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**Working Paper**

## Does the East Get What Would Otherwise Flow to the South? FDI Diversion in Europe

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**Kiel Working Paper No. 1061**

**Does the East Get  
What Would Otherwise Flow to the South?  
FDI Diversion in Europe**

by

**Claudia M. Buch  
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July 2001

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## **Does the East Get What Would Otherwise Flow to the South? FDI Diversion in Europe\***

### **Abstract:**

This paper examines the FDI flows towards two regions in the periphery of Europe: the Central and Eastern European countries (CEECs) and the countries of Southern Europe. We investigate whether evidence exists for FDI diversion from Southern Europe to the CEECs. A cursory observation of recent FDI trends might give rise to such claims of diversion. On the basis of gravity model equations, this paper compares the expected and actual FDI figures. The findings lead us to conclude that there is no evidence of FDI diversion between these two regions.

**Keywords:** European Integration, Transition Economies, FDI, Gravity Model.

**JEL classification:** F15 (Economic Integration), F21 (International Investment; Long-Term Capital Movements).

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## 1 The Issue

With their re-orientation towards Western Europe, the countries of Central and Eastern Europe (CEECs) have increasingly become the destination for considerable amounts of Foreign Direct Investment (FDI). Due to the prospects of EU membership, most CEECs have succeeded in attaining both institutional and political stability. Five CEECs including the Czech Republic, Estonia, Hungary, Poland, and Slovenia opened negotiations with the EU in March 1998 while five other CEECs – Bulgaria, Latvia, Lithuania, Romania, and Slovakia – began negotiations in February 2000. The very probable membership of the CEECs in the EU has already caused anticipatory investment in the region as investors seek to gain a foothold in potentially profitable future markets within the secure and predictable institutional setting of the EU.

This paper seeks to single out the determinants of FDI in Europe with the help of the gravity model approach using data on outward FDI for several OECD countries. On the basis of these regression results, we simulate the "expected" or "normal" FDI flows for Southern and Eastern Europe. Obtaining a conception of the magnitude of "normal" FDI flows towards the periphery of Europe is essential for determining the impact of European integration on market structures and

thereby on economic growth, employment, and adjustment requirements in the present EU as well as in the CEECs.

This paper's particular focus is on the issue of FDI diversion. The considerable FDI flows towards the CEECs have raised the issue whether investment flows previously destined for the relatively cheap labor markets of Southern Europe may have been diverted to Central and Eastern Europe (see, for instance, Baldwin et al. 1997). Indeed, cursory evidence has shown that FDI flows into some Southern European countries has tended to decline since the early 1990s while FDI flows to the CEECs have tended to increase over the same period (cf. Figure 1). Two interpretations of these reduced flows to Southern Europe are conceivable. On the one hand, stocks of FDI in Southern Europe might be approaching their equilibrium levels. Hence, since much of the stock adjustment has already taken place, FDI flows would be expected to decline. On the other hand, as new investment opportunities open in Eastern Europe, FDI flows might be attracted to those regions previously secluded behind the iron curtain. It is one goal of this paper to empirically discriminate between these two interpretations and to examine the prospects for FDI diversion from South to East.

We study the determinants of FDI flows and stocks, using data for the years 1990 through 1998. Based on these results, we then perform forecasts of FDI flows and stocks to Southern and Eastern Europe, which we compare to the actual levels of FDI. Our expectation would be that, to the extent that some

equilibrium adjustment processes are still taking place, FDI flows for the transition economies are *above* the average level of flows to countries with comparable attributes while the stocks should be *below* these values. For the Southern European countries, we might expect a similar, albeit quantitatively much less important catching-up effect as these economies are still relatively underdeveloped as compared to the average industrialized country. However, as our results below suggest, quite the opposite equilibrium adjusted process might indeed be taking place: FDI inflows have been "overshooting" for some time thereby pushing stocks of FDI over and above their long-run equilibrium, while inflows of FDI are now below their long-run average.

Our findings suggest that there is no strong evidence in favor of the hypothesis of FDI diversion from the South towards the East of Europe, at least as far as the aggregate levels of FDI are concerned. Rather, the fact that stocks of FDI in Southern Europe have already been exceeding their equilibrium levels seems to be behind the stylized fact that inflows of FDI have tended to level off.

The structure of the paper is as follows: Section II examines briefly the economic theory and literature concerning FDI flows, especially in the context of regional integration. Section III derives the determinants for FDI flows and stocks within Europe on the basis of the gravity model approach. Section IV sets out the simulations concerning the expected or "normal" FDI flows and stocks within Southern Europe and the CEECs and the comparison with the actual data. Section

V offers additional evidence with a focus on German FDI towards Southern Europe and the CEECs, taking a somewhat longer perspective in time by covering the past 20 years. Section VI concludes and suggests avenues for future research.

## **2 What Determines FDI? A Brief Survey of the Theoretical Literature**

Until recently, FDI flows were frequently examined within the conceptual framework of the OLI (ownership, location, internalization) model, introduced by Dunning (1958). This model suggests that firms are driven in the decisions to engage in direct investment abroad by the three factors of ownership, location, and internalization ultimately related to cost advantages, market access, and maintaining knowledge assets internally. However, the inadequacy of this OLI model in explaining what is observed in the real world has been repeatedly emphasized (cf. Di Mauro 1999). The OLI framework does explain why domestic firms choose to become multinationals as well as how factors at the firm level cause some industries to consist predominantly of multinationals. However, the model fails to explain important trends in FDI over the past three decades. Most notably, the OLI framework is not able to account for the surge of FDI among similar countries, such as the increasing volume of intra-industry investment



between the rich industrial countries at a time of falling trade barriers. As a result, the OLI framework has tended to be of limited value in explaining the effects of regional integration.

In response to these shortcomings, a so-called "new theory of FDI" has emerged seeking to apply the OLI model's and location advantages into general equilibrium models. In this "new theory", multinational corporations (MNCs) arise endogenously as FDI flows occur between two countries. Early approaches sought to explain the presence of MNCs as the result of differences in factor endowments (Helpman 1984, Helpman and Krugman 1985). More recently, other models have emerged seeking to explain both horizontal and vertical FDI flows. One line of thought, forwarded by Brainard (1993), is that multinational activity is driven not by factor endowment differences, but instead by a tradeoff between proximity and concentration advantages. The "proximity advantage" is derived from "firm-level" economies of scale where any type of knowledge capital activity (such as R&D) is transferable to affiliates, thus allowing MNCs to be closer to foreign markets. The "concentration advantage" is derived from traditional "plant-level" economies of scales, which make it more profitable to concentrate production in one location rather than to export. When proximity advantages outweigh concentration advantages, foreign investment will take

place, becoming more likely with higher tangible assets relative to the fixed costs of opening up an affiliate and with higher transport costs.<sup>1</sup>

The impact of economic integration on the pattern of FDI flows has in large part been explained in analogy to the Vinerian model of trade creation and trade diversion (Viner 1950). Whereas Viner demonstrates that regional integration effects can induce welfare enhancing increases in trade between partners to the trade agreement (trade creation) as well as welfare-diminishing declines in trade with potentially more efficient non-members (trade diversion), other economists have sought to explain integration and FDI flows in a similar manner.

Most notably, Baldwin et al. (1999) identify production shifting and market fragmentation as two potential integration effects. The production shifting effect works along similar lines as in the Viner model: if two of three countries join a regional integration agreement such as an economic union but the third does not, intra-union export sales rise, and the competitiveness of the rest of the world (the third country) diminishes. Accordingly, capital shifts from the rest of the world to the economic union, raising the capital stock within the union and diminishing capital stock in the rest of the world.

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<sup>1</sup> Similar frameworks using of proximity and concentration measures have been considered in Markusen (1995) or Kleinert (2001).

