2.362*	2.847**	2.777*
	(1.418)	(1.420)	(1.419)	(1.424)
Population density	-1.160	-1.379[***]	-0.880	-1.179[***]
	(1.423)	(1.423)	(1.424)	(1.424)
Growth rate	0.029***	0.006[***]	0.028***	-0.002[***]
	(0.005)	(0.007)	(0.005)	(0.008)
Resource variables				
Physical infrastructure	0.472***	0.407***[*]	0.486***	0.338***[***]
	(0.062)	(0.066)	(0.062)	(0.068)
Secondary education	0.017***	0.001[***]	0.017***	-0.008**[***]
	(0.003)	(0.003)	(0.003)	(0.003)
Tertiary education	0.010**	-0.002[***]	0.009**	-0.009*[***]
	(0.004)	(0.005)	(0.004)	(0.005)
Unemployment rate	-0.012***	-0.016***	-0.010**	-0.024***[**]
	(0.005)	(0.006)	(0.004)	(0.006)
Wage rate	-0.630***	-0.850***[**]	-0.651***	-0.811***
	(0.169)	(0.180)	(0.168)	(0.189)
Dummy: wage rate	-10.364***	-11.371***[***]	-11.321***	-12.312***[***]
	(2.136)	(2.142)	(2.136)	(2.151)
Macroeconomic variables				
Openness to trade	-0.001	0.000	-0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Exchange rate	-0.004***	-0.002	-0.004***	-0.003
	(0.001)	(0.002)	(0.001)	(0.002)
Exchange rate volatility	-0.004	-0.000	-0.005**	0.001
	(0.003)	(0.004)	(0.003)	(0.004)
Single currency	0.150***	0.277***[***]	0.174***	0.236***
	(0.047)	(0.051)	(0.045)	(0.055)
Corporate tax rate	-0.007***	-0.016***[***]	-0.008***	-0.018***[***]
	(0.002)	(0.003)	(0.002)	(0.003)
EU Structural Funds	-0.065***	-0.070***	-0.076***	-0.036**[***]
	(0.009)	(0.012)	(0.008)	(0.014)
Country risk	0.003	-0.017***[***]	-0.000	-0.013***[***]
	(0.003)	(0.004)	(0.003)	(0.004)
Industry variables				
Foreign specialisation	0.011***	0.074***[***]	0.011***	0.102***[***]
	(0.002)	(0.006)	(0.001)	(0.007)
Domestic specialisation	0.128***	0.174***[***]	0.132***	0.180***[***]
	(0.007)	(0.011)	(0.007)	(0.013)
Jacobs term	-0.085***	-0.053***[*]	-0.085***	-0.051***[*]
	(0.014)	(0.018)	(0.013)	(0.019)
Herfindahl index	-0.894***	-1.141***[***]	-0.955***	-1.011***
	(0.037)	(0.058)	(0.035)	(0.065)
Dummy: Bulgaria-Romania	6.746*	7.605**[***]	7.702**	8.532**[***]
	(3.482)	(3.486)	(3.485)	(3.494)
Dummy: Herfindahl index	-1.220***	-1.507***[***]	-1.300***	-1.305***
	(0.046)	(0.077)	(0.044)	(0.087)
Country fixed effects	Yes		Yes	
Log-likelihood	-89,260.1		-89,126.5	
Wald statistic	38,371.3		38,364.6	
N	877,575		877,575	

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level; [***]/[**]/[*] coefficient significantly different at 1%/5%/10% significance level between project types;
A - captures new investment; B - captures expansions; C - captures co-locations

effect of the growth of host economies on the probability of new investment location and re-investment. While new investment is motivated by higher growth rates, it is a factor of no significance in the case of re-investments. Furthermore, column (VIII) shows that while expansions and co-locations are motivated by rich markets, new investments do not attach any importance to income per capita.

In the resource variables category, there is a marked difference between new investment projects and re-investments in their attitude towards education and skills of the workforce. Multinational firms establishing new investment facilities in the EU-25 seek skilled workers, but in the case of re-investments the investors are either indifferent towards skills ('broad' definition in column (VIII)) or are discouraged from re-investing further if the education level of the labour force is high ('narrow' definition in column (IX)).

There is also heterogeneity between project types in their attitude towards the behaviour of the exchange rate. In essence, new investments are deterred by an appreciating exchange rate, a factor to which re-investments do not attach importance. The volatility of the exchange rate is insignificant when new investment is compared with 'broad' re-investments in column (VIII). However, for the 'narrow' definition, the volatility of the exchange rate has a negative effect on the probability of new investment and new co-location, but not 'narrow' re-investments. Finally, the political risk of a country discourages re-investments from taking place but it does not deter new investment in the first place.

For the last group of variables, the industry factors, the sign and significance of the industry variables are similar between the two types of investments. However, Table 5.6 shows that there are significant differences in the magnitude of these effects in all of the industry variables in column (VIII). In particular, greater significance is attached to the intra-industry agglomeration variables for the re-investment projects, suggesting that these projects place more importance on, or are better able to capture, these spillover effects. This in turn suggests that if the re-investment projects have efficiency-seeking motives in terms of capturing economies of scale, these are external economies to the location and not internal economies to the firm.

Importantly, the information in the square brackets demonstrate that the statistically significant differences exist between project types. Although some of the variables have the identical parameter sign and are statistically significant across different project types, square brackets signal that their effect is significantly different in terms of magnitude. In column (VIII) this applies to the EU membership, peripherality index, physical infrastructure, wage rate, the Single currency, corporate tax rate, and as indicated above, all controls included in the industry group. On the whole, these results recognise that re-investments are different in nature to new investment, and subject to market- and resource-seeking motives.

In summary, the estimation results in Table 5.6 show that there are significant differences between the determinants of FDI location choice of new investment and re-investment projects, suggesting that motives other than internal economies of scale are important for re-investments. However, there is also indication that intra-industry spillover effects are of relatively greater importance to re-investment FDI so providing some support for external economies of scale being a motive for these projects. However, the results in Table 5.5 in the previous section demonstrated that the motives for FDI differ between the 'old' and 'new' EU Member States, so that this possibility is examined in the context of different project types in the next section.

5.5.4 Location Choice Motives by Project Type and 'West-East' Divide

The empirical evidence presented in the preceding sections established that motives for FDI differ between 'old' and 'new' EU countries, as well as between new and re-investments. In this section the above two types of heterogeneity are combined to allow an examination of the degree to which market access and resource factors affect new and re-investment projects in the EU-15 and EU-10, with the results given in Table 5.7. The model interacts dummy variables for the West and the East on the slope coefficients for the predictor variables and is run separately for new investments only (in column (X)), 'broad' re-investments only (in column (XI)) and 'narrow' re-investments only (in column (XII)). The main focus however is on predominantly columns (X) and (XI).

Examining the market potential variables it can be seen that access to the EU motivates re-investments but does not stimulate new FDI. This is surprising at first but an explanation of this may be that with new investments, multinational firms are willing to take more risks in order to gain access to the new markets, and not necessarily those within the EU Single Market. For the re-investments, a decision to expand the existing activity will follow the successful economic performance of a foreign subsidiary. It is possible that the EU Single Market creates an economic environment conducive to firms' growth and new job creation, and therefore, is associated with the higher probability of re-investments.

Continuing with the market potential variables, column (X) shows that none of the market access factors positively and significantly affect new investment location in the West, and that new investment in the West displays a preference to locate in the periphery, away from the main markets. Re-investments in the West do not reveal a preference for either the core or the periphery but they are attracted by the markets that grow faster. The re-investments in the West are also deterred by congestion as shown by the negative and statistically significant coefficient on population density.

Table 5.7: Results by project type with West-East heterogeneity

	Dependent variable: location choice					
Sample:	New investment		Expansions and co-locations		Expansions	
Column:	(X)		(XI)		(XII)	
	West × var	East × var	West × var	East × var	West × var	East × var
Market potential variables						
East	-26.839*		-71.853***		-92.516***	
	(16.215)		(22.889)		(27.078)	
EU membership	0.076		0.411***		0.396***	
	(0.066)		(0.101)		(0.120)	
Peripherality index	-4.657**	1.040[***]	3.915	13.787***[***]	3.681	14.598***[***]
	(2.095)	(2.567)	(3.057)	(3.749)	(3.564)	(4.403)
Internal market GDP	0.063	-8.848***[*]	5.407	-4.607	0.164	-6.631
	(4.207)	(2.365)	(5.630)	(3.681)	(6.549)	(4.340)
Income per capita	-3.019	5.518***[*]	-5.888	2.439	-0.815	4.442
	(4.227)	(2.139)	(5.670)	(3.446)	(6.596)	(4.083)
Population density	-5.375	0.269	-12.099**	4.003[**]	-9.031	9.419**[**]
	(4.034)	(2.523)	(5.363)	(3.896)	(6.257)	(4.558)
Growth rate	0.010	0.034***[**]	0.050***	0.012[**]	0.066***	-0.008[***]
	(0.010)	(0.007)	(0.015)	(0.010)	(0.017)	(0.012)
Resource variables						
Physical infrastructure	0.838***	0.172[***]	1.018***	-0.130[***]	1.027***	0.132[***]
	(0.136)	(0.133)	(0.170)	(0.212)	(0.193)	(0.251)
Secondary education	0.018***	-0.008[*]	0.004	-0.028	-0.002	-0.035
	(0.004)	(0.014)	(0.006)	(0.022)	(0.007)	(0.027)
Tertiary education	0.013	-0.015	0.071***	-0.042*[***]	0.060***	-0.050*[***]
	(0.009)	(0.016)	(0.013)	(0.025)	(0.015)	(0.030)
Unemployment rate	-0.069***	-0.000[***]	-0.019*	0.005	-0.035***	-0.007
	(0.008)	(0.009)	(0.011)	(0.014)	(0.013)	(0.016)
Wage rate	-0.120	-1.066***[*]	1.128*	0.631	2.283***	-0.086[**]
	(0.432)	(0.375)	(0.612)	(0.554)	(0.712)	(0.671)
Dummy: wage rate	4.787	-9.441***	20.495	2.203	6.859	-0.822
	(14.583)	(2.242)	(19.598)	(3.619)	(22.829)	(4.293)
Macroeconomic variables						
Openness to trade	0.000	-0.005**[*]	-0.001	-0.004	-0.001	-0.002
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.004)
Exchange rate	-0.009***	-0.018***[**]	-0.009***	-0.014***	-0.007*	-0.017***
	(0.002)	(0.003)	(0.003)	(0.005)	(0.004)	(0.005)
Exchange rate volatility	-0.015***	0.014***[***]	0.001	-0.002	0.006	-0.004
	(0.004)	(0.005)	(0.005)	(0.007)	(0.006)	(0.008)
Single currency	0.166**	0.636***[***]	0.348***	0.795***[**]	0.496***	0.699***
	(0.071)	(0.150)	(0.095)	(0.193)	(0.113)	(0.222)
Corporate tax rate	-0.004	-0.034***[***]	-0.006	-0.037***[***]	-0.008	-0.041***[***]
	(0.003)	(0.006)	(0.005)	(0.008)	(0.006)	(0.010)
EU Structural Funds	-0.039	-0.042***	-0.022	-0.123***[*]	-0.078	-0.112***
	(0.034)	(0.013)	(0.054)	(0.019)	(0.061)	(0.022)
Political risk	0.003	0.012	-0.006	0.010	-0.009	0.019[*]
	(0.004)	(0.008)	(0.006)	(0.013)	(0.006)	(0.015)
Industry variables						
Foreign specialisation	0.070***	0.009***[***]	0.140***	0.056***[***]	0.187***	0.087***[***]
	(0.006)	(0.002)	(0.013)	(0.009)	(0.016)	(0.009)
Domestic specialisation	0.171***	0.107***[***]	0.202***	0.137***[***]	0.199***	0.146***[**]
	(0.013)	(0.010)	(0.017)	(0.016)	(0.020)	(0.018)
Jacobs term	-0.047***	-0.036	-0.103***	0.029[***]	-0.095***	-0.014[*]
	(0.016)	(0.032)	(0.025)	(0.039)	(0.027)	(0.044)
Herfindahl index	-0.802***	-0.911***	-0.933***	-1.130***[*]	-0.824***	-0.853***
	(0.044)	(0.061)	(0.070)	(0.093)	(0.080)	(0.106)
Dummy: Bulgaria-Romania	-	19.260***	-	17.518**	-	24.058**
		(5.529)		(8.694)		(10.266)
Dummy: Herfindahl index	-0.968***	-1.266***[***]	-1.246***	-1.335***	-1.002***	-1.079***
	(0.057)	(0.066)	(0.095)	(0.118)	(0.108)	(0.138)
Country fixed effects	Yes		Yes		Yes	
Log-likelihood	-60,409.3		-28,491.2		-22,087.4	
Wald statistic	24,577.0		13,742.6		11,890.0	
N	583,075		294,500		235,550	

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level;
[***]/[**]/[*] coefficient significantly different at 1%/5%/10% significance level between West and East

The behaviour of the new investments locating in the East is different, as it is motivated by higher per capita income and growth rates, while for the re-investments in the East a positive and statistically significant coefficient on the peripherality index suggests that the probability of re-investment in the East increases in the markets closer to the core. This may again be a result of a business environment that is more conducive to firms' growth so that in the case of 'new' EU-10 Member States it exists only in the core markets with low transport costs.

Considering the resource-seeking motives, both new investments and re-investments reveal their appreciation of a well-developed physical infrastructure in the West. The skills and education of the workers are valued highly in the EU-15, but while the middle range of skills captured by secondary education are sought to be utilised in the new investment projects, the higher skills are more important for re-investments. In the West, new investments and re-investments are both found to avoid areas with high unemployment, as this may be where skills of the workforce are poor. In the 'new' EU-10, unlike in the West, physical infrastructure is not sufficient to attract new FDI or encourage re-investment. The role of education in attracting new investment in the East is also not statistically significant, but tertiary education discourages re-investments. Finally, higher wage rates in the East deter new inward FDI. These results suggest that the 'general-asset' resource-seeking is a motive for new investment in the 'new' EU-10, given that cheap labour is sought by the new investments, whereas reduced probability of re-investment in the locations with highly skilled labour may be indicative of the same motive.

The remaining macroeconomic and industry controls are on the whole significant across the West and East for different project types. The Single currency motivates inward FDI, regardless of whether it is a new or re-investment, while the tendency of the exchange rate to appreciate is a deterrent of FDI. Exchange rate volatility has a negative effect on new investment in both 'old' and 'new' EU Member States, but does not affect the probability of expansions. Corporate tax rates and EU Structural Funds have a significant and negative effect on the probability of new investment location and re-investment in the East, but this effect is not detected in the West. This 'West-East divide' in the adverse effect of taxes was not evident when the analysis was conducted on a full sample and did not account for the heterogeneity in the project type (Table 5.5). The coefficients on the industry variables demonstrate that foreign and domestic specialisation externalities, as well as industrial concentration, affect new investment and expansion projects across both the West and the East. The positive effect of specialisation externalities is significantly stronger in the West but the negative effect of industrial concentration is stronger in the East. Inter-industry agglomeration, captured by the Jacobs term, is negative and statistically significant for the West only for both project types suggesting that industrial diversity is more important for FDI location choice in the West.

Finally, the results can be examined in terms of the efficiency-seeking motive for FDI location in the 'old' and 'new' EU. Assuming that re-investments are a random sample of the new investment projects that were carried out at an earlier stage, then if exploiting economies of scale is the sole motive for expansions then there would be no difference in the market- and resource-seeking motives between a sample of new and re-investment projects. At first inspection it is evident that differences exist between the new investment and expansion projects. In particular, while new investment projects in the West do not display any market-seeking tendency, re-investments in the West prefer markets that grow faster. Likewise, re-investment projects in the East have a strong preference to locate in the central markets, which is unlike the new investment that is indifferent between the core and periphery but prefers rich and fast growing markets. Similarly, the resource-motives do not uniformly affect choices of the new and re-investments in the West and East. Overall, this suggests that expansions are quite different in nature to new investments, so that they are not simply about adding scale to existing operations for the purpose of achieving greater economies to scale. While greater economies of scale or scope may be a consequence of these expansions, the results of this analysis suggests that they are also subject to market-access and resource-seeking motives.

In summary, these results give a basis to argue that the market-seeking motive is more important for new investment projects setting up their production facilities in the 'new' EU-10 countries rather than the 'old' EU-15. Market access is also an important motive for re-investments in the East, where the probability of re-investment is higher in the core locations. The 'specific-asset' resource-seeking motive tends to drive the behaviour of new and re-investment projects in the EU-15, where depending on the project type the workers with middle and higher skills are sought by the multinational firms. In the East the inexpensive unskilled or semi-skilled workers are sought, suggesting that the motive for investment is the 'general-asset' resource-seeking. Finally, motives other than efficiency-seeking through economies of scale drive the behaviour of expansionary investment in both the 'old' and the 'new' EU.

5.5.5 Location Choice Motives: Outside and Inside EU-27 FDI

The location strategies and motives for FDI location in the EU-25 are likely to differ between the multinational firms from outside the EU and the firms that are already established in the EU. As discussed in section 5.2, the multinational firms from outside of the EU are faced with more significant information asymmetries. Furthermore, while multinational firms from outside of the EU may want to gain access to the EU Single Market rather than just the national market of the individual host economy, by definition the firms from inside the EU are interested in accessing the national markets in other countries seeing that they have already an access to the EU Single Market. The aim of this section is to explore these differences in location strategies between intra-EU and inter-EU FDI empirically.[11] The weakness of this analysis is that in the situation when an investor from outside the EU-27 chooses to shut down a plant in one EU-25 country and re-open in another EU-25 country, it appears that the investment originates from outside the EU-27 but in practice it is really a re-location of investment within the EU-25. However, the FDI data does not record re-locations of existing projects so I cannot distinguish between 'true' FDI originating from outside the EU-27 and the re-locations within the EU-25.

To analyse the preferences of investors from outside and inside of the EU further, I estimate the baseline regression model on the restricted samples of outside EU-27 FDI (column (XIII)) and inside EU-27 FDI (column (XIV)), where the latter includes outward FDI from Cyprus and Malta. Later, I estimate the baseline regression model on a full sample but allow for the slope on the predictor variables to differ between outside EU FDI and inside EU FDI (model with origin region heterogeneity in column (XV)). Finally, I also allow for the motives for inward investment location to differ between 'old' EU-15 and 'new' EU-10 (West-East heterogeneity) as I re-estimate the model on the restricted samples of outside EU-27 FDI (column (XVI)) and inside EU-27 FDI (column (XVII)).

The estimation results for the restricted samples of outside and inside EU-27 FDI are given in Table 5.8 (columns (XIII) and (XIV) respectively). They show that access to the EU Single Market is important for both as the EU membership of the host economies is associated with a higher likelihood of inward FDI location. Both types also prefer the peripheral locations of the EU-25 and the economies that grow faster but their preferences differ in respect of the internal market GDP, income per capita and population density. On the one hand, the investment from outside the EU-27 tends to locate in less densely populated markets but it does not have defined preferences as to the size of the national market and the mean income as demonstrated by the insignificant coefficients on internal market GDP and income per capita. On the other hand, the inward investment originating from inside the EU-27 gravitates towards relatively smaller but wealthier host economies but is indifferent between densely and sparsely populated markets.

[11]For the purpose of the analysis intra EU-27 includes those projects with 'mixed' partners (at least one parent company from the EU-27, and at least one parent company from outside of the EU-27) because of the information advantages of the EU partner.

Table 5.8: Results by origin region

	Dependent variable: location choice			
Sample:	outside EU-27	inside EU-27	Full	
Column:	(XIII)	(XIV)	(XV)	
			D × var	E × var
Market potential variables				
EU membership	0.173**	0.289***	0.081	0.344***[***]
	(0.082)	(0.062)	(0.079)	(0.060)
Peripherality index	-7.707***	-6.007***	-6.823***	-6.468***[***]
	(2.180)	(2.108)	(1.503)	(1.503)
Internal market GDP	-1.451	-5.437***	-3.968***	-4.164***[***]
	(2.481)	(1.809)	(1.452)	(1.453)
Income per capita	0.432	3.791**	3.410**	2.468*[***]
	(2.451)	(1.755)	(1.424)	(1.421)
Population density	-4.291*	-0.410	-1.191	-1.722[***]
	(2.481)	(1.751)	(1.428)	(1.428)
Growth rate	0.033***	0.013**	0.032***	0.014***[**]
	(0.007)	(0.005)	(0.007)	(0.005)
Resource variables				
Physical infrastructure	0.550***	0.385***	0.326***	0.551***[***]
	(0.096)	(0.081)	(0.065)	(0.063)
Secondary education	0.011***	0.012***	0.015***	0.003[***]
	(0.004)	(0.004)	(0.003)	(0.003)
Tertiary education	0.010	-0.000	0.024***	-0.016***[***]
	(0.006)	(0.006)	(0.005)	(0.005)
Unemployment rate	-0.008	-0.016***	-0.005	-0.016***[*]
	(0.006)	(0.006)	(0.005)	(0.005)
Wage rate	-0.568**	-0.624***	-0.898***	-0.513***[***]
	(0.270)	(0.219)	(0.176)	(0.171)
Dummy: wage rate	-7.294**	-13.212***	-11.554***	-11.106***[**]
	(3.656)	(2.650)	(2.144)	(2.133)
Macroeconomic variables				
Openness to trade	-0.003**	-0.000	-0.000	-0.003**[***]
	(0.001)	(0.001)	(0.001)	(0.001)
Exchange rate	-0.003**	-0.005***	-0.004***	-0.005***
	(0.002)	(0.002)	(0.001)	(0.001)
Exchange rate volatility	-0.007**	0.003	-0.008**	0.002[**]
	(0.003)	(0.003)	(0.003)	(0.003)
Single currency	0.216***	0.229***	0.103**	0.303***[***]
	(0.063)	(0.062)	(0.049)	(0.048)
Corporate tax rate	-0.010***	-0.011***	-0.017***	-0.005**[***]
	(0.003)	(0.003)	(0.002)	(0.002)
EU Structural Funds	-0.057***	-0.077***	-0.043***	-0.087***[***]
	(0.013)	(0.010)	(0.012)	(0.009)
Political risk	0.000	-0.007*	0.006*	-0.013***[***]
	(0.004)	(0.004)	(0.003)	(0.003)
Industry variables				
Foreign specialisation	0.015***	0.012***	0.016***	0.012***
	(0.003)	(0.002)	(0.003)	(0.002)
Domestic specialisation	0.153***	0.118***	0.150***	0.117***[**]
	(0.008)	(0.011)	(0.008)	(0.011)
Jacobs term	-0.089***	-0.068***	-0.060***	-0.100***[**]
	(0.018)	(0.017)	(0.015)	(0.015)
Herfindahl index	-0.946***	-1.012***	-0.983***	-0.988***
	(0.046)	(0.043)	(0.046)	(0.042)
Dummy: Bulgaria-Romania	0.472	9.943**	7.366**	6.680*
	(6.006)	(4.337)	(3.501)	(3.496)
Dummy: Herfindahl index	-1.345***	-1.360***	-1.388***	-1.330***
	(0.061)	(0.052)	(0.060)	(0.051)
Country fixed effects	Yes	Yes	Yes	
Log-likelihood	-43,730.2	-44,385.1	-88,204.3	
Wald statistic	25,589.2	13,523.6	38,843.3	
N	469,350	408,225	877,575	

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level; [***]/[**]/[*] coefficient significantly different at 1%/5%/10% significance level between West and East;
D - captures outside EU-27 FDI; E - captures inside EU-27 FDI

On the resource-driven determinants, the preferences of the intra-EU and inter-EU investment are similar. Firstly, more developed physical infrastructure attracts inward FDI, both from outside EU and inside EU. Both types of investors are attracted by middle range skills, as demonstrated by the positive and statistically significant coefficient on secondary education, but are neutral with respect to higher range skills as the coefficient on tertiary education is insignificant. The difference between the investors from outside EU-27 and inside EU-27 is noticed in the effect that unemployment has on the probability of inward FDI location. Specifically, the multinational firms from inside the EU tend to locate where unemployment is lower. Furthermore, both types of multinational firms favour locations where wages are lower.

On the remaining controls of macroeconomic and industry groups, the signs and statistical significance of the parameter estimates are similar across the two samples. Among those macroeconomic factors whose effect does not change across the samples are the exchange rate (the appreciation of the domestic currency of the host economy deters FDI), the Single currency (the Single currency is a factor that attracts FDI), the corporate tax rate (higher rates discourage FDI) and EU Structural Funds (the investors avoid those countries that receive substantial support under the EU regional policy). The effect of the openness to trade, exchange rate volatility and political risk differ across the samples. Greater openness to trade of a host economy is associated with reduced investment from outside the EU, but it does not influence FDI from the EU-27. The same applies to the more volatile exchange rates. The political risk rating of a host country is not a motive for FDI from outside the EU, but a lower rating attracts FDI from inside the EU. Finally, both types of investors gravitate towards those countries where intra-industry agglomeration (agglomeration of foreign and domestic firms) and inter-industry agglomeration are strong, but avoid countries where monopolies prevail as the main competitors.

Column (XV) allows the slope coefficients on the predictor variables to differ between outside and inside EU FDI, i.e. introduces the origin-region heterogeneity in the model and uses the full sample, and although the results are broadly similar to those in columns (XIII) and (XIV), there are some differences. These differences are most pronounced for the market potential variables and their effect on inward FDI from outside the EU-27. Most importantly, the model with origin-region heterogeneity suggests that the EU Single Market access is not a motive for inward FDI from outside the EU-27, which appeared to be a significant location-pull factor in column (XIII). The market access preferences of the multinational firms from outside the EU-27 start to resemble more the preferences of the EU-based firms as the internal market GDP is negative and significant, income per capita is positive and significant, and population density is statistically insignificant. Higher growth rates continue to attract inward FDI from both outside and inside the EU-27 to the faster-growing host economies, in line with columns (XIII) and (XIV).

The full sample results of column (XV) reveal a substantial difference between FDI from outside and inside the EU-27 with respect to the effect of education. Essentially, the former type is attracted to the EU-25 Member States by skills, as captured by the positive and statistically significant parameter sign on secondary and tertiary education. By contrast, the inward FDI originating from inside the EU-27 is neutral with respect to middle skills (secondary education is insignificant), but it avoids those markets where higher skills among workforce dominate. However, multinational firms from outside the EU-27 and from inside the EU-27 avoid those markets within the EU-25 where labour costs are relatively high. The remaining differences between columns (XIII) and (XIV) on the one hand, and column (XV) on the other hand, include the preference of multinational firms from outside the EU-27 to locate in host countries that are politically more stable, but indifferent between more and less open economies. The less open economies are favoured by the multinational firms from inside the EU-27.

Although insightful and informative on the motives for FDI location in the EU-25, the results presented so far in this section show the combined West-East effect and conceal any differences in the motives that both types of multinational firms have when investing in the 'old' EU-15 and the 'new' EU-10. The model estimated on the restricted samples of outside and inside EU-27 FDI is re-estimated again but with West-East heterogeneity introduced by allowing the slopes on the predictor variables to vary. The results are presented in Table 5.9 for outside EU-27 in column (XVI) and inside EU-27 FDI in column (XVII). Importantly, the multinational firms from outside the EU-27 are indifferent between the 'old' EU-15 members and CEECs as the East dummy that captures the overall preference to locate in the CEECs is insignificant. This is counter to expectations considering a large proportion of these investments locate in the 'old' EU-15, as demonstrated in Table 5.3 of section 5.2. Furthermore, the insignificant EU membership dummy shows that the access to the EU Single Market is not sufficient to attract the investors from outside the EU-27. A positive and significant EU membership dummy suggests that the CEECs benefited from the accession to the EU, as the probability of inward FDI from inside the EU-27 increases with EU membership.

