REGIONAL INTEGRATION AGREEMENTS:
IMPACT, GEOGRAPHY AND EFFICIENCY

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Abstract

In this paper the gravity equation is used to analyse the impact on trade flows of different types of RIAs. Special emphasis is devoted to the test of the natural bloc hypothesis as well as the comparison of different degrees of integration. The empirical analysis has shown that RIAs have a strong impact in determining trade flows. Particularly, the effects on intra-regional trade are shown to be non-contradictorily positive, while evidence is mixed on the influence on non-member countries. At the same time, geography seems to matter and the location in the same continent emerges as an important issue for intra-regional trade creation, while there is still some confusion on the effects on countries that belong to other continents. Finally, the type of RIA, as expected, contributes to introducing some heterogeneity in the results, but it was not possible to confirm the pattern according to which the higher (lower) the intensity of the agreement the stronger (the weaker) the impact on trade flows.

Key words: Gravity equation, integration, international trade, regionalism
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1. Introduction

This paper investigates the interaction between regional agreements and trade. The starting point is a general question on the impact Regional Integration Agreements (RIAs) generate and on its nature. The trade diverting and creating effects of the agreements are explored both on member and non-member countries. The accent is then put on the role of geography to try to find an answer to the question concerning the optimality of natural and unnatural trading blocs (Frankel et al., 1995). Finally, the analysis focuses on the role of the different types of agreements and on how the levels of intensity of integration can influence the effectiveness of each agreement and whether it is possible to identify a best performing type of agreement.

In other words, the aim of this empirical analysis, through the application of a gravity model, is to find and answer to the following research questions:

1. How do RIAs behave in the global context? Do they generate a non-contradictory impact? Is this impact trade-creating or trade-diverting? Does trade creation or diversion only affect member countries or does it affect non-member countries as well? (IMPACT issue).

2. Does geography matter in determining the impact of RIAs on trade? Is location on the same continent an important issue? (GEOGRAPHY issue).

3. Does the type of RIA matter in the generation of trade-creating/diverting effects? How does the intensity of integration influence the effectiveness of a RIA? Is it possible to detect a type of RIA that is more effective than others? (EFFECTIVENESS issue).

The specifications of the gravity equation adopted in this empirical analysis to estimate bilateral trade flows are, on the one hand, the standard estimation method of pooled-cross-section (Frankel et al, 1995; Soloaga and Winters, 2000; Cernat, 2001, among many others), which is a restriction of the standard single-year cross section model, and, on the other hand, the country-pair specific fixed effect model in its two steps version, which allows to capture the specific characteristics of country pairs (Martinez et al, 2004; Cheng and Wall, 2005; Coulibaly, 2005). The novelty of this empirical work lies not only in the extensive number of agreements taken into consideration, which account for most of the countries of the world, African ones included, but especially in the in depth analysis of the role of the intensity of integration, which so far has been explored by very few studies.

The remainder of the paper is organized as follows. Section 2 provides a description of the dataset, how it was constructed and the data sources, and presents the variables that are included in the specification of the gravity equation adopted in the empirical analysis, paying particular attention at the choice of the regional and intensity dummy variables. In the third section, the two adopted models are presented and compared and some methodological issues that may cause difficulties to the analysis are discussed. Section four discusses the empirical findings, which are organized following the three research questions raised at the beginning of the work, i.e. impact, geography and effectiveness of RIAs. Section five concludes.

3.1 Data Description

The model is estimated with data for 108 countries[1] over the period 1988-2003. There are 164,378 observations in total (all missing values are assumed to be equal to zero[2]), and 12,656 pairs of countries are used to calculate the pair-specific effects.

According to the simplest formulation of the gravity equation, the volume of trade between countries *i* and *j* is a function of their GDPs, their populations, the distance between them and, in the augmented version of the model, of a set of dummy variables catching up unobserved characteristics.

The specification of the model is

$$X_{ijt} = \beta_t K_{ijt}^{\beta ij} \varepsilon_{ijt} \qquad t = 1,...,T \tag{1}$$

where *i* and *j* denote trading partners, *t* denotes time and $K_{ijt}^{\beta ij}$ is the vector of all the gravity variables (including dummy variables).

Written in logarithms, equation (1) becomes:

$$\begin{aligned} \ln X_{ijt} = \; & \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln GDPpc_{it} + \beta_4 \ln GDPpc_{jt} + \\ & + \beta_5 \ln DIST_{ij} + \beta_6 \ln REMOTENESS_{ijt} + \beta_7 OFF\_LANG_{ij} + \beta_8 MIN\_LANG_{ij} + \\ & + \beta_9 ADJ_{ij} + \beta_{10} COMM\_COL_{ij} + \beta_{11} PRES\_COL_{ij} + \beta_{12} COL_{ij} + \beta_{13} COMM\_CONT_{ij} \\ & + \sum_k \gamma_k RIA^k{}_{ijt} + \sum_k \delta_k RIA^k{}_{it}\_e + \sum_k \phi_k RIA^k{}_{jt}\_i \\ & + \sum_w \lambda_w TYPE^w_{ijt} + \sum_w \mu_w TYPE^w_{it} + \sum_w \nu_w TYPE^w_{jy} + \sum_x \pi_x CONT^x{}_{ij} + \varepsilon_{ijt} \end{aligned} \tag{2}$$

<u>The dependent variable</u>

X_{ijt} denotes real exports from country *i* to country *j* at time *t*. There has been debate in the literature[3] on which is the most appropriate measure of trade to use as the dependent variable. Some authors use total trade (for instance, Wang and Winters, 1991; Ghosh and Yamarik, 2004), while some others adopt data on imports (among many others Hamilton and Winters, 1992; Soloaga and Winters, 1999; Carillo and Li, 2005), arguing

[1] A list of the countries is given in Appendix A

[2] The second section of this paragraph deals with some econometric issues that affect this kind of model. One of these problems is the impossibility of distinguishing between missing values and zero trade observations.

[3] For a very brief description of this debate see Piermartini and Teh (2005).

that they are much more reliable since it is easier to control for incoming flows of goods, so that national trade statistics should be more accurate. The main criticism brought against the use of imports as the dependent variable (Piermartini and Teh, 2005) is that, because imports are recorded using c.i.f. prices (i.e. including transport costs and insurance costs), the variable measuring transport costs (distance in most cases) is correlated with the error term, thus generating a problem of inconsistency; conversely, if exports are calculated on f.o.b prices they do not cause any consistency problem. In what follows, therefore, exports have been chosen as the dependent variable (Krueger, 1999; Cernat, 2001 and Rose, 2003).[4]

The trade data (in American dollars) are taken from the UN-COMTRADE data set developed by the United Nations (UN) statistical division and which covers bilateral trade between 108 countries over the period from 1988 to 2003.

Traditional gravity regressors

The GDP of the importing country (GDP_{jt}) is used to control for the role of demand, while the GDP of the exporting country (GDP_{it}) controls for the supply side.[5] Both variables are expected to have a positive effect on the regressand. A high level of income in the exporting country is indicative of a high level of production, so that exports are expected to be high as well. At the same time, a high level of income in the importing country suggests that imports will be higher.

The signs of the coefficients of the populations of the exporter (POP_{it}) and importer country (POP_{jt}) may be either positive or negative. In the past, they were expected to be positive because it was believed that larger countries, generally speaking, trade more. More recently, it has been shown[6] that if the exporter is big in terms of population it may either need its production to satisfy domestic needs, so that it exports less (*absorption effect*), or it may export more than any other small country, as happens when small and large enterprises achieve *economies of scale*. The same reasoning can be applied to the case of the importing country (POP_{jt}): if it is big, it may either import less because it is more self-sufficient or it may import more because it cannot satisfy all internal demand with its own production. Alternatively, it is possible to use GDP per capita ($GDPpc_{jt}$ and $GDPpc_{it}$) instead of population, according to the correlation among the variables.[7] Population data, as well as GDP data, are taken from the World Development Indicators database compiled by the World Bank.

[4] For the sake of comparison, regressions using imports as a dependent variable were also run. The results are available from the author upon request.

[5] In order to avoid estimation of missing GDP values through interpolation method, and to deal with some measurement error problems, countries without complete data for all the years considered were eliminated from the database.

[6] As explained initially by Oguledo and Macphee (1994) and more recently by Martinez-Zarzoso and Nicholas Horsewood (2005).

[7] In this study GDP per capita has been preferred to population because of the high correlation between population and GDP.

The distance between the countries in a trading pair ($DIST_{ij}$) has been calculated using the great-circle distance measure between their capital cities.[8] Geographical distance is used as a proxy for transport costs, assuming that the further a country is away from another the more expensive bilateral trade will be. Quite straightforwardly, distance is expected to have a negative impact on bilateral trade flows. Of course, use of this measure has a number of shortcomings. Firstly, the distance between two capital cities may not represent the effective distance to be considered if, for instance, the most important commercial cities are not the capitals. Secondly, if only great-circle distance is calculated, account is not taken of the variation of costs due to the means of transport adopted. A solution to this problem could be the introduction, as in Martinez-Zarzoso and Nowak (2004), of infrastructure measures such as the extent of highways and railways, and the number of ports[9] or airports in a country. Finally, as proposed by CEPII, the number of inhabitants of the cities used to measure distance should be considered as a weight, especially when it is intended to introduce the role of internal distance.[10]

The section describing the methodology will shed light on how these problems can be overcome when switching from cross section estimation to panel fixed effects estimation techniques.

Since the enlightening work by Anderson and van Wincoop (2003), the debate on gravity models has pointed out the importance of the multilateral resistance[11] term in the gravity equation (Piermartini and Teh, 2005). As a consequence, the variable REMOTENESS has been included in the equation, being calculated as follows

$$REMOTENESS_{ijt} = \frac{X_{ijt}}{\sum_{n} X_{it}} \times DIST_{ij} \qquad (3)$$

The remoteness value is smaller, the greater is the index, and it should indicate how the weight of a partner in all trade relations influences the level of exports to that country.

[8] The measure has been taken from those made available by the CEPII (www.cepii.fr). According to the notes on CEPII's distance measures by Clair et al. (2004), *geodesic distances are calculated following the great circle formula, which uses latitudes of the most important cities/agglomerations (in terms of population) for the distance variable and the geographic coordinates of the capital cities for the distcap variable, which measures distance between capital cities*. The latter measure is used here. Distances were calculated both by using the website http://www.wcrl.ars.usda.gov/cec/java/capitals.htm and by using the Arc View GIS program which enables the distance between a pair of countries to be calculated by taking the barycentre of the country's area as the reference point. Although the differences between the CEPII and Arc View GIS measures are not great, the former is more accurate as a proxy for transport costs, given, for instance, that a country's barycentre may be on top of a mountain.

[9] Adding the number of ports can also be an instrument to complete the information provided by the commonly used land lock dummy variable, which is unable to differentiate the better ability to exploit, in terms of trade flows, access to the sea.

[10] CEPII introduces a measure that accounts for internal distance, which is not used in this empirical analysis because internal trade to each country is not considered.

[11] A description of the term can be found in by Anderson and van Wincoop (2003).

Needless to say, the sign is expected to be positive, given that proximity in terms of trade relations should act as a catalyst for trade flows.

Traditional dummy variables

The model then includes a set of dummy variables traditionally considered to be determinants of bilateral trade flows.

A number of country-specific variables are first exploited in order to capture relations between pairs of countries that may influence trade flows: adjacency, common language, and a common colonial past.

The adjacency dummy variable (ADJ_{ij}) takes the value of one if countries *i* and *j* share a common border; it is zero otherwise. Common language is included by using two different dummy variables: on the one hand the role of sharing an official language is captured by a dummy variable (OFF_LANG_{ij}) assuming the value of one if at least 20 per cent of the populations of both countries *i* and *j* speak the same language. On the other hand, special attention is paid to the role of linguistic minorities[12] by introducing a dummy (MIN_LANG_{ij}) that takes the value of one when the same language is spoken by between 9 per cent and 20 per cent of the population of each of the two countries.[13]

Information on whether a country has been a colony is included in the dummy variable COL_{ij} , or if it still is a colony in $PRES\_COL_{ij}$, while $COMM\_COL_{ij}$ provides information on the role played by the sharing of a common colonizer, both in the present and in the past.[14] This set of variables is of particular interest for this study because many African countries are included in the dataset and one may presume that colonial ties, which ceased relatively recently, still play an important role in determining trade flows for those countries.

Regional integration dummy variables

If the goal of the analysis is to capture trade creation and trade diversion effects of RIAs, the corresponding variables must be constructed so that these effects can be recognized separately for both member and non-member countries. To this end, I first introduce three regional integration dummy variables as general indicators of membership in a RIA (RIA_{ijt}, RIA_{it}_e and RIA_{jt}_i) and then consider membership in 16

[12] Considering linguistic minorities should account for the presence of strong cultural minorities perhaps located in two contiguous countries. To complete the analysis it would be interesting to include information on other factors that commonly characterize minorities, such as religion.

[13] The CEPII has proposed this second measure, which has been calculated using a selection of sources: *the web site http://www.ethnologue.com, the CIA world factbook and Jacques Leclerc web page*.

[14] The constructions of the dummy variables reporting information on colonial links were again taken from the CEPII database.

different RIAs (RIA^k_{ijt}, $RIA^k_{it\_}e$ and $RIA^k_{jt\_}i$).[15] The information used to create these variables was obtained from the World Trade Organization[16] and from each agreement's official website.

Both the general and the specific regional integration dummy variables are used as proxies for intra-regional trade effects and for extra-regional trade effects on the exports and imports sides respectively. It is thus possible to allow imports and exports to be affected differently by the creation of a RIA (Piermartini and Teh, 2005).

RIA^k_{ijt} is a binary variable that takes the value of one if countries *i* and *j* belong to the same k^{th} RIA and zero otherwise. $RIA^k_{it\_}e$ ($RIA^k_{jt\_}i$) is a binary variable equal to one if only the exporting (importing) country *i* (*j*) belongs to the k^{th} RIA and equal to zero otherwise. The same definition is used for the general regional integration dummy variables, i.e. those that do not distinguish among different RIAs.

Regional integration variables are time variant. This means that they take the value of one from the year in which a country enters into the agreement onwards.

Therefore, the regression equation, besides the three general regional dummy variables, includes 16 intra-bloc trade dummy variables (RIA^k_{ijt}), 16 extra-bloc ones on the export side ($RIA^k_{ijt\_}e$), and 16 extra-bloc ones on the import side ($RIA^k_{ijt\_}i$), all defined as above.