The market defragmentation effect involves advantages attained through competition and scale economies within a regional integration area.<sup>2</sup> In the model outlined by Baldwin et al. (1999), integrated market pricing serves to effectively equalize producer prices, eroding the advantages firms may have enjoyed in specific segmented markets. Accordingly, a pro-competitive effect is realized, which lowers the initially high profits in the integrated region, leads to the exit of firms, lowers average costs, and ultimately increases total production. Real income gains are realized through positive scale effects, which raise the average productivity of each nation's resources and induce capital formation. Ultimately, the increased attractiveness of the integrated region and the drop in total foreign production results in further investment diversion from the rest of the world to the integrated region. Similar lines of argument are also offered by Blomström and Kokko (1997) and Dunning (2000).

This theoretical approach can be applied to the economic geography of Europe where the different regions are subject to differing levels of production shifting and market desegmentation effects. While Southern Europe and the CEECs might be seen as roughly comparable in the wage and education level of labor, the CEECs still might be considered a less stable region than Southern Europe. With EU membership, uncertainty about the completion of transition may be reduced

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<sup>2</sup> These ideas are also set out in Haaland and Wooton (1992), and Baldwin and Venables (1995).

and the CEECs could conceivably divert some of the investment flows destined to Southern Europe towards the East.

The literature about FDI in the CEECs has been primarily concentrated until now on the link of progress in transition and FDI inflows, on the relationship between FDI and trade, or on the likely level of FDI flows. This paper will try to examine the extent of FDI diversion within Europe by making use of the methods for evaluating the likely level of FDI flows. This is done with the help of gravity models that are set out in the following section.

### **3 Determinants of FDI: Empirical Results**

Essentially, there exist two different ways of analyzing the determinants of FDI. Using firm-level data, factors such as labor costs, openness, and industrial concentration are likely to be relevant. For example, Resmini (2000), using firm-level data, finds that FDI stocks are largely determined by sector-specific considerations, though factors related to market size and strategic aspects tend to prevail. In the present paper, however, we are interested in the determinants of aggregate stocks of FDI and the possible effects of enlargement. Hence, the industry-level approach is not applicable for our analysis.

A second approach towards analyzing the determinants of FDI uses aggregate, country-level data. In the previous section, we have argued that factors such as

proximity and market size should make countries attractive locations for FDI. To date, one of the most robust methods for analyzing the importance of these factors is through use of the gravity model. While initially employed for empirical studies of trade theory, and indeed derivable from trade theory itself (Deardorff 1995, Anderson and van Wincoop 2001), the gravity model approach has been more recently applied to studies of FDI as a means of picking up the common determinants of FDI flows across countries (Brenton et al. 1999). The gravity equation of that model used in this study is of the form:

$$(1) \quad \ln X_{ij} = \alpha + \beta_1 \ln GDP_j + \beta_2 \ln (POP)_j + \beta_3 \ln Dist_{ij} + \beta_4 (Imp/GDP)_j \\ + \beta_4 (M2/GDP)_j + \sum \gamma_k D_{ij}$$

where  $X_{ij}$  is the value of the FDI flow from country  $i$  (home country) to country  $j$  (host country),  $GDP_j$  is the gross domestic product in the host country,  $POP_j$  is the population of the host country and  $Dist_{ij}$  is the distance between the two countries. Following Brenton et al. (1999), this model also takes into account the ratio of a country's GDP devoted to imports  $(IMP/GDP)_j$ . The variable  $(M2/GDP)_j$  is defined as the share of broad money to GDP.  $D_{ij}$  is a dummy variable for EU membership (1 for EU members). This equation draws on work by Buch and Piazzolo (2000) who examine the determinants of bank claims, portfolio investment, FDI and trade with the gravity approach.

In the formulation of the gravity model, the volume of FDI is explained by the size of the market, proxied by GDP and the country's population. Larger markets are expected to attract more FDI, and the coefficient on these two variables should thus be positive. Furthermore, it may be expected that firms will tend to prefer FDI to exports as trade costs, proxied by distance, rise. However, a negative coefficient on the distance variable might be expected since the costs of operating overseas affiliates are likely to rise as the distance from their domestic central headquarters increases.

The size of the financial system, as proxied by M2/GDP, is included as a measure of the host country's level of development. We would expect countries with more developed financial systems to be relatively more attractive for FDI. The share of imports of GDP is included as a proxy for the openness of a country for foreign trade, expecting a positive coefficient. In some cases, we found that the share of import measure is not significant, but that, instead, the total trade as percentage of GDP yields a significant coefficient.

Our empirical analysis proceeds in three steps. First, we calculate estimations for FDI flows for the four years of 1990, 1993, 1995, and 1997 for seven European countries (Austria, Belgium, France, Germany, Italy, the Netherlands, and the United Kingdom) and two non-EU countries (the United States and Japan). For each of these countries, we run cross-section regressions for bilateral FDI flows into up to forty-eight countries. These partner countries are given in

Table 1, the definition and the sources of the variables are presented in Table 2. In the second step, we use these estimates to perform out-of-sample forecasts for FDI flows to both the CEECs and to the southern members of the EU subsequently comparing these estimated flows to actual flows. We would expect that actual capital flows to Eastern Europe are above the expected flows because of the stock adjustment process that is still taking place. For Southern Europe, to the contrary, the stock adjustment should be less pronounced. Hence, actual and expected flows should be more closely aligned. Finally, we proceed to estimate equation (1) for the stocks of FDI and perform a similar simulation exercise as for the flows of FDI. Our expectation is that stocks of FDI in the transition economies are still somewhat below the expected values while no such discrepancy should be found for the Southern EU members. Overall, these comparisons also allow us to shed some light on the question whether FDI creation or FDI diversion has taken place, since the results would implicitly give an indication whether the decline in FDI flows to Southern Europe was due to completed stock adjustments or to the diversion of FDI away from Southern Europe.

Tables 3–6 summarize the results for the flow estimates. For 1990, coefficients for FDI outflows are in large part as predicted by theory (Table 3).<sup>3</sup> The GDP coefficient is positive where significant, but the population coefficient is significant (and negative) only in one case. The import coefficients are positive while the distance variable is negative for France, Japan, and Germany, the only instances where it is significant.

For 1993, coefficients for GDP are also mostly positive (Table 4). In two cases, trade/GDP is significant with positive coefficients while the import coefficient is significant in three other cases. In addition, distance variables show up significant in all eight countries, each with negative coefficients. Population coefficients turn up positive, where significant, in a pattern to be followed in 1995 as well.

For 1995, many of these characteristics remain the same (Table 5). GDP coefficients remain uniformly positive as do those for population. Coefficients for trade remain positive as do the coefficients for imports. The coefficient for M2/GDP, significant in two cases, is positive. Distant coefficients again remain negative in all cases.

Finally, the estimations for 1997 confirm several of the earlier results (Table 6). In this year, all GDP and import coefficients are positive while the distance

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<sup>3</sup> Lack of outflow data for Italy and the Netherlands results in the absence of estimations for these respective countries for 1990. If a regression for a country



coefficient remains uniformly negative. However, the coefficients for M2/GDP and population show mixed results. For population, the coefficients are negative for Germany and the UK, but positive for Japan. The M2/GDP coefficient is positive for Austria yet negative for France and the UK. Compared to previous years, the results are fairly consistent for Austria and Japan; however, for Germany and the UK, the coefficients are less robust.

The lack of robustness of some results underscores the importance of interpreting the coefficients carefully. This holds in particular for the data on FDI flows at which we are looking here. These figures may be considerably biased upward or downward in a particular year if, for instance, a large merger and acquisition deal has taken place or if a substantial portion of the domestic corporate sector has been privatized . Hence, we should not be surprised to see some instability in the coefficients over time. However, the fact that the coefficients are in a reasonable range on average and are consistent with economic theory strengthens our confidence that we are not too far off the mark.

