Measuring Trade Intensity within the European Zone

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Abstract

Using a gravity model, this paper investigates the extent of integration within the European zone. As many econometric studies in cross section have tendency to neglect the endogeneity bias that appears when omitted variables are correlated with the traditional "gravity variables", we show that implementing an instrumental variables method in panel data (Hausman & Taylor estimator) allow us to correct for the correlation between some regressors and unobservable characteristics. This procedure provides a better model fit. In addition, the paper considers the impact on trade of regional trade arrangements in the European zone over last recent years. We find that the European Union and Baltic countries have a significant impact on the trade volume and that this impact is mainly an import creation combined with an improvement of the export performances vis-à-vis to the rest of the world (only for the EU trade bloc since the competitiveness performance follows the model prediction for the Baltic countries). For the CEFTA trade bloc, evidence suggests an impact that is conform to the gravity model predictions.

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I. Introduction

This paper deals with economic integration within the European zone by considering trade patterns shared by the countries belonging to this area.

Despite the fact that debate remains whether it is trade liberalization that boots economic performances or the reverse, economists widely recognize that countries that are integrated into their regional economy can benefit each other from some externalities (i.e. larger markets, technological synergies, etc.). These externalities may differ from some countries to others. In particular, the economic integration within the European zone (that represents in this paper the European Union, PECO countries and countries in the southern Mediterranean side) is not uniform across countries. In others words, there are several groups of countries that are integrated to each other at different levels.

Indeed, beside E.U. countries which provide evidence of a strong economic integration[2], PECO countries that were formerly a relatively isolated trade bloc are presently sending and receiving more that two thirds of their goods and services to and from the rest of the world.

Nevertheless among PECO countries, some know a rapid and deep integration (ex. Accession countries and Baltics) while other have a far small integration (ex. South Eastern Europe countries). Note that the degree of integration of countries in the southern Mediterranean side generally appears as very small. Dupuch, Mouhoud and Talahite (2002) analyze in details the integration modalities of the European zone. Although they highlight real improvements of the productivity of some countries such as Turkey, Dupuch, Mouhoud and Talahite (2002) state a net structural divergence between the countries in the southern Mediterranean side and the U.E., compared to the PECO's or the countries at the southern of Europe.

Using a gravity model approach, the paper attempts to examine the determinants of the European zone market integration and aims to investigate to which extent this integration has been achieving. To do this the paper tests a large set of potential determinants of the trade volume. Additionally to the traditional gravity determinants, the paper considers both the role of regional trade agreements and of the trade liberalization context of the countries in explaining the trade volume differences among the three main trade blocs of the European zone.

[2] One caveat should be noted when considering the integration of the U.E: since some countries at the southern of Europe record less good performances at the structural convergence level in comparison of what the core countries of the E.U exhibit, there is a risk for some European countries (i.e. Portugal, Greece) to be in direct competition with the PECO in their main production domain.

The analysis of the impact of the regional trade agreements on the trade volume is, most of the time, based on the ratio of intra – regional trade (i.e.: the analysis of the evolution of the participation of countries (members – States or not) to the trade volume of the considered trade bloc). The latter analyses neglect the fact that some countries can suffer from geographical disadvantages or negative evolution of some trade determinants, implying that they can not benefit as much as others from international trade.

In addition, the interest of the introduction of the trade agreement variables allows to test whether the setting up of these agreements has lead to an increase of the trade volume between the European zone, at different stages of the liberalization process. In particular, the motivation behind the inclusion of the dummy trade bloc variable into the gravity model is to verify if the respective trade agreements have resulted as a gross trade creation (in the Balassa (1967) sense). And if it is the case, is this trade volume increase a net trade creation or a net trade diversion (in the Viner sense).

The trade liberalization context of the countries is another interesting issue. While some PECO countries enjoy IMF ratings for trade restrictiveness that are close to the E.U 'ones, the economic freedom still remains rather poor in general. The trade liberalization context of the countries associated with their geographic characteristics may account for a large proportion of the trade volume difference between current and potential trade volume.

Finally, studying trade determinants, the paper devotes a particular attention to the model specification: in order to approach the best model fit, the paper presents and discusses results from different econometric specifications of the trade gravity model.

The remainder of the paper is structured as follows. Section II motivates the chosen methodology, surveys the expected effects of the trade explanatory variables and presents the data. Section III analyses the model specifications and Section IV carries the results and reports several robustness checks. Section V concludes and appendix describes the variables, which are used in the model, and exhibits complete regression results.

II. Data and Methodology

The choice of the model and the variables that have to be included in the gravity model constitute an important issue to obtain an efficient estimation of the bilateral trade flows. This is the aim of the present section.

II. a. The data

In the paper, the investigations on trade patterns are run on the basis of a panel of 36 countries of the European zone with annual data during the period 1988 – 2000. The estimations are run over an unbalanced sample because some country pairs are absent for one or several years. This is the case of some PECO and Baltic countries for which the data availability is quite late (1993) or for some country pairs for which no trade is recorded.

The trade data used in this paper come from CHELEM (database of CEPII) and from the World Bank Development Indicators databases. The CHELEM database provides the bilateral importations in U.S. dollar (in current prices and deflated by the import world price index taken from the World Bank's CD-Rom). Others data sources and author's calculations are detailed in the appendix (section VII. a description of the variables).

The countries included in the country sample are: Bulgaria, Estonia, Latvia, Lithuania, Romania, Poland, Slovenia, former Yugoslavia, Hungary, Czech Republic, Slovak Republic, Czechoslovakia, Egypt, Morocco, Algeria, Tunisia, Cyprus, Malta, Syrian Arab Republic, Turkey, Israel and the E.U.(15) countries - France, Belgium, Luxembourg, Germany, Netherlands, Italy, Ireland, UK, Spain, Portugal, Greece, Denmark, Austria, Sweden, Finland -.

II. b. The methodology

Traditionally, papers, which study bilateral trade flows, derive the specification from either monopolistic competition framework or gravity theory. In the present paper, this is the gravity model that is selected. This model is a simple and efficient tool to predict bilateral trade flows.
The theoretical foundations of the gravity model[3] have been developed by Anderson (1979)[4], Bergstrand (1985), Helpman & Krugman (1985) and Deardoff (1995).

[3] The gravity model comes from the Newton's law of universal gravitation (1687). In 1962, Jan Tinbergen – in his paper "Shaping the World Economy suggesting for an International Economic Policy" - modeled the international trade flows by using a functional form that is a generalization of the Newton's one.

The gravity model is consistent with different classes of models of international trade. In fact, the gravity equation is compatible with any model in which countries are completely specialised in differentiated goods[5]. This differentiation can appear from economies scale or from differences on factors endowments[6].

The success of such so-called gravity model can be explained by various reasons. Firstly this model that empirically describes bilateral trade patterns rather well, is quite flexible and has seen numerous empirical applications: to test for the impact of regional trade blocs (i.e. Frankel & Wei (1993)), border effects (i.e. McCallum (1995), Anderson & van Wincoop (2001)), or for the impact of a common currency on bilateral trade flows (i.e. Frankel & Rose (2000)). Moreover the gravity model allows a direct estimation of the effects by introducing dummy variables.

So doing, the gravity model gives the "normal" level of the bilateral trade on a given country sample while the dummy variables capture the bilateral trade "abnormal" level.

The basic gravity relationship, used in the literature, is the following:

$$M_{ij} = \beta_0.(Y_i)^{\beta 1}.(Y_i)^{\beta 2}.(Pop_i)^{\beta 3}.(Pop_j)^{\beta 4}.(D_{ij})^{\beta 5}.(C_{ij})^{\beta 6} u_{ij} \qquad (1)$$

M_{ij} :country i's importations from country j; Y_i : country i's income; Y_j : country j's income; Pop_i : country i's population; Pop_j : country j's population; D_{ij} : bilateral distance between country i and country j; C_{ij} : factors helping or restricting bilateral trade between i and j; and u_{ij} : the error term.

The traditional trade gravity model explains the trade volume between two countries as a function of their incomes, their populations, the transport costs between country pairs (generally proxied by the countries bilateral distances) and additional variables capturing facts that favouring or restricting trade (existence of trade agreements, etc.).

The **income** variables are expected to have a positive effect on the trade volume between countries.

On the supply side, an increased income signals a bigger available production devoted for exports. On the demand side, an increased income should lead to more imports[7].

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[4] Cited in Anderson J.E. & van Wincoop E. (2001), "Gravity with Gravitas: a Solution to the Border Puzzle", NBER working paper.

[5] Recently Feenstra, Markusen and Rose (1998) had derived a gravity equation from homogeneous goods models such that the product differentiation is not anymore a necessary condition to obtain the gravity model.

[6]See Deardoff A. (1995), Evenett & Keller (1998) and Maurel M. (1998) for a more complete discussion.

[7] Some gravity specifications introduce the incomes' variables multiplicatively implying that trade between two equal sized countries exceeds trade between a large and a small country of the same aggregate output.

In what concerns the impact of the **population** variables on the trade flows, it is not clear in the literature. A large population size can reflect, in the one hand an important domestic market and in the other hand, an abundant factor endowment.

Transport costs are generally presented in the literature, as a particularly important trade determinant, especially if the latter measures the ability of a country to insert itself fully both in the regional economy and in the world network. Presently, it become frequent to consider nearby countries as being as "natural trading partners" mainly because of the transport costs difference that can intervene crucially in the cross border trade[8]. At this point, it is noticeable that during last recent years trade arrangements have involved countries that are located in the same geographic region.

