THE EASTWARD EXPANSION OF THE EUROPEAN UNION: IS FOREIGN DIRECT INVESTMENT BEING DIVERTED FROM THE EU PERIPHERY?

by

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LIST OF ACRONYMS

CEEC – Central Eastern European Countries

CIS – Commonwealth of Independent States

EU – European Union

FDI – Foreign Direct Investment

FGLS – Feasible Generalized Least Squares

FIAS – Foreign Investment Advisory Services

FTA – Free Trade Agreement

FYROM – Former Yugoslavian Republic of Macedonia

GDP – Gross Domestic Product

GMM – Generalized Methods of Moments

IMF – International Monetary Fund

MFN – Most Favored Nation

OECD – Organization for Economic Cooperation and Development

OLS – Ordinary Least Squares

PPP – Purchasing Power Parity

R&D – Research and Development

SEZ – Special Economic Zone

SMP – Single Market Program

TNC – Transnational Corporation

UNCTAD – United Nations Conference on Trade and Development

WTO – World Trade Organization

LIST OF EUROPEAN UNION MEMBERS WITH DATES OF INTEGRATION

Belgium – 1952

France – 1952

Germany – 1952

Italy – 1952

Luxembourg – 1952

Netherlands – 1952

Denmark – 1973

Ireland – 1973

United Kingdom – 1973

Greece – 1975

Portugal – 1986

Spain – 1986

Austria – 1995

Finland – 1995

Sweden – 1995

Czech Republic – 2004

Cyprus – 2004

Estonia – 2004

Hungary – 2004

Latvia – 2004

Lithuania – 2004

Malta – 2004

Poland – 2004

Slovak Republic– 2004

Slovenia – 2004

Bulgaria – 2007

Romania – 2007

ABSTRACT

This thesis investigated the relationship between FDI and the EU periphery, along with the region's interaction with the CEECs and EU-27. Much research has been done to identify both the flow and attraction of FDI, but while previous studies have looked at the effect of in the CEECs prior to integration into the EU, to the best of my knowledge, this is the first analysis to capture the effects of the latter two enlargement rounds, utilizing data that includes a running series up until the duration of 2009. By focusing on the most recent data series in the EU periphery and CEECs, along with their respective FDI stock, a more accurate relationship can be discerned. As such, this analysis seeks to investigate FDI and its directional relationship with the CEECs.

This analysis relies on a panel model approach, using GMM estimation to evaluate FDI stock in the EU periphery and CEECs during the period from 1995-2009. The resulting coefficients estimated in each specification did not indicate any presence of FDI diversion, instead noting an overall positive impact the CEECs have on peripheral-bound FDI. Moreover, increased opportunities in the EU-27 also have both a positive and significant relationship with FDI in the EU periphery. Subsequently, the analysis finds evidence for unidirectional interaction between the EU periphery and the CEECs, and not vice versa. Furthermore, the results show wage competiveness to have a strong negative impact on FDI in the EU periphery, while reductions in risk are strongly beneficial. Additional tests were conducted using FDI stock by share of the EU-27 and found similar results, failing to find any evidence of FDI diversion.

Chapter 1

INTRODUCTION

1.1 Context for the Analysis

Over the past decade, the European Union (EU) has witnessed unprecedented membership expansion, culminating in a succession of eastward enlargements. Collectively, these repeated waves of integration into the EU have resulted in dramatic shifts in both inward and outward foreign direct investment (FDI), more aptly defined as a composite of bilateral transfers of investment, technology, training or expertise, and payments between States (Cheng and Kwan 2000). In the context of this analysis FDI stock is treated as the value of capital and reserves, which includes retained profits of parent enterprises, plus the indebtedness of affiliates of parent enterprises measured in real US dollars (UNCTAD 2011). This flow of stock is determined by trade patterns within the EU, contracting the vast continental frontier through integration and interaction with Western Europe – the traditional nexus of investment for developing member countries. The recent surge of investment in the east has coincided with the decline of FDI growth in the periphery, raising concerns as to whether or not the rapid and continued enlargement of the EU is diverting FDI to Eastern Europe.[1] It is in this expanding context that this analysis will attempt to

[1] With respect to myriad geographical constructs that encompass the EU, the periphery can best be defined as four member countries – the Republics of Portugal, Spain, Greece, and Ireland whereas the CEECs include the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Slovenia.

decipher the relationship between FDI in the EU periphery and the Central Eastern European Countries (CEECs).

The bilateral flow of FDI is of particular interest in empirical studies that seek to analyze the changes and influences of economic growth at the State level. Considering the diversity of nations and cultures encompassing the EU, these trade flows are paramount to the economic fortitude and stability of each constituent member in a variety of circumstances. Studying these trends remain vital to States that possess weaker or emerging economies that depend on a steady flow of investment to drive, or in some cases initiate development that is a requisite to membership in the EU. FDI itself is a dynamic and volatile form of investment and for this reason a more thorough understanding is needed to address the feasibility of attracting adequate investment across these countries.

FDI is an important focus for this study, as it constitutes sizable portions of Gross Domestic Product (GDP) across countries as well as a large influence on the economies of the European community. The source of FDI in each EU peripheral country as well as the respective top exporters is reported in Figures 1.1-4. The vast majority of FDI flowing into each peripheral State comes from the EU, however this varies across each country. With the exception of Canada, every major exporter of FDI to the EU periphery is located in Central or Western Europe. As witnessed in each successive EU enlargement round, levels of FDI undergo differences in overall volume prior to membership admission and in the years following integration. For this reason, the timeline of the data allows for an appropriate perspective on a variety of salient issues that are pertinent to a variety of members. In addition, this study holds specific relevance to emerging European economies and the EU periphery. As the

name periphery suggests, these countries lie on the fringe of the 'inner' EU, characterized as the core, which is comprised of the original six founding member States dating back to 1957 (Levin 2002).[2] While initially opposed towards expansion, the core has since fostered an initiative to create a European trading zone across the continent, which over the ensuing decades has allowed EU membership to expand to 27 members as of 2007. This expansion has triggered a surge of investment in Eastern Europe, coinciding with declining FDI growth in the peripheral States – a region already considered stagnant and lagging, relative to their eastern European counterparts, as seen in Figure 1.5 (Galego and Vieira 2004). The recent collapse of the Greek and Irish financial institutions, coupled with the waning of the Portuguese and Spanish economies, underscore the reliance on investment that these countries still maintain. Further considerations and improvements in areas of economic shortcomings must be bolstered in an effort to maximize future growth and investment. This pressure creates a situation that requires constant diligence, as the factors that constitute economic growth are all subject to scrutiny in the wake of financial and economic instability.

[2] Germany, France, Italy, Belgium, Netherlands, and Luxembourg

Figure 1.1 Source of Portuguese FDI

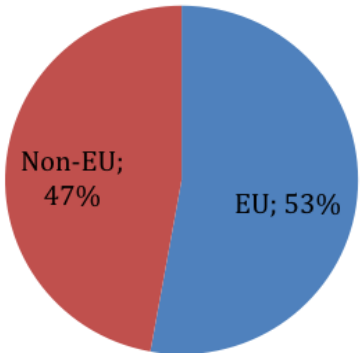


Figure 1.2 Source of Spanish FDI

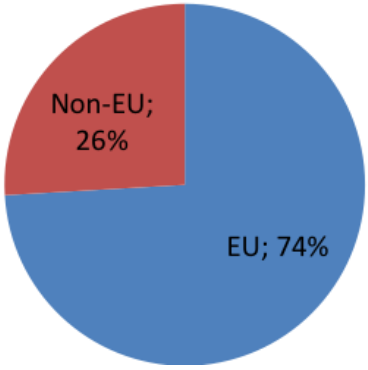


Figure 1.3 Source of Greek FDI

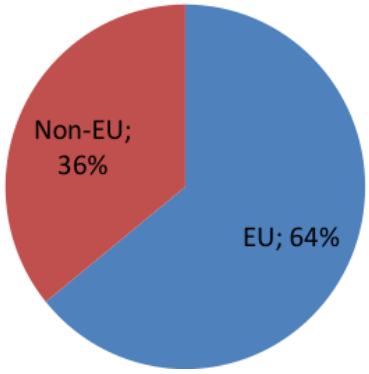
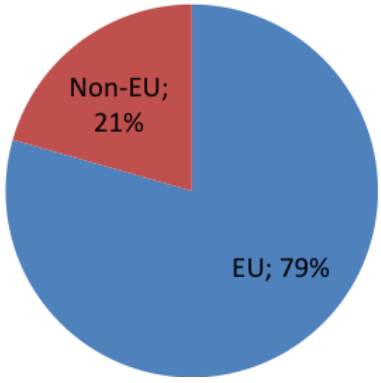


Figure 1.4 Source of Irish FDI



Figures 1.1 – 1.4 were derived from the UNCTAD database (UNCTAD 2011).

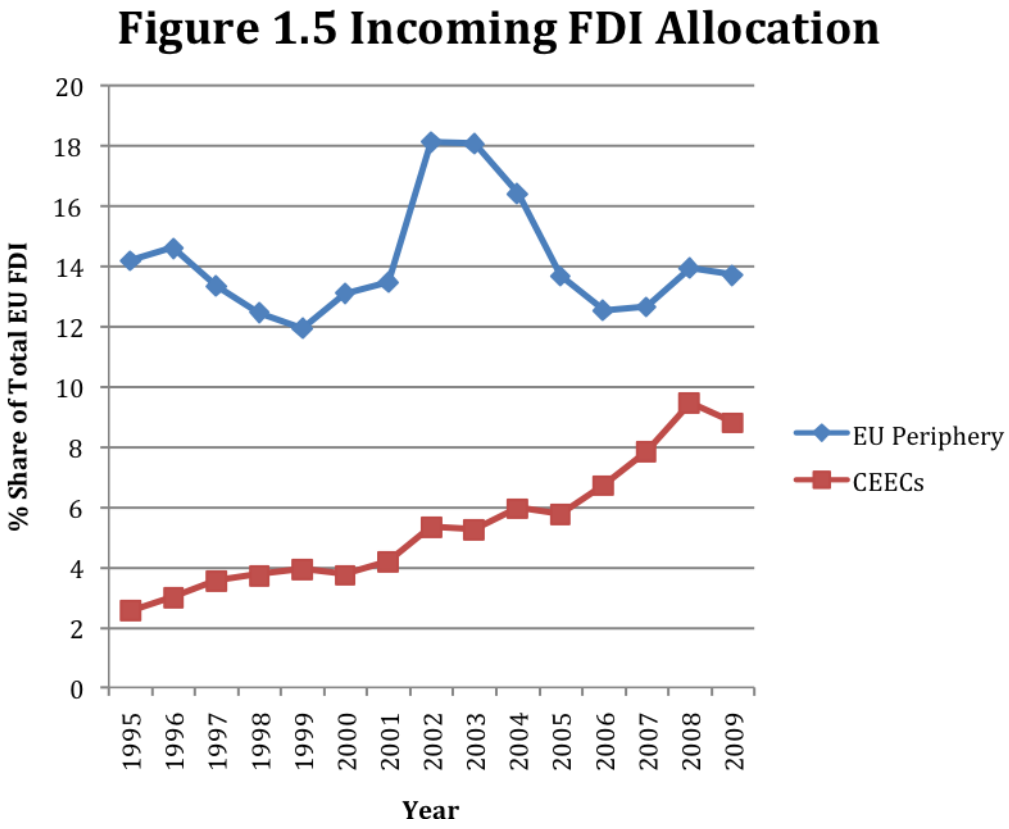


Figure 1.5 was derived from the UNCTAD database (UNCTAD 2011).

Table 1.1 Top Exporters of FDI to each EU Peripheral State in 2009[3]

Portugal	Spain	Greece	Ireland
Spain	Netherlands	Netherlands	Netherlands
Canada	Luxembourg	Luxembourg	Luxembourg
Netherlands	United Kingdom	Germany	United Kingdom
United Kingdom	France	France	France

[3] All data from Figures 1.1-5 and Table 1.1 were collected from UNCTAD (2009).

1.2 Thesis Objectives

This thesis seeks to investigate the stock of FDI across the four EU peripheral countries, measured against the CEECs. The subsequent relationship relies on a series of factors that collectively impact FDI volume in these European economies. More specifically, this thesis will address a number of objectives listed below.

- Isolate the significant effects of the factors that impact FDI stock in the EU periphery and CEECs.
- Determine if any significant unidirectional relationships exist between the EU periphery and the CEECs and vice versa.
- Determine the EU periphery's relationship with the rest of the EU and whether FDI is being diverted away from the EU periphery.

1.3 Analytical Approach

To answer the research questions outlined in the previous section, the analysis will rely on the estimation techniques utilizing panel data of FDI stocks in the EU. A panel data approach is the preferred method for this type of analysis, with one of the notable precedents being set by Chung and Kwan (2000). This thesis uses similar techniques that rely on both fixed and random effects along with Generalized Method of Moments technique (GMM). The coefficients that are calculated by these models are used to calculate the observed effect on FDI stock flowing into each constituent State under investigation. More information on these methods and the means to accomplish this strategy will be provided in Chapter 4.

1.4 Organization of Study

The rest of this thesis proceeds as follows. Chapter 2 presents an overview of FDI along with the background of the periphery and CEECs in the context of an increasingly expanding EU. Chapter 3 follows with a review of the literature regarding similar empirical works that hold particular relevance to the analysis. Chapter 4 details the methodology used in the empirical work and data analysis. Lastly, chapter 5 presents the results of the empirical analysis, while chapter 6 concludes with the interpretation and implications of these results.

Chapter 2

BACKGROUND

2.1 Foreign Direct Investment in the EU

Understanding the role of FDI across countries is central to the study of international commercial economics. At its most basic level, FDI represents an amalgamation of technology, innovation, management, and capital that moves between at least two separate States, though it can also be observed on a regional and inter-regional level as well (Cheng and Kwan 2000). To this end there exists both a host and a recipient locale or country in which FDI is channeled from and into. With regard to European trade and investment pattern, the majority of investment flows disproportionately from the EU's traditional economic stalwarts – Germany, France, Austria, and the United Kingdom. For the purposes of this analysis, only the levels of investment flowing into countries, designated as inward FDI, will be accounted for and analyzed, however it is also worth noting that the flow of FDI is almost always multidirectional or bilateral in nature.

The prevailing literature suggests the incidence of four main types of FDI that occur with regular frequency (Dunning 1993). Ultimately, the economic landscape determines which subsequent categorization of FDI is the most efficient or desired, subject to certain conditions or constraints (Zhou and Lall 2005). The first category is deemed market-seeking FDI, given that the propensity for investment is determined by the size, potential growth, and overall attractiveness of the recipient market. Due to the large degree of diversity across markets as well as the relative abundance of favorable investment destinations, market-seeking FDI does not usually

incur competition across countries. For example, one country's investment opportunities needn't infringe upon another's as long the alternative country boasts equally attractive markets (Dunning 1993). Second, resource-seeking FDI is driven by the presence and overall abundance of resource endowments in a given locale. Resource-seeking FDI is similar to market-seeking FDI in that it does not engender substitution between two countries unless a disparity in price or efficiency exists. This type of FDI is highly sensitive to policy changes and diplomatic interference, such as domestic conflicts or strikes. In the context of this analysis, the EU periphery and the CEECs do not hold any pronounced resource advantage in the conventional sense – each are export-based economies, devoid of large reserves of oil, rare earth elements, and abundances of precious metals.