There is little evidence that market access motivates the inward investment from outside the EU-27 as most market potential variables are either insignificant or have wrong signs. Although as expected, the growth rate encourages investment in both EU-15 and EU-10, the multinational firms from outside the EU-27 are indifferent between markets of different sizes and different mean income. These investors tend to locate in the periphery of the EU-15 (indifferent between core and periphery of CEECs) and avoid densely populated areas of the EU-10 (indifferent in the EU-15). For the multi-

Table 5.9: Results by origin region with West-East heterogeneity

	Dependent variable: location choice			
Sample:	outside EU-27		inside EU-27	
Column:	(XVI)		(XVII)	
	West × var	East × var	West × var	East × var
Market potential variables				
East	21.103		-75.586***	
	(21.833)		(16.738)	
EU membership	0.131		0.183***	
	(0.096)		(0.069)	
Peripherality index	-7.376***	-0.886[***]	-1.739	6.028**[***]
	(2.474)	(3.216)	(2.419)	(2.870)
Internal market GDP	-5.116	-4.030	2.854	-8.917***[**]
	(5.060)	(3.606)	(4.610)	(2.370)
Income per capita	3.062	1.591	-5.228	5.574***[**]
	(5.094)	(3.270)	(4.624)	(2.166)
Population density	-0.733	-8.380**	-9.948**	6.262**[***]
	(4.945)	(3.684)	(4.320)	(2.573)
Growth rate	0.046***	0.035***	-0.009	0.016**[*]
	(0.011)	(0.010)	(0.012)	(0.007)
Resource variables				
Physical infrastructure	0.940***	0.070[***]	0.787***	0.067[***]
	(0.145)	(0.201)	(0.157)	(0.137)
Secondary education	0.013***	-0.036*[**]	0.012**	-0.006
	(0.004)	(0.020)	(0.005)	(0.015)
Tertiary education	0.026***	-0.047**[***]	0.025**	-0.017[**]
	(0.010)	(0.023)	(0.011)	(0.016)
Unemployment rate	-0.042***	-0.003[**]	-0.057***	-0.000[***]
	(0.009)	(0.013)	(0.009)	(0.009)
Wage rate	0.748	-0.228	0.004	-0.520
	(0.486)	(0.554)	(0.526)	(0.370)
Dummy: wage rate	-9.629	-5.803*	13.312	-6.061***
	(17.619)	(3.279)	(15.943)	(2.348)
Macroeconomic variables				
Openness to trade	-0.002	-0.005	0.001	-0.006***[***]
	(0.002)	(0.004)	(0.002)	(0.002)
Exchange rate	-0.009***	-0.019***[**]	-0.011***	-0.016***
	(0.002)	(0.004)	(0.003)	(0.003)
Exchange rate volatility	-0.013***	0.014**[***]	-0.002	0.005
	(0.004)	(0.007)	(0.005)	(0.005)
Single currency	0.276***	0.755***[**]	0.224***	0.711***[***]
	(0.077)	(0.205)	(0.082)	(0.144)
Corporate tax rate	-0.009**	-0.036***[***]	-0.003	-0.035***[***]
	(0.004)	(0.008)	(0.004)	(0.006)
EU Structural Funds	-0.021	-0.065***	-0.065	-0.081***
	(0.038)	(0.018)	(0.044)	(0.013)
Political risk	0.005	-0.003	-0.006	0.021**[***]
	(0.004)	(0.012)	(0.005)	(0.008)
Industry variables				
Foreign specialisation	0.087***	0.012***[***]	0.076***	0.010***[***]
	(0.007)	(0.002)	(0.007)	(0.002)
Domestic specialisation	0.168***	0.130***[**]	0.133***	0.113***
	(0.012)	(0.013)	(0.021)	(0.013)
Jacobs term	-0.078***	0.010[**]	-0.063***	-0.006[*]
	(0.019)	(0.040)	(0.019)	(0.032)
Herfindahl index	-0.749***	-1.160***[***]	-0.955***	-0.929***
	(0.053)	(0.087)	(0.053)	(0.062)
Dummy: Bulgaria-Romania	-	6.576	-	22.538***
		(8.386)		(5.592)
Dummy: Herfindahl index	-0.991***	-1.484***[***]	-1.178***	-1.256***
	(0.073)	(0.102)	(0.066)	(0.069)
Country fixed effects	Yes		Yes	
Log-likelihood	-43,635.2		-44,281.4	
Wald statistic	25,569.8		13,633.3	
N	469,350		408,225	

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level; [***]/[**]/[*] coefficient significantly different at 1%/5%/10% significance level between West and East national firms originating from the EU-27, the market access motive is not evident for the inward investment in the West, but the motive appears to be market-seeking when investing in the East. In particular, these firms are attracted to the core areas within CEECs and those relatively smaller, richer, more densely populated and faster growing economies are preferred.

The 'specific-asset' resource-seeking tendencies exert a strong influence on the location behaviour of multinational firms that invest in the West, and this applies to both firms from outside and inside the EU-27. The multinational firms choose those host economies in the West that possess better physical infrastructure and labour force with better skills (both middle secondary and higher tertiary skills). The unemployment acts as a deterrent to inward investment in the West due to its detrimental effect on the skills of the labour force. Wages are not statistically significant, meaning that in search of skills firms are not discouraged from paying a wage premium to the workers. The resource-seeking motive does not influence the location strategies of multinational firms from the EU-27 investing in the East as none of the resource variables is statistically significant. Those direct investors from outside the EU-27 appear to be motivated by the 'general-asset' resource-seeking as the negative and statistically significant parameter estimates on the secondary and tertiary education demonstrate that they seek unskilled labour inputs in CEECs.

The other macroeconomic and industry variables are generally consistent across the two samples, and across the West and East. Those variables that change sign or become statistically insignificant include the exchange rate volatility, which is negative for the FDI from outside the EU-27 in the West, positive for the FDI from outside the EU-27 in the East, and statistically insignificant for the investment from the EU-27. The corporate tax rate, which tends to have a detrimental effect on inward FDI, does not affect the probability of the investment from inside the EU-27 in the West. The size of the EU Structural Funds payments does not affect the investment in the West but discourages the inward FDI to CEECs. The openness to trade and the political risk are mostly insignificant, although FDI from inside EU-27 prefers to locate in those CEECs that are less open to trade and more politically stable. Finally, as discovered in the other models with West-East heterogeneity, the inter-industry agglomeration of Jacobs is not a motive for investment in the East.

In summary, the multinational firms from outside of the EU-27 are not market-seeking but display a 'specific-asset' and 'general-asset' resource-seeking behaviour as they invest in the 'old' EU-15 and the 'new' EU-10 countries respectively. Surprisingly, it appears that the access to the EU Single Market is not necessarily the motive for inward FDI from outside the EU-27. The investors from inside the EU-27 are reluctant to invest in CEECs that remain outside the EU, but the positive and statistically significant

EU membership term suggests that as these countries accede to the EU, they start to receive larger inflows of FDI from inside the EU. The multinational firms from inside the EU-27 are seeking market access as they choose to locate in the 'new' EU-10 but prefer access to better quality resources in the 'old' EU-15, most of all workforce skills and physical infrastructure.

5.6 Conclusions

This chapter provides comprehensive cross-country evidence on the motives that drive FDI location decisions in the EU-25. It distinguishes between market access and resource factors, and tests for the presence of efficiency-seeking behaviour through the exploitation of economies of scale. Specifically it examines how the three motives for FDI location differ between the 'old' and 'new' Member States of the EU and seeks to establish whether there exists a significant 'West-East divide' in the location preferences of multinational firms. To capture the discrete choice nature of location choice, a conditional logit model is used and a range of market-based and resource-based factors are analysed, including macroeconomic and industry controls.

Overall, the chapter shows that market access and resource-seeking motives are both important for FDI location in the EU-25 but reveals differences in the location behaviour exist, both between the West and East and between the different investment modes. Allowing for FDI location motives to differ between 'old' and the 'new' EU Member States, the results show that FDI tends to avoid congested locations in the EU-15 by locating in the periphery further away from main markets, but this tendency is not evident for the EU-10 countries, which suggests that access to the market is important for the latter. Investment in the EU-15 is predominantly 'specific-asset' resource-seeking, as a better educated workforce attracts FDI and multinational firms are prepared to pay for the skills of the labour force. The market-seeking and the 'general-asset' resource-seeking are the motives for FDI location in the 'new' EU-10 as firms tend to locate in the rich, core markets, and the tendency to avoid locations where workers are highly-skilled suggest that those direct investors consider the inexpensive unskilled and semi-skilled workers as a source of comparative advantage for the multinational firms operating in CEECs.

An analysis distinguishing between new and re-investment projects shows that re-investments are quite different in nature to new investments, so that they are not simply about adding scale to existing operations for the purpose of achieving greater economies of scale. While greater economies of scale or scope may be a consequence of these expansions, the results of this analysis suggests that they are also subject to market-access and resource-seeking motives, so that they are not being made to simply add scale to existing operations for efficiency motives. Allowing for the West-East heterogeneity, the analysis by project type indicates that the 'specific-asset' resource-seeking motive affects both new investment and re-investment projects in the EU-15, as investing multinational firms are motivated by access to better physical infrastructure and a skilled labour force but avoid areas with a high level of unemployment, where skills may have been eroded. The market access motive dominates the location choices of new investment and re-investments in the EU-10, where depending on the project type investing multinational firms seek rich, densely populated and fast growing markets in the core of the CEECs. The analysis also shows that in the EU-10 the labour costs discourage new investment while re-investments are less likely to occur where workers are highly skilled, suggesting that the 'general-asset' resource-seeking motive is important for new investments and re-investments in CEECs.

To account for different degrees of information asymmetries faced by the multinational firms from outside and inside the EU-27 the motives for FDI location are analysed depending on the origin region of the investor. It is found that the 'specific-asset' resource-seeking motive influences the FDI location choice of the multinational firms from both outside and inside the EU-27 that seek access to better quality resources as they invest in the 'old' EU-15 countries, most of all workforce skills and physical infrastructures. The unskilled labour inputs are sought by the direct investors from outside of the EU-27 choosing to invest in the 'new' EU-10, suggesting the 'general-asset' resource-seeking. The multinational firms from inside the EU-27 want access to the market as they choose to locate in the CEECs but are reluctant to invest prior to their accession to the EU, indicative of the benefits of the fifth enlargement to the CEECs. In general, the multinational firms from outside the EU-27 are not market-seeking.

Overall, the chapter shows that the 'old' EU-15 continues to be a more attractive destination for investment than the 'new' EU-10 Member States, independent of the investment mode. The results also indicate that on the whole access to the EU Single Market increases the inflow of FDI, indicating that the 'new' EU-10 benefited from EU accession in 2004 and 2007. Similarly, the Single currency is also found to encourage FDI location, suggesting that the 'new' EU-10 Member States should see their investment grow as they choose to adopt the Single currency. Although the analysis shows that unskilled and semi-skilled workforce is a source of comparative advantage for the CEECs, this chapter stops short of considering upskilling strategies inefficient in attracting inward investment to these countries. Over time, the economic development of the 'new' EU-10 is expected to gradually catch with that of the 'old' EU-15, and as less economically developed countries such as Turkey and former Yugoslav republics are expected to join the EU in the future, the highly skilled workers may become a new source of comparative advantage for the CEECs as these countries start to resemble the 'old' EU-15.

Chapter 6

Border and Distance Effects

6.1 Introduction

The signing of the Single European Act in 1986 and the establishment of the Single European Market in 1993 laid the foundations for the dismantling of trade barriers and the simplification of rules. The 'four freedoms' it embodied - the free movement of people, goods, services and capital - formed the basis for the Single European Market and were intended to foster strong economic integration. As well as augmenting trade (Crozet and Koenig Soubeyran, 2004), it is likely that a reduction in trade barriers will alter the economic geography of countries in the new and existing Member States (Hanson, 2001). The continuing deepening and widening of economic integration within the EU provides a highly relevant backdrop for examining the spatial effects of European integration on the location of economic activity. Indeed, while one of the main benefits of the enlargement was a boost to economic activity, Bruelhart and Koenig (2006) note that a reconfiguration and reorganisation of productive activities in the EU is to be expected as "integration transforms the internal structures of national economies" (p. 246). Past efforts at economic integration have been associated with an increased interest in studying its implications for the spatial distribution of economic activity.

Arguably, the EU fifth enlargement was one of the most complete attempts at regional integration. At a regional level it is certainly much greater than the attempts to achieve integration outside of Europe, such as the Association of South East Asian Nations (ASEAN), African Union (AU), North American Free Trade Agreement (NAFTA) and Mercosur in South America. Niebuhr (2008) argues that the impact of the fifth enlargement on the location of economic activities in Europe is likely to be profound. Unquestionably, the integration of the CEECs into the European Union and the accession in 2004 and 2007 transformed their internal economic geographies. This includes the location of new industrial activity, such as foreign direct investment.

The empirical evidence on the spatial implications of regional economic integration for industrial location tends to focus on a small number of countries (e.g. Hanson, 1996 and Hanson, 2001 for US-Mexico border-city pairs, Overman and Winters, 2005 and Overman and Winters, 2006 for the UK). It also considers activity measures such as real GDP per capita, employment (e.g. Bruelhart *et al.*, 2004 for the Objective 1 peripheral regions of the EU-15) or wages (e.g. Bruelhart and Koenig, 2006 for Czech Republic, Hungary, Poland, Slovenia and Slovakia). Given the increased importance of multinational enterprise (MNE) activity in the form of FDI (Blonigen, 2005), which has grown at a faster rate than trade over the past three decades (Yeyati *et al.*, 2003), it is surprising that there is little analysis of the implications for the spatial distribution of FDI.

The aim of this chapter is to examine the distribution of FDI activity in the enlarged EU of 25 countries (EU-25) at the level of NUTS2 regions over 1997-2010. It considers how the Eastern enlargement altered the economic geography of FDI location, identifying the regions of the enlarged EU that have most benefited from the process of integration and the resulting reallocation of productive activity. In addition to an EU membership effect, the focus is on the border regions located along the former West-East border, which are likely to play a critical role within the spatial dynamics initiated by the fifth enlargement (Resmini, 2003b). Owing to the change in market access and the reduction in trade costs it is plausible that economic activity shifted from the eastern border regions of the 'old' EU (EU-15) towards the western border regions in the 'new' EU (EU-10) (Lafourcade and Paluzie Hernandez, 2005), especially if the motive for investment is access to resources at a lower cost. It could also be the case that both the eastern EU-15 regions and western EU-10 regions will gain from enlargement, as their relative position is altered from a peripheral region to an internal EU region (Niebuhr and Stiller, 2002).

If the motive for investment in the 'new' EU-10 is market-seeking and 'general-asset' resource-seeking (see: Chapter 5), then the bunching of FDI in the western EU-10 regions is expected for three reasons. Firstly, the 'new' EU-10 as a whole offer access to unskilled and semi-skilled labour resources at a lower real cost compared to the 'old' EU-10 countries. Secondly, investors want to invest in the 'new' EU-10 if the access to their internal national markets is desired. Thirdly, within these countries the western regions close to the West-East border offer relatively better market access to the EU Single Market as a whole. With the eastward extension of the EU Single Market, however, the border between the 'old' EU-15 and the 'new' EU-10 Member States is now closer to the middle of the enlarged EU-25, meaning that the border itself may not be a relevant determinant of the FDI distribution. Rather than the bunching of FDI in the EU-10 western border regions, FDI could be distributed more uniformly across the regions that are close to the middle of the EU-25 regardless of which side of the West-East border they are positioned. Another reason to think that the West-East border has not shaped spatial distribution of FDI after the fifth enlargement is because the location of FDI had already restructured along this border prior to enlargement in 2004.

To the best of my knowledge, this is the first study on the role of national borders in the reconfiguration of FDI location patterns after the 2004 enlargement using NUTS2 regional level for all the major EU countries. The aim of Lafourcade and Paluzie Hernandez (2005) is similar, but they use a gravity model to study an asymmetry between the border and interior regions of two countries only: France and Spain. They focus on the impact of European integration on the internal geography of trade rather than FDI, and a time period up to the year 2000 that is before the most recent wave of EU enlargement. This chapter considers FDI projects that are located in one of 260 NUTS2 regions of the EU-25 between 1997 and 2010, of which 206 are located in the 'old' EU-15 and 54 in the 'new' EU-10.[1] To study the spatial distribution of FDI activity across NUTS2 regions of the EU-25 I use data described in Chapter 4.[2]

The remainder of this chapter is organised as follows. The next section looks at the theoretical model that underpins the econometric analysis and explores what traditional location theory and the New Economic Geography models say with respect to the spatial implications of regional integration. These build on the literature review of Chapter 2. The econometric framework is set out in section 6.3, and the results of the estimation are presented and discussed in section 6.4. Section 6.5 concludes.

6.2 The Theoretical Framework

According to Longhi *et al.* (2003) there are three main strands to the literature on the impact of economic integration on the specialisation and the location of industrial activity: the neoclassical trade theory, the new trade theory and the new economic geography (NEG). As I have argued in Chapter 2, the neoclassical theory of international trade is the first attempt to explain the emergence of FDI. This is as a decision on where to locate production internationally. The neoclassical trade theory attempts to explain the spatial pattern of industrial location by examining differences between countries in either comparative advantage (Ricardo, 1821), such as technology or labour productivity, or in relative factor endowments (Heckscher, 1919; Ohlin, 1933). The theory offers an insight into where firms want to locate their production facilities and why. Towards the end

[1]As explained in Chapter 4, the NUTS1 region for London is used, so that strictly speaking I have 259 NUTS2 regions and one NUTS1 region.

[2]Two FDI projects are located in the Faroe Islands, which has autonomous status. It is not classed as a NUTS2 region of Denmark and since regional data is not available then there are 35,103 observations for this analysis. This also excludes fifty projects that located in Cyprus and Malta.

of 1970s and over the 1980s, the new trade theory emerged to explain why countries that produce similar goods and services continue to trade with each other, thus focusing on intra-industry international trade. The models emphasise the role of increasing returns to scale, product differentiation and monopolistic competition. The new trade theory acknowledges the role of market access and predicts that as trade barriers are removed, economic activities with increasing returns to scale will move to core locations with good market access. Krugman and Venables (1990) qualify this by arguing that the relocation of industries from periphery to the core is most likely to occur for the intermediate level of trade costs, since for low trade costs the geographical advantage of core locations disappears, which means that some activity will stay in the periphery.

Bruelhart and Koenig (2006) note that the NEG theory "provides a well-suited framework for a formal analysis of the internal geography of countries that open their markets towards the outside world" (p. 247). The NEG theory relies on four inherent elements to explain the spatial distribution of industrial location, and that underpin the general functioning of NEG models. These are increasing returns to scale, monopolistic competition, non-zero trade costs and external economies of scale (see: section 2.4 of Chapter 2).[3] Livas Elizondo and Krugman (1992) and Rauch (1991) demonstrate that owing to the existence of trade costs some locations will naturally possess a geographic advantage in production. Hanson (1996) ties this in with the market access concept and argues that border regions and port cities, which have relatively low-cost access to foreign markets, emerge as natural production sites. Therefore, regional integration is likely to lead to their expansion and result in the spatial agglomeration of economic activity in border regions and port cities. In this sense, market access acts as a principal determinant of the geographic structure of economic activity (Bruelhart and Koenig, 2006), and alongside trade costs it will be important in the reconfiguration of economic activity in response to integration.

Perhaps the most successful attempt at modelling the spatial consequences of regional integration, such as EU enlargement, is a two-country, three-region NEG model developed by Bruelhart *et al.* (2004). It is based on a three-region model that is derived from Pflueger (2001) as an analytically solvable version of Krugman's (1991) core-periphery model (see: section 2.4.2 of Chapter 2). The domestic country contains an interior region '1' and a border region '2'; but the foreign country consists of a single region '0' only. The domestic country can be thought of as the EU and the foreign country as an accession country. There are two sectors: a perfectly-competitive 'agriculture sector', which uses the labour (L) input only; and a monopolistically-competitive 'manufacturing sector', which not only uses fixed human capital (K) and variable labour (L),

[3] Ascani *et al.* (2012) is a detailed review of the main contributions to the NEG theory that focuses on the effects of economic integration on spatial development.

but produces a differentiated good that is characterised by increasing returns to scale. The size and composition of the foreign economy is exogenous, so that it has fixed amounts of labour and human capital, L_0 and K_0, but the domestic economy has fixed regional supplies of labour (L_1 and L_2), and interregionally mobile levels of human capital, which is therefore determined endogenously between regions 1 and 2. All goods are traded between the regions according to non-zero 'iceberg' trade costs.

The model predicts that trade liberalization, which lowers the external trade barriers (i.e., a regional integration process such as EU enlargement), will have implications for the spatial distribution of domestic manufacturing activity. Trade liberalisation triggers two countervailing forces. On the one hand, both domestic demand-related agglomeration and domestic cost-related agglomeration forces are weakened as domestic consumers represent a smaller share of domestic firms' sales, while at the same time foreign firms represent a more important share of supply to domestic consumers (Bruelhart *et al.*, 2004). On the other hand, external trade liberalisation increases the competition from foreign firms, reducing the importance for domestic firms of locating away from domestic competitors and weakening the dispersion force. Bruelhart *et al.* (2004) find that both their analytical and simulation results indicate that the effect of trade liberalisation on the dispersion force is stronger. However, this assumes perfect symmetry between domestic regions (the trade costs are equal), and while it is clear that closer economic integration reinforces the emergence of a domestic agglomeration of manufacturing activity, it is not possible to determine the location of these agglomerations.

Bruelhart *et al.* (2004) admit that the assumption of perfectly symmetric domestic regions is flawed, and they extend the model to allow for trade costs with the foreign market that differ between regions 1 and 2. It is supposed region 2 has better access to the foreign market, so that it is a border region, while region 1 is interior. This model predicts that domestic manufacturing is attracted towards the border region where they can benefit from the improved access to foreign demand, hence weakening the domestic agglomeration force. By contrast, the interior region offers domestic manufacturing firms a shelter from foreign competition, and this weakens the domestic dispersion force. The simulation results show that domestic manufacturing is generally attracted to the border region, unless the interior region has a relatively large share of domestic manufacturing prior to trade liberalisation. The larger the foreign country, the greater is the locational pull to the border region.

Bruelhart *et al.* (2004) examine the implications associated with changing the sectoral composition of the domestic and foreign economy (i.e. the balance between manufacturing and agriculture). Agricultural workers are an immobile workforce and represent a large demand without a threat of competition. For this reason, the location of domestic manufacturing in the border region is greater as the share of agriculture in the foreign country increases. The pull towards the border region also increases as the share of domestic manufacturing sector increases. Overall, this demonstrates that the border region is more likely to be the winner from integration the larger is the domestic share of manufacturing and the smaller is the foreign one.

6.3 Model Specification

The two-country, three-region NEG model of Bruelhart *et al.* (2004) predicts that a regional integration process that lowers external trade barriers and associated trade costs, such as EU enlargement, leads to a spatial reconfiguration of manufacturing activity. In this section an empirical approach is set out to examine how well the evidence supports these predictions. This is then explored at the NUTS2 regional level for FDI inflows to the EU-25 countries. The main interest is in the effect of EU integration on the regional distribution of FDI activity in the EU-25. For this purpose the dependent variable is measured by the number of FDI projects that region j receives at time t. However, as total inward FDI in the EU-25 as a whole varies over time, the regional share of EU-25 FDI projects is also considered. In either case, distance terms for the former West-East border are subsequently considered in order to capture border effects. This is the external EU-15 border that the 2004 EU enlargement made internal to the EU-25.

The regression model is specified in a log-linear form and estimated by the Least Squares Dummy Variable (LSDV) estimator. The following baseline equation is estimated across the 260 NUTS2 regions of the EU-25 from 1997 to 2010:

$$\begin{aligned}\ln \frac{\big((FDI{+}1)_{jt}\big)}{annualFDI_{EU,t}} = \beta_0 + \beta_1 \ln \frac{\big((FDI{+}1)_{jt-1}\big)}{annualFDI_{EU,t-1}} + \beta_2 \text{Spatial lag}_{jt} + \beta_3 X_{jt-1} \\ + \beta_4 EU_{jt} + \beta_5 EURO_{jt} + \beta_{6j} region_j + \beta_{7t} time_t + \varepsilon_{jt},\end{aligned} \tag{6.1}$$

where the dependent variable is the natural log of the number of FDI projects that region j receives at time t. Given that a region may receive no FDI in some years then the number of projects is increased by one in each case in order to work with logarithms, where $\ln(1) = 0$. The inclusion of time fixed effects effectively means that the denominator for the log of the sum of projects across the EU-25 is effectively dummied out in both the dependent variable and the lagged dependent variable, so that (6.1) is in effect a regression in the log of the number of projects. To regress (6.1) in the log of FDI shares it is necessary to omit the time fixed effects altogether, and both approaches are considered below (i.e it is regressed in the numbers and shares). The log-linear form means that the coefficients on the regressors give a proportionate effect.

The coefficient β_4 on the EU membership dummy variable is the parameter of interest as it captures the EU membership effect. It is a dummy variable, so that the proportionate effect can be evaluated as $\exp \beta_4 - 1$. Given that the theoretical model of Bruelhart *et al.* (2004) outlined in section 6.2 allows for different integration effects on domestic and foreign country, a distinction is made in the EU membership effect between the EU-10 (the dummy variable: 'New' EU) and the EU-15 (the dummy variable: 'Old' EU (after 2004)). Moreover, given that the effect of EU membership is also likely to vary by country (see: section 4.4.3 of Chapter 4), an allowance is made for the heterogeneity through the inclusion of interaction terms between the EU term and country dummies.

To capture the border effect the baseline regression model is subsequently generalized through the inclusion of a distance variable that captures the distance between the region and the (former) West-East border.

$$\begin{aligned} \ln \frac{\left((FDI{+}1)_{jt}\right)}{annualFDI_{EU,t}} = \beta_0 + \beta_1 \ln \frac{\left((FDI{+}1)_{jt-1}\right)}{annualFDI_{EU,t-1}} + \beta_2 \text{Spatial lag}_{jt} + \beta_3 X_{jt-1} + \beta_4 EU_{jt} \\ + \beta_5 EURO_{jt} + \beta_8 distance_j + \beta_{6j} region_j + \beta_{7t} time_t + \varepsilon_{jt}, \end{aligned} \tag{6.2}$$

where the β_8 coefficient measures the size of the distance effect.

Two distance measures are considered that are both measured in kilometres. The first is based on the shortest road distance between the capital of region j and the West-East border. The second is the shortest Euclidean distance, i.e. 'as the crow flies', from the capital to the West-East border border. As indicated in section 4.5.5 of Chapter 4, Google Maps is used to calculate the road distance, and the latter using an online Distance Calculator. The road distance is used in the main analysis, while the straight-line distance is used as part of a series of robustness checks. Naturally, the further is a region from the West-East border the weaker is the expected effect, so that a negative sign is expected on the β_8 coefficient. An explanation for this is that distance affects transport costs, which are a component of trade costs. To illustrate this it becomes harder to serve regional markets in Portugal from as far as the West-East border, and therefore industrial activity in Portugal is less likely to be affected by the Eastern EU enlargement than is industrial activity in Austria, say.

Similarly, as with the EU membership term, an asymmetry is allowed for in the effect that distance from the West-East border has on the 'old' and 'new' EU Member States. For this purpose, two interaction terms are defined: 'New' EU*road distance to EU border and 'Old' EU (after 2004)*road distance to EU border. Subsequently, this effect is investigated further to consider heterogeneity in distance between the 'new' EU-10 countries. The analysis of the FDI data in section 4.4.4 of Chapter 4 showed that two NUTS2 regions in the EU-10 that have a similar position relative to the West-East show a different performance in their post-accession level of FDI inflows.[4] A heterogenous treatment of distance effect is the most appropriate approach to capture this.

To test more directly the predictions of the 'asymmetric' version of the model of Bruelhart *et al.* (2004), border dummies are considered. These distinguish a border region from an interior region (see: section 4.5.5 of Chapter 4 for the discussion on how the border regions are defined and the dummies constructed). The aim is to establish if asymmetries exist in the response of economic activity in the border and interior regions of the accession countries, and if border regions are in a stronger position to attract more FDI after the EU enlargement given their proximity to the core of the European Single Market. The econometric model is modified, such that the distance term is replaced with a border term:

$$\begin{aligned}\ln \frac{\left((FDI{+}1)_{jt}\right)}{annualFDI_{EU,t}} = \beta_0 + \beta_1 \ln \frac{\left((FDI{+}1)_{jt-1}\right)}{annualFDI_{EU,t-1}} + \beta_2 \text{Spatial lag}_{jt} + \beta_3 X_{jt-1} \\ + \beta_4 EU_{jt} + \beta_5 EURO_{jt} + \beta_9 border_j + \beta_{6j} region_j + \beta_{7t} time_t + \varepsilon_{jt},\end{aligned} \tag{6.3}$$

where the β_9 coefficient measures the magnitude of the border effect, for which a positive and statistically significant coefficient indicates that regions located close to the West-East border have an advantage in attracting inward FDI. Again, as set out in section 4.5.5 of Chapter 4, I differentiate between different border region categories in order to see if the size of the border effect decays with distance.