We also experimented with a measurement of investment risk as offered by the World Bank's Euromoney country credit-worthiness rating for the year 1997 (World Bank 2000). Since a country's rating can be expected to be closely correlated to some of the other variables that we have included, we used both the

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does not yield any significant coefficients, the country is not included in the tables, e.g. Austria in the years 1990, 1993 and 1995.

rating itself as well as the residual of a regression of the rating on the other variables. Irrespective of the specification used, however, the inclusion of this variable yielded no substantial change in the estimated coefficients. The rating variables did indicate negative signs, but proved to be insignificant in both methods. Though the absence of a consistent risk measure across each year precluded the use of a risk measure in the estimations for earlier years, the minimal impact of the risk variable on the results for 1997 indicate that the absence of this measure does not introduce a significant bias in our results.

## **4 Simulation of FDI Flows**

After finding the determinants for outflows of FDI from the eight source countries analyzed, we proceed to use data from the accession countries (as well as Russia) to examine the difference between actual FDI stocks and flows compared with those that would be expected based on the empirical model described above. Technically speaking, we perform out-of-sample forecasts of FDI flows to these countries. The same methodology is also applied for the Southern EU countries (Spain, Portugal, and Greece).

For the CEEC countries (Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia and Russia), meaningful data for FDI flows are available for the years 1993, 1995, and 1997. For the Southern European

countries, the out-of-sample forecasts are possible for the years 1990, 1993, 1995, and 1997. Results are reported as the ratio of the actual to the simulated values in Tables 7 to 13. Averages for each of the countries are noted at the bottom of the tables with "adjusted average" referring to the average calculation minus any egregious outliers.<sup>4</sup>

#### 4.1 Results for the Different Years

For 1990, only calculations for Southern Europe are possible. The simulation for FDI flows indicates that Spain and Portugal received more FDI than expected – roughly 193% and 115% respectively – while Greece received only 53%.

The year 1993 provides the first opportunity to make comparisons between the two regions. The adjusted averages for the CEEC countries indicate that only Hungary accumulated more FDI flows than expected. The other countries received inflows on average between the 3% and 80% range. The calculations for Southern Europe indicate that Spain attracted about 267% of the total expected FDI inflows while Portugal and Greece attracted 62% and 35%, respectively.

Calculations for the year 1995 in the CEECs show similar orderings of FDI inflows as in 1993. In this year, only Hungary and the Czech Republic attracted

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<sup>4</sup> The respective data sources are reported in Table 2. Outliers are denoted in the tables by an asterisk (\*) appearing to the right of the value. Results that are negative or at least four times the size of the average are considered outliers.

more FDI than expected. However, each of the other CEECs showed increases in their ratios of actual to expected FDI inflows. The results for Southern Europe in 1995 show a downward shift in inflows for Spain with slight increases for Portugal and Greece.<sup>5</sup> Adjusted averages highlight that Spain received about 130% of expected flows, while Portugal received 67%. The ratio for Greece increased from 35% in 1993 to 47% in 1995.

The inflows in 1997 show an impressive increase in flows towards the CEECs as towards the countries of Southern Europe. Inflows for the CEECs were nearly all above 120%, with the exceptions of Slovakia and Bulgaria. Poland, Hungary, Romania, and Russia saw the largest inflows relative to the expected values, followed by the Czech Republic and Slovenia. In Southern Europe, inflows slightly decreased in Spain from the adjusted average of about 130% in 1995 to just over 123% in 1997. The ratio of actual to expected inflows in Portugal increased significantly reaching 141%, as well as increased in Greece to 54%.

## 4.2 Overall Comparison between Eastern and Southern Europe

While it must be remembered that the modeling procedure employed in this studies is analogous to photographic snapshots of a particular state of affairs at

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<sup>5</sup> Corado (2000) notes that the Single Market Programme in the early 1990s resulted in exchange rate stability which may have caused "FDI de-location" from Spain and Portugal to the larger economies of Europe.

a particular point in time, it is useful to compare these snapshots side-by-side. Accordingly, Figure 2 shows graphically the results of our out-of-sample forecasts over time. Time is displayed on the horizontal axes with the forecast averages, expressed in percentage terms, on the vertical axes. The results for the CEECs are averaged in two groups: the advanced CEECs with the largest FDI inflows (CEE1), consisting of the Czech Republic, Hungary, and Poland, and the other CEECs (CEE2), consisting of Bulgaria, Slovakia, Slovenia, Romania, and Russia.

For the countries of Southern Europe, there does not appear to be a uniform pattern in the manner in which the ratio of actual to estimated inflow change. For Spain, a relatively high ratio in 1990 of nearly 200% peaks in 1993 only to decline to around 130% in 1995 and 124% in 1997. Thus, Spain receives more FDI inflows than expected in each year under consideration. For Portugal, the ratio steadily declines from a little over 100% to around 50% in 1993 and 1995, only to rebound for 1997 to more than 140%. In Greece, the adjusted averages tend to hover around the 50% mark in all years. For the countries of Eastern Europe, the pattern appears to be that of increase. For the CEE1 countries, the ratio begins at around 100% and steadily increases thereafter. The CEE2 average remains below 100% for 1993 and 1995 but increases to 162% in 1997.

### 4.3 Interpretation

For an interpretation of the estimation results based on the gravity model, it is useful to recall the raw FDI data represented in chapter 1. Figure 1 indicated that Spain and Greece had generally experienced a flattening out of inflowing FDI during the 1990s, while Portugal had experienced a dip in FDI inflows followed by increases from 1996-1998. The corresponding graphs for the two sets of CEEC countries showed an increase in FDI towards Eastern Europe. Consequently, these graphs of raw FDI data might be taken as indication of investment diversion from Southern to Eastern Europe.

The estimations based on the gravity model approach tell, however, a different story. The actual FDI flows towards Spain in all the examined years of the 1990s were considerable higher expected. The actual FDI inflows towards Greece relative to the expected ones has remained quite constant for the observed periods. Only Portugal experienced a certain decline for two examined years, but the actual FDI inflows for 1997 were one and a half of the expected ones. Consequently, the gravity model based analysis does not suggest that Eastern Europe's increase in FDI inflows had a correlated adverse impact on the Southern Europe.

As mentioned before, the derived estimations from a gravity model require a certain level of caution during interpretation; however, the results can be taken as

indication that the Southern European countries suffered no great diminution of FDI below their expected inflows due to the flows towards Eastern Europe. It might be rather the case that the development of FDI inflows can be seen as the convergence of the FDI stock to its long run steady state. Since the Southern European countries have received substantial FDI before 1990, the likely decrease of FDI inflows merely coincided with the FDI flows towards the CEECs with the process of transition.

This hypothesis can be tested by an examination of the actual FDI stock in percentage of the simulated FDI stock for 1998. Using the same approach as for the FDI flows and employing the derived regression coefficients for FDI stock data from Buch and Piazzolo (2000), we have simulated the expected FDI stocks in the CEECs and the Southern European countries. Data limitations preclude the use of bilateral FDI data; therefore, these estimations are made using the total FDI stock in the countries as given by the OECD (2000).

Figure 3 shows that most of the CEECs have not yet reached their expected FDI stock level. Only Hungary comes close to the simulated level. Remarkably, but not surprisingly, Russia has received less than 20% of its expected FDI stock by 1998. The actual FDI stock in the Southern European countries are much closer to their expected level than in the CEECs. Spain has attained 120% of the expected FDI stock and Portugal as well as Greece reach up to 80% of their expected levels.

## 5 Long-Term Adjustment Processes: Evidence from German Data

The evidence that we have presented so far has shown only the short-term adjustment processes of FDI flows during the 1990s as well as the divergence from "equilibrium" levels towards the end of the decade. In an additional step, we use evidence on the stock of German FDI abroad to trace the adjustment process that has taken place during the past two decades. For this purpose, we estimate a slightly modified equation:

$$(1') \quad \ln X_{ij} = \alpha + \beta_1 \ln (\text{GDP per capita})_j + \beta_2 \ln (\text{POP})_j + \beta_3 \ln \text{Dist}_{ij} \\ + \beta_4 \ln (\text{Trade})_{ij}$$

where *Trade* denotes the bilateral trade between Germany and the respective partner country. In contrast to the analysis above, we distinguish directly between the level of development (GDP per capita) and market size (population).

