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The Role of Association Agreements within European Union Enlargement to Central and Eastern European Countries

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The main goal of regionalisation is to create free trade areas and to guarantee the countries to have access to a widened market. Many studies dealing with the effects of regional free trade agreements on trade flows already exist in the economic literature and the explosion of the number of regional agreements among countries has recently stressed the key role of regionalisation. However, the effects of agreements on trade were sometimes contradictory in those studies. These diverging results can be explained by the potential endogeneity bias of the agreement variable. Our research aims at reassessing the genuine role of associations. For this matter, we particularly study the association of Central and Eastern European countries (CEEC) with the European Union. Our econometric analysis based on qualitative choice models highlights in particular why European countries chose to conclude an association agreement with CEEC, and stresses the fact that European Union countries endogenously select the conclusion of association agreements. We are also particularly interested in modeling the effect of an association agreement on export performance between countries, and in quantifying its impact. When considering annual data for 4 CEEC and 19 OECD countries (1990–2004), we find a positive impact of the association agreement on bilateral exports.

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1 Introduction

Globalisation has been the subject of various debates and has already received considerable attention in the economic literature, which distinguishes between two main streams: the former considers that a world with trade freedom is better than a world with tariff and non-tariff barriers. The latter suggests that some specific but limited tariff and non-tariff barriers are however preferable to a complete trade freedom. Actually since the end of World War II it seems that this trade liberalisation has developed more on a local than on a global scale and has led to the development of various free trade areas as for instance, the European Economic Community, the Free Trade European Association and other. Since the sixties Western Europe

has been the most interesting and successful regional liberalisation process.[1] The nineties were the most opportune period for a deeper economic integration.

Many studies dealing with the effects of regional free trade agreements on trade flows already exist in the economic literature and the explosion in the number of regional agreements among countries has recently stressed the key role of regionalisation. However, the effects of agreements on trade were sometimes contradictory in those studies. Our research in this paper aims at reassessing the genuine role of associations. For this matter, we first theoretically study the association of Central and Eastern European countries (CEEC) with European Union countries (EU). Our econometric analysis based on qualitative choice models then highlights why European countries have chosen to conclude an association agreement with CEEC, and stresses the fact that European Union countries have endogenously selected the conclusion of association agreements. Within this perspective we proceed in two steps: first, we try to find the main determinants that better characterise the European agreement using qualitative models. Then, we calculate the marginal effects that provide indications of the quantitative contribution of each determinant to the probability to conclude association agreements between countries. And finally, we try to determine the effects of association agreements on trade exchanges. We are particularly interested in the two following issues: (i) do European agreements have for main goal to increase the trade exchanges of their members and (ii) if so, how much?

The remainder of the paper is organised as follows. In section 2 we address the European agreements and we briefly review their main determinants in section 3. In sections 4 and 5 we report our empirical investigation as well as our econometric results and we discuss their policy implications. Finally, in section 6 we summarise the paper's major findings.

2 European Agreements

Since the nineties Western Europe has had to face the economic and political changes of Central and Eastern Europe. The main concern of Western Europe has been the creation of a framework aiming at facilitating and strengthening the gradual economic and political integration with Central and Eastern Europe. The solution retained has been to propose a former

1 See Silva (2001)

European policy: Preferential trade relationships were established as European Agreements, or Association Agreements in the early nineties.

All candidate countries signed association agreements with the European Union, establishing the creation of a free trade agreement, dialogue modalities between governments and community institutions. These agreements were signed[2] on bilateral basis having a political and economic motivation. The regional influence on the geographical structure of trade exchanges has already been the subject of an important literature.

Some of the econometric results reported in these studies were contradictory, even concerning the European Community (EC). For instance, researchers like AITKEN (1973) or ABRAMS (1980) found that the EC agreement had a significant impact on the trade exchanges of community members. On the contrary, BERGSTRAND (1985) found an insignificant effect. Besides, FRANKEL (1997) found a significant but negative effect of the agreement impact for EC members. He explains intra-European trade by *"various natural factors with little role of EC until the 1980s"*. These diverging results can be explained by the potential endogeneity bias of the agreement variable.

GHOSH and YAMARIK (2004) use extreme bounds analysis to test the robustness of the hypothesis that regional trading arrangements (RTAs) are trade creating. Their findings underline that the effect of most regional trading arrangements is fragile. They suggest that its effect may be over- or under-estimated due of the potential endogeneity of this variable.