One would expect the intra-regional trade dummy variables (RIA_{ijt} and RIA^k_{ijt}) to report a positive sign (i.e. trade creation among member countries) throughout the whole period considered. The expected results on the other two dummy variables are more controversial. If RIA_{it_i} or $RIA^k_{it\_}e$ and $RIA_{jt\_}i$ or $RIA^k_{jt\_}i$ are <0 (>0), this signifies that third-country exports and imports decrease (increase) as a result of the formation of agreements. This indicates whether RIAs are trade-diverting (creating).[17]

Geographic and typology dummy variables

In order to answer the second and third research questions set out in the introduction, the empirical analysis includes two further sets of dummy variables, which are termed 'geographic' and 'typology' dummy variables.

Firstly, the fact that two countries belong to same continent is controlled for by the dummy variable $COMM\_CONT_{ij}$, and only as a second step are different dummies for each continent used according to the three different definitions adopted for the RIA dummy variables. There are consequently three different variables for each continent

[15] K denotes the agreements considered by this study, namely, APEC, ASEAN, CACM, CAN, CARICOM, MED, MERCOSUR, NAFTA, UEMOA, CER, COMESA, EU15, EU25, EU27, SACU and COMESA. See Appendix B and C for details on member countries and typologies.

[16] The website of the WTO (www. WTO.org) devotes an entire section to regional integration issues, where all information about past, present and notified agreements can be found very easily.

[17] Although Cernat (2001) uses only two different regional dummy variables, without distinguishing between the import and the export sides, he suggests that interpretation of these coefficients can help shed light on the substitution between more and less efficient suppliers, which depends on the relative efficiency of each member of the RIA.

representing, respectively, *intra-continental* trade effects and *extra-continental* trade effects on both the import and export sides. The continents are defined as follows: AFRICA, ASIA, EUROPE, OCEANIA and AMERICA. The continental dummy variables are time invariant.

Five types of RIAs[18] have been considered: PTA, FTA, CU, CI and OEC,[19] for each of which three dummy variables have been included in the analysis in order to control for the impact of each type of agreement on trade among member states and between member and non-member countries, in terms of both exports and imports. The empirical analysis is expected to find a positive relation between the "deepness" of an agreement and its ability to create trade. In other words, it is expected that the more articulated an agreement is, the greater its effect on trade flows.

Other dummy variables

In order to include information on the role of the multilateral trading system, the analysis also includes a dummy variable (WTO/GATT) which takes the value of one if the exporter country is a member of the GATT/WTO and zero otherwise. In a well-known article, Rose (2003) conducts detailed analysis to obtain the very puzzling result that no strong empirical evidence can be found on the role that GATT/WTO membership plays in stimulating trade. Conversely, Zanardi (2005) uses WTO/GATT membership as an indicator for the presence of anti-dumping measures and finds that it always exerts a positive effect on bilateral trade flows. Rose (2003) describes his results as an *interesting mystery, which contradicts the common and conventional wisdom that accords an important role to GATT/WTO in creating trade.* Zanardi's finding seems to be more plausible, at least at first sight.

Year dummy variables are also included in order to control for the presence of potential globalisation trends and business cycle effects, which are common to all country pairs.

3.2 Empirical Methodology

This section sets out the specifications of the gravity equation adopted to estimate bilateral trade flows and the estimation techniques. The latter include both the standard estimation method of pooled-cross-section, which is a restriction of the standard single-year cross section model, and the country-pair specific fixed effect model in its two steps version, which allows identification not only of unobserved fixed effects affecting bilateral trade flows but also of their determinants.

[18] Appendix 3 provides a description of the agreements considered, their complete names, their typologies and member countries.

[19] Where PTA stands for Preferential Trade Agreement, FTA for Free trade Area, CU for Customs Union, CI for Complete Integration and OEC for Organizations for Economic Cooperation, which can be used to define arrangements that dispose economic cooperation without effective integration.

3.2.1 The model specification

The gravity equation estimated assumes the following general form:

$$\ln X_{ijt} = \alpha_o + \alpha_t + \alpha_{ij} + \beta_{ijt}^{'} K_{ijt} + \varepsilon_{ijt} \qquad t = 1,...,T \tag{4}$$

where X_{ijt} are again exports from country *i* to country *j* at time *t*. *K* is the vector of the gravity variables (including dummy variables in the augmented version of the model) that characterize the equation. In this equation the intercept is divided into three parts: a common one, α_0, a time-specific one, α_t and a pair-specific one, α_{ij}. ε_{ijt} is the error term, which is normally distributed with zero mean and constant variance for all observations, i.e. $\varepsilon_{ijt} \sim N(0, \sigma_t^2)$. It is also assumed that the disturbances are pair-wise uncorrelated, i.e. $E(\varepsilon_{ijt}, \varepsilon_{ij't}) = 0$ and $E(\varepsilon_{ijt}, \varepsilon_{ijt-1}) = 0$.

Equation (4) was initially estimated in a pooled-cross-section framework. Therefore, pair-specific intercepts were assumed to be the same across country pairs ($\alpha_{ij} = 0$), while slope coefficients did not vary across country pairs and over time ($\beta_{ijt} = \beta$).

The gravity equation became:

$$\ln X_{ijt} = \alpha_o + \alpha_t + \beta^{'} K_{ijt} + \varepsilon_{ijt} \qquad t = 1,...,T \tag{5}$$

Equation (5) was estimated using OLS.

The results obtained with the traditional pooled-cross section analysis were then compared with those estimated using a fixed-effect panel approach that averted the risk of omitting crucial variables of a cultural, political, historical and social nature which might be not observable or not available (Egger, 2004).

The gravity equation thus became

$$\ln X_{ijt} = \alpha_o + \alpha_t + \alpha_{ij} + \beta^{'} K_{ijt} + \varepsilon_{ijt} \qquad t = 1,...,T \tag{6}$$

where α_{ij} represents country-pair-specific effects.

The debate on the need to use a panel framework instead of a cross-section approach in order to deal with the biased results yielded by the latter has been well explained by

Chang and Wall (2004). To be mentioned here is that there are two different ways to specify country-pair effects. Some authors (Glick and Rose, 2001; Egger, 2004) have imposed the restriction of symmetry in the country-pair effects (i.e. $\alpha_{ij} = \alpha_{ji}$). However, the asymmetry restriction, i.e. $\alpha_{ij} \neq \alpha_{ji}$, seems to be more plausible, because the relation between a pair of countries may also depend on the role played by each of them, be it the importer or the exporter[20] (Cheng and Wall, 2005).

A problem with the country-pair fixed effects model is that all variables that are cross-sectionally specific but remain constant over time cannot be included in the regression because they are automatically dropped. I refer to variables such as geographical distance, adjacency, common language (be it the official language or that spoken by a minority), common colonial past, and basically all information on cultural and historical links.

A two-step procedure can be adopted (Chang and Wall, 2005) in order to account for the influence these variables may have on trade flows. It consists firstly in estimation of the gravity equation with fixed effect panel techniques and secondly in estimation of the determinants of the country-pair fixed effects obtained in the first step. Generally speaking, the set of explanatory variables will now include, in addition to the traditional explanatory variables, all the time-invariant regressors dropped in the first stage.

In conclusion, the two-stage equations estimated for the present study can be summarized as follows:

$$\begin{aligned}\ln X_{ijt} = {} & \alpha_o + \alpha_t + \alpha_{ij} + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln GDPpc_{it} + \beta_4 \ln GDPpc_{jt} + \\ & + \beta_5 \ln REMOTENESS_{ijt} + \sum_k \gamma_k RIA^k_{ijt} + \sum_k \delta_k RIA^k_{it}\_e + \sum_k \phi_k RIA^k_{jt}\_i + \sum_w \lambda_w TYPE^w_{ijt} \\ & + \sum_w \mu_w TYPE^w_{jt}\_e + \sum_w \nu_w TYPE^w_{it}\_i + \sum_z \pi_z CONT_{zij} + \varepsilon_{ijt}\end{aligned} \tag{7}$$

$$\begin{aligned}\hat{\alpha}_{ij} = {} & b_0 + b_1 \ln GDP_{it} + b_2 \ln GDP_{jt} + b_3 \ln GDPpc_{it} + b_4 \ln GDPpc_{jt} + \\ & + b_5 \ln REMOTENESS_{ijt} + b_6 \ln DIST_{ij} + b_7 ADJ_{ij} + b_8 OFF\_LANG + b_9 MIN\_LANG \\ & + b_{10} COMM\_COL + b_{11} PRES\_COL + \sum_k g_k RIA^k_{ijt} + \sum_k d_k RIA^k_{jt}\_e + \sum_k f_k RIA^k_{it}\_i \\ & + \sum_w l_w TYPE^w_{ijt} + \sum_w m_w TYPE^w_{jt}\_e + \sum_w n_w TYPE^w_{it}\_i + \sum_z p_z CONT_{zij} + e_{ijt}\end{aligned} \tag{8}$$

[20] A good example supporting this restriction is the case when the exporting country is an industrialized economy and the importing country is a developing economy strongly specialized in the production of few raw materials.

The coefficients of the regional integration dummy variables in equation (7) and (8) provide different items of information: the (g, d, f) in equation (8) measure the cross-section dimension of RIAs, that is, *trade variations due to any relevant difference or similarity between their members* (Coulibaly, 2004). The (γ, δ, ϕ) in equation (7) instead measure the time dimension of RIAs, that is, the trade variation which arises on the one hand from the entry into force of a RIA, and on the other, when a new member has joined it over time. The coefficients of the two equations should be added in order to obtain total trade effects. Therefore, $(\gamma_k + g_k)$ gives the total intra-regional trade effect, $(\delta_k + d_k)$ shows the total extra-regional trade effect on the export side, while $(\phi_k + f_k)$ gives the total extra-regional trade effect on the import side.

The same interpretation applies to the dummy variables representing the different types of agreement.

3.2.2 Some methodological issues

Some studies, such as Soloaga and Winters (2001), Rose (2003) and Carrère (2005), use data from the DOT database compiled by the International Monetary Fund (IMF) and UN-COMTRADE, which cannot be used to determine whether a pair of countries does not trade or whether the information on the flows of trade between them is simply missing.

This impossibility of distinguishing between zero trade and missing values may give rise to biased results when the phenomenon involves many observations in the sample.

In most datasets used for gravity studies,[21] zero values for trade and missing values may make up even fifty per cent or more of the trade data considered.

The dataset at the basis of the present analysis is affected by very similar characteristics: the total number of observations for bilateral export flows is 169,406, of which 91,678 are zeros or missing values, since it is not possible to differentiate between them.

In order to overcome the problem of missing values, one may assume that all missing values are very small quantities of trade and thus transform them into zero trade values. No matter how strong this hypothesis may be, it is used very often (Rose, 2003; Cheng and Tsai, 2005, among others).

However, since a logarithmic transformation of the gravity equation is used, when the trade information is transformed, all the zeros again become missing values, because the logarithm of zero does not exist. As a result, the dataset once again becomes the one that contained missing values, or more generally speaking, the new transformed data set has a potential selection bias problem (Bénassy-Quéré et al. 2005).

[21] Rose's (2003) dataset is available on his web page, while the dataset used by Mayer and Zignago (2005) is a version of the very well known "Trade and Production" database available at the World Bank website (www.worldbank.org) created by Alessandro Nicita and Marcelo Olarreaga.

In order to deal with this problem, after assuming that all missing information is equal to a very small quantity (i.e.=0), the strategy adopted here is the following: I have first added one to the export variable (X_{ij}) and then taken its logarithmic form. In other words, the dependent variable is $\log(X_{ijt}+1)$. This implies that it is equal to zero if $X_{ij}=0$.[22]

Another way to address this problem is to run the two-step Heckman estimation procedure, thereby transforming the possible selection bias problem into an omitted variable issue. When the Mills ratio is included in the estimation as a regressor, the omitted variable problem is controlled for. If the coefficient of the Mills ratio is significant, the selection bias is confirmed and corrected. This procedure has been used here as a robustness check as in Bénassy-Quéré et al. (2005) and Coulibaly (2005).

Another issue, which requires attention, is the variability of coefficients over time, because one would expect that, in such a long time span, there will be noticeable changes in the results. It is advisable to check for this variability by dividing the sample into different sub-periods (Rose, 2003) or by plotting year by year all coefficients of at least regional integration dummy variables, in order to observe their evolution through time (Carrère, 2005).

The second procedure is adopted in this study. Therefore graphs 1-14 display the coefficients of the RIA dummy variables calculated yearly.

Finally, as regards distance, all the problems mentioned earlier as arising when one seeks to find its best definition and measure are simply overcome through the fixed effect specification. Besides elimination of the need to control for contiguity,[23] Cheng and Wall (2005) regard the introduction of the fixed effects model as an excellent opportunity to avoid this long-standing measurement problem.

[22] In order to avoid excessive compression of the distribution of the variable of interest, Bénassy-Quéré et al. (2005) propose the use of other values smaller than one. This methodology, however, raises doubts in the case of export flows, since the logarithmic transformations on values included in the unit interval produce a negative result. The economic justification for using a negative value for export flows seems not easily fundable.

[23] As a matter of fact, the dummy variable representing contiguity assumes that all types of contiguity are the same and that they do not change through time. Constructed as it is, this variable is not particularly informative: consider for instance the differing impact of a common border before and after 1989 for the Central and Eastern European countries, or even more so, since the new ten states have become effective members of EU25. All the same, considering China and Russia and Chile and Argentina to be equivalently contiguous pairs (Chang and Wall, 2005) seems a rather strong assumption.

3.3 Discussion of the results

3.3.1 The base line model

Table 1 shows the results of an estimation of the bilateral trade flows accounting for the potential effects of being or not being a member of an agreement through the general variable RIA. As expected, the model fits the data well, explaining a large part of the changes in bilateral trade flows. Both the estimation techniques described in the previous section have been used: column (1) and (2) present the results for the pooled-cross-section OLS model, while columns (3) and (4) present the fixed effects model results, where the first step of the model is reported in column (3) and the second stage[24] results are in column (4).

All the variables – which can be regarded as traditional for the gravity model – display the expected signs and significances.

To summarize: the GDP and GDP per capita of both origin and destination countries induce a positive effect on bilateral trade flows. All dummy variables have the expected signs. Although it is not significant, it is of some interest that the negative sign reported in the fixed effects model for the dummy variable PRES_COL indicates that being a colony has today a negative influence on trade flows.

