Do Western European FDI substitute for export towards Eastern Europe?

STEFANO ELIA
Politecnico di Milano, Department of Management, Economics and Industrial Engineering
stefano.elia@polimi.it

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Abstract

This paper aims to assess whether Foreign Direct Investments (FDI) substitute for trade between home and host countries. Using a survey from Clausing [2000] as a benchmark, the analysis refers to the FDI-trade relationship of both European Union and each of its 15 original countries with Eastern Europe, during the period 1995-2002. The endogeneity problem, which arises from the fact that trade and FDI share the same determinants, has been faced through the price variables, which have been used both as a proxy for FDI and as instruments in the 2SLS analysis. In line with the mainstream of the empirical literature, the results confirm the complementarity hypothesis, both for European Union and for most of the single countries, with the noticeable exception of Belgium, Luxembourg and Germany. Finally, European FDI in Eastern Europe do not seem to displace Japanese and American trade in the same area during the period considered.

Keywords: Foreign Direct Investments, export, substitution and complementarity effects, Eastern European Countries

JEL classification: F14, F23,F43.

Introduction

Growing globalisation of the economy is pushing firms towards a scenario of world-wide competition. The situation requires international strategies in order to survive. The liberalisation of international trade and investments, together with progress in telecommunications and information technologies, has made it possible for Multinational Companies (MNC) to split their production chain into several parts that can be located in different countries. Most debates about the activity of MNC are focussed on the effects of International Investments on the host economies. But how the home countries are affected by FDI? Do they gain or lose from the de-localisation of domestic activities in other countries?

There are several ways to evaluate the impact of international investments on the home country economy, since outward FDI can pour they effects on domestic employment, capital stock, productivity, knowledge spillovers and trade. This paper deal with this last issue, since it tries to assess the impact of outwards investments on domestic export.

The main concern is whether production abroad substitutes for or complements the trade between home and host countries. Indeed foreign production may replace the export of the parent company from the home to the host economy. Nevertheless, this does not happen when the FDI is internationally integrated and foreign affiliates require intermediate products from the parent companies. In this scenario FDI can generate trade rather than substituting for it, and this happens whenever the export loss, in terms of finished product, is more than offset by the export gain, in terms of intermediate goods, as pointed out also by Head and Ries [2004]. Furthermore, even when we have horizontal FDI that (in the short run) displaces trade from home to host countries, this does not entail that the home country will report a loss in the long run. Indeed, if a firm is able to increase its sales on a foreign market through the international investment, it can maintain or even increase its international market share, and this allows the firms to remain an international and strong competitor. Furthermore, in an alternative scenario with no FDI firms might have lost market power with a negative repercussions on home economy and labour.

These arguments show that it is very important to assess whether trade and FDI are substitutes for or complements of one another. Attention is drawn to the effects of European Investments on European trade with Eastern European Countries: to our best knowledge, no studies concerning this topic have been conducted looking first at the whole European Union and then to each of its 15 original countries, in order to disentangle Western Europe's heterogeneity in international investments towards Eastern Europe. Therefore, starting from this sample, this paper will try to establish whether European FDI in Eastern Europe complements European trade towards

the same area or substitutes for it, and whether each single Western European country's FDI in Eastern Europe is complement or substitute with respect to each Western European country's trade towards Eastern Europe.

The paper is organised as follows. The first paragraph is dedicated to the review of the literature, with a distinction between the theoretical and the empirical approach. In the second section the methodology and the data are discussed. The third part shows the results of the econometric analysis. Finally conclusions about the research are drawn.

1. Previous literature

The relationship between international investments and trade is a very controversial subject, since it combines different effects that can sometimes pull in different directions. In order to detect all the possible dimensions that may arise from the trade-FDI relationship, it is useful to catalogue the relevant literature distinguishing between the theoretical and the empirical considerations. In fact, theoretically both substitution and complementarity effects arise, whereas empirically the results mostly show a positive relationship. Behind this apparent discrepancy, there are good reasons that justify every different output according to the aspects that have been taken into account in studying the FDI-trade relationship.

1.1 - The theoretical approach

From the theoretical point of view, we observe some authors supporting the substitution argument, while some others find a complementarity relationship between trade and FDI. The divergence of these results can be explained looking at the historical evolution of the Trade Theory, which has gradually incorporated more complex issues related to the relationship between FDI and trade, always coming to newer and more advanced conclusions.

Traditional Trade Theory looks upon FDI as alternative of trade. The so-called "OLI paradigm" (Dunning [1981]) summarises what are the main determinants in firms' choice of serving a foreign market, namely Location advantages, Ownership and Internalisation. Location[1] refers to the advantages that arise from the different endowments of countries, Ownership[2] is related to those intangible assets[3] that firms can exploit only through direct investments and not by

[1] The Location advantage argument has been developed by Heckscher–Ohlin.
[2] The Ownership as justification for FDI has been developed originally by Hymer [1960].
[3] E.g. in terms of production technology, trademark or organisation.

exporting, and Internalisation[4] occurs when the transaction costs are higher than the costs of organising the same activity inside the firm. According to the OLI paradigm, a firm will engage FDI instead of trade whenever all these three conditions are fulfilled. If location advantage does not hold, the firm will export. The greater the ownership advantage, the greater the incentive to invest. The presence of economies of scales and trade costs act as a incentive to internalise. Hence, we see that in this case trade and FDI are seen as alternatives for one another, according to what determinants prevail.