BAIER and BERGSTRAND (2005), pointed out that the regional agreement variable is not exogenous and the estimation of a gravity model using cross-section data for investigating the quantitative effect of this variable on trade flows can be biased because of unobservable heterogeneity or/and omitted variables.

In the next section we try to more precisely identify the main determinants that better characterise the European agreements.

2 The EC has signed Association agreements with CEEC in the following order: Hungary (1991), Poland (1991), Romania (1993), Czech Republic (1993), Slovakia (1993), Bulgaria (1993), Latvia (1995), Estonia (1995), Lithuania (1995) and Slovenia (1995).

3 The main determinants of Association Agreements

The analysis of the effect of regional integration agreements was considerably enriched not only with mechanisms involving scale economies and the location of firms, but also with the non-economic gains of regional integration. Non-economic objectives are also the reasons for the conclusion of regional agreements. A political stability in the agreement zone, the intensification of democracy, a guarantee of policy irreversibility, higher lever of security and increased negotiating power with third parties are variables which can be considered for the explanation of an agreement conclusion.

DE MELO, PANAGARIYA and RODRIK (1993) showed that regional agreements allow to implement the most effective policies within the passage of the national framework to the regional framework since the power of lobbies is in this case more reduced.

The irreversibility of economic policies is guaranteed because trade agreements do not allow governments to implement a discretionary policy or to implement a protectionist trade policy again.[3] Then, agreements make domestic reforms of economic policies irreversible. Regional agreements have increasing effects on the negotiating power of members with third countries and permit a faster exchange liberalisation than within the multilateral framework.

Concerning "the security capital" of a country, it symbolises confidence in the neighbouring country. Indeed, according to SCHIFF and WINTERS (1998) the security capital of a country represents the consumers' utility function and positively depends on imports from the nearby country. Consequently, the higher imports are, the higher the confidence is in the nearby country. BAIER and BERGSTRAND (2005) developed a theoretical and econometric specification to underline the endogeneity of regional agreements using economic and political instruments. The pairs of countries that signed an agreement tend to share common economic characteristics associated with an important trade and with a net trade creation that determines welfare growth. Regional agreements like every regional policy are actually an endogenous potential variable. The bias resulting from not considering this variable as endogenous is an important question that was neglected in literature. According to the authors this endogeneity bias can be the conse-

3 See FERNANDEZ and PORTES (1998).

quence of omitted variables that can be correlated with the regional agreement variable.

KRUGMAN (1991) showed that countries trying to conclude an agreement are natural commercial partners and are close from a geographic point of view. MANSFIELD, MILNER and ROSENDORFF (2000) introduced a theoretical and econometric model showing that because of the conclusion of an agreement, a government becomes more democratic. There exist different sets of factors determining the decision of two governments to conclude an agreement. For instance, BAIER and BERGSTRAND (2004) mentioned the importance of political variables and pointed out that a regional agreement is more likely to emerge when governments are more democratic.

Having now reviewed economic and non economic gains, and given that the regional agreement variable is not exogenous, we propose in the next section to estimate an econometric model that takes into account the determinants of a regional agreement concluded between countries with a different development level. We are particularly interested in identifying the main reasons for the conclusion of the association agreement between CEECs' government and EU-15 countries.

4 Econometric investigation

The agreement can be modeled by a parametric form using a model of qualitative choice. The data used span a 19 year period (from 1987 to 2005), and cover a sample of 19 OECD countries (UE-15 and non-European countries)[4] and four Central and Eastern European countries (CEEC-4)[5] organised in a panel framework. Our binary qualitative model indicates that CEEC's decision of economic and political integration into EU is influenced by two categories of variables: economic and noneconomic ones. The PROBIT model permits to identify the variables which have an impact on the conclusion of an agreement and to quantify their contribution to this process. From economic and political conditions we found convenient to use 5 explanatory variables to characterise the association process to the EU. These variables are the following:

4 Austria, Belgium and Luxemburg, Denmark, England, Finland, France, Germany, Greece, Holland, Ireland, Italy, Portugal, Spain, Sweden, Australia, Canada, Japan, Switzerland, the United States of America.