In all cases, I work with a dynamic model by including a Lagged Dependent Variable (LDV) to allow for inertia in the location behaviour of the investing firms. The LDV approach is often used as a robust strategy to eliminate autocorrelation in the residuals and to model a dynamic data-generating process in an OLS regression. It is plausible that this year's inflow of FDI is strongly affected by the size of inward FDI in the previous year, meaning that the effects of an investment decision to set up a production site in a region this year persist into the future. In this situation it appears rational to adopt an LDV approach to account for serial dependence, and to model regional inward investment as a long-term process (Beck and Katz, 2011; Shumway and Stoffer, 2006). The use of the LDV model implies a loss of one year's worth of data, so that instead of using information on regional FDI activity for 14 years between 1997 and 2010, it is examined between 1998 and 2010. Since there are 260 NUTS2 regions this reduces the number of observations from 3,640 to 3,380.

In the spatial context, the model that most appropriately captures the features of the industrial location choice is dynamic in both time and space. Given the relatively

[4]Located at a similar distance to the West-East border, Podlaskie in Poland and Nord-Vest in Romania receive a similar number of FDI projects prior to the fifth enlargement in 2004, but markedly different FDI levels after 2004.

small size of the NUTS2 regions a spatial lag term is introduced into the specification to capture spatial dependence and interactions between NUTS2 regions. The spatial lag (otherwise referred to as the spatially lagged dependent variable) assumes that the magnitude of the regional FDI activity affects the size of FDI activity in neighbouring regions and it measures the spatial spillovers. Buczkowska and de Lapparent (2014), who study location choice of newly-created establishments at the aggregate level in the Paris metropolitan area, find that it improves model performance. This justifies the inclusion of the spatial lag term into my model to account for spatial spillovers, which are more important for small geographical units, such as NUTS2 regions.

Control variables are not of the main interest in this analysis, but it is important to include them in the model specifications to account for location factors that affect the spatial choice decision of a multinational firm. These are discussed at length in section 4.5 of Chapter 4 and their effect between the West and East was examined in Chapter 5. They include terms for market potential, resources, macroeconomic events and industry-level variables. All control variables are lagged one year, but except for the EU Single currency dummy, which was announced well in advance and may have been anticipated by investors. The EU membership terms are also not lagged, as this was also announced in advance and up to two years beforehand for the CEECs (see: Chapter 3).

Regional fixed effects are included in each model specification to control for unobserved region heterogeneity. This method of controlling for unobserved heterogeneity is referred to as the Least Squares Dummy Variable (LSDV) estimator. The LSDV estimator draws out the individual region heterogeneity of the error term by including dummies for each NUTS2 region (Roodman, 2009b). Time dummies are also part of the baseline regression model and they control for the time trends, such as the effect of the macroeconomic business cycle on the location of FDI activity. Finally, my model specifications make use of the clustered standard errors by NUTS2 region. The usual assumption in the regression analysis is that the error terms are independently and identically distributed (*iid*). Naturally, when working with panel data with repeated observations on individual regions it is likely that the observations within region j group are correlated over time in some unknown way, inducing correlation in the error term, ε_{jt}, within j, but that error term correlation across groups of region j and region l is zero. This induces a severe bias in the conventional standard error estimates if there is also serial correlation in the error process (Kezdi, 2004). The introduction of the clustered standard errors by region ensures that I allow for the possibility that model errors in different time periods for a given region may be correlated but remain uncorrelated with model errors for different regions (Cameron and Miller, 2013).

Although the inclusion of time and region dummies in the LSDV estimator is a method used to control for unobserved heterogeneity, it is not a perfect measure. Given that the dependent variable, $\ln\left((FDI+1)_{jt}\right)$, is a function of the fixed effects, both the LDV and the spatial lag are correlated with the error term (Baltagi, 2008). In my model specification, both the LDV and spatial lag are endogenous explanatory variables. A solution to the fixed effects problem is to time difference the data (Hanson, 2001), but as discussed in section 4.2.2 of Chapter 4 this method makes it impossible to estimate the effect of time invariant variables, for example capital city status, and for that reason it is not used in this study. Nickell (1981) established that OLS parameter estimates on the LDV in a dynamic panel model are biased due to the correlation between the fixed effects and the LDV. The bias of the LSDV estimator is referred to as the 'Nickell bias', where the size of the bias is inversely related to time dimension of the panel. A Monte Carlo study by Judson and Owen (1999) showed that potentially severe biases of much as 20% remain even with a time-series dimension as large as 30 observations. To handle the modelling concerns such as fixed effects and the endogeneity of regressors, while avoiding 'Nickell bias' of the LSDV estimator, a two-step robust system generalised method of moments (GMM) estimator is also used to estimate the size of the border effects.

6.4 Empirical Results

This section presents the empirical results and considers how closely it supports the predictions of the three-region, two-country theoretical model on the regional implications of the EU integration. I start by examining the aggregate EU membership and distance effect of the integration, making an explicit distinction between the impact of EU enlargement and road distance from the West-East border on the 'new' EU-10 and 'old' EU-15 (Tables 6.1 and 6.2 below). After this, I allow the EU membership and distance effects to differ between countries (Tables 6.3 and 6.4). Subsequently, I explore the role of the time fixed effects (Tables 6.5 and 6.6). Finally, I estimate the regression models with the border effects (Tables 6.7 and 6.8) to examine the above predictions. In the extension to my econometric analysis I consider alternative measures of distance (Table 6.9) and investigate how the main results are affected as the country fixed effects are used instead of the region fixed effects (Table 6.10). The GMM methodology is used to estimate the regression models with the border effects and it constitutes the final part of the formal econometric analysis of this thesis (Tables 6.11 and 6.12).

6.4.1 Aggregate EU Membership and Distance Effects

I begin by estimating the aggregate EU membership and distance effect on the pattern of regional FDI location in the EU-25. This makes a simple distinction between the EU membership and distance effect on the acceding 'new' EU Member States (EU-10) and incumbent EU Member States (EU-15). In Table 6.1 I focus on the aggregate EU membership effect of the fifth enlargement for all CEECs (the first wave of 2004 is relevant for eight countries and the second wave of 2007 for two countries), but in Table 6.2 I allow for the distance from the West-East border to influence the spatial distribution of regional FDI location too. Both equations include region and time fixed effects. The specification is the log-linear model, which contains the Lagged Dependent Variable (LDV), spatial lag, the aggregate EU membership effect and a full set of control variables. The LDV and spatial lag are in the log form, and their interpretation differs from the other regressors. Positive and statistically significant coefficients on the LDV and spatial lag terms, which are bounded between zero and one, demonstrate inertia and spatial spillovers in the behaviour of multinational firms that invest in the EU-25. Specifically, the size of the regional inflows of FDI is not only influenced by the FDI inflows to that region in the previous year (inward FDI inertia) but also by that size of inward FDI in neighbouring regions.

Column (I) is the most basic version of my baseline regression model. First of all, focusing on the result in column (I) of Table 6.1, the estimate on LDV is positive and significant, although the magnitude of the estimate does not suggest that the persistence of regional FDI is strong. The estimate on the spatial lag term is also positive and significant, and in magnitude it is much greater, suggesting that the FDI is spatially autocorrelated at the NUTS2 region level (i.e. FDI tends to locate in regions that are contiguous). Many of the control variables are insignificant, but they indicate that at the region level high internal market potential and openness to trade attract FDI, but a high population density, wage rate and tax rate all deter FDI. These have the expected signs, with the population density term indicating that on the whole (across all regions) FDI tends to go to less densely populated regions. The Jacobs term indicates that FDI is attracted to more-diversified regions. These results for the control variables are worse than those found in Chapter 5, but they possibly reflect the fact that some of these terms are measured at the country rather than region level, while region fixed effects are included that capture persistent regional influences.

On EU membership, the insignificant coefficient on the 'new' EU dummy term is surprising, as it suggests that EU membership under the fifth enlargement failed to stimulate inward FDI across the NUTS2 regions of the accession countries. This could arise because the long period of the EU accession negotiations and the changes that the

Table 6.1: Regional FDI location: aggregate EU membership effect

	Dep. var.: LN(number of FDI projects)			
Sample:	Full	Full	Full	Full
Column:	(I)	(II)	(III)	(IV)
LDV: LN(number_FDI)	0.123***	0.123***	0.122***	0.119***
Spatial lag: LN(number_FDI)	0.666***	0.610***	0.612***	0.590***
'New' EU	0.110	0.280***	0.243**	-0.032
'Old' EU (after 2004)				-0.369***
EU membership ($\geq$ 1 year)		-0.062	-0.062	-0.057
EU membership ($\geq$ 2 years)		-0.250***	-0.249***	-0.252***
EU membership ($\geq$ 3 years)		0.006	0.007	-0.030
Capital city ('new' EU)			0.195*	0.203*
Capital city ('old' EU after 2004)				0.180**
Jacobs term	-0.079***	-0.076***	-0.076***	-0.080***
Dummy: Bulgaria-Romania	0.134	0.176	0.214	0.099
Adjacent market GDP	-0.023	-0.021	-0.019	-0.013
Peripherality index	-6.121	-6.518	-6.237	-2.741
Internal market GDP	0.011***	0.011***	0.011***	0.010***
Income per capita	-0.003	-0.003	-0.006	-0.009
Population density	-0.571**	-0.634**	-0.625**	-0.865***
Growth rate	0.146	0.155	0.206	0.116
Physical infrastructure	-4.742	-4.697	-5.026	-5.096*
Unemployment rate	0.648	0.451	0.469	0.360
Secondary education	0.196	0.199	0.203	0.277
Tertiary education	0.246	0.330	0.292	0.215
Wage rate	-0.044**	-0.043**	-0.041**	-0.032*
Dummy: wage rate	-0.558	-0.672	-0.745	-0.782
Openness to trade	0.434**	0.544***	0.537***	0.432**
Exchange rate	-0.301	-0.131	-0.127	-0.139
Exchange rate volatility	-0.492	-0.344	-0.320	-0.238
Political risk	0.334	0.302	0.267	0.173
Corporate tax rate	-0.692**	-0.636*	-0.645*	-0.581*
EU Structural Funds	-0.139	-0.076	-0.081	-0.052
Single currency	-0.030	-0.022	-0.022	0.008
N	3380	3380	3380	3380
R^2	0.847	0.848	0.848	0.849
$RMSE$	0.471	0.470	0.470	0.468
NUTS2 region fixed effects	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	Y

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

CEECs underwent do not exactly coincide with a surge in FDI in these countries. However, as the membership dummy is measured as unity for each year after enlargement, it could arise because the regions of the accession countries attracted more FDI upon their respective EU entry, which did not persist over time. To explore this, column (II) includes three post-accession dummies to capture the EU membership effect one, two and three years after membership (i.e. EU membership ($\geq$ 1 year), EU membership ($\geq$ 2 years), EU membership ($\geq$ 3 years) respectively). These dummies do not make an allowance for asymmetries between 'old' and 'new' EU Member States, as the purpose is to examine if the inward FDI falls-off after EU membership.

Column (II) demonstrates that EU membership has a positive and statistically significant effect on the inflows of FDI to NUTS2 regions in the 'new' EU, but the post-accession dummies reveal that this effect is not permanent. Overall, they show that the number of FDI projects in the EU-10 regions increased by 32.3% ($\exp(0.280) - 1$) on average, but that two years later it falls by 22.1% ($\exp(-0.250) - 1$), which partly offsets the initial gain in FDI from EU membership. A similar change in regional FDI is not observed at one and three years post-accession, as these coefficients are not significant. This regression suggests a reduced role of the effect that the neighbouring regions' FDI has on the size of the regional FDI inflow. The coefficient on the spatial lag term remains statistically significant but falls relative to column (I) (from 0.666 in column (I) to 0.610 in column (II)). The coefficient on LDV is unchanged.

The analysis of the FDI data in section 4.4.4 of Chapter 4 revealed the capital city region of a country tends to emerge as a prime destination for inward investment. For this reason, column (III) adds a capital city dummy for the 'new' EU Member States to account for the special status of these regions. The regression shows that the capital city dummy is positive and significant at the 10% level, suggesting that the capital city regions of CEECs attract 21.5% more inward FDI compared to other CEEC regions. As expected it causes the coefficient on the EU membership to drop from 0.280 (column (II)) to 0.243 (column (III)). This means that the EU membership increases the regional numbers of FDI projects in EU-10 by 27.5%, and not by 32.3% as the previous model suggested. The remaining coefficients remain broadly unchanged.

Finally, column (IV) of Table 6.1 separately estimates the EU membership effects for the 'old' and 'new' Member States by including dummy variables for the 'old' EU members and for the capital city regions of the 'old' EU Member States. Both dummies take the value of unity from 2004 onwards, which assumes that the EU integration shock on the incumbent EU Member States is effective from this date. The specification examines the aggregate EU membership effect of enlargement on both the incumbent EU Members and acceding countries. The estimates on the membership terms indicate a similar pattern to before, since while it is insignificant for the group of 'new' EU Member States, it is negative and significant for the 'old' EU Member States, suggesting that there were larger effects on FDI in the CEECs after EU membership. The post-accession effects are robust to the new specification. Overall, the net effect of EU membership on FDI in the CEECs now appears stronger (as high as 30.9%), but the comparison is now made between the 'new' and 'old' Members States after 2004 only, whereas previously it was across all years. This suggests that some of the 'old' Members States lost FDI to the 'new' Members as a result of accession. With regard to the capital city regions, both the 'new' and 'old' EU capital city regions attract more FDI after the EU enlargement, with an average of 22.5% and 19.7% more FDI projects respectively compared to the non-capital city regions. These capital city region dummies cause marginal reductions in the coefficients on the spatial lag (to 0.590) and LDV terms (to 0.119), suggesting that FDI has tended to build-up relatively more in these capital city regions in the post-accession period.

Table 6.2: Regional FDI location: aggregate EU membership and distance effects

	Dep. var.: LN(number of FDI projects)			
Sample:	Full	Full	Full	Full
Column:	(V)	(VI)	(VII)	(VIII)
LDV: LN(number_FDI)	0.123***	0.122***	0.122***	0.119***
Spatial lag: LN(number_FDI)	0.668***	0.611***	0.613***	0.593***
'New' EU	0.155	0.368***	0.327**	0.016
'Old' EU (after 2004)				-0.357***
EU membership ($\geq$ 1 year)		-0.065	-0.065	-0.059
EU membership ($\geq$ 2 years)		-0.251***	-0.251***	-0.251***
EU membership ($\geq$ 3 years)		-0.016	-0.014	-0.037
'New' EU: road distance to EU border	-0.011	-0.019	-0.018	-0.008
'Old' EU (after 2004): road distance to EU border				0.001
Capital city ('new' EU)			0.187	0.201*
Capital city ('old' EU after 2004)				0.182**
Jacobs term	-0.078***	-0.075***	-0.075***	-0.079***
Dummy: Bulgaria-Romania	0.133	0.177	0.214	0.105
Adjacent market GDP	-0.023	-0.021	-0.019	-0.012
Peripherality index	-6.745	-7.612	-7.282	-3.101
Internal market GDP	0.011***	0.011***	0.011***	0.010***
Income per capita	-0.004	-0.004	-0.007	-0.010
Population density	-0.557**	-0.616**	-0.608**	-0.867***
Growth rate	0.135	0.133	0.183	0.113
Physical infrastructure	-4.774	-4.737	-5.051	-5.145*
Unemployment rate	0.613	0.369	0.391	0.334
Secondary education	0.207	0.219	0.222	0.271
Tertiary education	0.244	0.333	0.297	0.215
Wage rate	-0.045**	-0.044**	-0.043**	-0.032
Dummy: wage rate	-0.554	-0.679	-0.749	-0.759
Openness to trade	0.409**	0.514***	0.509***	0.434**
Exchange rate	-0.302	-0.115	-0.113	-0.131
Exchange rate volatility	-0.501	-0.346	-0.323	-0.247
Political risk	0.347	0.316	0.282	0.188
Corporate tax rate	-0.751**	-0.724**	-0.728**	-0.629*
EU Structural Funds	-0.136	-0.064	-0.069	-0.048
Single currency	-0.034	-0.029	-0.028	0.004
N	3380	3380	3380	3380
R^2	0.847	0.848	0.848	0.849
$RMSE$	0.471	0.470	0.470	0.469
NUTS2 region fixed effects	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	Y

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

In addition to EU membership, the above discussion indicates that what matters for FDI in a region during the post-accession period is its position relative to the former West-East border. This is why Bruelhart *et al.* (2004) introduce a formal distinction between border and interior regions, allowing for an asymmetric reaction to an integration shock. I capture the effect of distance on the location of FDI activity by introducing a term for the road distance between the principal town of each region to the affected West-East border. I interact the distance term with 'new' EU and 'old' EU dummies to capture the aggregate distance effect for the incumbent EU Members and new accession countries. The results are presented in Table 6.2, which reproduce the specifications in Table 6.1, including the distance term. The distance term for the EU-10 is used for the 'new' EU dummy in columns (V) to (VII), but distance terms are included for each of the 'new' and 'old' EU dummies in column (VIII).

On the whole there is little difference between the respective estimation results of the models between Tables 6.1 and 6.2. The coefficients on LDV and spatial lag term remain positive and statistically significant in all columns, suggesting a positive effect on the amount FDI that a region receives based on its previous period's FDI and in adjacent regions. The positive effect of accession on regional FDI in the 'new' EU countries is again evident when allowance is made for its temporary effect through the post-accession change in FDI (columns (VI) and (VII)). In comparison with Table 6.1, the inclusion of the distance term causes the size of the coefficient on 'new' EU dummies to increase (from 0.280 in column (II) to 0.368 in column (VI) and from 0.243 in column (III) to 0.327 in column (VII)), implying that the EU membership increases the regional inflows of FDI to the 'new' EU-10 by up to 44.5%. This is notwithstanding that the estimate on the distance term is insignificant in both specifications. Indeed, as a whole, Table 6.2 does not find a statistically significant distance effect for either the EU-10 or EU-15 countries. The inclusion of the distance term causes the capital city region dummy for the 'new' countries to be insignificant in column (VII), although these are positive and statistically significant for both the 'new' and 'old' members in column (VIII). The net effect of membership on FDI in the CEECs is similar in columns (VII) and (VIII).

As regards the control variables, the coefficients on these are robust and change only a small degree between different model specifications in (I) to (VIII). The negative coefficient on population density is visibly larger for the specifications that include two sets of capital region dummies in columns (IV) and (VIII), but this suggests that investing firms reveal an even stronger preference for the less-densely populated regions once the attraction of the capital city regions is controlled for. These two regressions are also the only ones to suggest that investors prefer regions with less developed road infrastructure, although in either case at the 10% significance level. The coefficient on the corporate tax rate becomes less negative in columns (IV) and (VIII), suggesting that the investors for which this is more important locate in the capital city regions, e.g. head office functions, adding plausibility to the results.

6.4.2 Heterogenous EU Membership and Distance Effects

The next stage of the empirical analysis allows for the EU membership and distance effects to vary between the EU-25 countries. The examination of the FDI data in section section 4.4.4 of Chapter 4 revealed that on the whole the Czech NUTS2 regions perform worse in attracting FDI after 2004 enlargement, whereas the Romanian regions do much better. This calls for a heterogenous treatment of EU membership and distance terms in the formal econometric analysis. I begin by examining the EU membership effect for the 2004 EU enlargement (Table 6.3) and then add the heterogenous distance effect for the West-East border to the regression model (Table 6.4). Again, all equations include the region and time fixed effects.

I replace the aggregate 'new' EU membership dummy with ten country-specific EU dummies in columns (IX) to (XII). Moreover, in column (XII) I add further 15 EU terms to replace aggregate 'old' EU membership dummy. Overall, the introduction of the heterogenous effects for EU membership leads to a decrease in the value of the coefficients on LDV and spatial lag in all model specifications but which remain statistically significant. On average, and depending on the model specification used, a 10% increase in the last year's regional FDI level leads to a 0.8% to 1.0% increase in the regional number of FDI projects in the current year, which again points to a low level of regional persistence (i.e. $1.1^{0.088} - 1 = 0.008$ and $1.1^{0.108} - 1 = 0.010$). However, a 10% increase in FDI in neighbouring regions causes a 4.9% to 6.2% increase in regional FDI. Again, it points to a high level of spatial autocorrelation, with FDI locating in continuous regions. This is independent of the distance to the West-East border, since once this term is included the corresponding estimates are 0.9% to 1.0% for FDI inertia and 5.7% to 6.3% for the spatial dependence between contiguous regions.

First of all, an examination of Table 6.3 indicates that around half of the EU membership terms are significant for the regions in new accession countries. In case of column (IX) the coefficients on the EU membership terms seem to be biased downwards compared to the other columns. This could be due to the omission of the three post-accession terms, although this regression also omits the capital city region dummies, which is likely to translate into an upward bias. Indeed, once the post-accession terms are included, the latter may explain why column (X) produces the largest number of positive and statistically significant country-specific membership terms. It suggests that EU membership succeeded in encouraging more FDI projects in the NUTS2 regions of Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. This effect does not occur for Bulgarian, Czech, Estonian and Hungarian regions.

Overall, the analysis suggests that the regions of Romania, Slovakia and Slovenia have benefited the most from EU integration in terms of increased FDI. The pos-

Table 6.3: Regional FDI location: heterogenous EU membership effect

	Dep. var.: LN(number of FDI projects)			
Sample:	Full	Full	Full	Full
Column:	(IX)	(X)	(XI)	(XII)
LDV: LN(number_FDI)	0.108***	0.108***	0.107***	0.088***
Spatial lag: LN(number_FDI)	0.634***	0.574***	0.578***	0.502***
Bulgaria: EU membership	-0.147	-0.072	-0.101	-0.389***
Czech Republic: EU membership	-0.189	-0.016	-0.038	-0.287
Estonia: EU membership	-0.179***	0.039	-0.136	-0.488**
Hungary: EU membership	-0.090	0.099	0.073	-0.230
Latvia: EU membership	0.193***	0.414***	0.244	-0.129
Lithuania: EU membership	0.188**	0.375***	0.195	-0.190
Poland: EU membership	0.088	0.307**	0.298**	-0.000
Romania: EU membership	0.398***	0.523***	0.499***	0.236
Slovak Republic: EU membership	0.525***	0.647***	0.603***	0.364**
Slovenia: EU membership	0.857**	1.088***	1.006**	0.677
Austria: after 2004				-0.593***
Belgium: after 2004				-0.109
Denmark: after 2004				-0.211
Finland: after 2004				-0.372**
France: after 2004				-0.234
Germany: after 2004				-0.259*
Greece: after 2004				-0.617***
Ireland: after 2004				-0.387**
Italy: after 2004				-0.515***
Luxembourg: after 2004				0.538**
Netherlands: after 2004				-0.304**
Portugal: after 2004				-0.556***
Spain: after 2004				-0.390**
Sweden: after 2004				-0.232
United Kingdom: after 2004				-0.274
EU membership ($\geq$ 1 year)		-0.062	-0.061	-0.060
EU membership ($\geq$ 2 years)		-0.256***	-0.256***	-0.280***
EU membership ($\geq$ 3 years)		-0.016	-0.014	-0.043
Capital city ('new' EU)			0.172	0.217
Capital city ('old' EU after 2004)				0.152*
Jacobs term	-0.083***	-0.080***	-0.079***	-0.067***
Dummy: Bulgaria-Romania	0.404	0.495	0.506	-0.151
Adjacent market GDP	-0.022	-0.019	-0.018	-0.005
Peripherality index	-9.380	-9.655	-9.318	-36.532***
Internal market GDP	0.011***	0.011***	0.011***	0.010***
Income per capita	-0.007	-0.007	-0.009	-0.021
Population density	-0.552**	-0.604**	-0.593**	-0.669**
Growth rate	0.154	0.159	0.174	0.138
Physical infrastructure	-4.199	-4.155	-4.577	-6.497**
Unemployment rate	0.497	0.226	0.239	0.141
Secondary education	0.008	0.047	0.067	0.185
Tertiary education	0.154	0.218	0.151	0.246
Wage rate	-0.039**	-0.036*	-0.035*	-0.038*
Dummy: wage rate	-1.045*	-1.331**	-1.334**	-1.638**
Openness to trade	0.560***	0.670***	0.655***	0.665***
Exchange rate	-0.286	-0.032	-0.031	0.016
Exchange rate volatility	-0.544*	-0.365	-0.364	-0.304
Political risk	0.263	0.210	0.219	0.268
Corporate tax rate	-0.630*	-0.598*	-0.587*	-0.516
EU Structural Funds	-0.145	-0.079	-0.082	-0.030
Single currency	-0.082	-0.070	-0.067	0.023
N	3380	3380	3380	3380
R^2	0.849	0.850	0.850	0.853
$RMSE$	0.468	0.467	0.466	0.463
NUTS2 region fixed effects	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	Y

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

itive membership effect exists for all model specifications (columns (IX) to (XII)) for Slovakia, and in all but column (XII) for Romania and Slovenia. However, the capital city regions of Romania and Slovenia displayed a significant increase in FDI activity in the post-accession period (see: section 4.4.4 of Chapter 4), and any model that does not account for this is likely to produce upward bias on membership. The evidence on how EU membership affects regional FDI activity in the other 'new' EU countries is more mixed and therefore inconclusive. In essence, two out of the four model specifications in Table 6.3 point to a positive EU membership effect for regional FDI activity in Latvia, Lithuania and Poland, but a negative effect for FDI in Estonia. One specification finds a negative effect in Bulgarian regions (column (XII)). Finally, all regression models fail to establish the existence of a significant impact of EU integration on the size of inward investment inflows to NUTS2 regions in the Czech Republic and Hungary. In section 4.4.4 of Chapter 4 it was noticed that while some Czech and Hungarian NUTS2 regions enjoyed post-accession growth in FDI, others experienced a drop in their investment level after the enlargement.

The model specification in column (XII) is the only one to include country-specific 'old' EU membership terms. These results show that nine out of 15 'old' EU dummies are negative and statistically significant, which suggests that these fared less well than the CEECs subsequent to EU membership. Luxembourg is the only 'old' EU Member State for which a positive EU enlargement effect is found.[5] Furthermore, there may be a shortcoming associated with employing heterogenous country-specific EU-15 dummies. Essentially, since all EU-15 terms take the value of zero between 1997 and 2003, and unity thereafter, it may be argued that they are like post-enlargement country dummies. The inclusion of the country-specific EU-15 dummies alongside the country-specific EU terms for the 'new' EU-10 Member States means that the comparison between the EU-15 and EU-10 is made for the accession period only, rather than comparing between these across all years that is more relevant. This causes the heterogenous EU-15 terms to be of less interest, and for this reason I choose not to employ them in the remaining regression analyses of this study.

The next stage of the empirical analysis involves adding distance terms to the estimating equations. These results are shown in Table 6.4. Since I no longer include country-specific EU-15 terms then I do not consider the distance effect for the regions in the 'old' EU Member States. In columns (XIII) to (XV) of Table 6.4 I add ten 'new' EU country-specific distance measures, and in column (XVI) I use an aggregate distance term for the new accession countries as a whole. Given that the 'new' EU Member

[5] While the other EU-15 countries consist of several NUTS2 regions, which may see their inward FDI increase or decrease after enlargement, Luxembourg consists of a single NUTS2 region only. This may explain the positive and statistically significant coefficient on this Luxembourg EU term, where FDI activity rose after the fifth enlargement in 2004.

