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Working Paper — Digitized Version

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Phare ACE Programme Discussion Paper Series, No. 09/1

Provided in Cooperation with:

Kiel Institute for the World Economy – Leibniz Center for Research on Global Economic Challenges

Suggested Citation: Brenton, Paul; DiMauro, Francesca; Lücke, Matthias (2001) : Economic integration and FDI: an empirical analysis of foreign investment in the EU and in Central and Eastern Europe, Phare ACE Programme Discussion Paper Series, No. 09/1, ACE Programme Management, Brüssel

This Version is available at:

<https://hdl.handle.net/10419/2749>

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Economic integration and FDI: an empirical analysis of foreign investment in the EU and in Central and Eastern Europe

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Phare ACE Programme

Discussion Paper Series

N° 09/1

Acknowledgements

This research was undertaken with support from the European Union's Phare ACE Programme 1996, within a project on "*The Determinants of Financial Flows in the EU and the Associated States of Central and Eastern Europe and the Implications for Enlargement*". Helpful comments by Daniel Piazzolo and several participants at a workshop at CEPS in April 1998 are gratefully acknowledged. Data on distance between countries were kindly provided by Dieter Schumacher.

Abstract

Recent evidence suggests that regional economic integration provides an important stimulus not only to trade, but also to FDI. In contrast, the available theory on FDI does not yet provide empirically testable propositions on the effects of concurrent trade and investment liberalisation. Moreover, given the limits of simulation models, which rely heavily upon parameter choice, in assessing the impact of such liberalisation, there is a need for empirical analysis to identify the principal features of FDI. This paper uses a 'gravity model' approach to assess the impact of the deepening integration between the EU and the CEECs on FDI flows in terms of three key issues. First, we provide systematic estimates of the expected long-term level of FDI in the CEECs. Second, we investigate whether FDI in the CEECs, on the one hand, and source country exports and imports, on the other hand, are complements or substitutes. Finally, we enquire whether an increase in the attractiveness of the CEECs to foreign investors has affected the magnitude of FDI going to other European countries.

Keywords: Foreign Direct Investment, Transition Economies, Gravity Model

JEL classification codes: F15, F21, F23.

Non-technical summary

Empirical evidence and initial modelling work suggest that regional economic integration can provide an important stimulus not only to trade, but also to foreign direct investment (FDI) within the region concerned. However, the available theory on FDI has yet to provide clear and empirically testable propositions on the effects of both trade and investment liberalisation. One approach to clarifying these effects is likely to rely upon the use of simulation models, but the results of which are dependent upon the choice of model specific parameters. Thus, there is a need, at present, for empirical analysis to identify the principal features of FDI and determine how these have evolved in an environment of increasing economic integration.

In this paper, we assess the impact of the deepening integration between the EU and the CEECs on FDI flows by addressing three major issues. First, we provide systematic estimates of the expected long-term level of FDI in the CEECs, by analysing the stock of investment in those countries. We employ a model of the determinants of bilateral FDI that is similar to the gravity model often used to explain bilateral trade flows. Secondly, we look at the impact of FDI from the source country point of view, where the immediate effect of growing FDI outflows is either to replace exports to the partner country by local production ("horizontal" FDI), or to enable firms in the source country to take advantage of lower labour costs abroad leading to the import of goods that were previously produced at home ("vertical" FDI). In either case, some structural change in the source country with the attending adjustment costs is likely to result. In other words, we investigate whether FDI in the CEECs, on the one hand, and source country exports and imports, on the other hand, are complements or substitutes. Finally, we enquire whether an increase in the attractiveness of particular countries or regions to foreign investors, as a result of policy changes, such as the Europe Agreements with the CEECs, has affected the magnitude of FDI going to other European countries.

The empirical tool that we use throughout the paper is the 'gravity model'. Developed in the 1960s, the gravity model is typically applied to bilateral trade data pooled over countries. The model describes the flow from an origin i to a destination j in terms of supply factors in the origin (income and population), demand factors in the destination (again, income and population) and various stimulating or restraining factors relating to the specific flow, such as distance (as a proxy for trade costs) and trade preferences. In this paper we argue that the gravity model is also appropriate to modelling the bilateral distribution of FDI, a proposition which is subsequently supported by the results of the empirical application. Here we apply the gravity model to data on the bilateral distribution of both the stock and the flow of FDI, imports and exports for individual countries.

FDI and exports are expected to be positively related to the level of income, since they are both attracted by larger domestic markets, whilst negatively affected by

country size. Large populous countries are expected to be more self-sufficient in terms of trade and investment. As for distance, theory suggests that firms will tend to prefer FDI to exports as trade costs, as proxied by distance, rise. More distant markets will tend to be served by overseas affiliates rather than by exporting. Nevertheless, this variable may also have a negative coefficient in the investment equations since the costs of operating overseas affiliates is likely to rise the further they are from the main headquarters (higher costs of placing personnel abroad, communication costs, language and cultural differences, informational costs on local tax laws and regulations, costs of being outside domestic networks, risks of exchange rate changes, etc.). Thus, distance will have a dampening effect on both trade and FDI, but the effect should be more pronounced for exports.

The results of our empirical analysis are as follows. The stock of FDI in the CEECs diverges little from the normal pattern we would expect after controlling for the main determinants of FDI stocks throughout the world. This, together with earlier research which suggested a similar conclusion for current flows of FDI to the CEECs, contradicts those who have argued that current FDI in the CEECs is very small compared to overseas investment in countries of similar income in different parts of the world. Thus, unlike these authors we do not expect a surge in FDI to the CEECs in future years. The key determinants of the growth of FDI to the region will be the pace of income growth and the success with which CEEC governments orient their policies to be conducive to business. We also find no empirical evidence to suggest that FDI has a direct impact upon the economy of the source country in terms of being a substitute for trade. This study reinforces previous empirical analysis which suggests a complementary relationship between FDI and trade. This is an issue which theoretical analysis of FDI can no longer ignore.

Finally, concerning the issue of whether changes in FDI flows to particular countries or regions, in response to an increase in economic integration, had a noticeable impact upon the flows of FDI going to other, excluded, regions, we find no evidence that increased investment in Spain and Portugal in the late 1980s significantly reduced investment flows to other European countries. Further, the flows of FDI going to the CEECs in the 1990s did not have a clear negative impact upon the amounts of investment in countries such as Spain and Portugal. These results are suggestive that additional integration between the EU and the CEECs, such as the accession of the latter, is unlikely to substantially divert flows of FDI away from other European countries.

1 Introduction

Empirical evidence and initial modelling work suggest that regional economic integration can provide an important stimulus not only to trade, but also to foreign direct investment (FDI) within the region concerned. For example, Brenton (1996) found that the EU Single Market programme led to a significant increase in investment by EU firms in other EU countries in the late 1980s. However, the available theory on FDI has yet to provide clear and empirically testable propositions on the effects of both trade and investment liberalisation. Indeed, with different types of multinational firms, vertical and horizontal, the impact of preferential trade liberalisation and preferential investment liberalisation is difficult to deduce theoretically due to the high degree of dimensionality that is required. One approach to clarifying these effects is likely to rely upon the use of simulation models, but the results of which are dependent upon the choice of model specific parameters. Thus, there is a need, at present, for empirical analysis to identify the principal features of FDI and determine how these have evolved in an environment of increasing economic integration. Such work is important in informing the policy debate on FDI but may also be of use in highlighting the key issues and so helping to direct the development of theoretical work on FDI.

In this paper, we assess the impact of the deepening integration between the EU and the Central and Eastern European countries (CEECs) on FDI flows by addressing three major issues. First, we provide systematic estimates of the expected long-term level of FDI in the CEECs. The stock of FDI in the CEECs has grown rapidly since the beginning of systemic transformation in the early 1990s, particularly in the more advanced transition economies. Nevertheless, Sinn and Weichenrieder (1997) assert in their influential article that the stock of FDI in the CEECs is still far lower than it should be, compared with countries having a similar level of income. Initial analysis of FDI flows (Brenton and Di Mauro (1998)) suggests that overseas investment in the more advanced CEECs, and particularly from Germany, is in fact high relative to other countries, after taking into account the main determinants of FDI flows. Here we assess whether similar conclusions can be derived when analysing the stock of FDI in the CEECs. We employ a model of the determinants of bilateral FDI that is similar to the gravity model often used to explain bilateral trade flows.