Not surprisingly, the results obtained using the fixed effects model report slightly smaller coefficients.[25]

The second stage of the fixed effects model, column (4), confirms the correct behaviour of the pair-specific time invariant variables, which were dropped in the first stage. As far as GDP per capita is concerned, the puzzling negative sign for the imports side reported in the second stage of the fixed effect model loses importance because of the very small size of the coefficient. Moreover, in regard to the total effect (i.e. adding coefficients of column (3) and (4)), the results are positive and similar to the usual gravity results for this variable.

Turning to the regional integration dummy variable RIA, as expected, membership of the same agreement exerts a positive effect on trade flows. In the next section this general perception that *it is good to be part of an agreement* will be explored more deeply when various individual agreements are considered. Extra-regional trade effects are less clear than intra-regional trade effects. On the imports side, the coefficients are positive, while on the exports side they are very close to zero in the case of the OLS estimates, and even slightly negative in the fixed effects model.

In what follows, I will report results both for the pooled-cross-section and the country-pair specific fixed effect model in its two steps version, underlining eventual discrepancies, which can or cannot be justified methodologically.

[24] In the second stage, the regressand becomes the country-pair-specific fixed effects, and the regressors, besides traditional variables, are all those variables not included in the first step. These variables are: distance, dummy variables for adjacency, common language and colonial links.

[25] Cheng and Wall (1999), as well as Egger (2000, 2004), stress the importance of this result, which is due to the correction of heterogeneity introduced by the fixed effects.

Table 1: The baseline model

Dep. Variable: Exports	OLS						FE					
	[1]			[2]			[3]			[4]		
	Coeff		std	Coeff		std	Coeff		std	Coeff		std
GDP_e	0.536	***	0.003	0.538	***	0.003	0.517	***	0.003	0.011	***	0.001
GDP_i	0.358	***	0.003	0.363	***	0.003	0.378	***	0.003	0.018	***	0.001
GDPpc_e	0.118	***	0.004	0.135	***	0.004	0.123	***	0.005	0.029	***	0.002
GDPpc_i	0.070	***	0.004	0.076	***	0.004	0.092	***	0.005	-0.009	***	0.002
Distance	-0.855	***	0.007	-0.762	***	0.007				-0.492	***	0.004
Remoteness	0.134	***	0.007	0.125	***	0.002	0.066	***	0.002	0.050	***	0.001
Adjacency				0.542	***	0.049				0.318	***	0.019
Com_Col				0.236	***	0.019				0.199	***	0.011
Colony				1.150	***	0.043				0.826	***	0.021
Pres_Col				0.106		0.272				-1.693	***	0.143
Min_lang				0.273	***	0.025				0.099	***	0.012
comm_lang				0.138	***	0.016				0.024	*	0.012
RIA	0.177	***	0.021	0.170	***	0.025	0.282	****	0.029	-0.015		0.014
RIA_i	0.358	***	0.020	0.343	***	0.020	0.178	***	0.024	0.053	***	0.012
RIA_e	0.016		0.020	0.002		0.020	-0.149	***	0.025	0.043	***	0.038
WTO/GATT	0.345	**	0.002	0.335	**	0.002				0.022	**	0.001
Constant	-2.477	***	0.070	-3.101	***	0.075	-2.867	***	0.053	4.219	***	0.038
Observations	164378			164378			164378			164378		
Rsq	0.421			0.452			0.550			0.170		

**** significant at 1%; ** significant at 5%; * significant at 10%.*
All non dummy variables are in logs.
The estimates of year dummies are omitted. White corrected standard errors

3.3.2 Impact of different Regional Integration Agreements

This section analyses the impact of several of the RIAs included in the sample.[26] Table 2 sets out the results.[27] Separate tables are given in order to illustrate the European process of integration. The reason for this distinction is the importance of the European RIA, which is the only agreement that to date has undergone this evolution, in terms of both its number of members and its characteristics. Hence Table 2 presents the results for the EU15, while Tables 3 and 4 refer to EU25 and EU27 respectively.

The conventional gravity variables display the expected sign and significance, although the coefficients of the GDP per capita variables are very small. All RIAs, with the sole exception of SACU, result in an increase of intra-regional trade above the levels predicted by the gravity model, both in the usual cross-section estimate and in the panel

[26] These RIAs are: APEC, ASEAN, CACM, CAN, CARICOM, MED, MERCOSUR, NAFTA, UEMOA, CER, COMESA, EU15, EU25, EU27, SACU.

[27] The coefficients of the regional integration dummy variables can be interpreted after performing the following transformation: if for instance $\gamma = 0.5543$, the impact of the agreement on trade will be equal to $[(\exp^{\gamma} - 1) * 100]$, which is 74.07. Hence the agreement under consideration will be said to increase trade to 74 per cent more than its normal level.

estimates. To be noted is that the impact on intra-bloc trade differs greatly, ranging from minus 15.29 per cent for SACU to plus 5586.54 per cent for CER,[28] which indicates that different agreements may have different trade-creating impacts. The agreement that creates the most intra-bloc trade is CER, followed by MERCOSUR[29] and CAN.

Intra-regional trade diversion is reported for ASEAN only in the pooled-cross section model, and its impact is very low, in that the result of the transformation of the coefficient is only minus 5.06 per cent.

As far as extra-bloc trade is concerned, and starting from the export side, some trade diversion occurs in the case of CEFTA, COMESA (only in the FE model), SACU, CAN, CARICOM (only in the FE model), MERCOSUR, APEC and CER. On the import side, all agreements are trade-creating except for SACU and CAN, even if only in the FE model and by minus 5.7 per cent. The agreements that are trade creating for both member countries and non-member countries are EU15, MED, UEMOA, NAFTA, CAM, COMESA (only in the pooled cross section model), and CARICOM (only in the pooled cross section model).

[28] The two results are obtained by transforming the sum of the coefficients of the first and second step of the fixed effect model using the formula $[(\exp^{b+\beta}-1)*100]$.

[29] The case of MERCOSUR is very interesting. Although I have just shown that its overall intra-regional impact is trade creating, the role played by country-pair specific effects strongly reduces the coefficient of the first step, thus indicating imbalances in the distribution of trade creation among member countries. This result may help explain why, for instance, a country like Paraguay, which complains that Brazil is the main beneficiary of MERCOSUR, wants to withdraw from the agreement.

Table 2: Impact of different RIAs: EU15

Dep.Var: Exports	OLS				FE			
	[1]		[2]		[3]		[4]	
	Coeff	std err	Coeff	std err	Coeff	std err	Coeff	std err
GDP_e	0.420 ***	0.004	0.414 ***	0.004	0.425 ***	0.005	-0.014 ***	0.002
GDP_i	0.322 ***	0.004	0.318 ***	0.004	0.357 ***	0.005	-0.034 ***	0.002
GDPpc_e	0.034 ***	0.005	0.033 ***	0.005	-0.007	0.007	0.043 ***	0.003
GDPpc_i	0.054 ***	0.005	0.055 ***	0.005	0.030 ***	0.006	0.037 ***	0.003
Distance	-0.767 ***	0.008	-0.708 ***	0.009			-0.429 ***	0.004
Remoteness	0.129 ***	0.002	0.126 ***	0.002	0.066 ***	0.002	0.052 ***	0.001
Adjacency			0.462 ***	0.050			0.352 ***	0.024
Com_Col			0.254 ***	0.019			0.163 ***	0.010
Colony			1.165 ***	0.044			0.835 ***	0.022
Pres_Col			0.332	0.255			-1.360 ***	0.056
Min_lang			0.175 ***	0.024			0.025 *	0.012
comm_lang			-0.020	0.024			0.125 ***	0.012
EU15	0.775 ***	0.046	0.866 ***	0.047	0.878 ***	0.044	0.218 ***	0.021
EU15_e	0.329 ***	0.025	0.308 ***	0.025	0.456 ***	0.025	-0.158 ***	0.012
EU15_i	1.349 ***	0.024	1.334 ***	0.025	1.417 ***	0.025	-0.057 ***	0.012
CEFTA	1.431 ***	0.093	1.364 ***	0.092	2.783 ***	0.147	-0.971 ***	0.035
CEFTA_e	-0.118 ***	0.024	-0.053 *	0.025	0.249 ***	0.028	-0.269 ***	0.011
CEFTA_i	0.463 ***	0.024	0.529 ***	0.024	0.756 ***	0.028	-0.185 ***	0.011
COMESA	0.064	0.041	0.055	0.041	1.221 ***	0.079	-0.783 ***	0.021
COMESA_e	0.009	0.017	-0.031 *	0.017	-0.098 ***	0.024	0.019 *	0.009
COMESA_i	0.136 ***	0.017	0.094 ***	0.017	0.003	0.024	0.037 ***	0.009
MED	0.399 ***	0.095	0.193 *	0.093	0.728 ***	0.124	-0.117 *	0.063
MED_e	0.201 ***	0.028	0.205 ***	0.028	0.322 ***	0.029	-0.109 ***	0.014
MED_i	0.246 ***	0.031	0.253 ***	0.031	0.324 ***	0.030	-0.050 ***	0.014
SACU	-0.413 ***	0.115	-0.877 ***	0.126	0.376	0.304	-0.542 ***	0.059
SACU_e	-0.248 ***	0.022	-0.282 ***	0.022	-0.548 ***	0.038	0.191 ***	0.012
SACU_i	-0.137 ***	0.022	-0.162 ***	0.022	-0.312 ***	0.038	0.104 ***	0.012
UEMOA	0.893 ***	0.082	0.520 ***	0.083	1.983 ***	0.101	-0.865 ***	0.039
UEMOA_e	0.034	0.023	0.041 *	0.023	-0.222 ***	0.026	0.253 ***	0.012
UEMOA_i	0.092 ***	0.024	0.100 ***	0.024	-0.145 ***	0.026	0.232 ***	0.012
NAFTA	1.803 ***	0.204	1.617 ***	0.185	0.681 *	0.306	1.295 ***	0.150
NAFTA_e	0.666 ***	0.048	0.656 ***	0.048	0.577 ***	0.041	0.068 **	0.025
NAFTA_i	1.006 ***	0.044	0.995 ***	0.044	0.856 ***	0.041	0.134 ***	0.025
CACM	0.406 **	0.150	0.203	0.152	2.657 ***	0.155	-1.480 ***	0.048
CACM_e	0.166 ***	0.024	0.175 ***	0.024	-0.278 ***	0.029	0.324 ***	0.012
CACM_i	0.229 ***	0.026	0.241 ***	0.026	-0.197 ***	0.029	0.322 ***	0.012
CAN	1.984 ***	0.133	1.710 ***	0.133	2.604 ***	0.210	-0.326 ***	0.066
CAN_e	-0.135 ***	0.023	-0.123 ***	0.023	-0.258 ***	0.031	0.043 ***	0.012
CAN_i	0.016	0.026	0.028	0.026	-0.145 ***	0.031	0.086 ***	0.012
CARICOM	0.177 **	0.058	0.107 *	0.059	1.744 ***	0.090	-0.945 ***	0.030
CARICOM_e	0.090 ***	0.021	0.026	0.021	-0.088 **	0.028	0.026 **	0.011
CARICOM_i	0.298 ***	0.022	0.235 ***	0.022	0.123 ***	0.028	0.033 **	0.011
MERCOSUR	2.212 ***	0.166	1.901 ***	0.168	4.249 ***	0.204	-1.555 ***	0.037
MERCOSUR_e	-0.029	0.029	-0.020	0.029	-0.162 ***	0.034	-0.014	0.014
MERCOSUR_i	0.549 ***	0.030	0.561 ***	0.030	0.389 ***	0.034	0.035 **	0.014
APEC	1.462 ***	0.051	1.473 ***	0.051	2.140 ***	0.060	-0.479 ***	0.024
APEC_e	-0.017	0.025	-0.013	0.025	-0.308 ***	0.028	0.133 ***	0.012
APEC_i	0.582 ***	0.026	0.592 ***	0.026	0.280 ***	0.028	0.176 ***	0.012
ASEAN	-0.052	0.125	-0.023	0.123	0.962 ***	0.201	-0.456 ***	0.073
ASEAN_e	0.200 ***	0.030	0.179 ***	0.030	-0.218 ***	0.034	0.346 ***	0.015
ASEAN_i	0.610 ***	0.030	0.583 ***	0.029	0.133 ***	0.034	0.382 ***	0.015
CER	2.947 ***	0.151	2.972 ***	0.148	2.854 ***	0.065	3.544 ***	0.068
CER_e	-0.148 **	0.045	-0.186 ***	0.045	-0.525 ***	0.053	0.178 ***	0.022
CER_i	0.426 ***	0.043	0.386 ***	0.044	-0.017	0.053	0.238 ***	0.022
_cons	-1.120 ***	0.097	-1.588 ***	0.100	-7.408 ***	0.090	3.368 ***	0.050
Observations	164378		164378		164378		164378	
Rsq	0.477		0.482		0.630		0.170	

**** significant at 1%; ** significant at 5%; * significant at 10%.*

All non dummy variables are in logs.

The estimates on year dummies are omitted. White corrected standard errors

In Table 3, the dummy variables representing EU15 have been substituted with those representing EU25. The results are very similar to those obtained earlier.

An increase in intra-regional trade is recorded for all RIAs, with the exception of SACU. A reduction in extra-regional imports and exports is recorded by CEFTA, APEC, SACU, CAN and MERCOSUR only in the fixed effects analysis, and by MED only in the OLS model.

COMESA is trade-diverting on the export side in the fixed effects model; so too are CARICOM and CER, which is also trade-diverting in the OLS model.

The EU25 dummy variables display positive signs and the intra-trade creation is evident ($[\exp(1.861)-1]*100 = 543$). However, some trade diversion is recorded on the extra-regional trade side: the coefficient for the variable EU25_e is negative in the first and second step. The total effect on trade when the coefficients are transformed is minus 8.5 per cent, while the effect on the imports side, even though positive, is not as strong as the intra-regional effect.[30] This result could be interpreted as negative for non-member countries after the enlargement to 25 members. Moreover, following Krueger (1999), it can be said that enlargement to the East has not, generally speaking, had a great impact on extra-EU trade partners.

It is nonetheless true that where deep integration is concerned, the effects on trade may be exceeded, in terms of time and importance, by social and political objectives. An analysis of the evolution over time of the coefficients of these dummy variables could help shed light on the timing of the effect. This exercise will be carried out from Table 5 and in graphs from 1 to 14.