In the early 80's a new Trade Theory emerged to account for two main aspects of the evidence that traditional theory left unexplained. First of all, half of the economic exchanges occur between industrial countries, which are very similar in factorial endowments. Secondly, one third of the trade can be classified as intra-industry flows, namely as exchanges of goods within the same industry. In order to justify this empirical evidence, New Trade Theories consider models based on increasing instead of constant returns to scale, imperfect instead of perfect competition, and heterogeneous instead of homogeneous products and firms. In this context, the more productive firms become international in order to exploit the economies of scale and to gain oligopoly power, by choosing either to export or to invest abroad. Even if these choices still appear as alternatives, FDI not always substitutes for the export: indeed FDI can occur either through vertical or through horizontal FDI. Vertical FDI consist of de-localisation of some of the stages of the production process, and they are undertaken when the upstream or downstream activities have different factor intensities and countries differ in factor endowments: as Helpman and Krugman [1985] claim, this situation give birth to intra-firm trade of intermediate products and therefore the localisation of activities abroad generates trade. On the other side, Horizontal FDI refer to foreign manufacturing of products and services roughly similar to those ones that firms produce in their home market. As Markusen [1984] observes, this generally happens when countries are similar in endowments and one firm wants to enter the foreign market: in this case plants in different locations produce the same good, therefore intra-firm trade does not occur and trade and FDI are substitutes.

Recent theories concerning trade/FDI relationship show different opinion about their correlation. Horstman and Markusen [1992] and Brainard [1993], which introduce trade costs in horizontal FDI models and develop the proximity-concentration trade-off, conceive trade and FDI as alternatives: export will prevail when fixed costs of investing are high and transport costs are low, whereas in the opposite scenario, the firm will invest abroad and will substitute for export. Markusen and Venables [1995, 1998] formulate the so called "convergence hypothesis": the more

[4] Buckley and Casson [1976], together with Coase [1960] and Williamson [1975], are the main referents for the Internalisation theory as justification for FDI.

the countries become similar in size and relative factor endowment, the more MNC will substitute for trade. The Knowledge-Capital models consider vertical and horizontal FDI by using complex analytical approaches: decision about exporting rather than engaging in horizontal or vertical FDI is endogenously taken as a function of three main variables, namely trade costs, investment barriers and differences among countries in terms of factor endowments. These models admit both complementarity and substitution effects, according to the combination that emerges from the decision variables[5]. Finally, Baldwin and Ottaviano [2001] and Markusen and Maskus [2001] have provided further contributions to the evidence of complementarity within the New Economic Geography theory: according to their findings, the possibility of splitting the production chain in different stages and the existence of multi-product firms mainly generates a positive relationship between FDI and trade, either with a scenario of agglomeration or with a context of dispersion. In the former case, inter-industry trade will prevail, whereas in the latter, intra-industry trade will take place, but in both cases FDI and trade turn out to be complementary. Finally Pontes [2005] finds a non monotonic relationship: trade and FDI behave as complements for high value of trade costs and as substitutes for low values of trade costs.

1.2 - The empirical approach

Most of the empirical papers find a positive relationship between FDI and export. The reliability of these analyses depends on the dimensions that the authors have considered when they study the effects of international investments on trade.

First of all, the level of aggregation of the data plays a crucial role in determining the statistical output. Some studies make use of data aggregated by industry (Lipsey and Weiss [1981], Blomstrom, Lipsey and Kulchycky [1988], Brainard [1993, 1997], Yamawaky [1991], Blomstrom, Kokko, Zejan [1994], Pfaffermayr [1996], Lipsey and Ramstetter [2002], Piscitello and Tajoli [2005]) or country (Grubert and Mutti [1991], Graham [1994, 1996], Clausing [2000], Rubio and Munoz [2001], Amiti and Wakelin [2003]). These surveys capture both the direct and the indirect effects, since it might happen that a foreign plant on the one hand substitutes for the exports of the firm that invests abroad, but on the other hand generates export for other domestic firms such as the suppliers of intermediate goods or facilities. Therefore these studies nearly always report a positive relationship between export and FDI.

[5] Following the model elaborated by Markusen *et al.*[1996], with the extensions in Markusen [1997, 2000] and Carr *et al.*[2001], we can have the following different scenarios: 1) All horizontal MNC firms, when transport costs are high and countries are similar in endowments and size (substitution) 2) All exporting domestic firms, when countries are similar in endowments but different in size (substitution) 3) Vertical Multinational firms, with headquarters in the home country and plants in host countries, when factor endowments are different and sizes are similar (complementarity).

On the other hand, firm-level data studies (Lipsey and Weiss [1984], Swedenborg [1979, 1982, 1985, 2000], Mucchielli et al. [1993], Head and Ries [1994, 2001]) catch only the direct effects that international investments exert on trade, since they refer only to the single firms. Therefore these papers should find mostly a negative relationship. Nevertheless almost all studies find a positive correlation between export and FDI, except for Svensson [1993, 1996], who finds substitution for Sweden. A good explanation for these findings is given by Head and Ries [2004], who claim that MNC are multi-product and multi-industries firms, which often invest abroad with only one product (or in only one industry) in order to enter the market and to increase their export with regards to the other products/industries, by exploiting products and industries complementarities. Therefore firm-level data do not allow to catch the substitution relationship between trade and FDI, since they refer to several products. Product level data should be used: indeed, authors who make use of this type of data (Blonigen [1999, 2001]), or who focus only on one industry (Belderbos and Leuwaegen [1998], Gopinath, Pick and Vasavada [1999], Vavilov [2005]), find substitution effects.

A second important issue that must be taken into account when testing the relationship between trade and FDI with data is the nature of investment, which might be either vertical or horizontal. As pointed out in the paragraph dedicated to the theoretical approach, theories and models with horizontal FDI sustain substitution, whereas theories and models with vertical FDI uphold complementarity. Few authors distinguish between horizontal and vertical FDI, also because of the difficulties in finding separate data. Lipsey and Weiss [1984] find complementarity with respect to affiliate production and exports of intermediate goods, but no effects with respect to affiliate production and export of finished goods. Head and Ries [1994, 2001] find that Japanese firms that engage in horizontal FDI and Japanese firms whose affiliates source a high share of intermediate inputs from other firms than the parent company, exhibit a net substitution effect between FDI and export. Belderbos and Sleuwaegen [1998], who found a negative relationship between trade and FDI for Japan when using product-level data, report a positive correlation between the two when they focus on vertical FDI. Finally Amiti and Wakelin [2003] find complementarity between US upstream export and US downstream unskilled FDI

Considering the nature of the investment also means to understand the reason of the FDI. For example, if the investment is undertaken to avoid trade tariffs or high trade costs, FDI is likely to substitute for export. Belderbos and Leuwaegen [1998] find that the “tariff-jumping” investments undertaken by electronic Japanese firms in Europe in the late 80’s has substituted for the export

from Japan, as well as Amiti and Wakelin [2003] who find substitution for U.S. horizontal FDI undertaken to avoid trade costs.