Table 6.4: Regional FDI location: heterogenous EU membership and distance effects

	Dep. var.: LN(number of FDI projects)			
Sample:	Full	Full	Full	Full
Column:	(XIII)	(XIV)	(XV)	(XVI)
LDV: LN(number_FDI)	0.099***	0.099***	0.098***	0.105***
Spatial lag: LN(number_FDI)	0.645***	0.586***	0.595***	0.580***
Bulgaria: EU membership	0.427	0.488	-0.000	0.529
Czech Republic: EU membership	-0.463***	-0.297*	-0.317*	0.015
Estonia: EU membership	-0.182***	0.033	-0.261	-0.075
Hungary: EU membership	0.251***	0.430***	0.341**	0.213
Latvia: EU membership	0.191***	0.409***	0.124	0.484**
Lithuania: EU membership	0.190**	0.374***	0.075	0.608*
Poland: EU membership	0.478**	0.695***	0.699***	0.503***
Romania: EU membership	0.237	0.359	0.391	0.995***
Slovak Republic: EU membership	0.653***	0.765***	0.606***	0.708***
Slovenia: EU membership	1.912***	2.121***	2.282***	1.034**
EU membership ($\geq$ 1 year)		-0.059	-0.057	-0.060
EU membership ($\geq$ 2 years)		-0.254***	-0.253***	-0.255***
EU membership ($\geq$ 3 years)		-0.017	-0.014	-0.013
'New' EU: road distance to EU border				-0.058
Bulgaria: road distance to EU border	-0.053	-0.052	-0.011	
Czech Republic: road distance to EU border	0.304**	0.308**	0.290**	
Estonia: road distance to EU border	(omitted)	(omitted)	(omitted)	
Hungary: road distance to EU border	-0.140***	-0.137***	-0.119**	
Latvia: road distance to EU border	(omitted)	(omitted)	(omitted)	
Lithuania: road distance to EU border	(omitted)	(omitted)	(omitted)	
Poland: road distance to EU border	-0.111**	-0.111**	-0.117**	
Romania: road distance to EU border	0.019	0.019	0.011	
Slovak Republic: road distance to EU border	-0.071**	-0.067**	-0.017	
Slovenia: road distance to EU border	-2.769***	-2.718***	-3.509***	
Capital city ('new' EU)			0.288**	0.161
Jacobs term	-0.082***	-0.079***	-0.078***	-0.079***
Dummy: Bulgaria-Romania	0.128	0.225	0.164	0.419
Adjacent market GDP	-0.022	-0.019	-0.017	-0.018
Peripherality index	-9.457	-9.731	-9.231	-9.421
Internal market GDP	0.011***	0.011***	0.011***	0.011***
Income per capita	-0.008	-0.007	-0.010	-0.009
Population density	-0.556**	-0.608**	-0.591**	-0.598**
Growth rate	0.157	0.162	0.190	0.182
Physical infrastructure	-4.829	-4.775	-5.480*	-4.507
Unemployment rate	0.520	0.250	0.263	0.256
Secondary education	-0.020	0.019	0.052	0.034
Tertiary education	0.178	0.241	0.155	0.145
Wage rate	-0.039**	-0.036*	-0.035*	-0.035*
Dummy: wage rate	-0.768	-1.055**	-0.988*	-1.332**
Openness to trade	0.563***	0.672***	0.652***	0.654***
Exchange rate	-0.286	-0.033	-0.029	-0.034
Exchange rate volatility	-0.542	-0.364	-0.358	-0.365
Political risk	0.278	0.224	0.235	0.225
Corporate tax rate	-0.633*	-0.601*	-0.585*	-0.589*
EU Structural Funds	-0.146	-0.081	-0.086	-0.081
Single currency	-0.082	-0.070	-0.066	-0.068
N	3380	3380	3380	3380
R^2	0.851	0.852	0.852	0.851
$RMSE$	0.466	0.465	0.465	0.466
NUTS2 region fixed effects	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	Y

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

States of Estonia, Latvia and Lithuania consist of a single NUTS2 region each only, the method I employ makes it impossible to confirm the existence of distance effect in spatial distribution of FDI activity in these three countries, since there is no way to compare size of FDI inflows in the regions of each of these countries that are either closer or further away from the West-East border.

The estimates of the distance effect in Table 6.4 are generally consistent across the model specifications, which mean that I find a negative distance effect for the NUTS2 regions of Hungary, Poland, Slovakia and Slovenia. For the regions of the Slovakia, a negative and statistically significant distance effect is identified provided that no capital city region dummy is employed in the regression. The interpretation of the heterogenous country-specific distance terms is that after the fifth enlargement FDI activity has reorganised within Hungary, Poland, Slovakia and Slovenia, such that regions within these countries in proximity to the West-East border have gained most FDI in the post-accession period. Therefore, the results identify NUTS2 regions in Hungary, Poland, Slovakia and Slovenia that are located closer to the West-East border to be the 'winners' of the EU integration, as opposed to their Eastern counterparts, which are the 'losers'. The distance effect is not statistically significant for the regions in Bulgaria and Romania, but these are a longer distance away from the former West-East border, as defined by the 2004 accession.

A peculiar feature of these results is that there is compelling evidence for a significant and positive distance effect for the regions of the Czech Republic. This suggests that after the EU accession in 2004 the regions closer to the West-East border did worse on average in attracting FDI activity compared to the regions that are further away, and that FDI activity has reorganised and relocated towards the interior regions. This is surprising, but an examination of the FDI data reveals that in the post-enlargement period the border regions in the Czech Republic lost their competitive position as a destination of inward FDI to the advantage of interior regions (see: section 4.4.4 of Chapter 4). This places the Czech border regions as the 'losers' of the EU enlargement and its interior regions as the 'winners'.

The inclusion of the country-specific distance terms in Table 6.4 yields some differences in the estimates of the EU membership terms compared to Table 6.3. In the earlier analysis I was unable to find a statistically significant membership effect for the NUTS2 regions of the Czech Republic and Hungary. However, once the distance terms are included, a negative and statistically significant EU membership effect is found for the regions of the Czech Republic, but which gets less negative with distance. The opposite is the case for Hungary. Perhaps, contrary to expectations, the models with heterogenous distance terms in columns (XIII) to (XV) produce an insignificant coefficient on the EU membership for Romania. Finally, in column (XVI) an aggregate distance term is included for the accession countries. Although this term is insignificant, this regression demonstrates that a large proportion of regions in the 'new' EU experienced a positive EU membership effect. These comprise the regions of Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. However, this should be treated with caution as the aggregate distance term does not perform well.

6.4.3 EU Membership and Distance: An Examination for FDI Shares

The purpose of this section is to examine whether the measurement of the dependent variable substantially affects the conclusions that can be drawn. As indicated above, the inclusion of time fixed effects in the model means the denominators in the dependent and lagged dependent variable are dummied out, as these do not vary within a time period, so that this is effectively an equation in the (log) number of FDI projects. However, the exclusion of the time effects imposes these terms on the estimation and it is a regression in (log) FDI shares. Two sets of results are presented: the first includes time fixed effects as part of the specification and is for the (log) number of FDI projects (see: Table 6.5) and the second omits the time dummies and is for (log) FDI shares relative to that of the EU-25 as a whole (see: Table 6.6). I focus on the degree to which two sets of regression results differ from each other. The advantage of using the share is that it holds constant events that affect the EU-25 level of FDI. Once again, in all specifications I examine the EU membership and distance effects both at the aggregate and country-specific level. In addition to the EU and distance terms the control variables are also included. I start by estimating the basic regression model that contains LDV, the EU membership term for 'new' regions and a full set of controls (column (XVII) in Table 6.5 and a corresponding column (XXIV) in Table 6.6) but I subsequently extend this by adding extra terms (the three post-accession terms, spatial lag and distance term). In this respect, the model specifications in columns (XIX), (XX), (XXII) and (XXIII) of Table 6.5 correspond to the results found in the earlier sections of this chapter.[6]

Importantly, the comparison between the regression estimates in Tables 6.5 and 6.6 demonstrate that a decision about whether or not to account for year-specific heterogeneity makes little difference to the estimates on the EU membership and distance terms, as well as on the LDV and spatial lag terms. Essentially, the coefficients show little difference between corresponding columns in these two regression tables. Furthermore, should a variable pass statistical significance test in a model specification with year fixed effects, it often passes it too in the corresponding model specification that omits the year dummies. This is reassuring as it means that regardless of whether

[6]To be precise, column (XIX) replicates column (II) of Table 6.1, column (XX) replicates column (VI) of Table 6.2, and columns (XXII) and (XXIII) replicate columns (XIV) and (XV) of Table 6.4.

Table 6.5: EU membership and distance effects: FDI numbers

	Dep. var.: LN(number of FDI projects)						
Sample:	Full	Full	Full	Full	Full	Full	Full
Column:	(XVII)	(XVIII)	(XIX)	(XX)	(XXI)	(XXII)	(XXIII)
LDV: LN(number_FDI)	0.140***	0.137***	0.123***	0.122***	0.106***	0.099***	0.098***
Spatial lag: LN(number_FDI)			0.610***	0.611***	0.577***	0.586***	0.595***
'New' EU	0.123	0.348***	0.280***	0.368***			
Bulgaria: EU membership					0.570	0.488	-0.000
Czech Republic: EU membership					0.036	-0.297*	-0.317*
Estonia: EU membership					0.091	0.033	-0.261
Hungary: EU membership					0.241*	0.430***	0.341**
Latvia: EU membership					0.648***	0.409***	0.124
Lithuania: EU membership					0.785***	0.374***	0.075
Poland: EU membership					0.516***	0.695***	0.699***
Romania: EU membership					1.028***	0.359	0.391
Slovak Republic: EU membership					0.751***	0.765***	0.606***
Slovenia: EU membership					1.112***	2.121***	2.282***
EU membership ($\geq$ 1 year)		-0.073	-0.062	-0.065	-0.061	-0.059	-0.057
EU membership ($\geq$ 2 years)		-0.341***	-0.250***	-0.251***	-0.256***	-0.254***	-0.253***
EU membership ($\geq$ 3 years)		-0.002	0.006	-0.016	-0.015	-0.017	-0.014
'New' EU: road distance to EU border				-0.019	-0.059*		
Bulgaria: road distance to EU border						-0.052	-0.011
Czech Republic: road distance to EU border						0.308**	0.290**
Estonia: road distance to EU border						(omitted)	(omitted)
Hungary: road distance to EU border						-0.137***	-0.119**
Latvia: road distance to EU border						(omitted)	(omitted)
Lithuania: road distance to EU border						(omitted)	(omitted)
Poland: road distance to EU border						-0.111**	-0.117**
Romania: road distance to EU border						0.019	0.011
Slovak Republic: road distance to EU border						-0.067**	-0.017
Slovenia: road distance to EU border						-2.718***	-3.509***
Capital city ('new' EU)							0.288**
Jacobs term	-0.093***	-0.088***	-0.076***	-0.075***	-0.080***	-0.079***	-0.078***
Dummy: Bulgaria-Romania	0.267	0.309	0.176	0.177	0.407	0.225	0.164
Adjacent market GDP	-0.014	-0.013	-0.021	-0.021	-0.019	-0.019	-0.017
Peripherality index	-9.716	-9.837	-6.518	-7.612	-9.739	-9.731	-9.231
Internal market GDP	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***
Income per capita	-0.009	-0.008	-0.003	-0.004	-0.007	-0.007	-0.010
Population density	-0.711**	-0.783***	-0.634**	-0.616**	-0.608**	-0.608**	-0.591**
Growth rate	0.412	0.393	0.155	0.133	0.168	0.162	0.190
Physical infrastructure	-3.590	-3.659	-4.697	-4.737	-4.112	-4.775	-5.480*
Unemployment rate	0.995**	0.683	0.451	0.369	0.244	0.250	0.263
Secondary education	0.167	0.175	0.199	0.219	0.015	0.019	0.052
Tertiary education	0.376	0.477	0.330	0.333	0.206	0.241	0.155
Wage rate	-0.064***	-0.060***	-0.043**	-0.044**	-0.036*	-0.036*	-0.035*
Dummy: wage rate	-1.499***	-1.549***	-0.672	-0.679	-1.329**	-1.055**	-0.988*
Openness to trade	0.578***	0.714***	0.544***	0.514***	0.667***	0.672***	0.652***
Exchange rate	-0.458**	-0.205	-0.131	-0.115	-0.035	-0.033	-0.029
Exchange rate volatility	-0.710**	-0.479	-0.344	-0.346	-0.366	-0.364	-0.358
Political risk	0.630	0.552	0.302	0.316	0.217	0.224	0.235
Corporate tax rate	-0.867**	-0.764**	-0.636*	-0.724**	-0.599*	-0.601*	-0.585*
EU Structural Funds	-0.190*	-0.097	-0.076	-0.064	-0.078	-0.081	-0.086
Single currency	-0.057	-0.042	-0.022	-0.029	-0.071	-0.070	-0.066
N	3380	3380	3380	3380	3380	3380	3380
R^2	0.842	0.844	0.848	0.848	0.851	0.852	0.852
$RMSE$	0.478	0.475	0.470	0.470	0.466	0.465	0.465
NUTS2 region fixed effects	Y	Y	Y	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	Y	Y	Y	Y

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

Table 6.6: EU membership and distance effects: FDI shares

	Dep. var.: LN(share of FDI projects)						
Sample:	Full	Full	Full	Full	Full	Full	Full
Column:	(XXIV)	(XXV)	(XXVI)	(XXVII)	(XXVIII)	(XXIX)	(XXX)
LDV: LN(share_FDI)	0.146***	0.143***	0.125***	0.124***	0.109***	0.102***	0.100***
Spatial lag: LN(share_FDI)			0.692***	0.693***	0.669***	0.679***	0.688***
'New' EU	0.102	0.276***	0.208**	0.292**			
Bulgaria: EU membership					0.569	0.538	0.002
Czech Republic: EU membership					0.026	-0.307*	-0.331*
Estonia: EU membership					-0.031	-0.088	-0.408**
Hungary: EU membership					0.144	0.333***	0.237*
Latvia: EU membership					0.490***	0.248***	-0.062
Lithuania: EU membership					0.687**	0.269***	-0.056
Poland: EU membership					0.441**	0.618***	0.623***
Romania: EU membership					0.958***	0.275	0.312
Slovak Republic: EU membership					0.765***	0.796***	0.616***
Slovenia: EU membership					1.037***	2.062***	2.242***
EU membership ($\geq$ 1 year)		-0.051	-0.040	-0.043	-0.041	-0.039	-0.037
EU membership ($\geq$ 2 years)		-0.335***	-0.239***	-0.240***	-0.241***	-0.240***	-0.238***
EU membership ($\geq$ 3 years)		0.057	0.058	0.042	0.045	0.043	0.045
'New' EU: road distance to EU border				-0.019	-0.061*		
Bulgaria: road distance to EU border						-0.058	-0.013
Czech Republic: road distance to EU border						0.308**	0.289**
Estonia: road distance to EU border						(omitted)	(omitted)
Hungary: road distance to EU border						-0.138***	-0.118**
Latvia: road distance to EU border						(omitted)	(omitted)
Lithuania: road distance to EU border						(omitted)	(omitted)
Poland: road distance to EU border						-0.111**	-0.118**
Romania: road distance to EU border						0.020	0.010
Slovak Republic: road distance to EU border						-0.077**	-0.022
Slovenia: road distance to EU border						-2.756***	-3.625***
Capital city ('new' EU)							0.315**
Jacobs term	-0.024*	-0.018	-0.018	-0.017	-0.019	-0.018	-0.018
Dummy: Bulgaria-Romania	0.295	0.323	0.107	0.130	0.363	0.179	0.127
Adjacent market GDP	-0.011	-0.010	-0.021	-0.020	-0.019	-0.020	-0.017
Peripherality index	-11.431	-12.346*	-10.992	-11.258	-12.957*	-12.886*	-11.720
Internal market GDP	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***
Income per capita	-0.015	-0.014	-0.008	-0.009	-0.013	-0.013	-0.016
Population density	-0.663*	-0.715**	-0.550*	-0.542*	-0.537*	-0.537*	-0.521*
Growth rate	-0.105	-0.201	-0.296	-0.312	-0.325	-0.332	-0.302
Physical infrastructure	-3.726	-3.985	-5.203	-5.297	-4.490	-5.155*	-5.898*
Unemployment rate	0.853*	0.592	0.389	0.291	0.229	0.236	0.236
Secondary education	-0.131	-0.116	-0.043	-0.020	-0.184	-0.179	-0.140
Tertiary education	0.121	0.243	0.124	0.131	0.024	0.055	-0.031
Wage rate	-0.054***	-0.055***	-0.040**	-0.042**	-0.032*	-0.033*	-0.031
Dummy: wage rate	-1.087**	-1.264***	-0.426	-0.444	-0.953*	-0.670	-0.588
Openness to trade	0.468***	0.603***	0.444***	0.426**	0.519***	0.522***	0.504***
Exchange rate	-0.603***	-0.407*	-0.302	-0.285	-0.254	-0.251	-0.239
Exchange rate volatility	-0.406	-0.252	-0.180	-0.188	-0.271	-0.269	-0.256
Political risk	1.101***	1.044***	0.642*	0.652*	0.620*	0.628*	0.623*
Corporate tax rate	-1.393***	-1.319***	-0.993***	-1.079***	-0.968***	-0.972***	-0.964***
EU Structural Funds	-0.216**	-0.161*	-0.119	-0.118	-0.113	-0.114	-0.121
Single currency	-0.082*	-0.082	-0.060	-0.066	-0.088*	-0.087*	-0.084*
N	3380	3380	3380	3380	3380	3380	3380
R^2	0.839	0.841	0.846	0.846	0.849	0.850	0.850
$RMSE$	0.481	0.479	0.472	0.472	0.468	0.467	0.467
NUTS2 region fixed effects	Y	Y	Y	Y	Y	Y	Y
Time fixed effects	N	N	N	N	N	N	N

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

I use estimating equation in the number of FDI projects or in the share of FDI projects for the EU-25 the findings of the empirical analysis in respect of the strength of EU membership and distance that arise in the wake of the EU economic integration process are little changed. However, the same conclusion cannot be reached with respect to the control variables. Specifically, the comparison of the results in Tables 6.5 and 6.6 indicate that these estimates can vary quite considerably. This applies both to the size and significance of these estimates as follows.

First, all the model specifications in FDI numbers (columns (XVII) to (XXIII) in Table 6.5) are consistent. They suggest that greater industrial diversity encourages more inward investment, as reflected in the negative and significant Jacobs term that measures inter-industry agglomeration and diversification economies. However, this is not the case for the model specifications in FDI shares. With the exception of the basic model in column (XXIV), which also shows a negative and significant coefficient on the Jacobs term, the other share specifications indicate an insignificant inter-industry agglomeration. Second, according to the models in FDI numbers the location of a region in the core or periphery of the EU-25 does not make any difference to how much FDI it receives. However, the models in FDI shares are inconclusive, as columns (XXV), (XXVIII) and (XXIX) suggest that regions in more peripheral markets attract more FDI, while columns (XXIV), (XXVI), (XXVII) and (XXX) indicate that this is not an important consideration.

Third, a similar consideration applies to the role that the quality of the physical infrastructure has on the size of regional inward investment. With the exception of column (XXIII), all regression models that included time fixed effects show that road infrastructure is not an important consideration for the investing multinational firms. The models that omit time dummies are not equally conclusive, as some of them indicate that the on average more FDI tend to go to regions with less dense motorway network. However, this effect is confirmed in two out of seven model specifications and in all two cases the motorway density passes significance test at the 10% level.

Fourth, there is a discrepancy in what two sets of results say in relation to the impact of the exchange rate and exchange rate volatility on the size of regional FDI activity, but overall this difference is not large. However, what is more important is that a further examination of estimation results reveals that the models in FDI shares offer contrasting evidence on the effect of political risk. Specifically, all the model specifications in FDI shares show that locations that are characterised by lower political risk attract larger FDI shares (a positive and significant coefficient on political risk). On the contrary, all models with time fixed effects in Table 6.5 suggest that the political risk rating is not statistically significant.

Finally, there is ambiguous evidence offered by the two sets of models with respect to the effect of the EU Single currency on the size of regional FDI activity. The estimating equations with time fixed effects suggest that the Single currency has no effect on the number of FDI projects that a region receives. However, the models without time fixed effects offer some support that the effect of the EU Single currency on the regional shares of FDI is negative and significant at the 10% level.

6.4.4 The Role of National Borders: The Border Effect

This section explores the possible of an asymmetry between the border and interior regions that was derived at a theoretical level by Bruelhart *et al.* (2004). Unlike the theoretical model, my attention is focused on the asymmetry between the border and interior regions of the new accession states. Like above, I define a border region with reference to its location relative to the West-East border that existed as an external border to the 2004 EU prior to enlargement. I do not perform a similar analysis for the border affected by 2007 enlargement as only a small proportion of the land borders of Bulgaria and Romania are with other EU countries. Given that the border regions of the EU-10 are generally closer to the core of the EU, and therefore have better market access, I anticipate the border effect on regional FDI location to be positive.

Table 6.7 reports the estimation results for the models that test the border effect in regional FDI location in the 'new' EU Member States. Given that the border effect may occur over a large geographical area, three different dummies for whether a region in the EU-10 is a border region are considered (see: Table 4.12 and Figure 4.10 in Chapter 4): BORDER if the region is contiguous to the West-East border; BORDER 01 if it is separated from the West-East by at most one other region; and BORDER 02 if it is separated from the West-East by at most two other regions. I examine an asymmetric relationship between border and interior NUTS2 regions both at the aggregate EU-10 level and for individual 'new' EU Member States. The shortcoming of the latter approach is that some countries consist of a single NUTS2 region only, and for these a country-specific difference in distance effect on FDI activity in border and interior regions cannot be explored. A similar difficulty is associated with countries that consist of border regions only (i.e. Slovenia and the Czech Republic using the BORDER 02 classification below) or interior regions only (i.e. Bulgaria and Romania).

Overall, the results at the aggregate EU-10 level in Table 6.7 offer only partial support for a positive border effect on FDI location in response to EU integration. Columns (XXXI), (XXXIII) and (XXXV) show that the asymmetry in the border effect is not supported by BORDER and BORDER 01, although for the BORDER 02 measure the border regions of the EU-10 receive on average 38.8% ($\exp(0.328) - 1$) more FDI projects in each year than the interior regions after 2004. Also within the individual

Table 6.7: Border effects

	Dep. var.: LN(number of FDI projects)					
Sample:	Full	Full	Full	Full	Full	Full
Column:	(XXXI)	(XXXII)	(XXXIII)	(XXXIV)	(XXXV)	(XXXVI)
LDV: LN(number_FDI)	0.107***	0.103***	0.107***	0.100***	0.105***	0.105***
Spatial lag: LN(number_FDI)	0.580***	0.581***	0.574***	0.580***	0.574***	0.575***
Bulgaria: EU membership	-0.071	-0.071	-0.070	-0.073	-0.070	-0.070
Czech Republic: EU membership	-0.129	0.105	-0.120	0.610***	-0.345*	-0.018
Estonia: EU membership	-0.188	0.037	-0.099	0.039	-0.290**	0.038
Hungary: EU membership	0.066	0.052	0.040	0.003	-0.137	-0.213**
Latvia: EU membership	0.413***	0.415***	0.275*	0.416***	0.084	0.411***
Lithuania: EU membership	0.374***	0.371***	0.377***	0.368***	0.048	0.376***
Poland: EU membership	0.264**	0.198*	0.254**	0.136	0.100	0.096
Romania: EU membership	0.522***	0.523***	0.523***	0.524***	0.523***	0.523***
Slovak Republic: EU membership	0.591***	0.581***	0.579***	0.509***	0.404***	0.580***
Slovenia: EU membership	0.862**	1.092***	0.949**	1.098***	0.760*	1.087***
EU membership ($\geq$ 1 year)	-0.062	-0.061	-0.062	-0.059	-0.061	-0.061
EU membership ($\geq$ 2 years)	-0.255***	-0.255***	-0.256***	-0.255***	-0.256***	-0.256***
EU membership ($\geq$ 3 years)	-0.016	-0.017	-0.015	-0.018	-0.015	-0.015
'New' EU: BORDER region	0.226					
Bulgaria: BORDER region		(omitted)				
Czech Republic: BORDER region		-0.244				
Estonia: BORDER region		(omitted)				
Hungary: BORDER region		0.300***				
Latvia: BORDER region		(omitted)				
Lithuania: BORDER region		(omitted)				
Poland: BORDER region		0.573**				
Romania: BORDER region		(omitted)				
Slovak Republic: BORDER region		0.272***				
Slovenia: BORDER region		(omitted)				
'New' EU: BORDER 01 region			0.138			
Bulgaria: BORDER 01 region				(omitted)		
Czech Republic: BORDER 01 region				-0.834***		
Estonia: BORDER 01 region				(omitted)		
Hungary: BORDER 01 region				0.210		
Latvia: BORDER 01 region				(omitted)		
Lithuania: BORDER 01 region				(omitted)		
Poland: BORDER 01 region				0.452**		
Romania: BORDER 01 region				(omitted)		
Slovak Republic: BORDER 01 region				0.286***		
Slovenia: BORDER 01 region				(omitted)		
'New' EU: BORDER 02 region					0.328***	
Bulgaria: BORDER 02 region						(omitted)
Czech Republic: BORDER 02 region						(omitted)
Estonia: BORDER 02 region						(omitted)
Hungary: BORDER 02 region						0.435***
Latvia: BORDER 02 region						(omitted)
Lithuania: BORDER 02 region						(omitted)
Poland: BORDER 02 region						0.334*
Romania: BORDER 02 region						(omitted)
Slovak Republic: BORDER 02 region						0.093
Slovenia: BORDER 02 region						(omitted)
Jacobs term	-0.080***	-0.079***	-0.080***	-0.079***	-0.080***	-0.080***
Dummy: Bulgaria-Romania	0.492	0.480	0.495	0.458	0.476	0.479
Adjacent market GDP	-0.019	-0.018	-0.019	-0.016	-0.019	-0.019
Peripherality index	-9.693	-9.689	-9.740	-9.609	-9.668	-9.758
Internal market GDP	0.011***	0.012***	0.011***	0.012***	0.011***	0.011***
Income per capita	-0.007	-0.008	-0.006	-0.011	-0.007	-0.007
Population density	-0.602**	-0.620**	-0.608**	-0.645**	-0.609**	-0.609**
Growth rate	0.153	0.173	0.154	0.165	0.158	0.164
Physical infrastructure	-4.216	-4.126	-4.196	-4.205	-4.464	-4.441
Unemployment rate	0.234	0.250	0.248	0.250	0.276	0.274
Secondary education	0.050	0.046	0.036	0.066	0.032	0.027
Tertiary education	0.220	0.197	0.231	0.199	0.231	0.231
Wage rate	-0.036*	-0.036*	-0.036*	-0.035*	-0.036*	-0.036*
Dummy: wage rate	-1.325**	-1.318**	-1.337**	-1.308**	-1.330**	-1.332**
Openness to trade	0.670***	0.668***	0.671***	0.667***	0.669***	0.670***
Exchange rate	-0.031	-0.032	-0.033	-0.031	-0.035	-0.034
Exchange rate volatility	-0.366	-0.364	-0.368	-0.364	-0.369	-0.367
Political risk	0.212	0.220	0.215	0.236	0.227	0.226
Corporate tax rate	-0.597*	-0.595*	-0.599*	-0.595*	-0.597*	-0.599*
EU Structural Funds	-0.077	-0.072	-0.077	-0.069	-0.078	-0.078
Single currency	-0.070	-0.069	-0.070	-0.067	-0.070	-0.070
N	3380	3380	3380	3380	3380	3380
R^2	0.851	0.851	0.850	0.852	0.851	0.851
$RMSE$	0.466	0.466	0.466	0.465	0.466	0.466
NUTS2 region fixed effects	Y	Y	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	Y	Y	Y

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

countries, columns (XXXII), (XXXIV) and (XXXVI) show that the estimated border effect is not robust to the particular measure used. While the border effect tends to be positive, Poland is the only accession country for which its border regions consistently receive more FDI projects than their interior counterparts regardless of the border region definition employed.[7] Depending on the definition, the NUTS2 border regions of Poland are found to receive on average 77.4% more investment projects than interior regions under the 'narrow' BORDER definition (i.e a coefficient of 0.573), 57.1% more under the 'medium' BORDER 01 definition (0.452) and 39.7% more under the 'broad' BORDER 02 definition (0.334).

These results do not offer compelling evidence for a border effect in the economic geography of FDI location in the 'new' EU countries. However, it is noticeable that the Czech Republic is the only country for which I find a negative and statistically significant border effect under the 'medium' BORDER 01 definition. Furthermore, under the 'narrow' BORDER definition the parameter estimate on the Czech border dummy is negatively signed, albeit not statistically significant. Indeed, unlike other EU-10 countries a positive and significant effect was found for the distance variable for the Czech Republic in Tables 6.4 to 6.6. The peculiar geography of the Czech Republic suggests that the interior regions are close to the West-East both to the north, west and south of this country. Overall, these features suggest that the NUTS2 regions of the Czech Republic are outliers and display a pattern in the economic geography of FDI location that does not conform to the spatial distribution of FDI activity observed for the other 'new' EU countries. The presence of outliers can significantly distort parameter estimates and in the context of the border effect analysis perhaps explain why no statistically significant border effect was found for the EU-10 in aggregate. This provides a rationale for re-estimating the regression models in Table 6.8. Columns (XXXVII), (XXXVIII) and (XXXIX) of this table include a Czech-specific border dummy alongside the aggregate EU-10 border dummy, and a strong and consistent border effect is now apparent under either measure.

The parameter estimates on the border terms in the first three columns of Table 6.8 conform to my prior expectations. They demonstrate that the border effect on the regional distribution of FDI activity is negative and statistically significant for the Czech Republic, but positive and significant for the other 'new' EU Member States. This suggests that after the EU enlargement in 2004 inward FDI activity tended to locate in the interior NUTS2 regions of the Czech Republic, but in the other EU-10 countries the border regions were favoured as a prospective location. Singling out the special case

[7] According to the 'narrow' BORDER definition, a positive border effect on regional FDI activity is also found for Hungary and Slovakia, for the 'medium' BORDER 01 definition a positive effect is found for Slovakia, and lastly for the 'broad' BORDER 02 definition a positive border effect is found for Hungary.