The third type is known as asset-seeking FDI, which results from Transnational Corporations (TNCs) or firms search for resources that are more advantageous to the overall production process, i.e. the discovery or acquisition of technology, skills, research and development, and training (Dunning 1993). This holds particular relevance in the EU, where labor productivity and skilled labor are in high demand. Fourth, efficiency-seeking FDI occurs where TNCs invest to serve external markets where competition is present. A larger market size often fosters this type of FDI due to integrated production networks that can improve efficiency through lower input costs (Dunning 1993). This has led to a rise in FDI targeting the formerly communist CEECs, where foreign firms benefit from pre-existing domestic operations, often at reduced expense. Investment in the EU generally takes one of these forms, although inherent factors and differences such as common languages or

currencies between a region or country may ultimately provide the final impetus for FDI.

Across any number of countries, foreign direct investment occurs in two forms – horizontal or vertical. Distinguishing between these two mediums is essential to understanding the behavior of investment and rational that dictates the volume of FDI across the EU (Appleyard, Field, and Cobb 2006). Horizontal FDI is defined as a strategy adopted by firms or TNCs, which effectively replicates their own production methods in at least one other country. This strategy has several latent benefits, the foremost being the circumvention of costly tariffs, quotas, and other barriers to trade that collectively serve as disincentives towards firms. In addition, the relocation of production generally mitigates export and transportation costs via reduced proximity of operations. Horizontal FDI is typically more prevalent in mature or developed countries given the establishment of a large market along with the safeguard of economic stability (Appleyard, Field, and Cobb 2006). In 1992, member states collectively ratified the Single Market Program (SMP) unifying a market of over 320 million consumers which allowed for the free movement of goods and services throughout the EU, in essence adopting the same features used in the 50 American states (Barrios, Dimelis, Louri, and Strobl 2004). As was often the case in the late 1990s and early 2000s, incentives from prospective members in the form of trade barrier abolishment and generous tax concessions often proved to be conducive towards integration into the EU whilst simultaneously fostering FDI growth, as was the case in Eastern Europe during the 1990s (Markusen and Venerables 1999).

Whereas horizontal FDI focuses on the duplication of production, vertical FDI instead deals with different stages of production in different countries. This

strategy is particularly salient in less developed countries or areas of lower economic stability. The propensity for vertical FDI also fosters key advantages to firms in the form of comparative advantages such as reduced labor costs, resource allocation, and governance that is often more conducive to centralized production (Appleyard, Field, and Cobb 2006). Overall, these incentives have often led firms to adopt this strategy, however most investing countries typically utilize a combination of both horizontal and vertical FDI strategies due to the variance across regions and availability of factors that govern optimal investment (Tang 2000).

2.2 Dissecting the EU Periphery

The European Union encompasses an enormous landmass that stretches from the Atlantic Ocean to the steppes of Asia. Though equally vast and diverse as the landscape it comprises, the EU can be divided into several regional entities based on economic performance, geographical similarities, and membership integration. A classic example of this regional classification is the periphery, which includes the republics of Portugal, Spain, Greece, and Ireland, located on the frontier of the EU core. While the name periphery generally implies a proximal divide from mainland Europe, there is something inherently different with these four economies that place them in a different category altogether. Relative to their core counterparts, these States are still considered newcomers to the EU stage. With the exception of Spain, which boasts the fourth largest economy in Europe, Portugal, Greece, and Ireland all rank among the smallest economies on the continent (Kottaridi 2005). Since the mid 1990s, beginning with the emergence of the formerly communist States, the periphery has lagged behind other regions in the EU as investors' gaze has increasing looked eastward.

Both the direction and volume of FDI vary greatly throughout the EU, holding particular weight amongst the peripheral States. While every country utilizes a seemingly different strategy for attracting investment, Portugal, Spain, Greece, and Ireland have all succeeded in instituting measures that have since elevated the growth of inward oriented FDI respectively (Dimelis and Louri 2002). The late 1980s and early 1990s would prove to be the golden age of investment in these countries, as their economic growth was as much a success as was their ability to rapidly liberalize their economies into beacons of investment. Coupled with their proximity to Western Europe, an untapped and emerging market, and various safeguards against volatilities in governance and institutional policies, the periphery witnessed a meteoric rise in the growth of FDI volume during this period (Barrios, Dimelis, Louri, and Strobl 2004).

Internal transformations undertaken in the periphery during the mid-1980s not only highlighted their desire to develop, but also to integrate with the rest of Europe. Market liberalization revamped these constituent economies allowing for a windfall of investment, notably in contrast with Eastern Europe, a region still suffocated by Soviet rule at this time (Facchini and Segnana 2003). Along with the privatization of most formal sectors of the economy, the most common measures adopted by the peripheral members to stimulate inward FDI were the reduction of corporate taxation – generally seen to be the primary barrier conspiring against robust investment, tax relief on investment in specifically targeted areas, and channeled incentives for designated programs, usually in the manufacturing and service sectors (Danson and Hughes 2002). These programs included, but were not limited to, infrastructural upgrades, developing of an advanced export market, and employee training programs. Beginning in the early 1980s with the Iberian States, foreign

investment advisory services (FIAS) were instituted by the EU's Phare program[4], fostering an influx of FDI growth that contributed a significant share of GDP. At its peak, FDI measured approximately 3% of total GDP in Iberia (Danson and Hughes 2002). In addition, the initiation of the SMP and the integration of a 'European' market also served as the primary catalyst for manufacturing and industrial development, which corresponded with rapid FDI growth (Markusen and Venerables 1999).

2.2.1 The Case of Ireland

The four EU members comprising the periphery exhibit acute similarities and differences, engendering the notion of mixed success post integration, during the latter stages of the twentieth century. Tracing their entrance within the EU reveals a variety of strategies that serve as a corollary for future prospective members. That being said, the first peripheral country to successfully integrate with the EU was Ireland in 1973 (Bevin and Estrin 2000). Ireland's unique relationship with the United Kingdom has always been instrumental in its path to development, as it has for most of its history. Prior to admission into the EU, Ireland suffered from political and social unrest, as well as chronically low levels of FDI volume and issues of underdevelopment, exacerbated by its inability to generate steady economic growth (Barrios, Dimelis, Louri, and Strobl 2004). In addition, the vast majority of multinational corporations operating in Ireland during this time were British owned,

[4] The EU's Phare program is one of three financial instruments designed to finance and assist CEEC candidate countries that have been approved for candidacy and are attempting to integrate into the EU. This program had its origin in the EU core as a measure to prepare for the inevitable expansion process.

limiting service only to the British domestic markets, essentially stymieing the overarching benefits of the investment held in Ireland (Barrios, Dimelis, Louri, and Strobl 2004). Given this deficiency, the Irish government abruptly changed course in the early 1980s and relied on one of its most underutilized, albeit valuable resources – an abundance of highly skilled, cheap labor. Together with many generous financial concessions aimed at attracting FDI to its modern sectors, Irish income per capita improved dramatically, and the country itself became a magnet for investment. This atmosphere led to the channeling of investment capital into its technology sector which culminated in efficiency spillovers and a host of positive externalities that. By the late 1980s Ireland offered one of the most internationally friendly environments in Europe, reinforced by favorable policies towards multinational investors and preexisting trading ties with the United Kingdom (Barrios, Dimelis, Louri, and Strobl 2004).

This momentum carried into the 1990s as Ireland witnessed tremendous rises in living standards and increased investment flows in other sectors as well. Labeled as the "Celtic Tiger" in reference to the surge in East Asian economies during the 1980s, Ireland has since risen from the doldrums of underdevelopment, becoming a standard for others EU transitional economies to follow. The country currently boasts the most competitive base for over 1100 multinational corporations, the most amongst any peripheral state (Danson and Hughes 2002). With an income per capita higher than most other EU members, Ireland exhibits many characteristics that distinguish it from its peripheral counterparts. Much like Portugal, Spain, and Greece, Ireland did however suffer from similar declines in FDI growth starting in the late 1990s. Regardless, Ireland does remain a paradigm for success in the European

community, highlighting the establishment of its domestic resources coupled with the potential benefits reaped from increased exposure to FDI. Unfortunately, a recent financial collapse in late 2010 has once again placed enormous stresses on Ireland's economy.

2.2.2 The Addition of Greece

The next addition to the periphery came in 1981, with the integration of Greece into the EU. Having just emerged from decades of dictatorship and moribund fiscal policies, Greece faced serious domestic challenges that were exacerbated by a low income per capita and a seemingly non-existent export market (Dritsaki and Adamopoulos 2004). At the precipice of membership, Greece shared certain similarities with Ireland in that it suffered from perpetual underdevelopment along with the failure of attracting adequate investment. Unfortunately for Greece, these problems were compounded by virtual isolation, as Greece is an island, metaphorically speaking, separated from the principal core investors in Western Europe (Dritsaki and Adamopoulos 2004). The lack of established trade patterns severely limited Greece's economic growth and did not afford foreign investors the same sorts of potential profitability seen in the rest of Western Europe during this time. Whereas Irish FDI growth and incentive schemes were mainly a phenomenon of the 1980s and 1990s, Greece had been adopting such policies since the early 1950s (Barrios, Dimelis, Louri, and Strobl 2004). Greece's main tools for attracting FDI were institutional changes, such as tax relief to foreign firms and the relatively free movement of labor and capital in the Adriatic Sea. Despite these measures however, the growth, aggregate volume, and overall effectiveness of investment in Greece throughout the latter stages of the twentieth century was mostly unimpressive. A study by Kuniholm (2010) suggests

that Greece may have suffered from a lack of human capital and labor productivity in the decades following 1950, often considered a co-requisite for development. In essence, Greece behaved much like a post-modern developing country, characterized by stagnated economic growth, limiting the inward volume of FDI to modest proportions, often without much success.

Unfortunately for Greece, geographical limitations have always plagued its development within the European context. Following stints of animosity and a brief war with Turkey over the island of Cyprus in the 1970s, Greece essentially found itself isolated from one of its biggest potential investors. However, since the ceasefire between these three States in 1974, trade and investment has recovered and has been instrumental in driving Greece's ascension into the EU (Dritsaki and Adamopoulos 2004). Subsequently, Greece, like the rest of the EU periphery, experienced an influx of foreign investment during the late 1980s. Ultimately, the new millennium has given Greece a series of new challenges, particularly in the form of competition from other destinations of potential investment. While FDI levels in Greece were never historically high relative to other European countries, the period leading up to the recent enlargement round of the EU in 2007 with Bulgaria and Romania's integration has corresponded with waning Greek FDI growth (Kuniholm 2010). In May of 2010, Greece's financial system collapsed amidst a flurry of pressure from the rest of the EU, placing enormous stresses on the struggling republic and a renewed necessity for investment initiatives.

2.2.3 Portugal and Spain's Integration

Half a decade after the admission of Greece, the EU saw the integration of the Iberian States of Portugal and Spain in 1986. In both instances, these young republics were recently removed from the shroud of a protectionist dictatorship whether it was the Salazar regime in Portugal or that of Franco in Spain (Markusen and Venerables 1999). Iberia at this time was considered an emerging economy on the European stage, characterized by its poor history of domestic performance and meager standards of living, relative to their European counterparts. Making matters worse, the rapid turnover from military to civilian rule left these cash-strapped countries in need of valuable revenue and investment. As such, the 1970s and 1980s were marked by economic hardship forcing the hand of multiple programs instituted by the International Monetary Fund (IMF). These measures, though hugely unpopular at home, did succeed in providing the stabilizing impetus that would ultimately culminate in Iberia's integration within the EU in the middle of the 1980s (Markusen and Venerables 1999). Unfortunately, purchasing power parity (PPP) in Portugal and Spain at this time lagged well behind their European counterparts, measuring only 51% and 67% of the EU average respectively (Facchini and Segnana 2003). For Portugal in particular, the GDP per capita at the onset of integration was approximately six times lower than the core member States average, highlighting the massive disparity between the core and transitioning peripheral economies during introductory years (Dignan 1995). Having witnessed the economic ascension of other cases in Europe, the Iberian States took extensive measures to liberalize trade and finance in an effort to attract investment. Though robust in proportion, the conditions for an influx of FDI growth were unfortunately not optimal, as the same highly

productive labor pool did not exist in Iberia as it had in other locales such as Ireland, which ultimately prevented rapid spillovers of information, technology, and innovation. Much like Greece had learned, this lack of skilled and productive labor mitigated gains to the workforce, which constrained technological growth across the peninsula (Bajo and Sosvilla 1994). Reflecting back on Iberia's development, the chronic shortcomings of human capital and productivity in the workforce would ultimately conspire against progressive wage competiveness – on the eve of the EU enlargement round in 2004, Portugal and Spain's labor productivity levels were still among the lowest in Europe (Facchini and Segnana 2003).

Despite these challenges and shortcomings in attracting FDI, the Iberian States still benefitted from a variety of measures instituted by their respective governments. Infrastructural upgrades and improved networks of trade with the rest of Europe would prove instrumental in attracting FDI, as core investors gained access to untapped regional and national markets in a much more cost effective manner. In addition, the Portuguese and Spanish governments succeeded in offering highly favorable terms of trade, including generous tax rates and financial concessions. (Markusen and Venerables 1999). Consequently, FDI growth markedly improved throughout the late 1980s and early 1990s, constituting upwards of 3% and 2% of Portugal and Spain's respective GDP (Barrios, Dimelis, Louri, and Strobl 2004). Having successfully stimulated FDI growth in Iberia, these measures allowed for efficiency gains and myriad spillover benefits to Portuguese and Spanish industry that transformed Iberia into a developed economy, integrated with the rest of Europe. Portuguese and Spanish FDI volume grew annually until peaking in the early 1990s with the economic emergence of the formerly Soviet countries on the European stage.

The subsequent eastward enlargement of the EU would eventually open up new channels for investment, which coincided with decreased FDI growth in Portugal and Spain, along with the rest of the periphery (Guimarães, Figueiredo, and Woodward 2000).

2.3 The Emergence of Eastern Europe

The collapse of the Soviet Union in 1991 set the stage for the gradual reintegration of Europe's eastern and western halves. Decades of Soviet rule left Central Eastern European Countries or CEECs with crumbling infrastructure, non-existent trade ties with Western Europe, and a poor history of liberalized institutions (Tang 2000). The same suffocating influence that had kept EU speculative investment out of Eastern Europe for years also succeeded in creating some of the most favorable environments for investment during the latter stages of the 1990s and into the new millennium. Relative to the periphery, which during this time had already been extensively targeted for FDI for the better part of a decade, the CEECs provided comparative advantages to investors in the form of cheap, skilled labor, unrivaled access to new regional and national markets, and a wave of liberalization and tax-friendly measures designed to attract FDI to stimulate their emerging economies (Facchini and Segnana 2003). By 1998, foreign-based EU firms had already overtaken domestic competitors to become the largest net exporters in the Czech Republic, Hungary, Estonia, and Poland. In addition to the removal of trade barriers, the CEECs launched a variety of bilateral free trade agreements (FTAs) with the EU prior to their eventual integration (Tang 2000). Indeed by 1999, roughly 80% of tariffs on the EU's industrial goods were not subject to tariffs from the CEECs With the advent of the

EU's Phare program and the Most Favored Nation (MFN)[5] trade policies, FDI gravitated towards the CEECs in relative abundance (Tang 2000).