5 Bulgaria, Hungary, Poland and Romania.

$DGDPC_{ijt}$ the difference between the GDP per capita of the partner countries at time t; reflecting the economic distance (source: CHELEM, French CEPII data base);

where:

$$DGDPC_{ijt} = \left| \frac{GDP_{it}}{N_{it}} - \frac{GDP_{jt}}{N_{jt}} \right|$$

(N_{it} = population of country i, N_{jt} = population of country j),

- $Dist_{ij}$ the geographic distance between the capitals of partner countries, reflecting a proxy for transport costs (source: French CEPII data base);
- FDI_{ijt} foreign direct investment (source: OECD data base);
- TTR_{ij} the traditional trade relationship between countries, (author's calculus, source: CHELEM, French CEPII data base);
- PS_{it} the political stability of countries (source: Freedom House).

The econometric specification used is the following:

$$(1) \quad Acc_{ijt} = a_0 + a_1 \log(DGDPC_{ijt}) + a_2 \log(Dist_{ij}) + a_3 TTR_{ij} + a_4 PS_{it} + a_5 \log(FDI_{ijt}) + \varepsilon_{ijt}$$

where:

- Acc_{ijt} denotes the association agreement between CEEC and EU countries (endogenous variable); (ε_{ijt}) is the residual term.

First, we determine the qualitative influence of the explanatory variables (see Table 1, column 1). The numerical value of the estimated parameters reported in Table 1, column 1 is not directly interpretable. The only really useful information is the sign of parameters that indicates whether the associated variable influences positively or negatively the dependent variable.

The results of the estimation indicate that some of the variable coefficients are positive and other negative. The lack of similarity of the economies entails that the variable of economic distance ($DGDPC_{ijt}$) has a negative impact on the decision of association agreement. The more the economic distance between the countries lowers, the higher the possibility increases to conclude an agreement. For this variable the coefficient sign is negative.

Traditional trade relationships (TTR_{ij}) have the role to stimulate partners' interest in association. Geographic distance ($Dist_{ij}$) is generally an obstacle

in the decision of association, as it is also confirmed by the negative sign in the above estimation. The closer the countries are, the higher the probability is to conclude an association agreement. To calculate marginal effects we proceed to another estimation in which variable coefficients indicate the contribution of the different variables in the decision of association agreement. Our results are reported in Table 1, column 2.

Table 1: Results of association agreement estimations

VARIABLES	(1)	(2)
	AGREEMENT	AGREEMENT
$DGDPT_{ijt}$	−0.894	−0.335
	(3.76)***	(3.76)***
$Dist_{ij}$	−1.541	−0.577
	(10.42)***	(10.55)***
TTR_{ij}	0.544	0.203
	(5.32)***	(5.40)***
PS_{it}	2.654	0.648
	(16.93)***	(33.44)***
FDI_{ijt}	0.833	0.311
	(8.25)***	(8.42)***
Constant	5.962	–
	(5.88)***	–
Observations	1441	1441
Number of groups	76	76
Correctly classified	86.75%	
ROC curve	0.92	
Absolute value of z statistics in parentheses		
* significant at 10% ** significant at 5% *** significant at 1%		

These results reveal that previous coefficient signs are preserved. We observe that the political stability variable (PS_{it}) and the foreign direct investment variable (FDI_{ijt}) influenced the conclusion of the association most, confirming that the main objective of the association was the creation of a zone stable from a political and economical point of view. The foreign direct investment variable indicates that it was in common interest both for the investor and the host country given the potential gains for the two partners.

Concerning the economic distance, it is a resistance factor against the association due to economies with a different level of development. The influence of traditional trade relationships is positive as shown before, but its contribution is low. The gains from the signature of the association agreement are those associated with the advantages of foreign direct investment and political stability. In the next section we analyse what was the impact of the European agreement on exports between countries.

5 The impact of the Association Agreement on bilateral export performances

Our main goal here is to determine the effect of the association agreement on the bilateral export performances between countries, and to quantify its impact. We use the gravity model[6] that permits to analyze the effects of regional agreements on trade flows between two countries. The trade flows of the country *i* towards the country *j* is a function of the offer of the exporter country as well as of the demand of the importer country, and of the resistance of trade between countries. In other words the national incomes of two countries, transport costs (transaction costs) and regional agreements are the basic determinants of the model.