There are several ways in the literature to model transport costs and economists generally used four main categories[9] of transport costs measures: (1) the uniform ad-valorem iceberg costs which assumes that only a g fraction of the shipment is delivered. This implies, if transport costs are positively related to commodity prices, that it is in addition proportional to them. (2), the transport costs measures based on distance and geography. This measure assumes that transport costs increase with the physical distance and between trade partners, and decrease with adjacency of these trade partners. (3), the transport costs measures based on cif / fob value of imports and exports. This measure compares the value of the trade flows inclusive (cif prices imports) and exclusive (fob prices exports) the freight and insurance costs. And finally (4), the transport costs based on real freight and insurance expenditure that are probably the best transport costs measures when they are available.

Having no real freight expenditure covering the entire country sample, the transport cost measure used in the present paper is the measure based on cif / fob value of imports and exports. However, as there is no accurate measure of this ratio[10] that is available, the paper follows the Limao & Venables (2001) approach, to solve this problem. They model transport costs by their main determinants. In addition of geodesic distances and incomes, our gravity model will consider as transport costs determinants the countries infrastructure stocks levels and dummies variables that capture whether countries are **landlocked** or whether they share a **common border** or **language**.

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[8] Frankel, Stein & Wei (1995) associate the concepts of « natural trading partners » and « welfare improvement ».
[9] See Combes & Lafourcade (2003) for a critical discussion on these transport costs measures.
[10] See Hummels (1999) and Limao & Venables (2001) for further details about the data problems in collecting cif / fob data. IMF's Direction of trade statistics suffers from critical data problem measurement of every country. Researchers should better use data from GTAP. that are better for trade with USA. The only problem is that these data determine the trade in the rest of the world on the basis of the trade patterns the USA – World trade.

Indeed, the geographical distance is expected to increase transports costs between countries and in particular if countries are landlocked. Limao & Venables (2001) infer that landlocked countries have transport costs 50% higher and trade volume 60% lower than coastal countries.

Transport costs can also increase as result of weak transport infrastructures. The countries infrastructure level, used in the paper, captures the quantity of transport and communication infrastructure. **Transport infrastructure stock** is a relevant variable in the extent that poor transport and communication infrastructure can badly reduce countries access to the world market[11].

In addition, the inclusion of the transport infrastructure variables in the gravity model allows to capture the fact that trade between neighbouring countries is characterized by the fact that transport infrastructure investments are chosen to be specific to both the traded goods and the partners countries. This infrastructure specificity generates spillover effects that lead to the existence of gains to cooperative agreements on investment levels[12].

In the countries sample of this paper, the countries transports infrastructure levels is rather different according the countries considered. The UE (15) trade bloc is quite homogeneous[13]. In the selected PECO countries, those countries that were past centrally planned are relatively well endowed in terms of infrastructure, although a large part need to be renewed. In the opposite, countries at the southern Mediterranean side suffer from under-investment in transport infrastructure (and from a lack of coordination in this field). The country infrastructure level variables used to model transport costs are built using a principal component analysis.

Finally, while **bilateral distance** between two countries has a positive impact on transport costs, the existence of a **common border** and/or a **common language** between i and j have a negative impact on transport costs. Thus, since adjacency and common language variables enter negatively in the transport costs function of the, countries that share a common border / language tend to trade more than otherwise.

Note that in the European zone, the border effects are expected to be sensibly different within the regions, particularly within the PECO countries where for example the disintegration of the Czechoslovakia and/or of the Yugoslavia numerous new borders have appeared[14].

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[11] Remark that beyond the quantity of the transport infrastructure network, what matters is the quality and coherence of this network within and between countries. Unfortunately, data about the quality of transport infrastructure are quite rare.

[12] See Bond (2000) for a complete discussion.

[13] Since the entry of the Greece, Spain and Portugal in the E.U. an Infrastructure Committee was created as part of the single market initiative to coordinate transportation investments across countries. In addition many transportation investments have been made in Greece, Spain and Portugal since their adhesion to homogenize the E.U. transport infrastructure network.

[14] For a study of the border effects, see among others: Head & Mayer (2001), Helliwell (1997) and Wei (1996) for OECD countries; Head & Mayer (2000) and Nitsch (2000) for Western European

In that way, this paper models the transport costs of a good, imported into i from j at time t as follows:

$$Ln\ C_{ijt} = \alpha_0 + \alpha_1 \ln D_{ij} + \alpha_2 ComBord_{ij} + \alpha_3 \ln Inf_{it} + \alpha_4 E_i + \alpha_5 \ln Inf_{jt} + \alpha_6 E_j + \alpha_7 Comlang_{ij} + w_{ijt} \qquad (2)$$

With C_{ijt} : transport costs; D_{ij} : bilateral distance between country i and country j; Inf_{it} : infrastructure level of country i; Inf_{jt} : infrastructure level of country j; E_i : dummy variable capturing when country i is landlocked (1 if it is the case, 0 otherwise); E_j : dummy variable capturing when country j is landlocked (1 if it is the case, 0 otherwise); $ComBord_{ij}$: dummy variable capturing when country i and country j share a common border (1 if it is the case, 0 otherwise); $ComLang_{ij}$: dummy variable capturing when country i and country j share a common language (1 if it is the case, 0 otherwise); and w_{ijt} = error term.

If equation (2) is put in equation (1) in log form, the reduced form of the gravity model is:

$$Ln\ M_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln Pop_{it} + \beta_4 \ln Pop_{jt} + \beta_5 landlocked_{it} + \beta_6 landlocked_{jt} + \beta_7 \ln Infr_{it} + \beta_8 \ln Infr_{jt} + \beta_9 ComBord_{ij} + \beta_{10} ComLang_{ij} + \beta_{11} Distance_{ij} + \eta_{ijt} \qquad (3)$$

With η_{ij} : error term.

As noted by Limao & Venables (2001), the theoretical model behind the equation (3) is the Dornbusch-Fischer-Samuelson (1977) model where infrastructure is introduced explicitly to show that infrastructure, by reducing transport costs, may be able to promote trade[15].

Consequently, as distance and landlocked variables, expected to have a positive impact on transport costs, should have negative coefficients in equation (3). In the opposite, common border, common language and infrastructure variables should have a positive impact on bilateral trade.

countries; McCallum (1995) and Wolf (1997) for Canada and USA, Head & Mayer (2000) and Nitsch (2000) for Western European countries. In addition, see Hillberry (1999) for further details about a US industrial sectors discussion of the border effect.

[15] This theoretical model has been developed by Boughéas, Demetriades & Morgenroth (1999). The introduction of the infrastructure stock in the Dornbusch-Fischer-Samuelson (1977) model allow to show that the infrastructure development leads, via an decrease of the transport costs, to an increasing countries specialisation, that enhance bilateral trading opportunities.

Discussing the transport costs variable is not sufficient to implement the trade gravity equation. Other variables need to be included in the analysis: the real exchange rate and the quality of countries institutions.

Given the time period and the fact that this paper implements panel trade gravity model, it becomes crucial to take into account the evolution of the competitiveness. In this way, the trade gravity model includes the **bilateral real exchange rate**. In the gravity equation, the bilateral real exchange rate is expected to have a negative impact on trade volume, since an increase of this variable represents a currency depreciation for the importer country i.

Considering variables that capture the appearing **trade policy** within countries of the European zone, an index of trade restrictiveness allows the taking into account of a wide range of variables that can potentially affect bilateral trade. Indeed, tariff and non-tariff barriers reduce bilateral trade[16].

Subramanian & Wei (2003) showed that WTO membership have a positive and significant impact on trade in particular for countries that are industrialized or that have joined after the Uruguay round since this has required important liberalization efforts.

In our analysis, we will not consider a dummy variable equals to 1 whether the countries are WTO members and equals to zero otherwise, we prefer to use an openness indicator because this would cover a broader field than just considering the impact of WTO membership. Among the numerous openness indicators that can be found in the literature, the most used are generally: (1) the IMF "Trade Restrictiveness Index", which measures a country's trade liberalization, (2) the US Tuck Research Center " Emerging Market Access Index" or the Fraser Institute " Economic Freedom Index", which both measure the degree to which countries have opened their borders to trade.

For a reason of data availability, the model uses the Fraser Institute " Economic Freedom Index". This index measures the degree of economic freedom present in five major areas: size of government, legal structure and security of property rights, access to sound money, freedom to exchange with foreigners and, regulation of credit, labour and business[17].

It seems necessary to take into account the degree of trade liberalization in our sample since important trade liberalization measure have been implemented since 1992 (in Poland for instance). Industrial goods have been imported freely to the EU from CEECs (except Slovenia) since 1995 (except textile, steel, and coal products).

[16] Note that few studies make the distinction between tariff and non-tariff barriers. See Head & Mayer (2000) and See Head & Mayer (2001) for example of illustrations of a such a distinction.

The coverage of the liberalization of EU import from the CEECs resulting from trade agreements is substantial. In the case of Hungary, 70% of the exports of industrial goods to the EU became free of duty[18]. Concerning the CEFTA, the CEFTA resulted in free trade in industrial goods between its original members as the January the 1st 1997[19]. Baltic countries formed since 1994 a free trade area in industrial goods trade.

Then, the trade gravity baseline model that is estimated is the following:

$$
\begin{aligned}
Ln\ M_{ijt} = {} & \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln Pop_{it} + \beta_4 \ln Pop_{jt} + \beta_5 \ln Infr_{it} \\
& + \beta_6 \ln Infr_{jt} + \beta_7 ComBord_{ij} + \beta_8 ComLang_{ij} + \beta_9 Dis\tan ce_{ij} \\
& + \beta_{10} RER_{ijt} + \beta_{11} \ln Efi_{it} + \beta_{12} \ln Efi_{jt} + \beta_{13} landlocked_i + \beta_{14} landlocked_j \\
& + \eta_{ijt} \qquad (4)
\end{aligned}
$$

With RER_{ijt} : bilateral real exchange rate between country i and country j; Efi_{it} : economic freedom index of country i; Efi_{it} : economic freedom index of country i; $Landlocked_i$: dummy variable indicating whether a country i is landlocked; $Landlocked_j$: dummy variable indicating whether a country j is landlocked.