After a decade of trade liberalization and bilateral investment between the EU and the CEECs, this mutual interdependence finally came to a climax in 2004 with the first of two EU enlargement rounds[6]. The EU enlargement round in 2004, followed by the round in 2007 with Bulgaria and Romania, substantially increased the size of the EU with twelve new member States, the vast majority of which being among Eastern Europe. In contrast with other regions of Europe, FDI growth in the CEECs had already exceeded that of the periphery at this time, with the primary destinations being Hungary and Estonia – by far the countries most heavily targeted by FDI (Facchini and Segnana 2003). The spike in investment growth directed towards the CEECs beginning in the mid 1990s coincided with waning FDI growth in the peripheral States. This divide suggests that FDI is being diverted away from the periphery towards the CEECs and Eastern European entrants. This remains a contentious issue amongst policymakers in the EU periphery, given the long-term repercussions of rapid EU enlargement are largely misunderstood by many individuals and experts in both the periphery and CEECs (Facchini and Segnana 2003).

For comparison, the volume of FDI flowing into each EU peripheral State, the CEECs, and the EU-27 are provided in Tables 2.1 – 2.3. These values highlight the relatively large weight the EU periphery still holds in FDI. Additionally, the CEECs

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[5] MFN rates are those that are issued on industrial outputs from non-preferential World Trade Organization (WTO) members.

[6] The EU expansionary round of 2004 included the states of Cyprus and Malta, along with the CEECs constituting the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovenia, and the Slovak Republic.

FDI stock has grown in each successive year, indicating an upward trend – it is noteworthy to point out that FDI in the peripheral States is increasing as well. On the whole, FDI stock in the EU-27 follows this same pattern, suggesting that these regions may be more interconnected than originally thought.

Table 2.1 FDI Stock: 1995-1999[a]

	1995	1996	1997	1998	1999
Portugal	18,982	21,118	22,392	30,089	26,911
Spain	104,521	119,766	105,296	126,059	125,361
Greece	10,971	12,029	13,013	13,084	15,890
Ireland	44,187	46,804	48,940	62,450	72,815
CEECs	32,052	40,564	50,185	69,015	79,058
EU-27	1,260,310	1,368,942	1,422,331	1,860,561	2,020,093
Peripheral FDI stock as % of EU	14.18	14.59	13.33	12.45	11.93

[a] measured in thousands of real US dollars (UNCTAD 2011).

Table 2.2 FDI Stock: 2000-2004[a]

	2000	2001	2002	2003	2004
Portugal	32,043	36,024	44,637	60,585	66,970
Spain	156,348	177,254	257,106	339,652	407,472
Greece	14,113	13,941	15,561	22,454	28,482
Ireland	127,089	134,052	182,897	222,837	207,647
CEECs	93,444	112,072	146,841	186,688	257,052
EU-27	2,517,348	2,683,916	2,760,158	3,572,572	4,330,427
Peripheral FDI stock as % of EU	13.10	13.46	18.12	18.07	16.41

[a] measured in thousands of real US dollars (UNCTAD 2011).

Table 2.3 FDI Stock: 2005-2009[a]

	2005	2006	2007	2008	2009
Portugal	63,340	88,460	115,314	99,970	11,1272
Spain	384,538	461,528	584,833	623,215	670,550
Greece	29,189	41,288	53,211	38,119	44,927
Ireland	163,530	156,491	203,683	168,332	193,302
CEECs	268,856	400,396	591,853	630,876	654,675
EU-27	4,690,869	5,969,754	7,568,562	6,670,900	7,447,892
Peripheral FDI stock as % of EU	13.66	12.53	12.64	13.96	13.70

[a] measured in thousands of real US dollars (UNCTAD 2011).

Chapter 3

REVIEW OF LITERATURE

3.1 Tracing the Flow of FDI in Europe

The mid 1980s to early 1990s marked the watershed years of investment in the peripheral States. During this period of time, FDI inflows were gravitating towards these four States virtually uncontested by any other transitioning economy in Europe (Baldwin, Francois, Portes 1997). According to these authors, the combination of cheap labor costs, the feasibility of investment by virtue of proximity with the traditional core investing countries, and the underdevelopment of industrial sectors, all stimulated the growth of FDI flows into the periphery. In addition, a timely stock market boom and relative surge of investment favorably coincided with Iberian admission in the 1980s. While generally seen as an outlier effect by historians, this thriving and bullish market no doubt fostered a more favorable atmosphere for investors who saw the newly insulated economies of Portugal and Spain as encouraging destinations for investment and production. This logic serves to justify the relative stagnation and ineffectiveness of Irish and Greek FDI growth preceding the mid 1980s, in which an unsettled macroeconomic environment of the 1970s in the aftermath of the oil price shocks and mounting inflation no doubt warded away many would be investors (Baldwin, Francois, Portes 1997).

Unfortunately for most of the periphery, the same conditions that had enabled the influx of FDI growth also led to a spike in investment elsewhere on the European continent. The mid-1990s would mark the ascension of the CEECs and their arrival on the European stage (Kaminski 2000). The fall of the Soviet Union in 1991

led to an explosion of risk reduction and opportunity in a region that had once sequestered such ambitions – the transitioning former communist states quickly caught the eyes of investors in Western Europe (Brainard 1993). In this context, Brainard argued that multinational corporate activity was not dictated solely by differences in factor endowments or labor, but rather by the potential for research and development (R&D) transfers to affiliates in conjunction with the variable profitability of FDI. His study suggested that the optimal localization of TNCs would cluster in areas of high population and expanding markets fueled by the potential of growing demand and scale. Nowhere were these trends more apparent in the mid-1990s than in the newly transitioning economies of Central Eastern Europe (Buch, Kokta, and Piazolo 2002).

The first EU enlargement round in 2004 ultimately marked the pinnacle of investment and capital windfalls in the CEECs, however it appeared as though this process was initiated roughly a decade earlier (Kaminski 2000)[7]. Whereas the peripheral countries held the comparative advantage of low-cost labor and growth in the 1980s, it was the CEECs that possessed them beginning in the mid-1990s (Lankes and Venerables 1996). The removal of trade barriers and subsequent liberalization of their respective markets allowed the CEECs to engage in bilateral FDI with all corners of Europe. Indeed by the late 1990s, the mantle of investment had already moved eastward and in many ways the CEECs boasted an environment ideally suited for horizontal FDI development (Facchini and Segnana 2003). The region itself was

[7] Included in the 2004 EU enlargement round were the island economies of Cyprus and Malta, however these countries did not see the same substantial increase in FDI growth as the other newly integrated CEECs. In addition Cyprus and Malta maintained pre-existing investment patterns with Western Europe and had abstained from socialist economic tendencies (Facchini and Segnana 2003).

geopolitically conducive to all manners of investment carrying seemingly less risk than other capital investment opportunities elsewhere in the late 1990s and early 2000s. Facchini's (2003) study confirmed these eastward trends, but also noted the expansion and success of the service sectors in the CEEC economies, marking a departure from the dominance of manufacturing-led growth, the paramount focus during the Soviet years. His sectoral decomposition revealed the inherent cost advantages possessed by the transitioning economies in Eastern Europe, as well as the mutual benefits and interdependence gained through the interaction of TNCs with the domestic populations they operated amongst (Facchini and Segnana 2003).

Investment flows were trending toward the CEECs long before their eventual ascension into the EU – the prospect of membership seemed to have triggered significant FDI growth during the late 1990s and early 2000s (Buch, Kokta, and Piazolo 2002). This anticipatory behavior was likely the result of investors seeking to gain a foothold in a potentially profitable, albeit future market. Buch, Kokta, and Piazolo's (2002) application of the gravity model illustrated the growth of FDI stocks into the Eastern locale relative to other destinations within the EU in the late 1990s. In accordance with the motions outlined in the 2003 Copenhagen Summit[8], the progressively liberal steps the CEECs took secured investment opportunities and attractiveness in the region, eventually leading to official candidacy approval and ultimately EU admission (Campos and Coricelli 2002).

[8] The Copenhagen Summit outlined the consequences and expectations of increased EU membership, which up until 2003, had never consisted of more than three new member states at once.

The 2004 membership expansion shaped the EU's economic atmosphere and engendered the capital and investment growth trending towards the eastern frontier. Membership enlargement consequently resulted in an explosion in market size as 75 million new consumers joined the EU commonwealth, providing ample incentives and rational to invest and take advantage of the fresh consumer composition (Facchini and Segnana 2003). Collectively, the achievement of membership status along with the additional advantages and benefits offered under such programs as the SMP caused a surge in investment and movement of capital. During the yearly interval from 1995-2000, the ratio of FDI into each respective CEEC country increased tremendously, far outpacing the previous gains incurred in the periphery during the 1980s (Galego and Vieira 2004). Galego and Vieira's (2004) study outlined bilateral investment flows in terms of a country's GDP and constituent population size using the gravity model application, which took into account the proximal divide between recipient and home countries. Their empirical assessment was similar to the results offered by Buch, Kokta, and Piazolo (2002), which pegged FDI growth to the establishment of foreign trade and networks with Germany, the Netherlands, and Austria, the EU's three largest net investors. As such, their analysis suggested that mechanisms governing FDI growth seemed to routinely trigger temporary spikes investment in the years directly preceding EU membership, thereby peaking shortly after, as observed in the countries of Portugal, Spain, and the CEECs (Galego and Vieira 2004),

3.2 FDI Direction vs. Diversion

The rapid influx of FDI growth that occurred in the CEECs during the 1990s raised a series of questions and concerns suggesting that investment volume

were being mitigated in the periphery in favor of cheap production costs and more profitable opportunities in the CEECs. The diminished growth of FDI flowing into the periphery during the late 1990s was beyond observable contestation, supported by numerous data. Unfortunately, the rational and causes influencing these tendencies were and remain slightly less clear (Galego and Vieira 2004). Galego's and Vieira's study explored the trending behavior of FDI into the CEECs as a ratio of inflows to stocks per capita. With the exceptions of Slovenia and the Slovak Republic, each CEEC experienced FDI growth roughly 25% higher than the EU moving average over the years from 1995 -1999. Moreover, Portugal and Spain's FDI growth slowed during this same period. Resmini (2000) noted similar results in his panel study, specifically in reference to the republic of Greece. The lone peripheral exception that escaped waning FDI growth occurred is Ireland, as its technology-heavy sector continually succeeded in attracting many investors which grew in size and value well into the new millennium (Danson and Hughes 2002).

Galego and Vieira's (2004) study relied on the use of a comprehensive gravity model to analyze the determinants of the bilateral FDI flows using panel data from 1993-1999. The resulting analysis concluded that FDI stocks were in fact diminishing in the Southern European countries during this period, either by diversion eastward or a crowding-out effect. Interestingly, the study did not yield or suggest any evidence of FDI diversion from the periphery to the CEECs, contrary to popular perception. Galego and Vieira posited that the reversible trending of FDI growth in the periphery was likely the result of a gradual downturn in which investment orients itself to an equilibrium or satiation level. Alternatively, the growth of FDI volume in the CEECs were explained by a movement towards EU candidacy approval, along with

gradual liberalization process that preceded admission in the mid-1990s (Galego and Vieira 2004).

Empirical evidence from a variety of studies suggests that there are myriad factors that can provide the impetus for FDI growth and decline. Brenton, Di Mauro, and Lücke (1990) analyzed the attractiveness of the CEECs to core investors and the subsequent magnitude of investment that was transferable to other member States. Brenton, Di Mauro, and Lücke considered the gap between actual and expected FDI stocks in the CEECs along with those of Portugal and Spain. This was accomplished using a gravity model approach designed to examine the bilateral distribution of FDI across these locales. Using value added tax (VAT), tariffs, levies and other trade instruments, no evidence was found linking increased FDI growth in Portugal and Spain during the 1980s to a reduction in investment flows amongst any other European States, in this case those of Eastern Europe. Similarly, the recent surge of FDI growth in the CEECs was not correlated with the FDI stagnation in Portugal and Spain (Brenton, Di Mauro, and Lücke 1999).

In examining a hypothesized relationship between the periphery and the CEECs, it is worth exploring all salient consequences of membership enlargement (Baldwin, Francois, and Portes 1997). Baldwin, Francois, and Portes used a GDP-weighted average to track the movements of FDI into the CEECs whilst analyzing the effects on the periphery simultaneously. Their results suggested that EU expansion was likely to have the largest impact on its most underdeveloped members, given the relatively high margins for returns to investment along with cheap labor. In addition, increased membership afforded poorer States the opportunity to catch up economically, subject to any capital and institutional constraints, which often plague

emerging economies. Baldwin, Francois, and Portes (1997) analysis yields an interesting viewpoint –the CEECs' entrance into the EU likely provides benefits to the periphery in that investments will ultimately pay dividends to other European markets (Baldwin, Francois, and Portes 1997). It is worth noting however, that any potential economic gains to the CEECs would unlikely be allocated evenly – in essence the periphery could potentially never see any such hypothesized benefits (Guimarães, Figueiredo, and Woodward 2000).

Prior studies have all indicated diminishing growth of FDI in the periphery coinciding with the heightened growth in FDI volume in the CEECs. Unfortunately, correlation alone does not determine causality (Buch, Kokta, and Piazolo 2002). Portes, Buch, Kokta and Piazolo (1997) revisited the study of Buch, Kokta, and Piazolo, which showed that changes in peripheral-bound FDI slowed during the late 1990s. They hypothesized two likely outcomes – the redirection of peripheral-bound FDI was in fact going to the CEECs transitioning economies, or that natural declines in FDI growth were simply representing a return to their respective equilibrium levels. To discern this trend, Buch, Kokta, and Piazolo analyzed the differences between actual and expected stocks, similar to Brenton, Di Mauro, and Lücke 's (1999) earlier study. The subsequent analysis relied on the gravity model and did not provide any evidence of FDI redirection from the peripheral States to the CEECs. Moreover, Buch, Kokta, and Piazolo (1997) used cross-sectional data from Germany over a period from 1981-2000 and determined that FDI volume in the periphery has almost approached equilibrium levels. Conversely, some CEECs have already begun to secure substantial FDI since their integration, in essence approaching their own equilibrium levels in the same fashion as the periphery (Resmini 2000). The

results from this analysis are consistent with prior studies, which found that the phenomena of slowing FDI growth in the periphery are subject to natural causes that are independent of the CEECs ascension on the European stage (Buch, Kokta, and Piazolo 2002).[9]

Facchini and Segnana (2003) analyzed the potential for FDI interaction between the EU periphery and the CEECs from 1989-2001. Their analysis relied on a gravity model that relied on the use of several monetary variables including value added tax (VAT), bond yields, country risk, distance and GDP. This study was completed on the precipice of the first EU enlargement round, placing it in a unique timeline. Their results concluded that labor productivity was the biggest deterrent to FDI stock in the EU periphery when compared to the rest of the EU-15. Additionally, the results showed that greater integration would ultimately facilitate increased FDI flows to the rest of the existing EU member States (Facchini and Segnana 2003).