As in Table 2, so in Table 3 SACU is a net trade diverter, while the other African agreements considered, namely COMESA and UEMOA, are both net trade creators when the OLS model is used, and only COMESA displays some trade diversion on the export side in the fixed effects model.

[30] See Table 5 for a closer comparison of coefficients.

Table 3: Impact of different RIAs: EU25

Dep.Var: Exports	OLS				FE			
	[1]		[2]		[3]		[4]	
	Coeff	std err	Coeff	std err	Coeff	std err	Coeff	std err
GDP_e	0.512 ***	0.004	0.503 ***	0.004	0.521 ***	0.005	-0.016 ***	0.002
GDP_i	0.349 ***	0.004	0.342 ***	0.004	0.392 ***	0.005	-0.043 ***	0.002
GDPpc_e	0.149 ***	0.005	0.149 ***	0.005	0.122 ***	0.006	0.036 ***	0.003
GDPpc_i	0.081 ***	0.005	0.082 ***	0.005	0.071 ***	0.006	0.022 ***	0.003
Distance	-0.772 ***	0.009	-0.714 ***	0.009			-0.426 ***	0.004
Remoteness	0.126 ***	0.002	0.123 ***	0.002	0.062 ***	0.002	0.051 ***	0.001
Adjacency			0.481 ***	0.050			0.364 ***	0.025
Com_Col			0.141 ***	0.019			0.100 ***	0.010
Colony			1.297 ***	0.044			0.907 ***	0.022
Pres_Col			-0.172	0.287			-1.577 ***	0.046
Min_lang			0.292 ***	0.025			0.086 ***	0.013
comm_lang			-0.161 ***	0.024			0.033 **	0.012
EU25	1.353 ***	0.047	1.433 ***	0.047	1.561 ***	0.050	0.300 ***	0.028
EU25_e	-0.029	0.027	-0.040	0.026	-0.008	0.022	-0.080 ***	0.012
EU25_i	0.272 ***	0.024	0.258 ***	0.024	0.229 ***	0.022	-0.029 *	0.012
CEFTA	1.357 ***	0.088	1.303 ***	0.087	2.730 ***	0.148	-0.989 ***	0.035
CEFTA_e	-0.271 ***	0.024	-0.212 ***	0.024	0.110 ***	0.027	-0.295 ***	0.011
CEFTA_i	-0.084 ***	0.022	-0.028	0.022	0.240 ***	0.027	-0.249 ***	0.011
COMESA	0.047	0.042	0.036	0.042	1.186 ***	0.079	-0.756 ***	0.022
COMESA_e	0.043 **	0.017	0.007	0.017	-0.021	0.024	-0.018 *	0.009
COMESA_i	0.234 ***	0.018	0.197 ***	0.018	0.140 ***	0.024	0.007	0.009
MED	0.289 **	0.099	0.095	0.095	0.700 ***	0.125	-0.182 **	0.065
MED_e	0.108 ***	0.029	0.134 ***	0.029	0.319 ***	0.029	-0.179 ***	0.014
MED_i	-0.160 ***	0.030	-0.135 ***	0.030	0.010	0.029	-0.146 ***	0.014
SACU	-0.433 ***	0.118	-0.974 ***	0.131	0.497	0.306	-0.707 ***	0.059
SACU_e	-0.305 ***	0.022	-0.338 ***	0.022	-0.640 ***	0.038	0.227 ***	0.012
SACU_i	-0.378 ***	0.022	-0.405 ***	0.022	-0.586 ***	0.038	0.125 ***	0.012
UEMOA	0.865 ***	0.081	0.559 ***	0.082	2.016 ***	0.102	-0.871 ***	0.041
UEMOA_e	0.083 ***	0.023	0.081 ***	0.023	-0.221 ***	0.026	0.300 ***	0.012
UEMOA_i	0.241 ***	0.024	0.239 ***	0.024	-0.051 *	0.026	0.290 ***	0.012
NAFTA	1.787 ***	0.198	1.627 ***	0.186	0.818 **	0.308	1.163 ***	0.147
NAFTA_e	0.603 ***	0.048	0.598 ***	0.048	0.517 ***	0.041	0.073 **	0.025
NAFTA_i	0.720 ***	0.042	0.711 ***	0.042	0.576 ***	0.041	0.119 ***	0.024
CACM	0.370 **	0.146	0.184	0.148	2.590 ***	0.156	-1.402 ***	0.047
CACM_e	0.133 ***	0.024	0.136 ***	0.024	-0.345 ***	0.029	0.355 ***	0.012
CACM_i	0.040	0.026	0.045 *	0.026	-0.419 ***	0.029	0.341 ***	0.012
CAN	1.970 ***	0.128	1.715 ***	0.128	2.945 ***	0.212	-0.642 ***	0.062
CAN_e	-0.182 ***	0.024	-0.175 ***	0.024	-0.305 ***	0.031	0.040 *	0.012
CAN_i	-0.196 ***	0.026	-0.192 ***	0.026	-0.356 ***	0.031	0.070 ***	0.012
CARICOM	0.154 **	0.058	0.152 **	0.059	1.690 ***	0.090	-0.852 ***	0.030
CARICOM_e	0.080 ***	0.021	0.028	0.021	-0.118 ***	0.028	0.057 ***	0.012
CARICOM_i	0.190 ***	0.023	0.137 ***	0.023	-0.011	0.028	0.060 ***	0.012
MERCOSUR	2.184 ***	0.166	1.876 ***	0.168	4.408 ***	0.206	-1.716 ***	0.041
MERCOSUR_e	-0.138 ***	0.029	-0.130 ***	0.029	-0.339 ***	0.033	0.052 ***	0.014
MERCOSUR_i	0.069 *	0.029	0.077 *	0.029	-0.153 ***	0.033	0.069 ***	0.014
APEC	1.451 ***	0.050	1.460 ***	0.050	2.150 ***	0.061	-0.497 ***	0.023
APEC_e	-0.175 ***	0.024	-0.155 ***	0.024	-0.546 ***	0.026	0.218 ***	0.011
APEC_i	-0.058 *	0.025	-0.039	0.025	-0.429 ***	0.026	0.218 ***	0.011
ASEAN	-0.060	0.122	-0.023	0.120	0.886 ***	0.203	-0.367 ***	0.070
ASEAN_e	0.265 ***	0.030	0.242 ***	0.030	-0.171 ***	0.034	0.364 ***	0.015
ASEAN_i	0.849 ***	0.029	0.822 ***	0.029	0.347 ***	0.034	0.416 ***	0.015
CER	2.934 ***	0.147	2.976 ***	0.144	2.762 ***	0.064	3.565 ***	0.067
CER_e	-0.159 **	0.046	-0.202 ***	0.046	-0.622 ***	0.054	0.261 ***	0.022
CER_i	0.339 ***	0.043	0.292 ***	0.044	-0.193 ***	0.054	0.315 ***	0.022
_cons	-2.952 ***	0.094	-3.356 ***	0.098	-9.575 ***	0.078	3.585 ***	0.050
Observations	164378		164378		164378		164378	
Rsq	0.463		0.472		0.613		0.150	

**** significant at 1%; ** significant at 5%; * significant at 10%.*
All non dummy variables are in logs.
The estimates on year dummies are omitted. White corrected standard errors

Table 4: Impact of different RIAs: EU27

Dep.Var: Exports	OLS				FE			
	[1]		[2]		[3]		[4]	
	Coeff	std err	Coeff	std err	Coeff	std err	Coeff	std err
GDP_e	0.512 ***	0.004	0.503 ***	0.004	0.521 ***	0.005	-0.016 ***	0.002
GDP_i	0.349 ***	0.004	0.342 ***	0.004	0.391 ***	0.005	-0.042 ***	0.002
GDPpc_e	0.152 ***	0.005	0.152 ***	0.005	0.126 ***	0.006	0.034 ***	0.003
GDPpc_i	0.081 ***	0.005	0.083 ***	0.005	0.073 ***	0.006	0.021 ***	0.003
Distance	-0.765 ***	0.009	-0.706 ***	0.009			-0.422 ***	0.005
Remoteness	0.126 ***	0.002	0.122 ***	0.002	0.061 ***	0.002	0.052 ***	0.001
Adjacency			0.497 ***	0.050			0.376 ***	0.025
Com_Col			0.139 ***	0.019			0.098 ***	0.010
Colony			1.304 ***	0.044			0.911 ***	0.022
Pres_Col			-0.161	0.286			-1.567 ***	0.045
Min_lang			0.296 ***	0.025			0.089 ***	0.013
comm_lang			-0.167 ***	0.024			0.030 **	0.012
EU27	1.394 ***	0.045	1.484 ***	0.045	1.672 ***	0.047	0.231 ***	0.026
EU27_e	-0.056 **	0.026	-0.070 **	0.026	-0.058 **	0.022	-0.066 ***	0.012
EU27_i	0.215 ***	0.023	0.198 ***	0.023	0.149 ***	0.022	-0.015	0.012
CEFTA	1.148 ***	0.088	1.080 ***	0.088	2.474 ***	0.148	-1.025 ***	0.038
CEFTA_e	-0.291 ***	0.024	-0.232 ***	0.024	0.078 **	0.027	-0.285 ***	0.011
CEFTA_i	-0.133 ***	0.022	-0.077 ***	0.022	0.186 ***	0.027	-0.245 ***	0.011
COMESA	0.050	0.042	0.040	0.042	1.181 ***	0.079	-0.752 ***	0.022
COMESA_e	0.045 **	0.017	0.010	0.017	-0.014	0.024	-0.021 **	0.009
COMESA_i	0.237 ***	0.018	0.200 ***	0.018	0.147 ***	0.024	0.004	0.009
MED	0.290 **	0.099	0.095	0.095	0.688 ***	0.125	-0.177 **	0.065
MED_e	0.112 ***	0.029	0.140 ***	0.029	0.328 ***	0.029	-0.182 ***	0.014
MED_i	-0.160 ***	0.030	-0.134 ***	0.030	0.013	0.029	-0.148 ***	0.014
SACU	-0.425 ***	0.118	-0.976 ***	0.131	0.475	0.306	-0.692 ***	0.059
SACU_e	-0.306 ***	0.022	-0.340 ***	0.022	-0.643 ***	0.038	0.229 ***	0.012
SACU_i	-0.382 ***	0.022	-0.409 ***	0.022	-0.592 ***	0.038	0.127 ***	0.012
UEMOA	0.869 ***	0.081	0.561 ***	0.082	2.005 ***	0.102	-0.865 ***	0.042
UEMOA_e	0.087 ***	0.023	0.085 ***	0.023	-0.211 ***	0.026	0.296 ***	0.012
UEMOA_i	0.246 ***	0.024	0.244 ***	0.024	-0.042	0.026	0.287 ***	0.012
NAFTA	1.791 ***	0.198	1.625 ***	0.185	0.813 **	0.308	1.162 ***	0.146
NAFTA_e	0.604 ***	0.048	0.600 ***	0.048	0.517 ***	0.041	0.075 **	0.025
NAFTA_i	0.717 ***	0.042	0.710 ***	0.042	0.572 ***	0.041	0.121 ***	0.024
CACM	0.385 **	0.146	0.198	0.148	2.580 ***	0.156	-1.391 ***	0.047
CACM_e	0.133 ***	0.024	0.137 ***	0.024	-0.340 ***	0.029	0.353 ***	0.012
CACM_i	0.038	0.026	0.042	0.026	-0.418 ***	0.029	0.339 ***	0.012
CAN	1.977 ***	0.128	1.720 ***	0.128	3.003 ***	0.212	-0.702 ***	0.060
CAN_e	-0.182 ***	0.024	-0.175 ***	0.024	-0.294 ***	0.031	0.031 *	0.012
CAN_i	-0.198 ***	0.026	-0.194 ***	0.026	-0.349 ***	0.031	0.061 ***	0.012
CARICOM	0.164 **	0.058	0.167 **	0.059	1.681 ***	0.090	-0.838 ***	0.030
CARICOM_e	0.081 ***	0.021	0.028	0.021	-0.118 ***	0.028	0.058 ***	0.011
CARICOM_i	0.186 ***	0.023	0.133 ***	0.023	-0.015	0.028	0.060 ***	0.011
MERCOSUR	2.195 ***	0.166	1.879 ***	0.168	4.397 ***	0.206	-1.709 ***	0.041
MERCOSUR_e	-0.139 ***	0.029	-0.132 ***	0.029	-0.333 ***	0.033	0.046 **	0.014
MERCOSUR_i	0.063 **	0.029	0.070 **	0.029	-0.152 ***	0.033	0.063 ***	0.014
APEC	1.450 ***	0.050	1.460 ***	0.050	2.151 ***	0.061	-0.501 ***	0.023
APEC_e	-0.177 ***	0.024	-0.157 ***	0.024	-0.544 ***	0.026	0.216 ***	0.011
APEC_i	-0.066 **	0.025	-0.046 **	0.025	-0.432 ***	0.026	0.215 ***	0.011
ASEAN	-0.050	0.122	-0.013	0.120	0.872 ***	0.203	-0.349 ***	0.070
ASEAN_e	0.266 ***	0.030	0.242 ***	0.030	-0.162 ***	0.034	0.356 ***	0.015
ASEAN_i	0.851 ***	0.029	0.824 ***	0.029	0.357 ***	0.034	0.408 ***	0.015
CER	2.945 ***	0.147	2.992 ***	0.143	2.754 ***	0.086	3.574 ***	0.067
CER_e	-0.162 ***	0.046	-0.206 ***	0.046	-0.616 ***	0.054	0.253 ***	0.022
CER_i	0.332 ***	0.043	0.285 ***	0.044	-0.190 ***	0.054	0.307 ***	0.022
_cons	-3.030 ***	0.094	-3.450 ***	0.098	-9.616 ***	0.077	3.563 ***	0.050
Observations	164378		164378		164378		164378	
Rsq	0.466		0.472		0.610		0.150	

**** significant at 1%; ** significant at 5%; * significant at 10%.*

All non dummy variables are in logs.

The estimates on year dummies are omitted. White corrected standard errors

Finally, the purpose of Table 4 is to complete the enlargement process so far established.[31]

The EU27 dummy variable, which represents entry into the EU of the next two countries, Bulgaria and Romania, is introduced into the analysis. In fact, this change is so minor that nothing new in comparison to the previous results can be said except that EU27_e has become non-significant and that the reduction in EU27_i 's coefficient has diminished.

To be noted is the still present trade-diverting effect on third countries when member countries are exporters. Trade diminishes by 11.6 per cent, so that the negative impact has increased in comparison to the case of EU25.