III. Econometric specification of the model

This section discusses the choice of both the model specification and estimation technique. Those choices are of a crucial importance since they have impacts on the estimations results. To discern these effects an analysis of sensibility of estimations will be run.

[17] See appendix for further details.
[18] Figures quoted in Wilhelmsson (2004)
[19] When the CEFTA came into force on March, the 1st 1993, the founding members were Poland, Czech Republic, Slovakia and Hungary. It was widened with the accession of Slovenia (1996), Romania (1997) and Bulgaria (1999). Technical barriers to trade were removed for those countries after a short transition period.

III. a. Cross-section or panel estimations?

After describing the model that is estimated and all the included variables, this sub - section looks at the model specifications. Indeed, a very interesting feature of the gravity model is its ability to provide a "benmarck model". In that way, the estimator accuracy is crucial because biases can be introduced in the trade gravity estimation following the inability of some gravity models to control for the country heterogeneity.

In the literature, many empirical works on the evaluation of the regional integration in a cross section framework have been done. Compared with the cross section estimation panel data estimation provides more information and gives estimates that are more interpretable and more consistent[20]. Moreover, opting for a panel specification framework allows the control of the specific characteristics that feature trade flows. Neglecting the impact of these unobserved characteristics introduces estimation biases.

These biases are mainly of two kinds:

Firstly, the introduction of dummy variables (i.e. border and/or regional variables) could capture all that is specific to the partner countries and that is not taking into account more explicitly in the estimation equation such as historical links or social, political or geographical factors that can influence trade volume. Frankel (1997)[21] noted, at this point, that this could generate a bias: the omitted factors are correlated with the dummy variables.

Secondly, another bias can intervene: the omitted variables in the gravity equation could be correlated with the traditional "gravity variables", that are GDP, population and bilateral distance of the partner countries. In this endogeneity bias[22] the omitted variables are correlated with the regressors and the levels of the volume of trade. It seems difficult to preclude this possibility in our study case.

Thus, OLS estimation provides biased estimated, since the OLS estimators assume no correlation between the explanatory variables and the unobserved characteristics. This is confirmed by the Breusch & Pagan (1980) Lagrange multiplier test, which checks the existence of individual heterogeneity among the panel.

[20] See Bayoumi & Eichengreen (1995) , Frankel (1997), or more recently Egger (2001) and Carrere (2002).
[21] Cited in and Carrere (2002).
[22] The specific solution to correct this bias will be examined below.

In the aim to control for those biases, the present paper opts for a panel estimation that provides the possibility to control for the omitted variables, difficult to quantify, by allowing to identify and to isolate country pair's specific effects (assumed as time constant effects): the trade gravity model includes "country pairs effects" b_{ij} that are specific to each country pairs, different according the trade direction ($b_{ij} \neq b_{ji}$) and time constant.

Thus, the paper complete model will be:

$$\begin{aligned} Ln\ M_{ijt} &= b_0 + b_{ij} \\ &+ \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln Pop_{it} + \beta_4 \ln Pop_{jt} + \beta_5 landlocked_{it} \\ &+ \beta_6 landlocked_{jt} + \beta_7 \ln Infr_{it} + \beta_8 \ln Infr_{jt} + \beta_9 ComBord_{ij} \\ &+ \beta_{10} Dis\tan ce_{ij} + \beta_{11} RER_{ijt} + \beta_{12} \ln Efi_{it} + \beta_{13} \ln Efi_{jt} \\ &+ \beta_{14} Landlocked_i + \beta_{15} Landlocked_j + \beta_{16} ComLang_{ij} + \eta_{ijt} \qquad (5) \end{aligned}$$

With b_0: constant term; and b_{ij} : country pair specific effect term, common to every years.

III. b. Tackle the endogeneity bias

To opt for a panel estimation (with "country pairs effects" b_{ij} that are specific to each country pairs, different according the trade direction ($b_{ij} \neq b_{ji}$) and common to every years) is not sufficient to correct the endogeneity bias that appears when the omitted variables in the gravity equation are correlated with the traditional "gravity variables", that are GDP, population and bilateral distance. Considering this bias leads to the selection of a particular estimation technique: the Hausman – Taylor (1981) method.

Indeed, in the case of unobservable variables, which are omitted and correlated to some explanatory variables, one is faced with three main alternative options[23]: (1) estimate a system of simultaneous equations, where explanatory variables correlated with the residual are endogenously determined in a separate equation, (2) use the instrumental variables to instrument the explanatory variables responsible for the endogeneity problem, (3) introduce all possible (time – invariant) omitted variables when pair (i,j) is considered.

In order to exploit both the cross section and time dimensions of the panel data set, the paper should estimate in a panel data framework. The question here is to know whether the gravity model has to be estimated using fixed or random effects specification. In fact, while the fixed effects model specification postulates that all explanatory variables are correlated with the unobserved characteristics, the random effects model assumes that there is no correlation. In case of the rejection of the random effects[24], fixed effects control the correlation by the WITHIN transformation. Unfortunately, by using the WITHIN transformation, the time – invariant variables disappear, which is very problematic in our study since important variables in the model such as distance, common border or language are time – invariant.

Fortunately, Hausman & Taylor (1981) present a model that is able to remove the endogeneity problem by using instruments taken exclusively from inside the model[25]. The Hausman & Taylor (1981) model combines the advantages to take into account the fixed effects and keeping in the equation the time – invariant variables whose impact on trade the paper aims to estimate.

The Hausman & Taylor (1981) procedure can be decomposed into four steps:

The first step consists in the identification of the variables X (time – varying) and Z (non time – varying), correlated with the unobserved characteristics. Following Hausman & Taylor (1981), the matrices X and Z can be defined as: X = X1, X2 and Z = Z1, Z2 where X1, X2 have k1, k2 columns respectively (with k1 + k2 = K) while Z1, Z2 have g1, g2 columns respectively (with g1 + g2 = G). The variables that are non correlated with the unobserved characteristics (bij) are indexed by 1 (X1 and Z1) while the correlated variables are indexed by 2 (X2 and Z2).

The panel data estimation leads to the transformation of the equation (5) into an equation of the following form:

$$Y_{ijt} = X_{ijt}\beta + Z_{ijt}\gamma + \mu_{ij} + \varphi_{ijt}$$

With Y_{ijt} : the bilateral trade flows , measured by the imports of country i fom country j; X_{ijt} : ln Y_{it}, ln Y_{jt}, ln Pop_{it}, ln Pop_{jt}, ln Inf_{it}, lnInf$_{jt}$, ln RER_{ijt}, ln EFI_{it}, ln EFI_{jt},; Z_{ijt} : ln D_{ij},, $ComBord_{ij}$, $ComLang_{ij}$, $Landlocked_i$, $landlocked_j$; μ_{ij} : the unobservable individual country pair characteristic;
and ρ_{ijt} = the non auto - correlated error term.

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[23] Cited in Koukhartchouk and Maurel (2003)
[24] See results in appendix (table 1, 2d col.).
[25] This point is an important advantage in comparison with the instrumental variables, which require to find instruments from outside the model.

The second step corresponds to the transformation of the non correlated variables into deviations from the individual means (using a transformation matrix Q) and into their individual means (using a transformation matrix P). Hausman & Taylor (1981) consider that deviations from the individual means of the variables that are not correlated and time varying (QX1) provide non biased estimates for β. They use the individual means to have valid instruments for the Z2. In addition, the identification condition of the Hausman & Taylor (1981) estimator require that if k1 $\geq$ to g2 then the individual means of the X1 variables are valid instruments for the Z2 variables. In other words, there must have at least as many exogenous time – varying variables as there are endogenous time – invariant variables. In this case, the Hausman & Taylor (1981) estimator is more convergent and more efficient than the fixed effects one.

The third step consists in the instruments selection. If there are no variables of the Z2 type, the instruments are QX1, QX2 and Z1. but, if there are variables of Z2 type, the list of instruments contains QX1, QX2, PX1, Z1.

The fourth step of Hausman & Taylor (1981) procedure is devoted to improve the efficiency of the estimator (which is consistent but non efficient). Hausman & Taylor (1981) suggest the use the instrumental variables to the following transformed model:

$$Y_{ijt} - (1-\theta)Y_{ij.} = \beta(X_{ijt} - (1-\theta)X_{ij.}) + \theta\gamma Z_{ij} + \theta\mu_{ij} + (\eta_{ijt} - (1-\theta)\eta_{ij.})$$

$$avec \quad \theta_{ij} = (\sigma_\eta^2 / T_{ij}\sigma_\mu^2 + \sigma_\eta^2)^{1/2}$$

σ_η^2: variance of the individual characteristic and, $\sigma\mu^2$: variance of the non specific error term.

The above discussion justifies the reasons why trade gravity equation is run on the basis of a panel data model in which specific country pairs effect are introduced to take into account unobservable characteristics between countries.

IV. Estimation Results

This section presents and discusses the estimation results of the gravity model according to the different econometric specifications.

IV. a. Estimation of the trade gravity equation

The presented results focus on the baseline trade gravity model estimation. In order to select the econometric specification that allows the control of the endogeneity bias, fixed effects, random effects and various Hausman & Taylor (1981) estimations are run.