3.3 Contribution to the Literature

As highlighted in the previous sections, a comprehensive body of research already exists on the study of FDI diversion and its subsequent relationship with the European Union. However there is still much work to be done to fully understand and evaluate the impacts of FDI growth across specific locales, subject to new forces, restrictions, and EU membership. This thesis will attempt to add to the pre-existing literature in a number of ways. First, to my knowledge, no other studies have utilized data that includes a timeline up until the conclusion of 2009. This could prove

[9] This analysis does not include data from the 2004 and 2007 EU enlargement rounds.

significant for a several reasons, as previous studies have not measured FDI in the CEECs since their integration into the EU in 2004. Past studies such as Campos and Kinoshita (2003) were completed while these countries were still candidates for membership, thereby being subject to their own respective international laws and trade policies and not those of the EU commonwealth. In addition, most other studies pre-date the latter EU enlargement round of 2007, which saw the addition of Bulgaria and Romania. As such, this analysis allows for the dissemination of economic data and statistics for all current EU member states. The dataset used in this study also includes the effect of the global financial crisis in 2008, which was of particular interest to most emerging and peripheral economies in Europe, given the disruption of FDI volume that was relied upon for sustained growth and development. The inclusion of all regions within the present-day EU offers an accurate assessment of economic growth causality and its subsequent hypothesized relationship with inward FDI.

A second advantage of this research is the ability to analyze FDI from a peripheral perspective. This analysis builds off the framework proposed by Cheng and Kwan's (2000) panel-data study in which specific regions within China were evaluated under the same economic stresses and measures that impacted FDI, with consideration of zones that maintained commercial autonomy. While particular attention in this analysis will be paid to the peripheral region of the EU constituting Portugal, Spain, Greece, and Ireland, this study also isolates the interactions these countries have with the CEECs as well as the remaining EU member States. The comparison of these regions and their subsequent observed characteristics could reveal the behavioral trending of investment across Europe and would suggest whether or not FDI volume in the periphery is in fact being affected by the CEECs. Consequently,

these results could potentially foster a change in policies, institutions, and understanding amongst the peripheral States that have not only failed to secure the desirable levels of investment from abroad, but blame the CEECs for sapping investment opportunities. In addition, the results of Buch, Kokta, and Piazolo's (2002) study on FDI as it approaches its respective equilibrium in specific European countries is of particular interest here and is certainly worth revisiting with fresh data including the two subsequent expansions of the EU. Moreover, their study looked at German FDI within the EU periphery, whereas this analysis widens the scope to all FDI flowing into the peripheral States, irrespective of origin, including the regions respective interaction with the rest of the EU-27. This analysis estimates the equilibrium levels of FDI in Portugal, Spain, Greece, and Ireland, which reflects the comparative static effect of policy changes and exogenous variables, without the interference of feedback effects and cost-adjustment effects that measures a country's potential for absorbing future FDI.

Chapter 4

METHODOLOGY

4.1 Econometric Model

The goal of this thesis is to investigate FDI volume as it is impacted by economic growth and several other variables in the EU periphery. In addition, the relationship between the peripheral States and CEECs are determined, thereby identifying if any bi-directional causal relationships exist. The null hypothesis is no interaction between these two regions. To achieve this objective, the analysis will rely on the use of panel data and the GMM technique to estimate an equation that captures inward-flowing FDI. The subsequent procedure uses a methodology similar to those used in Cheng and Kwan's (2000) panel analysis of China's regional-based FDI, and Zhou and Lall's (2005) study on FDI flows. This thesis adds to the existing body of literature by testing for the directional flow of FDI through the use of an up-to-date dataset in an effort to more effectively estimate the effects of economic growth on secured FDI volume in the EU periphery. This is in contrast to previous studies that have instead relied upon pre-EU enlargement data to measure the investment performance of CEECs along with the hypothesized gravitating effect of FDI away from other locales within the EU.

The analysis postulates a positive relationship between FDI growth and EU membership. Ultimately, FDI growth is not driven by a singular effect – due to its complexity. FDI is influenced by several explanatory variables to allow for a thorough understanding of the mechanisms that potentially impact overall volume, depending on the country or region under investigation. Using the countries of Portugal, Spain,

Greece, and Ireland, weighed against the CEECs, this study can obtain a set of meaningful coefficients for each variable in question that is included in the investigation. In this instance, total inward FDI stocks in real US dollars are included as the dependent variable. To estimate the model, a composite of factors that collectively capture the potential determinants of FDI are regressed on the volume of FDI stock in each EU peripheral State and CEEC case. The following equation forms the basis for the econometric model used in this analysis:

$$\ln(FDIstock_{it}) = \beta_0 + \beta_1 \ln(\text{lag}FDIstock_{it-1}) + \beta_2 \ln(RealGDP_{it}) + \beta_3 Openness_{it} + \beta_4 LaborCost_{it} + \beta_5 Education_{it} + \beta_6 Risk_{it} + \beta_7 \ln(Telecom_{it}) + \beta_8 \ln(CEEC_t) + \varepsilon_{it} \quad (1)$$

where *I* and *t* denote country *I* at time *t* respectively. The variable $\text{lag}FDIstock_{it-1}$ is a one-year lag of the dependent variable that represents agglomeration or spillover effects. $RealGDP_{it}$ is a country's total GDP measured in real US dollars, while $Openness_{it}$ is the sum of a country's total exports and imports divided by its respective total GDP in real US dollars. The variable $LaborCost_{it}$ is included as the comprehensive unit labor cost in a given country. $Education_{it}$ represents a country's tertiary education enrollment rate as a proxy for human capital. $Risk_{it}$ is a composite measure that captures the abundance of economic freedoms along with the risk of starting a business in the country under consideration. $Telecom_{it}$ is the ratio of telephone lines per 100 people in a country. Additionally, a variable is included to measure the peripheral interaction with the CEECs – $CEEC_t$ is the aggregate FDI volume flowing into the CEECs, deflated in real US dollars in time *t*. The significance and impact of this variable is central to this analysis, as it will determine whether FDI is actually being diverted towards the CEECs. In additional specifications, EU_{it} and

$Periphery_t$ are measured as the total aggregate FDI stock in year *t*. excluding country *i*. Finally, ε_{it} is included in the model as the random disturbance term.

4.1.1 Hypothesized Coefficients

The expected signs of the coefficients representing the independent variables are all based on a combination of economic theory, previous studies, and a thorough understanding of the issues. The coefficient of the variable lag$FDIstock_{it-1}$ is likely to be positive across all countries in the sample, indicating that the higher the lagged volume of FDI, the greater the overall levels of inward FDI will be. Economies of agglomeration predict the occurrence of positive externalities, which often signals a more favorable atmosphere of investment, thereby bolstering confidence (Campos and Kinoshita 2003). Similarly, the hypothesized coefficient of $RealGDP_{it}$ should also be positive, implying that increases to a country's real GDP will see a greater volume of incoming FDI. This seems plausible as larger markets offer more advantages to TNCs who want to benefit from higher growth potential. The coefficient of $Openness_{it}$ will be positive as well, indicating that the higher a country's trade openness, the greater the stocks of inward FDI. Openness is a good barometer for trade liberalization – the reduction of trade restrictions coupled with market reforms that are favorable to outside investors often provide incentives for TNCs (Chantasasawat, Fung, Iizaki, and Siu 2010).

Table 4.1 Hypothesized Coefficients

$lagFDIstock_{it-1}$	+
$RealGDP_{it}$	+
$Openness_{it}$	+
$LaborCost_{it}$	–
$Risk_{it}$	+
$Education_{it}$	+
$Telecom_{it}$	+
$CEEC_t$	–
$Periphery_t$	–
EU_{it}	+

The coefficient for the variable $LaborCost_{it}$ should have a negative sign, implying that a decrease in the unit cost of labor will correspond to increases in inward FDI volume. Labor costs in Europe are extremely competitive, with movement and emigration between EU countries a frequent occurrence. Countries with cheap labor are generally preferred, as it is an effective means of cutting costs of production, thereby increasing profits. The proxy for labor productivity, $Education_{it}$, the proxy for human capital should have a positive sign however, meaning that the higher a country's tertiary enrollment rate is, the larger their inward FDI stock will be. Greater proportions of skilled labor in the population are attractive to TNCs since a more educated workforce can learn and adopt new technology faster, and train additional workers at reduced costs (Campos and Kinoshita 2003). The hypothesized coefficient for $Risk_{it}$ is also likely to be positive, indicating that the higher the rating for the absence of risk, the greater the levels of inward FDI. Greater economic freedoms, improved business practices, and less investment risks collectively result in increased confidence and a safer atmosphere for FDI.

The coefficient of the infrastructural variable $Telecom_{it,}$ will have a positive sign, indicting that an increase in the percentage of a country's telecommunications coverage will result in greater inward FDI volume. Telephone lines help facilitate communication with other branches or domestic operations. Furthermore, in the modern business world, the availability of information is paramount. The next two variables yield coefficients that both predict the impact of directional FDI. Recall that the null hypothesis is no interaction between the EU periphery and the CEECs. The coefficient of $CEEC_t$ will have a negative sign, indicating that a decrease in investment flowing into the CEECs should result in

increased peripheral-bound FDI and vice-versa. It remains to be seen whether the fluctuations of FDI in the EU periphery are a product of domestic shortcomings or an eastward diversion of investment opportunities. The resulting sign and overall significance of $CEEC_t$ is instrumental in the interpretation of this analysis. By the same token, the coefficient of the variable $Periphery_t$ should also be negative, implying that decreases of peripheral-bound investment will result in greater FDI in the CEECs. To detect any reverse effects, the equations must each be estimated to account for unidirectional interaction between each respective locale. It is also worth mentioning that the significance of the variables $CEEC_t$ and $Periphery_t$ do not have to be consistent with one another. As stated previously, the flow of FDI is usually bi-directional in nature, however this is not without the occasional exception.

Finally, the coefficient of the additional variable EU_{it} will likely have a positive sign, meaning an increase in FDI to the rest of the EU-27 should also result in greater stocks of FDI in the investigated country. The case can be made that the opposite is true in Portugal, Spain, Greece, and Ireland, where many predict FDI is diverted away from the periphery. However, the region itself historically accounts for upwards of 18% of aggregate incoming FDI, which not only represents a sizable denomination, but a disproportionate amount of investment, relative to the size and wealth of these countries (UNCTAD 2010). As such, the model hypothesizes that greater investment opportunities to the overall EU-27 are equally favorable to the EU periphery as well. When hypothesizing this impact in the CEECs, the argument is slightly more one sided, as these emerging economies have continually attracted larger proportions of FDI from European investors, implying that greater overall investment opportunities are percolating east.

4.1.2 Panel Data Analysis

This thesis relies on a balanced panel data approach that feature the observations of multiple explanatory variables encapsulating FDI growth over multiple yearly intervals. The decision to utilize panel data affords key advantages relative to conventional time-series or cross-sectional data by using elements in both a spatial and temporal, or longitudal dimension. Panel data improves the efficiency of econometric estimation by allowing for large numbers of data points that increase the degrees of freedom, thereby reducing collinearity amongst the explanatory variables. Additionally, panel data presents certain challenges, as heterogeneity and selection biases may occur, invalidating the final estimates. As such, the correct measures must be taken to effectively account for these issues if the estimated coefficients are to be accurate.

A panel data regression model usually takes one of two forms – random effects or fixed effects. The random effects model is a feasible generalized least squares (FGLS) estimation that assumes some or all of the explanatory variables are treated as if they originate from stochastic causes, hence the colloquial term *random*. Furthermore, a random effects model maintains that individual effects are uncorrelated with the variables that are used in the model, which makes its appearance in an econometric model as a composite disturbance term, given as an example below:

$$y_{it} = \alpha + \beta' x_{it} + (\mu_i + \varepsilon_i) \quad (2)$$

where α is the intercept term, and μ_i is the uncorrelated individual effect. This differs from the pooled ordinary least squares (OLS) regression model, which views this

individual effect as a constant that integrates itself with the intercept term, α in the equation below:

$$y_{it} = \alpha + \beta' x_{it} + \varepsilon_{it} \quad (3)$$

A random effects model estimates these parameters through the use of FGLS estimation that captures the variances of the error components. One advantageous feature of this model is that it approximates all variables in an equation without requiring additional specification. Often times the use of random effects is precluded by running the Lagrange multiplier test developed by Breusch and Pagan (1980) – a test that determines whether random effects is permitted in the model or if it is preferable to pool the data and run the estimation using OLS regression as in equation (3). The random effects model will most likely be the preferred model in this analysis, as it relies on the assumption that the regressors are completely uncorrelated with the individual effects of each cross-sectional country unit. This assumption is reasonable when the data is a sample of a much larger population, which in this instance satisfies the assumption since the EU periphery and the CEECs are evaluated separately. If the sample under investigation included the EU-27 in its entirety however, this assumption would be invalid given that this constitutes the entire EU population.

The second form of a panel data regression model is the fixed effects model. Several attributes distinguish fixed effects from the random effects model. At its most basic level, the fixed effects model is estimated below:

$$y_{it} = \alpha + \mu_i + \beta' x_{it} + \varepsilon_{it} \quad (4)$$

This model does not require the same assumption as the random effects model, in that individual effects are uncorrelated with regressors. For this reason, the fixed effects model carries a unique set of issues that must be addressed. Since the observed qualities of the explanatory variables are treated as if these qualities were non-random by design, the fixed effects model must control for unobserved heterogeneity across units (e.g. countries). A common strategy is the differencing of the intended data, which removes any latent heterogeneity that exists between the different cross-sectional units, consequently dismissing all time-invariant variables. The decision to use fixed or random effects is ultimately dictated by the structure of the data. To determine whether the fixed or random effects modeling technique is permitted, the specification test outlined by Hausman (1978) must be performed to evaluate the significance of each estimator as it corresponds to the data.