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A third element that should be taken into account is the counterfactual analysis. Indeed, when dealing with FDI and trade relationship one should ask what would have happened to export if the MNC had not invested abroad. Would the firms have been able to maintain their market share or would they have been driven out of the market by the international competition, with a consequent reduction in exports? Would the parent company be able to supply the same markets served by affiliates only through export?

The evaluation of the alternative "exporting scenario" against the benchmark of FDI is called counterfactual analysis. Frank and Freeman [1978] show that U.S. MNC would not be able to maintain their market share if they had attempted to serve the foreign countries by exporting instead of investing. Lipsey and Weiss [1981] find that the production of U.S. foreign affiliates is positively related to U.S. export but negatively to export to the same host country by a third developed country; in other words, the presence of affiliates in a country tends to attract export from the home to the host country and to discourage the export from other countries to the host economy, and this reveals that countries that did not engaged in FDI are suffering from market share losses. Lipsey and Weiss [1984] also find that U.S. foreign affiliates that produce to export in third countries displace U.S. export towards that country, but this effect is more than offset by the increase of export of U.S. MNC towards the host economy; they also argue that, even if there is a short-run displacement effect, in the long run the activity of foreign affiliates, which export their production to third countries, could later give rise to export from the U.S. to the third country. Lipsey [1994], by comparing the share that United States, Japan and Sweden have in world export in different periods of time, demonstrates that one major role for overseas production was that one of retaining market shares when home country economic conditions and exchange rates made them less competitive in international trade. Finally Lipsey and Ramstetter [2001] find that Japanese export towards a country is negatively correlated with American affiliates production in the same country, and this show that without investing abroad a country run the risk to lose market shares.

Another issue that must be controlled for is the endogeneity problem. As Barba Navaretti and Venables [2004] underline, the basic problem of all econometrics studies that evaluate the impact of FDI on export is that the determinants of FDI often coincide with the determinants of export. This generates an endogeneity problem, which alters the econometric results derived from regressing the FDI proxy on export. There are several ways to control for this problem. Most of the

authors (Swedenborg [1985], Blomstrom, Lipsey and Kulchycky [1987], Grubert and Mutti [1991], Head and Ries [1997], Swedenborg [2000], Clausing [2000], Marchant, Cornell and Koo [2002]) adopt the 2-SLS technique by using from time to time different instruments, such as the estimated production levels by foreign affiliates, the European Community membership, taxes and wages, and they still find complementarity between export and FDI. Graham [1996] and Pfaffermayer [1996], estimate two equations simultaneously, one for FDI and one for Export, and they look at the correlation between the residuals. They still both find a positive relationship between export and investments. Finally, other authors face the problem of endogeneity by using different proxies for FDI. Brainard [1993] use the affiliates' employment level and their net asset, and still obtains a positive relationship between American export and American FDI. Clausing [2000], Belderbos and Sleuwaegen [1998], and Amiti and Wakelin [2003] use the so-called price variables, which are proxies that represents the cost of investing abroad. To assess whether there is substitution or complementarity, thay look at the cross-price elasticity: if the price variable is negatively correlated with Export a positive relationship holds between trade and FDI, since it means that when the cost of investing abroad rises the FDI decrease and Export also decreases.

Heterogeneity of firms is another item that should be considered, even if few authors take it into account. Helpman, Melitz and Yeaple [2003] find that heterogeneity plays a crucial role in trade/FDI relationship, not only because only the productive firms become international and only the most productive become multinational, but also because they show that more heterogeneity leads to significantly more FDI sales relative to export sales and therefore to a substitution relationship.

A final issue that is debated within the trade/FDI relationship is the proxy for FDI. Since the earliest studies (Lipsey and Weiss [1981, 1984]), the most used variable has bee net sales, which is constructed by subtracting from the sales of the foreign affiliates the imports of intermediate goods coming from the parent company. In this way we decrease the correlation between trade and FDI due to the import of intermediate goods from the parent company. To further avoid spurious correlation between sales and FDI, several authors (again Lipsey and Weiss [1981, 1984], Blomstrom Lipsey and Kulchycky [1988], Clausing [2000] and many others) have considered the net local sales, that refer to the sales of foreign affiliates in the market where they produce. This further adjustment allows to avoid the correlation between the export from home to host country and the export from home country to the third countries through foreign affiliates.

Alternatively, when there is lack of this type of data, the added value of foreign affiliate can be used as a good proxy of net sales of foreign affiliates, as we find in Lipsey, Ramstetter and Blomstrom [2000].

Finally, to face the endogeneity problem, different variables have been used for FDI in other studies, such as the affiliates' employment level and net asset of firms in Brainard [1997] and the price variables in Clausing [2000], Belderbos and Sleuwaegen [1998], and Amiti and Wakelin [2003]. Belderbos and Sleuwaegen [1998] also used different dependent variables for export, such as trade barriers (tariffs, antidumping measures, quotas and voluntary export restraint).

