TRADE EFFECTS OF CONTINENTAL AND INTERCONTINENTAL PREFERENTIAL TRADE AGREEMENTS

Salvador Gil-Pareja*

Rafael Llorca-Vivero*

José Antonio Martínez-Serrano*

Abstract

The specialised literature calls preferential trade agreements (PTAs) that are drawn along continental lines *natural*, to distinguish them from intercontinental PTAs, which are called *unnatural*. The central statement of the hypothesis of "natural" trading partners is that to the extent that trade follows the natural lines dictated by proximity the formation of regional trading blocs is good. Such natural blocs are contrasted with unnatural blocs, PTAs between countries on different continents, which are less likely to be welfare improving through their impact on trade. The goal of this paper is to determine the effect on trade of continental and intercontinental PTAs. To this end, using the gravity equation we estimate trade creation and trade diversion effects of both kinds of PTAs on a sample of 182 countries over the period 1980-2007. The results indicate that trade creation forces prevail over trade diverting ones in continental PTAs whereas this is not the case for intercontinental preferential agreements.

Key words: Natural and unnatural trading partners, Continents, Preferential trade agreements.

JEL Classification numbers: F14.

Corresponding author: Salvador Gil Pareja. *Facultad de Economía, Departamento de Estructura Económica, Av. de los Naranjos s/n, C.P. 46022, Valencia, Spain. Email: Salvador.Gil-Pareja@uv.es;

* Facultad de Economía, Departamento de Estructura Económica, Av. de los Naranjos s/n, C.P. 46022, Valencia, Spain.

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1. Introduction

During the last two decades there has been a dramatic rise in the number of preferential trade agreements (PTAs) all over the world.[1] In the "Americas", the Common Market of the South (MERCOSUR) and the North American Free Trade Association (NAFTA) were created in 1991 and 1994, respectively, and old PTAs like the Andean Pact and the Central American Common Market (CACM) started a process of renewal in the late 1980s and early 1990s.[2] Moreover, 34 American countries have been negotiating since 1994 a continental-wide free trade agreement (known as the Free Trade Area of the Americas) that would include all democracies in the Western Hemisphere.[3] The process of regionalism has also received a revived impulse in Africa by both the creation of new regional agreements (on the basis of old ones) and the broadening and deepening of existing agreements.[4] In Europe, the European Union (EU) has experimented successive enlargements (from 12 members until 1995 to 27 in 2007) and a deepening in the economic integration process.[5] Additionally, the European Economic Area, an agreement that entered into force in 1994, has created a Free Trade Agreement between remaining European Free Trade Association (EFTA) members (with the exception of Switzerland) and EU.[6] In Asia, the Association of the Southeast Asian Nations (ASEAN)[7] broadened from 6 to 10 countries in the 1990s, and nowadays the major countries in the region are rigorously pursuing preferential trade agreements, which may eventually lead to an Asian-wide trade bloc. Finally, Oceania has not been an exception. The Australia New Zealand Closer Economic Relations Trade Agreement (into force since 1983) has totally eliminated tariffs and quantitative restrictions

[1] In the period 1948-1994, the GATT received 124 notifications of preferential trade agreements (relating to trade in goods). Since the creation of the World Trade Organization (WTO) in 1995, near 300 agreements covering trade in goods and services have been notified to the WTO (as of December 2008).
[2] Baier, Bergstrand and Vidal (2007) examine trade effects of free trade agreements in the Americas.
[3] Talks about the Free Trade Area of the Americas began in Miami on December 1994. The last meeting was held in Mar del Plata, Argentina, in November 2005, but not agreement on FTA was reached.
[4] For example, in early 1990s the West African Economic and Monetary Union (WAEMU) was created out of the *Communaute Economique de l'Afrique Occidentale*; old integration agreements were revamped like the *Union Duanière et Economique de l'Afrique Centrale*. Moreover, others, like the Common Market of Eastern and Southern Africa (COMESA) revived and expanded the preferential trade area.
[5] Austria, Finland and Sweden joined the EU in the fourth enlargement in 1995. The fifth enlargement took place in May 2004 with the inclusion of 10 new members (Cyprus, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Malta, Poland, Slovakia and Slovenia) and the sixth one in January 2007 with the adhesion of Bulgaria and Romania. Moreover, in 1993 the EU celebrated the completion of the Single Market and most of their member States formed a Monetary Union in 1999. In 2009, 16 EU member States participate in the single currency.
[6] An agreement on free trade in manufactures between the EU and EFTA was in effect since 1973.
[7] ASEAN comprises Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

between the two countries in 1990 and business communities from both countries have proposed to extend the agreement to other Pacific Island nations.