5.1 Estimation methods and gravity equation specifications (statistical overview)

The gravity equation has been widely used for explaining the bilateral trade flows between countries and for estimating the impact of regional blocks. Various specifications of the model have been used by researchers over time to underline the role of regional blocks on trade exchanges.[7] Most of these specifications were estimated using cross-section data which could actually lead to biased estimates since they do not permit to control individual heterogeneity which is highly possible in bilateral trade flow data.[8]

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6 The theoretical foundations of the gravity model are provided by Linnemann (1966), Helpman and Krugman (1985), Bergstrand (1989), Evenett and Keller (2002). The popularity of the gravity model is highlighted by Eichengreen and Irwin (1995), who consider it "the workhorse for empirical studies of regional integration".

7 See for instance Frankel (1997), Wei and Frankel (1998), Bayoumi and Eichengreen (1995).

8 "Panel data suggest that individuals, firms, states or countries are heterogeneous. Time-series and cross-section studies that do not control this heterogeneity run the risk of obtaining biased results" (see Baltagi, Egger and Pfaffermayr 2003).

On the other hand, panel data allows the researcher to have greater flexibility in modeling differences in behavior across individuals. A number of different specifications of the equation using panel data have been applied in different contexts in order to try to control individual effects. MATYAS (1997) argues that a correct econometric specification of a gravity equation should control the time, exporter and importer specific effects and hence proposes the following *three-way model*.

$$(2) \qquad \ln(Y_{ijt}) = \alpha_0 + \alpha_t + \theta_i + \omega_j + \beta' X_{ijt} + \varepsilon_{ijt}$$

for t = 1, 2,....., T; i = 1, 2,....., N and j = 1, 2,....., N, i ≠ j, where Y_{ijt} are the exports from country *i* to country *j* in year *t*, $X_{ijt} = [x_{1t}\ x_{jt}\ .....]$ is the 1 x k row vector of gravity variables, α_t is a time-specific effect, θ_i is time invariant country-specific effect when the country is an exporter, ω_j is a time invariant country-specific effect when the country is an importer and ε_{ijt} is the disturbance term which is assumed to follow a normal distribution with a zero mean and a constant variance for all observations and pairwise uncorrelated. In this specification, the time invariant regressors are eliminated even though they are not collinear with the country-specific effects.

GLICK and ROSE (2002) consider the following specification of the gravity model:

$$(3) \qquad \ln(Y_{ijt}) = \alpha_0 + \alpha_t + \alpha_{ij} + \beta'_{ijt} X_{ijt} + \varepsilon_{ijt}$$

where: α_{ij} is a time invariant country-pair specific effect with the restriction that bilateral interaction effects are symmetric, *i.e.* $\alpha_{ij} = \alpha_{ji}$.

EGGER and PFAFFERMAYR, (2003) underline that not including the bilateral interaction effect to control heterogeneity may yield to biased estimations and hence propose a similar *two-way model* (3) but with time-invariant country-pair specific effect, distinct for each direction of trade, when the countries are alternately importer or exporter that is $\alpha_{ij} \neq \alpha_{ji}$.

CHENG and WALL (2004) compare the different possible ways to take heterogeneity into account when using the gravity model to estimate bilateral trade. They show that alternative models proposed by GLICK and ROSE (2002) and MATYAS (1997) are special cases of the general gravity model (see equation 3). MATYAS model (1997) is a special case of this equation because it has a unique value for each trading pair's intercept, with the res-

trictions that a country's individual effect as an exporter or importer is the same for all of its trading partners. As these specific restrictions have little or no economic support and are actually not often statistically supported by data, CHENG and WALL (2004) argue that these restrictions should not be imposed. As a consequence, our econometric investigation will rely on the *two-way model* with time and country pairs effect when the countries are alternately importer or exporter that is $\alpha_{ij} \neq \alpha_{ji}$. The time effects account for the business cycle and changes in openness degree across all countries.

In the traditional approach to panel data models, individual effect, is called a *"random effect"* when it is treated as a random variable, and a *"fixed effect"* when it is treated as a parameter to be estimated for each cross-section observation. We follow WOOLDRIDGE (2002) in the sense that unobserved effects are treated as random variables, and the key issue is whether the unobserved effect is correlated or not with the explanatory variables.

Basically, we have two alternative different estimation methods, the *"random effects"* estimation (RE), which is associated with GLS estimator and the *"fixed effects"* estimation (FE), which is related to the *"within"* estimator.