Before beginning the discussion of the choice of best panel specification, the first column of table1 displays the OLS estimation of the baseline gravity model. Confronting the OLS results with the random effects specification 'ones (in the second column), the statistic of the Breusch & Pagan (1980) Lagrange multiplier test rejects the OLS specification ($Chi^2(1) = 18527.2$).
The third column of table 1 exhibit the Within. Recall the Within estimation considers the country pair effects as fixed and gives unbiased estimates for time – varying variables (the time – invariant variables are thus dropped from the estimation). All the variables are strongly significant at 1% with the expected signs supporting in this way the theoretical predictions. In the case of the real exchange rate, the coefficient is negative, meaning that a real depreciation of the country i money, in comparison to the country's money, decreases the imports of country i from country y. The coefficient of the population is negative supporting the factor endowment hypothesis. Notice that coefficients are fairly similar to those found in the empirical literature (for example Carerre (2002), Limao & Venables (2001), Soloaga & Winter (1999)).

A Hausman specification test is performed to check the equality of the random and fixed effects coefficients. This test strongly rejects the null hypothesis of no correlation between the individual characteristics and some regressors. Thus, the random effects regression is biased, which justify the use of the Hausman & Taylor (1981) estimation model.
A priori, we do not know what are the variables correlated with the unobserved country pair characteristics[26], thus to select the right instruments as well as to provide an analysis of sensibility, we estimate four regressions using the Hausman & Taylor (1981) estimation model.

For each of those estimations an over – identification test is run (this latter test is in fact an Hausman test that is applied to the coefficient differences between the fixed effects and the Hausman & Taylor estimations[27]). The over – identification test allows to verify whether the Hausman & Taylor estimation used a valid set of instruments (that is if the Ch² statistic is non significant) or whether there remain additional sources of bias (that is if the Ch² statistic is significant).

The first Hausman & Taylor estimation (column 1 of table 1 (followed 1)) provides highly significant estimates. This regression considers the incomes and bilateral distance as endogenous. The Hausman & Taylor estimation provides estimates that are close to the coefficients of the fixed effects specification. The non - significant variables are the dummy variables capturing whether country pairs share a common language, whether a country is landlocked and distance.

The non -significances can be explained by several ways: (1) While in the other specifications (before the correction of the correlation) those variables captured a part of the specific characteristics, the introduction of fixed effects allows a better grasp of these unobserved characteristics. The outcome is that the significance of the geographic variables may plummet. (2) The distance is a weak proxy of transport costs.

The obtained results show that the selected endogeneous variables are correlated with the specific effects. Indeed, the over – identification test reveals the presence of additional sources of correlation between regressors and country pair effects: the Ch²(6) statistic (=116.02) is significant at 1%, meaning that only a part of the bias has been corrected.

The second Hausman & Taylor estimation (column 2 of table 1 (followed 1)) considers as endogenous: incomes, bilateral distance and real exchange rate. This specification does not change a lot the estimates (distance, landlocked and Comlang variables are still non significant). Performing the over – identification test, we find that there still remain correlation between the some regressors and the specific characteristics. The Ch²(5) statistic (= 88.28) rejects the specification.

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[26] More precisely, in order to correct the endogenous bias, we do not know the set of variables that have to be considered as endogenous when the Hausman & Taylor (1981) estimation procedure is undertaken.

[27] For what follows, we won't consider anymore over – identification tests between random effects and Hausman & Taylor specifications because we definitely preclude the random effects specification since this specification is rejected by the Hausman test that has been applied to the coefficient differences between fixed and random effects specifications.

The third Hausman & Taylor estimation (column 3 of table 1 (followed) takes into account the fact that the level of economic liberalization could be considered when one attempts to tackle the endogeneity bias. Indeed as shown by Rodrik, Subramanian & Trebbi (2002) among others, there exist a two-way causality between trade and institutions: a better quality of national institutions is supposed to have a positive impact on trade, and higher levels of trade tend to improve the national institutions. To measure the quality of institutions, we use the Economic Freedom Index. It is composed of factors that most influence the institutional setting of economic growth and it was computed both for measuring economic freedom around the world and for emphasizing the empirical strong correlation between freedom and growth.

In this setting, we consider as endogeneous: the national incomes, bilateral distance, real exchange rate and countries economic freedom indexes. Here again, the $Ch^2(3)$ statistic (= 84.76) of the over – identification test still rejects the specification.

The fourth Hausman & Taylor estimation (column 4 of table 1 (followed 1)) adds the countries population as additional endogenous variables. The instrumentation of these variables improves sensibly the regression, the $Ch^2(1)$ statistic (= 3.27) of the over – identification test is no more significant such that the choice of the set of instruments can not be rejected anymore.

As required by the identification condition of Hausman & Taylor (1981): $k1 \geq g2$, thus the Hausman & Taylor (1981) procedure provide a convergent estimation, which is more efficient than those performed by the fixed effects specification. In addition, Hausman & Taylor (1981) procedure gives estimates for time – invariant variables, this was not the case with the fixed effects model.

IV. b. Estimation of the impact of the trade agreements

After having selected the specification that allows the taking into account in an efficient way the endogeneity bias of the trade gravity model, the paper focus, now, on the impact of the regional trade agreements on trade volume on the period 1988 - 2000. The baseline trade gravity model (equation 5) will include trade bloc dummy variables. As noted above, the variables of the baseline gravity model control for the factors that are assumed to explain the "normal" trade among countries (that is in absence of trade agreement, member – State would have the same relationship to the baseline gravity model variables as the non member – States). In this way, the trade bloc dummy variables would pick up the "abnormal" levels of trade that could be attributed a particular trade agreement.

We also add time dummies of all the years of the period. This makes our model similar to Matyas' (1997) fixed-effects model. However as Matyas incorporates time-invariant fixed effects for each individual country and argues that in a correctly specified gravity model, bloc dummies are linear combinations of fixed effects, we include dummies for each (bloc x time) combination in order to estimate and interpret separately trade bloc dummies and fixed effects[28]. Moreover, the so-built interaction variables enable the analysis of the effects of integration in different integration phases. The dynamic formulation is important since the trade preferences have been implemented gradually and at different points in time for different groups of countries. Therefore, it is not satisfactory to analyse trade effects on the basis of time – invariant dummy variables.

The purpose is to determine whether a trade arrangement has a significant impact on trade. Has this agreement produces additional trade among its member – States or in other words, have this trade agreement generates a gross trade creation in the Balassa (1967) sense? In this case, the coefficient of the trade agreement should be significantly positive.

We also explore, beyond the gross trade creation, the impact the trade agreements to know if the eventual increase of trade among the member – States is mainly a trade creation or a trade diversion (in the Viner sense).

The first thing to do in order to infer the impact the regional agreements on trade is to determine the trade blocs relative to these agreements. In the paper sample, we consider three trade blocs: UE, CEFTA, Baltics[29]. According to the World Bank's definition, trade blocs regroup countries that have established particular preferential arrangements governing trade between members. The general purpose of such arrangements is to promote exports by bloc members to each other[30].

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[28] As stated by Soloaga & Winters (1999), bloc dummies pertain to flows between a set of importers and only a subset of their supplying exporter such that one can not represents this by variables which treat all partners symmetrically.

[29] UE refers to the European Union countries; CEFTA regroups Bulgaria, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic, and Slovenia; Baltic regroups Lithuania, Latvia, and Estonia.

[30] Although the structure of regional arrangements varies widely among trade blocs, their main objective is always to encourage trade and economic integration by reducing tariffs and quotas among countries, even if it is well recognized that effective integration requires more than removing tariffs and quotas among countries. However, membership in a regional integration arrangement may reduce the average cost of trade by creating a "fair" environment to trade.

Secondly, following Carrere (2002) and Soloaga & Winters (1999) we introduce three different sets of dummy variables aiming to capture the impact of the regional trade agreements.

For each trade agreement, we define:

(i) a dummy variable capturing the intra – bloc trade (CEFTA_intra, UE_intra, Baltics_intra). This variable is equals to 1 if both countries i and j of the country pair belong to the same trade agreement; 0 otherwise. We use this variable to know whether the considered trade agreements have resulted as a gross trade creation.

(ii) a dummy variable capturing the impact of the imports of countries belonging to a trade agreement from non member – States. (CEFTA_M, UE_M, Baltics_M). This variable is equals to 1 if the importer belongs to a trade agreement while the exporter dot not, 0 otherwise. Combining this set of dummy variables with the preceding set allow to draw conclusions about trade creation and trade diversion. We have net trade creation in case of an increase of the intra – regional trade is recorded, while the imports from non member – States increase or are unchanged. A net trade diversion appears when the growth of the intra – bloc trade balances the collapse of the imports from non member – States. Note that trade creation and trade diversion can simultaneously arise when the expansion of the intra – bloc trade overbalances the collapse of the imports from non member – States.

(iii) a dummy variable capturing the impact of the exports of countries belonging to a trade agreement into non member – States. (CEFTA_X, UE_X, UMA_X). This variable is equals to 1 if the exporter belongs to a trade agreement while the importer dot not, 0 otherwise.

The take into account of the evolution of the member – States exports to non member – States allows having a view on the evolution of the member – State competitiveness (whether the implementing of the regional agreement has increased the export volume to non member – States and thus their welfare). Confronting this variable with the intra – bloc trade allow to know whether the eventual new exports among member – States are just a trade diversion of exports initially devoted to non member – States.

Besides the intra trade bloc dummies, we add also inter bloc trade dummies (EU_CEFTA and EU_Baltics) to have an idea of the trade relationships between the E.U. and its new adhering member – States.