2. The Methodology and the Data

The main benchmark of this analysis concerning the relationship between trade and FDI is the paper of Clausing [2000], which is considered to be one of the most complete studies in this field[6], since she tries to control for as many biases as possible. Furthermore, the use of Clausing's specification makes it possible to strictly compare US and EU experiences, econometric technique being equal. Indeed, while Clausing studied the effects of U.S. foreign investments in 29 host countries from 1977 to 1994, this paper investigates the impact of European investments towards Eastern Europe on European trade. The only difference is the historical period, which will be controlled for through time dummies as Clausing did. Finally, this work goes beyond that one of Clausing since it also disentangles European heterogeneity looking at each of the 15 original European country's experience in FDI towards Eastern Europe and it also analyse the displacement effects of European FDI with respect to Japanese and U.S. export..

The host economies that have been considered are eleven Central Eastern European Countries (CEECs), seven of which joined Europe in May 2004 while other two joined Europe in January 2007[7]. The panel data that have been used refers to the period 1995 – 2002. The starting date is due to the nearly absolute absence of data about FDI in Eastern Europe before 1995, since Eastern Countries started quite late to gather statistical data after the fall of the Berlin wall.

[6] Two very recent and noticeable works that deal with the effects of FDI on trade, namely the survey of Forte [2004] and the book of Navaretti and Venables [2004], have this opinion about Clausing's paper.

[7] The 11 CEECs that have been taken into account to evaluate the effects of European FDI on European Exports are: Bulgaria, Croatia, Czech republic, Estonia, Hungary, Latvia, Poland, Romania, Slovak Republic, Slovenia and Ukraine. Bulgaria, and Romania joined Europe in 2007, while the other countries (except Croatia and Ukraine) joined Europe in May 2004. Lithuania has been excluded because of the difficulties in finding detailed data on the export. Other studies admit the difficulties in finding detailed data of trade and/or FDI for Lithuania, such as Lovino [2002] in her survey "Foreign Direct Investment in the Candidate Countries: sector and country composition".

However, most of the FDI from Western to Eastern Europe have been massively undertakenrting from the half of the 90's, with a significant growth since 1996[8]. As a closing date 2002 have been chosen because this year was the last available in the database used for the export data[9].

Following Clausing, country level data on export and FDI have been considered, in order to catch both the direct and the indirect effects. It was not possible use Firm-level data to isolate the direct effects and to better discriminate between horizontal and vertical FDI, since no data on single firm exports were available in the databases used. Data at product-level and industry level were not available either[10].

The specification used to evaluate the effects of European FDI on trade with the CEECs is the "gravity equation", that is a popular formulation for statistical analyses of bilateral flows between two geographical entities. The multiplicative nature of the gravity equation makes it possible to take the natural logarithm of the variables, and it permits to obtain a linear relationship between trade flows and the other variables included in the equation. The advantage of using the logarithm is that we can interpret the coefficient as elasticity. The equation is therefore:

$$\ln(Exports_{ect}) = \alpha + \beta_1 \ln(GDP_{ct} * GDP_{et}) + \beta_2 \ln(GDPpc_{ct} * GDPpc_{et}) + \beta_3 \ln(distance_{ec}) + \beta_4 \ln(Exch.\ Rate_{ect}) + \beta_5 \ln(Exch.\ Rate\ Lag\ 1_{ect}) + \beta_6 \ln(Exch.\ Rate\ Lag\ 2_{ect}) + \beta_7 \ln(AddedValue_{ect}) + \beta_8 Z + \varepsilon_{ect}$$

where *e* represents first the whole European Union and then each of the 15 EU countries, *c* is the CEEC and *t* is the time.

The *export* variable is the export from Europe (and then from each of the 15-EU countries) towards each Eastern Country from 1995 until 2002[11].

The GDP term serves as proxy of the economic sizes of the exporting and importing countries. The idea is that the closer the characteristics of the markets the more the countries trade, therefore we expect a positive sign from this variable.

[8] Source: Eurostat, Statistics in focus, Economy and Finance, Survey from Lovino [2002]: "Foreign Direct Investment in the Candidate Countries: sector and country composition". See also Passerini [2000]: "European union FDI with Candidate Countries: an overview".

[9] As it will be explained later, data about export of Western Europe towards and from the CEECs come from WIIW database.

[10] Neither AMADEUS nor WIIW databases, which have been used for the econometric analysis, contained these types of data.

[11] All data about trade between Europe and CEECs from 1995 until 2002 come from the WIIW (The Vienna Institute for International Economic Studies) database, except for the data of Estonia and Latvia that come from the respective national statistics offices.

The GDPpc term represents the GDP per-capita of the EU Country and the CEEC. The idea behind this variable is that higher income countries trade more, according to the New Trade theory which states that intra-industry trade prevails. On the other hand a negative coefficient might be consistent with conclusions from the traditional Trade Theory, which states that trade across countries is determined by their factorial differences. We can expect thereby also a negative sign, since most of the investments that take place in the CEECs are justified by the lower cost of the wages. This means that if trade follows FDI, there will be more exchanges with countries that have a lower GDP per-capita[12].

The distance is normally used as proxy for transport cost. We expect therefore a negative sign, because the more the distance the more the costs of trading and, hence, the less the export. The transportation costs are calculated for each pair of EU-Eastern country as the distance between the capitals[13].

The exchange rate plays a significant role in explaining trade, so it needs to be included in the gravity equation. It is calculated as the exchange rate between each CEEC currency against each of the 15-EU countries' currency, starting from 1995 until 2002. For the European Union as a whole the exchange rate has been calculated as each CEEC currency against the ECU (until 2001) and Euro (in 2002). We expect a negative sign since whenever the foreign currency depreciate the export of the European Country decreases[14].

Inside the equation, lagged values of the exchange rates have been included in order to control for the so-called "J-curve effect". According to this phenomenon, it could be that in the short term a depreciation of the exchange rate might not affect the trade due to the low price elasticity of demand for imports and due to the fact the contract last generally at least 1 year so prices are not changed before the deadline. This means that when the exchange-rate depreciates, the balance of payments (export-import) will initially deteriorate because the nominal value of the export decreases, but in the long run it will improve because prices changes and exports increase.