3.3.2.1 The role of the integration process in Europe

Comparison of the results for EU15, EU25 and EU27 using the results from Tables 2, 3 and 4 shows that changes are evident mostly because of the first enlargement (i.e. from 15 to 25 member countries), while the differences between EU25 and EU27 are not remarkable. On the side of intra-regional trade effects, EU15 has a much lower trade-creating impact than EU25, while EU27 is even slightly smaller than EU25, which indicates that the entry of Bulgaria and Romania into the EU has had very little impact in terms of internal trade creation. The trade-creation capacity of enlargement of the EU (Table 5) rises from 199.3 per cent in the case of the EU15 to 542.7 per cent in that of the EU25 and slightly increases to 570.1 per cent in the case of EU27.

Turning to extra-regional trade effects, EU15 is trade-creating on both the import and export sides.[32] As far as EU25 is concerned, some trade diversion can be noted when the EU is an exporter, although the value of the transformed coefficient is very small (minus 8.5 per cent). On the side of imports, both EU25 and EU27 are trade creators (plus 22.1 per cent and plus 14.4 per cent, respectively), whereas EU27 diverts trade when it is an exporter (minus 11.6 per cent).

The evolution of the European integration process may also exert effects on the other RIAs considered by this study. For instance, the coefficients obtained when the EU15 regional dummy variable is used are much more different from each other than the ones deriving from the regressions that included EU25 and EU27.

The future FTA with EU25 notwithstanding, the MED countries seem to have been negatively affected by enlargement, at least as far as imports are concerned.

CAN is trade-diverting to non-member countries in the three specifications. The result is very similar in the case of SACU, while CEFTA and APEC and MERCOSUR are

[31] Besides Bulgaria and Romania, whose effective membership is scheduled for 2007, two more countries – Croatia and Turkey – have recently started their accession processes, but the exact date of their entry has not yet been established.

[32] This result should be compared with graphs 9, 10, 11 in the next section, which report the evolution over time of the coefficients of the regional integration dummy variables for EU15, EU25 and EU27, respectively.

always extra-regionally trade diverting with the exception of the side of imports when EU15 is considered.

Table 5: Role of the European integration process*

FE	EU15	EU25	EU27		EU15	EU25	EU27
EU	199.3	542.7	570.1	CACM	224.2	228.1	228.3
EU_e	34.6	-8.5	-11.6	CACM_e	4.7	1.0	1.2
EU_i	289.7	22.1	14.4	CACM_i	13.3	-7.6	-7.6
CEFTA	512.2	470.5	325.9	CAN	875.6	900.8	898.2
CEFTA_e	-2.0	-16.9	-18.7	CAN_e	-19.3	-23.3	-23.2
CEFTA_i	77.1	-0.9	-5.8	CAN_i	-5.7	-24.9	-25.0
COMESA	55.0	53.7	53.5	CARICOM	122.1	131.1	132.3
COMESA_e	-7.6	-3.8	-3.4	CARICOM_e	-6.1	-5.9	-5.7
COMESA_i	4.1	15.8	16.3	CARICOM_i	16.9	4.9	4.7
MED	84.1	67.8	66.7	MERCOSUR	1378.9	1376.1	1369.5
MED_e	23.7	15.0	15.7	MERCOSUR_e	-16.2	-25.0	-25.0
MED_i	31.6	-12.7	-12.6	MERCOSUR_i	52.7	-8.1	-8.5
SACU	-15.3	-19.0	-19.5	APEC	426.5	422.3	420.5
SACU_e	-30.1	-33.8	-33.9	APEC_e	-16.0	-27.9	-28.0
SACU_i	-18.8	-37.0	-37.1	APEC_i	57.8	-19.1	-19.5
UEMOA	205.9	214.4	212.9	ASEAN	65.8	68.0	68.6
UEMOA_e	3.1	8.2	8.8	ASEAN_e	13.7	21.2	21.4
UEMOA_i	9.1	27.0	27.8	ASEAN_i	67.4	114.4	115.1
NAFTA	621.2	624.5	621.1	CER	5996.4	5586.2	5588.7
NAFTA_e	90.6	80.4	80.8	CER_e	-29.4	-30.3	-30.5
NAFTA_i	169.0	100.4	100.1	CER_i	24.8	13.1	12.5

**This table reports the transformed total coefficients of the regional integration dummy variables of Tables 2, 3 and 4. It is thus possible to observe how all RIAs behave differently when EU15, EU25 and EU27 are considered.*

3.3.3.2 The impact of RIAs and its evolution in time

In order to capture the evolution over time of these coefficients more closely, it is necessary to observe them on even smaller sub-samples, preferably with yearly observations. The estimated coefficients of the regional dummy variables have therefore been plotted over time, with all non-significant coefficients graphed as zero because they have no effect on trade flows.[33]

The graphs (from 1 to 14) clearly show the differences between pooled cross section and panel estimates. Before the results for each RIA are described, it can be anticipated that panel estimates deliver more reasonable results in terms of trade creation and trade diversion[34] than do OLS estimates.

[33] For all the RIAs considered, the graphs display the coefficients of the three types of dummy variable, i.e. intra-regional and extra-regional trade creation for exporter and importer member countries.

[34] Carrère (2005) ends up with the same conclusion: *Comparison of panel estimates with the more usual cross section estimates revealed a far more plausible pattern of trade associated with RTAs (Carrère, 2005, page 15).*

Comments will be made on the graphs only in the case of the most significant results, focusing first on intra-regional trade effects and then on extra-regional trade effects.

In the case of APEC (graph 1.a) the panel estimates show a continuing pattern of positive intra-regional trade growth, while the OLS estimates report a decreasing trend, albeit one that is still positive, from 1996.

CACM, CAN and CARICOM (graphs 3.a, 4.a and 5.a) have very similar graphs in the PANEL estimates, which show trade creation from certain points in time onwards: 1998, 1990 and 1996 respectively.

The results for the MED (graph 8.a) region are not very satisfactory because all the coefficients are non-significant in the case of the intra-regional dummy variable.

MERCOSUR (graph 12.a) displays very strong and high coefficients with a slightly increasing trend from 1990 to 1996 and from 1999. The first increase can be interpreted as a consequence of implementation of the agreement.

NAFTA (graph 13.a) registers a fall in intra-regional trade until 1997, when the agreement generates a trade-creating wave.[35] This finding is of some interest because it shows that, before its implementation, NAFTA, better said, its member countries were highly trade-creating in comparison to other countries and RIAs, although the trend was sharply decreasing. Only two years after implementation of the free trade area the trend started to be once again increasing.

Focusing on EU15, EU25 and EU27 (graphs 9.a, 10.a, and 11.a), the year 2000 seems to have been a sort of threshold at which tendencies in trade creation and trade diversion started to change, displaying a stabilization of trade creation, which had been increasing since 1994.[36] The reason for this change may relate to both adoption of the Euro and the announcement effects of enlargement to the new ten member states. Both Kaminski (2001) and Resmini (2005) show that the trade effects of economic integration in Europe started at the beginning of the 1990s and that there is no strong evidence that the importance of the EU markets has grown over time. They conclude that the role of preferential agreements has not been so crucial in determining the orientation of trade flows to the EU.

As far as the effects on third countries are concerned, the graphs facilitate identification of signs of trade diversion on both the export and import sides. Trade diversion is apparent in CAN and CARICOM (graphs 4.b and 5.b) until 1995, while in the MED (graph 8.b) region, trade diversion is recorded for the entire period but is persistently decreasing.

MERCOSUR (graph 12.b) has always been trade diverting, but the coefficients are always very small, although the tendency of the last four years has been towards trade

[35] Notice that the magnitude of the coefficients for intra-regional trade were so high, that it was not possible to contain them in the graph while keeping the vertical axes scale comparable with the other RIAs taken into account.

[36] It is worth noticing that in 1995 the enlargement process of the EU15 comes to an end with the full membership of Austria, Finland and Sweden.

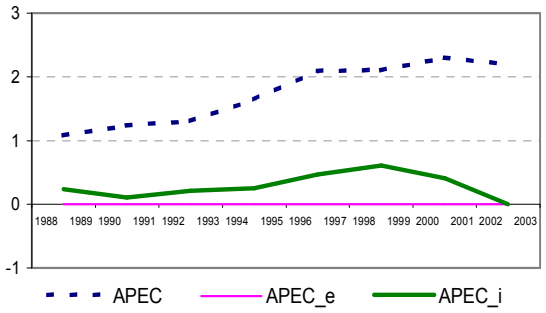
creation in the case of exports, and continuing trade diversion when member countries are importers.

Finally the fact that from 1999 onwards EU25 and EU27 (graphs 10.b and 11.b) display both import and export trade diversion confirms the findings of Tables 3 and 4 and can once again be interpreted as an effect of enlargement or of adoption of the Euro.

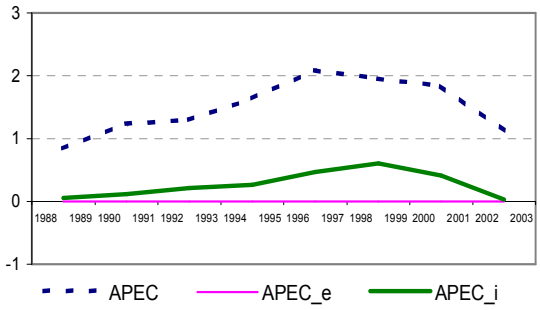
Graphs 1-14: Evolution of RIAs over the period 1988-2003