Thus the above variables are used to analyse the integration effect on trade and they should be interpreted as deviation from the reference group ROW (countries that are not EU or CEFTA, or not Baltic) over time of the sample. For instance, a positive intra – bloc trade coefficient therefore implies that imports of the relevant country group have grown faster than imports of one ROW country from another ROW country and reveals a trade creation. The reference group has been chosen since (1) trade flows features among these countries are not of direct interest to us and, (2) their trade policies and trade flows have not anticipated experiencing major changes even though trade barriers are prone to decrease, for instance across EU countries.

-insert table 3 -

Since the coefficients of the baseline trade gravity model do not fundamentally change the conclusions we drawn in the preceding section, we only discuss the estimates of the dummy variables[31] .
Studying the first column of Table 3, we notice that the CEFTA bloc displays no significant estimates meaning that the coefficient levels are conform to the gravity model predictions. Only the EU and Baltic trade agreements have generated a gross trade creation. Indeed, those agreements exhibit significant and positive coefficients with level above that the "expected" levels (that is the trade level reached if this was determined solely by the gravity forces): in 2000, countries belonging to the European Union trade 6.6 times more with member – States than with non members. Such results confirm the strong trade intensity within the European Union but do not constitute a piece of evidence that the construction and the coming into force of the European Single Market have enhance multilateral trade with the EU bloc; since the countries of this blocs largely trade before the SMP as highlighted by Bayoumi & Eichengreen (1995). Note that the EU trade intensity seems to increase through the time.

Concerning Baltic countries, we find strong trade intensity among member – States: Baltic countries trade about 12 times more between each other than with non Baltic countries. This result is similar to the finding of Fidrmuc & Fidrmuc (1999) finding. These authors documented the evolution of trade intensities among Eastern Europe around the time of disintegration and have calculated that those exceed the predicted level of the gravity model: according the countries that are considered, Eastern Europe countries could trade about 11 to 40 times more between each other than otherwise.

The second column of Table2 reports the estimates of the variables capturing the impact of imports of member – States from non members. Combining the results of this column with those of the first column allow to determine if the gross trade creation of the EU and Baltic blocs are meanly a trade creation or a trade diversion.

[31] See in appendix for the complete set of estimates for these regressions.

For the EU and Baltics, we can conclude that the gross trade creation is a net trade creation.

The last column displays the coefficients related to the impact of the exports of the member – State of a regional agreement into non member – States. We see that this coefficient is significant with a positive sign for the E.U. bloc at 1%. This means that the trade agreement has a positive coefficient meaning that this agreement has did allow the improving the competitiveness of the EU member – States by strongly improving the export volume of this bloc to non member – States. Such result suggests that new exports from EU bloc are not just a trade diversion of exports initially devoted to non member – States.
In contrast for the CEFTA and Baltics countries, we found mitigated results such that we can not clearly conclude about the competitiveness impact of theses trade blocs. For Baltic countries, when the estimates are significant they are negative suggesting competitiveness deterioration. For CEFTA countries, we only find significant results in 1995 and 1997 with a positive and negative impact respectively.

In what concerns the inter trade dummies EU-CEFTA and EU_Baltics, we find no significant trade relationship between EU and Baltics during the sample period. In opposite, we have a significant trade relationship between EU and CEFTA. Although the impact is negative, it is decreasing through the time since in 1993 the effective trade in percent of potential trade between EU and Baltic countries trade is about 48% while is was about 35% in 1993

One explanation of this phenomenon can be found, at least partly, in the analysis of the main trade partners of CEFTA countries. Indeed, E.U countries (and before it, the former CEE) have developed since long time trade links with CEFTA countries. Historical ties, shared with the UE bloc, explain why trade within CEFTA bloc is less developed than trade between CEFTA and EU blocs. In fact, those historical ties can take the form of preferential and free trade agreements with the non member – States of EU bloc and help to develop trade mainly in the sense EU countries – non member – States.

De Souza & Disdier (2002) argue that CEFTA member – States mostly opt for the development of trade with the UE bloc instead of focussing on trade intensification among each other.

IV.c. Comparison with other studies

In this section we therefore contrast our findings with those of previous researches. It is interesting to compare in which extent the results of the paper may differ from those obtained in other studies using the same methodology. We mainly focus on the EU and CEFTA trade blocs since literature is more abundant on those two blocs than for Baltics one.

Typically, the effects of regional trade agreements on bilateral trade flows are estimated through the use of a dummy variable that takes a value of unity when both partner countries are members of the same trade bloc. Using this measure of trade arrangements within the framework of a gravity model, a consensus has emerged among researchers that regional trade agreements, in general, are trade creating. See for illustration, Frankel & Wei (1993), Frankel & Rose (2002) and Carrere (2002).

Using a sample of 21 industrial countries for the period 1953 - 1992, Bayoumi & Eichengreen (1995) run a more accurate analysis in distinguishing trade creation (intensification of trade within the member – States of a trade agreement) from trade diversion (reduction of trade with non member – States). They find that the former EEC has heavily promoted intra – bloc trade via a trade creation combined with a trade diversion. Fidrmuc & Fidrmuc (1999) implementing a gravity model, over the period 1990 –1998, to assess the economic consequences of the disintegration in Eastern Europe, state that the formation of free trade areas in Western Europe only had a moderate positive effect on trade flows. They explained this amazing result by arguing that despite the introduction of the Single Market in 1992, the impact of the EU on trade intensity remained stagnant. The authors even record a slight decline of the trade intensity within the EU bloc through the time. In 1999, Soloaga and Winter have already reported similar finding of the little effect of European integration on trade intensity on the period 1980 – 1996. Results of this nature were not interpreted as a failure of the European integration process but mostly as an effect of the world global liberalization, which reduces the relative advantage of regional integration.
None of these studies implement a Hausman &Taylor estimation technique.

Our findings give partial supports to those previous studies. In fact, we do find a positive effect of trade agreements within the E.U, however this impact is stronger. In what concerns, the CEFTA we fail to find any impact of the trade agreement.

Insert Table 4

V. Conclusions

This paper attempts to infer the degree of trade intensity within the European Zone. Postulating that the integration within this zone largely remains incomplete, the paper distinguishes three different sets of countries on basis of the World Bank's definition of trade bloc. The paper thus considers the CEFTA, the U.E. and the Baltics trade blocs.

To estimate the trade intensity among countries of the European Zone, the paper undertakes gravity model estimation. However this framework has been largely used in the related literature, many empirical studies that implementing such model, do it without considering efficiently the correlation between some traditional variables of the trade gravity model and bilateral specific characteristics. In fact, the fixed effects model already deals with the correlation problem by assuming that all explanatory variables are correlated with the unobserved effects, and it eliminates this correlation by the Within transformation. The main disadvantage with the fixed effects model it is that by using the Within transformation, this estimation technique drops all variables that are time – invariant. But trade gravity model includes time – invariant variables (i.e: distance variable, dummy variables as border or capturing the existence of regional agreement, etc.) that are crucial to explain bilateral trade patterns.

Recently, some authors have re - explored this correlation problem and have brought to light an estimation technique, which since it has been invented did not have been used a lot, but possesses all the qualities to provide a consistent and efficient estimation of the trade gravity model. This technique is the Hausman & Taylor (1981)'s procedure. The Hausman & Taylor (1981)'s model provides a model that is able to remove the endogeneity problem by using the method of instrumental variables with instruments exclusively from inside the model.

Thus in the present paper, we devote a special attention of the model specification. To select the model specification that allows to correct the endogeneity problem and provide estimates corroborating the theoretical predictions, we run an analysis of sensibility that reveals that a panel data estimation, which incorporates bilateral specific effects, can correct fully the correlation bias when the per capita incomes, infrastructure levels and Economic Freedom Index of both partner countries are taken as endogenous.

After having estimate consistently and efficiently the baseline gravity model of the paper, we add into the model dummy variables capturing the impact of the regional trade agreements that governs trade with each regional bloc.

Mainly, the results state that: (1) trade within EU and Baltic countries are significantly positive above what the gravity model predicts, meaning that this has resulted in a gross trade creation. No trade creation has been detected for CEFTA (2).Combining the EU bloc result with the import propensity, we conclude that the gross creation mainly result in a trade creation. We draw the same conclusion for the Baltic countries. (3) While EU has improved its export performance with the rest of the world, CEFTA and Baltics countries display not clear results.

VI. Bibliography

Anderson J.E. & van Wincoop E. (2001), "Gravity with Gravitas: a Solution to the Border Puzzle", NBER working paper, MA.

Apoteker T. & Crozet E. (2003), "Davos versus Porto Alegre: A survey on key issues behind international trade and financial integration and liberalization", Communication at the 7th ISINI International Congress, Lille.

Babetskii, Babestskaia – Kukharchuk & Raiser (2003), "How Deep is Your Trade? Transition and Integration", Centre for Economic Policy Research Discussion Paper.

Balassa B. (1967), "Trade Creation and Trade Diversion in the European Common Market", Economic Journal, 77: 1 – 21.

Bayoumi T. & Eichengreen B. (1995), "Is Regionalism Simply a Diversion? Evidence from the Evolution of the EC and NAFTA", NBER working paper 5283, MA.

Bergstrand J. (1985), "The gravity Equation in International Trade: Some Miroeconomic Foundations and Empirical Evidence", The review of Economics and Statistics, 67: 474 – 481.

Bocock P., Dervi K. & Devlin J. (1998), "Intraregional Trade among Arab Countries : Building a competitive Economic Neighborhood", paper presented at the Middle East Institute 52nd Annual Conference, Panel on "Arab Economy Market", Washington, DC.

Bougheas S., Demetriades & Morgenroth (1999), "Infrastructure, transport costs and trade", Journal of international Economics, 47: 169 – 189.