An important feature of the aforementioned wave of regionalization is that many PTAs are continental trade blocs, *i.e.* trade blocs formed among countries on the same continent.[8] However, in recent years, there has been an increasing number of PTAs including countries located on different continents; in fact, nowadays the main trend in international economic integration is the proliferation of transcontinental trade agreements. In particular, about 30 per cent of the more than 200 PTAs existing over the sample period are of the intercontinental sort. The Aghadir agreement, the Great Arab Free Trade Area, the PTAs between Israel and the United States, Canada and Mexico, between Jordan and Morocco, New Zealand and Singapore or Mexico and the EU are examples of PTAs that cross different continents.

The economic geography literature calls PTAs that are drawn along continental lines *natural*, to distinguish them from intercontinental PTAs, which are called *unnatural*. According to the natural trading partner hypothesis (see, for example, Wonnacott and Lutz, 1989; Krugman, 1991a; Summers, 1991; and Frankel Stein and Wei, 1995 and 1996) trade blocs formed along continental lines offer more hope to be welfare-improving in terms of trade (in the sense that trade creation dominate trade diversion) than trade blocs that cross different countries.[9] Notwithstanding, trade creation may be lower than trade diversion in continental PTAs. The specialised literature refers to such continental agreements as "super-natural".[10]

The aim of this paper is to determine the effect on trade of both continental and intercontinental PTAs. We estimate trade creation and trade diversion effects for both kinds of PTAs. To this end, we use the gravity equation on a sample of 182 countries over the period 1980-2007. We attempt to answer two questions in this paper. First, are continental PTAs in the real world natural or super-natural blocs? Second, is the recent movement towards the formation of trading blocs across different continents good or bad?

[8] All the PTAs cited until now are of this kind.

[9] Trade creation refers to the increment on trade of goods that are more efficiently produced within the bloc. Trade diversion refers to substitution of imports previously produced efficiently from nonmember countries for imports sourced inefficiently by bloc members.

[10] Frankel Stein and Wei (1993, 1995 and 1996) set up a trade theory model of many countries that are grouped into continents with high trade costs across continents and low ones within them. In these papers, the term super-natural refers to a continental PTA that is welfare-reducing on net due to low intercontinental transportation costs.

In addition to the academic interest of these questions, they are especially important for policy reasons. If continental PTAs are welfare enhancing on net (because large intra-continental trade creation dominate the potential intercontinental trade diversion) this evidence would provide support to the implementation of this kind of agreements. However, if continental PTAs are super-natural, policymakers should avoid such PTAs. In a similar way, if we find that intercontinental PTAs (unnatural PTAs) are welfare decreasing (because the welfare loss from intra-continental trade diversion exceeds the welfare gain from intercontinental trade creation) these should be avoided.

Krishna (2003), using a general equilibrium model and US trade data for the period 1964-95, has analysed whether regional trading arrangements are "natural" finding no support for the natural trading partner hypothesis. Moreover, a great number of studies have investigated whether economic integration agreements create or divert trade.[11] However, to the best of our knowledge, no study has tried to investigate this issue empirically distinguishing between continental and intercontinental PTAs.

The remainder of the paper is organised as follows. Section 2 summarises the background. Section 3 presents the methodology. Section 4 describes the data. Section 5 discusses the estimation results. Finally, section 6 concludes the paper.

2. Background

Pioneered by Viner (1950), international economists have studied and debated intensely the question of PTAs over near sixty years. However, as is well known, the theoretical analysis of PTAs is ambiguous on their effects on trade, welfare, as well as multilateral trade liberalization making the empirical work on PTAs critical in evaluating their effects.[12] Moreover, this theoretical ambiguity has stimulated an active discussion about conditions to ensure positive welfare effects from PTAs. In this context, since the beginning of the 1990s, the economic geography literature has analyzed the theoretical welfare gains and losses from PTAs on the base of the existence of differences in trade costs between and within continents. Such differences are a

[11] See, for example, Adams *et al*. (2003), Dee and Gali (2003), Ghosh and Yamarik (2004a and 2004b), Lee, Park and Shin (2008), Holmes (2005), Medvedev (2006), Carrère (2006), Baier and Bergstrand (2007), DeRosa (2007), Baier, Bergstrand and Vidal (2007) or Gil, Llorca and Martinez-Serrano (2008a).
[12] For a survey about the theory of PTAs see Panagariya (2000).