The question of how much more FDI the CEECs can expect to receive as a result of their continuing transformation and future EU membership is important for both host and source countries. From the host country perspective, the economic effects of FDI are usually regarded as unambiguously beneficial. FDI finances a substantial share of domestic investment in some CEECs and is probably less volatile than other international capital flows because of the essentially long-term orientation of investors. Furthermore, FDI represents an important source of managerial and technological knowledge which is particularly welcome in transition as in developing

economies¹.

By contrast, from the source country point of view, the immediate effect of growing FDI outflows is either to replace exports to the partner country by local production ("horizontal" FDI), or to enable firms in the source country to take advantage of lower labour costs abroad leading to the import of goods that were previously produced at home ("vertical" FDI). In either case, some structural change in the source country with the attending adjustment costs is likely to result. In contrast to this pessimistic scenario, however, nearly all empirical studies of the trade effects of FDI find that source country exports tend to increase along with FDI (see Graham, 1996 for a review of this literature). Our second objective in this paper, therefore, is to investigate whether FDI in the CEECs, on the one hand, and source country exports and imports, on the other hand, are complements or substitutes.

Finally, we enquire whether an increase in the attractiveness of particular countries or regions to foreign investors, as a result of policy changes, such as the introduction of the Single Market in the EU and transition in Central and Eastern Europe and the integration agreements with EU countries, has affected the magnitude of FDI going to other European countries. Here we estimate our model of bilateral FDI on annual flow data and follow the evolution over time of the coefficients of dummy variables for countries such as the Scandinavian countries and Spain and Portugal.

The paper is organised as follows. Section 2 introduces the gravity-type model that forms the basis of the empirical analysis. Section 3 presents estimates of the long-term level of FDI in individual CEECs by major investing countries and compares these to current levels. Section 4 analyses the relationship between FDI and trade. Section 5 investigates the possible impact of increasing economic integration between groups of countries upon FDI flows going to countries not directly included. Section 6 concludes and provides some policy implications.

¹ Apart from FDI, there exist many other types of links between firms ("buyer-seller relationships") where such knowledge transfer takes place. FDI is prominent among these, first, because it is easier to measure. Second, to build up a close buyer-seller relationship require substantial intangible investment from the partners. It is likely, therefore, that an environment conducive to FDI will also be conducive to other buyer-seller relationships, and that the evolution of FDI is a good indicator of knowledge transfer through inter-firm links more generally (Szalavetz and Lücke, 1996).

2 An Empirical Model of Bilateral FDI Flows

Until recently, the dominant paradigm for most empirical research on FDI has been the OLI framework. This identifies three broad conditions which are necessary before a firm will engage in direct investment abroad: advantages through ownership, location, and internalisation. An ownership advantage gives a multinational firm a cost advantage over local rivals in the foreign market, it can be in the form of a product or process, or intangibles such as a reputation for quality, a superior management and so on. There must also be a locational advantage which encourages the firm to produce the product, or provide the service, in the foreign country rather than producing it in domestic plants and exporting. Trade barriers, both natural (transport costs) and artificial (tariffs and quotas), cheap factors of production and ease of access to consumers appear to be the principal locational advantages. The internalisation advantage leads the firm to set up a foreign subsidiary rather than exploit its ownership advantage by licensing a foreign firm to produce the product or use the process.

Although this literature has provided a sound base for understanding why individual firms become multinationals and which factors at the level of the firm lead some industries being characterised by multinationals, the OLI framework has been sterile in explaining some of the key trends in FDI over the past three decades, such as the increasing volume of two-way investment between rich industrial countries, at a time of falling trade barriers. It has also been unable to generate empirical models conducive to a careful analysis of the effects of regional integration.

Recently, a small body of literature has emerged which has taken the key elements of ownership and locational advantages from the firm-based approach OLI (the issue of internalisation is largely ignored) and introduced them into general equilibrium trade models. In these models multinational firms arise endogeneously and two-way FDI can occur between countries (see, for example, Brainard (1997) and Markusen and Venables (1995, 1996)). Here (horizontal) multinational activity is driven by the trade-off between the additional fixed costs of establishing an overseas plant against the costs of servicing this overseas market via exporting. As with the OLI approach trade and FDI are substitutes. Markusen *et al* (1996) develop a model which allows for both vertical and horizontal multinational activity together with intra and inter industry trade. A feature of these theoretical models is that they demonstrate the role of country characteristics, such as, economic size, in explaining the pattern of FDI and trade flows.

This has stimulated some empirical studies of the bilateral distribution of FDI using the gravity model (Brainard (1997), Eaton and Tamura (1996), Brenton (1996)). This model has proved to be popular and empirically successful in explaining bilateral trade flows. Since the evolution of FDI over the past three decades shares some common features with the evolution of trade, having become more intense between countries with similar relatively high income levels, and having grown faster than income, then the gravity model may also be useful in modelling the regional pattern of FDI.

Developed in the 1960s (Linnemann, 1966) the gravity model is typically applied to bilateral trade data for a single year (or average of years) pooled over origin countries. The model describes the flow from an origin i to a destination j in terms of supply factors in the origin (income and population), demand factors in the destination (again, income and population) and various stimulating or restraining factors relating to the specific flow, such as distance (as a proxy for trade costs) and trade preferences. Two recent contributions (Polak (1996) and Mátys (1997)) have, however, suggested that the standard gravity model may be mis-specified. In both cases this mis-specification arises from pooling the data over source countries and/or over time and is not relevant when estimating the gravity model separately for each source country and for a single year. In this paper we apply the gravity model to data on the bilateral distribution of FDI, imports and exports for individual countries.

Our actual estimating equation takes the form:

$$\ln X_{ij} = \alpha + \beta_1 \ln Y_j + \beta_2 \ln POP_j + \beta_3 \ln Dist_{ij} + \sum \gamma_k D_{kij}$$

where X_{ij} is the value of any flow (FDI, imports or exports) or stock (FDI) from country i (source country) to country j (host country)

Y_j is the income of country j

POP_j is the population of country j

$DIST_{ij}$ is the distance between countries i and j

D_{kij} are dummy variables representing preferential relationships between i and j which stimulate the flow/stock taken into account.

The volume of the relevant flow into a country is explained by the level of income of that country and its absolute size, as proxied by population. FDI and exports are expected to be positively related to the level of income, since they are both attracted by larger domestic markets, whilst negatively affected by country size. Large populous countries are expected to be more self-sufficient in terms of trade and investment. As for distance, theory suggests that firms will tend to prefer FDI to exports as trade costs, as proxied by distance, rise. More distant markets will tend to be served by overseas affiliates rather than by exporting. Nevertheless, this variable may also have a negative coefficient in the investment equations since the costs of operating overseas affiliates is likely to rise the further they are from the main headquarters (higher costs of placing personnel abroad, communication costs, language and cultural differences, informational costs on local tax laws and regulations, costs of being outside domestic networks, risks of exchange rate changes, etc.). Thus, distance will have a dampening effect on both trade and FDI, but the effect should be more pronounced for exports, a feature found in initial estimates of the gravity model applied to data for outflows from Japan and the US (Brainard (1997), Eaton and Tamura (1996)) and from EU countries (Brenton (1996)).

For the three parts of our empirical analysis, we will use the gravity model in the following ways: first, in Section 3 we estimate a “normal pattern” of bilateral FDI stocks of major European investing countries as well as the US, Japan, and South Korea. This normal pattern may be thought of as reflecting FDI under conditions where stocks have been fully adjusted to any changes in the explanatory variables that have occurred in the past. The current, actual level of FDI from each of the source countries to the CEECs can then be compared to this “normal pattern” through the use of dummy variables for the main groups of CEECs (first-round candidates for membership, and other CEEC candidate countries).