Breusch T. & Pagan A. (1980), "The Lagrange multiplier test and its applications to model specification in econometrics", Review of Economic Studies, 47: 239 – 253.

Canning D. (1998), "A database of world infrastructure stocks, 1950-1995", World Bank, working paper, Washington, DC.

Carrere C.(2002), " Impact des Accords Régionaux Africains sur le Commerce Extérieur: Evaluation à l'aide d'un modèle de Gravité en Panel", CERDI working paper.

Combes P-P, Lafourcade M. & Mayer T. (2002), "Can Business and Social Networks Explain the Border Effect Puzzle?" CEPR Discussion Paper 3750.

Deardorff A.V. (1995), "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?", NBER working paper 5377, MA.

De Souza J. & Disdier A.-C. (2002), "Border effects and inobservable characteristics: a panel specification with instrumental variables estimators", in Mayer T. and Mucchiell J.-L. eds, Multinational Firms' Location and New Economy Geography, Cheltenham, Ed. Elgar.

Disdier A.-C. & Mucchielli J.-L. (2000), "Integration and Border Effects", paper presented at the RSA conference "Regional Transitions: European Regions and Challenges of Development, Integration and Enlargement", 15th-18th sept. 2000, University of Gdansk, Poland.

Dupuch, Mouhoud & Talahite (2002), " Les perspectives d'intégration entre l'Union européenne, les PECO et les pays du Sud et de l'EST méditerranéen: incidences sur les tendances de la spécialisation des activités en Europe", paper presented at the first spring school of international economy applied to countries in the southern Mediterranean side.

Eichengreen B. & Douglas A.I. (1996), "The Role of History in Bilateral Trade Flows", NBER working paper, MA.

Egger P. (2001), "Proper Estimation of Cross – Section Gravity Models: A Note, WIFO Working Paper, Vienna.

Evenett S.J. & Keller W. (1998), "On Theories Explaining the Success of the Gravity Equation", NBER working paper 6529, MA.

Feenstra R.C. (1998), "Integration of Trade and Disintegration of Production in the Global Economy", Journal of Economic Perspectives, 12 (4), 31-50.

Feenstra R.C., Markusen J.A. & Rose A.K.(1998), "Understanding the Home Market effect and the Gravity Equation: The Role of differentiating goods", NBER working paper 6804, MA.

Frankel J.A. & Wei S.-J. (1993), "Trade Blocs and Currency Blocs", NBER working paper, MA.

Frankel J.A. & Rose A.K. (2000), "Estimating the Effect of Currency Unions on Trade and Output", NBER working paper, MA.

Greene W.H.(2000), "Econometric Analysis", Prentice Hall International, Inc., N.J.

Hausman J.A. (1978), "Specifications Tests in Econometrics", Econometrica, 46: 1251 – 1271.

Hausman J.A & Taylor E. (1981), "Panel data and unobservable individual effects", Econometrica, 49: 1377 – 1398.

Head K.(2003), "Gravity for Beginners", Faculty of commerce, UBC.

Head K. & Mayer T. (2000), "Non-Europe: The Magnitude and Causes of Market Fragmentation in the EU, Weltwirtschaftliches Archiv, 136(2): 285-314.

Head K. & Mayer T. (2001), Effet frontière, intégration économique et "Forteresse Europe"", Economie et Prévision, 152 – 153: 71-92.

Head K. & Mayer T. (2002),"Illusory Border Effects: Distance mismeasurement inflates estimates of homes bias in trade", document de travail CEPII n°2002-01.

Helliwel J.F. (1997), "National Borders, Trade and Migration", NBER working paper, MA.

Helpman E. & Krugman P. (1985),"Market Structure and Foreign Trade, the MIT Press, Cambridge, MA.

Hillberry R. (1999), "Aggregation bias, compositional change, and the border effect"; the Canadian Journal of Economics, 35(3): 517 – 530.

Hoekman B. & Konan D.E. (1999), "Deep integration, Nondiscrimination, and Euro-Mediterranean Free Trade", Washington, DC.

Hummels D. (1999), "Have international transport costs declined?" working paper.

Fidrmuc & Fidrmuc, (1999), "Integration, Disintegration and Trade Flows in Europe: Borders Do Matter!" In: "East-West Trade: Ten Years After," Chapter IV, pp. 39-56. Vienna, Austria: Institute for Advanced Studies and Bank Austria AG.

Koukhartchouk O. & Maurel M. (2003), " Accession to the WTO and EU enlargement: What potential for trade increase?", Centre for Economic Policy Research Discussion Paper 3944.

Kaminski B. & Ng F. (2001), "Trade and Production Fragmentation: Central European Economies in EU Networks of Production and Marketing"" World Bank, Washington, DC.

Limão N. & Venables A. J. (2001), " Infrastructure, Geographical Disadvantage, Transport Costs and Trade", Wold Bank Economic Review, 15, p.451 – 479.

Matyas L. (1997), "Proper Econometric Specification of the Gravity Model", The World Economy, 30: 363-368.

McCallum J. (1995)," National Borders Matter: Canada – U.S. regional trade patterns, American Economic Review, 85: 615 – 623.

Michaely M. (1976)," The assumptions of Jacob Viner's Theory of Customs Unions", Journal of International Economy, 6: 75 – 93.

Nitsch V. (2000), "National Borders and International Trade: Evidence from the European Union", Canadian Journal of Economics, 33:1091-1105.

Nitsch V. (2002), "Border Effects and Border Regions: Lessons from the German Unification", HWWA discussion paper.

Polak J.J. (1996), "Is APEC a regional trading bloc: a critique of "gravity model" of international trade", The World Economy, 19: 533 – 543.

Rodrik, Subramanian & Trebbi (2002), "Institution Rules: The Primacy of Institutions over Geography and Integration in Development Economic, NBER working paper 9305.

Soloaga I.& Winter L.A, "Regionalism in the Nineties: What Effect on Trade", World Bank working paper,DC.

Subramanian A. & Wei S.-J.(2003), "The WTO promotes trade, strongly bur unevenly", NBER working paper 10024, MA.

Wilhelmsson F.(2004), "Trade Creation, Diversion and Displacement of the EU Enlargement Process", paper presented at the MEDEE international conference on "The EU Enlargement: Stakes, Effects & Perspectives", 9^{th}-10^{th} sept. 2000, University of Lille, France.

Wolf H.C. (1997), "Patterns of Intra- and Inter-State Trade", NBER working paper, MA.

VII. Appendix

VII. a. Description of the variables

M_{ijt}: Aggregated bilateral imports of country i from country j at time t. Source : CHELEM (CEPII). As this flow is given in value (current $US), we divide it by the unit import value index (taken from the IFS) to obtain the real trade flows of trade.

$Y_{i(j)t}$: Gross domestic product of country i (j) in PPP ($US). Source: World Bank's CD-Rom (World Development 03).

$Pop_{i(j)t}$: Total population of country i (j) at time t. Source: World Bank's CD-Rom (World Development 03).

$Distance_{ij}$: Bilateral distance between country i and j. We take the geodesic distances between i and j. Source: Haveman.com

$ComBord_{ij}$: Dummy variable equals to 1 if country i (j) share a common border, 0 otherwise. Source: author's calculation.

$ComLang_{ij}$: Dummy variable equals to 1 if country i (j) share a common language, 0 otherwise. Source: author's calculation.

$Landlocked_{i(j)t}$: Dummy variable equals to 1 if country i (j) does not have a direct sea access, 0 otherwise. Source: author's calculation.

$Inf_{i(j)t}$: Infrastructure level index of country i(j) at time t. The principal component analysis allowed us to construct a synthetic index of the infrastructure, which replicates the best the variance of the indicators that were selected to determine the impact of the infrastructure endowments on the trade flows. This index is built on the basis on three variables: number of km of roads, of paved roads and number of telephone main lines per person at time t. The first two measures are reported to the country area (taken from International Statistical Yearbook and Canning D. (1998)' database) and each variable is normalized to have the same mean equals to 1. Source: International Statistical Yearbook, Canning D. (1998) and author's calculation.

RER_{ijt}: The bilateral real exchange real . To construct this variable, we take the nominal real exchange (NER) rate from the World Bank's CD-Rom (World Development 03) in respect of $US and CPI's for each country and every year on the period 1988 – 2000. The bilateral real exchange rate (for country i) is thus compute as: **RER_{ij}** $= (CPI_j) / (CPI_i) * (NER_{i/\$} / NER_{j/\$})$. Source: the World Bank's CD-Rom (World Development 03) and author's calculation.

EFI_{ij}: Economic Freedom index. This index measures the degree of economic freedom present in five major areas (size of government, legal structure and security of property rights, access to sound money, freedom to exchange with foreigners and regulation of credit, credit and Business). Within the five major areas, 21 components are incorporated into the index. Source: Economic Freedom of World: 2001 annual Report of the Fraser Institute[32] .