We run this regression for 18 years (1981-1997) individually, using a cross-section of up to 37 countries (including both the Southern members of the EU and the accession states Czech Republic, Hungary, and Poland). Based on these regressions, we perform out-of-sample forecasts for the six countries and



compare these to the actual levels of FDI in the respective years. Figure 4 plots the resulting time series,<sup>6</sup> i.e. the residuals for each country.

The results clearly show that a stock adjustment process has taken place. In Southern Europe, German FDI clearly exceeded the levels that we would have expected on the basis of our estimations in the early 1980s. This holds for Portugal and, in particular, Spain. When the two countries officially joined in the EU in 1986, they had attracted FDI from Germany which was two to four times higher than one would have expected for countries of a similar state of development, size, and distance from Germany. Although the sharp adjustment in 1983/1984 might to some extent be a statistical artifact because the estimations for the beginning of the sample period rely on a relatively small number of observations (around 20), the estimations do correspond to the popular view that expected EU membership in the case of Spain and Portugal has triggered a substantial amount of anticipatory FDI. One could thus argue that FDI into Spain and Portugal had been overshooting initially. Subsequently, a gradual downward adjustment to the long-run equilibrium has taken place, which does not seem to have had accelerated after the start of the reform process in Eastern Europe.

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<sup>6</sup> In this section, we alter the set up of the forecasting exercise slightly compared to that before because too many degrees of freedom are lost without including the Southern and Eastern European countries. Hence, we now present within-sample-forecasts.

No such overshooting effect has been visible for Greece. At the time of its EU membership in 1981, Greece had attracted slightly more FDI from Germany than one would have expected. However, in the immediate post-accession period, this stock has been adjusted, and German FDI in Greece have, at least since the mid-1980s, been below-average.

The picture for the transition economies of Central and Eastern Europe appears almost as a mirror-image of the pattern observed in Portugal and Spain. Until the beginning of the transition period, stocks of German FDI stood at less than 20 percent of what would have been expected for economies with the similar characteristics as Hungary and Poland. While FDI into Hungary rapidly took off in the early 1990s and reached 100 percent of its expected level already in 1992, the adjustment process in Poland was much more gradual. By 1998, German FDI in Poland just exceeded its expected level while FDI in Hungary was coming down but still remained above its long-run equilibrium level. The Czech Republic lies somewhat in between these two cases. At least since 1993, the stock of German FDI has been very close to its expected level, and it has remained practically unchanged since then.

As in the case of Portugal and Spain, one could argue that Hungary has experienced a positive "anticipation" effect of future EU membership but that expectations were realigned somewhat later on. Of course, however, in the case of the transition economies, a number of additional factors are at play which we

have not captured in our gravity model. Most notably, the timing of the privatization process has had an important impact on the time pattern of FDI inflows. The fact that Hungary has started prior to Poland to sell state-owned enterprises to foreign investors is thus an important explanation for the "overshooting" of FDI.

These results are interesting for at least three reasons. First, in the long run, the fact that the forecast error that we make is relatively small which strengthens our confidence in the gravity model that we have used. Second, the estimates also show that adjustment processes can be fairly long, and that it might take more than a decade before equilibrium levels of FDI are reached. Finally, on the basis of these results, there is no reason to believe that the inflows of FDI into the transition economies of Central and Eastern Europe, which have started in the early 1990s, have caused a significant amount of FDI diversion away from the Southern EU members. Stocks of FDI in these countries have come down and are now tracking their equilibrium levels more closely, but this process has started ahead of the entry of the transition economies into international capital markets and has not accelerated since then.

## 6 Conclusions

This paper has examined the issues surrounding FDI diversion in Europe in the context of EU accession and the transition process in the CEECs. Generally, we do not find convincing evidence that a process of FDI diversion away from Southern towards Eastern Europe has taken place.

The recent increase of FDI towards the CEECs and the simultaneous leveling off of FDI flows into the Southern European countries rather seems to reflect an adjustment process towards a long run equilibrium. With the help of the gravity model approach, we were able to derive a normalized yardstick for the expected FDI flows and stocks. Simulations for FDI flows indicated that while the Southern European countries experienced a decline in flows relative to expected flows during the mid-1990s, by 1997, only Greece received less FDI inflows than expected. Our comparisons with actual data lead us to the conclusion that the Southern European countries are already quite close to their expected FDI holdings and therefore now attract only relatively small amounts of FDI inflows. In contrast, the CEECs continue to build up their FDI stocks and therefore currently receive relatively large FDI inflows.

Future research into this area might seek a better modeling procedure aimed at investigating FDI flows on a sectoral level. The work of Resmini (2000) which examines patterns of FDI in various sectors of the CEEC's might serve as a

useful starting point, though data for such analyses is scarce. Studies such as Estrin et al (1997) highlight firm-level factors which induce foreign direct investment, many of which differ by firm despite investment in the same countries. Future research might also experiment with additional variables attached to the gravity model, such as those measuring human capital in the hope of capturing a greater understanding of FDI determinants on the general level. An analysis using disaggregated FDI data, considering the incidence of greenfield, takeover, or brownfield investments, could also be quite insightful.

We continue to stress that the gravity model approach requires caution and that the numerical results of our analysis should merely be considered first approximations. Nevertheless, in light of these restrictions, our findings do suggest a rejection of the hypothesis of FDI diversion from the South to the East of Europe.

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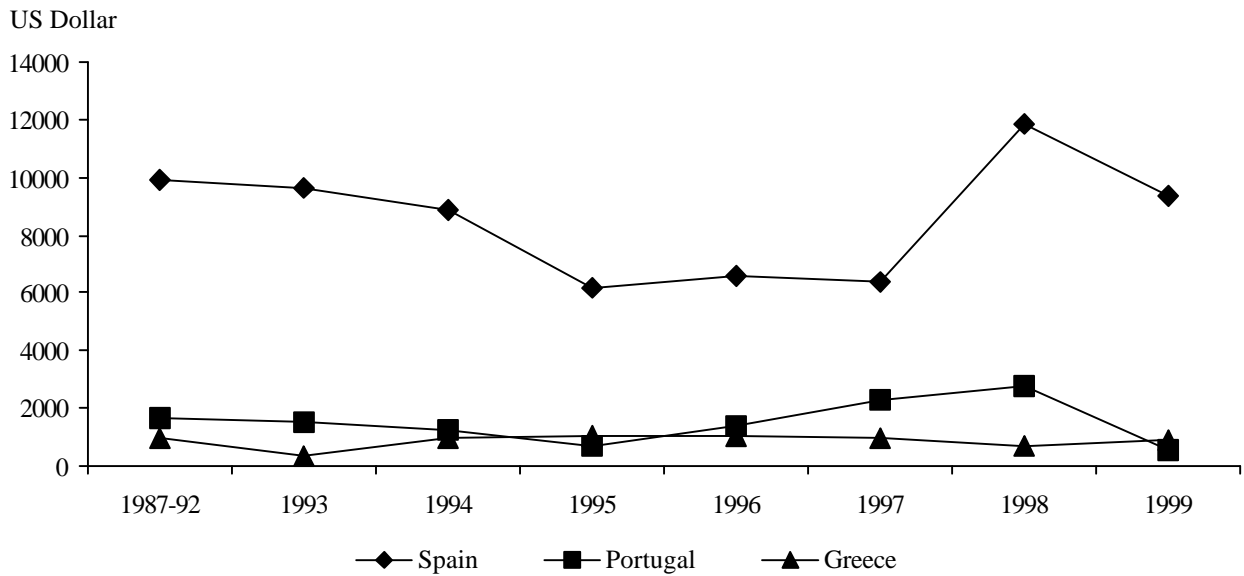
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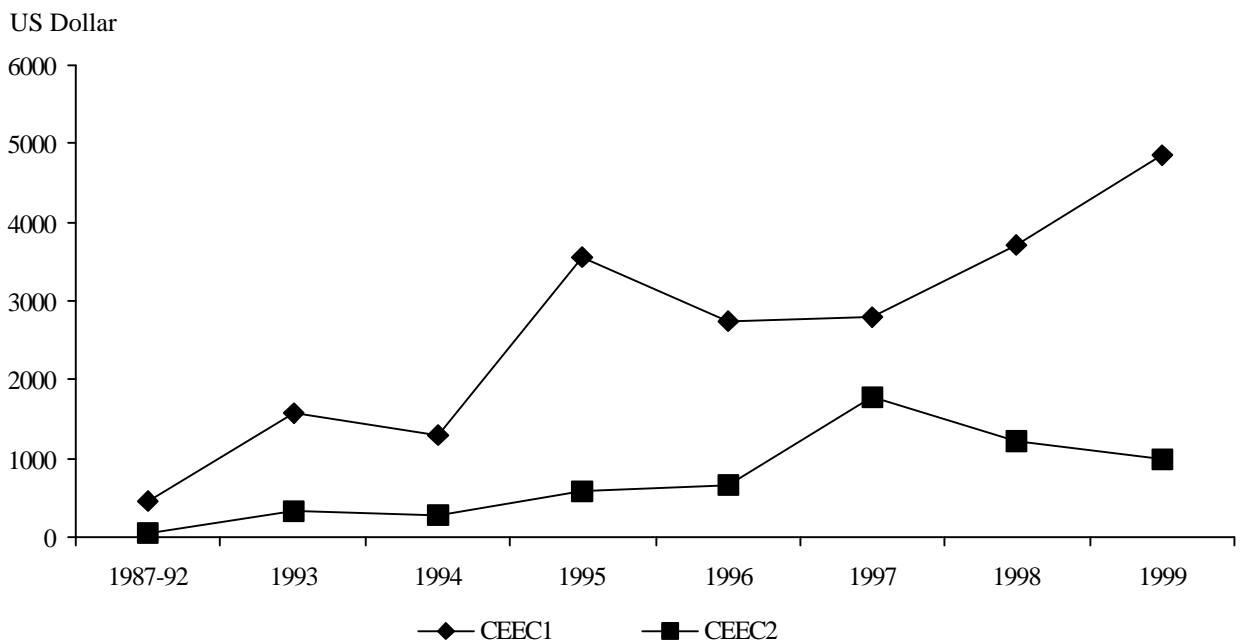
*Figure 1: FDI Inflows Over Time*