To identify whether the unobservable variables are correlated or not with explanatory factors, we perform a HAUSMAN test comparing the fixed effects and random effects estimators. The test is based on the fact that the random effect estimator is biased if unobservable variables are correlated with the explanatory variables, while the fixed effect estimator is always unbiased, but is less efficient if there is no correlation. The gain in efficiency is due to the utilisation of the *"between"* estimator in addition to the *"within"* estimator. Furthermore, when the effects are not correlated with the explanatory variables, the within and between estimators are the same and therefore any weighted matrix combination will be the same. But the fixed effect model has two main drawbacks: first of all it does not allow to estimate the effect of time-invariant variables such as the geographic distance or the common language and implies an important loss of degrees of freedom.

The instrumental variable method (IV) allows to identify and to add exogenous variables, which can be used as relevant instruments for the endogenous explanatory variables. The major difficulty of this method is to find external instruments (outside the original specification) uncorrelated with unobservable characteristics.

HAUSMAN and TAYLOR (1981)[9] estimator (hereafter HT) overcomes these problems using a method, which allows to estimate the time-invariant variables and also to consider some explanatory variables included in the model as instruments. In this case the major difficulty of the instrumental method, which consists in finding external instruments uncorrelated with unobservable characteristics is avoided.

In HT explanatory variables are divided into four categories: time varying (X_{it}^{1}) uncorrelated with individual effects α_{ij}, time varying (X_{it}^{2}) correlated with individual effects α_i, time-invariant (Z_i^{1}) uncorrelated with α_i and time-invariant (Z_i^{1}) correlated with α_i. More precisely, the considered equation writes as follows:

$$(4) \qquad Y_{it} = \beta_0 + \beta_1 X_{it}^{1} + \beta_2 X_{it}^{2} + Z_i^{1}\gamma_1 + Z_i^{2}\gamma_2 + \alpha_i + \theta_t + \eta_{it}$$

where:

- β_1, β_2, are k_1, k_2, vectors of coefficients associated with time-varying and γ_1, γ_2 are g_1, g_2 vectors of coefficients associated with time-invariant, uncorrelated (index 1) and correlated (index 2) variables respectively;
- θ_t is the time-specific effects common to all cross section units that is used to correct for the impact of all the individual invariant determinants (obtained by the inclusion of T-1 dummy variables);
- α_j are individuals effects that account for the effect of all possible time invariant determinants, which are assumed to be a time-invariant latent random variable, distributed independently across individuals with variance σ_α^2, and that might be correlated with X_{it}^{2} and/or Z_i^{2};
- η_{it} is a zero mean idiosyncratic random disturbance uncorrelated within cross-section units and over time periods.

The explanatory variables are not correlated with η_{it}, even if some of them are correlated with α_i. The HT approach consists in using the explanatory variables uncorrelated with α_i as instruments for the correlated explanatory variables.

The X_{it}^{2} regressors are instrumented by the deviation from individual means (as in the Fixed Effect approach) and the Z_i^{2} regressors are instrumented by the individual average of X_{it}^{1} regressors. Hausman-Taylor estimator allows us to estimate the effect of time-invariant variables such as distance, com-

9 The Hausman-Taylor method relies on an hybrid specification of both the fixed-effect model and the random effect one.

mon border, and common languages using only internal regressors as instruments.

The (HT) procedure follows 4 steps in the estimation:

(i) *Identification of variables* X_{it}^1, Z_{i1}^1 uncorrelated with the unobservable characteristics α_i and X_{it}^2, Z_{i1}^2 correlated with the unobservable characteristics α_i.

(ii) *Transformation of variables* X_{it}^1, X_{it}^2 of the model into deviations from individual means $\Delta(X^1)$, $\Delta(X^2)$ and uncorrelated variables X_{it}^1 into individual means $\Lambda(X^1)$. Under the assumption of no correlation between deviations from individual means of varying variables and α_i, HT provides unbiased instruments for the β coefficients. If the number k_1 of variables X_{it}^1 is equal to or higher than g_2, then the individual means of X_{it}^1 are valid instruments for Z_{it}^2 and HT estimator is then more efficient than the *within* estimator. The instrument set proposed by HT is $[\Delta(X^1), \Delta(X^2), Z^1, \Lambda(X^1)]$[10] with the condition $k_1 \geq g_2$.

(iii) *Selection of instruments.* When any variable is of type Z_i^2, we use deviations from individual means of X_{it}^1 as instruments, as well as variables Z_i^1. On the other hand, in the presence of Z_i^2 variables, it is necessary to add to the set of instruments individual means of variables X_{it}^1.[11] The HT estimator resulting from this procedure is unbiased, but it is not efficient.