[32] More details are available in the Annual Report of Economic Freedom of the World (www.freetheworl.com)

VII. b. Tables of estimation results

Table 1 : Estimation Results of the baseline gavity model

Variables	Dependent Variable : Mijt		
	OLS	PANEL	
		Random Effects	Fixed Effects
ln Y_{it}	1.0314***	1.0122***	0.6182***
	(25.45)	(16.17)	(6.11)
ln Y_{jt}	1.3791***	1.5556***	1.1013***
	(40.51)	(25.59)	(11.10)
ln Pop_{it}	-0.1011***	-0.0643	-0.8217**
	(-2.38)	(-0.84)	(-3.64)
ln Pop_{jt}	-0.4534**	-0.6425***	-2.5040***
	(-11.94)	(-8.48)	(-11.60)
ln Rer_{ijt}	-0.0155***	0.0526***	-0.2950***
	(-3.75)	(-4.51)	(-9.14)
ln Inf_{it}	0.1277***	0.3701***	0.2360***
	(4.74)	(9.58)	(5.22)
ln Inf_{jt}	0.0913***	0.2618***	0.1745***
	(3.26)	(6.54)	(3.71)
ln Efi_{it}	1.9507***	0.8448***	0.7106***
	(22.98)	(13.53)	(10.91)
ln Efi_{jt}	1.6701***	0.1956***	0.2632***
	(23.34)	(4.17)	(5.49)
ln $Distance_{ijt}$	-1.1157***	-1.2665***	-
	(-42.34)	(-16.56)	-
ln $ComBord_{ijt}$	0.3313***	0.2754	-
	(5.51)	(1.51)	-
ln $ComLang_{ijt}$	1.0114***	1.3213***	-
	(10.66)	(4.34)	-
ln $Landlocked_{it}$	-0.2288***	-0.3987***	-
	(-5.62)	(-3.36)	-
ln $Landlocked_{jt}$	-0.5447***	-0.5985***	-
	(-12.66)	(-5.06)	-
Constant	-20.6240***	-16.6907***	-8.8803***
	(-39.98)	(-16.60)	(-5.59)
Number of obs.	7437	7437	7437
Number of groups	-	737	737
Pairs fixed effects	0.0002***	-	49.50***
	(3.65)		F(736, 6690)
Time fixed effects	-0.0684***	-0.0093***	0.0324***
	(-16.74)	(-3.68)	(7.91)
Specification test	-	18527.20***	60.54***
		ch2(1)	ch2(9)
R-sq.	0.80	0.8	0.34

Note:

1) ***, **, * define 1%, 5% and 10% significance level respectively (t- stat. Between brackets);

Table 1 (followed): Estimation Results of the baseline gavity model

Variables	Dependent Variable : Mijt			
	Hausman&Taylor$_1$	Hausman&Taylor$_2$	Hausman&Taylor$_3$	Hausman&Taylor$_4$
ln Y_{it}	0.6938***	0.7036***	0.778***	0.6313***
	(7.13)	(7.23)	(7.25)	(6.38)
ln Y_{jt}	1.3956***	1.3955***	1.3790***	1.1031***
	(15.49)	(15.50)	(14.83)	(11.42)
ln Pop_{it}	-0.0129	0.06364	0.0197	-0.9101***
	(-0.10)	(0.46)	(0.13)	(-4.21)
ln Pop_{jt}	-0.9558***	-0.9874***	-1.0066***	-2.4726***
	(-7.23)	(-7.46)	(-7.05)	(-11.72)
ln Rer_{ijt}	-0.1655***	-0.2522***	-0.2584***	-0.2868***
	(-6.87)	(-8.23)	(-8.34)	(-9.16)
ln Inf_{it}	0.3439***	0.3386***	0.3427***	0.2383***
	(8.09)	(7.97)	(7.98)	(5.39)
ln Inf_{jt}	0.2276***	0.2400***	0.2362***	0.1796***
	(5.18)	(5.45)	(5.29)	(3.89)
ln Efi_{it}	0.7462***	0.6918***	0.6935***	0.7143***
	(12.01)	(10.94)	(10.89)	(11.18)
ln Efi_{jt}	0.1981***	0.2313***	0.2300***	0.2594***
	(4.30)	(4.97)	(4.91)	(5.51)
ln $Distance_{ijt}$	1.4361	1.1929	2.1305	0.1228
	(1.49)	(1.23)	(1.43)	(0.06)
ln $ComBord_{ijt}$	3.4013***	3.1351***	4.1866**	3.5073
	(2.91)	(2.67)	(2.44)	(1.60)
ln $ComLang_{ijt}$	1.4295	1.3264	1.4113	0.4271
	(1.58)	(1.46)	(1.50)	(0.36)
ln $Landlocked_{it}$	-0.0083	-0.2191	0.0237	-1.1298
	(-0.02)	(-0.49)	(0.04)	(-1.62)
ln $Landlocked_{jt}$	0.555	0.4925	0.8701	-0.4999
	(1.05)	(0.93)	(1.25)	(-0.54)
Constant	-29.3433**	-27.7731***	-34.2392***	-10.6348
		(-4.00)	(-3.24)	(-0.77)
Number of obs.	7437	7437	7437	7437
Number of groups	737	737	737	737
Pairs fixed effects	-0.0016***	-0.0013***	-0.0017**	0.0002
	(-2.93)	(-2.45)	(-2.25)	(0.783)
Time fixed effects	0.0078***	0.0075**	0.0081**	0.0323***
	(2.36)	(2.29)	(2.44)	(8.07)
Specification test	116.02***	88.28***	84.76***	3.27
	ch2(6)	chi2(5)	chi2(3)	ch2(1)
R-sq.				

Note:

1) ***, **, * define 1%, 5% and 10% significance level respectively (t- stat. 'between brackets);

2) Endogeneous variables in Hausman&Taylor$_1$ estimation : ln Y_{it}, ln Y_{jt}, ln $Distance_{ijt}$

in Hausman&Taylor$_2$ estimation : ln Y_{it}, ln Y_{jt}, ln $Distance_{ijt,}$ ln Rer_{ijt}

in Hausman&Taylor$_3$ estimation : ln Y_{it}, ln Y_{jt}, ln $Distance_{ijt}$, ln Rer_{ijt}, ln Efi_{it}, ln Ef_{ijt}

in Hausman&Taylor$_4$ estimation : ln Y_{it}, ln Y_{jt}, ln $Distance_{ijt}$, ln Rer_{ijt}, ln Efi_{it}, ln Efi_{jt}, ln Pop_{it}, ln Pop_{jt}

Table 2 : Estimation Results of the baseline gavity model
with selection bias correction

Variables	**Dependent Variable : Mijt**			
	Hausman&Taylor$_5$	**Hausman&Taylor$_6$**	**Hausman&Taylor$_7$**	**Hausman&Taylor$_8$**
ln Y_{it}	0.6182***	0.6349***	0.6513***	0.6327***
	(60.40)	(6.39)	(6.64)	(6.38)
ln Y_{jt}	1.0970***	1.0953***	1.1592***	1.1500***
	(11.57)	(11.20)	(12.08)	(11.80)
ln Pop_{it}	-0.8834***	0.9211***	-0.9876***	-0.8411***
	(-4.09)	(-4.31)	(-4.60)	(-3.86)
ln Pop_{jt}	-2.4759***	-2.4056***	-0.4660***	-2.4640***
	(-11.82)	(-11.40)	(-11.79)	(-11.66)
ln Rer_{ijt}	-0.2879***	-0.2749***	-0.3022***	-0.3062***
	(-9.26)	(-8.80)	(-9.72)	(-9.67)
ln Inf_{it}	0.2343***	0.2356***	0.2563***	0.2502***
	(5.32)	(5.29)	(5.84)	(5.64)
ln Inf_{jt}	0.1767***	0.1809***	0.1722***	0.1650***
	(3.87)	(3.91)	(3.77)	(3.57)
ln Efi_{it}	0.7144***	0.7206***	0.6534***	0.6526***
	(11.27)	(11.23)	(10.27)	(10.17)
ln Efi_{jt}	0.2607***	0.2561***	0.2345***	0.2384***
	(5.58)	(5.42)	(5.02)	(5.05)
ln $Distance_{ijt}$	-0.2439	-1.5157	0.3039	1.5854
	(-0.13)	(-0.84)	(0.15)	(0.74)
ln $ComBord_{ijt}$	3.0108	1.7251	3.6715	4.6632**
	(1.35)	(0.86)	(1.65)	(2.03)
ln $ComLang_{ijt}$	-0.0994	-1.0502	0.4494	-0.1243
	(-0.08)	(-1.05)	(0.37)	(0.12)
ln $Landlocked_{it}$	-1.0674	-1.1190**	-1.0718	-0.4427
	(-1.53)	(-1.96)	(-1.50)	(-0.70)
ln $Landlocked_{jt}$	-0.3760	-0.6341	-0.4428	0.6656
	(-0.41)	(-0.82)	(-0.47)	(0.4.72)
Constant	-10.4108	-0.7317	-12.5850	-28.7747*
	(-0.76)	(-0.06)	(-0.89)	(-1.75)
Pres	0.2501	-	-	0.7985***
	(1.03)	-	-	(2.52)
DD	-	3.3027***	-	-1.9882
	-	(6.41)	-	(-0.95)
PA_t	-	-	0.2134***	0.2125***
	-	-	(10.25)	(10.12)
Number of obs.	7437	7437	7435	7435
Number of groups	737	737	737	737
Pairs fixed effects	0.0006	0.0008	0.0001	-0.0007
	(0.04)	(0.90)	(0.17)	(-0.73)
Time fixed effects	0.0327***	0.0321***	0.0241***	0.0241***
	(8.19)	(7.93)	(5.95)	(5.88)
Specification test	135.18***	131.08***	2.58	0.00
	chi2(1)	chi2(1)	chi2(1)	chi2(1)
R-sq.				