Finally we have the proxy for the FDI. It was not possible to use the variable *net local sales* as most of the studied do, since the database[15] used did not allow to distinguish between import from parent company and material costs. Therefore the variable *Added Value* of foreign European

[12] GDP and GDPpc come from the Eurostat database, except for Ukrainian data that comes from the WIIW database.
[13] The distance between each pair of capitals have been calculated through the site www.michelin.com, by choosing the option "the shortest route" in the "Driving directions" menu. For European Union the distance between each Eastern European capital city and Frankfurt have been taken into account. This city is in fact the benchmark generally used to calculate the distance with respect to Europe (see e.g., Carmignani and Chowdhury, [2005])
[14] The exchange rates between each CEEC and each European Country have been calculated through the exchange rate against the dollar. The exchange rate between the CEECs currencies and the dollar comes from the WIIW database, whereas the exchange rate between each EU-15 currency and the dollar comes from the database Datastream.
[15] Data about FDI have been downloaded from the AMADEUS database. The data refer to the added value of Eastern Countries foreign affiliates owned by EU shareholders at least at 51%.

affiliates in the CEECs have been used, since it is considered a good proxy both for FDI and (even if imprecise) for net sales, as Lipsey, Ramstetter and Blomstrom [2000] claim. This variable is crucial to understand the relationship between trade and FDI. A positive sign would reveal complementarity while a negative sign would show the existence of substitutability.

The variable *Z* expresses the two dummies that have been inserted in the regressions to control for other elements that may have influenced the trade between Europe and CEECs from 1995 till 2002. The first one, named *dummyEU*, serves to control whether the seven CEECs that joined Europe in 2004 traded more than the other four countries, in view of their future membership. The other dummy is the *dummyborder* and its function is to control for the advantages that some CEECs may have had in trading with Western Europe because of their contiguity to the EU border.

Since the explanatory variables affect not only the export but also FDI, an endogeneity problem, which must be controlled for, rises. Therefore the so-called price variables have been introduced both as proxies of FDI and as instrument of a 2-SLS analysis, according to the procedures used by Brainard [1993], Clausing [2000], Belderbos and Sleuwaegen [1998], and Amiti and Wakelin [2003]. The price variables express the cost of investing in the host countries and can reveal the relationship between export and FDI in terms of cross-country elasticity: if the coefficient is negatively correlated with export it means that, whenever the cost of investing abroad increases, trade decreases and therefore trade and FDI are complements. Furthermore, price variables are supposed to be correlated with FDI but not with trade, since they express the cost of investing and not of exporting, therefore they also can be used as instruments of a 2SLS analysis.

The price variable that have been taken into account are compensation of workers and taxes:

$$\ln(Exports_{ect}) = \alpha + \beta_1 \ln(GDP_{ct} * GDP_{et}) + \beta_2 \ln(GDPpc_{ct} * GDPpc_{et}) + \beta_3 \ln(distance_{ec}) + \beta_4 \ln(Exch.\ Rate_{ect}) + \beta_5 \ln(Exch.\ Rate\ Lag\ 1_{ect}) + \beta_6 \ln(Exch.\ Rate\ Lag\ 2_{ect}) + \beta_7\ taxrate_{ect} + \beta_8 \ln(compensation_{ect}) + \beta_{10} Z + \varepsilon_{ect}$$

The *taxrate* variable has been built as the ratio between the taxes paid by the foreign European affiliates and their gross income, always pairing each CEEC with each 15-EU country from 1995 until 2002. The cost of the workers (*compensation*) is calculated with respected to the employed in the foreign European affiliates, always for each pair of countries from 1995 until 2002[16].

Finally, the so-called displacement effects have been evaluated. Following the procedure of Blomstrom, Lipsey and Kulchycky [1988], the aim is to understand the impact of A's investments

in B, on C's exports towards B, where in our case A is the European Union, B consists of the Eastern Countries and C incorporates the United States and Japan[17].

The equations used to evaluate the displacement effects of European FDI on American and Japanese exports are the followings:

$$\ln(Exports_{uct}) = \alpha + \beta_1 \ln(GDP_{ct} * GDP_{ut}) + \beta_2 \ln(GDPpc_{ct} * GDPpc_{ut}) + \beta_4 \ln(Exch.\ Rate_{uct}) + \beta_5 \ln(Exch.\ Rate\ Lag\ 1_{uct}) + \beta_6 \ln(Exch.\ Rate\ Lag\ 2_{uct}) + \beta_7 \ln(AddedValue_{ect}) + \beta_8 Z + \varepsilon_{uct}$$

for United States, and:

$$\ln(Exports_{jct}) = \alpha + \beta_1 \ln(GDP_{ct} * GDP_{jt}) + \beta_2 \ln(GDPpc_{ct} * GDPpc_{jt}) + \beta_4 \ln(Exch.\ Rate_{jct}) + \beta_5 \ln(Exch.\ Rate\ Lag\ 1_{jct}) + \beta_6 \ln(Exch.\ Rate\ Lag\ 2_{jct}) + \beta_7 \ln(AddedValue_{ect}) + \beta_8 Z + \varepsilon_{jct}$$

for Japan.

The *e* still represents Europe, whereas *u* is for United States and *j* is for Japan. The distance has been omitted since the countries of destination of the export are all located very far from the United States and Japan and are concentrated in the same area, all close one to each other, therefore distances have been considered insignificant for the gravity equation.

The variables have been built in the same way and comes from the same databases as the other specifications. A negative relationship between *added value* of European affiliates and American or Japanese export would mean that European FDI displace Japanese and U.S. trade, otherwise United States and Japan gained as well as Europe from European Investments in the CEECs.

3. Results

3.1 – European Union

Column [1] of table 1 shows the results for European Union, without fixed effects. All the variables have the expected sign for all specifications, except for the exchange rate lag.