Table 6.8: Border effects (the Czech Republic outlier)

	Dep. var.: LN(number of FDI projects)				
Sample:	Full	Full	Full	Full	Full
Column:	(XXXVII)	(XXXVIII)	(XXXIX)	(XL)	(XLI)
LDV: LN(number_FDI)	0.104***	0.100***	0.105***	0.098***	0.098***
Spatial lag: LN(number_FDI)	0.579***	0.581***	0.574***	0.587***	0.587***
Bulgaria: EU membership	-0.071	-0.072	-0.070	-0.073	-0.073
Czech Republic: EU membership	0.106	0.610***	-0.345*	0.449***	-0.739***
Estonia: EU membership	-0.422***	-0.324**	-0.290**	-0.562***	-0.562***
Hungary: EU membership	0.030	-0.062	-0.137	-0.127	-0.127
Latvia: EU membership	0.415***	0.054	0.084	0.117	0.117
Lithuania: EU membership	0.370***	0.369***	0.048	0.200	0.200
Poland: EU membership	0.220**	0.170	0.100	0.095	0.095
Romania: EU membership	0.522***	0.523***	0.523***	0.522***	0.522***
Slovak Republic: EU membership	0.535***	0.471***	0.404***	0.386***	0.386***
Slovenia: EU membership	0.633	0.735*	0.760*	0.500	0.500
EU membership ($\geq$ 1 year)	-0.061	-0.059	-0.061	-0.058	-0.058
EU membership ($\geq$ 2 years)	-0.255***	-0.255***	-0.256***	-0.254***	-0.254***
EU membership ($\geq$ 3 years)	-0.016	-0.018	-0.015	-0.018	-0.018
'New' EU: BORDER region	0.460***			0.598***	
Czech Republic: BORDER region	-0.704**			-1.188***	
'New' EU: BORDER 01 region		0.362***			
Czech Republic: BORDER 01 region		-1.196***			
'New' EU: BORDER 02 region			0.328***		0.598***
Czech Republic: BORDER 02 region			(omitted)		(omitted)
'New' EU: BORDER 12 region					-0.299*
Czech Republic: BORDER 12 region					0.044
'New' EU: BORDER 11 region				0.300**	
Czech Republic: BORDER 11 region				-1.143***	
'New' EU: BORDER 22 region				0.164	-0.135
Czech Republic: BORDER 22 region				(omitted)	1.143***
Jacobs term	-0.079***	-0.079***	-0.080***	-0.079***	-0.079***
Dummy: Bulgaria-Romania	0.470	0.458	0.476	0.444	0.444
Adjacent market GDP	-0.018	-0.016	-0.019	-0.015	-0.015
Peripherality index	-9.609	-9.607	-9.668	-9.528	-9.528
Internal market GDP	0.012***	0.012***	0.011***	0.012***	0.012***
Income per capita	-0.009	-0.011	-0.007	-0.012	-0.012
Population density	-0.620**	-0.645**	-0.609**	-0.639**	-0.639**
Growth rate	0.178	0.169	0.158	0.170	0.170
Physical infrastructure	-4.218	-4.178	-4.464	-4.347	-4.347
Unemployment rate	0.257	0.259	0.276	0.261	0.261
Secondary education	0.052	0.069	0.032	0.082	0.082
Tertiary education	0.188	0.201	0.231	0.188	0.188
Wage rate	-0.035*	-0.035*	-0.036*	-0.035*	-0.035*
Dummy: wage rate	-1.312**	-1.306**	-1.330**	-1.289**	-1.289**
Openness to trade	0.665***	0.666***	0.669***	0.664***	0.664***
Exchange rate	-0.032	-0.031	-0.035	-0.030	-0.030
Exchange rate volatility	-0.365	-0.364	-0.369	-0.362	-0.362
Political risk	0.224	0.238	0.227	0.241	0.241
Corporate tax rate	-0.593*	-0.594*	-0.597*	-0.591*	-0.591*
EU Structural Funds	-0.072	-0.068	-0.078	-0.068	-0.068
Single currency	-0.068	-0.067	-0.070	-0.066	-0.066
N	3380	3380	3380	3380	3380
R^2	0.851	0.852	0.851	0.852	0.852
$RMSE$	0.466	0.465	0.466	0.464	0.464
NUTS2 region fixed effects	Y	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	Y	Y

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

of the Czech Republic, the analysis shows that the NUTS2 regions contiguous to the West-East border on average receive 58.4% more FDI projects than the interior regions (i.e. a coefficient of 0.460). As I gradually broaden the border region definition, the relative advantage of the border regions in attracting FDI appears to diminish. While the border regions in the EU-10 (excluding the Czech Republic) receive 58.4% more FDI under the 'narrow' border definition, under the 'medium' definition the strength of the border effect is 43.6%, while under the 'broad' definition it is 38.8%.[8]

These results indicate that the border effect is weaker the greater is the area defined by the West-East border region. To examine this proposition empirically I consider the two auxiliary dummy variables: BORDER 11 and BORDER 22, which were defined in Table 4.12 of Chapter 4. These are subsets of the above border regions, where BORDER 11 = BORDER 01 - BORDER, so that these are separated from the West-East border by one other region, and BORDER 22 = BORDER 02 - BORDER 01, so that that these are separated from the West-East border by two other regions (see: Figure 4.10). I expect that on average border regions attract more inward FDI, but that the positive border effect diminishes for regions that are further away from this border. The parameter estimates for these terms are reported in column (XL) of Table 6.8. Since the Czech Republic does not fit with the spatial distribution of FDI observed for other EU-10 countries, then these regions are again dummied out.

Column (XL) confirms that the positive border effect diminishes in strength for regions further away from the West-East border. Specifically, the parameter estimate on the aggregate 'new' EU BORDER dummy is 0.598 and statistically significant at the 1% level, indicating that the NUTS2 regions in the EU-10 that are contiguous to this border on average receive 81.8% ($\exp(0.598) - 1$) more FDI per annum than the interior regions. This finding does not apply to the border regions of the Czech Republic, for which the border effect is negative and statistically significant. For the NUTS2 regions in EU-10 that are separated from the West-East border by another region (BORDER 11), the size of the border effect is 35.0%. It is a weaker border effect, but statistically significant at the 5% level, so that the BORDER 11 regions have a location advantage in attracting inward investment. However, this is not evident for the BORDER 22 regions, which are found not to receive significantly more FDI than the interior regions.

Finally, I examine if there is a statistically significant decay in the strength of the border effect with distance. For this purpose, I define a new border region dummy, BORDER 12, which consists of all BORDER 11 and BORDER 22 regions (see: Figure 4.10). Column (XLI) of Table 6.8 regresses the model with BORDER 02, BORDER 12

[8]Under the 'broad' BORDER 02 definition, all NUTS2 regions of the Czech Republic fall within the category of a border region and therefore the Czech border region effect cannot be estimated. As such, the parameter estimates in column (XXXIX) repeat those previously reported in column (XXXV).

and BORDER 22. The first term gives the strength of the border region effect for the regions that are contiguous to the West-East border, the second term determines if the effect is significantly smaller for the BORDER 11 regions and the third if it is smaller in the BORDER 22 regions. The estimates confirm a statistically significant decay in the strength of the border effect as the distance from the border increases. The regions alongside the West-East border receive 81.8% more FDI than the interior regions, as in column (XL), but the next set of regions (BORDER 11) on average receives 25.8% less FDI than the contiguous regions. However, the reduction in FDI for the BORDER 22 regions is not statistically significant.[9]

6.4.5 Extensions: Alternative Distance Measure

Earlier I found that the distance of a region from the West-East border has a negative effect on the inward investment effect in the EU-10 in the post-accession period. This was the case for both the number and the share of FDI projects in Tables 6.5 and 6.6. In this section I examine how robust the earlier results are to alternative specifications of distance, based on the regressions in columns (XXI) and (XXVIII) of these tables, where the distance term is statistically significant at the 10% level only. Table 6.9 considers three alternative measures of distance for the specifications in the number and share of FDI projects (i.e. with and without the time fixed effects). First, columns (XLII) and (XLV) include the distance terms as a quadratic. Second, columns (XLIII) and (XLVI) include the distance term in log form. Third, columns (XLIV) and (XLVII) consider an alternative measure of distance, which is using the Euclidean straight-line measure of distance, as explained in Chapter 4. Of course, the distance may affect regions in different countries differently but this is not considered. Each specification in Table 6.9 employs a heterogenous, country-specific treatment of the EU membership effect and an aggregate EU-10 treatment of distance effect.

It should be emphasized that the log-linear specifications used in Tables 6.5 and 6.6 already allow for a non-linear relationship between the number or share of FDI projects and the distance. Specifically, they allow for an exponentially declining effect of distance the further a region is from the West-East border. Columns (XLII) and (XLV) of Table 6.9 do not suggest the relationship is any more complicated than this, as the squared distance term is insignificant. The log transformation of the distance term in columns (XLIII) and (XLVI) of Table 6.9 effectively allows for a linear effect between

[9] Again, the pattern for the spatial distribution of FDI activity in the Czech Republic does not match this pattern, where NUTS2 regions that are separated from the affected border by two other regions (BORDER 22) are the clear 'winners' as the top destination for inward investment in the post-accession period. In the remaining 'new' EU countries the regions alongside the affected border are the unquestionable 'winners' attracting a stunning 81.8% more FDI than the interior regions.

Table 6.9: Alternative specifications of the distance term

	Dep. var.: LN(number of FDI projects)			Dep. var.: LN(share of FDI projects)		
Sample:	Full	Full	Full	Full	Full	Full
Column:	(XLII)	(XLIII)	(XLIV)	(XLV)	(XLVI)	(XLVII)
LDV: LN(number_FDI)	0.105***	0.105***	0.106***			
LDV: LN(share_FDI)				0.108***	0.108***	0.109***
Spatial lag: LN(number_FDI)	0.578***	0.582***	0.577***			
Spatial lag: LN(share_FDI)				0.671***	0.674***	0.669***
Bulgaria: EU membership	0.516	0.914*	0.572	0.516	0.920*	0.572
Czech Republic: EU membership	0.090	0.586*	0.034	0.079	0.587*	0.024
Estonia: EU membership	0.146	0.671**	0.101	0.024	0.562*	-0.021
Hungary: EU membership	0.360**	0.848**	0.244*	0.263*	0.764**	0.147
Latvia: EU membership	0.816***	1.258***	0.686***	0.657***	1.113***	0.530***
Lithuania: EU membership	0.940***	1.294***	0.839***	0.842***	1.207***	0.743**
Poland: EU membership	0.652***	1.095***	0.520***	0.576***	1.032***	0.446**
Romania: EU membership	1.091***	1.468***	1.045***	1.021***	1.407***	0.976***
Slovak Republic: EU membership	0.835***	1.268***	0.752***	0.848***	1.293***	0.766***
Slovenia: EU membership	1.135***	1.589***	1.107***	1.060***	1.525***	1.031***
EU membership ($\geq$ 1 year)	-0.061	-0.061	-0.061	-0.040	-0.040	-0.041
EU membership ($\geq$ 2 years)	-0.255***	-0.255***	-0.256***	-0.241***	-0.240***	-0.241***
EU membership ($\geq$ 3 years)	-0.015	-0.015	-0.015	0.046	0.045	0.045
'New' EU: road distance to EU border	-0.128**			-0.129**		
('New' EU: road distance to EU border)^2	0.007			0.007		
LN('New' EU: road distance to EU border)		-0.141**			-0.144**	
'New' EU: line distance to EU border			-0.076*			-0.077*
Jacobs term	-0.080***	-0.079***	-0.080***	-0.018	-0.018	-0.019
Dummy: Bulgaria-Romania	0.424	0.406	0.409	0.380	0.361	0.364
Adjacent market GDP	-0.019	-0.019	-0.019	-0.020	-0.019	-0.019
Peripherality index	-9.621	-9.556	-9.745	-12.819*	-12.784*	-12.981*
Internal market GDP	0.011***	0.012***	0.011***	0.011***	0.011***	0.011***
Income per capita	-0.008	-0.008	-0.007	-0.013	-0.013	-0.013
Population density	-0.612**	-0.610**	-0.608**	-0.541*	-0.539*	-0.537*
Growth rate	0.171	0.165	0.165	-0.322	-0.326	-0.328
Physical infrastructure	-4.395	-4.459	-4.140	-4.770	-4.843	-4.519
Unemployment rate	0.265	0.258	0.240	0.249	0.242	0.226
Secondary education	0.034	0.053	0.013	-0.168	-0.151	-0.186
Tertiary education	0.225	0.211	0.207	0.041	0.026	0.025
Wage rate	-0.036*	-0.036*	-0.036*	-0.032*	-0.032*	-0.032*
Dummy: wage rate	-1.327**	-1.663***	-1.330**	-0.951*	-1.298**	-0.955*
Openness to trade	0.666***	0.665***	0.668***	0.518***	0.519***	0.520***
Exchange rate	-0.034	-0.032	-0.035	-0.253	-0.251	-0.254
Exchange rate volatility	-0.365	-0.365	-0.367	-0.268	-0.267	-0.272
Political risk	0.223	0.222	0.215	0.626*	0.623*	0.620*
Corporate tax rate	-0.596*	-0.594*	-0.599*	-0.967***	-0.963***	-0.968***
EU Structural Funds	-0.077	-0.075	-0.078	-0.112	-0.110	-0.113
Single currency	-0.069	-0.068	-0.071	-0.088*	-0.087*	-0.089*
N	3380	3380	3380	3380	3380	3380
R^2	0.851	0.851	0.851	0.849	0.849	0.849
$RMSE$	0.466	0.466	0.466	0.468	0.468	0.468
NUTS2 region fixed effects	Y	Y	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	N	N	N

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

the number or share of FDI projects and the distance. These are both negative and statistically significant, but now at the 5% level, suggesting that they provide a better fit to the data. An estimate of -0.141 in the number of FDI projects equation and -0.144 in the share of FDI projects equation suggests that on average a 10% increase in distance from the West-East border leads to a reduction of -1.33% projects per annum, and a reduction in the region's share of EU-25 FDI projects of 1.36%. Finally, the Euclidean measure in columns (XLIV) and (XLVII) of Table 6.9 appears to perform no better than the road distance in Tables 6.5 and 6.6. Since the straight-line distance is likely to be shorter than the road distance, it is not surprising that larger estimates are obtained for this.

Overall, these results indicate that the alternative straight-line measure of distance makes no real difference to the estimates, but that the linear specification of the relationship between inward investment and distance performs better for the regions of the new accession countries. Thus, while I find in section 6.4.4 that the border effect diminishes strongly, when the CEEC regions as a whole are considered there is a significant distance effect. Since this effect is linear and is preferred over alternative specifications that allow for a diminishing effect it means that the effect of distance from the West-East border is not just felt at the border itself.

6.4.6 Extensions: Country Fixed Effects

To avoid biased parameter estimates due to regional heterogeneity and time effects the model includes a set of region and year dummies. This approach is easily implementable and helps account for unobservable effects and omitted variables. However, a problem that is intrinsic to this approach for dealing with unobserved heterogeneity is that the inclusion of a large number of dummy variables for the large sample of regions (with a small number of annual observations for each region) is likely to lead to a large loss of degrees of freedom (Hadjimichael *et al.*, 1996). For this reason, and since it is plausible that a multinational firm will be more interested in investing in a particular country rather than in a particular NUTS2 region, in this section I employ country dummies instead of using region fixed effects. I focus on the number of FDI projects and I replicate columns (XVII) to (XXIII) of Table 6.5, but including country fixed effects rather than region fixed effects.[10] The results are presented in Table 6.10 and I explore how this modification affects the parameter estimates compared with Table 6.5.

At first inspection it is apparent that the parameter estimates for the model specifications with country fixed effects suggest more inertia in the intertemporal inflows of

[10] Although the approach helps to address the problems caused by the large loss of degrees of freedom (i.e. imprecise coefficient estimates), potential biases may arise due to regional time invariant unobservables when only country fixed effects are included in the model specification.

Table 6.10: Country fixed effects

	Dep. var.: LN(number of FDI projects)						
Sample:	Full	Full	Full	Full	Full	Full	Full
Column:	(XLVIII)	(XLIX)	(L)	(LI)	(LII)	(LIII)	(LIV)
LDV: LN(number_FDI)	0.615***	0.615***	0.607***	0.601***	0.599***	0.600***	0.598***
Spatial lag: LN(number_FDI)			0.227***	0.198***	0.192***	0.222***	0.231***
'New' EU	0.077	0.395***	0.367***	0.436***			
Bulgaria: EU membership					0.274**	0.744	0.386
Czech Republic: EU membership					0.162	0.157*	0.140
Estonia: EU membership					0.263***	0.245***	0.007
Hungary: EU membership					0.379***	0.651***	0.577***
Latvia: EU membership					0.538***	0.476***	0.247*
Lithuania: EU membership					0.757***	0.668***	0.420***
Poland: EU membership					0.527***	0.783***	0.785***
Romania: EU membership					0.449***	0.534**	0.563***
Slovak Republic: EU membership					0.597***	0.540***	0.416**
Slovenia: EU membership					0.925***	1.086***	1.199***
EU membership ($\geq$ 1 year)		-0.261**	-0.254**	-0.256**	-0.257**	-0.257**	-0.255**
EU membership ($\geq$ 2 years)		-0.348***	-0.314***	-0.318***	-0.326***	-0.322***	-0.320***
EU membership ($\geq$ 3 years)		0.164**	0.172**	0.152**	0.127*	0.126*	0.129*
'New' EU: road distance to EU border				-0.015***	-0.015***		
Bulgaria: road distance to EU border						-0.059	-0.029
Czech Republic: road distance to EU border						-0.008	-0.023
Estonia: road distance to EU border						(omitted)	(omitted)
Hungary: road distance to EU border						-0.126***	-0.113***
Latvia: road distance to EU border						(omitted)	(omitted)
Lithuania: road distance to EU border						(omitted)	(omitted)
Poland: road distance to EU border						-0.088***	-0.092***
Romania: road distance to EU border						-0.025	-0.032*
Slovak Republic: road distance to EU border						0.018	0.054
Slovenia: road distance to EU border						-0.452***	-1.055***
Capital city ('new' EU)							0.230**
Jacobs term	-0.087***	-0.078***	-0.075***	-0.075***	-0.077***	-0.076***	-0.076***
Dummy: Bulgaria-Romania	0.271*	0.295*	0.257*	0.282*	0.539***	0.534***	0.529***
Adjacent market GDP	0.001	0.001	-0.005	-0.007	-0.007	-0.005	-0.005
Peripherality index	-2.407	-2.794	-1.526	-2.848	-2.603	-2.528	-2.439
Internal market GDP	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***
Income per capita	0.010***	0.010***	0.011***	0.011***	0.011***	0.010***	0.010***
Population density	-0.009	-0.007	-0.017	-0.020	-0.018	-0.014	-0.016
Growth rate	-0.327	-0.332	-0.345	-0.326	-0.281	-0.315	-0.348
Physical infrastructure	2.463***	2.478***	2.486***	2.641***	2.657***	2.518***	2.524***
Unemployment rate	0.770**	0.590*	0.727**	0.773**	0.718**	0.580*	0.664*
Secondary education	0.607*	0.598*	0.577**	0.522*	0.488	0.453	0.494*
Tertiary education	1.416***	1.448***	1.364***	1.309***	1.288***	1.366***	1.236***
Wage rate	-0.034***	-0.030**	-0.024*	-0.026**	-0.019	-0.018	-0.018
Dummy: wage rate	-1.023***	-1.037***	-0.792**	-0.879**	-1.421***	-1.361***	-1.345***
Openness to trade	0.246**	0.335***	0.254**	0.236*	0.258*	0.262*	0.253*
Exchange rate	-0.423***	-0.231	-0.215	-0.211	-0.045	-0.039	-0.038
Exchange rate volatility	-0.770**	-0.580*	-0.527	-0.547	-0.517	-0.501	-0.513
Political risk	0.168	0.121	0.082	0.121	0.041	0.007	0.025
Corporate tax rate	-0.614**	-0.603**	-0.542**	-0.618**	-0.583**	-0.593**	-0.571**
EU Structural Funds	0.272***	0.322***	0.336***	0.366***	0.367***	0.346***	0.338***
Single currency	-0.051	-0.044	-0.035	-0.043	-0.058	-0.060	-0.057
N	3380	3380	3380	3380	3380	3380	3380
R^2	0.774	0.777	0.778	0.779	0.780	0.780	0.781
$RMSE$	0.551	0.549	0.547	0.546	0.545	0.545	0.545
Country fixed effects	Y	Y	Y	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	Y	Y	Y	Y

Notes: The table replicates the results in table 6.5 using country fixed effects.
*** = 1% significance level; ** = 5% significance level and * = 10% significance level

inward investment. While the models with region dummies of Table 6.5 indicate that a 10% increase in the (log) number of FDI projects in a region the previous year leads to an approximately 0.9% to 1.3% increase in regional FDI activity in the current year, the models with country dummies of Table 6.10 predict a much larger increase in FDI activity in the range of 5.9% to 6.0% in response to the same shock. On the other hand, the importance of spatial dependencies between FDI activity in the neighbouring regions is much reduced. A shock that entails 10% increase in the FDI activity in adjacent regions is shown to translate to 5.7% - 6.0% surge in regional (log) FDI according to the models with region fixed effects (Table 6.5), but the models with country dummies predict a 1.8% - 2.2% rise (Table 6.10). Hence, the relative importance of inward investment inertia and spatial dependencies between regions is reversed when the change is made between region and country fixed effects.

The estimate on the aggregate EU membership term is unaffected by this modification to the model specification as I continue to find positive and statistically significant coefficient estimates on the 'new' EU membership term in all model specifications with three post-accession terms. However, the estimates for the regional FDI project numbers vary in the post-accession period. The models with region dummies generally predict that the FDI level decreases two years after membership. The models with country dummies indicate that FDI decreases one year after the EU accession and that it continues its downward trend two years after, before picking up three years after accession.

The models with country dummies are also more likely to find a positive and significant EU membership effect for individual 'new' EU Member States, since in a large number of cases heterogenous country-specific EU membership terms are positive and statistically significant at the 1% level. The inclusion of the country fixed effects means that I fail to identify a positive distance effect on the distribution of FDI activity associated with the Czech regions since the coefficient on distance is now insignificant. The aggregate distance terms in columns (LI) and (LII) are negative and statistically significant at the 1% level, indicating that the models with country dummies are more likely to detect a negative distance effect at an aggregate EU-10 level.

The most pronounced differences between models with country and region fixed effects are associated with the parameter estimates on the control variables. A few of these controls turn from being insignificant in the models with region dummies to statistically significant in the models with country dummies. Income per capita, physical infrastructure, unemployment rate and EU Structural Funds all feature among the control variables that are insignificant in the regression models with region dummies but that have a positive and statistically significant effect on the size of regional FDI activity in the models that account for unobserved country effects. On the contrary, the effect of population density becomes insignificant. The models with country fixed effects provide a more compelling evidence of a positive effect of education on FDI activity.

6.4.7 Extensions: GMM Analysis

The analysis so far has been conducted using the LSDV approach and estimated by OLS. Although the LSDV approach is "an intuitive first attack on the fixed effects" (Roodman, 2009b, p. 102), in the presence of endogeneity associated with serially and spatially lagged dependent variable, the parameter estimates are perhaps biased and inconsistent. Additional issues such as short panel width of fourteen years could render the LSDV methodology unsuitable. In this section I focus on re-estimating some of the earlier models using system GMM methodology to examine how robust LSDV parameters estimates are to this alternative econometric modelling framework. The GMM methodology was discussed at length in section 4.2.2 of Chapter 4.

Since the focus of the empirical analysis is on the effect of EU membership and distance from the West-East border on the spatial distribution of inward FDI activity, I select the model specifications in columns (XX), (XXI) and (XXII) of Table 6.5 to explore using the system GMM methodology. These consider in turn the aggregate EU and distance effects; heterogenous EU and aggregate distance effects; and heterogenous EU and distance effects. Subsequently, I examine FDI activity in the border and interior regions of the 'new' EU in response to EU integration and so estimate all of the model specifications in Tables 6.7 and 6.8 using GMM.

Before discussing the parameter estimates of GMM analysis, it is essential to check for second-order autocorrelation in first-differenced errors. The presence or absence of second-order autocorrelation will determine which lags of the endogenous explanatory variables can be used as valid GMM-style instruments in the GMM analysis. The LDV and spatial lag term are treated as endogenous explanatory variables. The Arellano-Bond test confirms that all of the regression models suffer from second-order autocorrelation. This invalidates the use of the second lags of endogenous explanatory variables as instruments in differenced equation, and their lagged differences as instruments in level equation. Therefore, in all GMM regressions I employ third and longer lags of LDV and spatial lag as instruments for the differenced equation, and the second lag of the differences of these endogenous variables as instruments for the level equation. Later, I must also check for third-order serial autocorrelation and inspect Sargan, Hansen and difference-in-Hansen tests to confirm that these instruments are valid.

The GMM results are presented in Table 6.11. The diagnostic tests indicate that there is no third-order serial autocorrelation in first-differenced residuals. Further, the

Table 6.11: System GMM analysis: EU membership and distance effects

	Dep. var.: LN(number of FDI projects)		
Sample:	Full	Full	Full
Column:	(LV)	(LVI)	(LVII)
LDV: LN(number_FDI)	0.620***	0.630***	0.604***
Spatial lag: LN(number_FDI)	0.523***	0.570***	0.616***
'New' EU	0.370***		
Bulgaria: EU membership		0.105	0.243
Czech Republic: EU membership		0.178	0.238*
Estonia: EU membership		0.306**	0.286**
Hungary: EU membership		0.295*	0.648***
Latvia: EU membership		0.351**	0.340**
Lithuania: EU membership		0.829***	0.842***
Poland: EU membership		0.257*	0.491***
Romania: EU membership		0.023	0.422
Slovak Republic: EU membership		0.508***	0.597***
Slovenia: EU membership		0.544***	0.637***
EU membership ($\geq$ 1 year)	-0.228	-0.157	-0.137
EU membership ($\geq$ 2 years)	-0.281**	-0.245**	-0.238**
EU membership ($\geq$ 3 years)	0.180**	0.176**	0.181**
'New' EU: road distance to EU border	0.001	0.005	
Bulgaria: road distance to EU border			-0.007
Czech Republic: road distance to EU border			-0.047
Estonia: road distance to EU border			(omitted)
Hungary: road distance to EU border			-0.151***
Latvia: road distance to EU border			(omitted)
Lithuania: road distance to EU border			(omitted)
Poland: road distance to EU border			-0.085
Romania: road distance to EU border			-0.043
Slovak Republic: road distance to EU border			-0.043
Slovenia: road distance to EU border			-0.295
Jacobs term	-0.026	-0.034*	-0.036*
Dummy: Bulgaria-Romania	0.005	0.194	0.171
Adjacent market GDP	-0.016***	-0.016***	-0.018***
Peripherality index	4.736*	3.625	4.356
Internal market GDP	0.005***	0.005***	0.005***
Income per capita	0.000	0.004	0.004
Population density	0.022	0.015	0.019
Growth rate	-0.252	-0.308	-0.313
Physical infrastructure	1.531**	1.478*	1.687**
Unemployment rate	0.176	0.213	0.219
Secondary education	0.470**	0.352*	0.239
Tertiary education	1.041***	0.759***	0.859***
Wage rate	-0.005	0.001	0.001
Dummy: wage rate	0.022	-0.079	-0.075
Openness to trade	0.017	-0.033	-0.070
Exchange rate	-0.448**	-0.400*	-0.461**
Exchange rate volatility	-0.158	-0.284	-0.356
Political risk	-0.304	-0.132	-0.118
Corporate tax rate	-0.570	-0.351	-0.457
EU Structural Funds	0.258*	0.230*	0.263*
Single currency	-0.032	-0.005	-0.014
Arellano-Bond test for AR(2) (p-value)	0.000	0.000	0.000
Arellano-Bond test for AR(3) (p-value)	0.086	0.090	0.084
Sargan test (p-value)	0.179	0.154	0.106
Hansen test (p-value)	0.104	0.083	0.091
Difference-in-Hansen tests			
H_0: GMM differenced-instruments are exogenous	0.133	0.119	0.079
H_0: system-GMM instruments are exogenous	0.240	0.195	0.440
H_0: GMM instruments without 'IV'' instruments are exogenous	0.170	0.188	0.141
H_0: Standard 'IV' instruments are exogenous	0.174	0.112	0.196
Number of instruments	193	202	208
Number of cross-sectional	260	260	260
N	3380	3380	3380

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

Sargan, Hansen and difference-in-Hansen tests do not reject the null hypothesis of valid overidentifying restrictions, thus indicating that I have used valid instruments in the GMM estimation. The number of instruments used is below the number of cross-sectional units of the panel data (i.e. 260), which complies with the 'rule of thumb' of Roodman (2003) that the number of instruments should be less than the number of cross sectional units. Overall, the diagnostic tests suggest that the GMM estimates of EU membership and distance effect are unbiased and consistent.