These graphs present actual dollar values of FDI inflows into Southern and Central and Eastern Europe from 1987 to 1999. The group CEEC1 includes the Czech Republic, Hungary, and Poland, whereas the group CEEC2 includes the countries Bulgaria, Slovakia, Slovenia, Romania, and Russia. The year 87-92 represents the annual average of FDI inflows for the years 1987 through 1992 reported by the World Investment Report.

a) Southern Europe



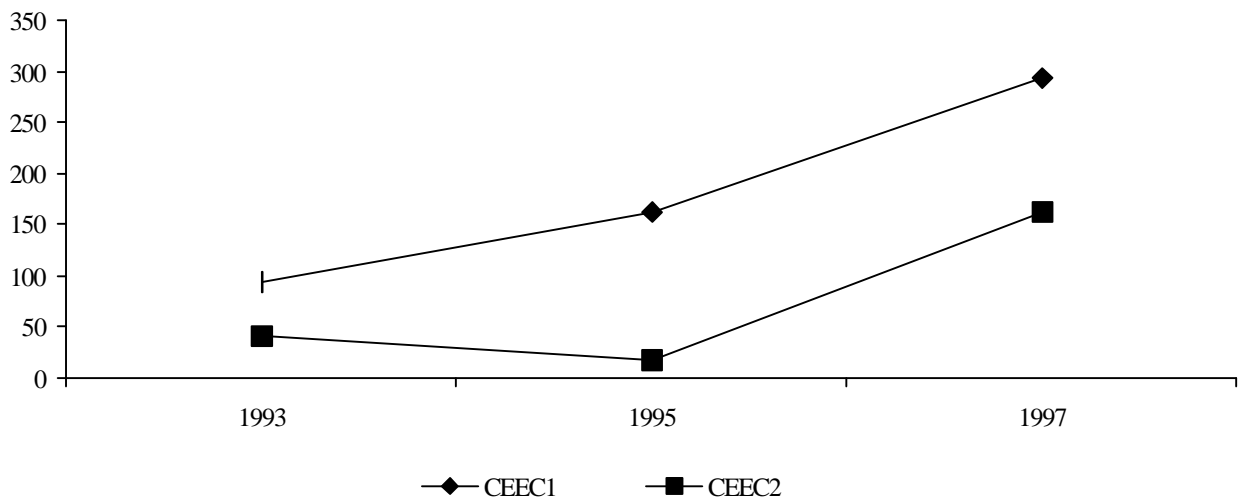
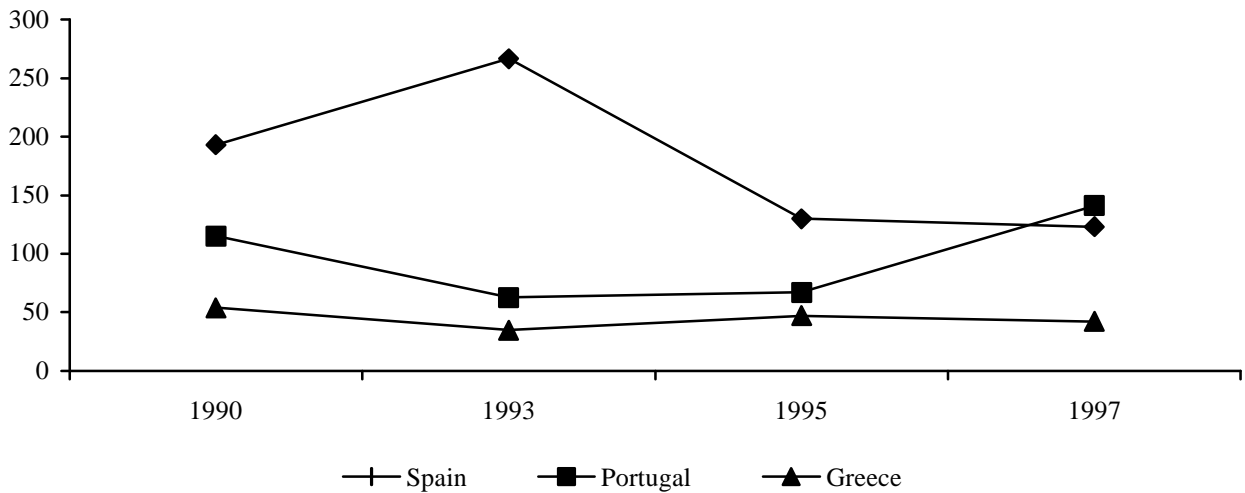
b) Central and Eastern Europe



Source: United Nations: World Investment Report, 1998, 1999, 2000.