Note:

1) ***, **, * define 1%, 5% and 10% significance level respectively (t- stat. Between brackets);

2) Endogeneous variables in Hausman&Taylor$_5$ estimation : ln Yit, ln Yjt, ln Distanceijt, ln Rerijt, ln Efiit, ln Efijt, ln Popit, ln Popjt, Pres
in Hausman&Taylor$_6$ estimation : ln Yit, ln Yjt, ln Distanceijt, ln Rerijt, ln Efiit, ln Efijt, ln Popit, ln Popjt, DD
in Hausman&Taylor$_7$ estimation : ln Yit, ln Yjt, ln Distanceijt, ln Rerijt, ln Efiit, ln Efijt, ln Popit, ln Popjt, Pat
in Hausman&Taylor$_8$ estimation : ln Yit, ln Yjt, ln Distanceijt, ln Rerijt, ln Efiit, ln Efijt, ln Popit, ln Popjt, Pres and Pat

Table 3 : Estimation Results of the baseline gavity model with trade bloc impacts

Variables	Dependent Variable : Mijt
ln Y_{it}	1.0288***
	(10.47)
ln Y_{jt}	1.3179***
	(13.49)
ln Pop_{it}	-0.1269
	(-0.82)
ln Pop_{jt}	-0.9619***
	(-5.23)
ln Rer_{ijt}	-0.2065***
	(-7.12)
ln Inf_{it}	0.2984***
	(6.84)
ln Inf_{jt}	0.1994***
	(4.46)
ln Efi_{it}	0.4537***
	(5.68)
ln Efi_{jt}	0.2554***
	(4.46)
ln $Distance_{ijt}$	-1.0947**
	(-2.20)
ln $ComBord_{ijt}$	0.7901
	(1.49)
ln $ComLang_{ijt}$	0.7901
	(1.49)
ln $Landlocked_{it}$	-0.3925
	(-1.52)
ln $Landlocked_{jt}$	-0.1990
	(-0.44)
Constant	-17.2818***
	(-4.54)
Pres	0.2686***
	(4.74)
DD	-1.0006***
	(-2.68)
PA_t	0.1661***
	(5.37)
Number of obs.	7435
Number of groups	737
Pairs fixed effects	0.0010**
	(2.13)
Time fixed effects	-0.0540***
	(-4.80)
R-sq.	

EU_intra1988	1.6106***	**EU_M1988**	1.4061***	**EU_X1988**	0.8206***

	(4.14)		(4.11)		(2.71)
EU_intra1989	1.5308***	**EU_M1989**	1.4755***	**EU_X1989**	0.7981***
	(3.95)		(4.34)		(2.64)
EU_intra1990	1.6498***	**EU_M1990**	1.6793***	**EU_X1990**	1.0177***
	(4.25)		(4.95)		(3.36)
EU_intra1991	1.6398***	**EU_M1991**	1.6489***	**EU_X1991**	0.9828***
	(4.22)		(4.87)		(3.24)
EU_intra1992	1.7414***	**EU_M1992**	1.5792***	**EU_X1992**	1.0242***
	(4.49)		(4.67)		(3.38)
EU_intra1993	1.6951***	**EU_M1993**	1.6083***	**EU_X1993**	1.1728***
	(4.38)		(4.75)		(3.87)
EU_intra1994	1.8104***	**EU_M1994**	1.7732***	**EU_X1994**	1.2771***
	(4.66)		(5.23)		(4.19)
EU_intra1995	1.9463***	**EU_M1995**	1.7365***	**EU_X1995**	1.2642***
	(4.98)		(5.12)		(4.03)
EU_intra1996	1.9817***	**EU_M1996**	1.7050***	**EU_X1996**	1.1469***
	(5.05)		(5.00)		(3.66)
EU_intra1997	1.9252***	**EU_M1997**	1.7829***	**EU_X1997**	0.8129***
	(4.88)		(5.21)		(2.59)
EU_intra1998	1.9658***	**EU_M1998**	1.7855***	**EU_X1998**	0.9401***
	(4.94)		(5.18)		(2.98)
EU_intra1999	1.9590***	**EU_M1999**	1.7457***	**EU_X1999**	0.8997***
	(4.89)		(5.04)		(2.84)
EU_intra2000	1.9097***	**EU_M2000**	1.9708***	**EU_X2000**	0.8703***
	(4.73)		(5.62)		(2.71)
CEFTA_intra1993	0.6050	**CEFTA_M1993**	0.2069**	**CEFTA_X1993**	0.0743
	(1.29)		(2.22)		(0.83)
CEFTA_intra1994	0.6440	**CEFTA_M1994**	0.1567	**CEFTA_X1994**	0.0482
	(1.37)		(1.61)		(0.51)
CEFTA_intra1995	0.5561	**CEFTA_M1995**	0.3435***	**CEFTA_X1995**	0.2070*
	(1.17)		(3.14)		(1.83)
CEFTA_intra1996	0.4715	**CEFTA_M1996**	0.1980*	**CEFTA_X1996**	-0.0654
	(0.99)		(1.80)		(-0.57)
CEFTA_intra1997	0.2138	**CEFTA_M1997**	0.0303	**CEFTA_X1997**	-0.3591***
	(0.45)		(0.28)		(-3.13)
CEFTA_intra1998	0.5210	**CEFTA_M1998**	0.1173	**CEFTA_X1998**	-0.1536
	(1.09)		(1.05)		(-1.31)
CEFTA_intra1999	0.5006	**CEFTA_M1999**	0.0938	**CEFTA_X1999**	-0.1253
	(1.05)		(0.82)		(-1.05)
CEFTA_intra2000	0.5309	**CEFTA_M2000**	0.1319	**CEFTA_X2000**	-0.1686
	(1.11)		(1.08)		(-1.32)
BALTICS_1995	2.3713***	**BALTICS_M1995**	0.0829	**BALTICS_X1995**	-0.7442*
	(2.47)		(1.01)		(-1.72)
BALTICS_1996	2.6383***	**BALTICS_M1996**	0.1583**	**BALTICS_X1996**	-0.7105
	(2.75)		(1.91)		(-1.62)
BALTICS_1997	2.5439***	**BALTICS_M1997**	0.4538***	**BALTICS_X1997**	-0.8343**
	(2.64)		(5.47)		(-1.90)
BALTICS_1998	2.5701***	**BALTICS_M1998**	0.3536***	**BALTICS_X1998**	-0.7512*
	(2.66)		(4.07)		(-1.70)
BALTICS_1999	2.4509***	**BALTICS_M1999**	0.3922***	**BALTICS_X1999**	-0.5891
	(2.53)		(4.37)		(-1.32)
BALTICS_2000	2.4935***	**BALTICS_M2000**	0.5354***	**BALTICS_X2000**	-0.5024
	(2.57)		(5.57)		(-1.12)
EU_BALTICS1990	0.7359**				

	(-1.94)
EU_BALTICS1991	-0.5979
	(-1.58)
EU_BALTICS1992	-0.8764**
	(-2.28)
EU_BALTICS1993	-0.6234*
	(-1.65)
EU_BALTICS1994	-0.3303
	(-0.88)
EU_BALTICS1995	0.0375
	(0.11)
EU_BALTICS1996	0.2801
	(0.85)
EU_BALTICS1997	0.2557
	(0.78)
EU_BALTICS1998	0.2180
	(0.66)
EU_BALTICS1999	0.1163
	(0.35)
EU_BALTICS2000	0.5985
	(0.18)
EU_CEFTA1988	-1.3564***
	(-5.12)
EU_CEFTA1989	-1.3876***
	(-5.23)
EU_CEFTA1990	-1.4861***
	(-5.64)
EU_CEFTA1991	-1.2984***
	(-4.97)
EU_CEFTA1992	-1.0743***
	(-4.11)
EU_CEFTA1993	-1.2775***
	(-4.74)
EU_CEFTA1994	-1.1359***
	(-4.21)
EU_CEFTA1995	-1.1304***
	(-4.10)
EU_CEFTA1996	-0.8407***
	(-3.06)
EU_CEFTA1997	-0.6460**
	(-2.35)
EU_CEFTA1998	-0.6670**
	(-2.42)
EU_CEFTA1999	-0.6136**
	(-2.22)
EU_CEFTA2000	-0.6585**
	(-2.35)

Note:

1) ***, **, * define 1%, 5% and 10% significance level respectively (t- stat. Between brackets);

2) Endogeneous variables : $\ln Y_{it}$, $\ln Y_{jt}$, $\ln Distance_{ijt}$, $\ln Rer_{ijt}$, $\ln Efi_{it}$, $\ln Efi_{jt}$, $\ln Pop_{it}$, $\ln Pop_{jt}$, Pat and Pres

Table 4 : Selected Previous Studies

Author	Analyses	Sample	Main Results
Egger & Pfaffermayer (2002)	intra-EU trade	OECD; 1960-1998	Trade diversion due to southern enlargements but not 1995 enlargement (Austria, Finland and Sweden).
Alho (2003)	Preferential Trade Agreements in Europe	Europe; 1995, 1999	EU causes trade diversion; EMU causes Trade creation.
Adam & al. (2003)	CEFTA, Baltic and European Free Trade Agreements	37 countries (CEEC, CIS, OECD and SEEC); 1996-2000	CEFTA, Baltic agreement have a positive overall impact. European Free Agreement has an positive impact only on EU exports.
Martin & Turrion (2001)	European Free Trade Agreements (Trade and FDI)	CEEC and OECD countries; 1988-1998	Trade creation, EU exports increase more than EU imports from the CEEC.
Carrère (2002)	8 Preferential Trade Agreements	Africa, Asia, South and Latin America	Trade diversion.
Fidrmuc & Fidrmuc (1999)	Eastern Europe disintegration	CEEC; 1990-1998	EU causes a moderate gross trade creation.
Soloaga & Winters (1999)	9 Preferential Trade Agreements	OECD and selected developing countries; 1989-1996	EU causes trade diversion.
Bayoumi & Eichengreen (1995)	Preferential Trade Agreements in industrial countries	21 industrial countries	EEC had caused trade creation.

Source:

Wilhelmsson (2004) and author' research