The exchange rate is negative for the exports as it should be, since as soon as foreign currency depreciates (that is, the exchange rate between the CEEC and the European Country increases) the exports towards the CEECs decrease. The anomalous result is the coefficient of the lagged values of the exchange rate, which turns out to be positive. A possible explanation for this result can be found in the pricing and marketing strategies that firms set up to protect themselves

[16] Both the tax rate and the cost of workers com from AMADEUS database.
[17] This analysis can not be considered a counterfactual analysis because both Japan an United States invest in the CEECs.

against exchange rate fluctuations. Indeed, European enterprises might be willing to defend their market share e.g. by appropriate price concessions. Despite the temporary losses of earnings associated with such a strategy, offering discounts allows firms to keep their market position, or even to increase it. Therefore it might be the case that European firms after one year react to the appreciation of their currency through a bulk of strategies (such as discounts) that allow them not only to stem the decrease of the exports, but also to invert the trend[18].

The negative sign of the GDP per capita appears to reveal that Europe trades more with the poorest CEECs. So it seems that the fundamental hypothesis of the traditional trade Theory, namely that countries trade because of the differences of their endowments, holds in this case. In other words Western Europe, which is capital abundant and have an abundance of skilled workers, trades more with countries that have a lower GDP per capita, since they have an abundance of unskilled workers and they produce low-cost labour-intensive products, which are traded with capital from Europe.

The other variables have all the expected signs. The positive coefficient for GDP confirms that market size matters in the international economic relationships. The distance is negative, revealing that the more the trade costs the less the trade between countries. The positive sign of the dummy *EU member* reflects the advantage that the candidate Eastern Countries had in their economic exchange with Europe, in view of their incoming accession to the European markets. Finally the positive coefficient of the dummy *border* implies that geographic and cultural contiguity to Europe represents an advantage for embarking on trade with EU.

Turning our attention to the FDI, the proxy is positively correlated with the export. This is coherent with the findings of most of the relevant literature about trade and FDI, according to which international investments and international exchanges are complements rather than substitutes.

To investigate whether these results are due to countries-specific characteristics, the fixed effects have been introduced in the equation. Since the data-set consist of 15 European countries and 11 CEECs, both European countries dummies and CEECs dummies[19] have been introduced. Indeed, the strong complementarity relationship can be due to specific characteristics of either some of the Eastern Countries or some of the EU-15 countries. Columns [2] and [3] of Table 1 show the results respectively with EU and with CEECs fixed effects analysis. In both cases trade and FDI remain complements.

[18] This explanation has been provided also by the Deutsche Bundesbank Monthly Report [1997] to account for the anomalous reactions of the German trade balance to the fluctuations of the exchange rate of Deutsche Mark against the U.S. Dollar. Indeed, it has been observed that during the mid-eighties, when the Mark appreciated, the German exports increased noticeably.

[19] The CEECs dummies and the EU-15 dummies have been introduced in separate equations, never together. Indeed, all these dummies together in the same equation would mean that we control for the specific economic relationship of each pair of Western-Eastern country, making it impossible to obtain significant results.

In table 2 price variables have been introduced to reduce the endogeneity problem and to check whether the outcome of complementarity is confirmed by the cross-price elasticities. The results are contrasting: indeed, while tax variable seems to confirm the complementarity hypothesis, with a negative sign, the cost of workers reveals a substitution relationship, with a positive sign. A plausible explanation of this finding might lie in the nature of the investments that Europe undertakes in the CEECs. Indeed, most of the trade and the investments between Western and Eastern Europe are vertically integrated[20] and this explains why we found a complementarity relationship in the previous regressions. Nonetheless, the main economic justification of these investments is the difference in economic endowments, as it turned out also from the negative sign of the GDP per capita coefficient. This means that investments are very sensitive to the wage differentials between countries, as Merlevede and Schoors [2004] claim. Whenever these costs decrease, FDI increase massively and they may result in export substitution at least in the short run because several phases of the production chain are moved from Western to Eastern Europe.

In order to drive out any doubt about the ultimate impact of Western European FDI on export towards Eastern Europe during the period 1995-2002, a 2SLS analysis have been run, by using the price variables as instruments. Table 3 shows the results without (specification [1]) and with (columns [2] and [3]) fixed effects. The complementarity relationship between export and FDI is definitely confirmed by the positive and significant sign of the coefficient.

3.2 – European Countries

After assessing the positive impact of FDI on export with respect to the whole European Union, it has made it necessary to disentangle the heterogeneity given by the 15 different countries that compose it. Therefore the data-set has been separated to analyse the specific relationship between export and FDI of each of the EU-15 countries towards Eastern Europe, by applying the same gravity equation and the same proxies used for European Union. Table 4 shows only the coefficients of FDI proxy, which mostly are positive and significant.

The only countries that seem to suffer from a substitution relationship between trade and FDI are Belgium and Luxembourg. There may be several explanations for their outcome: the less likely is that their FDI in Eastern Europe are mainly horizontal. Alternatively, it might be that they invest vertically but in upstream activities, therefore they import from Eastern Countries rough

[20] See e.g. Gabrisch and Segnana [2003] for a description of the vertical nature of trade and FDI between EU and CEECs.

materials or goods which are at the beginning of the production chain and this does not generate exports for Belgium and Luxembourg, but only imports. A final possible explanation is that Belgium and Luxembourg are traditionally considered small open economies, and therefore they are price takers with respect to Western European Countries and, as a consequence, with respect to Eastern Countries, whose terms of trade are set upon those ones of the biggest Western Countries. In this case FDI might generate trade, but the terms of this trade, imposed by the biggest European Countries that act as price makers, might be unfavourable to small open economies, with negative repercussions on the value of export. Also Portugal appears to uphold a negative relationship between investments and trade, but the coefficient is not significant.

However, the European countries that are main investors in the CEECs, such as Austria, France, Italy, United Kingdom and Netherlands, show complementarity between export and FDI. The only exception is Germany, which shows a relationship between export and FDI not significantly different from zero. This is probably due to the heterogeneity of German investments towards Eastern Europe: indeed German is absolutely the main investors in the CEECs, with a presence of a huge amount of firms that behave either as asset exploiters (which engage in vertical FDI), or as market seekers (which engage in horizontal FDI), or as asset explorer (which engage in horizontal/vertical FDI).