We then proceed to analyse the substitutability or complementarity between FDI and trade. We follow Graham (1996) and estimate gravity models for the exports and imports of each FDI source country in addition to the FDI stock. If trade and FDI are complementary, the residuals from the export or import regression should be positively correlated with the residuals from the corresponding FDI regression. If trade and FDI are substitutes, there should be a negative correlation.

Third, to assess the possible impact of investment and trade liberalisation between certain countries upon FDI going to excluded countries we estimate gravity equations using data on FDI flows over time (Section 5) and investigate the time profile of dummy variables for particular host countries; for Portugal and Spain and for the three new Member-States (Austria, Finland and Sweden).

3 Actual vs. Expected FDI Stocks in CEE

This section presents the results of a regression analysis of bilateral FDI stocks by major investing countries in the mid-1990s. The gravity model introduced in the preceding section is used to define a “normal pattern” of bilateral FDI stocks. Dummy variables are included for two groups of Central and Eastern European economies (first- and second-round candidates for EU membership) to test for a possible divergence from this pattern. If the corresponding coefficients are significant and negative, the CEECs concerned can expect to benefit from further, large FDI inflows as foreign investors adjust their stocks to the new opportunities created by economic transformation. If the dummies are not significant, the future growth of the FDI stock can be expected to be in line with changes in the “normal” determinants of FDI, especially GDP growth.

We also include in our regression equation an Economic Freedom Index, EFI (see Johnson, Holmes and Kirkpatrick, 1998). The index ranks annually more than 150 countries (lower values stand for freer countries) and takes into account 10 factors of ‘economic freedom’: trade policy, taxation, government intervention in the economy, monetary policy, foreign investment, banking, wage and price controls, property rights, regulation and black market activity. It is therefore an indicator of the ‘market-friendliness’ of economic policies in the host country and we expect a negative sign for countries with a less favourable environment to foreign investors.

The regression results in Table 3.1 of the Annex are arranged by investing country and show differences between three model specifications for each investing country. When only the three basic variables income, population, and distance are included (in addition to the CEEC dummies)², most coefficients have the expected signs: positive for income, negative for population and distance. When the Economic Freedom Index is added, its coefficient is nearly always significant and negative. At the same time, the sign of the population coefficient changes in many regressions because the index is highly negatively correlated with per capita income, which is implicit in the combination of the GNP and population explanatory variables. However, since the Economic Freedom Index adds considerably to the explanatory power of the model as measured by the adjusted R^2 , we prefer this specification to the one including only the basic variables. This is justified in particular because we are interested in obtaining a normal pattern of bilateral FDI, rather than “correct” estimates of the individual coefficients. The high explanatory power of the model with the Economic Freedom Index, with adjusted R^2 in the range from 0.52 to 0.79, leads us to conclude that these results represent fairly well the normal pattern of bilateral FDI stocks.

In order to explore the possible link between FDI and regional integration, a dummy for host country membership in the EU(15) is also included. The expected sign of the corresponding coefficient is not clear a priori. When the investing country is an EU member, both its trade and outward FDI may benefit from the reduced transaction costs and the liberalisation of financial flows. Therefore, if FDI and trade are substitutes, the impact of regional integration on FDI is not obvious. When the investing country is not an EU member, firms investing overseas might prefer an EU country over other potential host countries because it offers free access to the whole EU and EFTA markets. It is not clear, however, that this would raise FDI in all EU countries, which is what is tested by the dummy variable.

As it turns out, the coefficient of the EU dummy is insignificant for all investing countries except Japan where it is negative. Thus these regression results convey the overall impression that host country membership in the EU does not significantly influence the stock of inward FDI. While this finding is not unexpected, a cautionary note is appropriate. The sample size for each source country is between 35 and 50 so that the roughly 15 EU countries can account for close to half of the sample. Since few other countries of similar per capita income are located in geographical proximity to the group, the EU dummy is likely to be correlated with the other explanatory variables. It is not entirely clear, therefore, whether the coefficient of the EU dummy provides an accurate measure of what FDI would be in the absence of European economic integration.³

² Where relevant we also found it necessary to include a dummy variable for the CIS countries - notably Russia and Ukraine.

³ As an alternative to the EU(15) dummy, separate dummies were also introduced for the 'core' EU of ten countries (EU10), the Iberian countries (Portugal and Spain; EU2), and the 'North European' recent entrants (Finland, Sweden, Austria; EU3). The point estimates for

With no other measure available, however, we now turn our attention to the coefficient estimates for the CEEC dummies. A distinction is made between first-round EU candidates (CEE1st - Poland, Hungary, Czech Republic), second-round candidates (CEE2nd - Slovakia, Bulgaria, Romania). For each investing country, the coefficients are not greatly affected by the specification of the underlying gravity model, i.e. the inclusion or not of the Economic Freedom Index and the EU dummy. Hence we limit ourselves to discussing the results for our preferred specification which includes only the Economic Freedom Index.

The coefficients of the CEEC dummies for the investing countries in Europe, except Norway and the UK, follow a pattern that differs notably from the remaining countries. Of the three coefficients, the one for the first-round EU candidates (CEE1st) always takes on the highest value, followed by CEE2nd and then by CIS. The Wald tests also reported in Table 1 reject the null hypothesis of equal coefficients for CEE1st, CEE2nd, and CIS only for France and Switzerland. Note that these tests are for individual countries and thus do not take into account that many of the European investing countries display the same basic pattern. Hence it seems safe to conclude that the CEE1st countries have been more successful than the rest of Central and Eastern Europe in terms of attracting FDI from Europe and Finland, even after controlling for differential progress in systemic transformation (through the Economic Freedom Index) and for geographical proximity (through the distance variable).

This finding is compatible with other evidence that the most advanced transition economies are increasingly hosting not only horizontal FDI aimed at their own domestic markets, but also vertical FDI that integrates local production into European production networks (Lankes, Venables; Szalavetz, Lücke, 1996). The ongoing accession to the EU of this group of countries may well have inspired international investors with sufficient confidence to rely on production in the CEE1st countries for their multinational sourcing. Furthermore, it is plausible that Central and East European transition economies are attractive locations for product sourcing mainly for European, rather than US or Japanese multinationals. For integration into production networks, geographical proximity to other production locations, ease of communication, and cultural affinity may well be of greater importance than for market-driven foreign investment. This could explain why the relatively favourable position of CEE1st countries is only found for investing countries in European.

We now turn to the question of whether FDI stocks in the three groups of CEECs are already close to their 'normal' levels, or whether significant further stock adjustment should be expected. The coefficient estimate for CEE1st is significant and negative for only four out of the total of eleven source countries for which data are available

EU3 were significant and negative for Korea and Japan. However, Wald tests did not reject the null hypothesis that the coefficients for the three separate EU dummies were equal.

(Finland, Netherlands, UK, Japan). CEE2nd has significant and negative coefficient estimates for four out of eight source countries (Netherlands, UK, US, Japan); CIS for three out of ten countries (Finland, France, Switzerland). Hence, for most combinations of source and host countries, the stock of FDI in Central and Eastern Europe has largely adjusted to the level that would be expected among market economy host countries. These results complement the findings of Brenton and Di Mauro (1998) who found no evidence that FDI flows into the more advanced CEECs diverged significantly from the 'normal' level defined by the gravity model.

So the assertion by Sinn and Weichenrieder (1997) that FDI in Central and Eastern Europe is tiny, compared with developing countries, appears to be exaggerated when judged against this background. Any sustained, substantial growth of FDI in the CEECs will have to be stimulated to a large extent by growth of the host country and continuing economic reforms. As our regression results demonstrate, these two variables are closely linked and their relative importance is difficult to disentangle statistically.