4.2 Partial Stock Adjustment Model

The model previously outlined in equation (1) is estimated in its base form. To perform the necessary functions of this analysis, the model needs to undergo a slight adjustment to account for certain aspects or issues of agglomeration, serial correlation, and biases in the estimation process. This analysis follows the methodology proposed by Cheng and Kwan (2000) and Campos and Kinoshita (2003). First, the ability to test for agglomeration effects in a model requires the examination of FDI stocks in both present and past terms. The prevalence of a lag rests on the assumption that it takes time for FDI to adjust to desired or equilibrium levels. Cheng and Kwan (2000) used this adjustment technique to postulate the satiation levels of China's FDI performance, however this analysis will rely on similar empirical framework to formulate the final model. The adjustment process is listed below:

$$\Delta Y_{it} = \alpha(Y^*_{it} - Y_{it\text{-}1})$$

(5)

where α is the partial adjustment of FDI, Y_{it} is the stock of FDI in country *i* at time *t, and* Y^*_{it} the corresponding steady-state or equilibrium level of stocks. Additionally, $\Delta Y_{it} = Y_{it} - Y_{it\text{-}1}$ and thus by collecting terms and rearranging equation (5), we get the following:

$$Y_{it} = (1 - \alpha)Y_{it\text{-}1} + \alpha Y^*_{it} \quad (6)$$

in which $\alpha < 1$ for the equation to be stable and not subject to fluctuation (Cheng and Kwan 2000). The steady-state or equilibrium level of FDI stock is subsequently determined by a compilation of explanatory variables whose origin is outlined in the equation below:

$$Y^*_{it} = \beta' x_{it} + \varepsilon_{it} \quad (7)$$

where x_{it} represents a vector of institutional, infrastructural, and theoretical variables discussed in the previous sections, while ε_{it} is the collective disturbance term that includes both country-specific and time-specific effects of the model (Cheng and Kwan 2000). In order to include the lag and decompose the model for examination, the following regression model will be estimated:

$$Y_{it} = \delta Y_{it\text{-}1} + \lambda x_{it} + u_{it}$$
$$u_{it} = \eta_1 + \gamma_t + v_{it}, \; i = 1,2\ldots,N, \; t = 2,\ldots,T$$

(8)

where $\delta = (1 - \alpha)$, $\lambda = \alpha\beta$, and $v_{it} = \alpha\varepsilon_{it}$. Furthermore, η_1 encompasses any country-specific effects or attributes, while γ_t represents a vector of time-specific properties such as the inclusion of any time dummy variables. The effect of agglomeration is effectively captured in δ. A significant and positive value of δ would indicate that agglomeration is observed in the model, whereas a negative sign would suggest that agglomeration is not present. In its current form, the OLS estimates for the model are inconsistent due to the correlation that still exists between the lagged Y_{it-1} and the time-invariant, country-specific properties of η_1. Moreover, the issue of reverse causality in the model through feedback effects has not yet been accounted for. To successfully address these issues the analysis relies on the GMM estimation technique (Arellano and Bond 1991).

4.3 GMM Framework and Estimation

The GMM technique is a set of population moment conditions that are derived from the assumptions of the econometric model. It is particularly attractive and useful for improving efficiency when the likelihood formulation is difficult but the moment conditions are relatively easy to obtain (Arellano and Bond 1991). The GMM approach starts with the first differenced version of equation (8).

$$\Delta Y_{it} = (1 - \alpha)\Delta Y_{it-1} + \beta' \Delta x_{it} + \Delta u_{it},\ i = 1,2. \ldots ,N,\ t = 2,. \ldots ,T \quad (9)$$

in which the region-specific effects are effectively eliminated by the differencing operation. According to the assumption of serially uncorrelated residuals in equation (9), values of the dependent variable Y_{it} lagged two or more periods qualify as

instruments in the first-differenced system (Cheng and Kwan 2000). This implies the following moment conditions:

$$E(Y_{it-s}\,\Delta u_{it}) = 0 \quad t = 3, \ldots, T \text{ and } s \geq 2. \tag{10}$$

The GMM estimation based solely on equation (10) could be inefficient and might yield inconsistent estimates. As is often the case, it is necessary to use the explanatory variables in the model as additional instruments, taking note of their endogenous properties. For explanatory variables that are strictly exogenous, both the past and future Δx serves as valid instruments, outlined below:

$$E(x_{it-s}\,\Delta u_{it}) = 0 \quad t = 3, \ldots, T \text{ and all } s \geq 2. \tag{11}$$

Equations (9)–(11) imply a composite of linear moment conditions that are applied under the GMM methodology. The validity of these moment conditions are central to the consistency of the GMM estimator, as the residuals must be serially uncorrelated and the explanatory variables absent of endogeneity. To ensure the quality and overall validity of these moment conditions, the Sargan test is utilized, which tests for misspecification (Campos and Kinoshita 2003). The null hypothesis of no misspecification is rejected if the GMM estimator contains a large value, relative to the chi-square distribution with degrees of freedom equal to the difference between the number of moment conditions and parameters. This can be particularly problematic when there are too many instruments used in the estimation process. Additionally, the analysis relies on the Sargan-difference test, which has a slightly different function than the conventional Sargan test in that it evaluates the validity of the extra moment

conditions in a nested or combined case. Ultimately, the assumption of strict exogeneity will be suspect if the extra moment conditions are rejected by the Sargan-difference test. For these reasons, the subsequent estimation in the analysis utilizes the Sargan-difference test to allay any potential issues of misspecification incurred in the use of additional instruments.

In addition to endogeneity and model misspecification, the appropriate measures are needed address the potential issue of serial or autocorrelation in the model. Serial correlation exists when the error terms in two different time periods are correlated. As such, a test for serial correlation is first performed using the test devised by Wooldridge measuring serial correlation in random or fixed effects one-way models, as specified in Stata (Wooldridge, 2002). The null hypothesis of the Wooldridge test in panel data is no first order autocorrelation. Additionally, the analysis relies on the Arellano-Bond test. Under the assumptions of this test, in order for the residuals to be uncorrelated, certain conditions have to be met. The first-differenced residuals provided by the GMM estimation in Stata must follow a MA(1) process, i.e. autocorrelations of the first-order AR(1) are non-zero while the second or higher-order autocorrelations AR(2) are zero, distributed as $N(0,1)$. As such, the null hypothesis in the Arellano-Bond test is zero first and second-order autocorrelation, tested independently. Therefore, an insignificant first-order statistic in conjunction with a significant second-order statistic will invalidate the moment conditions due to the presence of serial correlation.

In order for the GMM estimates to be valid and consistent, the analysis needs to successfully account for panel-level heteroskedasticity in the model. To address this issue, a Breush-Pagan/Cook Weisberg test for panel-level

heteroskedasticity is done – the null hypothesis of this test being constant variance. If the null hypothesis is rejected, indicating that these errors are present, the residuals from the GMM estimates will be re-estimated using robust standard errors to correct for this problem.

4.4 Specifications of Variables and Data Sources

This analysis will use the total value of inward FDI stocks as the dependent variable. The primary focus is FDI targeting the EU peripheral countries of Portugal, Spain, Greece, and Ireland, analyzed during the period of 1995-2009. Moreover, to address the potential for bi-directional interaction, the levels of FDI flowing into the CEECs will be measured as well, as a basis for comparison during the same period. The range of this data is appropriate to the nature of this analysis as it captures the period directly following the liberalization of the CEEC economies, as well as their path towards eventual integration, simultaneously measured against the performance of the EU periphery. In addition, further specifications will be estimated from 1995-2003, coinciding with interval prior to the EU enlargement rounds. Finally, specifications will be run from 2004-2009, which includes only the period of time where every case in the sample is a member state of the EU. The results for each specification will be compared for differences to better capture the effects during specific periods. Each of these regions constitutes a portion of aggregate inward FDI in the EU-27 – since 1995, the EU periphery and the CEECs themselves have accounted for 14% and 6.4% of total inward investment, respectively (UNCTAD 2010). With the exception of Greece, the EU peripheral countries reside exclusively in Western Europe, while the CEECs are located on the Eastern frontier. The geographic variation these regions possess adds to the robustness of the model, given each region

maintains unique differences with the other. The data for the dependent variable $FDIstock_{it}$ was collected from the United Nations Conference on Trade and Development (UNCTAD) database and represents the total value of inward FDI stocks, adjusted for inflation in real US dollars. $FDIstock_{it}$ will be investigated in its natural log form, as this allows for the improved examination of the variable despite its high variation. The observations used in this analysis stop at the conclusion of 2009 due to the availability of data.

The first explanatory variable lag$FDIstock_{it-1}$ is the modified one-year lag of the dependent variable in natural log form that integrates the aspect of agglomeration effects into the model. Agglomeration economies emerge when latent benefits via efficiency spillovers and externalities arise (Guimarães, Figueiredo, and Woodward 2000). The availability of sectoral level data would permit the differential significance of several types of agglomeration economies, however as this is not the focus of the analysis, a single one-year lagged dependent variable encapsulating this effect will suffice. The inclusion of a lagged dependent variable on the right side of the equation does present a certain challenge however, as the OLS estimates suffer from inconsistencies (Campos and Kinoshita 2003). This issue will be addressed in subsequent sections.

The data for the variable $RealGDP_{it}$ represents the total GDP in natural log form, measured in real US dollars in country *i* at time *t*. These figures were obtained from the World Bank's database under the Global Development and Finance Program. The inclusion of GDP in real terms is congruent with the deflated values used in the dependent variable, which controls for inflation – a major issue for post-communist countries. Rather than measuring real GDP in per capita terms, which is

traditionally used as an indicator of market sophistication and differentiation, this analysis instead utilizes total GDP, which is a proxy for overall market size (Campos and Kinoshita 2003). This is consistent with the dependent variable $FDIstock_{it}$, which also is compiled in aggregate form rather than per capita terms. Previous studies have noted the potential for endogeneity or reverse causality between FDI and GDP (Cheng and Kwan 2000), thus the Durban-Wu-Hausman endogeneity test using the Stata statistical software package is conducted. This test is based on the null hypothesis, which states that the OLS estimator yields consistent results, i.e. any endogeneity amongst the regressors yields no effect on the OLS estimates. A rejection of the null hypothesis requires the use of instrumental variables to correct for endogeneity issues.

The variable $Openness_{it}$ is the summation of the total real value of exports and imports, divided by total real GDP in country *i* at time *t*. This data was collected using the World Bank's database for Development Indicators. Openness is a broad measure that captures country size, resource wealth, and the volume of overall trade, which is used to gauge a country's overall trade performance. Due to this wide focus, it is entirely possible that some factors, irrespective of trade policy, may affect a country's trade openness (Zhou and Lall 2005). However, the correct specification ultimately controls for these effects and the inclusion of trade openness remains essential to any study that strives to feasibly measure FDI. Like the previously mentioned explanatory variable, trade openness has the potential to exhibit endogeneity through feedback effects. Consequently, $Openness_{it}$ is tested for endogeneity.

The next two variables both capture the composition and attributes of the overall labor pool. The variable $LaborCost_{it}$ is a proxy for wage competiveness that

measures the unit labor costs in country *i* at time *t*. To maintain consistency with the previously mentioned variables, these figures are adjusted for inflation in real US dollars. The cost of labor is extremely important to TNCs as they often determine the overall competiveness and attractiveness in a region. No other single region experiences greater variation in labor costs than the EU, as it is, in its most basic form, an amalgamation of 27 sovereign States. In addition to labor competiveness, $Education_{it}$ represents a proxy for labor productivity by including the tertiary enrollment rate in country *i* at time *t*. These two explanatory variables were obtained from the World Bank's Education Statistics database. An alternative to tertiary enrollment was provided in Cheng and Kwan's (2000) study on Chinese FDI, which included both primary and secondary education in their model through multiple specifications, however each EU member country adheres to certain minimum standard of education and development, thereby restricting the level of necessary variation in the sample. As a result, these two variables are omitted in the model due to collinearity, leaving tertiary enrollment as the sole determinant for labor productivity in the model. The complex relationship between labor and FDI makes these variables possible candidates for endogeneity – both $LaborCost_{it}$ and $Education_{it}$ are tested for endogeneity concerns.

The variable $Risk_{it}$ represents a composite of economic freedoms that rate the level of risk incurred in doing business in country *i* at time *t*. This measure consists of ten weighted benchmarks that account for such factors as the difficulty in starting a business, investment risks, the ease in obtaining licenses, and the recovery of lost investments. These figures were obtained from the Heritage Foundation using the Index of Economic Freedom. Implicit in international trade or FDI is the potential for

profitability and the security of investment, especially in areas where corruption is present. Each county in the sample maintains a specific rating, as outlined in the Index of Economic Freedom. Basic intuition would suggest the potential for reverse causality between a more investment-friendly environment and the propensity to secure FDI, thus $Risk_{it}$ is subjected to the Durban-Wu-Hausman endogeneity test.

The next variable is a proxy for infrastructural development in the model. $Telecom_{it}$ measures the number of telephone lines per 100 individuals in country *i* at time *t.* Telecoms were used in the analysis because they are the most complete statistic in each country that represented infrastructural development. Furthermore, $Telecom_{it}$ is analyzed in its natural log form as it was originally recorded as a ratio, allowing for its interpretation as a percentage. These figures were compiled at the World Bank's database using the Development Indicators for Infrastructure. Zhou and Lall's (2005) study of the CIS included the effect of telecommunications, citing the importance of communication that TNCs must maintain with a host country. Despite the variation in the quality of infrastructure across Europe, this measure serves as the sole proxy for infrastructure in this analysis. In addition to telecoms, roadways and railways are sometimes included in the examination of FDI (Cheng and Kwan 2000). Ultimately, the similarities shared between each country's roadways and railways, coupled with the insignificance of these statistics, resulted in the exclusion of these variables from the final model. To maintain consistency and accuracy in the estimation technique, $Telecom_{it}$ is tested for endogeneity.

The variable $CEEC_t$ allows for the evaluation of directional trending and is the summation of the aggregate value of FDI stocks in natural log form, measured in real US dollars that flowed into the CEECs in time *t*. These values were collected from

the UNCTAD database. When this statistic is regressed against the dependent variable of FDI in Portugal, Spain, Greece, or Ireland, the subsequent relationship will reveal not only if a one-way relationship exists between the EU peripheral State under investigation and the CEECs, but also whether or not there is a positive or negative impact on FDI volume. Buch, Kokta, and Piazolo (2002) and Galego and Vieira's (2004) previous studies analyzed this relationship, in which they ultimately found no evidence of interaction between the two regions. For this reason, the null hypothesis is no interaction between the EU periphery and the CEECs. If the same factors impacting FDI in the EU periphery are also responsible for influencing FDI levels in the CEECs, then endogeneity may be an issue in the model. To control for this problem, $CEEC_t$ is tested for endogeneity.

Investment and trade between two regions is almost always bi-directional in nature. For this reason, the above model is also estimated through an alternative specification in which the CEECs are each analyzed using the same method and model with one notable exception. The adaptation of the sample in the model estimation requires a few alterations – the variable $CEEC_t$ is removed from the model and substituted with $Periphery_t$. The new variable $Periphery_t$ shares the same attributes and rational as the replaced variable $CEEC_t$, except that $Periphery_t$ instead measures the total aggregate value of FDI stocks in natural log form flowing into the EU periphery, rather than into the CEECs. In addition, dependent variable measures FDI stock in the eight CEECs rather than the EU periphery. As in the previous instance, these values were obtained from the UNCTAD database. The regression of dependent variable on the variable $Periphery_t$ will connote whether a one-way relationship exists between the CEECs and the EU periphery, which in conjunction with the estimation of

$CEEC_t$, will account for any joint two-way interactions between each region. $Periphery_t$ is also tested for endogeneity to maintain consistency in the analysis.