Finally, the other countries exhibit not significant results because of their low level of FDI in Eastern Europe. In particular, Finland and Sweden invested massively in Estonia and Latvia, but sporadically in the other eastern countries, therefore it is not possible to obtain significant results with aggregate data. The same applies to Greece, whose investments are directed almost only to Bulgaria.

3.3 – Displacement Effects on U.S. and Japanese export.

Following the procedure of Blomstrom, Lipsey and Kulchycky [1988], and Lipsey and Weiss [1981], a final analysis have been conducted to assess whether European FDI in Eastern Europe displace the U.S. and Japanese trade in the same area. The goal is to understand whether the positive relationship between European Export and European FDI during the period 1995-2002 occurred to the disadvantage of the U.S. and Japan. In other words, an eventual negative coefficient would reveal that European FDI decreased the American and Japanese market share in Eastern Countries, whereas a positive relationship would tell us that even the United States and Japan benefited from European FDI in terms of market expansion.

Table 5 shows positive coefficients for European affiliates' added value with respect to both Japanese and U.S. export. This disproves the hypothesis that European FDI displace third countries' trade, at least as far as United States and Japan are concerned.

A final interesting finding that results from this regression is the coefficient for the GDP per capita. It turns out to be positive instead of negative as it is for Europe. This might mean that, contrary to the European Union, the economic justification of U.S. and Japanese trade with Eastern Europe is linked to other reasons than differences in endowments and wage differentials, and that U.S. and Japanese firms are more market seekers than asset exploiters with respect to European firms.

4. Conclusions

This paper tries to evaluate whether FDI substitute for the trade of home country with the host economy. Looking at the previous literature, we can distinguish between a theoretical and an empirical approach. While the theory is divided between the supporters of substitution and the backers of complementarity, the empirical papers are fairly homogeneous in finding a positive relationship between trade and FDI.

The analysis refers to the empirical works on trade and FDI from Clausing [2000], who evaluated the impact of U.S. FDI on U.S. trade with some host countries. Following the basic formulation of this author, the same specifications has been applied to assess whether Western European FDI have substituted for European export towards Eastern Europe during the period 1995-2002. To our best knowledge, there are no studies concerning this topic that both look at the whole European Union and disentangle the pattern of each of the 15 original European Union countries. To give more robustness to the results, fixed effects have been introduced in the panel data and the 2SLS technique, together with the price variables, have been used to control for the endogeneity problem, which arises from the fact that FDI and trade share the same determinants.

The empirical findings confirm the complementary relationship between export and FDI, in line with the mainstream of the literature. This outcome is valid not only for the whole European Union, but also for most of the single European Countries, with the noticeable exception of Belgium, Luxembourg and Germany. A final analysis shows that no displacement effects have occurred between European FDI in Eastern Countries and U.S. and Japanese trade within the same area during the period considered.

Nevertheless, results must be interpreted with caution. Indeed what have been analysed is the country level dimension of the impact of FDI on trade, which is able to capture the direct and indirect effects, but not to isolate either the effects of internationalisation on the single firms nor the patterns of different industries. Furthermore the investments that have been taken into account are mainly of vertical type, since Western Europe is capital abundant while Eastern Europe is labour abundant, and the negative sign of both the GDPpc and the cost of workers confirms this hypothesis. As we have seen, vertical FDI tend to be complements with respect to export. The same analysis run between European export and European FDI towards OECD countries, where FDI are more of horizontal than of vertical type, might give different results. All these issues can be some of the lines along which to undertake further research in future works.

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Table 1: European Union

Independent Variables	[1]	[2]	[3]
Added Value	0.0797 ***	0.1218 ***	0.1050 ***
	(5.37)	(10.66)	(7.11)
GDP term	0.7899 ***	0.5274 ***	0.8933 ***
	(37.26)	(21.34)	(38.59)
GDP per capita term	-0.1825 ***	-0.0304	-0.2109 **
	(-3.08)	(-0.62)	(-2.24)
Distance	-1.0209 ***	-0.9759 ***	-1.0135 ***
	(-20.61)	(-22.44)	(-20.65)
Exchange rate	-0.3557 ***	-0.4217 ***	-0.2643 **
	(-2.72)	(-4.63)	(-2.17)
Exchange Rate Lag 1	0.3338 **	0.3934 ***	0.3577 **
	(1.97)	(3.37)	(2.32)
Exchange Rate Lag 2	0.0211	-0.0020	-0.0697
	(0.22)	(-0.03)	(-0.78)
Dummy border EU	-0.0374	0.2681 ***	-1.0604 ***
	(-0.57)	(5.40)	(-4.64)
Dummy member EU	0.3808 ***	0.2133 ***	-0.2041
	(4.71)	(3.63)	(-1.20)
Constant	-9.5849 ***	-1.9052 **	-12.1661 ***
	(-11.02)	(-2.04)	(-11.78)
Year Dummies	yes	yes	yes
Fixed Effects EU	no	yes	no
Fixed Effects CEECs	no	no	yes
Number of observations	628	628	628
F	256.39	307.08	221.49
Prob (F)	0.0000	0.0000	0.0000
Adjusted R^2	0.8593	0.9371	0.8855

Notes: ***Significance at 1%. **Significance at 5%. *Significance at 10%. Specifications [1] is without fixed effects, specification [2] is with Fixed effects for EU countries and specification [3] is with Fixed effects for the CEECs.