Graph 1: APEC

a) Panel

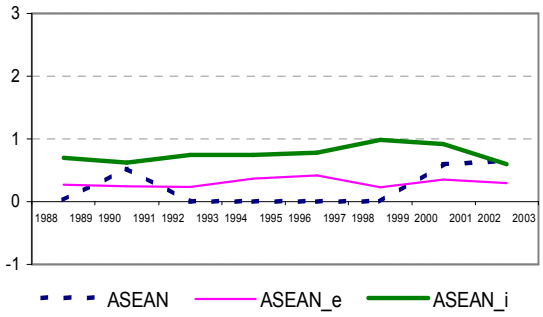


b) Pooled-Cross-section

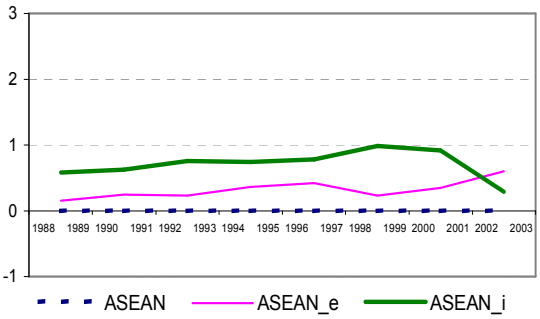


Graph 2: ASEAN

a) Panel

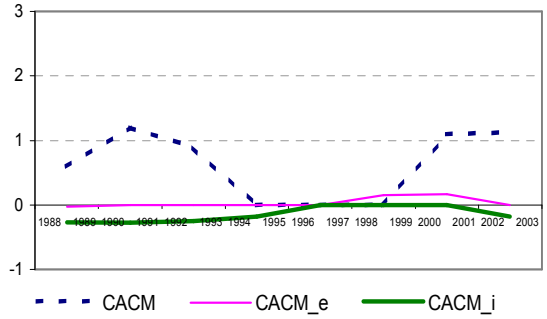


b) Pooled-Cross-section

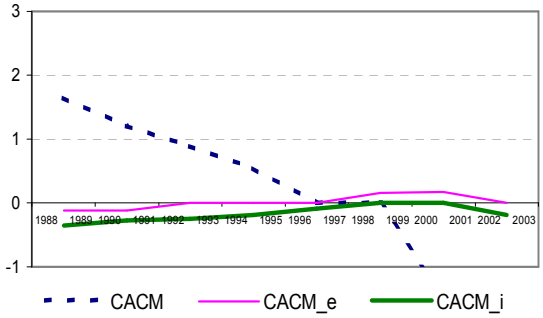


Graph 3: CACM

a) Panel

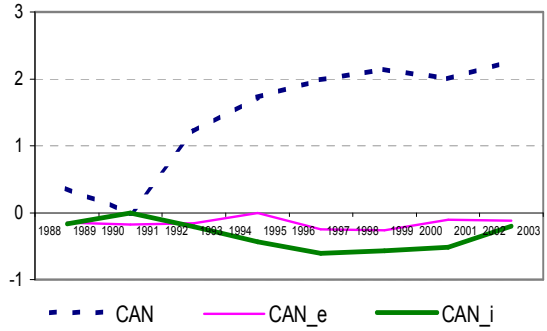


b) Pooled-Cross-section

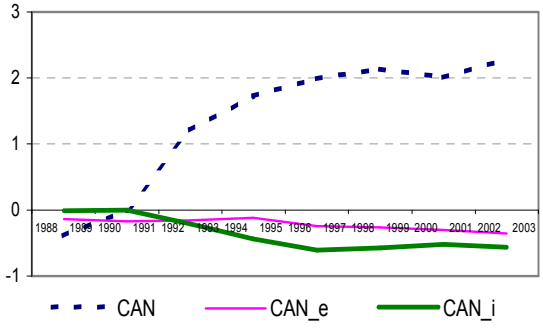


Graph 4: CAN

a) Panel

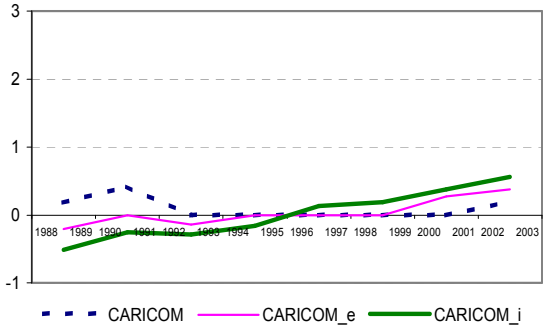


b) Pooled-Cross-section

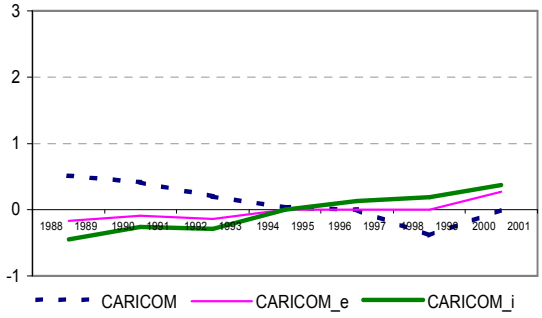


Graph 5: CARICOM

a) Panel

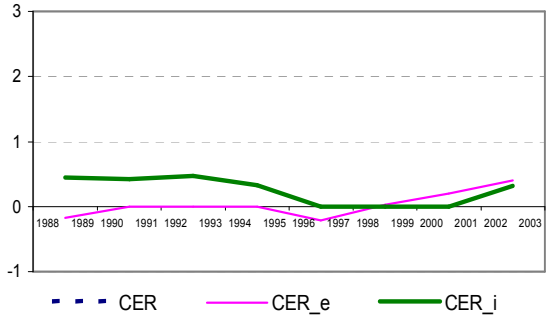


b) Pooled-Cross-section

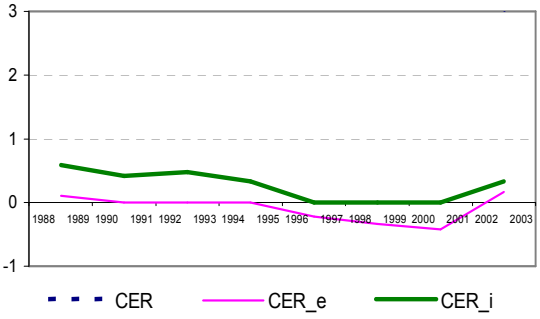


Graph 6: CER

a) Panel

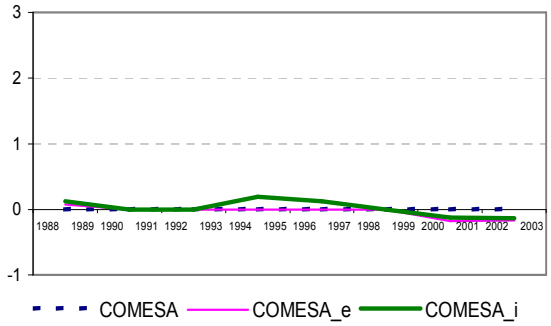


b) Pooled-Cross-section

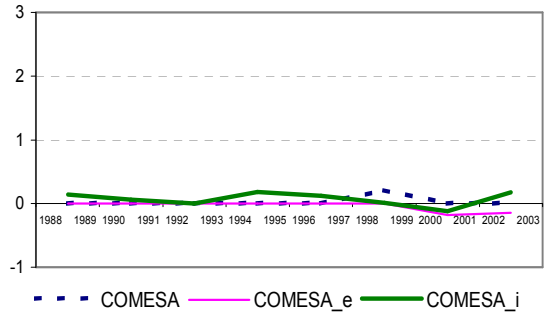


Graph 7: COMESA

a) Panel

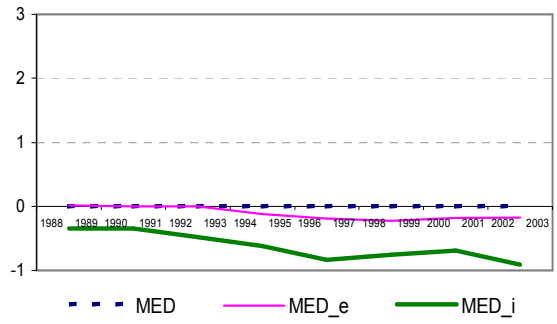


b) Pooled-Cross-section

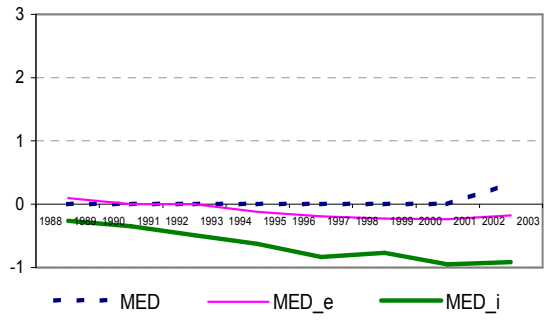


Graph 8: MED

a) Panel

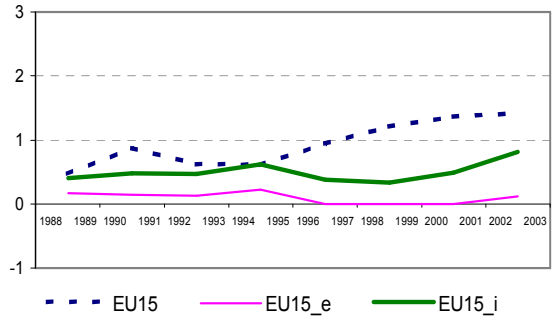


b) Pooled-Cross-section

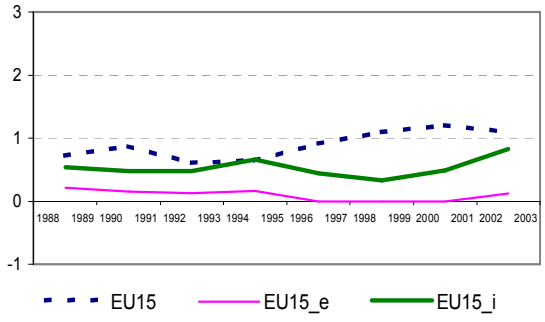


Graph 9: EU15

a) Panel

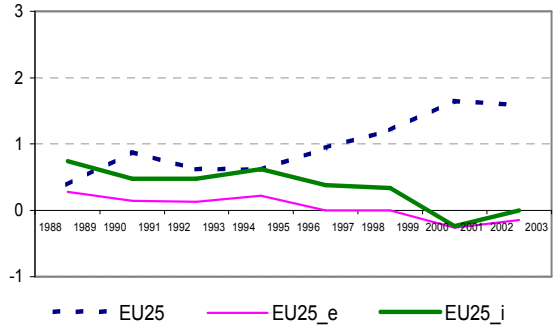


b) Pooled- Cross-section

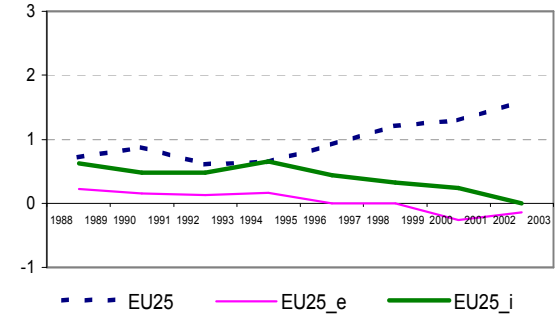


Graph 10: EU25

a) Panel

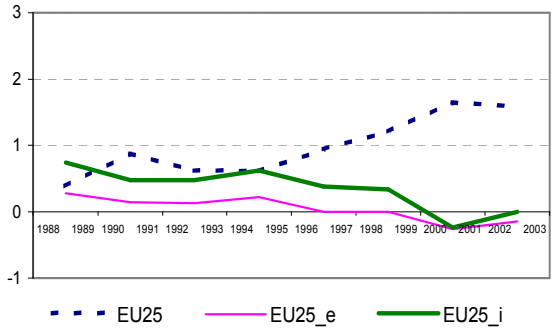


b) Pooled- Cross-section

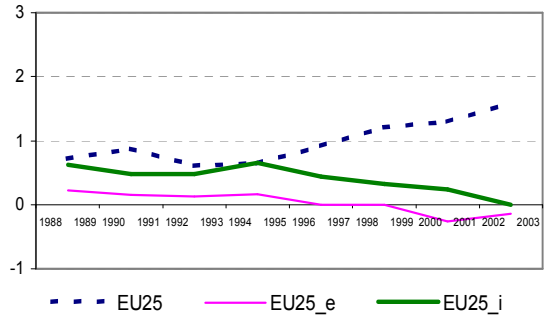


Graph 11: EU27

a) Panel

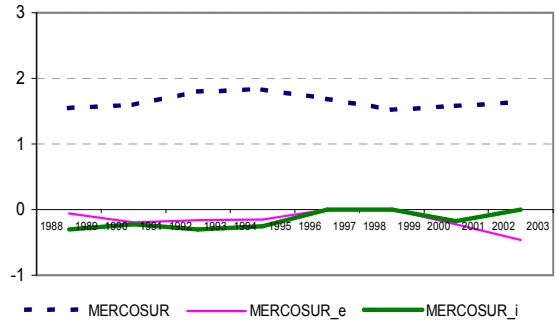


b) Pooled-Cross-section

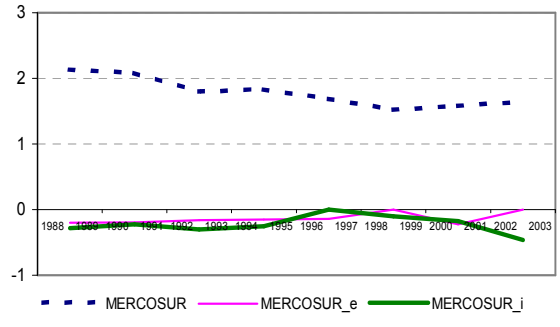


Graph 12: MERCOSUR

a) Panel

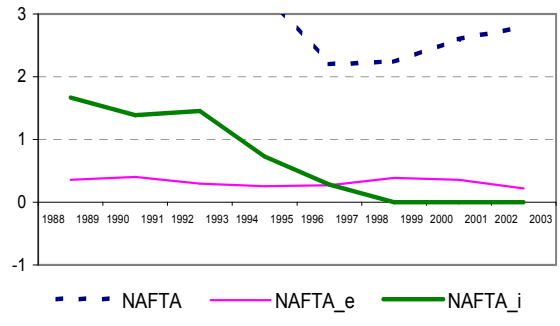


b) Pooled- Cross-section

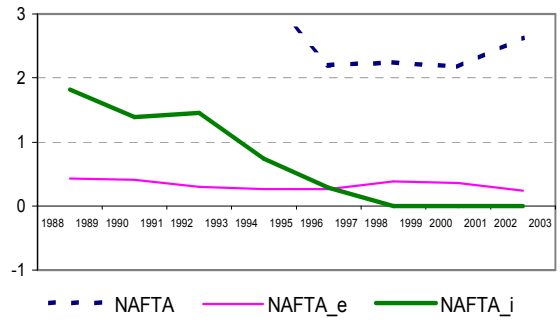


Graph 13: NAFTA

a) Panel

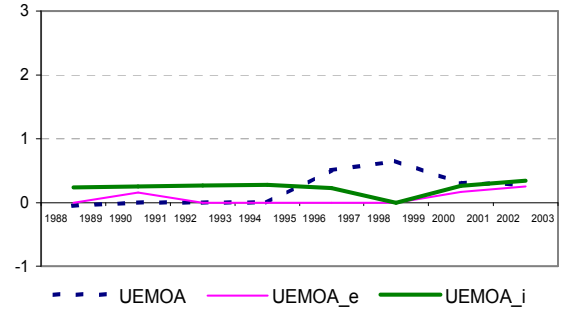


b) Pooled-Cross-section

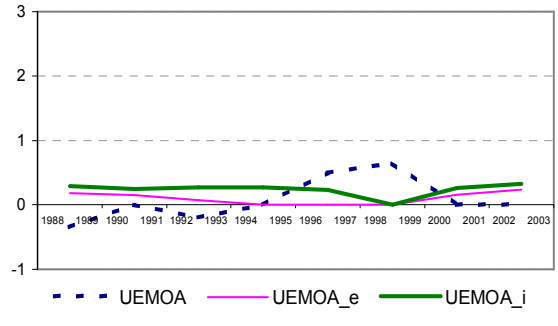


Graph 14: UEMOA

a) Panel



b) Pooled-Cross-section



3.3.3 The Role of Geography

The idea of natural trading partners is closely related to transport costs theory. Krugman's theory on the number of blocs that should maximize the welfare gains from trade is well known.

Moreover, no clear answer has yet been forthcoming to the question of how and to what extent RIAs among natural trading partners are more welfare-improving than RIAs among unnatural trading partners.

All the RIAs considered here, besides APEC, were created among countries on the same continent, which seems a plausible fact under the transport cost argument.

For the purpose of investigating how the location of each country on a continent, and the subsequent formation of RIAs within each continent[37] influence trade flows. Table 6[38] sets out the results of a test on how continental dummy variables affect trade creation and trade diversion processes.

Firstly, a generic dummy variable indicating the location of a pair of countries on the same continent was included in the standard gravity equation. The variable (SAME_CONT) should have captured, as in the previous exercises, the effects of trade creation for countries located on the same continent. The coefficient (column 1) is positive and significant, thus giving a first indication of the positive effects that a natural partnership may exert.

Columns (2) and (3) report the results for the continental dummy variables with and without the inclusion of traditional dummies. There are no surprises as far as the signs and significances of the coefficients are concerned. Intra-continental trade creation is reported for Africa, Europe, America and Oceania, while Asia seems to exert some trade-diverting effects for its countries.

As far as ASIA is concerned, and borrowing a useful expression from Rose (2003), one may say that interpretation of the results is a 'mystery'; or, as the APEC experience shows, one may say that countries in the Asian continent profit more from trade with countries on different continents.

Trade diversion is evident in the case of Africa and Europe, which confirms the results in Tables 3 and 4 on EU25 and EU27. America is a net trade creator, and Oceania diverts trade from third countries that are importers.

This mixture of results may be evidence that refutes the commonly-held belief that natural partnership guarantees success in terms of trade creation. Krugman's model seems to work only partially, in that trade creation is present in most continents, but trade costs do not seem to be so prohibitive or so low as to influence the effects on third countries unequivocally.

[37] These regional integration agreements can be called *continental RIAs.*

[38] As in Table 5, only the pooled cross section specification is presented here, since continental dummy variables, which are time invariant, could only have been included in the second stage of the fixed effect regression.