The results in Table 6.11 may be compared with the regressions in Table 6.5. What is clear from a visual inspection of these results is there is a larger parameter estimate on the lagged dependent variable (LDV) using GMM, which in Table 6.11 ranges from 0.604 in column (LVII) to 0.630 in column (LVI). In the corresponding models that were estimated using OLS the coefficients on LDV ranges from 0.099 to 0.122 (columns (XX) to (XXII) of Table 6.5). This difference may be attributed to the weakness of OLS in dealing with the endogenous explanatory variables in the dynamic panel data, despite the fact that the LSDV approach accounts for one of the panel data modelling problems that is associated with unobserved heterogeneity. What applies to both the system GMM and LSDV estimates of LDV is that they find a highly significant FDI activity inertia, which is statistically significant at 1% level in all model specifications, suggesting that last year's FDI activity is an important determinant of this year's FDI activity.

Despite the discrepancy in the magnitude of the coefficient estimate on LDV between the LSDV and system GMM approaches, the equivalent observation is not applicable to the estimates of the spatially lagged dependent variable. For the GMM this ranges from 0.523 to 0.616 (columns (LV), (LVI) and (LVII) of Table 6.11), but for the LSDV it is between 0.577 and 0.611 (columns (XX), (XXI) and (XXII) of Table 6.5). These ranges are broadly in line. The spatial lag is statistically significant at the 1% level in all model specifications, highlighting the importance of spatial spillovers between neighbouring NUTS2 regions.

Turning to the parameter estimates on EU and the distance terms in Table 6.11, the system GMM analysis produces an estimate that is similar to that found using by OLS, and it shows that on average after their EU accession the regions in the 'new' EU Member States gain 44.8% more FDI projects (i.e. $\exp(0.370) - 1$). The majority of the heterogenous EU membership terms in column (LVI) are positive and statistically significant when estimated by GMM, where when evaluated the positive effect of this term for the number of FDI projects ranges from 29.3% for Poland to 129.1% for Lithuania (i.e. from 0.257 to 0.829 in terms of coefficient values). A positive EU membership effect is not detected for Bulgaria, Romania and the Czech Republic, where the first two countries joined in 2007, and the Czech Republic was previously found to be a peculiar case based on its economic geography. The three post-accession EU terms in Table 6.11 are consistent in sign and magnitude with the LSDV parameter estimates, in that it falls-off significantly two years after the EU accession. However, what contradicts the earlier LSDV estimates is the positive and significant effect of EU membership term three years after accession. This suggests that it may recover, although the reason for this is not known.

The aggregate distance term is statistically insignificant in the first two columns of Table 6.11, whereas it was negative but significant at the 10% in column (XXI) of Table 6.5. However, when it is replaced by the heterogenous distance terms in column (LVII) of this table, the EU membership term for the Czech Republic is positive and statistically significant, a feature that distinguishes the GMM parameter estimate from that of LSDV, which was found to be negative and statistically significant in column (XXII) of Table 6.5. Nevertheless, out of ten 'new' countries the positive EU membership effect is smallest in magnitude for the Czech Republic regions, where an EU membership is found to increase regional FDI activity by 26.8% (i.e. a coefficient estimate of 0.238). The largest positive EU membership effect continues to be recorded for Lithuania, where the EU membership is found to increase inward FDI by 132.1% (0.842). Bulgaria and Romania remain the two countries for which EU membership status does not stimulate extra inward investment.

Although model specification in column (LVII) of Table 6.11 provides a strong evidence for the positive impact of EU membership on regional FDI activity in a large number of 'new' EU countries, there is weak evidence that the distance from the West-East border significantly affects the economic geography of FDI. It is seen from column (LVII) that out of ten country-specific distance terms, only one is significant, which is for Hungary. To be precise, an increase in a distance from the West-East border by 100 kilometres causes the regional FDI numbers in Hungary to fall by 14.0% (i.e. a coefficient estimate of -0.151). In the other EU-10 countries the distance effect is insignificant, while it cannot be estimated for Estonia, Latvia and Lithuania, which have a single NUTS2 region only. Unlike GMM, the LSDV results provide more convincing evidence of a negative effect of distance on FDI location.

Moving to the border analysis, the system GMM is used to re-estimate all model specifications that were previously regressed with OLS and reported in Tables 6.7 and 6.8. The diagnostic tests reveal that all but one of these specifications is correctly specified, do not suffer from third-order serial autocorrelation in first-differenced errors or have valid instruments. The exception is regression model in column (LXIII), for which the null hypothesis of no third-order autocorrelation is marginally rejected at the 5% level. Although I attempted to lag the instruments by a further year, the specification did not pass the Sargan and Hansen tests for valid overidentifying restrictions. For this

Table 6.12: System GMM analysis: border effects

	Dep. var.: LN(number of FDI projects)					
Sample:	Full	Full	Full	Full	Full	Full
Column:	(LVIII)	(LIX)	(LX)	(LXI)	(LXII)	(LXIII)
LDV: LN(number_FDI)	0.614***	0.601***	0.625***	0.611***	0.626***	0.603***
Spatial lag: LN(number_FDI)	0.652***	0.689***	0.591***	0.676***	0.581***	0.712***
Bulgaria: EU membership	0.145	0.108	0.157	0.108	0.157	0.058
Czech Republic: EU membership	-0.008	-0.017	0.060	0.307*	0.036	0.129
Estonia: EU membership	-0.024	0.231*	0.144	0.229*	0.134	0.223
Hungary: EU membership	0.215	0.159	0.229	0.126	0.180	0.100
Latvia: EU membership	0.310**	0.257*	0.207	0.271*	0.196	0.246
Lithuania: EU membership	0.846***	0.825***	0.845***	0.828***	0.689***	0.825***
Poland: EU membership	0.164	0.109	0.181	0.061	0.137	0.041
Romania: EU membership	0.035	0.008	0.055	-0.008	0.059	-0.039
Slovak Republic: EU membership	0.437***	0.493***	0.412***	0.360***	0.413**	0.394***
Slovenia: EU membership	0.252	0.484***	0.394**	0.486***	0.377**	0.484***
EU membership ($\geq$ 1 year)	-0.122	-0.116	-0.137	-0.099	-0.144	-0.118
EU membership ($\geq$ 2 years)	-0.239**	-0.243**	-0.244**	-0.273**	-0.242**	-0.158
EU membership ($\geq$ 3 years)	0.184**	0.200**	0.182**	0.214**	0.182**	0.096
'New' EU: BORDER region	0.270**					
Bulgaria: BORDER region		(omitted)				
Czech Republic: BORDER region		0.274				
Estonia: BORDER region		(omitted)				
Hungary: BORDER region		0.287**				
Latvia: BORDER region		(omitted)				
Lithuania: BORDER region		(omitted)				
Poland: BORDER region		0.437*				
Romania: BORDER region		(omitted)				
Slovak Republic: BORDER region		-0.040				
Slovenia: BORDER region		(omitted)				
'New' EU: BORDER 01 region			0.137			
Bulgaria: BORDER 01 region				(omitted)		
Czech Republic: BORDER 01 region				-0.241		
Estonia: BORDER 01 region				(omitted)		
Hungary: BORDER 01 region				0.165		
Latvia: BORDER 01 region				(omitted)		
Lithuania: BORDER 01 region				(omitted)		
Poland: BORDER 01 region				0.285		
Romania: BORDER 01 region				(omitted)		
Slovak Republic: BORDER 01				0.173**		
Slovenia: BORDER 01 region				(omitted)		
'New' EU: BORDER 02 region					0.153	
Bulgaria: BORDER 02 region						(omitted)
Czech Republic: BORDER 02 region						(omitted)
Estonia: BORDER 02 region						(omitted)
Hungary: BORDER 02 region						0.150
Latvia: BORDER 02 region						(omitted)
Lithuania: BORDER 02 region						(omitted)
Poland: BORDER 02 region						0.215
Romania: BORDER 02 region						(omitted)
Slovak Republic: BORDER 02 region						0.150
Slovenia: BORDER 02 region						(omitted)
Jacobs term	-0.036*	-0.006	-0.036*	-0.008	-0.036*	-0.013
Dummy: Bulgaria-Romania	0.183	0.252	0.177	0.257	0.173	0.238
Adjacent market GDP	-0.019***	-0.021***	-0.018***	-0.019***	-0.017***	-0.020***
Peripherality index	3.589	3.897	3.964	3.817	4.022	3.338
Internal market GDP	0.005***	0.005***	0.005***	0.004***	0.005***	0.004***
Income per capita	0.004	0.004	0.004	0.004	0.004	0.004
Population density	0.016	0.021	0.014	0.015	0.014	0.025
Growth rate	-0.318	-0.727	-0.333	-0.371	-0.320	-0.373
Physical infrastructure	1.713**	1.800**	1.665**	1.735**	1.638**	1.615**
Unemployment rate	0.238	0.136	0.236	0.231	0.230	0.256
Secondary education	0.249	0.208	0.233	0.211	0.221	0.224
Tertiary education	0.778***	0.881***	0.803***	0.802***	0.794***	0.816***
Wage rate	0.000	-0.002	0.001	-0.002	0.001	-0.001
Dummy: wage rate	-0.088	-0.081	-0.086	-0.096	-0.082	-0.067
Openness to trade	-0.058	-0.052	-0.069	-0.050	-0.067	-0.066
Exchange rate	-0.435**	-0.427*	-0.443**	-0.424*	-0.446**	-0.425*
Exchange rate volatility	-0.299	-0.375	-0.319	-0.500	-0.309	-0.536
Political risk	-0.144	-0.171	-0.123	-0.093	-0.106	-0.094
Corporate tax rate	-0.332	-0.607	-0.378	-0.519	-0.398	-0.414
EU Structural Funds	0.254*	0.278**	0.261*	0.262*	0.256*	0.284**
Single currency	-0.016	-0.026	-0.013	-0.033	-0.013	-0.031
Arellano-Bond test for AR(2) (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(3) (p-value)	0.084	0.078	0.088	0.069	0.089	0.045
Sargan test (p-value)	0.143	0.072	0.131	0.027	0.138	0.005
Hansen test (p-value)	0.104	0.095	0.088	0.077	0.089	0.075
Difference-in-Hansen tests						
H_0: GMM differenced-instruments are exogenous	0.115	0.085	0.107	0.085	0.106	0.091
H_0: system-GMM instruments are exogenous	0.313	0.422	0.264	0.305	0.269	0.260
H_0: GMM instruments without 'IV' instruments are exogenous	0.185	0.067	0.205	0.139	0.196	0.038
H_0: Standard 'IV' instruments are exogenous	0.163	0.427	0.106	0.159	0.115	0.527
Number of instruments	202	205	202	205	202	204
Number of cross-sectional	260	260	260	260	260	260
N	3380	3380	3380	3380	3380	3380

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

Table 6.13: System GMM analysis: border effects (the Czech Republic outlier)

	Dep. var.: LN(number of FDI projects)				
Sample:	Full	Full	Full	Full	Full
Column:	(LXIV)	(LXV)	(LXVI)	(LXVII)	(LXVIII)
LDV: LN(number_FDI)	0.613***	0.618***	0.626***	0.600***	0.600***
Spatial lag: LN(number_FDI)	0.650***	0.607***	0.581***	0.678***	0.678***
Bulgaria: EU membership	0.148	0.150	0.157	0.141	0.141
Czech Republic: EU membership	0.015	0.349**	0.036	0.286	-0.099
Estonia: EU membership	-0.033	0.064	0.134	-0.125	-0.125
Hungary: EU membership	0.218	0.193	0.180	0.131	0.131
Latvia: EU membership	0.309**	0.127	0.196	0.122	0.122
Lithuania: EU membership	0.841***	0.841***	0.689***	0.797***	0.797***
Poland: EU membership	0.161	0.132	0.137	0.072	0.072
Romania: EU membership	0.036	0.045	0.059	0.032	0.032
Slovak Republic: EU membership	0.435***	0.345**	0.413**	0.316*	0.316*
Slovenia: EU membership	0.234	0.313*	0.377**	0.145	0.145
EU membership ($\geq$ 1 year)	-0.121	-0.122	-0.144	-0.101	-0.101
EU membership ($\geq$ 2 years)	-0.239**	-0.249**	-0.242**	-0.246**	-0.246**
EU membership ($\geq$ 3 years)	0.185**	0.180**	0.182**	0.179**	0.179**
'New' EU: BORDER region	0.283*			0.363*	
Czech Republic: BORDER region	-0.027			-0.385	
'New' EU: BORDER 01 region		0.208*			
Czech Republic: BORDER 01 region		-0.422**			
'New' EU: BORDER 02 region			0.153		0.363*
Czech Republic: BORDER 02 region			(omitted)		(omitted)
'New' EU: BORDER 12 region					-0.188
Czech Republic: BORDER 12 region					-0.215
'New' EU: BORDER 11 region				0.175	
Czech Republic: BORDER 11 region				-0.600***	
'New' EU: BORDER 22 region				0.045	-0.130
Czech Republic: BORDER 22 region				(omitted)	0.600***
Jacobs term	-0.036*	-0.036*	-0.036*	-0.036*	-0.036*
Dummy: Bulgaria-Romania	0.183	0.177	0.173	0.174	0.174
Adjacent market GDP	-0.019***	-0.018***	-0.017***	-0.020***	-0.020***
Peripherality index	3.697	4.018	4.022	3.703	3.703
Internal market GDP	0.005***	0.005***	0.005***	0.005***	0.005***
Income per capita	0.004	0.004	0.004	0.004	0.004
Population density	0.017	0.010	0.014	0.013	0.013
Growth rate	-0.314	-0.348	-0.320	-0.324	-0.324
Physical infrastructure	1.694**	1.718**	1.638**	1.800**	1.800**
Unemployment rate	0.239	0.239	0.230	0.240	0.240
Secondary education	0.251	0.245	0.221	0.271	0.271
Tertiary education	0.790***	0.802***	0.794***	0.800***	0.800***
Wage rate	0.000	0.001	0.001	-0.000	-0.000
Dummy: wage rate	-0.084	-0.089	-0.082	-0.087	-0.087
Openness to trade	-0.060	-0.065	-0.067	-0.053	-0.053
Exchange rate	-0.438**	-0.443**	-0.446**	-0.436**	-0.436**
Exchange rate volatility	-0.327	-0.310	-0.309	-0.255	-0.255
Political risk	-0.134	-0.135	-0.106	-0.166	-0.166
Corporate tax rate	-0.344	-0.402	-0.398	-0.368	-0.368
EU Structural Funds	0.256*	0.263*	0.256*	0.262*	0.262*
Single currency	-0.015	-0.015	-0.013	-0.019	-0.019
Arellano-Bond test for AR(2) (p-value)	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(3) (p-value)	0.084	0.086	0.089	0.084	0.084
Sargan test (p-value)	0.140	0.134	0.138	0.140	0.140
Hansen test (p-value)	0.097	0.088	0.089	0.107	0.107
Difference-in-Hansen tests					
H_0: GMM differenced-instruments are exogenous	0.105	0.101	0.106	0.105	0.105
H_0: system-GMM instruments are exogenous	0.324	0.290	0.269	0.378	0.378
H_0: GMM instruments without 'IV' instruments are exogenous	0.168	0.251	0.196	0.213	0.213
H_0: Standard 'IV' instruments are exogenous	0.170	0.074	0.115	0.140	0.140
Number of instruments	203	203	202	206	206
Number of cross-sectional	260	260	260	260	260
N	3380	3380	3380	3380	3380

Notes: *** = 1% significance level; ** = 5% significance level and * = 10% significance level

reason, I report the model as it is, and the reader may need to exercise caution when interpreting the estimates in column (LXIII).

The analysis at an aggregate 'new' EU level in column (LVIII) of Table 6.12 shows that only those regions that are strictly contiguous to the West-East border possess a location advantage against the interior regions, where the advantage amounts to 31.0% (an estimate of 0.270) in favour of the border region. For the 'medium' (BORDER 01) and 'broad' (BORDER 02) definitions, columns (LX) and (LXII) show that the location advantage of the border regions is not evident. Since the NUTS2 regions of the Czech Republic are bundled together in the aggregate border dummies, I also examine in Table 6.13 if the GMM parameter estimates alter once allowance is made for heterogeneity in the border effect between the NUTS2 regions of the Czech Republic and the other 'new' EU Member States.

The analysis of heterogenous border effect in columns (LIX), (LXI) and (LXIII) of Table 6.12 offers partial support for the positive border effect at the level of individual countries, although perhaps the evidence is more compelling when the regression models are estimated by OLS. Depending on the border region definition used, the positive border effect is found for Hungary and Poland ('narrow' BORDER definition), for Slovakia ('medium' BORDER 01 definition), but it is not detected for any country using the 'broad' BORDER 02 definition.

Finally, Table 6.13 explores the aggregate border effect, allowing for the possible outlier effect associated with the Czech Republic. Columns (LXIV) and (LXV) of Table 6.13 show that the border effect is now positive and statistically significant for both the 'narrow' (BORDER) and 'medium' (BORDER 01) measures. It suggests that the regions that are adjacent to the West-East border have a clear location advantage, receiving on average 32.7% (coefficient of 0.283) more FDI than their interior counterparts (column (LXIV)). Further, on the 'medium' measure this is 23.1% (0.208). The 'broad' BORDER 02 definition is the only category of border region that has no significant advantage in attracting FDI against the interior regions, a finding that stands in contrast to the OLS estimates in Table 6.8.

The GMM estimates in column (LXVII) show that the greatest border location advantage belongs to those NUTS2 regions that lie alongside the affected border (excluding NUTS2 border regions in the Czech Republic), which are found to receive on average 43.8% (coefficient of 0.363) more FDI than other types of regions. For the set of NUTS2 regions that are separated from the West-East border by one (BORDER 11) and two (BORDER 22) other regions respectively the relative proximity to the border does not appear to translate to the increased FDI activity. Although the GMM analysis recognises the leading position of strictly contiguous border regions as a destination for inward investment after the EU enlargement in 2004, a statistically significant decay in the size of the positive border effect is not confirmed empirically in column (LXVIII). The economic geography of FDI is different in Czech Republic, where the analysis identifies BORDER 22 regions as the strongest performers.

6.5 Conclusions

This chapter has examined the implications of the fifth enlargement of the European Union on the spatial distribution of FDI activity. Specifically, it has examined how the economic geography of FDI in the European Union has changed as a result of Eastern enlargement in 2004. I consider the pattern of FDI activity at the level of the NUTS2 regions for 25 EU Member States, ten of which joined the EU as part of the Eastern enlargement in 2004 and 2007. The aim of the analysis is to identify the regions that benefited the most from EU integration ('winners'), as well as those regions that have not ('losers'). To the best of my knowledge this is the first statistical examination of the reconfiguration of the regional FDI in response to the EU enlargement in 2004.

The focus of my formal econometric analysis is to quantify the effect that EU membership and the distance from the West-East border has had on the magnitude of regional flows of FDI into the accession countries. I expect that the most profound impact of the integration will have been felt on the border between the two integrating groups of countries: the incumbent EU Member States and the accession countries. In this respect the distance of a region is measured relative to the West-East border that as a result of the 2004 enlargement was transformed from an external EU-15 border to an internal EU-25 border. I examine if the regions that are in closer proximity to the border that was affected by the enlargement attract more inward FDI. The emphasis of the chapter is on the role of the border effect in shaping the spatial distribution of inward investment activity in the new accession states. Essentially, I argue that FDI activity in the border regions of the accession countries responds differently to the EU integration process compared to the interior regions of these countries. I construct a set of border region dummies to examine the asymmetry between border and interior regions of the accession countries and to determine if the strength of the border effect diminishes as the distance from the West-East border increases.

Overall, I find compelling evidence for the importance of inward FDI inertia and spatial spillovers on the regional distribution of FDI activity, implying that the size of the regional FDI inflows depends upon FDI inflows to that region in the previous year and on the FDI inflows into the neighbouring NUTS2 regions. The analysis shows that on average EU membership increased the regional inflows of FDI to 'new' EU-10 countries by between 27.5% and 44.5%, although the effect is not permanent as FDI falls-off at two years after accession. At the aggregate level, I can find evidence for a significant negative distance effect on the size of regional FDI activity. Allowing for a heterogenous treatment of distance, I find evidence of negative effect of distance on the regional distribution of FDI activity within some accession countries, most notably in Hungary, Poland, Slovakia and Slovenia, where after the 2004 EU enlargement regions in these countries that are in closer proximity to the West-East border on average receive more FDI projects. A different pattern is observed for the Czech Republic, owing to its unique geography, such that the regions further away from the West-East border get more FDI. However, overall, these results not only suggest that FDI decreases in the CEECs as a whole the further is the distance from the former West-East border, but that within these countries there has also been a spatial redistribution of FDI towards those regions that are closer to the West-East border.

The analysis of border effects reveals that after the EU enlargement in 2004, FDI particularly favoured the border regions in the 'new' EU Member States that are contiguous to the former West-East border. The only exception to this is the Czech Republic owing to its special economic geography in relation to the West-East border and the centroid of the enlarged EU-25. As such, the chapter shows that the NUTS2 regions contiguous to the West-East border are most likely to 'win' from the EU integration, receiving on average 81.8% more FDI projects compared to other non-border regions. This positive border effect diminishes as the distance from the border increases, so that is 35.0% for the regions separated from the border by one other region, but it ceases to have any statistically significant effect beyond that. It confirms the analysis for the distance effect across the CEECs as a whole, for which a linear decay is found to be the best fit.

In summary, this analysis arrives at the three main conclusions on the spatial distribution of FDI activity across the regions of CEECs in the post-accession period. First, at the aggregate level of the 'new' EU-10 members it shows that the distance from the West-East border matters for the size of regional FDI activity, where a 10% increase in distance from the West-East border leads to a reduction of 1.33% project per annum, and a reduction in the region's share of EU-25 FDI projects of 1.36%. Second, it shows that FDI has reorganised within some countries (Hungary, Poland, Slovakia and Slovenia), such that regions within these countries that are closer to the West-East border have gained most FDI in the post-accession period. Third, it offers evidence that the border regions in CEECs emerge as the 'winners' of the fifth enlargement, with the exception of the Czech Republic where the pattern of the spatial distribution of FDI activity suggests that the interior regions are the 'winners'.

Chapter 7

Conclusions

This thesis studies the impact of European economic integration on the location of foreign direct investment (FDI) across the Member States and NUTS2 regions of the European Union (EU) between 1997 and 2010. It focuses on the fifth enlargement of the EU that was completed in two stages in 2004 and 2007, and involved the accession of the ten Central and Eastern European Countries (CEECs) and two small Mediterranean countries. The thesis fills gaps in the existing literature and believed to make three new contributions to knowledge. First, it examines the economic geography of FDI location at the country and region level for the EU countries and analyses how it has altered after the enlargement in 2004. Second, it analyses empirically the motives for FDI location choice in the 'old' EU-15 and 'new' EU-10 countries (i.e. the CEECs). Third, it measures the impact of the fifth enlargement on the size of inward FDI across the 260 NUTS2 regions of the EU-25, focusing on how the national borders and distance from the former West-East border have influenced the regional distribution of FDI activity in CEECs in the post-accession period. Alongside these contributions, the thesis has involved a detailed review of the theory of FDI and of the empirical literature on FDI location choice. It has also involved the collection of a unique and original dataset on FDI on location factors at both the country and regional level.

7.1 Principal Findings

To study the impact of the fifth enlargement on FDI location choice in the EU-25 I have used annual panel data on inward FDI obtained from the European Investment Monitor (EIM) for the period 1997-2010. It includes all cross-border 'productive' investment occurring within the European Union countries, regardless of where it arises from. The EIM data comprise project-level data on 35,155 investments for the EU-25 (plus Cyprus and Malta), and it records detailed information on a range of investment characteristics, including the company name, the year, the host location, the origin of the project parent company, the project type and the industry of the investment. These data have been collected for each year from 1997. The findings are discussed in relation to the three contributions.

7.1.1 The Country and Regional Descriptive Analysis

The data allow a detailed descriptive analysis of inward FDI. In particular, I have sought to determine the extent to which the spatial distribution of FDI activity in the EU-25 differs between the pre- and post-accession periods and so identify the 'winners' and 'losers' of the fifth enlargement. The descriptive statistics examined as part of this analysis are the total number of FDI projects, the EU-25 FDI project share, location quotients and the mean FDI projects per annum before and after the fifth enlargement (i.e. 1997-2003 and 2004-10). These descriptive statistics were analysed for the countries and regions of the EU-25, as well as the three sub-groups: the 'old' EU-15 members, the ten 'new' members (including Cyprus and Malta) that joined in 2004 and the 'new' members that joined in 2007 (Bulgaria and Romania). I use maps to more easily identify the spatial patterns in FDI location.

This analysis reveals that the distribution of inward FDI is unbalanced. Of the more than 35,000 investment projects, approximately 80% located in the 'old' EU-15 countries, while of the remaining 20% of projects, 16% located in the 'new' EU countries that acceded in 2004 and 4% in the 2007 countries. However, I find that significant heterogeneity exists within the respective groups. The major recipients of inward FDI as a whole for the period 1997-2010 are the 'old' EU-15 countries of the United Kingdom (8,343 projects), France (6,022) and Germany (3,491). Among the 'new' EU Member States, Poland (1,613) and Hungary (1,413) emerge as the major recipients of FDI. Some countries receive little FDI, including Finland (251 projects), Lithuania (239), Estonia (234), Latvia (181), Slovenia (118), Greece (100) and Luxembourg (90). Although the United Kingdom, France and Germany dominate as the top destinations for inward FDI in the EU, and account for more than half of the projects, the location quotient analysis shows that when the scale of inward FDI is measured relative to the economic size of a country their performance is weaker. Overall, I find that some 'old' EU-15 countries 'under-perform' and attract a smaller share of inward FDI than might be anticipated based on their economic size, including (in ascending order of average location quotient) Greece, Italy, Germany, Finland, the Netherlands, Spain, Denmark, Portugal, Luxembourg and Austria. By contrast, all 'new' EU-10 members 'over-perform'. Although the smaller economies of the EU receive the least investment in absolute terms, the weakest performers in the EU-25 in relative terms are Greece and Italy, which attracted the smallest amount of inward investment relative to their economic size.

The examination of the descriptive data reveals that Austria and Ireland are the 'losers' of the fifth enlargement, attracting less FDI after 2004. However, with the exception of these, all other countries of the EU-25 receive more FDI over 2004-10 than over 1997-2003. The quintile analysis of mean FDI per annum shows that alongside Austria and Ireland, Estonia is another country that is in the lower quintile of the mean FDI distribution. By contrast, countries that moved to a higher quintile include Lithuania, Romania and Slovakia. The examination of the absolute change in mean FDI per annum shows that the countries that gained the most FDI in absolute terms include France (an extra 211 projects per annum after 2004), Germany (160), the United Kingdom (126), Romania (81) and Poland (69).

I also establish in the thesis that the national data conceal a lot of regional variation that exists within countries and that significant disparities exist between regions of different EU-25 members. I find that most NUTS2 regions containing the country capital city make the top end of the FDI distribution, and that with the exception of Belgium, Germany, Italy, Slovakia, Slovenia and Spain they emerge as the top destination for inward FDI in their respective countries. Although the capital regions attract substantial FDI, the quintile analysis shows that 20% of NUTS2 regions receive at most one project per annum over the period 1997-2003, and at most two projects per annum over 2004-10. These weaker-performing regions in the lowest quintile include the regions of Greece, the Italian Mezzogiorno and the regions of northern Finland and Sweden, but also and perhaps surprisingly a substantial proportion of German regions.