central issue of the hypothesis of "natural" trading partners with clear welfare implications.[13]

Paul Krugman's works in the early 1990s considered the two extreme assumptions about intercontinental transport costs: zero and infinite. These assumptions lead to diametrically opposite conclusions. With zero intercontinental transport costs, continental PTAs decrease welfare (Krugman, 1991b). However, when intercontinental transport costs are infinite, such agreements increase welfare (Krugman, 1991a). The intuition is immediate: to the extent that trade follows the natural lines dictated by proximity, there is no intercontinental trade to divert, and the formation of regional trading blocs is good for welfare.

Frankel, Stein and Wei (1993, 1995 and 1996) have investigated the continuum between zero and prohibitive transport costs. According to these authors, for the intermediate realistic case, where intercontinental transportation costs are less than infinite but greater than zero (and greater than transportation costs within continents) the relationship between intercontinental and intra-continental transportation costs determines the net impact on welfare of PTAs. For high intercontinental transport costs, continental or natural PTAs are welfare-improving, because larger intra-continental trade creation would dominate small intercontinental trade diversion. However, as intercontinental transport costs fall, continental PTAs may become welfare-reducing on net. Such continental trading blocs that reduce welfare are called "super-natural".[14] On the other hand, for any level of intercontinental transport costs, PTAs between countries geographically distant or on separate continents, that is, unnatural PTAs, are welfare decreasing as the welfare loss from intra-continental trade diversion exceeds the welfare gain from intercontinental trade creation.

The Krugman and the Frankel, Stein and Wei theoretical results were derived in a model with the assumptions of identical economies, one factor, one industry and zero intra-continental transport costs. Moreover, the results rest on the assumptions about intercontinental transportation costs. Neither these authors nor others in the literature provide supportive evidence about the effects on trade of continental and

[13] The literature on the economic determinants of the formation of PTAs also explicitly considers intercontinental and intra-continental transportation costs among multiple countries on multiple continents (see, for example, Baier and Bergstrand, 2004 and Egger and Larch, 2008).

[14] Despite Frankel *et al.* model allows for transport costs within continents, for simplicity they assume that these costs are zero. This is clearly an unrealistic assumption that is not innocuous. Nitsch (1996) finds that the phenomenon of super-natural trade blocs may disappear when intra-continental transport costs are allowed for. In fact, intra-continental distances are important. The average bilateral distances are 2,259 miles within Africa, 1,891 (America), 2,511 (Asia), 1,069 (Europe) and 2,083 (Oceania).

intercontinental PTAs. Our paper is concerned with providing evidence of trade creation and trade diversion for both kinds of PTAs in the real world.

3. Methodology

The international trade literature provides two approaches to analysing the effects of PTAs: *ex ante* studies and *ex post* studies. The *ex-ante* approach uses computable general equilibrium (CGE) models.[15] In contrast, *ex post* analyses of PTAs measure trade creation and trade diversion effects by means of regression techniques. In this paper, we study the *ex post* effects of both continental and intercontinental PTAs on intra and extra-bloc trade.

The gravity equation has emerged as the empirical workhorse in international trade for examining the *ex-post* effects of PTAs on bilateral trade flows. It relates bilateral trade flows to economic size (GDP), distance and other factors that affect trade barriers. In order to analyse the effects of PTAs on trade using panel data, a specification like gravity equation (1) bellow is normally estimated:

$$\ln Trade_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln Dist_{ij} + \beta_4 PTAboth_{ijt} + \beta_5 PTAone_{ijt} + Othercontrols + \alpha_{ij} + \lambda_t + u_{ij} \quad (1)$$

where *i* and *j* denote trading partners, *t* is time and the variables are defined as: $Trade_{ijt}$ are the bilateral trade flows from *i* to *j*,[16] GDP_i and GDP_j are the Gross Domestic Products, $Dist_{ij}$ denotes the distance between *i* and *j*, $PTAone_{ij}$ and $PTAboth_{ij}$ denotes dummy variables for different kinds of multilateral and bilateral preferential trade agreements (the suffix "*both*" indicates that *i* and *j* belong to the same PTA and the suffix "*one*" denotes that either *i* or *j* (but not both) is a member of a particular PTA), *Othercontrols* are variables that are included to capture variation in various trade costs, such as binary variables for the presence of islands or landlocked countries in the pair, a common land border or a common language. α_{ij} represents country-pair individual effects, λ_t are time dummies, and u_{ijt} is the standard classical error term. In this set-up,

[15] These models take into account all relative price changes and not only the partial impact on two countries' trade (disregarding the feedback effects of other price changes). One advantage of these models is that they can be used to draw direct inferences about consumption, output and welfare. However, one major limitation of CGE models is that they use restrictive assumptions and very simple characterisations of real-world PTAs.