*Figure 2: Actual FDI in % of Forecasted FDI*

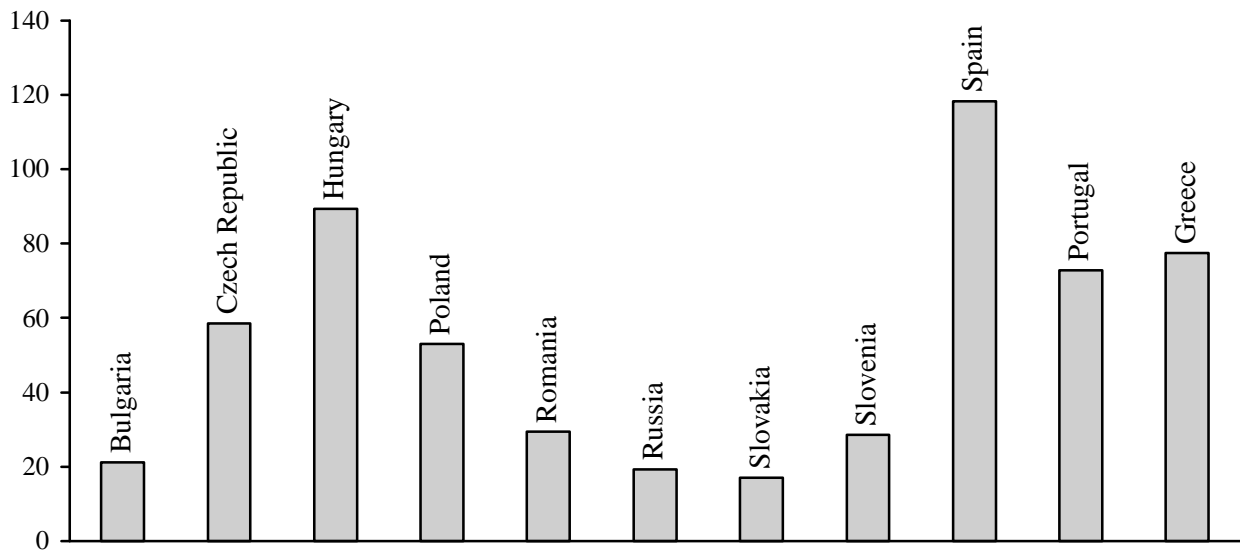
These figures graphically present the results of our simulations of FDI flows for the years 1990 (in Southern Europe only), 1993, 1995, and 1997. Using the determinants of FDI displayed in Tables 3-6 to generate expected values of FDI inflows, we divide the actual amount of FDI flows received by the expected value. Accordingly, the results presented in these graphs reflect FDI inflows as a percentage of expected inflows. The values plotted reflect the "adjusted average" values described and displayed in Tables 6-13. "Central and Eastern Europe: Group 1" includes the Czech Republic, Hungary, and Poland, whereas "Central and Eastern Europe: Group 2" includes the countries Bulgaria, Slovakia, Slovenia, Romania, and Russia.



Source: Own calculations.

*Figure 3: Simulations of FDI Stocks, 1998*

This graph presents results of simulations of FDI stock in the CEECs and countries of Southern Europe for the year 1998. Using the gravity model in Buch and Piazzolo (2000) to find the determinants of FDI stock, this graph presents the quotient of the actual value of FDI stock over the expected value in percentage terms. That is, the graph reflects the FDI stock in the countries as a percentage of simulated stock given by the model.

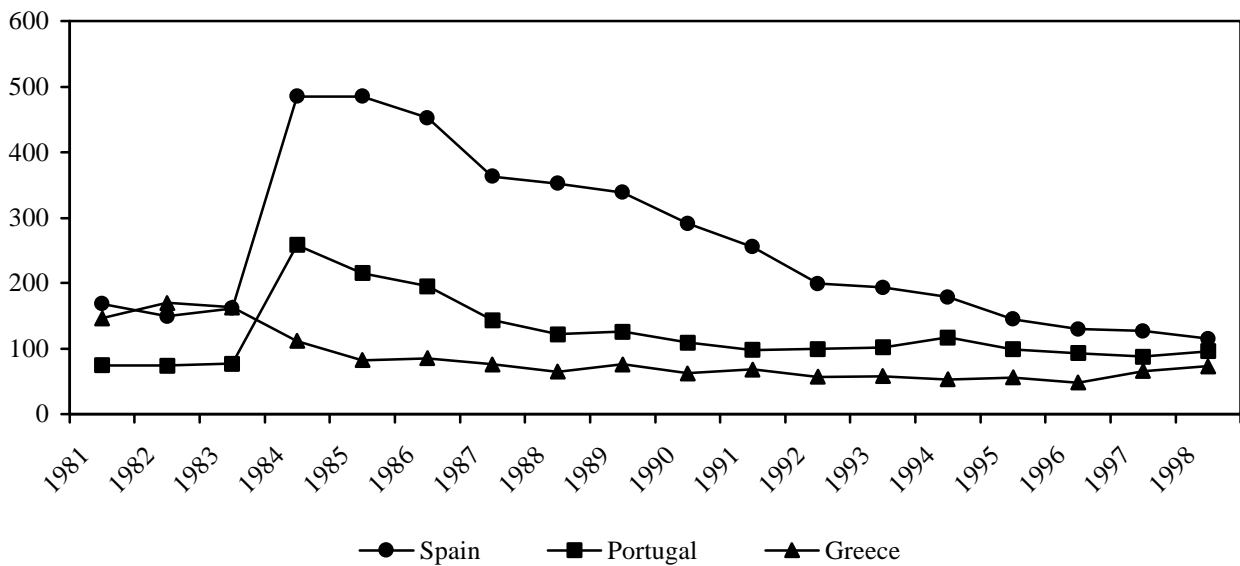


Source: Own calculations.

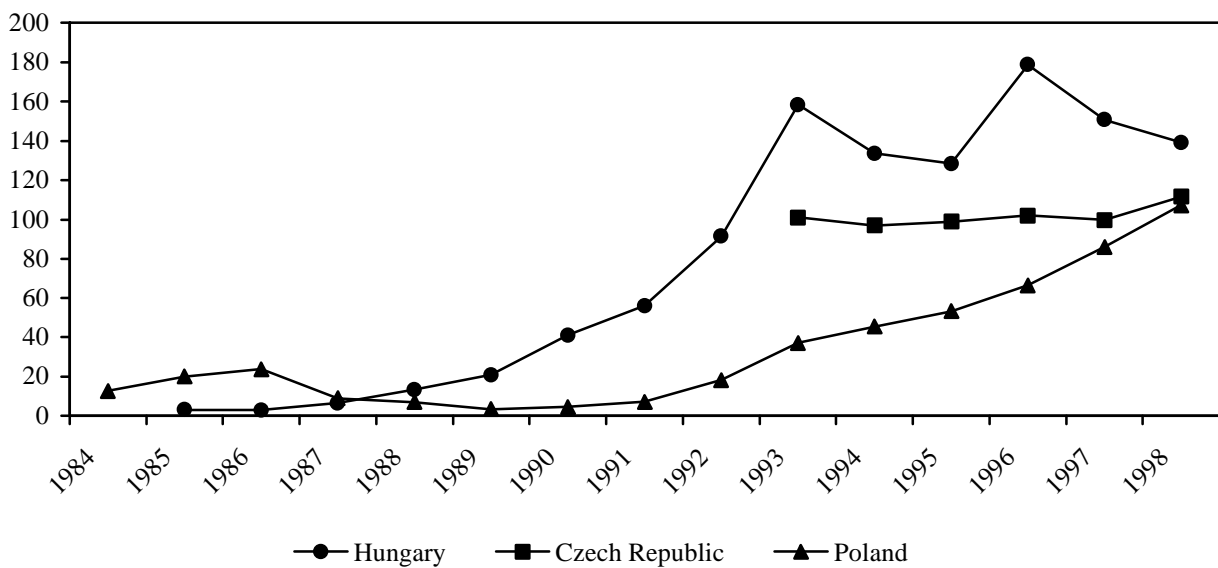
Figure 4: Actual FDI of Germany in % of Forecast

These graphs present the results of FDI stock simulations for Germany between 1981 and 1998. Using a gravity model of the form:  $\ln X_{ij} = \alpha + \beta_1 \ln (\text{GDP per capita})_j + \beta_2 \ln (\text{POP})_j + \beta_3 \ln \text{Dist}_{ij} + \beta_4 \ln (\text{Trade})_{ij}$ , the determinants of FDI stock are derived and used to produce expected levels of outward FDI stock. The actual values of simulated FDI outward stock are divided by the simulated values and are plotted on the graphs as FDI outward stock as a percentage of simulated outward stock.

a) Southern Europe



b) Eastern Europe



Source: Deutsche Bundesbank (various issues), own calculations.