The analysis of the change in mean FDI per annum shows that 59 out of 260 NUTS2 regions received less inward FDI after the fifth enlargement in 2004, and a further 20 regions saw no change in FDI relative to pre-enlargement period. The latter group includes the regions of southern Italy (Mezzogiorno) and Greece, as well as a good proportion of the British, Dutch and French regions, plus two regions in Ireland. I also identified a cluster of regions with negative (or non-positive) FDI growth rates that follows the former West-East border between the 'old' EU-15 and the 'new' EU-10, stretching from eastern Germany, through the Czech Republic and to eastern Austria. While positive growth in FDI from 2004 applies to most regions of the 'new' EU, a large proportion of the NUTS2 regions of the Czech Republic do not fit with this pattern. This suggests that the regions of the Czech Republic were the 'losers' of the fifth enlargement. By contrast, I found that the Romanian capital region of Bucuresti-Ilfov featured among the few NUTS2 regions that gained extra investment of more than 30 projects per annum after 2004, making it the largest absolute change in FDI for any region in the EU-10 regions (and fifth among the EU-25 regions), suggesting that it was the 'winner' from the fifth enlargement. Among the EU-10 the regions that received the largest FDI flow before and after the fifth enlargement in 2004 is the Hungarian capital region of Kozep-Magyarorszag.

7.1.2 The Motives for FDI Location in the EU-15 and EU-10

The second main contribution of this thesis is the examination of the motives for inward FDI location choice, focusing on how these motives differ between the 'old' EU-15 and 'new' EU-10. To explore whether there is a significant 'West-East divide' in the location decisions of multinational firms, which is highlighted by Disdier and Mayer (2004), I allowed for the effect of each explanatory variable in the analysis to vary between 'old' EU-15 countries and 'new' EU-10 countries. The econometric analysis was conducted for the EU-25 countries using a conditional logit model, owing to the discrete nature of the project location choice. The theoretical classification of three 'asset-exploiting' FDI motives developed by Dunning (1993) underpinned the research framework, and was reflected in the way in which the data on location factors were grouped into market- and resource-based determinants. Further distinction was made between 'specific-asset' resource-seeking and 'general-asset' resource-seeking motive as in Iammarino and McCann (2013). The efficiency-seeking motive that seeks to achieve greater efficiency through exploiting economies of scale was analysed by differentiating between 'new' and 'expansion' investment and by examining whether the location choice determinants were significantly different between these.

For a sample of 35,103 inward investment projects, I found that the multinational firms were attracted to the EU-25 by access to the EU Single Market. I established that although market access and resource-seeking motives were both important for the multinational firms locating in the EU-25, the statistically significant differences between the slope parameter estimates suggests that the motives for FDI location differ significantly between the 'old' EU-15 (West) and 'new' EU-10 (East). I found that the main motives for FDI location choice were 'specific-asset' resource-seeking for the higher-range skills in the 'old' EU-15 but market-seeking and 'general-asset' resource-seeking for inexpensive unskilled and semi-skilled labour in the 'new' EU-10. Further, motives other than efficiency and economies of scale seemed to drive the expansion FDI, since it was also subject to market-access and resource-seeking motives. An analysis of motives for FDI location choice depending on the project type (new investment and expansions) offered further evidence to support these findings (i.e. resource-seeking motive for skills dominates in the West, and market access and resource-seeking for cheap labour inputs are important in the East). Market access was not an important motive for the direct investors from outside the European Union, large proportion of whom invested in the 'old' EU-15 to access resources. I established that multinational firms from inside the EU-27 were seeking access to markets of CEECs, but were reluctant to invest there prior to the EU accession suggesting that the CEECs benefited from the fifth enlargement.

The econometric analysis establishes what attracts and deters inward FDI to or from the 'old' EU-15 and 'new' EU-10. The skills of the labour force appear to be a main motive for investment location in the West of Europe, with investors avoiding locations with high unemployment that possibly signal inflexible labour markets and a poor-quality workforce. Investment in the EU-15 also tends to be in those less congested peripheral locations that are well-connected to other markets through good quality road infrastructure. These findings were indicative of the 'specific-asset' resource-driven location choice behaviour of investors in the 'old' EU-15. Market access appears to drive the location choice in the CEECs as inward investment tends to locate in the rich markets with high growth potential, close to the core where road connectivity to other markets is not important. A skilled workforce did not attract inward investment to the 'new' EU and in fact greater education attainment and higher labour costs both discourage FDI suggesting 'general-asset' resource-seeking FDI location choice.

7.1.3 The Distance and Border Effects

The third contribution of this thesis involves the analysis of the effect of the fifth enlargement on the spatial distribution of FDI activity across the EU-25 regions, focusing on the role of borders in shaping the regional economic geography of inward FDI in CEECs after the fifth enlargement. This analysis was performed for 260 NUTS2 regions of the EU-25 countries for which I examined the size of the regional FDI inflows using panel data techniques. A two-country, three-region NEG model developed by Bruelhart *et al.* (2004) formalises the implications of regional integration on the spatial distribution of domestic manufacturing activity among the border and interior regions of the domestic and foreign countries, and underpinned my analysis. A log-linear model was specified with serially and spatially lagged dependent variable. A Least Squares Dummy Variable (LSDV) estimator was used in the main part of the econometric analysis, but to reflect the limitations of LSDV estimator in handling endogenous and pre-determined explanatory variables I also performed system GMM estimation. The aim was to establish statistically whether the benefits of EU accession were distributed equally across all regions of the CEECs. The role of 'border effects' was explored as I allowed for an asymmetry between the border and interior regions to establish if border regions benefited disproportionately more than other interior regions and emerged as the 'winners' of the fifth enlargement. I also quantified the effect of EU membership and the distance from the former West-East border on the size of regional inward FDI.

Using a sample of 35,103 inward investment projects, I found convincing evidence for the location advantage of the border regions of CEECs in attracting FDI after the fifth enlargement. Specifically, I found that the border regions receive up to 82% more inward investment than other regions, identifying them as the 'winners' of the fifth enlargement owing to their favourable location close to the major markets of the incumbent EU-15 countries. A statistically significant decay was confirmed as I found that the positive border effect diminished in magnitude as I moved further away from the former West-East border. The positive border effect did not apply to the border regions of the Czech Republic, which received less inward FDI than interior regions, but owing to the peculiar geography of this country in relation to the West-East border and the centroid of the enlarged EU-25. The analysis of distance showed that at an aggregate level a 10% increase in distance from the West-East border leads to a reduction of 1.33% projects per annum, and a reduction in the region's share of EU-25 FDI projects of 1.36%, suggesting that westernmost regions of CEECs have an advantage over easternmost regions as host locations of inward FDI. Overall, the magnitude of the negative distance effect is weak relative to the positive border effect.

Allowing for the distance effect to differ by country, I was also able to examine whether the distance from the West-East border has caused FDI to reorganise itself within the countries of the CEECs after 2004. This was notable for Hungary, Poland, Slovakia and Slovenia, where investment favours the regions that are in closer proximity to the West-East border. Again, a reverse location pattern was found for the regions of the Czech Republic. I also showed that EU accession resulted in a temporary 'boom' in the size of inward FDI to the regions of CEECs, which fell off two years after the accession. Finally, a statistically significant effect of inward FDI inertia and spatial spillovers was found, suggesting that the size of regional FDI activity depended on the size of inward FDI to that region in the previous year and the size of inward FDI in neighbouring regions, implying that it is serially and spatially correlated.

7.2 Policy Implications: Discussion

According to Iammarino and Santangelo (2000), "FDI has traditionally been considered one of the fundamental variables in determining long-run growth rates" (p. 7), and increasing FDI activity is considered to be a signal of accelerating globalisation. Through the process of technology and know-how transfer, the presence of multinational firms can make a positive contribution to the productivity of domestic firms and stimulate economic growth in the host economies. Although the presence of foreign firms implies increased competition and some level of job destruction associated with the crowding out of the firms that are least able to sustain this pressure, 'greenfield' investments also create (gross) new jobs and stimulate productivity gains as the most-productive firms are likely to be those that survive in the long run. Further, those domestic firms that seize the opportunity associated with the presence of multinational competitors and embrace the new technologies and knowledge, and organisational and managerial skills, may be better able to compete in the global market.

This thesis shows that the progress towards economic and political integration of the EU - with the addition of twelve new countries and 105 million new citizens to the existing EU's internal market of 380 million people - influences the economic geography of FDI activity within the enlarged EU-25. The thesis shows that while some countries and regions of the EU-25 appear to have gained a significant amount of inward FDI after enlargement (the 'winners'), other countries and regions appear to be 'losers'. Moreover, the regions within the individual 'new' EU-10 countries that are geographically closer to the West-East border (and hence, closer to the core of the EU Single Market) tend to attract relatively more FDI. These results raise questions about the promotion of economic convergence associated with the deepening and widening of economic integration within the EU, and in particular with respect to the EU's periphery. Furthermore, the findings of the thesis raise further issues about whether the inward investment activity of multinational firms promotes the economic convergence of the EU-25, or exacerbates the existing disparities further.

The study of Iammarino and Santangelo (2000) that aimed to investigate whether the European integration process and foreign activities have promoted convergence (or divergence) between Italian regions, found evidence that "the Italian geographical asymmetry is not an isolated case in the 'Europe of regions' and that cohesion within the area is far from being achieved" (p. 16). I reach a similar conclusion after studying the impact of FDI from the fifth enlargement on the economic geography of the EU-25. My analysis shows that while some countries and regions within the EU-25 receive a substantial amount of inward FDI (e.g. the United Kingdom and London in particular), other locations fail to attract FDI (e.g. the regions of Greece and the Italian Mezzogiorno). Although I find evidence that EU accession resulted in an increase in inward FDI to the CEECs in the post-accession period, the inward FDI flows are not distributed evenly across regions within CEECs. Some regions (e.g. Romanian capital regions of Bucuresti-Ilfov) gained a significant amount of FDI, while others (e.g. Podlaskie in the north-east of Poland and the Czech border regions) lost FDI. Given that I find that FDI has reorganised within some countries, such that regions within these countries closer to the West-East border have gained most raise questions about the economic convergence of the EU Member States and its regions.

Alongside economic convergence, the thesis raises questions about the future patterns of inward FDI to the EU, especially as the process of the widening of European integration continues and more countries such as the former Yugoslav republics and Turkey are expected to join the EU. Will the 'new' EU-10 Member States that acceded to the EU in 2004 and 2007 lose investment to these prospective new members? What will be the motives for investment in these prospective new members and how will this affect the motives for investment in the EU-10? Will the motives for investment in the EU-10 change and will these countries need to 'reinvent' their economies to attract new investment?

The thesis established that the motives for investment in the 'new' EU-10 were market-seeking and 'general-asset' resource-seeking, and I consider it plausible that these will also be the motives for investment in these prospective new members that join in the future due to their lower economic development level, the availability of low cost labour force and the general opportunities that arise from the first mover advantage. A likely implication is that the low cost unskilled and semi-skilled labour force would no longer be a source of comparative advantage of the 'new' EU-10 countries and would cease to be a factor that attracts inward FDI to these countries following the future enlargements of the EU.

As the economic development of the EU-10 advances, the comparative advantage of the EU-10 economies is expected to shift away from the labour-intensive production towards more capital-intensive production and knowledge-focused activities. The challenge for the EU-10 countries will be to replace jobs in declining industries with jobs in more knowledge-focused areas of activity. Although it appears that at present the skilled labour force deters inward FDI to the EU-10, an investment in upskilling the population is likely to bring the long-term benefits at the expense of the short-term costs especially if knowledge become a source of the comparative advantage in the future. Globalisation, as well as technological and transport advancements, are expected to reduce the importance of places that offer low-value production of goods and services, and increase the importance of places that facilitate knowledge exchange and creation of new ideas (Swinney and Thomas, 2015).

7.3 Future Work

The thesis offers comprehensive cross-country and cross-region evidence on the economic geography of FDI in the enlarged European Union covering the period of the fifth enlargement. It has filled significant gaps in the academic literature on foreign investment location, especially in respect of the present understanding of the determinants that shape the spatial distribution of FDI activity in the EU-25 before and after enlargement. Most importantly my work is not without limitations, and several issues open-up interesting avenues for future research.

First of all, the thesis adopts a relatively 'crude' approach to measure the efficiency-seeking motives for FDI location choice, which is examined by looking for any differences among market access and resource factors that exist between 'new' and 'expansion' investment. If the expansions are just a random sample of the new projects that are carried out at an earlier stage, I expect no differences in market-seeking and resource-seeking motives between these and the new investments if they are simply about adding scale. I acknowledge that the assumptions that I adopt to capture the efficiency-seeking motive are simplistic and fail to measure this motive for FDI location choice precisely, but they are a good attempt. In the future work more thought and consideration might be given to capturing the efficiency-seeking motive.

Second, a limitation of the conditional logit model is that it embodies the Independence of Irrelevant Alternatives (IIA) assumption, which imposes a uniform pattern of substitutability between alternative locations. As discussed in this thesis, the evidence suggests that this assumption is flawed and that it does not hold when two location alternatives are considered closer substitutes than other locations. My intention was to estimate a nested logit model to complement the conditional logit analysis in the study of the motives for FDI location choice in the 'old' EU-15 and 'new' EU-10. However, owing to the large number of observations and the resulting computational intensity of this modelling technique I was unable to estimate the nested logit model. I would like to conduct nested logit analysis as soon as I gain access to a more advanced technology. Importantly, the nested logit analysis is another method of studying the importance of national borders, as in Basile *et al.* (2009), and it can determine if borders strengthen the 'West-East' divide (see: chapter 5), complementing the analysis of the role of borders on FDI location in CEECs in the post-accession period (see: chapter 6).

Third, the analysis of economic geography of FDI across the regions of the EU-25 used the panel data techniques of the LSDV and system GMM estimators. Although these empirical techniques allow me to examine the effect of the EU membership, distance from the West-East border and border effects on the size of the regional inward FDI flows, the techniques made it impossible to analyse a range of project-specific information that was concealed when the aggregate investment flows were analysed. In future, I intend to conduct an analysis of the inward FDI location choice at the NUTS2 region level using the discrete choice methodology. Importantly, the use of the discrete choice methodology, such as conditional and nested logit models, would enable me to use project-specific information such as the project type, industry group and origin of investment, and to offer further insights into the nature of the spatial distribution of FDI activity across the EU-25 regions and the characteristics of investment projects that agglomerate close to the West-East border in CEECs in the post-accession period.

The analysis of the border effects focused on how it shaped the spatial distribution of FDI activity in the CEECs in the post-accession period. An extension of this analysis is to study the effect of national borders and distance on the economic geography of FDI in the 'old' EU-15 Member States. Importantly, the existing research suggests that the significant regional disparities exist within the 'old' EU-15 countries (e.g. Centre for Cities, 2015 shows that the 'North-South' divide exists in the United Kingdom). This study could examine the location of the regional clusters of FDI activity within countries of the 'old' EU-15, and measure whether these clusters are more likely to form close to the economic centres (capitals) of individual countries, or whether the distance to an arbitrary economic 'centroid' of the EU matters more within an integrated area such as the EU. Another feasible extension is to examine the effect of distance from the border affected by the second wave of the fifth enlargement in 2007, although I anticipate this effect to be relatively weak relative to the 2004 West-East border as these cross-border ties are likely to much less strong as they are a long way away from the core of the EU.

The research conducted in this thesis is conditional on a multinational firm having already decided to invest in the EU-25, so that I do not always consider the impact of the 'external forces' caused by the economic agents outside of the EU-25 system, although I do consider EU-25 FDI shares in the regional analysis. However, the accelerating globalisation and the process that causes economies to become more interlinked may put into question the validity of my approach. It is perhaps of interest to consider the size of inward FDI flows to other major recipients of inward investment such as Brazil, China, India, Mexico and the US. Given that the investing multinational firms choose a single location from a list of location alternatives in the EU-25 in my modelling framework, in practice multinational firms may choose a single location from all global alternatives. Any improvement in the performance of the global competitors is going to reduce the size of inward FDI to the EU-25, and more so to those countries and regions that are closer substitutes to location alternatives outside the European Union.

Finally, all three contributions of this thesis utilise the European Investment Monitor (EIM) data on FDI that records all productive investment (new 'greenfield' and expansion investment at an existing site for the multinational firm). A limitation of the EIM data is its failure to report information on the survival rate of a project. If a proportion of the projects fail soon after the start-up date of the investment, the positive effect of the inward investment on job creation and stimulating productivity growth among the domestic firms of the host economy will be reduced substantially. Essentially, it is plausible that some investment projects, and perhaps predominantly smaller projects may be carried out to first 'test' the market and are not necessarily intended to be a long-term investment. Furthermore, it covers gross inflows only, and if a project is a relocation from another EU-25 country, and possibly from within the

CEECs, then the net impact for the EU and the CEECs will be much smaller. This potentially is concern for the results as 60% of investment in the CEECs arises from the EU-15, although only four percent is from other CEECs. The border effects could arise from these 'boundary-hoppers' that look for cheap resources, but which is unexplored in this thesis and worthy of further study.

Appendix A

Table A.1: Distribution of FDI projects in the European Union: project numbers per country, 1997-2010

Destination	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total (country)	Percentage (%)	Yearly average	Min	Max
Austria	23	84	66	61	53	44	32	35	59	56	45	64	41	33	696	1.98	49.71	23	84
Belgium	100	132	109	111	88	73	77	136	179	185	175	142	146	159	1818	5.15	129.43	73	185
Bulgaria	13	10	11	16	19	29	29	64	32	68	63	60	27	29	470	1.34	33.57	10	68
Cyprus	0	0	0	0	0	0	0	0	0	2	4	5	4	9	24	0.07	4.80	2	9
Czech Republic	57	56	53	73	82	96	91	112	116	114	83	87	61	71	1152	3.28	82.29	53	116
Denmark	17	33	29	29	27	32	44	70	55	60	59	53	34	26	568	1.62	40.57	17	70
Estonia	10	10	13	18	21	17	16	35	23	15	7	14	13	22	234	0.67	16.71	7	35
Finland	12	14	11	14	31	12	9	19	9	15	25	42	15	23	251	0.71	17.93	9	42
France	426	271	392	353	265	254	313	490	538	565	541	523	529	562	6022	17.13	430.14	254	565
Germany	190	197	196	170	171	153	110	163	182	286	305	390	418	560	3491	9.93	249.36	110	560
Greece	1	7	4	4	4	5	5	7	8	12	11	13	11	8	100	0.28	7.14	1	13
Hungary	116	114	88	76	85	100	85	139	115	108	135	100	64	88	1413	4.02	100.93	64	139
Ireland	169	112	115	113	61	51	46	76	67	74	80	108	84	114	1270	3.61	90.71	46	169
Italy	43	36	45	60	52	29	23	33	49	74	69	96	100	103	812	2.31	58.00	23	103
Latvia	18	9	5	5	10	12	8	18	16	22	16	24	10	8	181	0.51	12.93	5	24
Lithuania	19	10	4	10	17	20	6	12	29	24	28	19	10	31	239	0.68	17.07	4	31
Luxembourg	8	4	3	1	5	2	4	8	8	10	13	5	8	11	90	0.26	6.43	1	13
Malta	0	0	0	0	0	0	0	1	2	2	4	2	9	6	26	0.07	3.71	1	9
Netherlands	85	84	87	105	67	61	58	56	82	95	123	116	108	115	1242	3.53	88.71	56	123
Poland	142	116	67	85	50	60	46	148	180	152	146	176	102	143	1613	4.59	115.21	46	180
Portugal	13	35	19	12	25	32	37	37	29	38	37	39	42	27	422	1.20	30.14	12	42
Romania	18	22	18	15	39	50	20	91	86	140	150	145	75	62	931	2.65	66.50	15	150
Slovakia	14	18	14	19	19	25	24	83	70	46	58	48	33	58	529	1.50	37.79	14	83
Slovenia	4	6	2	4	2	1	1	10	9	9	19	17	16	18	118	0.34	8.43	1	19
Spain	76	90	139	148	141	122	119	121	147	212	256	211	173	169	2124	6.04	151.71	76	256
Sweden	29	28	40	44	90	71	74	97	95	113	81	85	58	77	982	2.79	70.14	28	113
United Kingdom	818	639	508	574	370	369	453	563	559	685	713	686	678	728	8343	23.73	595.93	369	818
Total (year)	2421	2137	2038	2120	1794	1720	1730	2624	2744	3182	3246	3270	2869	3260	35155	100.00	2511.07	1720	3270
Percentage (%)	6.89	6.08	5.80	6.03	5.10	4.89	4.92	7.46	7.81	9.05	9.23	9.30	8.61	9.27					

(source: EIM dataset, authors' own elaboration)

Table A.2: Correlation matrix: country-level variables

	Peripherality index	Internal market GDP	Income per capita	Population density	Growth rate	Physical infrastructure	Secondary education	Tertiary education	Unemployment rate	Wage rate	Dummy: wage rate	Openness to trade	Exchange rate	Exchange rate volatility	Corporate tax rate	EU Structural Funds	Political risk	Foreign specialisation	Domestic specialisation	Jacobs term	Herfindahl index	Dummy: Bulgaria-Romania	Dummy: Herfindahl index
Peripherality index	1.0000																						
Internal market GDP	0.0839	1.0000																					
Income per capita	0.4596	0.2628	1.0000																				
Population density	0.6102	0.3667	0.3366	1.0000																			
Growth rate	-0.0646	-0.1887	-0.1328	-0.1356	1.0000																		
Physical infrastructure	0.6573	0.2293	0.5814	0.8500	-0.1559	1.0000																	
Secondary education	0.1751	-0.2202	-0.4143	-0.1719	0.1088	-0.3237	1.0000																
Tertiary education	0.1854	0.0940	0.3771	0.0737	-0.1007	0.2129	-0.3429	1.0000															
Unemployment rate	-0.2505	0.0111	-0.4904	-0.2767	-0.0220	-0.3641	0.1458	-0.0841	1.0000														
Wage rate	0.2530	0.5524	0.5769	0.4108	-0.2378	0.3924	-0.3462	0.3699	-0.2396	1.0000													
Dummy: wage rate	-0.1261	-0.3592	-0.2005	-0.2213	0.1466	-0.0732	0.2046	-0.0749	-0.0189	-0.6699	1.0000												
Openness to trade	0.5379	-0.4404	-0.1543	0.2012	0.2011	0.2192	0.3795	0.1250	-0.0773	-0.1720	0.0897	1.0000											
Exchange rate	0.0989	0.0423	0.0875	-0.0248	-0.2243	0.0495	0.0513	0.1830	-0.1382	0.0678	0.0404	0.0411	1.0000										
Exchange rate volatility	-0.0907	-0.1453	-0.3717	-0.1421	-0.0584	-0.3226	0.3150	-0.1656	0.1553	-0.3266	0.1800	0.0844	0.0896	1.0000									
Corporate tax rate	0.1351	0.4823	0.3042	0.3754	-0.0901	0.3953	-0.3484	-0.0606	0.0405	0.4256	-0.3215	-0.3135	-0.3771	-0.2255	1.0000								
EU Structural Funds	-0.2830	0.5671	0.0342	0.0668	-0.0898	0.0425	-0.4960	-0.0417	0.2026	0.2302	-0.3477	-0.4948	0.0542	-0.1016	0.3722	1.0000							
Political risk	0.2976	0.1165	0.7603	0.2658	-0.0539	0.4280	-0.2987	0.1688	-0.5006	0.5440	-0.3835	-0.0809	-0.0090	-0.3425	0.2879	-0.0267	1.0000						
Foreign specialisation	-0.0019	0.0013	0.0010	-0.0001	0.0035	-0.0006	-0.0009	0.0003	0.0002	0.0024	0.0022	-0.0026	0.0036	-0.0063	-0.0006	-0.0010	0.0028	1.0000					
Domestic specialisation	0.1733	0.1029	0.1774	0.0663	-0.0502	0.0980	0.0327	0.0860	-0.0587	0.1795	-0.2269	0.0876	0.0403	-0.1013	0.0590	0.0212	0.2201	0.1065	1.0000				
Jacobs term	0.2308	0.6944	0.4283	0.3000	-0.1300	0.3105	-0.1519	0.0712	-0.0483	0.6811	-0.6230	-0.2139	0.0286	-0.3311	0.4828	0.4594	0.4412	0.0009	0.2918	1.0000			
Herfindahl index	-0.0733	-0.1494	-0.1003	-0.0453	0.0063	-0.0272	0.0539	-0.0581	0.0209	-0.1067	0.0647	0.0738	0.0044	0.0203	-0.0862	-0.0680	-0.0536	0.1465	-0.0667	-0.1069	1.0000		
Dummy: Bulgaria-Romania	-0.2771	-0.1798	-0.3633	-0.1341	0.0486	-0.2357	0.1328	-0.2303	0.0060	-0.3515	0.5247	0.0039	-0.0861	0.3186	-0.1990	-0.1840	-0.4578	-0.0017	-0.3345	-0.6436	0.0628	1.0000	
Dummy: Herfindahl index	-0.1261	-0.2326	-0.0218	-0.1597	0.0718	-0.0686	-0.0002	-0.0275	0.0397	-0.2219	0.2345	-0.0323	-0.0781	-0.0226	0.0028	-0.1167	-0.0289	-0.2464	-0.0650	-0.1794	-0.5966	0.0130	1.0000

Table A.3: Correlation matrix: region-level variables

	'New' EU: road distance	'Old' EU: road distance	'New' EU: line distance	Jacobs term	Dummy: Bulgaria-Romania	Adjacent market GDP	Peripherality index	Internal market GDP	Income per capita	Population density	Growth rate	Physical infrastructure	Unemployment rate	Secondary education	Tertiary education	Wage rate	Dummy: wage rate	Openness to trade	Exchange rate	Exchange rate volatility	Political risk	Corporate tax rate	EU Structural Funds
'New' EU: road distance	1.0000																						
'Old' EU: road distance	0.5763	1.0000																					
'New' EU: line distance	0.9907	0.5688	1.0000																				
Jacobs term	-0.0439	0.0365	-0.0539	1.0000																			
Dummy: Bulgaria-Romania	-0.1750	-0.1528	-0.1645	-0.5403	1.0000																		
Adjacent market GDP	-0.0080	0.0617	-0.0035	0.3323	-0.2068	1.0000																	
Peripherality index	-0.1936	0.0014	-0.1845	0.1168	-0.2600	0.3257	1.0000																
Internal market GDP	0.0674	0.0967	0.0795	0.2925	-0.1613	0.2257	0.0547	1.0000															
Income per capita	0.1303	0.1940	0.1192	0.4486	-0.4129	0.3807	0.3151	0.4793	1.0000														
Population density	-0.0134	0.0054	-0.0088	0.0656	-0.0537	0.0619	0.1989	0.3417	0.3665	1.0000													
Growth rate	0.0047	-0.1593	0.0105	-0.3194	0.0260	-0.1042	-0.0486	-0.0487	-0.0916	-0.0044	1.0000												
Physical infrastructure	0.0630	0.0827	0.0752	0.2594	-0.1895	0.3395	0.3121	0.2999	0.4799	0.5021	-0.0695	1.0000											
Unemployment rate	-0.0217	-0.1059	-0.0190	-0.0148	0.0491	-0.3042	-0.2287	-0.0901	-0.4379	-0.0172	0.0176	-0.1925	1.0000										
Secondary education	0.2177	0.2564	0.2215	0.1474	-0.2007	0.2294	0.3453	0.2593	0.5502	0.2523	-0.0471	0.3071	-0.1795	1.0000									
Tertiary education	-0.7797	-0.4382	-0.7711	-0.0089	0.1484	-0.0620	0.1993	-0.1790	-0.2758	-0.0548	0.0236	-0.1837	0.0332	-0.2636	1.0000								
Wage rate	0.0823	0.1522	0.0673	0.6474	-0.4660	0.4540	0.3987	0.3053	0.7513	0.1617	-0.1979	0.3964	-0.2531	0.4853	-0.1963	1.0000							
Dummy: wage rate	-0.2125	-0.1728	-0.1990	-0.5343	0.8496	-0.2303	-0.2206	-0.1749	-0.3676	-0.0709	0.0645	-0.1707	0.0309	-0.1671	0.1719	-0.5485	1.0000						
Openness to trade	-0.3816	-0.2266	-0.3624	-0.2465	0.0921	-0.0547	0.5921	-0.1799	-0.0821	0.0983	0.0945	0.1675	-0.0871	0.0927	0.2831	-0.0636	0.1364	1.0000					
Exchange rate	0.1243	0.1462	0.1222	0.1666	-0.1552	0.1076	0.1173	0.0792	0.2109	0.0352	-0.0314	0.0907	-0.1383	0.1967	-0.0186	0.2273	-0.1153	-0.0224	1.0000				
Exchange rate volatility	-0.1034	-0.0935	-0.1016	-0.2885	0.2605	-0.1086	-0.0650	-0.1297	-0.3148	-0.0177	-0.0759	-0.1885	0.0880	-0.1163	0.2231	-0.3632	0.2162	0.0126	-0.0735	1.0000			
Political risk	0.0512	-0.0805	0.0439	0.3013	-0.4701	0.2483	0.2129	0.0949	0.5560	0.1193	0.0337	0.3051	-0.3771	0.3114	-0.0549	0.5440	-0.4384	0.0220	0.1314	-0.2141	1.0000		
Corporate tax rate	-0.0175	-0.1137	-0.0225	0.5081	-0.2428	0.2281	0.0070	0.1817	0.2795	0.0736	-0.0290	0.2445	0.0878	0.0475	-0.1429	0.4790	-0.2842	-0.2574	-0.1473	-0.1925	0.2370	1.0000	
EU Structural Funds	0.3505	0.2301	0.3588	0.0552	-0.0955	-0.1342	-0.2500	0.1203	-0.1361	-0.0443	0.0070	-0.0431	0.2347	-0.0528	-0.3120	-0.0833	-0.0908	-0.1406	0.0420	-0.0574	-0.0465	0.0252	1.0000