4 Trade and FDI: Complements or Substitutes?

We begin our analysis of the link between FDI and trade by estimating gravity equations for the exports and imports of the FDI source countries to and from the host countries in our FDI database. As in the previous section, various specifications with and without the Economic Freedom Index and the EU dummy have been tested. Dummy variables for the two groups of CEECs and the CIS are employed to test for any divergence of trade with the so called countries from the "normal pattern" established by the gravity model.

Selected regression results with and without the EU dummy are reported in Table 4.1 of the Annex. The coefficient of the EU dummy variable is expected to be positive for EU reporting countries (i.e. the source countries of FDI) because regional integration is expected to reduce trade costs. Its expected sign is not clear for the remaining reporting countries. It turns out that, among European reporting countries, the coefficient estimates for the EU dummy variable are significant and positive only for German and Norwegian imports as well as for Dutch exports. Coefficient estimates are significant and negative for US and Japanese exports and imports.

These negative estimates are difficult to interpret with respect to the expected trade between the US and Japan on the one hand and future EU members among the CEECs on the other hand. Conceivably, the estimates might reflect a restrictive trade regime on the part of the EU leading to trade diversion to the disadvantage of the US and Japan. However, as we discussed above for FDI, the estimated negative coefficient might be the result of collinearity between the EU dummy and the other explanatory variables and might thus reflect low trade with Europe as a geographical region rather than the impact of institutional arrangements. In any event, the large absolute size of the negative coefficient estimates for the various CEEC dummies

suggests that current US and Japanese trade with the CEECs is substantially lower than predicted and will probably increase just to attain the predicted (low) level of US and Japanese trade with EU members.

Given that few coefficient estimates for the EU dummy are statistically significant in the case of European reporting countries, plus the difficulty of interpreting the negative coefficient estimates for the US and Japan, the subsequent analysis will be based on the regressions without the EU dummy. Turning now to the level of trade between the European reporting countries and the CEECs, the coefficient estimates for the CEEC dummies are mostly insignificant, indicating that bilateral trade is close to the level expected among market economies. Important exceptions include French imports with large negative coefficients for all three groups of CEECs, UK exports to the first-round candidate countries (CEE1st), and UK imports from the second-round candidate countries (CEE2nd) as well as from Russia and Ukraine (CIS). Thus the trade of West European countries with the CEECs has largely adjusted to the regional pattern predicted on the basis of bilateral trade with market economies⁴.

In order to explore the possible impact of FDI on bilateral trade, we now include the residual from the FDI regressions in the gravity models for exports and imports. We follow the approach of Graham (1996) in assuming that if FDI substitutes for trade, then trade should be lower than "normal" whenever FDI is higher than "normal". Hence, under the hypothesis of substitutability, the coefficient of the FDI residual in the gravity model for trade should be negative. For consistency, we use the same set of explanatory variables for calculating the FDI residual and in the gravity regression for trade. Also we allow the FDI residual to vary between the two groups of CEECs and the CIS and the remaining countries by adding the products of each CEEC dummy and the FDI residual as explanatory variables.

Table 4.2 reports the results for the extended gravity model for exports. The coefficient of the FDI residual is significant and positive for 7 out of 11 FDI source countries, and insignificant for the rest. Also, this coefficient differs only rarely between any of the three groups of CEECs on the one hand and the remaining countries on the other hand. A similar finding applies to imports (Table 4.3). The coefficient of the FDI residual is significant and positive for 5 out of the 11 FDI source countries and, again, differs little between the CEECs and CIS and the other countries. Hence we find no well-defined link between the stock of FDI and trade for France, Germany, the Netherlands, and Switzerland, nor between the stock of FDI on the one hand and Austrian and South Korean imports on the other. For the remaining countries, the stock of FDI and both exports and imports are found to be complementary. Complementarity is also found between FDI and Austrian and South Korean exports. Again, these results reinforce those of Brenton and Di Mauro (1998)

⁴ This confirms the results of other studies, such as Brenton and Gros (1997). For a more detailed discussion see Piazzolo (1997).

who found, using a similar approach, complementarity between FDI *flows* and both import and exports.

In interpreting this finding, it is helpful to refer to the distinction between horizontal and vertical FDI. Most case studies of FDI find that the main motivation of foreign investors is to produce for the host country market or for export to other countries in the same region (horizontal FDI). While such investment may replace some final goods exports of the source country, it may also lead to exports of machinery and, subsequently, intermediate goods to the host country. This may explain the complementary relationship between FDI and exports for some source countries. Interestingly, however, calculations using the few available data on sectoral FDI for Germany, the US, and Japan suggest that even sectoral FDI and sectoral exports tend to be complementary⁵.

FDI may also be aimed at outsourcing production activities to the host country and exporting products (e.g. components) back to the source country. Such vertical FDI is perfectly compatible with the observed complementarity between FDI and imports. However, empirical studies, based mostly on enterprise surveys, find almost universally that vertical FDI plays only a small role as a proportion of total FDI, although its importance appears to have grown in Central European transition economies in recent years (Lankes and Venables, 1997).

One possible interpretation of the observed complementarity between FDI and both exports and imports is that FDI enhances the commercial presence of source country firms in the host country. The transfer of source country technology, the presence of source country nationals in the host country, the participation of host country nationals in training courses etc. in the source country, all serve to foster close commercial links that may affect trade in both directions.

If the main effect of FDI on trade is indeed through enhanced commercial presence, the fear found frequently in Western Europe of jobs being exported to Central and Eastern Europe through FDI is misplaced. It is by no means clear whether, in the absence of horizontal FDI from a particular source country, the host country would import the good in question from the source country. It may well import from another source, or the good might be produced by host country firms that might be domestically or foreign-owned.

⁵ Space constraints prevent presentation of the results here, but they are available upon request.

5 Domino FDI?

Does economic integration between two countries or regions affect the amount of FDI being invested in third countries? The experiences of Spain and Portugal, upon joining the EU, and Mexico, following the decision to negotiate the NAFTA, suggest that joining a regional economic integration scheme can provide an impetus to inward FDI. This raises the question of whether these increases in incoming FDI affected the flows of direct investment going to other potential host countries that did not offer the advantage of belonging to the regional integration scheme concerned. Baldwin et al. (1995) suggest that the creation of the Single Market in the EU "probably led to investment diversion in the economies of the European Free Trade Association (EFTA) and investment creation in the EU economies", the latter being particularly prevalent in Spain and Portugal. This may, in turn, have encouraged these countries to seek access to the Single Market via the European Economic Area, and subsequently to request membership of the EU itself.

The question of whether discriminatory liberalisation between two countries affects investment in other countries suggests a possible parallel with the impact of regional integration on trade between partners and non-partners. Here, customs union theory has a long history and is relatively well developed. Free trade agreements are the archetypal example of the theory of second best, whereby the removal of one economic distortion (trade restrictions against future partners) in the presence of other distortions (trade restrictions against other countries) may actually reduce economic welfare. The standard Vinerian approach to such regional trade agreements identifies the welfare-enhancing increase in trade between the partners to the trade agreement (trade creation) against which must be considered trade diversion, the potential decline in trade with non-members (if they are more efficient producers), which is detrimental to welfare. More recently, this body of theory has been extended to allow for imperfect competition and the presence of scale economies. One key result is that regional integration can lead to agglomeration whereby economic activity becomes increasingly concentrated in countries or areas which contain, or are close to, the main pockets of demand.

The analysis of the effects of economic integration on FDI flows is much less developed. It is clear, however, that simple analogies with the literature on trade and, in particular, the terminology of creation and diversion, are not possible⁶. Most of the available reasoning concentrates upon the effects of trade liberalisation within regional agreements upon FDI flows. The crucial issue is whether trade and FDI are substitutes, as standard trade theory and much of the literature on FDI would suggest,

⁶ Trade creation and trade diversion have a clear welfare interpretation. This is not the case if these terms are applied to FDI flows. Winters (1997) accordingly advises that the terms investment diversion and creation are dangerous and should be dropped from our vocabulary.

or whether they are complements, which our analysis above would support. Under the former, the removal of trade barriers will entail that partners markets will be increasingly served by exports rather than by overseas production. Hence trade integration will dampen FDI flows. If trade and FDI are complementary then trade liberalisation will stimulate FDI flows.