Additionally, to capture the relationship between the EU-27 and each individual country, the variable EU_{it} is substituted into the model as two additional specifications. This statistic represents the total value of all inward FDI in the EU-27 in a natural log form, measured in real US dollars, excluding county *i* at time *t*. The totals for this measure were accumulated at the UNCTAD database. The first alternative specification will include EU periphery, however the variable EU_{it} replaces $CEEC_t$ in the model. In the second instance, the CEECs will be estimated, however the variable $Periphery_t$ is replaced by EU_{it} in the model. Unfortunately, EU_{it} cannot exist in the model with either $CEEC_t$ or $Periphery_t$ due to the likelihood of collinearity, as one is the determinant of the other. Given that this variable excludes the incoming FDI volume in country *i*, EU_{it} serves as a tool for comparing the investment performance in country *i* to the rest of the EU-27, irrespective of region in a given year. In essence, this variable essentially captures a peripheral State or CEECs' interaction with all other member countries in the EU when regressed against the dependent variable. Consequently, this raises the potential of endogeneity in EU_{it} ensuring that it be subjected to the endogeneity test described previously.

Chapter 5

RESULTS

5.1 Panel Data Regressions

This chapter details the results of the equations and techniques developed in the previous chapters. The first section includes the regression results, which describe the process of estimating the coefficients of the variables that constitute this model. For the purposes of clarification, four individual specifications were run – the first two focus on the four EU peripheral States and their unidirectional relationship with the CEECs, along with the rest of the EU-27. The remaining two specifications focus instead on the eight CEECs and their respective one-way interaction with the EU periphery, along with the rest of the EU.

5.1.1 Random Effects Model

The initial process of estimating the model began with the application of the Breush-Pagan Lagrangian multiplier test to determine if random effects were preferred to a simple OLS regression. In each instance, large chi-squared statistics were reported and are presented in Tables 5.1-5.3, which resulted in the rejection of the null hypothesis that OLS is properly specified. Though this suggested that the random effects model is preferable to OLS, it did not ultimately reveal any information about the individual specific effects, nor their respective correlations with the independent variables. Since the random effects model rests on the assumption that these effects are uncorrelated, the possibility still exists that the estimated coefficients are inconsistent. This was addressed by running the Hausman test, which identified

whether the fixed or random effects model is permitted. The subsequent chi-square values are reported in Tables 5.1-5.3. Once again, each instance produced consistent results, this time collectively failing to reject the null hypothesis, which indicated that the random effects model is appropriate in the analysis. The results for the random effects model are presented in each column of Tables 5.1-5.3 and are compared to the GMM estimates where appropriate. Ultimately, we cannot draw any final conclusions based on these results, as subsequent sections show they still suffer from inconsistencies and biases in their present form.

5.1.2 Detecting and Correcting for Endogeneity and Heteroskedasticity

An additional econometric issue that is always of concern with panel data models is the potential for endogeneity in the independent variables. In this particular form of regression analysis, it is assumed that the independent variables are strictly exogenous. However, as is often the case when working with trade or FDI models, certain variables suffer from the issue of reverse causality through feedback effects and warrant the use of instruments to control for this shortcoming. To account for endogeneity in the model, each variable was subjected to the Durbin-Wu-Hausman test in Stata. The null hypothesis for this test is that the variable under investigation is strictly exogenous. The subsequent results of this test are reported below in Tables 5.4-5.6.

Table 5.1 Random Effects Estimation: 1995-2009[a]

	Periphery		CEECs	
	(1)	**(2)**	**(3)**	**(4)**
$lagFDIstock_{it-1}$	-0.048	-0.038	0.061	-0.014
	(-0.35)	(-0.27)	(0.59)	(-0.14)
$RealGDP_{it}$	0.350	0.543**	0.488***	0.558***
	(0.98)	(1.78)	(3.40)	(4.00)
$Openness_{it}$	0.008*	0.008**	0.002	-0.001
	(1.82)	(1.79)	(1.13)	(-0.24)
$LaborCost_{it}$	-0.020**	-0.109**	-0.001	-0.002
	(-1.91)	(-1.80)	(-0.43)	(-0.62)
$Risk_{it}$	0.017	0.014	0.004	0.001
	(1.07)	(0.91)	(0.62)	(0.07)
$Education_{it}$	0.056***	0.051**	0.022	0.018
	(2.48)	(2.28)	(1.04)	(0.87)
$Telecom_{it}$	-0.002	0.005	-0.002	-0.007
	(-0.12)	(0.30)	(-0.29)	(-1.00)
$CEEC_t$	0.399**			
	(1.96)			
$Periphery_t$			0.627***	
			(5.30)	
EU_{it}		0.427**		0.714***
		(2.21)		(5.41)
Constant	0.031	0.046	0.061*	0.069**
	(0.56)	(0.96)	(1.72)	(2.02)
Hausman Test[b]	0.53	0.66	2.05	4.67
BP Lagrangian Multipler[d]	4.55**	6.18**	5.89***	5.44***
N	4	4	8	8
$\mathbf{R^2}$	0.522	0.526	0.540	0.509

[a] *t*-statistics in parenthesis
[b] Hausman test chi-squared values reported, H_0: random effects permitted
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level
[d] BP Lagrangian chi-squared values reported, H_0: OLS preferred to random effects

Table 5.2 Random Effects Estimation: 1995-2003[a]

	Periphery		CEECs	
	(1)	**(2)**	**(3)**	**(4)**
***lagFDIstock*$_{it-1}$**	-0.394	-0.165	-0.052	-0.033
	(-1.43)	(-0.65)	(-0.32)	(-0.21)
***RealGDP*$_{it}$**	0.863*	0.215	0.640*	0.651*
	(1.80)	(1.32)	(1.79)	(1.68)
***Openness*$_{it}$**	0.010**	0.023*	0.003	0.001
	(2.26)	(1.75)	(1.02)	(0.48)
***LaborCost*$_{it}$**	-0.001**	-0.002*	-0.014**	-0.011*
	(-2.00)	(-1.90)	(-2.11)	(-1.79)
***Risk*$_{it}$**	0.024	0.056*	0.003	0.009
	(0.90)	(1.77)	(0.30)	(0.89)
***Education*$_{it}$**	0.012	0.069	0.009	0.006
	(0.42)	(1.14)	(0.16)	(0.10)
***Telecom*$_{it}$**	-0.019	-0.008	0.022	0.002
	(-0.67)	(-0.27)	(1.59)	(0.15)
***CEEC*$_{t}$**	0.005			
	(0.11)			
***Periphery*$_{t}$**			0.447*	
			(1.88)	
***EU*$_{it}$**		0.575		0.249
		(1.51)		(0.91)
Constant	0.156	0.004	0.080	0.134**
	(1.24)	(0.06)	(1.05)	(2.18)
Hausman Test[b]	2.37	2.90	8.09	1.94
BP Lagrangian Multipler[d]	9.29**	17.45**	10.87***	17.45***
N	4	4	8	8
R^2	0.492	0.502	0.498	0.527

[a] *t*-statistics in parenthesis
[b] Hausman test chi-squared values reported, H_0: random effects permitted
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level
[d] BP Lagrangian chi-squared values reported, H_0: OLS preferred to random effects

Table 5.3 Random Effects Estimation: 2004-2009[a]

	Periphery		CEECs	
	(1)	**(2)**	**(3)**	**(4)**
***lagFDIstock*$_{it-1}$**	-0.166	-0.165	-0.294	-0.122
	(-0.57)	(-0.65)	(-0.22)	(-0.98)
***RealGDP*$_{it}$**	0.677	0.215	0.029	0.021
	(0.60)	(0.32)	(0.99)	(0.69)
***Openness*$_{it}$**	0.023	0.023	0.005**	0.005***
	(0.63)	(0.75)	(2.28)	(2.60)
***LaborCost*$_{it}$**	-0.002**	-0.002*	-0.001	-0.001
	(-2.14)	(-1.90)	(-0.12)	(-0.03)
***Risk*$_{it}$**	0.054	0.056*	0.030*	0.034**
	(1.54)	(1.77)	(1.94)	(2.11)
***Education*$_{it}$**	0.100*	0.069	0.070*	0.056
	(1.74)	(1.14)	(1.85)	(1.40)
***Telecom*$_{it}$**	-0.011	-0.008	0.005	-0.004
	(-0.35)	(-0.27)	(0.47)	(-0.35)
***CEEC*$_{t}$**	0.453			
	(0.98)			
***Periphery*$_{t}$**			0.890***	
			(4.84)	
***EU*$_{it}$**		0.575		0.234***
		(1.51)		(4.84)
Constant	0.028	0.004	-0.022	-0.023
	(-0.31)	(0.06)	(-0.50)	(-0.52)
Hausman Test[b]	4.37	2.90	2.86	5.38
BP Lagrangian Multipler[d]	7.45**	17.45**	12.27***	9.24***
N	4	4	8	8
R^2	0.460	0.473	0.481	0.499

[a] *t*-statistics in parenthesis
[b] Hausman test chi-squared values reported, H_0: random effects permitted
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level
[d] BP Lagrangian chi-squared values reported, H_0: OLS preferred to random effects

The test for endogeneity reported mixed results in each model. Beginning with Table 5.4, the first EU peripheral model in column (1) found the variable $LaborCost_{it}$ to be endogenous as it strongly rejected the null hypothesis of strict exogeneity. By comparison, the variables in column (2) found no evidence of endogeneity in the model, which in its present form requires no further instrumentation before the final estimation procedure. Conversely, each CEEC model in columns (3) and (4) indicated that $RealGDP_{it}$ suffers from endogeneity as it strongly rejected the null hypothesis. These results are consistent with previous studies such as Cheng and Kwan (2000) and Campos and Kinoshita (2003), which found GDP or measures of growth to have a strong reinforcing effect on FDI. In addition to the variable $RealGDP_{it}$, the terms $Periphery_t$ and EU_t strongly rejected the null hypothesis for strict exogeneity, which indicated the use of instruments. Recall from equation (11) that under the first-differencing operation, we consider Δx = (market size, trade openness, wage, risk, education, infrastructure, and additional region terms) as valid instruments when lagged two or more periods. The use of these instruments effectively correct for endogeneity, however before the model can be re-estimated with additional instrumentation, the issue of heteroskedasticity must be addressed. As such, the Breush-Pagan/Cook Weisberg test for heteroskedasticity was performed on all four models and produced varied results that are presented in Table 5.4. The results of the models in columns (1) and (2) indicated that both EU peripheral models rejected the null hypothesis of constant variance, and suffer from heteroskedasticity. Consequently, these two models were run using robust standard errors in conjunction with GMM estimation to correct for heteroskedasticity. By comparison, the CEEC

models in columns (3) and (4) failed to reject the null hypothesis of homoskedasticity, thus forgoing the need to utilize robust standard errors in the final estimation process.

In Table 5.5, the variable $Openness_{it}$ rejected the null hypothesis for strict endogeneity in column (1), which indicated the use of an instrument to control for endogeneity. In the CEEC models, only the variable $Periphery_t$ in column (3) rejected the null. Failure to reject the null in the remaining variables suggested that they are strictly exogenous and do not require the use of instruments. Moreover, the Breush-Pagan/Cook Weisberg test for heteroskedasticity was performed on each model finding evidence of constant variance in each model. Thus, robust standard errors are not needed in the final estimation process.

Lastly, Table 5.6 found the variable $Risk_{it}$ in column (1) to strongly reject the null for strict exogeneity. Furthermore, column (3) found both $Openness_{it}$ and the $Periphery_t$ to suffer from endogeneity, while column (4) found the variable EU_{it} to strongly reject the null. These variables all require the use of instruments to correct for bias in the final estimation. To address any potential for heteroskedasticity, the Breush-Pagan/Cook Weisberg test was run and found results consistent with the previous models, in that there was not enough evidence to reject the null for constant variance.

Table 5.4 Tests for Endogeneity and Heteroskedasticity: 1995-2009

	Periphery		CEECs	
	(1)	**(2)**	**(3)**	**(4)**
$RealGDP_{it}$	0.108	3.57	14.60***	22.89***
$Openness_{it}$	4.30	4.30	2.85	0.45
$LaborCost_{it}$	19.92***	3.58	1.51	1.19
$Risk_{it}$	0. 51	2.72	0.51	2.27
$Education_{it}$	10.78	7.12	4.59	4.27
$Telecom_{it}$	1.24	0.21	0.05	0.71
$CEEC_t$	6.72			
$Periphery_t$			63.67***	
EU_{it}		8.90		53.03***
Breush-Pagan[b]	13.62*	18.37**	10.54	3.67
N	4	4	8	8

[a] Durbin-Wu-Hausman chi-square values reported, H_0: strict exogeneity
[b] Breush-Pagan chi-square values reported, H_0: constant variance
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

Table 5.5 Tests for Endogeneity and Heteroskedasticity: 1995-2003[a]

	Periphery		CEECs	
	(1)	**(2)**	**(3)**	**(4)**
$RealGDP_{it}$	3.36	0.23	1.93	2.95
$Openness_{it}$	13.28*	6.97	1.79	0.63
$LaborCost_{it}$	0.05	0.05	0.21	0.04
$Risk_{it}$	0. 16	0.20	0.07	0.19
$Education_{it}$	0.19	0.22	1.46	1.77
$Telecom_{it}$	0.04	0.17	10.64	6.97
$CEEC_t$	3.42			
$Periphery_t$			16.15**	
EU_{it}		5.61		7.06
Breush-Pagan[b]	7.74	7.43	9.07	6.96
N	4	4	8	8

[a] Durbin-Wu-Hausman chi-square values reported, H_0: strict exogeneity
[b] Breush-Pagan chi-square values reported, H_0: constant variance
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

Table 5.6 Tests for Endogeneity and Heteroskedasticity: 2004-2009[a]

	Periphery		CEECs	
	(1)	**(2)**	**(3)**	**(4)**
$RealGDP_{it}$	9.16	2.97	0.29	0.17
$Openness_{it}$	0.26	0.43	15.77**	8.22
$LaborCost_{it}$	0.22	0.30	0.32	0.17
$Risk_{it}$	32.41***	4.36	2.71	4.36
$Education_{it}$	4.54	1.49	1.53	3.56
$Telecom_{it}$	0.07	0.01	0.03	0.16
$CEEC_t$	0.84			
$Periphery_t$			36.19***	
EU_{it}		1.81		26.51***
Breush-Pagan[b]	6.70	2.97	8.50	4.84
N	4	4	8	8

[a] Durbin-Wu-Hausman chi-square values reported, H_0: strict exogeneity
[b] Breush-Pagan chi-square values reported, H_0: constant variance
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