Table A.4: Distribution of FDI projects in the European Union: project numbers per industry, 1997 – 2010

Industry: NACE code	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total (industry)	Percentage (%)
								Agriculture								
1	4	0	3	0	1	1	0	4	3	6	3	6	11	8	50	0.14
2	0	0	1	0	0	0	0	0	0	1	0	0	1	1	4	0.01
5	2	0	0	0	0	0	0	0	0	1	0	0	0	1	4	0.01
Agriculture - Total:	6	0	4	0	1	1	0	4	3	8	3	6	12	10	58	0.17
Agriculture (%):	0.25	0.00	0.20	0.00	0.06	0.06	0.00	0.15	0.11	0.25	0.09	0.18	0.42	0.31	0.17	
								Energy								
11	1	2	0	0	11	15	11	20	12	18	20	26	14	25	175	0.50
40	8	9	10	6	6	5	7	2	8	13	26	27	21	39	187	0.53
Energy - Total:	9	11	10	6	17	20	18	22	20	31	46	53	35	64	362	1.03
Energy (%):	0.37	0.51	0.49	0.28	0.95	1.16	1.04	0.84	0.73	0.98	1.42	1.62	1.23	1.91	1.03	
								Manufacturing								
15	122	92	82	74	63	74	99	139	111	100	102	117	117	110	1,402	3.99
16	12	4	3	2	3	6	2	6	4	8	0	3	2	4	59	0.17
17	30	15	11	15	14	29	14	26	19	17	15	12	13	31	261	0.74
18	17	16	12	7	8	9	17	21	16	16	17	22	24	20	222	0.63
19	6	1	2	3	2	6	0	1	5	4	1	1	1	3	36	0.10
20	11	6	18	12	16	10	15	25	28	20	18	14	12	21	226	0.64
21	62	56	45	35	28	21	44	36	33	31	30	34	30	32	517	1.47
22	14	23	16	10	7	9	9	34	35	44	61	56	53	50	421	1.20
23	12	10	10	3	3	2	6	2	6	15	27	6	17	7	126	0.36
24	301	209	168	128	101	90	90	100	111	140	105	125	127	125	1,920	5.46
24.4	114	115	93	75	88	108	123	128	101	112	108	102	127	99	1,493	4.25
25	79	52	65	40	51	51	62	113	92	85	78	82	75	96	1,021	2.90
26	57	64	43	38	26	27	44	63	61	79	85	87	57	55	786	2.24
27	51	48	33	27	22	35	28	16	29	17	32	30	16	22	406	1.15
28	47	40	33	30	19	32	23	71	69	95	89	68	74	78	768	2.18

Table A.4: Distribution of FDI projects in the European Union: project numbers per industry, 1997 – 2010

Industry: NACE code	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total (industry)	Percentage (%)
29	124	114	86	78	54	60	101	152	136	216	181	215	196	242	1,955	5.56
30	117	69	66	60	27	40	47	51	45	53	34	51	47	39	746	2.12
31	59	55	41	54	52	48	43	50	64	85	101	99	123	117	991	2.82
32	203	180	185	213	163	121	112	184	216	222	187	177	159	171	2,493	7.09
33	52	40	46	33	29	28	40	35	58	64	55	69	68	90	707	2.01
34.1	99	74	69	63	80	74	57	76	46	46	69	47	37	76	913	2.60
34.3	165	152	162	131	120	145	157	235	210	158	120	138	62	130	2,085	5.93
35	34	34	37	20	16	20	26	29	38	37	42	41	47	35	456	1.30
36	24	28	24	20	19	23	25	24	27	24	20	38	31	29	356	1.01
Manufacturing - Total:	1,812	1,497	1,350	1,171	1,011	1,068	1,184	1,617	1,560	1,688	1,577	1,634	1,515	1,682	20,366	57.97
Manufacturing (%):	74.85	70.04	66.22	55.24	56.35	62.09	68.44	61.61	56.86	53.12	48.61	50.02	52.84	51.77	57.97	
Construction																
45	5	0	5	3	7	15	7	16	12	17	26	20	25	27	185	0.53
Construction - Total:	5	0	5	3	7	15	7	16	12	17	26	20	25	27	185	0.53
Construction (%):	0.21	0.00	0.25	0.14	0.39	0.87	0.40	0.61	0.44	0.53	0.80	0.61	0.88	0.83	0.53	
Retail and Hospitality																
50	0	0	0	1	0	0	1	1	3	3	5	14	4	2	34	0.10
51	10	2	10	9	6	9	4	24	12	27	21	43	30	40	247	0.70
52	12	21	19	19	33	16	10	38	47	37	49	34	35	36	406	1.15
Retail and Hospitality - Total:	22	23	29	29	39	25	15	63	62	67	75	91	69	78	687	1.95
Retail and Hospitality (%):	0.91	1.08	1.42	1.37	2.17	1.45	0.87	2.40	2.26	2.11	2.32	2.79	2.42	2.37	1.95	
Transport																
55	0	1	1	0	3	3	2	4	1	4	1	7	1	3	31	0.09
60	7	0	1	0	12	13	13	33	13	17	6	11	12	4	142	0.40
61	11	8	1	4	5	2	9	6	8	3	14	6	16	6	99	0.28
62	13	7	5	5	7	20	9	17	14	18	25	26	25	42	233	0.66
63	57	48	67	57	52	38	48	94	158	133	156	166	116	149	1,339	3.81

Table A.4: Distribution of FDI projects in the European Union: project numbers per industry, 1997 – 2010

Industry: NACE code	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total (industry)	Percentage (%)
64	46	60	62	143	80	43	43	59	69	61	48	34	46	46	840	2.39
Transport - Total:	134	124	137	209	159	119	124	213	263	236	250	250	216	250	2,684	7.63
Transport (%):	5.53	5.81	6.73	9.86	8.86	6.92	7.17	8.12	9.59	7.39	7.69	7.66	7.49	7.64	7.63	
Services																
65	98	53	46	61	62	31	47	102	119	162	196	150	132	151	1,410	4.01
66	29	32	25	18	15	15	6	23	25	36	61	47	43	26	401	1.14
67	12	24	33	14	13	2	1	0	2	4	30	16	13	17	181	0.51
70	3	6	1	0	11	0	4	3	8	23	44	43	14	13	173	0.49
71	0	1	1	2	0	0	0	3	1	7	2	5	5	5	32	0.09
72	195	245	298	432	310	283	172	299	337	438	437	368	306	350	4,470	12.72
73	0	1	0	0	7	4	1	35	27	27	41	40	42	42	267	0.76
74	84	99	87	171	138	125	136	206	283	413	436	500	396	515	3,589	10.21
Services - Total:	421	461	491	698	556	460	367	671	802	1,110	1,247	1,169	951	1,119	10,523	29.90
Services (%):	17.39	21.58	24.10	32.92	30.99	26.74	21.21	25.58	29.21	34.83	38.39	35.67	33.12	34.24	29.90	
Education and Health																
80	0	0	1	0	3	1	3	8	4	1	4	10	2	5	42	0.12
85	1	1	0	1	0	5	4	2	3	8	10	17	12	12	76	0.22
Education and Health - Total:	1	1	1	1	3	6	7	10	7	9	14	27	14	17	118	0.34
Education and Health (%):	0.04	0.05	0.05	0.05	0.17	0.35	0.40	0.38	0.26	0.28	0.43	0.83	0.49	0.52	0.34	
Recreation																
92	11	20	11	3	1	6	8	8	15	16	8	20	32	13	172	0.49
Recreation - Total:	11	20	11	3	1	6	8	8	15	16	8	20	32	13	172	0.49
Recreation (%):	0.45	0.94	0.54	0.14	0.06	0.35	0.46	0.30	0.55	0.50	0.25	0.61	1.12	0.40	0.49	
Total (year)	2,421	2,137	2,038	2,120	1,794	1,720	1,730	2,624	2,744	3,182	3,246	3,270	2,869	3,260	35,155	100
Percentage (%)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		

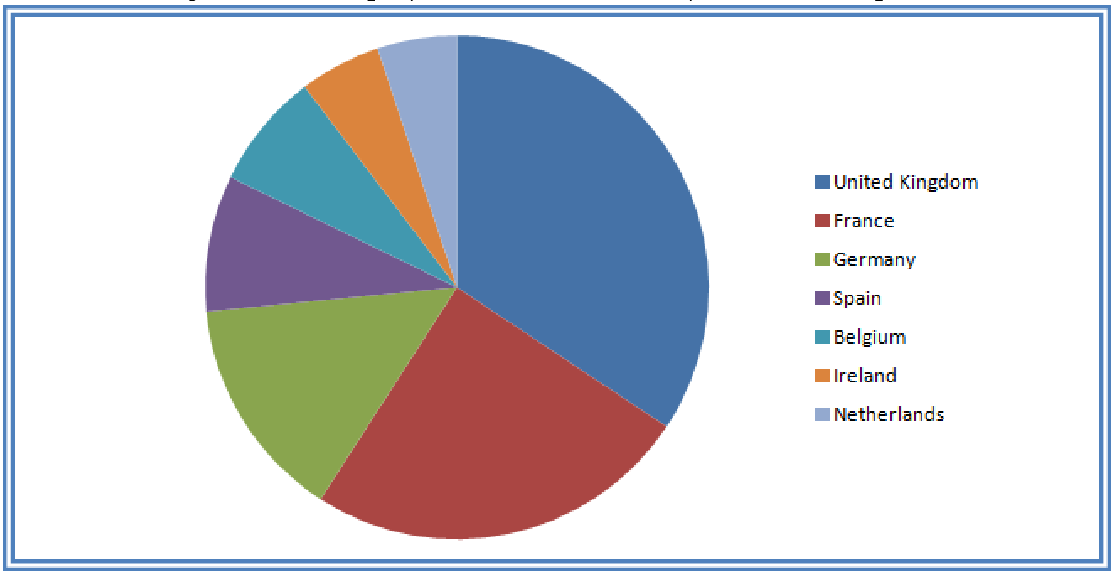
(source: EIM dataset, authors' own elaboration)

Table A.5: Explanatory variables: descriptive statistics

	Country-level				Region-level			
Variable	Mean	S.D.	Min	Max	Mean	S.D.	Min	Max
LDV: LOG(number_FDI)					1.64	1.16	0.00	5.73
LDV: LOG(share_FDI)					-6.14	1.15	-8.09	-2.36
Spatial lag: LOG(number_FDI)					0.71	0.35	0.00	1.86
Spatial lag: LOG(share_FDI)					-2.67	0.34	-3.51	-1.53
Road distance to EU border					830.68	626.82	1.00	3,748.00
Straight line distance to EU border					626.60	483.70	1.00	3,200.00
Number of regions distance to EU border					5.78	4.61	0.00	20.00
Adjacent market GDP					3,790.06	3,969.41	0.00	27,886.72
Peripherality index	36.84	15.77	14.54	83.91	37.74	14.58	14.54	83.91
Internal market GDP	421,779.49	615,700.23	6,061.80	2,407,913.00	40,405.54	49,811.34	722.28	538,338.21
Income per capita	20,060.80	13,848.58	1,900.00	70,400.00	20,991.90	10,373.12	1,410.93	73,021.58
Population density	129.39	102.71	16.80	492.20	315.16	672.96	3.30	6,902.00
Growth rate	2.90	3.74	-17.70	11.70	2.20	5.75	-20.18	21.20
Physical infrastructure	17.05	19.01	0.00	78.00	27.00	30.41	0.00	225.00
Secondary education	50.61	15.51	10.80	80.20	47.29	15.13	6.90	80.30
Tertiary education	23.23	8.08	8.20	44.00	21.62	7.91	5.20	49.50
Unemployment rate	8.57	3.96	1.80	22.10	8.67	4.55	0.80	28.70
Wage rate	18.41	10.05	2.65	34.83	21.24	8.76	2.65	34.83
Openness to trade	78.25	34.26	27.06	186.26	63.55	32.68	27.06	186.26
Exchange rate	97.85	10.46	53.82	134.34	98.24	8.48	53.82	134.34
Exchange rate volatility	3.30	3.31	0.01	19.30	3.15	3.35	0.01	19.30
Corporate tax rate	28.67	8.27	10.00	56.80	32.42	8.43	10.00	56.80
EU Structural Funds	1,259.57	1,948.83	0.00	10,011.59	73.15	151.33	0.00	2,229.82
Political risk	81.92	6.85	65.00	96.50	82.19	5.76	65.00	96.50
Jacobs term	3.72	1.39	1.45	9.71	4.53	1.57	1.45	9.71
Foreign specialisation	1.09	5.03	0.00	415.80				
Domestic specialisation	1.10	1.39	0.00	40.41				
Herfindahl index	0.65	0.32	0.02	1.00				

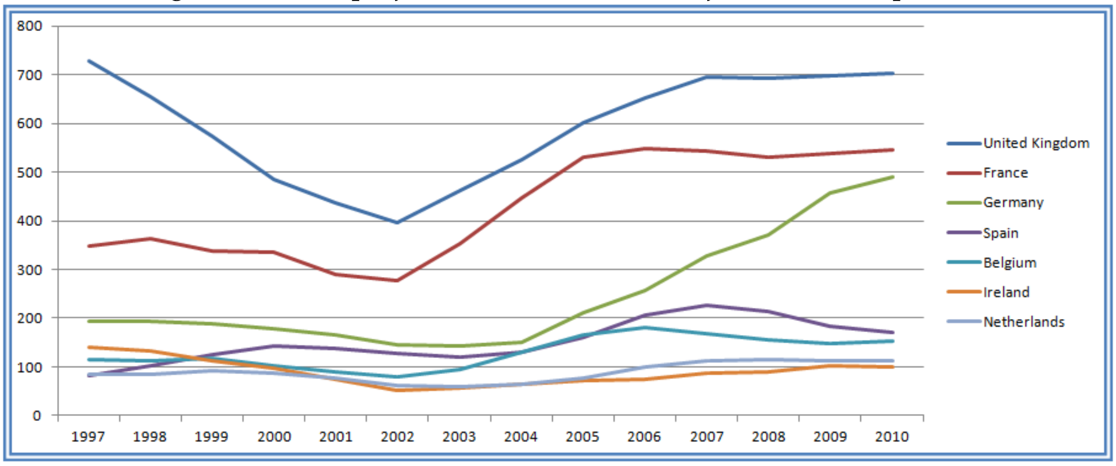
(source: authors' own elaboration)

Figure A.1: FDI project shares for the 'major' EU-15 recipients



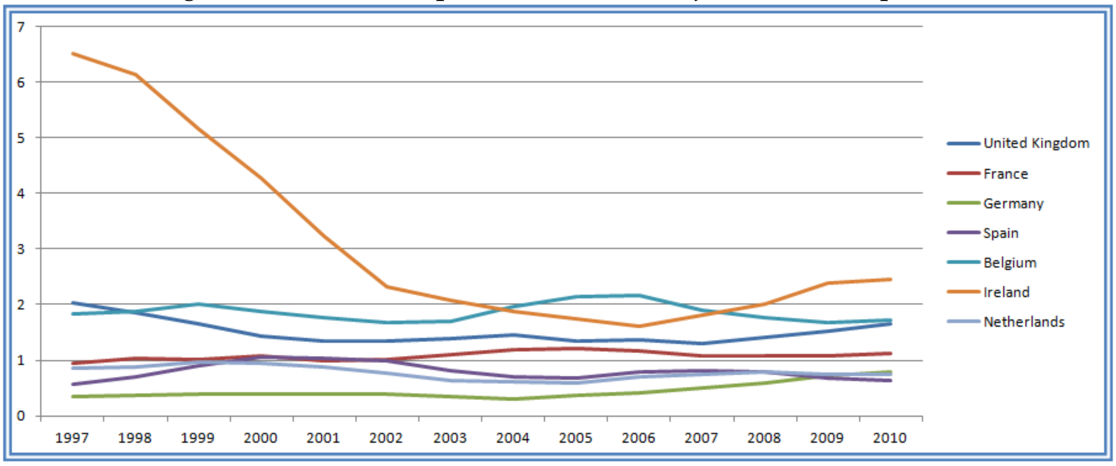
(Source: EIM dataset, authors' own elaboration)

Figure A.2: FDI project numbers for the 'major' EU-15 recipients



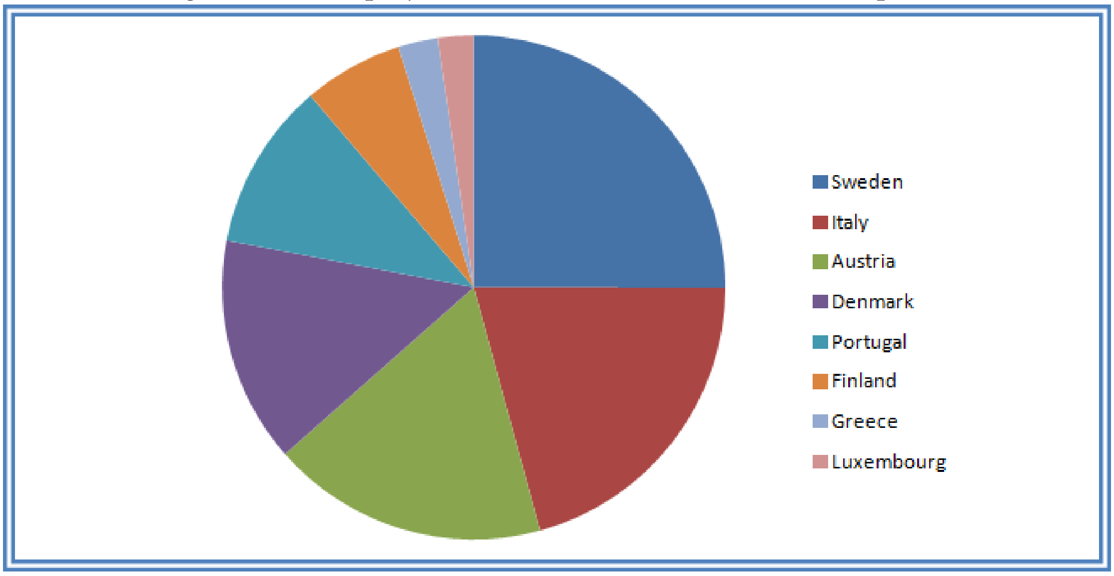
(Source: EIM dataset, authors' own elaboration)

Figure A.3: Location quotients for the 'major' EU-15 recipients



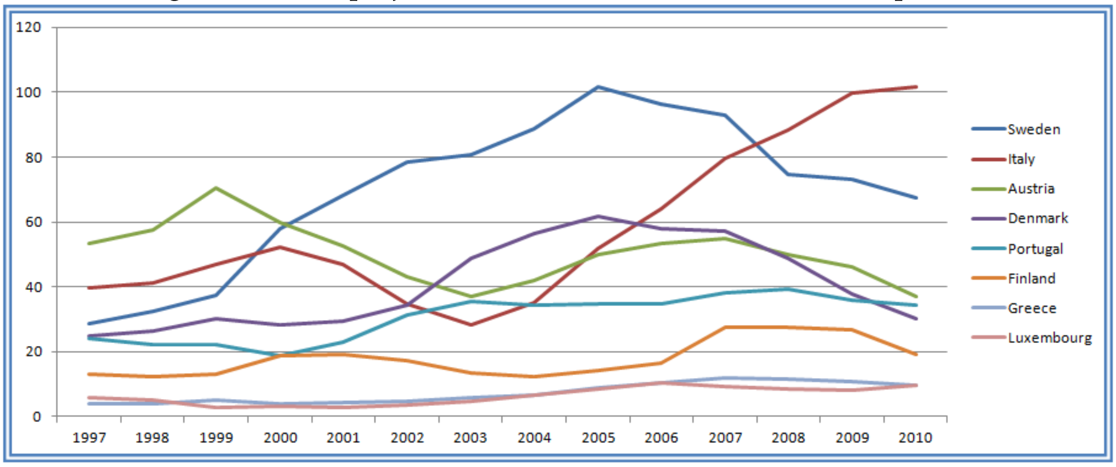
(Source: EIM dataset, authors' own elaboration)

Figure A.4: FDI project shares for the 'minor' EU-15 recipients



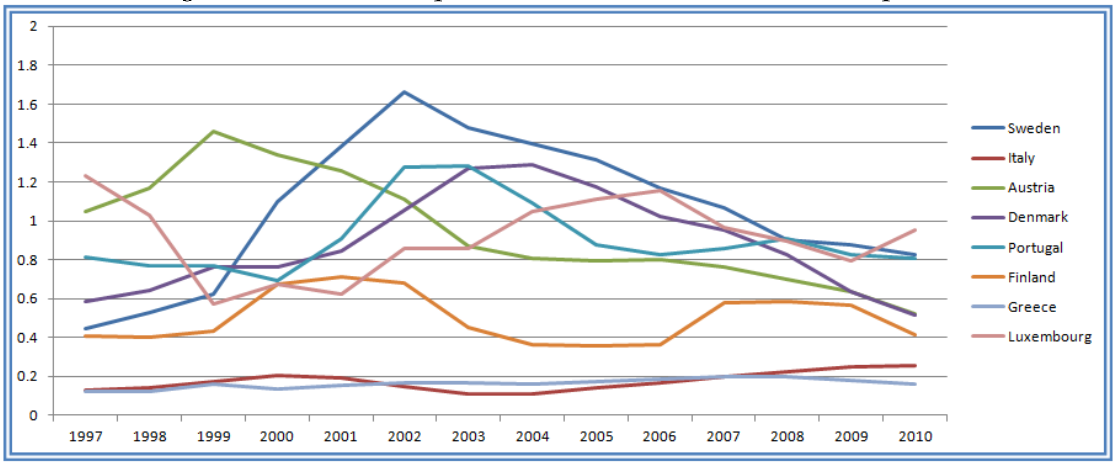
(Source: EIM dataset, authors' own elaboration)

Figure A.5: FDI project numbers for the 'minor' EU-15 recipients



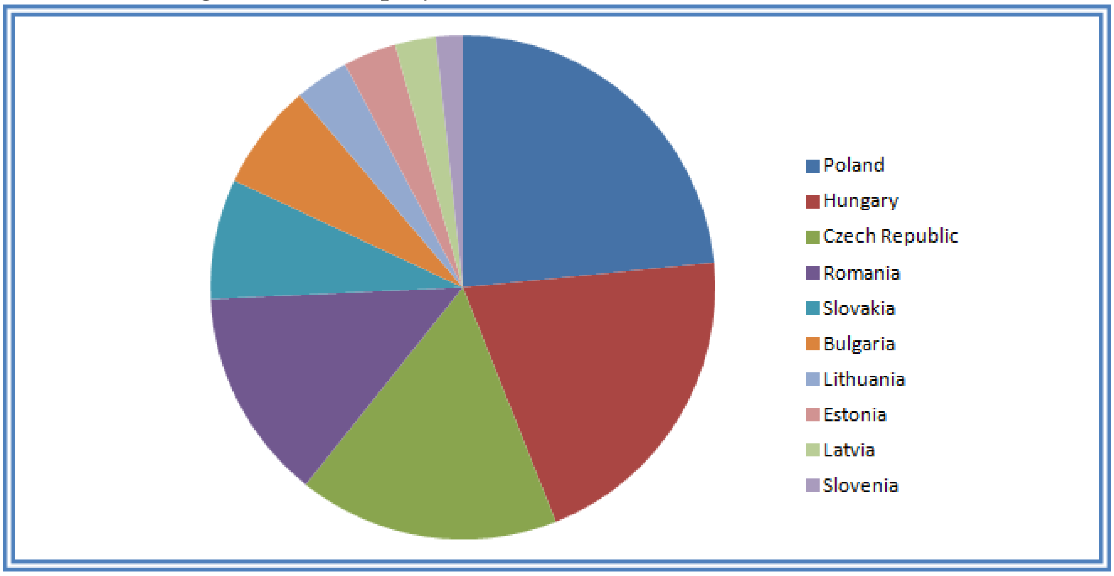
(Source: EIM dataset, authors' own elaboration)

Figure A.6: Location quotients for the 'minor' EU-15 recipients



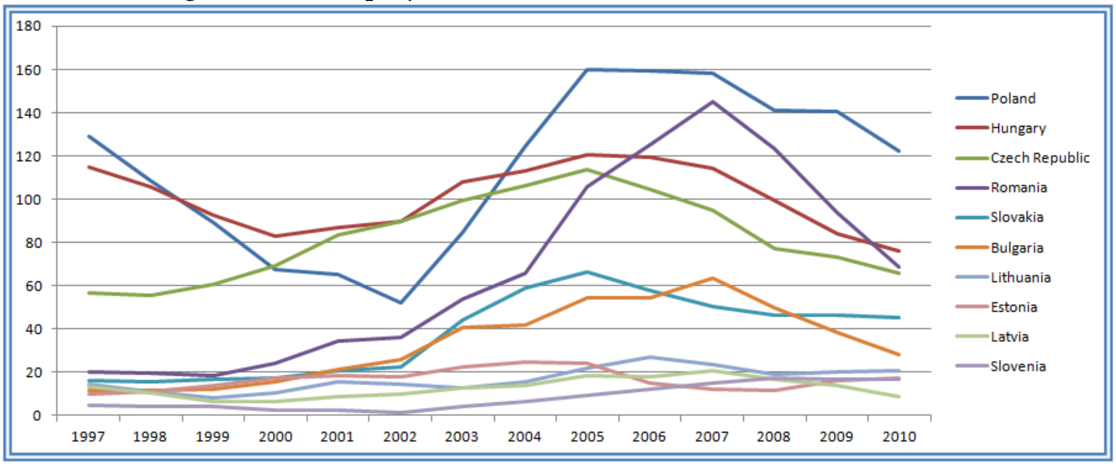
(Source: EIM dataset, authors' own elaboration)

Figure A.7: FDI project shares for the 'new' EU-10 countries



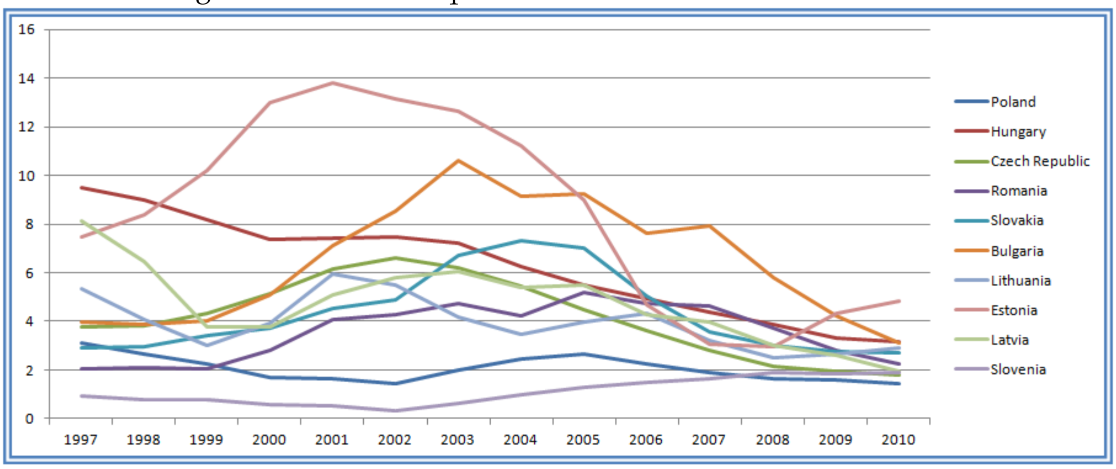
(Source: EIM dataset, authors' own elaboration)

Figure A.8: FDI project numbers for the 'new' EU-10 countries



(Source: EIM dataset, authors' own elaboration)

Figure A.9: Location quotients for the 'new' EU-10 countries



(Source: EIM dataset, authors' own elaboration)

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