(iv) *Improving the efficiency of the estimator.* HT suggest to apply the instrumental variable method to the transformed model:

$$(5) \qquad Y_{it}-(1-\phi_i Y_i)=[X_{it}-(1-\phi_i)X_i]\beta+\phi_i Z_i\gamma+\phi_i\mu_i+[\eta_{it}-(1-\phi_i)\eta_{it}]$$

where:

$$\phi_i=\left[\frac{\sigma_\eta^2}{\sigma_\eta^2+T_i\sigma_\alpha^2}\right]^{\frac{1}{2}}$$

In order to identify and to quantify the impact of the association agreement on the intensification of bilateral exports between CEEC-4 and EU-15 countries, the choice of the estimation method is based on our sample data, on the existence of correlated or uncorrelated unobservable bilateral char-

10 Δ is the operator which transforms the variables into deviation from their individual means and Λ is the operator which transforms the variables into their individual means.

11 If Z_2 is empty, the gain obtained by adding individual means of X_1 as instruments is marginal.

acteristics with explanatory variables and on the reduction of multicolinearity among variables.

Our econometric specification is the following:

$$(6) \quad \begin{aligned} \text{Log}(Y_{ijt}) &= a_0 + a_1\log(GDP_{it}) + a_2\log(GDP_{jt}) \\ &+ a_3\log(DGDPC_{ijt}) + a_4\log(Dist_{ij}) + a_5\log(Tchr_{ijt}) + a_6Acc_{ijt} \\ &+ a_7Bo_{ij} + u_{ij} + \theta_t + \varepsilon_{ijt} \qquad (i=1,\ldots\ldots N; t = 1,\ldots..T) \end{aligned}$$

In this specification, the bilateral trade (Y_{ijt}) is the dependent variable. The explanatory variables used are the gross domestic product of the two partners (GDP_{it}), (GDP_{jt}), geographic distance (Dis_{tij}), the difference in development level ($DGDPC_{ijt}$), real exchange rate ($Tchr_{ijt}$), the dichotomous variable association agreement (Acc_{ijt}) and the dichotomous variable common border (Bo_{ij}).

The notation is the following:

- Y_{ijt} denotes the bilateral trade between countries ***i*** and ***j*** at time ***t*** with $i \neq j$ (source: CHELEM – French CEPII data base);
- a_0 is the intercept;
- GDP_{it}, GDP_{jt} represents the Gross Domestic Product of country ***i*** and country ***j*** (source: CHELEM- French CEPII data base)
- $Tcrh_{ijt}$ is the real exchange rate which indicates the price competitiveness;

$$(7) \quad Tchr_{ijt} = Tcn_{ijt} \times P_{it}/P_{jt}$$

where:

- Tcn_{ijt} is the real exchange rate (CHELEM- French CEPII data base);
- $P_{i(j)}$ is the consumer price index (WORLD BANK – World Tables);
- Acc_{ijt} is a dummy variable that equals 1 if country *i* and country *j* have signed a regional agreement, and zero otherwise;
- Bo_{ij} is a dummy variable which indicates a common border;
- u_{ij} is a bilateral specific effect (i = 1,2,…,N, j = 1,2,…,M) ;
- θ_t is a time specific effect (t = 1,…..T);
- ε_{ijt} is the disturbance term, which is assumed to be normally distributed with a zero mean and a constant variance for all observations and to be uncorrelated.

The estimation period goes from 1990 to 2004, that is 15 years for a sample of 19 developed countries (OECD) and 4 CEEC countries. Data are organised in panel with two dimensions: countries-pairs, and years.

5.2 Estimation results

We apply different panel data estimation methods like Pooled Ordinary Least Squares (PLS), Fixed Effect Model (FEM), Random Effect Model (REM) and HausmanTaylor (HT) and we compare the results (see table 2). The first regression is a classic one (PLS, columns 1, 2). In the other regressions (FEM, columns 3,5; REM, columns 4,6; and HT, columns 7,8), we use panel data techniques to control heterogeneity due to a possible correlation between some explanatory variables and unobserved characteristics in order to avoid getting biased results.

The possible presence of multicolinearity among variables can bias econometric results. In particular, standard errors can be wrongly higher and/or the coefficients of some variables wrongly insignificant. In order to evaluate the risk of multicolinearity we calculate, the variance inflation factor (VIF). Literature indicates that a variance inflation factor value higher than 10 reveals the presence a multicolinearity requiring specific corrections (see GUJARATI 1995).[12]

The econometric results show that the association agreement positively influences bilateral exports, and after the elimination of endogeneity the coefficient value of the agreement variable is close to 0.17 (see column 8).