[16] Some authors treat the sum of two-way bilateral trade as the dependent variable (see, for example, Rose, 2004). However, all theories that underlie a gravity-like specification yield predictions on unidirectional trade rather than total trade. Hence, our specification is more closely grounded in theory.

the effect of PTAs on bilateral trade flows between member countries and between members and non-members is measured by the estimated coefficients of the dummy variables *PTAboth* and *PTAone*, respectively. If trade is created when both countries are members of a PTA, the estimated coefficient of the dummy variable *PTAboth* should be positive; if trade is diverted from non-members, then the estimated coefficient of *PTAone* should be negative.

However, equation (1), despite being a typical specification to estimate the effect of PTAs on trade flows, ignores the theoretical foundations for the gravity equation that have developed since 1979 (see, among others, Anderson, 1979; Bersgtrand, 1985; Deardoff, 1998; and Eaton and Kortum, 2002). As Anderson and van Wincoop (2003) emphasize gravity model theory implies that one must take into account the role of relative prices ("multilateral resistance", in Anderson and van Wincoop's terminology). The usual solution to the presence of such multilateral resistance is to include country fixed effects (for both the exporter and the importer) when estimating gravity equations.[17]

More recently, Helpman, Melitz and Rubinstein (2008) (henceforth HMR) have developed a theoretical model that generalizes the Anderson and van Wincoop's (2003) framework in two ways. Firstly, they account for non-observable firm heterogeneity and fixed trade costs in line with the so-called new-new trade theory (Melitz, 2003). Secondly, they account for asymmetries in the volume of bilateral exports between countries depending on the direction of export flows (from *i* to *j* versus from *j* to *i*). Moreover, they also develop the empirical framework for estimating the gravity equation derived in their model.

In this paper we use the two-stage estimation procedure proposed by HMR (2008). In the first stage we estimate a probit equation that specifies the probability that country *i* exports to *j* conditional on the observable variables. In the second stage, predicted components of this equation are used to estimate the gravity equation. This procedure simultaneously corrects for two types of potential biases: a Heckman selection bias and a bias from potential asymmetries in the trade flows between pairs of countries.

More formally, in a first stage we estimate a probit equation of the type:

[17] Following Anderson and van Wincoop (2003 and 2004) and Feenstra (2004), many recent studies include country fixed effects in the estimation of gravity equations for international trade flows. See, among others, Klein and Shambaugh (2006), Baier and Bergstrand (2007) and Gil, Llorca and Martinez-Serrano (2008a, 2008b).

$$\Pr ob(T_{ij} = 1 / observed \text{ var } iables) = \Phi(\chi_i, \lambda_j, X_{ij}, Z_{ij}, \varepsilon_{ij}) \quad (2)$$

where T_{ij} is an indicator variable equal to 1 when country *i* exports to *j* and zero when it does not, Φ is the cumulative distribution function of the standard normal distribution, χ_i and λ_j are exporter and importer fixed effects, X_{ij} are variables which affect both the probability and the volume of trade, and Z_{ij} represents variables that are used for the exclusion restriction, that is, those that affect the probability of observing a positive volume of trade but do not impact the volume of trade if this were to be positive.[18] We include in X_{it} the log of bilateral distance between countries as well as dummy variables used as controls in the standard gravity equation, such as the presence of a land border, of islands in the pair, of a landlocked country in the pair, of a common language, of colonial ties, of a previously common country and common membership in a currency union. Finally, in order to estimate the effect of PTAs on trade we additionally include dummy variables for continental PTAs (those that are drawn along continental lines) and intercontiental PTAs (those including countries located on different continents). We refer to these dummy variables as *PTAcont* and *PTAintercont,* respectively.