However, the issue is further complicated if the regional integration involves investment liberalisation as well as trade liberalisation, as is clearly the case in the transition of the CEECs to market economies and their integration into the EU. Markusen (1997) has shown in a simple model with just two countries, that the two forms of liberalisation may have different effects on important variables, such as output and relative wages, and that both forms of liberalisation together may generate different impacts that when either is implemented alone.

The lack of clear theoretical prescriptions on the impact of economic integration on FDI flows requires that empirical analysis be used to identify the key mechanisms at work. Here we use the gravity model to look at the evolution over time of the bilateral distribution of the FDI flows of a particular investing country, rather than the stock of FDI as in the exercises above, and assess whether changes in FDI flows to regions which are economically integrating appear to be associated with changes in FDI flows to other regions. In particular, we look to see whether increasing EU integration in the late 1980s, adjustment to the Single Market and the accession of Portugal and Spain, had a negative impact upon FDI flows from EU countries going to the three European countries (EU3) which subsequently joined the EU in 1995, Austria, Finland and Sweden. We then try and assess whether the increased FDI flows from EU countries to the CEECs in the 1990s had any noticeable impact upon foreign investments by these countries in Portugal and Spain (EP)⁷.

Our methodological approach is based upon that of Sapir (1997) who sought to identify whether a domino effect had characterised the impact of European integration upon bilateral trade flows. We use annual data on FDI outflows from France, Germany, Italy and the UK to a range of destination countries, both European and in the rest of the world. Initially, as in Sapir, we estimated a separate gravity equation for each investing country for each year and plotted the evolution of dummy variables for the EU3 and EP for 1982 to 1995 and for the CEECs from 1992 to 1995. However, many of the individual dummies were not well defined, reflecting in part the relatively small number of observations for each year and the variability in our FDI flow data. We then experimented by pooling the data over our sample period and including dummy variables for particular sub-periods: 1982 to 1986, 1987-1991, 1992-1995.

⁷ Greece is not separately identified since it has never been an important recipient of FDI from EU countries.

The model estimated is similar to that applied to the stock data except here we include a time trend to capture increases in FDI over time unrelated to income and population. The results, summarised in Table 5.1 of the Annex, show that for all four source countries, GDP and distance are statistically significant, and, with the exception of the UK (a feature found before by Brenton (1996) and Brenton and Di Mauro (1998)), of the expected sign. Population has a negative impact upon the magnitude of FDI, but is only statistically significant for France and the UK. Adjacency also has a strong positive effect upon FDI flows. The fit of each of the equations is reasonably high, but in every case the standard error of the estimate is large. This suggests that some caution should be exercised with these results.

We now proceed to discuss the coefficients on the various dummy variables, the magnitude and significance of which are demonstrated in charts 1 to 4. We include dummy variables for the EU10 (EU members prior to the Iberian enlargement), the EU3 (Austria, Finland and Sweden), EP (Spain and Portugal), the CEEC3 (the more advanced countries in central and eastern Europe - Czech Republic, Hungary and Poland), and the CEEC2 (those less advanced in the process of transition - Bulgaria and Romania), for each of three sub-periods, 1982 to 1986, 1987 to 1991 (the period after the announcement of the plan to create the Single Market and after the accession of Spain and Portugal), and 1992 to 1995 (the period covering the integration of the CEECs into the world market). The height of the bar in each case shows the magnitude of the coefficient on the dummy whilst the small circles show the relevant (5 per cent) interval of significance. Thus, if the bar lies outside of the relevant circle then the estimated coefficient is statistically significant.

The results suggest that there has been an intensification of FDI in the EU10 countries since the introduction of the Single European Act. For France, Germany and the UK the EU10 dummy became significantly positive for the period 1987 to 1991, for the previous sub-period the intra-EU effect was small and statistically insignificant. In the subsequent period, 1992 to 1995, the strength of this effect has waned slightly in Germany, although it remains statistically significant, has become insignificant for France, but has intensified for the UK. In the case of Italy, the intra-EU effect became significant only for the last sub-period.

For Austria and the two Scandinavian countries we find no strong evidence that the two key developments in the latter half of the 1980s, the announcement of the Single Market and the Iberian enlargement, adversely affected the magnitude of inward FDI from EU countries. We do find that in the early 1980s these countries were receiving substantially less FDI than could be expected on the basis of their incomes and proximity to the EU. However, the magnitude of this 'under-potential' weakened in the late 1980s and in the first half of the 1990s. There is now no significant difference between the actual and potential flows of FDI into these countries from Germany and the UK. For France, the effect is still significantly negative but the magnitude is much smaller than in the early 1980s.

Next we look at the magnitude of FDI in Portugal and Spain, where the ratio of actual to potential FDI increased considerably in the period immediately after accession, whilst this effect has declined since 1991, with the exception of investment from Italy. We note that for Germany, where investment in the CEEC3 in the latest sub-period has been particularly strong, that the strong positive and significant dummy for Portugal and Spain has remained. Similarly, for Italy, the presence of a positive and significant effect for investment in the CEEC3 is associated with an intensification of investment in Portugal and Spain. For the UK and France the CEEC3 dummy is not statistically significant, whilst for all four source countries actual investment in the CEEC2 does not differ significantly from its 'normal' level, in contrast to previous findings (Brenton and Di Mauro (1998)). Hence, our, albeit limited, analysis finds no evidence to suggest that the intensification of FDI in particular countries or regions, following integration with the EU, has had a discernible dampening effect on FDI flows going to other countries in Europe.

6 Conclusions

In this paper we have utilised a very simple model of the bilateral distribution of a country's FDI to investigate issues regarding the economic integration of the CEECs with EU countries. We find that the stock of FDI in CEEC countries diverges little from the normal pattern we would expect after controlling for the main determinants of FDI stocks throughout the world. This, together with earlier research which suggested a similar conclusion for current flows of FDI to the CEECs, contradicts those who have argued that current FDI in the CEECs is very small compared to overseas investment in countries of similar income in different parts of the world. Thus, unlike these authors we do not expect a surge in FDI to the CEECs in future years. The key determinants of the growth of FDI to the region will be the pace of income growth and the success with which CEEC governments orient their policies to be conducive to business. We also find no empirical evidence to suggest that FDI has a direct impact upon the economy of the source country in terms of being a substitute for trade. This study reinforces previous empirical analysis which suggests a complementary relationship between FDI and trade. This is an issue which theoretical analysis of FDI can no longer ignore.

Finally, we investigated whether changes in FDI flows to particular countries or regions, in response to an increase in economic integration, had a noticeable impact upon the flows of FDI going to other, excluded, regions. Again, using the gravity model to explain the bilateral distribution of FDI flows over time, we found no evidence that increased investment in Spain and Portugal in the late 1980s significantly reduced investment flows to other European countries. Further, the flows of FDI going to the CEECs in the 1990s did not have a clear negative impact upon the amounts of investment in Spain and Portugal. Additional integration between the EU and the CEECs, as the accession of the latter, is therefore unlikely to substantially dampen the flows of FDI going to other European countries.