Table 2: European Union with price variables

Independent Variables	[1]	[2]
Taxes	-7.1552 **	-6.2198 **
	(-2.51)	(-2.17)
Compensation	0.1328 ***	0.1416 ***
	(5.16)	(5.63)
GDP term	0.7406 ***	0.8124 ***
	(22.45)	(22.02)
GDP per capita term	-0.2830 ***	-0.3313 **
	(-2.67)	(-2.30)
Distance	-0.9345 ***	-0.9299 ***
	(-12.52)	(-12.90)
Exchange rate	-0.1630	-0.0516
	(-0.60)	(-0.25)
Exchange Rate Lag 1	0.4638	-0.1205
	(1.00)	(-0.25)
Exchange Rate Lag 2	-0.3151	0.1786
	(-0.87)	(0.43)
Dummy border EU	-0.0745	-0.8980 **
	(-0.61)	(-2.31)
Dummy member EU	0.2778 ***	0.1161
	(2.09)	(0.38)
Constant	-7.9337 ***	-9.6279 ***
	(-5.90)	(-6.01)
Year	yes	yes
Fixed Effects EU	no	no
Fixed Effects CEECs	no	yes
Number of observations	318	318
F	113.66	93.14
Prob (F)	0.0000	0.0000
Adjusted R^2	0.8580	0.8746

Notes: ***Significance at 1%. **Significance at 5%. *Significance at 10%. Specifications [1] is without fixed effects while specification [2] is with Fixed effects for the CEECs The regressions with European countries Fixed Effects are not significant, therefore they have not been reported.

Table 3: European Union 2SLS

Independent Variables	[1]	[2]	[3]
Added Value	0,9090 ***	0.1719 ***	0.1535 ***
	(4.63)	(7.47)	(5.52)
GDP term	0.7481 ***	0.4891 ***	0.8283 ***
	(21.77)	(12.41)	(22.24)
GDP per capita term	-0.1842 *	0.0361 ***	-0.2210
	(-1.66)	(0.34)	(-1.53)
Distance	-0.9373 ***	-0.9765 ***	-0.9029 ***
	(-12.02)	(-15.00)	(-11.78)
Exchange rate	-0.1304	-0.1313	-0.0411
	(-0.46)	(-0.68)	(-0.15)
Exchange Rate Lag 1	0.4649	-0.0957	-0.0451
	(1.01)	(-0.29)	(-0.09)
Exchange Rate Lag 2	-0.3538	0.1913	0.1024
	(-1.03)	(0.71)	(0.24)
Dummy border EU	-0.1989 **	0.2207 **	-1.0644 **
	(1.86)	(2.54)	(-2.48)
Dummy member EU	0.2751 **	0.1217	0,0426
	(2.02) **	(1.21)	(0.12)
Constant	-8.7052	-2.3165	-11.2170 ***
	(-6.32)	(-1.75)	(-6.88)
Year dummy	yes	yes	yes
Fixed Effects EU	no	yes	no
Fixed Effects CEECs	no	no	yes
Number of observations	306	306	306
F	118.00	152.24	96.40
Prob (F)	0.0000	0.0000	0.0000
Adjusted R2	0.8513	0,9348	0,8728

Notes: ***Significance at 1%. **Significance at 5%. *Significance at 10%. Specifications [1] is without fixed effects, specifications [2] and [3] are respectively with EU and CEECs fixed effects

Table 4: 15-EU Countries

Countries	FDI
Austria	0.2367 *
	(6.52)
Belgium	-0,0990 *
	(-2.56)
Denmark	-0.0043
	(-0.08)
Finland	0.0302
	(1.31)
France	0.1256 *
	(3.90)
Germany	0.0102
	(0.51)
Greece	0,0516
	(1.60)
Ireland	0.0012
	(0.02)
Italy	0.1862 *
	(7.72)
Luxembourg	-0.1404 *
	(-3.17)
Netherland	0.1254 *
	(2.97)
Portugal	1.4663
	(4.56)
Spain	0,0837
	(1.249
Sweden	0.0083
	(0.43)
United Kingdom	0.0673 **
	(2.61)

Notes: ***Significance at 1%. **Significance at 5%. *Significance at 10%. It was no possible to run the same regressions with the CEECs dummies to control for the Eastern Countries fixed effects, since these dummies were dropped by the program which could identify univocally the CEEC through the distance.

Table 5: Displacement Effects on U.S. and Japanese Export

Independent Variables	USA		Japan	
	[1]	[2]	[3]	[4]
Added Value EU	0.1162 ***	0.1117 ***	0.3039 ***	0.3079 ***
	(3.01)	(2.80)	(4.34)	(4.04)
GDP term	0.6901 ***	0.6839 ***	0.3847 ***	0.3382 **
	(9.79)	(9.20)	(2.83)	(2.25)
GDP per capita term	0.1041	0.1754 *	0.5083 **	0.6065 ***
	(1.05)	(1.68)	(2.59)	(2.87)
Exchange rate	-0.5086 **	-0.5666 **	-0.5498	-0.5581
	(-2.44)	(-2.53)	(-1.63)	(-1.42)
Exchange Rate Lag 1	0.5356 *	0.6031 **	0.7108	0.7245
	(1.82)	(1.93)	(1.57)	(1.42)
Exchange Rate Lag 2	-0.0476	-0.4937	-0.2250	-0.2245
	(-0.27)	(-0.27)	(-0.74)	(-0.69)
Constant	-16.9383 ***	-17.2442 ***	-18.8188 ***	-19.87 ***
	(-6.82)	(-6.45)	(-3.05)	(-2.99)
Year	no	no	no	no
Fixed Effects CEECs	no	yes	no	yes
Number of observations	60	60	60	60
F	51.67	21.30	20.78	8.11
Prob (F)	0.0000	0.0000	0.0000	0.0000
Adjusted R^2	0.8375	0.8463	0.6680	0.6584

Notes: ***Significance at 1%. **Significance at 5%. *Significance at 10%. Sales, Dummy border EU and Dummy member EU never resulted significant. Specifications [1] and [3] are without fixed effects, while specifications [2] and [4] are with CEECs fixed effects. Distance has not been included since the Eastern countries all far from Japan and USA and all concentrated in the same area. The Year dummy has been dropped by the statistical program.