Using the probit regression, we construct two variables that are included as regressors in the second stage estimation. One is the inverse of Mills ratio and the other is an expression that controls for firm size heterogeneity. In particular, the second stage consists in the estimation for a given year of the following non-linear equation for all country-pairs with positive trade flows:

$$\ln T_{ij} = \beta_0 + \lambda_j + \chi_i - \gamma X_{ij} + \theta \hat{\eta}_{ij}^{*} + \ln\left\{\exp\left[\delta(\hat{z}_{ij}^{*} + \hat{\eta}_{ij}^{*})\right] - 1\right\} + \varepsilon_{ij} \quad (3)$$

where $\hat{\eta}_{ij}^{*}$ is the inverse Mills ratio and $\hat{z}_{ij}^{*} = \Phi^{-1}(\hat{p}_{ij})$ in which $\hat{p}_{ij}$ are the estimates from the probit equation.[19] Since equation (3) is non-linear in δ, we estimate it following HMR (2008) using maximum likelihood.

4. Data

The trade data for the dependent variable (export flows from country *i* to country *j*) come from the "Direction of Trade" (DoT) dataset developed by the International

[18] In this set-up, parameter identification requires the existence of a variable that affects the probability of observing a non-zero flow between two countries but not the volume. Alternatively, a variable which affects both decisions in opposite directions would also work.

[19] Since equation (3) is non-linear in δ, we estimate it following HMR (2008) using maximum likelihood.

Monetary Fund (IMF). The sample covers bilateral merchandise trade between 182 countries and territories (see Table A1) over the period 1980-2007.[20] The DoT data set provides FOB exports in US dollars. These series are converted into constant terms using the American GDP deflator taken from the Bureau of Economic Analysis (US Department of Commerce).

The independent variables come from different sources. For location (geographical coordinates) of countries, used to calculate Great Circle Distances, and the construction of the dummy variables for physically contiguous neighbours, island and landlocked status, common language, colonial ties and common country background data are taken from the CIA's World Factbook. In order to create the indicators of preferential trade agreements, we use data from the World Trade Organization, Preferential Trade Agreements Database (The Faculty of Law at McGill University) and the web site http://ec.europa.eu/trade/issues/bilateral/index_en.htm. More specifically, the sample includes 202 preferential trade agreements (multilateral and bilateral), 142 at the intra-continental level and 60 including countries located on different continents.[21]

5. Empirical results

The traditional approach to addressing the effect of integration agreements on trade flows extends the basic gravity model by including dummy variables that capture the impact of such arrangements on intra-bloc trade. Therefore, we firstly estimate a version of the gravity equation that does not consider potential trade diversion effects.[22] The estimated equations include exporter and importer fixed effects as well as year dummies. The results for the probit regression are presented in column 1 of Table 1. Before discussing the empirical results, it is worth noting that the estimation of equation (2) might be subject to the incidental parameter problem introducing a bias in the coefficients of the rest of variables (X_{ij} and Z_{ij}). However, as pointed out by Fernández-

[20] It is noteworthy that not all the areas considered are countries in the conventional sense of the word. We also include some dependencies, territories and overseas departments in the data.

[21] The list of preferential trade agreements considered is available from the authors upon request. As noted before, the expression PTAs refers not only to preferential trade agreements but also to more profound economic integration agreements. In fact, most trade agreements considered in the sample are free trade agreements.

[22] Following HMR (2008) we also have country pairs whose characteristics are such that their probability of trade is indistinguishable from 1. Therefore, we assign the same $\hat{z}_{ij}^{*}$ to those country pairs with an estimated $\hat{p}_{ij}^{*} > 0.9999999$.

Val (2007), this bias does not affect the estimated marginal effects and, therefore, the predicted values obtained for the dependent variable. The estimated marginal effects are, in general, economically and statistically significant with sensible interpretations. More distant countries are less likely to trade. In a similar way, the existence of a landlocked country in the pair reduces the probability of a trade link. On the contrary, we find that sharing a common border, a common language, a common currency, colonial ties and being islands or part of the same country in the past increase the probability of trade. Finally, focusing on the variables of interest (*PTAContBoth* and *PTAInterconBoth*) we find that common membership in both continental and intercontinental PTAs increase the probability of trade.