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Annex

Table 3.1: Determinants of Bilateral FDI, Major OECD Investing Country (Dependent Variable: Log of FDI)

Investing country	Log of GNP	Log of population	Log of distance	EFI	EU	CEE1st	CEE2nd	CIS	Wald test that CEE dummies are equal (F-stat.)	Adj. R ²	S.E.	N. of obs.
Austria	1.23***	-0.38	-0.81***			2.31**	0.46	-1.06	3.30**	0.53	1.57	43
	0.82**	0.09	-0.97***	-1.21*		2.05*	0.58	-0.50	1.79	0.55	1.54	43
	0.74*	0.15	-0.69*	-1.27*	1.07	2.96**	1.47	0.10	2.15	0.56	1.52	43
Finland	1.02***	-0.52	-1.25***			-2.15		-4.44**	1.18	0.49	1.74	35
	0.32	0.47	-1.68***	-2.35**		-2.45*		-4.12**	0.73	0.56	1.62	35
	0.36	0.43	-1.77***	-2.29**	-0.31	-2.71*		-4.39**	0.71	0.55	1.64	35
France	1.38***	-0.25	-0.59***			0.41	-0.61	-3.46***	4.49**	0.65	1.43	50
	0.91***	0.27	-0.71***	-1.36**		0.42	-0.40	-2.72**	3.02*	0.68	1.37	50
	0.88***	0.30	-0.63**	-1.37**	0.28	0.57	-0.28	-2.62**	3.03*	0.67	1.39	50
Germany	1.22***	-0.30*	-0.52***			0.15	-0.51	-1.74*	1.85	0.67	1.12	48
	0.87***	0.11	-0.63***	-1.03**		0.06	-0.25	-1.22	0.82	0.70	1.08	48
	0.81***	0.16	-0.41*	-1.08**	0.82	0.63	0.23	-0.83	1.10	0.70	1.06	48
Netherlands	0.94***	-0.19	-0.43***			-1.36**	-2.78**		1.48	0.69	1.06	42
	0.44**	0.37	-0.55**	-1.52***		-1.39**	-2.49**		1.17	0.77	0.91	42
	0.43*	0.37*	-0.52**	-1.53***	0.12	-1.32**	-2.41**		1.13	0.77	0.93	42
Norway	0.88**	-0.56	-0.96***			-1.33		-1.77	0.06	0.50	1.46	34
	0.33	0.16	-1.23***	-1.43*		-1.97		-1.63	0.04	0.53	1.41	34
	0.30	0.20	-1.09**	-1.50*	0.40	-1.64		-1.34	0.03	0.52	1.43	34
Switzerland	1.04***	-0.30**	-0.36***			-0.84		-5.22***	20.24***	0.79	0.81	40
	0.96***	-0.20	-0.39***	-0.25		-0.89		-5.13***	17.66***	0.79	0.82	40
	0.94***	-0.17	-0.31	-0.27	0.25	-0.69		-5.03***	17.15***	0.78	0.83	40

Table 3.1 - continued

Investing country	Log of GNP	Log of population	Log of distance	EFI	EU	CEE1st	CEE2nd	CIS	Wald test that CEE dummies are equal (F-stat.)	Adj. R ²	S.E.	N. of obs.
UK	1.11***	-0.45**	-0.01			-2.55***	-3.47***	-2.37*	0.52	0.72	1.30	47
	0.53**	0.23	-0.21	-1.74***		-2.60***	-2.92***	-1.70	0.36	0.78	1.17	47
	0.49*	0.29	-0.02	-1.79***	0.72	-2.20***	-2.57***	-1.43	0.33	0.78	1.16	47
US	1.17***	-0.29**	-0.58			-0.59	-2.58**	-1.78	1.46	0.65	1.06	48
	0.71***	0.28	-1.02***	-1.55***		-0.69	-2.11**	-1.11	0.82	0.72	0.95	48
	0.78***	0.21	-1.04***	-1.49***	-0.27	-0.73	-2.12**	-1.18	0.72	0.72	0.95	48
Japan	0.95***	0.03	-0.99**			-2.95**	-4.12***	-2.23	0.45	0.59	1.68	40
	0.12	1.06**	0.05	-2.80***		-3.05***	-2.76**	-0.82	0.78	0.68	1.48	40
	0.52	0.64	0.08	-2.20**	-1.24**	-3.30***	-3.12**	-1.30	0.69	0.72	1.40	40
South Korea	0.51**	0.38	-1.26***			0.08	1.46	0.48	0.54	0.38	1.44	37
	-0.17	1.38***	-0.41	-2.45***		0.28	2.62**	1.69	1.89	0.52	1.28	37
	-0.30	1.53***	-0.40	-2.64***	0.44	0.37	2.74**	1.82	1.92	0.50	0.51	37

*** (**; *) Significant at the 1% (5%; 10%) level.

Notes

Destination countries include all OECD countries, plus Bulgaria, Romania, Russia, Slovenia, Slovakia, Ukraine, Argentina, Brazil, Chile, China, Hong Kong, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand.

The country coverage is different for each source country, which explains differences in the sample size

Dummy variables

- EU: all 15 EU Member-States
- CEE1st: Czech Rep., Hungary, Poland, Slovenia and "Baltic Countries", since separate data for Estonia were not available.
- CEE2nd: Bulgaria, Romania and Slovakia
- CIS: Russia and Ukraine

Table 4.1 - Regression Results for Bilateral Trade, Major OECD Countries

Reporting country	Dependent variable	Log of GNP	Log of population	Log of distance	EFI	EU	CEE1st	CEE2nd	CIS	Adj. R ²	S.E.	N. of obs.
Austria	Log of exports	0.80***	-0.02	-0.79***	-0.45*		0.64	0.34	-0.15	0.85	0.60	52
		0.81***	-0.03	-0.82***	-0.45	-0.13	0.54	0.26	-0.20	0.85	0.61	52
	Log of imports	0.50*	0.55*	-1.04***	-1.26**		-0.07	-0.04	0.21	0.64	1.21	52
		0.43	0.60**	-0.87***	-1.27**	0.68	0.46	0.44	0.53	0.64	1.21	52
Finland	Log of exports	0.51***	0.30**	-0.95***	-1.17***		0.23	-0.18	0.01	0.82	0.66	53
		0.48***	0.32**	-0.87***	-1.18***	0.26	0.39	-0.07	0.19	0.82	0.66	53
	Log of imports	0.57**	0.39	-0.96***	-1.39**		0.24	-0.15	0.22	0.58	1.30	53
		0.46	0.46	-0.67**	-1.44**	0.97	0.83	0.24	0.87	0.60	1.28	53
France	Log of exports	0.56***	0.13	-0.70	-0.41		-0.90***	-1.05**	-1.32***	0.82	0.57	53
		0.56***	0.12	-0.73***	-0.41	-0.09	-0.95***	-1.08**	-1.35***	0.85	0.57	53
	Log of imports	0.64***	0.17	-0.75***	-0.48		-0.75*	-0.59	-0.71	0.82	0.69	53
		0.63***	0.18	-0.72***	-0.48	0.12	-0.69	-0.55	-0.67	0.81	0.70	53
Germany	Log of exports	0.67***	0.09	-0.61***	-0.55***		0.24	0.14	-0.01	0.89	0.45	53
		0.65***	0.11	-0.53***	-0.56***	0.31	0.48	0.30	0.12	0.89	0.45	53
	Log of imports	0.57***	0.24*	-0.78***	-0.81***		0.19	0.20	-0.57	0.84	0.59	53
		0.53***	0.27**	-0.62***	-0.83***	0.61**	0.58	0.49	-0.31	0.85	0.57	53
Netherlands	Log of exports	0.62**	0.04	-0.73***	-0.59***		-0.32	-0.46	-0.40	0.89	0.51	53
		0.57***	0.08	-0.56***	-0.62***	0.67**	0.03	-0.19	-0.15	0.90	0.48	53
	Log of imports	0.63***	0.04	-0.52***	-0.53		-0.47	-0.62	-0.87	0.76	0.74	53
		0.63***	0.05	-0.52***	-0.53	0.02	-0.46	-0.61	-0.86	0.75	0.75	53
Norway	Log of exports	0.85***	0.04	-1.15***	-0.81**		-0.78*	-1.10*	-0.90	0.85	0.79	53
		0.77***	0.09	-0.86***	-0.84**	0.84*	-0.23	-0.71	-0.41	0.86	0.77	53
	Log of imports	0.61**	0.47*	-1.13***	-1.33**		-0.30	-0.39	0.25	0.69	1.20	53
		0.48*	0.55**	-0.64**	-1.39***	1.39**	0.62	0.27	1.06	0.71	1.15	53
Switzerland	Log of exports	0.70***	0.02	-0.46***	-0.82**		-0.31	-0.07	-0.67	0.72	0.82	53
		0.70***	0.02	-0.45**	-0.81**	0.04	-0.28	-0.04	-0.66	0.72	0.83	53
	Log of imports	0.69***	0.22	-0.96***	-1.47***		-0.88	-0.33	-0.46	0.78	0.97	53
		0.64***	0.25	-0.75***	-1.42***	0.68	-0.42	0.02	-0.21	0.79	0.96	53