*Table 1: Country Sample*

Algeria	Iran	Philippines
Argentina	Ireland	Saudi Arabia
Australia	Israel	Singapore
Austria	Italy	South Africa
Belgium	Japan	Sweden
Brazil	Korea	Switzerland
Canada	Kuwait	Thailand
Chile	Liberia	Turkey
China	Luxembourg	United Arab Emirates
Hong Kong	Malaysia	United Kingdom
Colombia	Mexico	United States
Denmark	Morocco	Venezuela
Egypt	Netherlands	
Finland	Netherlands Antilles	
France	New Zealand	
Germany	Norway	
India	Pakistan	
Indonesia	Peru	

*Table 2: Data Definitions and Sources*

Variable	Definition	Source
Foreign Direct Investment	international direct investment to or from another country; includes inflows, outflows and inward stock in millions of US-dollars	IMF (2000) OECD (2000) UN (1999)
EU	dummy variable for EU members	
GDP	gross domestic product converted into millions of US-dollars with average annual exchange rate of the national currency to the US-dollar at the end of each year	IMF (2000)
Population	Population size in millions	IMF (2000)
M2	Broad money; converted to millions of US-dollars using average annual exchange rate of the national currency	IMF (2000)
Imports	merchandise imports in millions of US-dollars	IMF (2000)
Trade	total imports plus exports in millions of US-dollars	IMF (2000)
Distance	the shortest line between two countries' capital cities in terms of miles	kindly provided by Dieter Schumacher, German Institute of Economic Research (DIW)

*Table 3: Determinants of Foreign Direct Investment: Outflows (1990)*

Tables 3-6 present the coefficients and t-statistics (in parentheses) for our estimations of FDI outflow determinants in the years 1990, 1993, 1995, and 1997, respectively. The gravity equation, estimated using bilateral data, is of the form:

$$\ln X_{ij} = \alpha + \beta_1 \ln GDP_j + \beta_2 \ln (POP)_j + \beta_3 \ln Dist_{ij} + \beta_4 (Imp/GDP)_j + \beta_5 (M2/GDP)_j + \sum \gamma_k D_{ij}$$

where  $X_{ij}$  is the value of the FDI flow from country  $i$  (home country) to country  $j$  (host country),  $GDP_j$  is the gross domestic product in the host country,  $POP_j$  is the population of the host country and  $Dist_{ij}$  is the distance between the two countries. Following Brenton et al. (1999), this model also takes into account the ratio of a country's GDP devoted to imports  $(IMP/GDP)_j$ . The variable  $(M2/GDP)_j$  is defined as the share of broad money to GDP.  $D_{ij}$  is a dummy variable for EU membership (1 for EU members). White-heteroscedasticity consistent standard errors are reported for equations with heteroscedastic errors. In addition, \*, \*\*, and \*\*\* denote values significant at the ten, five, and one percent levels, respectively.

	Belgium	France	Germany	Japan	UK	US
Constant	-6.74*** (-3.45)	0.65 (0.18)	-11.49*** (-3.02)	5.98* (1.66)	-3.50** (-1.69)	1.77* (1.59)
Log GDP	0.77*** (4.66)	0.79*** (3.46)	1.62*** (7.69)	0.63*** (3.50)	0.60*** (3.42)	0.47*** (4.54)
Log population						-0.31** (-2.00)
M2/GDP			-1.43** (-1.29)			
Imports/GDP	0.02*** (3.74)	0.01* (1.81)	8.76 (3.88)	0.02*** (3.36)	2.34*** (5.24)	0.01** (2.82)
Trade/GDP						
Distance		-0.75*** (-3.82)	-0.67*** (-3.32)	-0.68** (-2.06)		
EU	3.00*** (3.33)				1.48** (2.38)	
R <sup>2</sup>	0.71	0.60	0.79	0.31	0.45	0.37
Jarque Bera (prob.)	0.35	0.29	0.71	0.28	0.95	0.17
White (prob.)	0.67	0.83	0.67	0.62	0.37	0.63
Number observ.	22	36	27	29	26	26

Table 4: Determinants of Foreign Direct Investments: Outflows (1993)

	Belgium	France	Germany	Italy	Japan	Netherlands	UK	US
Constant	-0.94 (-0.25)	9.20*** (4.83)	5.47** (1.69)	10.60*** (3.13)	8.29** (1.93)	5.65*** (3.43)	7.81*** (4.82)	14.48*** (5.18)
Log GDP	0.87*** (3.11)	0.25** (2.56)	0.31 (1.63)		0.25** (1.93)	0.34*** (3.32)		0.20*** (2.98)
Log population					0.39 (1.25)	0.23 (1.18)	0.30 (1.16)	
M2/GDP							0.48*** (4.71)	0.33*** (3.58)
Imports/GDP		0.72** (2.56)	1.01** (2.02)		1.46*** (2.90)			
Trade/GDP	1.52*** (2.81)					0.83** (2.27)		
Distance	-0.99*** (-4.44)	-0.78*** (-4.22)	-0.73*** (-3.21)	-1.06*** (-2.55)	-0.98** (-2.10)	-0.90*** (-6.20)	-0.49** (-2.27)	-1.23*** (-3.98)
EU			1.75*** (2.78)	1.39 (1.17)				
R <sup>2</sup>	0.63	0.38	0.58	0.43	0.26	0.54	0.16	0.27
Jarque Bera (prob.)	0.84	0.82	0.69	0.45	0.72	0.37	0.89	0.86
White <sup>a</sup> (prob.)	0.32	0.15	0.49	0.01***	0.67	0.76	0.68	0.68
N	20	32	32	26	32	28	31	32

Table 5: Determinants of Foreign Direct Investments: Outflows (1995)

	Belgium	France	Germany	Italy	Japan	Netherlands	UK	US
Constant	-0.97 (-0.72)	1.80 (0.41)	6.38* (1.96)	-13.09*** (-5.42)	-1.98 (-0.81)	2.06* (1.77)	-1.38 (-0.38)	9.18** (2.39)
Log GDP	0.84*** (3.94)	0.61** (2.22)	0.28 (1.35)	1.20*** (6.55)	0.37** (2.17)	0.19* (1.91)	0.36 (1.27)	0.55*** (3.45)
Log population			0.62** (2.29)		0.62 (2.66)		0.31 (1.05)	
M2/GDP					1.35 (1.18)		2.02 (1.45)	
Imports/GDP			1.31* (1.69)	1.65** (2.74)	2.52*** (4.10)		2.56** (2.86)	1.06** (2.01)
Trade/GDP	1.16*** (4.38)	0.73** (2.64)				0.57** (2.33)		
Distance	-0.83*** (-4.65)	-0.72*** (-3.30)	-0.87*** (-4.52)					-1.12*** (-3.24)
EU				2.40** (3.53)		1.07* (1.69)	1.65** (2.60)	
R <sup>2</sup>	0.66	0.42	0.51	0.69	0.40	0.18	0.33	0.46
Jarque Bera (prob.)	0.43	0.78	0.29	0.82	0.80	0.55	0.75	0.77
White <sup>a</sup> (prob.)	0.61	0.03**	0.84	0.20	0.66	0.68	0.83	0.65
N	25	36	33	25	29	30	31	37



Table 6: Determinants of Foreign Direct Investment: Outflows (1997)

	Austria	Belgium	France	Germany	Italy	Japan	Netherlands	UK	US
Constant	-0.06 (-0.01)	-9.21** (-2.34)	-2.73 (0.80)	-5.64** (-2.44)	-11.26*** (-5.24)	-2.12 (-0.44)	-6.98** (-2.39)	-5.89** (-2.55)	4.53 (1.18)
Log GDP	0.60** (2.43)	0.97*** (3.18)	1.01*** (5.59)	1.11*** (9.27)	1.15*** (7.17)	0.81*** (3.16)	0.93*** (4.42)	1.08*** (5.79)	0.81*** (3.75)
Log population						0.45 (1.42)		-0.38** (-2.23)	
M2/GDP	1.34* (1.75)		-1.34 (-1.28)					-1.16* (-1.86)	
Imports/GDP			2.28** (2.31)	1.83** (2.56)	2.01** (2.12)	3.11*** (2.94)	2.06* (1.83)	2.00* (1.70)	2.01*** (5.61)
Trade/GDP									
Distance	-0.82*** (-3.33)		-0.56*** (-3.09)	-0.39*** (-2.79)		-0.58 (-1.48)			-0.94*** (-3.41)
EU		3.34*** (5.32)			1.13 (1.47)		0.78 (1.58)		
R <sup>2</sup>	0.55	0.55	0.63	0.67	0.58	0.49	0.48	0.42	0.55
Jarque Bera (prob.)	0.72	0.99	0.84	0.61	0.18	0.42	0.15	0.42	0.89
White <sup>a</sup> (prob.)	0.52	0.20	0.47	0.45	0.12	0.21	0.69	0.67	0.40
N	25	26	34	30	35	30	29	35	32