Using the probit regression, as discussed earlier, we construct two variables for correcting sample selection bias and firm heterogeneity. The results for the second stage can be seen in column (2) of Table 1. The variable *language* has been excluded from the estimation for identification reasons (see the methodological section). The estimated coefficients show that almost all determinants that affect the probability of bilateral exports also impact bilateral export volumes. Disregarding the PTAs dummies, the effect of a common currency is the only exception. It raises the probability of trading but does not affect the volume of trade. With respect to the variables of interest, at this stage, a difference emerges. We once again find a positive and significant coefficient for the *continental PTAs* dummy variable. In particular, the estimated coefficient is 0.293 which suggests that two countries members of a PTA located on the same continent trade approximately 34% more [exp(0.293)-1=0.340] than two identical countries that do not share common membership in an agreement of this type. However, for the intercontinental PTAs we do not find a statistically significant effect on the volume of trade.

The results of column 1 and 2 do not take into account the possible existence of trade diversion. In order to capture PTAs effects on trade between bloc members and non-members, in columns 3 and 4, we add the corresponding dummies (*PTAContOne* and *PTAIntercontOne*). As it is observed, both continental and intercontinental PTAs divert trade in a significant magnitude. That is to say, according to the natural trading partner hypothesis these estimations reveal that intercontinental PTAs are unnatural since they divert trade but do not create trade. With respect to continental PTAs not a clear conclusion emerges since we found both trade creation and trade diversion effects.

In the above analysis the coefficient of the dummy for continental PTAs has been constrained to be the same for every continent. In order to estimate the effect of the continental PTAs by continent, we have dissagregated the intra-bloc and extra-bloc continental PTAs dummies into five. Table 2 shows the results. According to column 2, intracontinental PTAs boost trade in all the continents but Oceania. Moreover, when we control for trade diversion effects (column 4), again for Europe, Asia and America continental PTAs increase trade significantly but in this case no impact is found not only for Oceania but also for Africa. Additionally, PTAs in Europe, Africa and Oceania divert trade in a significant way but this is not the case for Asia and America. In comparison to column 2, the estimated coefficient of the intra-bloc dummies for Europe and Africa decrease. This result is consistent with our estimates for extra-bloc dummies for these continents (which are negative and statistically significant at the 1 per cent level). When we exclude the possibility that PTAs stimulate or divert trade with non-members the comparison is between intra-bloc trade flows and the rest of trade flows, including in the rest of trade flows those between members and non-members of a same PTA. In summary, trade partners in Asia and America can unambiguously be considered as natural and trade partners in Africa and Oceania as supernatural. No clear conclusion is obtained for Europe.

On the other hand, intercontinental PTAs increase trade around 15% but, as before, also divert trade significantly. The existence of overlapings on the variables capturing trade diversion effects could explain this result.

6. Conclusions

One of the major international developments in the last two decades has been the dramatic rise in the number of preferential trade agreements. Many existing trade blocs are made up of countries located on the same continent. However, in recent years, there has been an increasing number of PTAs including countries located on different continents. The significant rise in the number of PTAs has led to an increase number of studies investigating whether PTAs are trade creating or diverting. This paper investigates the issue empirically distinguishing, for the first time, between continental and intercontinental PTAs.

The results suggest that for the cases of Asia and America trade partners that share membership in a continental PTAs can be considered as natural trading partners. On

other hand, trade partners of continental PTAs in Africa and Oceania seems to be supernatural. Finally, for Europe no clear conclusion is found.

According to our results the recent proliferation of intercontinental bilateral trade agreements has led to a moderate trade creation but also has diverted trade with non members. However, it is worth noting that since many of these intercontinental agreements have got into force very recently maybe is too soon to appropriately evaluate their impact on trade

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Table 1. HMR two-stage estimation of continental and intercontinental PTAs. Sample period 1980-2007