Table 4.1 - continued

Reporting country	Dependent variable	Log of GNP	Log of population	Log of distance	Economic Freedom Index	EU	CEE1st	CEE2nd	CIS	Adj. R ²	S.E.	Number of obs.
UK	Log of exports	0.61***	0.03	-0.46***	-0.91***		-0.92**	-0.82	-0.71	0.79	0.72	53
		0.57***	0.07	-0.32**	-0.93***	0.54	-0.65	-0.61	-0.53	0.80	0.71	53
	Log of imports	0.53***	0.21	-0.51***	-1.10***		-0.67*	-0.68	-1.32**	0.83	0.65	53
		0.49***	0.24*-	-0.38***	-1.12***	0.50	-0.43	-0.49	-1.14**	0.83	0.64	53
US	Log of exports	0.31**	0.44***	-0.95***	-1.15***		-1.76***	-1.62***	-1.17*	0.80	0.74	53
		0.57***	0.23	-1.02***	-0.97***	-0.94***	-1.88***	-1.65***	-1.38**	0.84	0.65	53
	Log of imports	0.48***	0.34*	-0.87***	-0.89**		-1.46***	-1.13*	-0.91	0.71	0.90	53
		0.76***	0.12	-0.94***	-0.69*	-1.03***	-1.60***	-1.17**	-1.14*	0.76	0.81	53
Japan	Log of exports	0.43***	0.38**	-1.05***	-1.37***		-2.09***	-2.43***	-1.37**	0.88	0.72	53
		0.59***	0.25	-1.02***	-1.25***	-0.55**	-2.16***	-2.45***	-1.50**	0.89	0.69	53
	Log of imports	0.57**	0.23	-0.89**	-1.07**		-1.78***	-1.90**	-0.27	0.72	1.06	53
		0.87***	-0.02	-0.84**	-0.87*	-1.05***	-1.91***	-1.95***	-0.51	0.76	1.00	53
South Korea	Log of exports	0.06	0.73***	-0.68**	-1.67***		-0.43		-0.68	0.70	0.81	38
		0.21	0.61***	-0.67**	-1.53***	-0.49	-0.48		-0.79	0.70	0.80	38
	Log of imports	0.49**	0.19	-0.58	-0.90		-1.69**		0.18	0.58	0.98	38
		0.66**	0.06	-0.56	-0.73	-0.57	-1.76**		0.05	0.59	0.97	38

*** (**, *) Significant at the 1% (5%; 10%) level.

Table 4.2 - Regression Results for Exports with FDI Residual , Major OECD Countries, mid-1990s

Investing country	Log of GNP	Log of population	Log of distance	EFI	FDI Residual	FDI Residual * CEE1st	FDI Residual * CEE2nd	FDI Residual * CIS	Adj. R ²	S.E.	N. of obs.
Austria	0.71***	0.00	-0.77***	-0.53**	0.11*	0.49**	0.01	0.30	0.86	0.54	42
Finland	0.38***	0.19	-0.85***	-1.14***	0.13**	-0.19		-0.52**	0.82	0.49	35
France	0.60***	0.13	-0.64***	-0.56**	0.11	-0.39	-0.03	0.36*	0.83	0.59	50
Germany	0.60***	0.11	-0.63***	-0.55***	0.09	0.10	-0.12	0.00	0.90	0.40	48
Netherlands	0.62***	0.01	-0.71***	-0.59***	0.12	0.12	0.44		0.90	0.47	42
Norway	0.87***	-0.10	-1.07***	-0.70*	0.35***	0.47		0.53	0.87	0.67	34
Switzerland	0.51**	0.25	-0.57***	-1.18**	-0.02	0.97		0.09	0.68	0.86	40
UK	0.64***	0.04	-0.41***	-0.93***	0.32***	0.05	0.21	-0.15	0.87	0.52	47
US	0.37**	0.44**	-0.98***	-1.33***	0.42***	0.42	0.00	-0.12	0.69	0.75	48
Japan	0.48***	0.46***	-1.08***	-1.82***	0.40***	0.06	0.88**	0.32	0.92	0.50	40
South Korea	0.24	0.44**	-0.91***	-0.98**	0.41***	-0.98*		-0.26	0.82	0.59	31

*** (**, *) Significant at the 1% (5%; 10%) level.

Table 4.3 - Regression Results for Imports with FDI Residual , Major OECD Countries, mid-1990s

Investing country	Log of GNP	Log of population	Log of distance	EFI	FDI Residual	FDI Residual * CEE1st	FDI Residual * CEE2nd	FDI Residual * CIS	Adj. R ²	S.E.	N. of obs.
Austria	0.72***	0.16	-0.85***	-0.86**	0.07	0.39	-0.01	-0.47	0.82	0.67	42
Finland	0.65***	0.00	-0.88***	-0.99***	0.15**	-0.10		-0.84***	0.84	0.57	35
France	0.72***	0.10	-0.68***	-0.45	0.04	-0.33	-0.14	0.34	0.80	0.70	50
Germany	0.58***	0.14	-0.74***	-0.77***	0.10	0.19	-0.09	0.46	0.87	0.50	48
Netherlands	0.66***	0.08	-0.44***	-0.78***	0.17	-0.25	0.13		0.81	0.61	42
Norway	0.87***	-0.14	-0.94***	-0.63*	0.19**	0.33		-1.51*	0.89	0.55	34
Switzerland	0.56**	0.41	-1.05***	-1.90***	-0.07	2.16		-0.11	0.80	0.94	40
UK	0.66***	0.14	-0.42***	-1.09***	0.27***	-0.21	0.01	-0.36	0.86	0.57	47
US	0.46**	0.46**	-0.96***	-1.28***	0.37**	0.49	0.33	-0.10	0.64	0.90	48
Japan	0.57**	0.38	-0.84*	-1.46**	0.43***	-0.01	0.26	-6.82	0.69	1.00	40
South Korea	0.54**	0.29	-0.49	-1.08	0.14	-1.43*		0.68	0.71	0.85	31

*** (**, *) Significant at the 1% (5%; 10%) level.

Table 5.1 - Gravity equation on FDI flows with country dummies

<i>db 1982-1995</i>	France	Germany	Italy*	UK
	<i>Coefficient</i>	<i>Coefficient</i>	<i>Coefficient</i>	<i>Coefficient</i>
R ²	0.60	0.5457	0.4698	0.3316
Standard Error	1.48	1.4757	1.7038	1.9982
N. observations	403	514	304	454
Intercept	-232.37***	-159.07***	14.98	-16.55
LGDP	0.97***	0.73***	0.92***	0.98***
LPOP	-0.30***	-0.09	-0.17	-0.40***
LDIST	-0.45***	-0.44***	-0.77***	0.55***
ADJ	0.58**	0.57**	0.26	2.18***
YEAR	0.12***	0.08***	-0.01	0.00
EU10P1	-0.42	0.14	0.61	0.50
EU10P2	0.88***	0.87***	0.54	1.81***
EU10P3	0.18	0.72**	0.97**	2.16***
EU3P1	-2.25***	-0.86*		-1.19*
EU3P2	-1.37***	-0.00	0.10	-1.29**
EU3P3	-1.05**	-0.07	-1.71***	0.98
EPP1	0.44	0.90*	0.19	1.83**
EPP2	1.58***	1.48***	0.79	2.71***
EPP3	-0.21	1.20**	2.11***	0.69
CEEC3	0.82	3.10***	1.25**	1.19*
CEEC2	-1.14*	0.14	-0.71	0.30

For Italy the EU3P2 dummy stands for 1990 only; no data were available prior to that year.