The estimation carried out at an aggregated level underline the positive influence of the association agreement variable on the bilateral exports, which is a result in accordance with previous studies.[13] Coefficients are statistically significant and have the expected signs in accordance with the gravity model: a positive effect of the variables as the country size, the association agreement, the common border on trade flows and a negative impact of geographical distance and of real exchange rate. In all estimations we can note that the variable of "difference between GDP per capita" has a positive and significant coefficient, which is in accordance with the Heckscher-Ohlin theory, that is the trade between two zones is based on comparative advantage.

12 The calculation of this variance inflation factor (reported here) indicates the absence of multicolinearity.
13 See for instance WINTERS and SOLOAGA (2001), GHOSH-YAMARICK (2004) and CARRÈRE (2006), RAULT, SOVA and SOVA (2008).

Table 2: Estimations Results

VARIABLES	OLS	OLS	FEM	REM	FEM	REM	HT_1	HT_2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Yij	Yij	Yij	Yij	Yij	Yij	Yij	Yij
GDP	0.974	0.957	1.383	1.267	0.427	0.872	1.385	0.427
	(60.12)***	(61.00)***	(14.15)***	(29.14)***	(3.67)***	(18.38)***	(14.15)***	(3.67)***
GDP_j	0.943	0.927	1.940	1.288	0.983	0.900	1.940	0.983
	(58.22)***	(59.04)***	(19.95)***	(29.64)***	(8.47)***	(18.99)***	(19.84)***	(8.47)***
$Dist_{ij}$	-1.260	-1.327	-	-1.495	-	-1.310	-2.057	-1.216
	(53.10)***	(54.07)***		(21.13)***		(18.77)***	(5.37)***	(5.08)***
$DGDPC_{ij}$	0.185	0.033	0.289	0.385	0.230	0.191	0.289	0.230
	(4.09)***	(0.71)	(4.61)***	(6.50)***	(3.77)***	(3.35)***	(4.61)***	(3.77)***
$Tchr_{ij}$	0.001	0.001	-0.028	-0.004	-0.028	-0.004	-0.028	-0.028
	(0.10)	(0.10)	(2.07)**	(0.36)	(2.22)**	(0.43)	(2.07)**	(2.22)**
Acc_{ij}	0.318	0.178	0.254	0.293	0.166	0.172	0.254	0.166
	(18.95)***	(7.76)***	(21.64)***	(25.54)***	(10.80)***	(11.36)***	(21.65)***	(10.80)***
Bo_{ij}	0.198	0.197	-	-0.057	-	0.226	-3.021	0.252
	(4.11)***	(4.24)***		(0.35)		(1.41)	(0.98)	(0.14)
c	-	***	-	-	***	***	-	***
Constant	-4.838	-3.490	-16.923	-8.281	-6.115	-3.591	-10.028	-2.093
	(24.09)***	(15.27)***	(36.00)***	(22.36)***	(6.73)***	(8.17)***	(7.39)***	(2.08)**
Observations	2280	2280	2280	2280	2280	2280	2280	2280
Number of groups			152	152	152	152	152	152
R-squared	0.80	0.82	0.65	0.78	0.69	0.81		
Fischer Test	-	-	42.32	-	45.83	-	-	-
Prob>Chi2			(0.00)		(0.00)			
Hausman test	-	-	-	163.47	-	19.65	1148.55	120.49
Prob>Chi2				(0.00)		(0.42)	(0.00)	(0.00)
VIF	1.28	1.83	-	-	-	-	-	-
Ramsey-Reset	9.26	11.66	-	-	-		-	-
Prob>Chi2	(0.00)	(0.00)						
Breusch-Pagan / Cook-Weisberg - Prob>Chi2 (before correction)	155.62 (0.00)	172.95 (0.00)	-	-	-	-	-	-
Absolute value of t statistics are in parentheses								
* significant at 10%; ** significant at 5%; *** significant at 1%								

The robustness of the estimators obtained is very important because it allows us to better quantify the impact of the association agreement on bilateral exports. This is one of the reasons why we use here a panel data approach, which permits to identify countries' bilateral specific effects and to isolate them. Our model allows us to take the global propensity to bilateral exports of a country into account (with the introduction of fixed or random effects) and the inclusion of temporal fixed effects permits to capture business cycles as well as the possible changes in the opening degree of all countries.