	(1)		(2)	(3)		(4)
Variables	Probit coefficient	Marginal effect	ML	Probit coefficient	Marginal effect	ML
Ln $Dist_{ij}$	-0.665 (0.011)***	-0.230 (0.004)***	-0.661 (0.048)***	-0.663 (0.011)***	-0.229 (0.004)***	-0.658 (0.048)***
$Contiguity_{ij}$	0.141 (0.068)**	0.047 (0.022)**	0.609 (0.078)***	0.126 (0.068)*	0.042 (0.022)*	0.588 (0.078)***
$Island_{ij}$	0.475 (0.034)***	0.143 (0.008)***	0.772 (0.091)***	0.472 (0.034)***	0.142 (0.008)***	0.770 (0.090)***
$Landlocked_{ij}$	-0.596 (0.034)***	-0.216 (0.012)***	-1.418 (0.089)***	-0.586 (0.034)***	-0.212 (0.012)***	-1.412 (0.088)***
$Language_{ij}$	0.380 (0.018)***	0.121 (0.005)***		0.381 (0.018)***	0.122 (0.005)***	
$Colony_{ij}$	0.424 (0.102)***	0.128 (0.026)***	0.736 (0.098)***	0.426 (0.102)***	0.128 (0.026)***	0.740 (0.097)***
$ComCount_{ij}$	0.800 (0.121)***	0.206 (0.020)***	1.326 (0.159)***	0.786 (0.121)***	0.204 (0.020)***	1.303 (0.158)***
$PTAContBoth_{ijt}$	0.181 (0.033)***	0.060 (0.010)***	0.293 (0.046)***	0.143 (0.033)***	0.048 (0.010)***	0.257 (0.045)***
$PTAIntercontBoth_{ijt}$	0.225 (0.065)***	0.073 (0.020)***	0.068 (0.152)	0.250 (0.065)***	0.080 (0.019)***	0.036 (0.052)
$PTAContOne_{ijt}$				-0.125 (0.018)***	-0.042 (0.006)***	-0.196 (0.038)***
$PTAIntercontOne_{ijt}$				0.044 (0.012)***	0.015 (0.004***	-0.150 (0.018)***
$CurrencyUnion_{ijt}$	0.462 (0.099)***	0.137 (0.024)***	0.031 (0.111)	0.403 (0.100)***	0.123 (0.026)***	-0.015 (0.110)
δ			0.112 (0.077)			0.115 (0.079)
$\hat{\eta}_{ij}^{*}$			0.967 (0.080)***			0.963 (0.081)***
No observat.	623,927		367,615	623,927		367,615
Pseudo R^2	0.43			0.43		

Notes:
The regressions include exporter, importer and year fixed effects.
Robust standard errors (clustering by country pair) are in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 2. HMR two-stage estimation of continental and intercontinental PTAs by continents. Sample period 1980-2007

	(1)		(2)	(3)		(4)
Variables	Probit coefficient	Marginal effect	ML	Probit coefficient	Marginal effect	ML
Ln $Dist_{ij}$	-0.654 (0.012)***	-0.228 (0.004)***	-0.680 (0.065)***	-0.622 (0.012)***	-0.217 (0.004)***	-0.696 (0.061)***
$Contiguity_{ij}$	0.192 (0.069)***	0.063 (0.021)***	0.536 (0.080)***	0.179 (0.068)***	0.059 (0.021)***	0.536 (0.079)***
$Island_{ij}$	0.447 (0.035)***	0.137 (0.009)***	0.761 (0.095)***	0.457 (0.034)***	0.140 (0.009)***	0.743 (0.093)***
$Landlocked_{ij}$	-0.597 (0.034)***	-0.218 (0.013)***	-1.452 (0.096)***	-0.527 (0.033)***	-0.191 (0.012)***	-1.372 (0.087)***
$Language_{ij}$	0.378 (0.018)***	0.122 (0.005)***		0.370 (0.018)***	0.120 (0.005)***	
$Colony_{ij}$	0.417 (0.100)***	0.128 (0.026)***	0.753 (0.104)***	0.430 (0.101)***	0.131 (0.026)***	0.819 (0.105)***
$ComCount_{ij}$	0.825 (0.121)***	0.213 (0.020)***	1.379 (0.168)***	0.884 (0.121)***	0.222 (0.018)***	1.383 (0.171)***
$PTAEUROPEBoth_{ijt}$	-0.727 (0.074)***	-0.280 (0.029)***	0.616 (0.081)***	-0.673 (0.074)***	-0.259 (0.029)***	0.334 (0.078)***
$PTAASIABoth_{ijt}$	-0.034 (0.111)	-0.012 (0.039)	0.525 (0.115)***	0.153 (0.113)	0.051 (0.036)	0.515 (0.115)***
$PTAAMERICABoth_{ijt}$	0.729 (0.076)***	0.197 (0.014)***	0.808 (0.127)***	0.587 (0.075)***	0.168 (0.016)***	0.916 (0.118)***
$PTAAFRICABoth_{ijt}$	0.143 (0.037)***	0.048 (0.012)***	0.361 (0.094)***	-0.006 (0.038)	-0.002 (0.013)	-0.103 (0.098)
$PTAOCEANIABoth_{ijt}$	1.307 (0.236)***	1.268 (0.018)***	0.380 (0.445)	1.015 (0.259)***	0.239 (0.032)***	-0.211 (0.433)
$PTAIntercontBoth_{ijt}$	0.221 (0.065)***	0.072 (0.020)***	0.067 (0.055)	0.246 (0.065)***	0.080 (0.019)***	0.136 (0.056)**
$PTAEUROPEOne_{ijt}$				0.106 (0.019)***	0.037 (0.007)***	-0.382 (0.039)***
$PTAASIAOne_{ijt}$				0.178 (0.019)***	0.060 (0.006)***	0.031 (0.035)
$PTAAMERICAOne_{ijt}$				-0.197 (0.021)***	-0.070 (0.007)***	-0.041 (0.043)
$PTAAFRICAOne_{ijt}$				-0.241 (0.019)***	-0.085 (0.007)***	-0.479 (0.054)***
$PTAOCEANIAOne_{ijt}$				-0.468 (0.050)***	-0.177 (0.020)***	-0.794 (0.167)***
$PTAIntercontOne_{ijt}$				0.034 (0.012)***	0.012 (0.004)***	-0.085 (0.019)***
$CurrencyUnion_{ijt}$	0.418 (0.098)***	0.128 (0.025)***	-0.016 (0.116)	0.318 (0.097)***	0.101 (0.027)***	-0.082 (0.114)
δ			0.933 (0.111)***			0.842 (0.112)***
$\hat{\eta}_{ij}^{*}$			0.220 (0.108)**			0.254 (0.107)***
No observat.	623,927		367,615	623,927		367,615
Pseudo R^2	0.43			0.43		