*** (**; *) Significant at the 1% (5%; 10%) level.

Notes

Destination countries include: all OECD countries + Bulgaria, Romania, Slovenia, Slovakia + Argentina, Brazil, Chile + China, Hong Kong, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand. The country coverage is different for each source country, which explains differences in the sample size.

Dummy variables

Each dummy is followed by P1, P2 or P3, which stands for:

- period 1: from 1982 to 1986
- period 2: from 1987 to 1991
- period 3: from 1992 to 1995
- EU10: Belgium-Luxembourg, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, UK
- EP: Portugal and Spain
- EU3: Austria, Finland and Sweden
- CEEC3: Czech Rep., Hungary and Poland (only from 1992 to 1995)
- CEEC2: Bulgaria and Romania (only from 1992 to 1995)

Chart 5.1: France- Evolution of the dummy variables in the 3 periods considered by group of partners

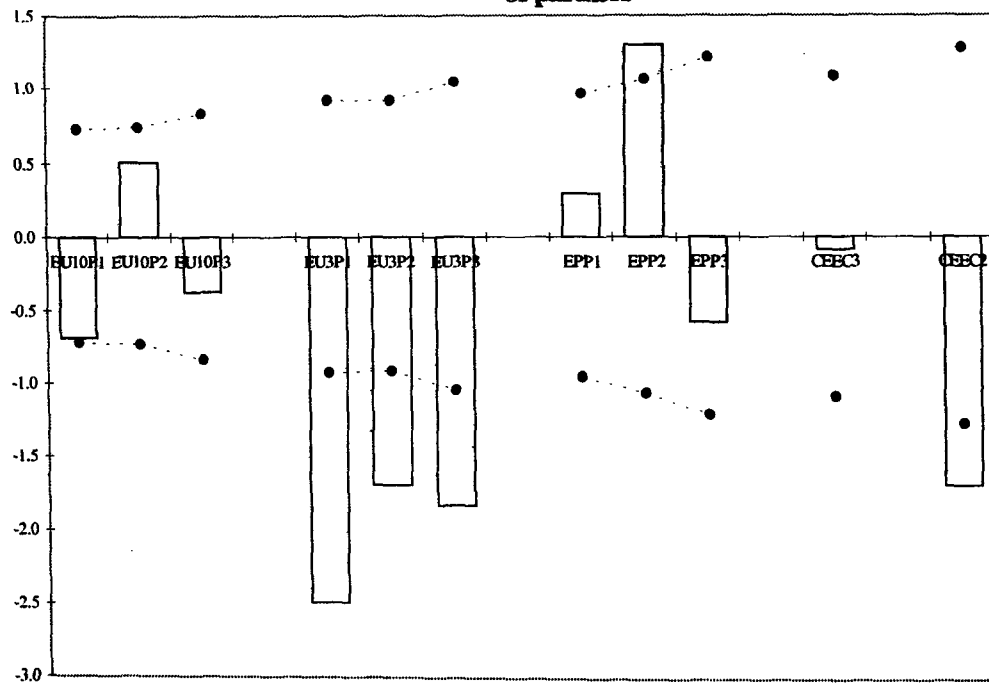


Chart 5.2: Germany- Evolution of the dummy variables in the 3 periods considered by group of partners

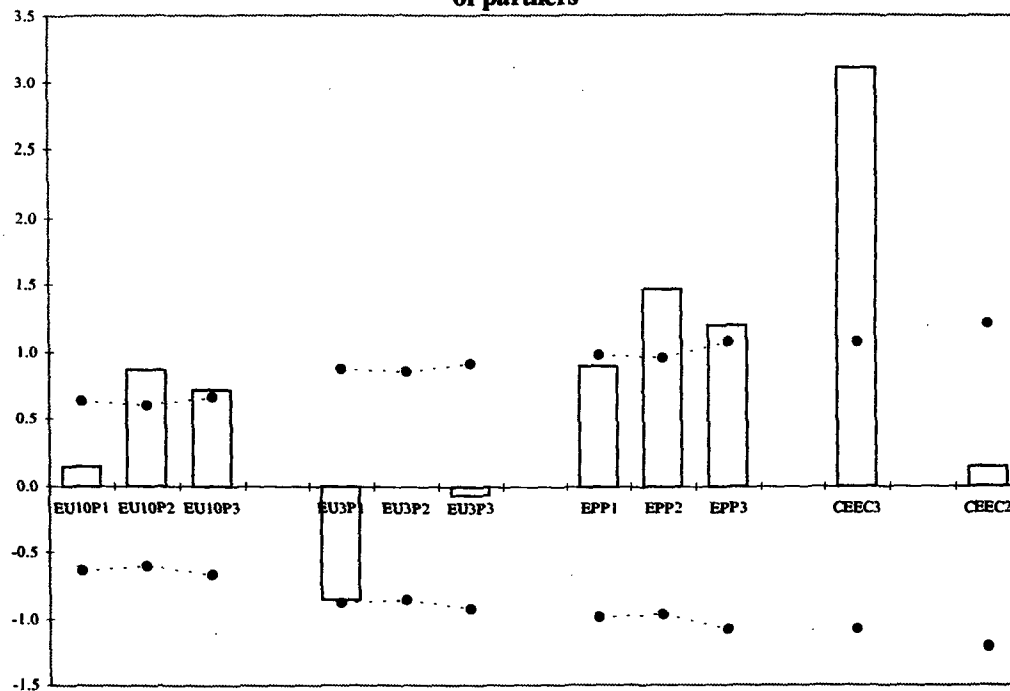


Chart 5.3: Italy- Evolution of the dummy variables in the 3 periods considered by group of partners

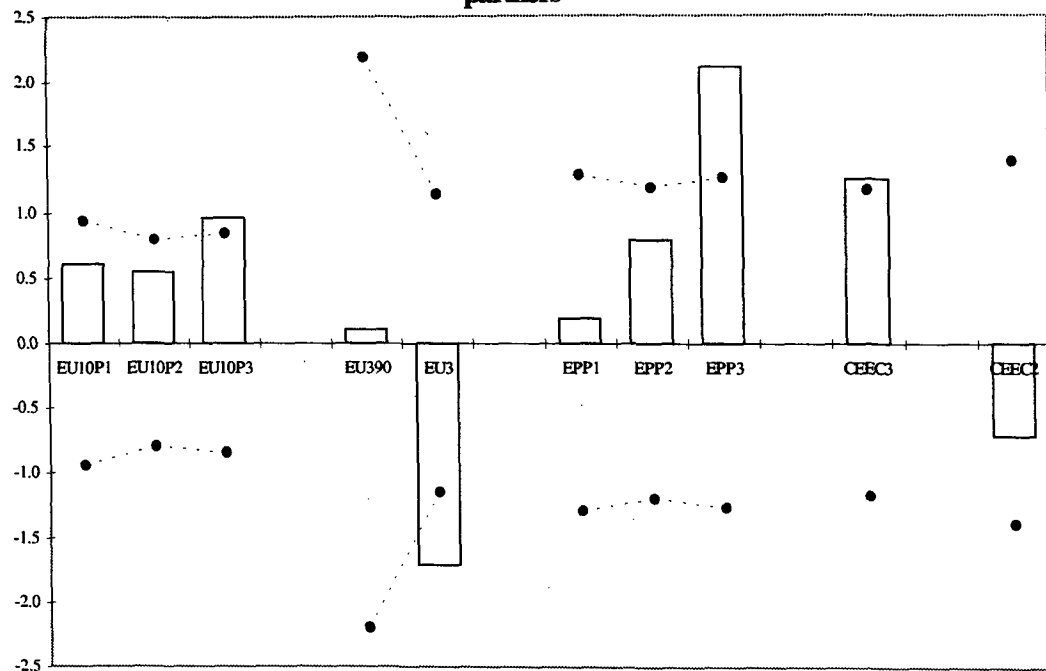


Chart 5.4: UK- Evolution of the dummy variables in the 3 periods considered by group of partners