5.1.3 GMM Estimation

The results of the GMM estimation process in each specification are reported in Tables 5.7-5.9. Each variable previously suffering from endogeneity was run in the model using a second-period lag, which successfully corrected for endogeneity in the respective models. Beginning with Table 5.7, the models in columns (1) and (2) were also estimated by running robust standard errors along with the GMM coefficients to correct for panel level heteroskedasticity, while the models in columns (3) and (4) were run using just the convention GMM estimation, as they were homoskedastic in nature. To check the validity of the overall moment conditions in each respective model, the Sargan-difference test was run, which in each instance failed to reject the null hypothesis of no misspecification. The results of the Sargan-difference test are also reported respectively in Tables 5.7-5.9, consequently indicating that each model was correctly specified and the second-period lags that were used are valid instruments. The regression results have changed slightly since the random effects estimation, however this was to be expected, as the previous estimates suffered from biases. The final regressions yield results that are generally consistent with the expectations of the respective models. In each instance the variable for agglomeration lag$FDIstock_{it\text{-}1}$, was both negative and insignificant, indicating that the EU periphery and CEECs do not observe agglomeration in their economies. Unfortunately, since the variable lag$FDIstock_{it\text{-}1}$ was not found to be significant, the coefficients implying the partial adjustment of stock cannot be calculated. The proxy for market size, $RealGDP_{it}$ was found to be positive in each

Table 5.7 GMM Estimation Results: 1995-2009[a]

	Periphery		CEECs	
	(1)[b]	**(2)**[b]	**(3)**	**(4)**
***lagFDIstock*$_{it-1}$**	-0.174	-0.222	-0.051	-0.238
	(-0.59)	(-0.97)	(-0.42)	(-0.26)
***RealGDP*$_{it}$**	0.108	0.644	0.500**	0.388**
	(0.22)	(1.69)	(2.49)	(2.16)
***Openness*$_{it}$**	0.007	0.010	0.003*	0.003*
	(1.16)	(1.67)	(1.72)	(1.94)
***LaborCost*$_{it}$**	-0.013**	-0.024**	-0.004	-0.008**
	(-3.01)	(-2.66)	(-0.91)	(-2.16)
***Risk*$_{it}$**	0.027***	0.024**	0.014	0.024***
	(4.84)	(3.30)	(1.46)	(2.66)
***Education*$_{it}$**	0.051	0.035	0.037	0.023
	(1.16)	(0.98)	(1.42)	(0.97)
***Telecom*$_{it}$**	-0.010	0.008	0.038***	0.034***
	(-1.05)	(0.64)	(3.41)	(3.40)
***CEEC*$_{t}$**	0.520***			
	(8.47)			
***Periphery*$_{t}$**			-0.164	
			(-1.20)	
***EU*$_{it}$**		0.355**		0.849***
		(2.60)		(4.41)
Sargan-Difference Test[c]	10.45	3.45	4.81	8.71
N	4	4	8	8
R^2	0.524	0.501	0.498	0.545

[a] *t*-stats in parenthesis
[b] GMM estimation using robust standard errors
[c] Sargan-difference chi-squared values reported, H_0: instruments are exogenous
[d] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

model in Table 5.7, but only significant in the CEEC models in columns (3) and (4). These results indicate that there is no evidence of greater market size attracting FDI into Portugal, Spain, Greece, or Ireland, while in the case of the CEECs, larger market size has been instrumental in attracting FDI. Growing consumer demand in these expanding markets during the economic resurgence that was taking place in the CEECs in the years leading up to EU integration continually provided investment incentives to TNCs who saw the opportunity for future growth.

In addition, the variable $Openness_{it}$ was found to be positive across each model in Table 5.7, however only in the CEECs were these coefficients significant. These results imply that there is no evidence of trade openness yielding a positive impact on FDI stock in the EU periphery, though in the CEECs, the improvement of trade balances and policies collectively have helped attract FDI. This seems plausible given the range of the data, in which the CEEC were perspective member States who removed tariffs and trade barriers to improve their terms of trade with the EU throughout the 1990s up until their eventual integration. The proxy for labor competiveness $Labor_{it}$, was found to be both negative and significant in each model, with the exception of the model in column (3). This helps explain why FDI opportunities in Portugal, Spain, Greece, and Ireland were not as lucrative or desirable when compared to the conditions in the CEECs and the rest of the EU. The results imply that FDI volume in the CEECs suffered as well due to the increased costs of labor relative to the rest of the EU. When measured against the EU periphery however, the cost of labor was not found to be significant.

The proxy variable used for labor productivity $Education_{it}$ was positive, but insignificant across every model. These results show no evidence of worker

productivity levels attracting FDI in either the EU periphery or the CEECs. Clearly, there were other forces and incentives that impacted the flow of FDI into these regions. $Risk_{it}$ was ultimately found to be positive and highly significant in each model, with the exception of the CEEC model in column (3). The improvement of operations integrity and business practices in conjunction with the decline of investment risks, have continually helped attract FDI into the EU periphery and CEECs since 1995. These countries exhibited and promoted an atmosphere that was more favorable to investment, which seems to have paid dividends in the form of FDI volume. The model estimated in column (4) did not show any evidence of this trend, which measured CEEC-bound FDI against the EU periphery. This implies that while the CEECs made tremendous strides in fostering greater economic freedom, their efforts still lagged well behind their peripheral counterparts, failing to impact the overall stock of FDI in Eastern Europe. This process is particularly gradual in instances where dictatorships or totalitarian governments have been in place for decades. The variable used to capture the effect of infrastructure $Telecom_{it}$, was not insignificant in either of the EU peripheral models. On the other hand, the coefficients of $Telecom_{it}$ in the CEEC models were found to be both positive and highly significant. This is likely due to the developmental upgrades the CEECs made during the 1990s as they attempted to catch up with Western Europe after years of moribund Soviet rule. The high significance of $Telecom_{it}$ in the CEECs highlights the advantages and benefits that are gained through internal development – a trend that investors have clearly noticed in recent years.

$CEEC_t$, the EU periphery's unidirectional variable with the CEECs was both positive and statistically significant. Interestingly, these results not only indicate

that the EU periphery shares a one-way relationship with the CEECs, but that the fears of FDI diversion away from the EU periphery are largely overblown. The model shows that increased investment in the East does not come at the expense of the traditional destinations in the West, as previously thought. On the contrary, increases in FDI stock in the CEECs actually benefit the countries of Portugal, Spain, Greece, and Ireland, suggesting that these regions are not rivals but partners in the European community. Conversely the CEECs' one-way variable with the EU periphery was found to be negative and insignificant, meaning that this relationship found no evidence of bi-directional behavior. Furthermore, these results failed to provide any evidence of the CEECs attracting peripheral-bound FDI. Finally, the variable EU_t, was determined to be positive and significant in both the EU periphery and the CEECs. These results indicate that growing investment opportunities in the rest of the EU favorably impact FDI stock in both regions. FDI is not a zero-sum game as each region has continued to increase their overall stock while securing greater portions of investment.

Table 5.8 reports the results for the model preceding the EU enlargement rounds in 2004. Consistent with Table 5.7, the results of the Sargan test provided in Table 5.8 collectively failed to reject the null hypothesis of misspecification, suggesting that the instruments used in the model are correctly

Table 5.8 GMM Estimation Results: 1995-2003[a]

	Periphery		CEECs	
	(1)	**(2)**	**(3)**	**(4)**
$lagFDIstock_{it-1}$	-0.552	-0.471	-0.158	-0.176
	(-1.21)	(-1.31)	(-1.01)	(-1.13)
$RealGDP_{it}$	0.361**	0.252**	0.538**	0.680*
	(2.23)	(2.23)	(1.97)	(1.86)
$Openness_{it}$	0.018**	0.019*	0.002**	0.002**
	(2.64)	(1.82)	(2.06)	(2.02)
$LaborCost_{it}$	-0.005**	-0.031**	-0.010*	-0.015**
	(-2.20)	(-2.05)	(-1.65)	(-2.13)
$Risk_{it}$	0.042	0.037	0.002	-0.009
	(1.61)	(0.86)	(0.23)	(-0.93)
$Education_{it}$	0.007	0.001	0.021	0.003
	(0.28)	(0.02)	(0.39)	(0.06)
$Telecom_{it}$	-0.044	0.027	0.014	0.009
	(-1.28)	(0.54)	(1.01)	(0.51)
$CEEC_t$	-0.342			
	(-0.82)			
$Periphery_t$			0.509	
			(0.56)	
EU_{it}		-0.713		0.266*
		(-1.38)		(1.97)
Sargan Test[b]	10.40	9.23	8.22	7.22
N	4	4	8	8
$\mathbf{R^2}$	0.521	0.522	0.504	0.495

[a] *t*-stats in parenthesis
[b] Sargan-difference chi-squared values reported, H_0: instruments are exogenous
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

specified. In addition, the variable lag$FDIstock_{it\text{-}1}$ was found to be negative and insignificant in each model, meaning that agglomeration did not significantly impact FDI volume in either the EU periphery or CEECs. Interestingly, $RealGDP_{it}$ tested positive and significant across each model, which is a departure from the previous models estimated during 1995-2009, which found only the CEECs to show significance towards GDP or the proxy for market size. This indicates that in the years leading up to the EU enlargement rounds in 2004, the presence of a larger market helped attract additional FDI in both the EU periphery and the CEECs. Furthermore, the variable $Openness_{it}$ was found to be positive and significant across each model in Table 5.8. These results imply that the removal of trade barriers and increased commercial interaction with the rest of the EU prior to 2004 helped promote increased FDI stock in both regions.

The proxy for labor competiveness $Labor_{it}$ was found to be negative and significant in each model in Table 5.8. This suggests that access to cheap labor was highly conducive to attracting FDI stock, which was the actual case in both the EU periphery and the CEECs prior to 2004. The remaining variables, $Risk_{it}$, $Education_{it}$, $Telecom_{it}$, as well as the additional variables $CEEC_t$ and $Periphery_t$, were all ultimately found to be insignificant and absent of any meaningful relationship with FDI stock prior to 2004. Only the variable EU_{it} in column (4) is consistent with the results estimated from 1995-2009, in which increased foreign investment flowing into the EU positively and significantly impacts FDI stock in the CEECs. This is in contrast to the results in Table 5.7, in which risk and the EU periphery's interaction with the CEECs and rest of the EU were positive and significant. This may partly be explained by less developed economic freedoms in Portugal, Spain, Greece, and

Ireland, given that these countries had essentially achieved integration only a decade earlier and had not yet taken progressive steps in improving their commercial atmospheres. The notable insignificance of the variable $CEEC_t$ seems plausible however, as the CEECs during the 1990s had just begun to liberalize their economies and stabilize themselves in the aftermath of the collapse of the Soviet Union, suggesting there were other options more preferable for foreign investment at this time.

The final GMM results include only the years since the first EU enlargement round in 2004 and are reported in Table 5.9. As was found in the other specifications, each model was correctly specified and collectively failed to reject the null hypothesis of misspecification via the Sargan test. The results provide an interesting snapshot of the EU-27 as we know it, given that each CEEC had already achieved integration throughout the duration of the timeline. As was found in previous examples, the variable lag$FDIstock_{it-1}$ was ultimately found to be negative and significant in each instance. The proxy for market size $RealGDP_{it}$ tested positive and also insignificant, suggesting that there is no evidence for market size attracting FDI in either region since 2004. In addition, the $Openness_{it}$ was not found to be significant in the EU periphery, but positive and significant in the CEECs. This reiterates the importance of trade openness in Eastern Europe since EU integration, marking an improvement in trade volumes and interaction with other member States. Once again, each model estimated in Table 5.9 found $LaborCost_{it}$ to be negative and highly significant indicating that access to cheap

Table 5.9 GMM Estimation Results: 2004-2009[a]

	Periphery		CEECs	
	(1)	**(2)**	**(3)**	**(4)**
$lagFDIstock_{it-1}$	-0.194	-0.196	-0.173	-0.117
	(-0.70)	(-0.55)	(-0.95)	(-0.60)
$RealGDP_{it}$	0.243	0.674	0.029	0.019
	(0.35)	(0.75)	(0.66)	(0.47)
$Openness_{it}$	0.012	0.042	0.004*	0.001*
	(0.98)	(1.19)	(2.05)	(1.97)
$LaborCost_{it}$	-0.031**	-0.020**	-0.002**	-0.001**
	(-2.72)	(-2.08)	(-2.36)	(-2.17)
$Risk_{it}$	0.056***	0.056**	0.003	-0.004
	(8.45)	(2.44)	(0.09)	(-0.18)
$Education_{it}$	0.089	0.049	0.009	0.011
	(1.57)	(0.73)	(0.16)	(0.20)
$Telecom_{it}$	-0.011	0.002	0.011	0.005
	(-0.31)	(0.06)	(0.70)	(0.30)
$CEEC_t$	0.399*			
	(2.14)			
$Periphery_t$			0.472	
			(0.79)	
EU_{it}		0.194**		0.256***
		(2.12)		(4.06)
Sargan Test[b]	9.17	12.34	8.22	9.77
N	4	4	8	8
$\mathbf{R^2}$	0.425	0.429	0.417	0.420

[a] *t*-stats in parenthesis

[b] Sargan-difference chi-squared values reported, H_0: instruments are exogenous

[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

labor in both the EU periphery and the CEECs is still instrumental in attracting FDI stock. While the cost of labor rose steadily throughout the EU since 1995, the EU periphery and CEECs still possessed the cheapest labor by the end of 2009 (UNCTAD 2010).

The variable $Risk_{it}$ was found to be positive and significant in each peripheral case in columns (1) and (2), meaning that the periphery's improved track record of economic freedoms and sound business practices has helped attract FDI since 2004. Conversely, there was no evidence to be found for $Risk_{it}$ impacting FDI in the CEECs, as it was insignificant in columns (3) and (4). The remaining results were consistent with the first timeline from 1995-2009, in which the unidirectional variable $CEEC_t$ was found to be positive and significant in both the EU Periphery. The lack of significant interaction between these two regions discerned from the results prior to 2004, coupled with the significance of this variable in Table 5.9 suggests a growing partnership and positive interaction between the EU periphery and the CEECs in terms of foreign investment. We find no evidence of any negative FDI diversion in either direction – the unidirectional variable $Periphery_t$ was positive and not significant, allaying any concerns for FDI redirection away from the EU periphery. Additionally, EU_{it} was found to be positive and significant in each instance, indicating that since 2004, the peripheral States and the CEECs have maintained a symbiotic relationship within the EU in terms of investment. Lastly, the remaining proxy variables $Education_{it}$ and $Telecom_{it}$ were both found to be insignificant, which is consistent with the previous results.

5.1.4 Testing for Serial Correlation

The time component that differentiates the panel data set used in this analysis from a traditional cross sectional dataset increases the possibility of serial correlation or autocorrelation, which could potentially invalidate the coefficients of the previous GMM estimation. To address this concern, the analysis first ran the Wooldridge test for autocorrelation in panel level data, as specified in Stata. The null hypothesis of this test is no first-order autocorrelation. Based on the results of this test that were reported in Tables 5.10-5.12, none of the models estimated during the three time intervals suffer from serial correlation, indicating that their respective error terms are not correlated across multiple time periods. In addition to the Wooldridge test, the Arellano-Bond test was run through the GMM estimation process. Recall that the null hypothesis of this test is zero first and second-order autocorrelation, tested independently. The results of the test, reported in Tables 5.10-5.12, indicate a rejection of the null hypothesis implying the autocorrelations in the first-order are non-zero across each model. Moreover, each second-order autocorrelation fails to reject the null, meaning the autocorrelations are zero in each model. The significant first-order statistic in conjunction with an insignificant second-order statistic indicates that there is no serial correlation in the residuals in any of the models, validating the coefficients from the GMM approach.