Notes:
The regressions include exporter, importer and year fixed effects.
Robust standard errors (clustering by country pair) are in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table A1: Sample of countries.

Albania	Dominica	Lebanon	Senegal
Algeria	Dominican Republic	Lesotho	Serbia and Montenegro
Angola	Ecuador	Liberia	Seychelles
Antigua and Barbuda	Egypt	Libya	Sierra Leone
Argentina	El Salvador	Lithuania	Singapore
Armenia	Equatorial Guinea	Macedonia	Slovak Republic
Australia	Eritrea	Madagascar	Slovenia
Austria	Estonia	Malawi	Solomon Islands
Azerbaijan	Ethiopia	Malaysia	Somalia
Bahamas	Fiji	Maldives	South Africa
Bahrain	Finland	Mali	Spain
Bangladesh	France	Malta	Sri Lanka
Barbados	French Polynesia	Mauritania	St. Kitts and Nevis
Belarus	Gabon	Mauritius	Sta. Lucia
Belgium-Luxembourg	Gambia	Mexico	St. Tome and Principe
Benin	Georgia	Moldova	St. Vincent and The Grenadines.
Bermudas	Germany	Mongolia	Sudan
Bhutan	Ghana	Morocco	Suriname
Bolivia	Greece	Mozambique	Swaziland
Bosnia and Herzegovina	Grenada	Myanmar	Sweden
Botswana	Guatemala	Namibia	Switzerland
Brazil	Guinea	Nepal	Syria
Bulgaria	Guinea Bissau	Netherlands	Tajikistan
Burkina Faso	Guyana	Netherlands Antilles	Tanzania
Burundi	Haiti	New Caledonia	Thailand
Cambodia	Honduras	New Zealand	Togo
Cameroon	Hungary	Nicaragua	Tonga
Canada	Iceland	Niger	Trinidad and Tobago
Cape Verde	India	Nigeria	Tunisia
Central African Republic	Indonesia	Norway	Turkey
Chad	Iran	Oman	Turkmenistan
Chile	Iraq	Pakistan	Uganda
China - Mainland	Ireland	Panama	Ukraine
China – Hong Kong	Israel	Papua New Guinea	United Arab Emirates
China – Macao	Italy	Paraguay	United Kingdom
Colombia	Jamaica	Peru	United States of America
Comoros	Japan	Philippines	Uruguay
Congo, Democratic Republic	Jordan	Poland	Uzbekistan
Congo, Republic of	Kazakhstan	Portugal	Vanuatu
Costa Rica	Kenya	Qatar	Venezuela
Croatia	Kiribati	Reunion	Vietnam
Cyprus	Korea	Romania	Yemen
Czech Republic	Kuwait	Russia	Zambia
Côte d'Ivoire	Kyrgyz Republic	Rwanda	Zimbabwe
Denmark	Laos	Samoa	
Djibouti	Latvia	Saudi Arabia	