*Table 7: Simulation Results: Foreign Direct Investment (1993)*

Tables 7–9 present the results of our simulations for FDI outflows in the CEECs for the years 1993, 1995, and 1997, respectively. Using the determinants of FDI flows derived above, we estimate the expected outflows from the countries in the left column to the countries of CEECs. We then divide the actual value of bilateral FDI received by this simulated value, and present the results as the percentages listed in the table. Thus, the values represent the actual FDI flow received as a percentage of that which would be expected by our model. These percentages are then averaged below. We consider those percentages that are negative or four times the value of the average to be outliers; therefore, these values, where they exist, are discarded and a new “adjusted average” is calculated. Outliers are denoted with a \*.

	Bulgaria	Czech Republic	Hungary	Poland	Romania	Russia	Slovakia	Slovenia
	<i>FDI flows to transition countries: Actual in % of simulated</i>							
Belgium	409.89*	64.71	970.01*	153.43	5.17	292.92*	23.38	9.27
France	0.01	10.75	10.86	-0.01*	1.32	2.14	1.46	0.00
Germany	9.83	236.23	577.73	207.46	8.49	26.76	55.34*	77.07*
Italy	1.72	23.38	99.20	925.15*	8.47	25.96	1.74	6.56
Japan	2.70	12.74	151.86	7.06	1.89	11.41	2.65	4.21
Netherlands	2.56	75.79	200.89	77.51	2.14	-13.46*	1.42	1.71
United Kingdom	5.25	3.06	9.32	5.35	5.35	4.52	0.46	0.72
United States	0.00	3.71	152.59	24.37	4.51	36.27	0.00	0.00
Average	53.99	53.79	271.56	175.04	4.70	48.32	10.81	12.44
Adjusted average	3.15	53.79	171.78	79.21	4.70	17.84	4.44	3.21

Table 8: Simulation Results: Foreign Direct Investment (1995)

	Bulgaria	Czech Republic	Hungary	Poland	Romania	Russia	Slovakia	Slovenia
	<i>FDI flows to transition countries: Actual in % of simulated</i>							
Belgium	83.69	68.73	918.19	9.77	52.34	13.62	0.00	16.92
France	6.76	292.05	103.59	100.63	13.03	52.80	3.95	9.62
Germany	3.73	84.35	283.27	89.39	14.19	36.84	19.40	0.00
Italy	173.47	537.46	4190.46*	51.28	702.56*	45.22	16.11	10.51
Japan	1.92	12.76	34.24	1.43	2.95	2.15	1.04	0.00
Netherlands	1.30	979.02*	259.83	262.54	65.74	21.07	25.72	1.99
United Kingdom	-3.64*	5.04	17.63	20.34	13.68	2.19	9.09	0.00
United States	5.70	-1.47*	143.28	11.47	-3.40*	61.32	-0.01*	0.00
Average	34.11	247.25	743.81	68.36	107.64	29.40	9.42	4.88
Adjusted average	17.18	166.73	251.43	68.36	26.99	29.40	10.77	4.88

Table 9: Simulation Results: Foreign Direct Investment (1997)

	Bulgaria	Czech Republic	Hungary	Poland	Romania	Russia	Slovakia	Slovenia
	<i>FDI flows to transition countries: Actual in % of simulated</i>							
Austria	396.45	591.41	969.38	1274.74*	1051.57	712.31	106.69	459.56
Belgium		0.00	7914.78*	633.85	264.73	518.68	851.33*	50.56
France	2.84	112.19	54.81	106.38	312.41	15.60	13.75	34.04
Germany	190.25	431.01	478.59	494.34	167.34	69.17	117.15	47.62
Italy	80.09	143.86	471.68	61.48	455.18	81.64	250.89	412.25
Japan	6.68	1.16	111.19	38.41	11.13	0.10	2.38	6.26
Netherlands	7.41	268.56	580.02	379.18	68.35	376.29	124.50	78.39
United Kingdom	28.32	90.46	19.65	16.78	-4.96*	2811.92*	1.39	7.53
United States	2.32	-6.59*	12.37	47.98	8.34	62.78	2.80	1.17
Average	89.30	181.34	1179.16	339.24	259.34	516.49	163.43	121.93
Adjusted average	89.30	204.83	337.21	339.24	292.38	229.57	77.44	121.93

*Table 10: Simulation Results: Foreign Direct Investment (1990)*

Tables 10–13 present the results of our simulations for FDI outflows in the Southern European countries for the years 1990, 1993, 1995, and 1997, respectively. Using the determinants of FDI flows derived above, we estimate the expected outflows from the countries in the left column to the countries of Southern Europe. We then divide the actual value of bilateral FDI received by this simulated value, and present the results as the percentages listed in the table. Thus, the values represent the actual FDI flow received as a percentage of that which would be expected by our model. These percentages are then averaged below. We consider those percentages that are negative or four times the value of the average to be outliers; therefore, these values, where they exist, are discarded and a new “adjusted average” is calculated. Outliers are denoted with a \*.

	Spain	Portugal	Greece
	<i>FDI flows to Southern Europe: Actual in % of simulated</i>		
Belgium	11.74	60.06	3.87
France	652.33	453.59	191.09
Germany	178.15	147.16	62.82
Italy	213.82	23.18	73.87
Japan	8.37	6.21	0.02
United Kingdom	238.35	112.13	37.93
United States	51.39	0.18	5.61
Average	193.45	114.64	53.74
Adjusted average	193.45	114.64	53.74

Table 11: Simulation Results: Foreign Direct Investment (1993)

	Spain	Portugal	Greece
	<i>FDI flows to Southern Europe: Actual in % of simulated</i>		
Belgium	306.46	132.19	-70.52*
France	79.60	17.54	6.44
Germany	77.32	53.62	29.86
Italy	375.31	34.32	32.32
Japan	209.32	130.07	8.09
Netherlands	551.68	88.01	108.03*
United Kingdom	-13.78*	22.48	44.64
United States	-88.68*	21.85	14.63
Average	187.15	62.51	21.69
Adjusted average	266.62	62.51	34.86

Table 12: Simulation Results: Foreign Direct Investment (1995)

	Spain	Portugal	Greece
	<i>FDI flows to Southern Europe: Actual in % of simulated</i>		
Belgium	378.30	203.33	-19.38*
France	262.12	89.74	79.36
Germany	50.62	40.38	-10.21*
Italy	108.21	660.61*	360.2*
Japan	12.43	3.79	1.11
Netherlands	156.17	59.48	41.02
United Kingdom	71.38	53.72	66.68
United States	0.00	21.38	-5.31*
Average	129.90	141.55	64.18
Adjusted average	129.90	67.40	47.04

Table 13: Simulation Results: Foreign Direct Investment (1997)

	Spain	Portugal	Greece
	<i>FDI flows to Southern Europe: Actual in % of simulated</i>		
Austria	112.27	147.28	-63.46*
Belgium	-28.31*	-8.45*	11.59
France	213.89	70.64	45.19
Germany	96.31	246.89	87.57
Italy	38.93	276.79	63.01
Japan	9032.51*	1615.83*	1.67
Netherlands	165.62	153.84	52.86
United Kingdom	225.19	76.65	156.74
United States	10.22	11.41	12.55
Average	1096.29	287.88	40.86
Adjusted average	123.20	140.50	53.90