Table 5.10 Tests for Serial Correlation and Autocorrelation: 1995-2009

	Periphery		CEECs	
	(1)	**(2)**	**(3)**	**(4)**
Wooldridge Test[a]	0.952	0.743	0.703	0.705
Arellano-Bond[b] **AR(1)**	-2.44**	-2.10**	-3.50***	-3.26***
Arellano-Bond[b] **AR(2)**	0.15	-0.53	1.37	0.58
N	4	4	8	8

[a] Wooldridge *P*-values reported, H_0: no first-order autocorrelation
[b] *z*-stats reported for Arellano-Bond test, an insignificant AR(1) and/or significant AR(2) indicates serial correlation
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

Table 5.11 Tests for Serial Correlation and Autocorrelation: 1995-2003

	Periphery		CEECs	
	(1)	(2)	(3)	(4)
Arellano-Bond[a] AR(1)	-1.94**	-2.95**	-3.32***	-3.05***
Arellano-Bond[a] AR(2)	-0.77	-0.54	-0.72	-0.42
Wooldridge Test[b]	0.650	0.348	0.803	0.192
N	4	4	8	8

[a] Wooldridge *P*-values reported, H_0: no first-order autocorrelation
[b] *z*-stats reported for Arellano-Bond test, an insignificant AR(1) and/or significant AR(2) indicates serial correlation
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

Table 5.12 Tests for Serial Correlation and Autocorrelation: 2004-2009

	Periphery		CEECs	
	(1)	(2)	(3)	(4)
Arellano-Bond[a] AR(1)	-5.37***	-1.63**	-3.12***	-6.19***
Arellano-Bond[a] AR(2)	0.12	-0.33	-0.22	-0.72
Wooldridge Test[b]	0.573	0.249	0.349	0.632
N	4	4	8	8

[a] Wooldridge *P*-values reported, H_0: no first-order autocorrelation
[b] *z*-stats reported for Arellano-Bond test, an insignificant AR(1) and/or significant AR(2) indicates serial correlation
[c] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

5.2 Robustness Check

As an additional basis of comparison, the estimation was run using each country case's share of aggregate FDI stock, relative to the EU-27, to test for diversion (Buch, Kokta, and Piazolo 2002). The subsequent estimation results are reported in Table 5.13 and are compared to the previous models, which utilized levels of FDI stock rather than share. In each peripheral case, lag$FDIstock_{it-1}$ was found to be positive and insignificant, suggesting that the effect of agglomeration is not significant in attracting FDI. Interestingly in columns (3) and (4), agglomeration was not only negative, but also highly significant, meaning that an increase of FDI in the CEECs reduced the attractiveness of future FDI into those countries. This may seem counterintuitive at first, however these results suggest that the marginal benefits of FDI diminished with increased volume. As was consistent with the previous estimations, the variables $RealGDP_{it}$ and $Openness_{it}$ were positive and insignificant in the EU periphery, but positive and significant in the CEECs. $Laborcost_{it}$ also reported results in the EU periphery that were negative and significant. However, the CEEC cases in columns (3) and (4) found the coefficients for $Laborcost_{it}$ to be negative and insignificant, which differs from the previous estimations. Moreover, the variable $Risk_{it}$ was positive and insignificant in each column. $Educationt_{it}$ was found to be positive in every instance, but only significant in the CEECs. In this model, labor productivity is instrumental in attracting FDI. The proxy for infrastructure, $Telecom_{it}$, was not found to be significant in any model, which yielded results that were consistent with previous estimations.

Table 5.13 GMM Alternative Estimation Results: 1995-2009

	Periphery		CEECs	
	(1)[b]	(2)[b]	(3)[b]	(4)[b]
$lagFDIstock_{it-1}$	0.117	0.075	-0.831***	-0.729***
	(0.79)	(0.60)	(-8.17)	(-8.38)
$RealGDP_{it}$	0.115	3.298	0.317**	0.465**
	(0.07)	(1.19)	(2.31)	(2.19)
$Openness_{it}$	0.017	0.020	0.002*	0.004**
	(1.92)	(1.21)	(1.95)	(2.29)
$LaborCost_{it}$	-0.067**	-0.091**	-0.001	-0.005
	(-2.13)	(-2.39)	(-0.03)	(-0.74)
$Risk_{it}$	0.034	0.055	0.008	0.002
	(0.54)	(0.81)	(0.98)	(0.49)
$Education_{it}$	0.032	0.093	0.079**	0.042**
	(0.25)	(0.65)	(2.16)	(2.61)
$Telecom_{it}$	0.043	0.098	-0.001	-0.001
	(0.97)	(1.61)	(-0.02)	(-0.07)
$CEEC_t$	0.337			
	(1.26)			
$Periphery_t$			0.026	
			(0.90)	
EU_{it}		3.61**		0.350
		(2.23)		(1.29)
Sargan-Difference Test[c]	7.22	4.92	5.18	9.02
N	4	4	8	8
$\mathbf{R^2}$	0.402	0.421	0.509	0.510

[a] *t*-stats in parenthesis
[b] GMM estimation using robust standard errors
[c] Sargan-difference chi-squared values reported, H_0: instruments are exogenous
[d] *denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level

The additional variables $CEEC_t$, $Periphery_t$ and EU_{it} estimated in Table 5.13 were partially inconsistent with the other specifications. The periphery's interaction with the CEECs, denoted by $CEEC_t$, was still positive, but insignificant, suggesting the absence of any unidirectional interaction the periphery maintains with the CEECs. Conversely, the CEECs unidirectional interaction with the EU periphery, $Periphery_t$ was positive and insignificant, which is consistent with the previous estimations. Finally, EU_t was found to be positive and significant in the EU periphery, but positive and insignificant in the CEECs. This represents a departure from the other specifications, indicating that aggregate FDI in the EU-27 yields no impact on the CEECs share of FDI stock. These results ultimately do not show any evidence of FDI redirection from the EU periphery to the CEECs, which is congruent with the other specifications in the analysis.

Chapter 6

CONCLUSIONS

This thesis investigated the relationship between FDI in the EU periphery, along with the region's interaction with the CEECs. FDI has flowed into the peripheral States since their integration, however a continually expanding European Union brings new opportunities and new choices to investors. This thesis is part of a growing number of works dedicated to examining the eastward expansion of the EU as it impacts the level of FDI in the peripheral economies of Portugal, Spain, Greece, and Ireland. The EU periphery was chosen as the focus for this study because the region represents the first stage of EU expansion, relative to the progressive evolution of the overall commonwealth. Their ability, or rather inability to maintain competitive with other recently emerging economies has since placed the region in the spotlight as it looks to the future. Ultimately, an investigation into the relationship between FDI and the EU periphery magnifies the strengths and shortcomings of the region itself as it continually seeks to attract future investment.

A panel data approach using GMM estimation was used to decipher the relationship between FDI in the EU periphery, in addition to the region's interaction with the CEECs and vice versa. Panel data estimation techniques yielded results that consistently establish the economic catalysts for FDI in the peripheral States, along with the interaction they share with the CEECs and the remaining EU-27. The positive sign associated with the coefficients $CEEC_t$ and EU_{it}, reveals the positive relationship the EU periphery shares with their European counterparts. The growth of investment in the EU-27 has continually diffused proportionately to all regions, the periphery

most of all. Furthermore, the negative impact observed in the estimation of $Labor_{it}$ highlights the area of greatest concern in the EU peripheral States moving forward. Rising domestic wages have made the region less competitive and less attractive to modern investors that continually relocate operations into locales to take advantage of the costs or production. In essence, the EU periphery is a victim of its own success in this respect, as efforts to develop internally in the mid 1980s in hopes of attracting greater FDI stock has since removed one of the primary incentives for investment in the region.

The results from the panel data approach were used to estimate a number of relationships, conditional to FDI and the interaction between the peripheral States, CEECs, and the EU-27 using levels and share of FDI. Domestically, the periphery has made enormous strides in the area of fostering greater economic freedom and culturing a safe and reliable atmosphere for investment. This has led to continuous investment throughout the last decade, despite fears of EU membership expansion. In the CEECs, the results estimated the positive impacts of market size, trade openness, and infrastructural development to be instrumental to the region's FDI growth. Moreover, the results found no evidence of peripheral-bound FDI diversion to the CEECs. Like the EU periphery before them, the CEECs relentless efforts to attract greater sums of FDI have yield several benefits, including the development of their economies and improvements to education. FDI is a limited commodity in the EU, but it is also one with seemingly unlimited growth potential. As the EU continues to expand, current members must look to their own economies to continually attract future investment.

REFERENCES

Appleyard, Field, and Cobb. International Economics, McGraw-Hill Irwin, Boston, MA (2006).

Arellano, M. and Bond, S. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", Review of Economic Studies, 58 (1991): 277-97.

Bajo, R. and Sosvilla, S. "An Econometric Analysis of Foreign Direct Investment in Spain", Southern Economic Journal, 61.4 (2004): 104-20.

Baldwin, R., Francois, J., and Portes, R. "The Costs and Benefits of Eastern Enlargement: The Impact on the EU and Central Europe", Economic Policy, 24 (1997): 127-76.

Barrios, S., Dimelis, S., Louri, H., and Strobl, E. "Efficiency Spillovers from Foreign Direct Investment in the EU Periphery: A Comparative Study of Greece, Ireland, and Spain", Review of World Economics, 180 (2004): 699-705.

Barro, R. and Lee, J. W. "Sources of Economic Growth", Carnegie-Rochester Conference Series on Public Policy, 40 (1994): 1-46.

Bevan, A. and Estrin, S. "The Determinants of FDI in Transition Countries", Center for Economic Policy Research. Discussion Paper: No. 2638. London Business School (2000).

Brainard, L. "A Simple Theory of Multinational Corporations and Trade with a Trade-off between Proximity and Concentration", NBER Working Paper No. 4269, National Bureau of Economic Research, Cambridge, MA (1993).

Brenton, P., Di Mauro, F., and Lücke, M. "Economic Integration and FDI: An Empirical Analysis of Foreign Investment in the EU and in Central and Eastern Europe", Empirica, 26 (1999): 95-121.

Breusch, T.S., and A.R. Pagan. "The Lagrange Multiplier Test and its Applications to Model Specification in Econometrics." The Review of Economic Studies 47 (1980): 239-53.

Buch, C., Kokta, R., and Piazolo, D. "Foreign Direct Investment in Europe: Is There Redirection from the South to the East?" Journal of Comparative Economics, 31 (2002): 94-109.

Campos, N. F. and Coricelli, F. "Growth in Transition: What We Know, What We Don't, and What We Should", Journal of Economic Literature, 40 (2002): 793-836.

Campos, N, and Kinoshita, Y. "Why Does FDI Go Where it Goes? New Evidence from the Transitional Economies", International Monetary Fund. Working Paper 03/228. IMF (2003).

Cartensen, K., and Toubal, F. "Foreign Direct Investment in Central and Eastern European Countries: A Dynamic Panel Analysis", Journal of Comparative Economics, 32 (2003): 3-22.

Chakraborty, C. and Basu, P. "Foreign Direct Investment and Growth in India: A Cointegration Approach", Journal of Applied Economics, 34 (2002): 1061-73.

Chantasasawat, B, Fung, L.C., Iizaka, H., and Siu, A. "FDI Flows to Latin America, East and Southeast Asia and China: Substitutes or Complements?", Review of Development Economics, 14.3 (2010): 533-46.

Cheng, L. and Kwan, Y. "What are the Determinants of the Location of Foreign Direct Investment? The Chinese Experience", Journal of International Economics, 51 (2000): 379-400.

Danson, M., Hughes, E. M. "The Central and Eastern European Challenge for FDI: Lessons from the Celtic Periphery", Journal of East-West Business, 8 (2002): 85-101.

de Mello, L. R. "Foreign Direct Investment in Developing Countries and Growth: A Selective Survey", Journal of Development Studies, 34.1 (1997): 1-34.

Dignan, T. "Regional Disparities and Regional Policy in the European Union", Oxford Review of Economic Policy, 2 (1995): 64-94.

Dimelis, S. and Louri, H. "Foreign Ownership and Production Efficiency: A Quartile Regression Analysis", Oxford Economic Papers, 54.3 (2002): 449-69.

Dritsaki, M. C. and Adamopoulos A. "A Causal Relationship Between Trade, Foreign Direct Investment and Economic Growth for Greece", American Journal Of Applied Science, 1.3 (2004): 230-35.

Dunning, J. H. "Multinational Enterprises and the Global Economy", New York: Addison-Wesley (1993).

Facchini, G., and Segnana, M. L. "Growth at the EU Periphery: The Next Enlargement", Quarterly Review of Economics and Finance, 43 (2003): 827-62.

Galego, A., Veira, C., and Viera, I. "The CEECs as FDI Attractors: Are They a Menace to the EU Periphery?" Emerging Markets Finance and Trade, 40 (2004): 74-91.

Guimarães, P., Figueiredo, O., and Woodward, D. Agglomeration and the Location of Foreign Direct Investment in Portugal", Journal of Urban Economics, 47 (2000): 115-35.

Heritage Foundation. "Index of Economic Freedom 2010." New York.

Kaminski, B. "How Accession to the European Union has Affected External Trade and Foreign Direct Investment in Central European Economies", Mimeo, Univeristy of Maryland, College Park. (2000)

Kottaridi, C. "The 'Core-Periphery' Pattern of FDI-led Growth and Production Structure in the EU", Applied Economics, 37 (2005): 99-113.

Kuniholm, B. R. "Intervention and Underdevelopment: Greece During the Cold War", Journal of Modern Greek Studies, 9.2 (2010): 269-71.

Levin, J. H. "A Guide to the Euro", Houghton Mifflin Company, Boston, NY, 2-9 (2002).

Lankes, H. P. and Venerables, A. J. "Foreign Direct Investment in Economic Transition: The Changing Pattern of Investments", Economics of Transition, 4 (1996): 331-47.

Markusen, J. R. and Venerables, A. J. "Foreign Direct Investment as a Catalyst for Industrial Development. European Economic Review, 43.2 (1999): 335-56.

OECD. International Direct Investment Statistics Yearbook 1985-2009: Labor Costs. US: OECD (2010).

Resmini, L. "The Determinants of Foreign Direct Investment Into the CEECs: New Evidence From Sectoral Patterns", Economics of Transition, 8.3 (2000): 665-89.

Solow, R. "A Contribution to the Theory of Economic Growth", Quarterly Journal of Economics, 70.1 (1956): 65-94.

Tang, H. “Progress Towards a Unified Europe”, World Bank Development Group, Washington, DC (2000).

UNCTAD. “The World Investment Report 2010: Foreign Direct Investment Flows and Stocks.” New York (2010).

Wooldridge, J. M. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, Mass: MIT Press (2002).

World Bank. Various dates. International Development Statistics. Washington DC. World (2009):930-41.

Zhou, Y. and Lall, S. “The Impact of China’s FDI Surge on FDI in South-East Asia: Panel Data Analysis for 1986-2001”, Transnational Corporations, 14.1 (2005): 42-66.