Table 6: The role of geography

Dep. Variable: Exports	OLS [1]			OLS [2]			OLS [3]		
	Coeff		std	Coeff		std	Coeff		std
GDP_e	0.537	***	0.003	0.535	***	0.003	0.532	***	0.005
GDP_i	0.362	***	0.003	0.359	***	0.003	0.359	***	0.005
GDPpc_e	0.141	***	0.004	0.093	***	0.005	0.083	***	0.005
GDPpc_i	0.082	***	0.004	0.072	***	0.005	0.063	***	0.005
Distance	-0.649	***	0.009	-0.777	***	0.010	-0.669	***	0.011
Remoteness	0.125	***	0.002	0.129	***	0.002	0.124	***	0.002
Adjacency	0.625	***	0.049				0.571	***	0.049
Com_Col	0.213	***	0.019				0.148	***	0.019
Colony	1.234	***	0.044				1.275	***	0.061
Pres_Col	-0.162		0.277				-0.848	***	0.296
comm_lang	0.264	***	0.025				0.348	***	0.025
Min_lang	-0.128	***	0.025				-0.119	*	0.040
WTO/GATT	0.543	***	0.003				0.036	**	0.011
Same_continent	0.361	***	0.016						
AFRICA				0.336	***	0.024	0.264	***	0.024
AFRICA_e				-0.105	**	0.029	-0.124	***	0.029
AFRICA_i				-0.324	***	0.026	-0.349	**	0.026
ASIA				-0.109	**	0.043	-0.058	**	0.043
ASIA_e				0.170	***	0.031	0.150		0.031
ASIA_i				0.016		0.028	-0.011	***	0.028
EUROPE				1.121	***	0.031	1.237	***	0.031
EUROPE_e				-0.237	***	0.031	-0.220	***	0.031
EUROPE_i				-0.229	***	0.028	-0.222	***	0.028
AMERICA				0.220	***	0.031	0.118	***	0.032
AMERICA_e				0.190	***	0.030	0.138	***	0.030
AMERICA_i				0.035		0.027	-0.026		0.027
OCEANIE				3.933	***	0.146	4.040	***	0.141
OCEANIE_e				-0.102	*	0.053	-0.168	**	0.053
OCEANIE_i				0.342	***	0.049	0.263	***	0.049
_cons	-4.342	***	0.090	-2.521	***	0.101	-3.328	***	0.105
Observations	164378			164378			164378		
Rsq	0.448			0.448			0.440		

**** significant at 1%; ** significant at 5%; * significant at 10%.*
All non dummy variables are in logs.
The estimates on year dummies are omitted. White corrected standard errors

3.3.4 Effectiveness: the role of the different types of agreement

This section groups pairs of countries according to their membership of RIAs, which have been classified into groups according to the scope of the agreement.

The dummy variables have been constructed as usual: three different types of dummies have been considered in order to capture Vinerian trade-creating and trade-diverting effects for member and non-member countries.

In particular, Organizations for Economic Cooperation without Integration (OEC), which should capture the role of *soft integration*, comprises APEC, ASEAN and MED. The following types of agreement have been considered as well: Preferential Trade

Agreements (PTA)[39], Free Trade Areas (FTA), Customs Unions (CU) and Complete Integration Agreements (CI).[40] COMESA is classified as a PTA; CEFTA, CER and NAFTA are FTAs; SACU, CACM, CAN, CARICOM and MERCOSUR are CUs; while EU and UEMOA are Complete Integration Agreements.

Table 7 reports the results for pooled-cross-section and panel estimations when the dummy variables just described are included.

After checking for similarities in coefficients[41] and having proved that all types of agreement in their three different specifications are significantly different from each other, it is possible to order them from the most to the least trade creating. The ranking of the types of agreement is given in Table 8.

As far as the impact on intra-trade flows is concerned, all the types of agreement are trade creating.

Turning to extra-regional effects, trade diversion is exhibited by all types with the exception of OEC in the case of exports with both specifications, while on the imports side, some trade creation is recorded for FTAs, CUs (only in the pooled cross section specification) and CIs.

[39] This type of agreement was not classified in the introduction. PTAs are agreements that reduce tariffs among member countries while maintaining protection against non-members.
[40] The difference between Monetary Unions and Economic Areas is not accounted for.
[41] Wald test was applied jointly for all the agreements.

Table 7: The role of the different types of agreement

Dep. Variable: Exports	OLS						FE					
	[1]			[2]			[3]			[4]		
	Coeff		std	Coeff		std	Coeff		std	Coeff		std
GDP_e	0.511	***	0.003	0.509	***	0.003	0.506	***	0.004	-0.002		0.002
GDP_i	0.351	***	0.003	0.351	***	0.003	0.379	***	0.004	-0.029	***	0.002
GDPpc_e	0.123	***	0.004	0.117	***	0.004	0.104	***	0.005	0.012	***	0.002
GDPpc_i	0.078	***	0.004	0.073	***	0.004	0.074	***	0.005	0.002		0.002
Distance	-0.698	***	0.008	-0.634	***	0.008				-0.364	***	0.004
Remoteness	0.129	***	0.002	0.125	***	0.002	0.069	***	0.002	0.049	***	0.001
Adjacency				0.510	***	0.049				0.364	***	0.024
Com_Col				0.171	***	0.019				0.138	***	0.010
Colony				1.265	***	0.045				0.863	***	0.024
Pres_Col				-0.256		0.279				-1.565	***	0.032
Comm_lang				0.307	***	0.025				0.104	***	0.013
Min_lang				-0.149		0.025				0.040	**	0.013
WTO/GATT	0.395	**	0.002	0.298	**	0.002				0.034	**	0.012
OEC	1.341	***	0.043	1.319	***	0.043	1.548	***	0.055	-0.057	*	0.022
OEC_i	-0.141		0.019	-0.120	***	0.019	-0.366	***	0.024	0.167	***	0.010
OEC_e	0.115	***	0.019	0.137	***	0.019	-0.113	***	0.023	0.178	***	0.010
PTA	0.868	***	0.036	0.773	***	0.036	2.008	***	0.060	-0.851	***	0.019
PTA_i	-0.117	***	0.015	-0.115	***	0.015	-0.215	***	0.020	0.041	***	0.008
PTA_e	-0.301	***	0.016	-0.297	***	0.016	-0.388	***	0.020	0.031	***	0.008
FTA	0.736	***	0.054	0.705	***	0.054	0.740	***	0.080	0.061	*	0.036
FTA_i	0.073	***	0.019	0.100	***	0.019	0.228	***	0.022	-0.174	***	0.010
FTA_e	-0.114	***	0.021	-0.084	***	0.021	0.081	***	0.022	-0.209	***	0.010
CU	0.494	***	0.055	0.397	***	0.055	1.962	***	0.075	-0.957	***	0.025
CU_i	0.017		0.017	0.029	*	0.017	-0.272	***	0.021	0.233	***	0.009
CU_e	-0.080	***	0.017	-0.068	***	0.017	-0.360	***	0.021	0.224	***	0.009
CI	0.453	***	0.025	0.496	***	0.025	1.008	***	0.029	-0.215	***	0.012
CI_i	0.058	***	0.018	0.076	***	0.018	-0.059	***	0.022	0.133	***	0.010
CI_e	-0.216	***	0.019	-0.197	***	0.019	-0.302	***	0.022	0.101	***	0.009
_cons	-3.168	***	0.080	-4.723	***	0.084	-9.063	***	0.062	3.100	***	0.043
Observations	164378			164378			164378			164378		
Rsq	0.451			0.458			0.614			0.120		

**** significant at 1%;** significant at 5%; * significant at 10%.*
All non dummy variables are in logs. The estimates on year dummies are omitted.
White corrected standard errors

Initial expectations notwithstanding, there is no clear relationship between the intensity of an agreement and its trade creating effect, as in Ghosh and Yamarik (2003). Moreover, it is not possible to find any overall consistency in the results obtained using the two different techniques.

OEC emerges as by far the most trade-creating type of agreement as far as intra-regional trade is concerned and extra-regional trade on the export side. However, OEC is also the most trade diverting from the point of view of imports in the case of the pooled-cross section regression and fixed effects estimates.

This result can be given a twofold interpretation. On the one hand, the less binding type of agreement seems to foster more trade creation among member countries. On the other, consideration should be made of the countries belonging to the OECs considered: in fact, they are mainly Asian countries (APEC and ASEAN members), which are all very open economies and keen to pursue a liberalization trade policy, exploiting their advantages more as exporters than as importers.

Interestingly, OEC[42] on the extra-regional export side is the only trade-creating type of agreement, while all the others are trade diverting at the expense of non-member countries.

As far as the other types are concerned, PTA is the second most intra-regional trade creating agreement, while it is trade diverting on both the imports and exports sides.

FTA generate trade creation intra-regionally. The impact on extra-regional trade on the imports side is positive but low – plus 10.54 per cent and plus 5.49 per cent in the OLS and FE models respectively – while trade diversion is registered on the export side.

This result should be the cause of concern, considering that the FTA is not only the most frequent type of agreement, but also the one most frequently notified. This feeble trade-creating effect, together with the strong diverting effect towards third countries, should raise concerns about FTA proliferation and its admissibility in the multilateral trading context.

Finally, it is interesting to note that CI are the least trade creating in terms of intra-regional trade, together with CU, and especially in the OLS estimates.

This result is unsurprising because, as integration deepens, trade effects have already been exploited in previous stages of the integration process, creating space for other objectives.

Nevertheless, there may still be some effects for third countries. In this case, when member countries are importers, some trade creation is recorded (plus 7.88 per cent and plus 7.78 per cent), while strong trade diversion (minus 17.91 per cent and minus 19.19 per cent) – in comparison to the other agreements – is reported when member-countries are exporters.

[42] In order to check the possible distorting role of the OEC type of agreement, the same regressions were run identifying only four types and leaving out OEC. The results obtained – which can be made available upon request – do not alter those reported in Table 8, thus confirming their non-distorting nature.

Table 8: Ranking of different types of agreement*

Impact on Trade			
OLS		**FE**	
Intra-regional trade			
OEC	274.14	*OEC*	344.23
PTA	116.68	*PTA*	218.05
FTA	102.37	*CU*	173.10
CI	64.19	*FTA*	122.70
CU	48.70	*CI*	120.94
Extra-regionale trade (Imports)			
FTA_i	10.54	*CI_i*	7.78
CI_i	7.88	*FTA_i*	5.49
CU_i	2.97	*CU_i*	-3.76
PTA_i	-10.86	*PTA_i*	-15.92
OEC_i	-11.33	*OEC_i*	-18.01
Extra-regionale trade (Exports)			
OEC_e	14.65	*OEC_e*	6.74
CU_e	-6.58	*FTA_e*	-11.98
FTA_e	-8.09	*CU_e*	-12.67
CI_e	-17.91	*CI_e*	-18.19
PTA_e	-25.70	*PTA_e*	-30.04

**Agreements are ranked from the most to the least effective*
Source: Calculations by the author. The impact on trade is represented by the transformation of the coefficients in the usual way $[(\exp^{\beta}-1)*100]$, which in the case of the FE model is applied to the sum of the coefficients obtained from the first and the second stage of the model. Table 7 reports all the coefficients.

3.4 Concluding remarks

The aim of this work has been to answer three research questions: on the effects of RIAs, on the role of geographical location, and on the effectiveness of different types of RIA. The investigation has been conducted using a gravity equation of bilateral trade flows. Both the traditional pooled cross section OLS estimation technique and the more recent panel fixed effect model have been estimated.

The adoption of both the standard estimation method of pooled-cross-section and the country-pair specific fixed effect model in its two steps version lead to not very univocal results, generally speaking. However, since the fixed effects method seems to be more plausible in explaining country pairs trade relations, it should be preferred to the pooled-cross-section one.

The results show that the conventional gravity variables have the expected signs and magnitudes. The role played by the presence of trade agreements has been captured by regional dummies, the geographical effects by continental dummies, while effectiveness has been determined by creating specific dummy variables for each type of agreement. In all cases, three different types of variable have been created in order to separate trade creation from trade diversion and distinguish their effects on member and non-member countries.

The findings, which concern 16 RIAs, provide strong evidence of growth in intra-regional trade, often accompanied by negative effects for non-member countries. This reduction in trade with the rest of the world indicates that trade diversion cannot be eliminated and may occur with different magnitudes on either the imports or the exports side.

The same kind of evidence is found in the case of geographical location, in the sense that belonging to the same continent is a positive determinant of trade flows. However, because the results on trade diversion effects are very mixed, nothing more definite can be concluded on the role of natural blocs.

Finally, the ranking of types of agreement according to their intensities has yielded interesting results. Ghosh and Yamarik (2003) find a positive correlation between intensity of integration and effectiveness of the agreement in terms of trade creation and trade diversion. However, this pattern has not been confirmed by the empirical analysis conducted here. Complete integration agreements, in particular, have not been found to be the most trade-creating ones, contrary to expectations. This result is not surprising, however, because as integration deepens, trade effects have already been exploited in previous stages of the integration process, creating space for other objectives.

References

Anderson, J. (1979), "A Theoretical Foundation for The Gravity Equation", *American Economic Review*, Vol.69, No. 1 March, pp. 106-116.

_____. and van Wincoop, E. (2003), "Gravity with Gravitas: A Solution to the Border Puzzle", *American Economic Review*, v93 (1, Mar), pp.170-192.

Baier, S.L. and Bergstrand, J.H. (2001), "The Growth of World Trade: Tariffs, Transport Costs, and Income Similarity", *Journal of International Economics*, 53, pp. 1-27.

Balassa, B. (1965), "Trade Liberalization and "revealed" Comparative Advantage", *The Manchester School of Economic and Social Studies*, Vol. 33 n.2, pp.99-123.

Benassy-Quere, A. and Coupet, M. and Mayer, T. (2005). "Institutional Determinants of Foreign Direct Investment," Working Papers 2005-05, CEPII.

Bergstrand, J. (1985), "The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence", *Review of Economics and Statistics*, vol. LXVII, n. 3, pp. 474-481.

_____. (1989), "The Generalised Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade", *Review of Economics and Statistics*, vol. LXXI, n.1, pp. 143-153.

_____. (1990), "The Heckscher-Ohlin-Samelsuon Model, the Linder Hypothesis and the Determinants of Bilateral Intra-industry Trade", *Economic Journal* 100 (4), pp. 1216-1229.

Carrere, C. (2005), "Revisiting the Effects of Regional Trade Agreements on Trade Flows with Proper Specification of the Gravity Model", *European Economic Review*, Forthcoming.

Carillo, C. and Li, C. (2004), "Trade Blocks and the Gravity Model: Evidence from Latin American Countries", *Journal of Economic Integration.*

Cernat, L. (2000), "Assessing Regional Trade Agreements: Are South-South RTAs more Trade Diverting?", UNCTAD, Policy Issues in International Trade and Commodities, Study series N. 16, UN, New York and Geneva.

Cheng, I. And Tsai, Y. (2005), "Estimating the Staged Effects of Regional Economic Integration on Trade Volumes", mimeo.

Cheng, I. and Wall, H. (2004), "Controlling for Heterogeneity in Gravity Models of Trade and Integration", Federal Reserve Bank of St. Louis, Working paper 1999-010E.

Coulibaly, S. (2004), "On the Assessment of Trade Creation and Trade Diversion Effects of Developing RTAs", mimeo.