A comparison between the estimation leads to the following conclusion. The calculated Fisher statistics ($F = 42.32$, $Prob > F = 0.00$) and ($F = 45.83$, $Prob > F = 0.00$) indicate that the introduction of bilateral and temporal effects significantly improve the estimated model and hence require the use of an estimation method allowing to consider bilateral specific effects (fixed or random) and temporal.

The estimated coefficients of the FEM are different from those obtained with the REM (for instance for GDP, economic distance, or association agreement variables), which can be explained by the existence of a correlation between some explanatory variables and the bilateral specific effect. Moreover, the calculated statistic of the Hausman test ($chi^2 = 163.47$, $Prob > chi^2 = 0.00$) rejects the null assumption of absence of a correlation between the individual effects and some explanatory variables. In this case random estimate is biased and the fixed effects model is preferred.

Given the endogeneity of the agreement variable (Accij) and to take into account possible omitted variables, invariant over time, we use the Hausman-Taylor method (HT1-without temporal effects, see column 7; and HT2 – with temporal effects see column 8). The Sargan test of surindentification ($chi2 = 1.301$ $Prob > chi2 = 0.254$) indicates that the instruments chosen are valid. Using HT method we obtain similar coefficients to FEM and we also emphasised the importance of time-invariant variables and their important impact on trade flows.

Table 2 above clearly underline the decreasing impact of the European agreement variable from 0.32 in the basic model to 0.29 in random effects model, to 0.17 in the fixed effects model with temporal effects and HT model with temporal fixed effects. These results highlight how controlling for unobserved heterogeneity in gravity models can avoid overestimating the effects of regional agreement on the trade volume.[14] Besides the agreement variable coefficient indicates a positive and significant influence on bilateral exports and hence underlines the effects of EU trade policy through the European agreement on the commercial relationships with CEEC-4.

14 See CHENG and WALL (2004) and BAIER and BERGSTRAND (2005).

6 Conclusions

Our study has highlighted that European agreements are not exogenous and that in addition to economic motivations there also exist non-economic reasons to conclude an agreement. The EU enlargement to Central and Eastern countries is an unprecedented event that has provoked ample discussions. Concerning the CEEC, their first step towards European integration was the signature of the association agreement.[15] In fact, association agreements legitimated the intention of candidate countries to become members of EU, which was confirmed after the application of these agreements when these countries individually applied for joining EU.

In our applied modeling we used two categories of variables, economic and non-economic ones. Our econometric results using CEECs' data indicate that the association agreement was based on traditional trade exchanges, on foreign direct investments, on the creation of a political stability, and on the tendency of reduction of the economic distance between CEEC and the EU. In other words, an economic convergence of these countries to European countries is an important desideratum for a successful European integration process. The higher the income level of partner countries, the more countries tend to share economic characteristics, which increases their economic welfare.

Foreign direct investment has strongly influenced the association decision as expected in the literature dealing with the gains for the investor and host countries. Moreover, the fact that political stability is one of the main factors influencing the association agreement leads us to conclude that EU enlargement was due in the beginning essentially to political reasons. Geographic distance and the difference of level of income per capita have a negative influence on the association decision as expected in literature. The quantitative estimation of the association agreement impact on trade flows highlighted a moderated role, which explains the political dimension of the association agreement on the first stage of CEEC adhesion to EU.

The results obtained by the HT and FEM methods are similar but different from those obtained by REM and OLS estimations which reveal the existence of an unobservable heterogeneity. The "regional agreement" variable is more significant in the OLS and random estimations but its significance decreases in the fixed effects estimations which takes into account the pos-

15 Hungary (1991), Poland (1991), Bulgaria (1993) and Romania (1993).

sible estimator bias due to the correlation of the agreement variable with some countries or time specific factors. The application of the HT and FEM methods was also used to take constant variables over time into account.

From an economic point of view the effect of regionalisation on bilateral trade flows between CEEC-4 and UE-15 had a positive but impact. From an econometric point of view the use of HT panel data method with time-fixed effects is appropriate for obtaining unbiased and efficient parameter estimates. To conclude, the association agreement between CEEC-4 and UE-15 is an endogenous variable and EU trade policies had a positive effect leading to an increase of bilateral exports.

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