_____. (2005), "Evaluating Trade and Welfare Effects of Developing RTAs", mimeo.

Deardoff, A. V. (1995), "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?", *NBER Working Paper Series*, WP n. 5377.

Egger, P. (2000), "A Note on the Proper Specification of the Gravity Equation", *Economic Letters* 66, pp. 25-31.

_____. (2002), "An Econometric View on the Estimation of Gravity Models and the Calculation of Trade Potentials", The World Economy, Vol.25 Iss.2, pp.297-312.

_____. (2004),"On the Role of Distance for Outward FDI", mimeo.

Feenstra, R.C. (2004), *Advanced International Trade: Theory and Evidence*, Princeton University Press

_____. Stein, E. and Wei, S. (1995), "Trading Blocs and the Americas: The Natural, the Unnatural, and the Super-natural", *Journal of Development Economics*, Vol. 47, 61-95.

Gacs, J. and Wyzan, M. (1998), "The European Union and the Rest of the World: Complements and Substitutes for Central and Eastern Europe?", interim report, IIASA, Laxenburg, Austria.

Glick, R. and Rose, A. (2002), "Does a Currency Union Affect Trade? The time-series evidence", European Economic Review, 46 (6), pp. 1125-51.

Ghosh, S and Yamarik, S. (2004), "Are Regional Trading Arrangements Trade Creating? An Application of Extreme Bounds Analysis", *Journal of International Economics* 63.

_____. and Yamarik, S (2004), "Does Trade Creation Measure Up? A Re-examination of the Effects of Regional Trading Arrangements", *Economic Letters* 82, 2004.

Hamilton, C.B. and L.A. Winters (1992), „Opening up International Trade with Eastern Europe" *Economic Policy*, Vol. 14, pp. 77-116.

Kaminski, B. (2001), "How Accession to the European Union has Affected External Trade and Foreign Direct Investment in Central European Economies", World Bank working paper series n. 2578, World Bank, Washington D.C.

Krueger, A. (1999), "Trade Creation and Trade Diversion under NAFTA", NBER working paper N. 7429.

Krugman, P. (1991a), "Is Bilateralism Bad?", in Helpman, E. and Razin, A. (eds), International Trade and Trade Policy, Cambridge, Mass.: MIT Press, pp.9-23.

Martínez-Zarzoso Felicitas Nowak-Lehmann D. (2002), "Augmented Gravity Model: An Empirical Application to Mercosur-European Union Trade Flows", mimeo

_____. and Horsewood, N. (2005), "Regional Trading Agreements: Dynamic Panel Data Evidence From the Gravity Model", mimeo.

_____. and Nowak-Lehmann, *F.* (2004), "Explaining MERCOSUR Sectoral Exports to the EU: The Role of Economic and Geographical Distance", *Open Economies review* 15:291-314, 2004.

Matyas, L. (1998), "The Gravity Model: Some Econometric Considerations", *World Economy*, vol. 20 n.3.

Mayer, T. and Zignago, S. (2005), "Market Access in Global and Regional Trade" Working Papers 2005-02, CEPII.

McCallun, J. (1995), "National Borders Matter: Canada-U.S. Regional Trade Patterns", *American Economic Review*, Vol.85 Iss.3, pp.615-623.

Oguledo, V. and MacPhee, C. (1994), "Gravity Models: a Reformulation and an Application to Discriminatory Trade Arrangements", *Applied Economics*, 26, pp. 107-120.

Piermarini, R. and The, R. (2005), "Demystifying Modelling Methods for Trade Policy", WTO Discussion Papers, N.10, World Trade Organization, Geneva, Switzerland.

Resmini, L. (2005), "Regional Patterns of Industry Location in Transition Countries: Does Economic Integration with the EU Matter?", *Regional Studies*, forthcoming.

Rose, A. K. (2003), "Do we Really Know that the WTO Increases Trade?", *American Economic Review*, Vol. 94, Issue 1, pp. 98-114.

Soloaga, I. and Winters, A. (2001), "Regionalism in the Nineties: What effect on Trade?", *The North American Journal of Economics and Finance* 12.

Vandenbussche, H. and Zanardi, M. (2005), "The Global Chilling Effects of Antidumping Proliferation", mimeo.

Viner, J. (1950), "*The Custom Union Issue*", Carnegie Endowment for International Peace, New York.

Yeats, A. (1997), "Does Mercosur's Trade Performance Raise Concerns about the Effects of Regional Trade Arrangements", World Bank, Policy Research Working Paper, n.1729.

Winters, A. (1997), "Regionalism and the Rest of the World: The Irrelevance of the Kemp-Wan Theorem"*, Oxford Economic Papers*, New Series, Vol. 49, n. 2, pp. 228-234.

Wang, Z. and Winters A. (1991), "The Trading Potential of Eastern Europe", CEPR Discussion Paper n. 610, London, UK.

Annex A

List of Countries in the Dataset, Codes and Agreements

Continent	Country	ISO code	Agreement	
Africa	Algeria	DZA	MED	
	Angola	AGO	COMESA	SADC
	Belize	BEL	CARICOM	
	Benin	BEN	UEMOA	
	Botswana	BWA	SADC	
	Burkina Faso	BFA	UEMOA	
	Burundi	BDI	COMESA	
	Cote d'Ivoire	CIV	UEMOA	
	Djibouti	DJI	COMESA	
	Egypt	EGY	COMESA	
	Eritrea	ERI	COMESA	
	Ethiopia	ETH	COMESA	
	Guinea Bissau	GNB	UEMOA	
	Kenya	KEN	COMESA	EAC
	Lesotho	LES	SADC	
	Madagascar	MDG	COMESA	
	Malawi	MWI	COMESA	SADC
	Mali	MLI	UEMOA	
	Mauritius	MRT	COMESA	SADC
	Morocco	MAR	MED	
	Mozambique	MOZ	SADC	SADC
	Namibia	NAM	COMESA	SADC
	Niger	NER	UEMOA	
	Nigeria	NGA		
	Rwanda	RWA	COMESA	
	Senegal	SEN	UEMOA	
	Somalia	SOM		
	South Africa	ZAF	SADC	
	Sudan	SDN	COMESA	
	Swaziland	SWZ	COMESA	SADC
	Tanzania	TZA	EAC	SADC
	Togo	TGO	UEMOA	
	Tunisia	TUN	MED	
	Uganda	UGA	COMESA	EAC
	Zambia	ZMB	COMESA	SADC
	Zimbabwe	ZWE	COMESA	SADC

Continent	Country	ISO code	Agreements	
Asia	Bangladesh	BGD	Bankok Agreement	
	Brunei	BRN	ASEAN-AFTA	
	Cambodia	KHM	ASEAN	
	China	CHN	Bankok Agreement	
	Hong Kong	HKG		
	India	IND	Bankok Agreement	
	Indonesia	IDN	ASEAN-AFTA	
	Israel	ISR	MED	
	Japan	JPN		
	Jordan	JOR	MED	
	Korea	KOR	Bankok Agreement	
	Laos	LAO	ASEAN-AFTA	
	Lebanon	LBN	MED	
	Malaysia	MYS	ASEAN-AFTA	
	Myanmar	MMR	ASEAN-AFTA	
	Philippines	PHL	ASEAN-AFTA	
	Russia	RUS		
	Seychelles	SYC	COMESA	
	Singapour	SGP	ASEAN-AFTA	
	Sri Lanka	LKA	Bankok Agreement	
	Syria	SYR	MED	
	Thailand	THA	ASEAN-AFTA	
	Vietnam	VNM	ASEAN-AFTA	
Europe	Austria	AUT	EU15-25-27-28	
	Belgium-Lux		EU15-25-27-28	
	Bulgaria	BGR	EU27-28	CEFTA
	Cyprus	CYP	EU25-27-28	
	Czech Republic	CZE	EU25-27-28	
	Denmark	DNK	EU15-25-27-28	
	Estonia	EST	EU25-27-28	
	Finland	FIN	EU15-25-27-28	
	France	FRA	EU15-25-27-28	
	Germany	DEU	EU15-25-27-28	
	Greece	GRC	EU15-25-27-28	
	Hungary	HUN	EU25-27-28	
	Ireland	IRL	EU15-25-27-28	
	Italy	ITA	EU15-25-27-28	
	Latvia	LVA	EU25-27-28	
	Lithuania	LTU	EU25-27-28	
	Malta	MLT	EU25-27-28	
	Netherlands	NLD	EU15-25-27-28	
	Norway	NOR		
	Poland	POL	EU25-27-28	
	Portugal	PRT	EU15-25-27-28	
	Romania	ROM	EU27-28	CEFTA
	Slovakia	SVK	EU25-27-28	
	Slovenia	SVN	EU25-27-28	
	Spain	ESP	EU15-25-27-28	
	Sweden	SWE	EU15-25-27-28	
	Turkey	TUR	EU28	MED
	United Kingdom	GBR	EU15-25-27-28	

Continent	Country	ISO code	Agreements	
SA	Antigua&barbuda	ATG	CARICOM	
	Argentina	ARG	MERCOSUR	LAIA
	Bahamas	BHS	CARICOM	
	Barbados	BRB	CARICOM	
	Bolivia	BOL	CAN	LAIA
	Brazil	BRA	MERCOSUR	LAIA
	Chile	CHL		LAIA
	Colombia	COL	CAN	LAIA
	Comoros	COM	COMESA	
	Costa Rica	CRI	CACM	
	Cuba	CUB		LAIA
	Dominica	DMA		
	Dominican Republic	DOM		
	Ecuador	ECU	CAN	LAIA
	El Salvador	SLV	CACM	
	Grenada	GRD	CARICOM	
	Guatemala	GTM	CACM	
	Guyana	GUY	CARICOM	
	Haiti	HTI	CARICOM	
	Honduras	HND	CACM	
	Jamaica	JAM	CARICOM	
	Mexico	MEX	NAFTA	LAIA
	Nicaragua	NIC	CACM	
	Panama	PAN		
	Paraguay	PRY	MERCOSUR	LAIA
	Peru	PER	CAN	LAIA
	St. lucia	LCA	CARICOM	
	St. Vincent & the Grenadines	VCT	CARICOM	
	St.Kitts&Navis	KNA	CARICOM	
	Surinam	SUR	CARICOM	
	Trinidad&Tobago	TTO	CARICOM	
	Uruguay	URY	MERCOSUR	LAIA
	Venezuela	VEN	CAN	LAIA
NA	Canada	CAN	NAFTA	
	USA	USA	NAFTA	
Oceanie	Australia	AUS	CER	
	New Zeland	NZL	CER	

Annex B

Regional Integration Agreements

Abbreviation	Full Title	Member countries	Year	Type[43]
AFTA	**ASEAN Free Trade Area**	Brunei Darussalam Cambodia Indonesia Laos Malaysia Myanmar Philippines Singapore Thailand Vietnam		FTA
ASEAN	**Association of South East Asian Nations**	Brunei Darussalam Cambodia Indonesia Laos Malaysia Myanmar Philippines Singapore Thailand Vietnam	1967	OEC
BAFTA	**Baltic Free-Trade Area**	Estonia Latvia Lithuania		FTA
CAN	**Andean Community**	Bolivia Colombia Ecuador Peru Venezuela	1993	CU
CARICOM	**Caribbean Community and Common Market**	Antigua & Barbuda Bahamas Barbados Belize Dominica Grenada Guyana Haiti Jamaica Monserrat Trinidad & Tobago St. Kitts & Nevis St. Lucia St. Vincent & the Grenadines Surinam	1973	CU
CACM	**Central American Common Market**	Costa Rica El Salvador Guatemala Honduras Nicaragua	1993	CU
CEFTA	**Central European Free Trade Agreement**	Bulgaria Croatia Romania	1992	FTA
CEMAC	**Economic and Monetary Community of Central Africa**	Cameroon Central African Republic Chad Congo Equatorial Guinea Gabon		MU
CER	**Closer Trade Relations Trade Agreement**	Australia New Zealand	1989	FTA
COMESA	**Common Market for Eastern and Southern Africa**	Angola Burundi Comoros Democratic Republic of Congo Djibouti Egypt Eritrea Ethiopia Kenya Madagascar Malawi Mauritius Namibia Rwanda Seychelles Sudan Swaziland Uganda Zambia Zimbabwe	1994	PTA

[43] Where, going from the most superficial to the deepest type of agreement, we have that **OEC** stands for Organizations for economic cooperation without integration; **PTA** corresponds to Preferential Trade Agreements and **FTA** for Free Trade Areas; **CU** represents Customs Unions, **MU** Monetary Unions and, finally, **CI** complete integration.

MED	**Euro-Mediterranean Association Agreement**	Algeria (2002) Egypt (2001) Israel (1995) Jordan (1997) Lebanon (2002) Morocco (1996) Palestine (1997) Syria (2004) Tunisia (1995) Turkey (1995)		OEC
MERCOSUR	**Southern Common Market**	Argentina Brazil Paraguay Uruguay	1991	CU
NAFTA	**North American Free Trade Agreement**	Canada Mexico United States	1994	FTA
SADC	**Southern African Development Community**	Angola Botswana Lesotho Malawi Mauritius Mozambique Namibia South Africa Swaziland Tanzania Zambia Zimbabwe	1992	
UEMOA WAEMU	**West African Economic and Monetary Union**	Benin Burkina Faso Côte d'Ivoire Guinea Bissau Mali Niger Senegal Togo	1994	MU
SACU	**South African Customs Union Agreement**	Botswana Lesotho Namibia South Africa Swaziland	1970	CU
EU15	**European Union 15 member states**	Austria (1995) Belgium Denmark (1973) Finland (1995) France Germany Greece (1981) Ireland (1973) Italy Luxembourg Netherlands Portugal (1986) Spain (1986) Sweden (1995) United Kingdom (1973)	1957, 1995	CI
EU25	**European Union 25 member states**	EU 15 plus Cyprus Czech Republic Estonia Hungary Latvia Lithuania Malta Poland Slovenia Slovak Republic	2004	CI
EU27	**European Union 27 member states**	EU25 plus Bulgaria Romania	2007?	CI
EU28	**European Union 27 member states plus Turkey**	EU27 plus Turkey	?	CI
CC1	**First wave of candidate countries to become members**	Cyprus Czech Republic Estonia Hungary Latvia Lithuania Malta Poland Slovenia Slovak Republic		
CC2	**Second wave**	Bulgaria Romania		
CC3	**Third wave** [44]	Croatia Turkey		

[44] The database does not contain any information on Croatia though.