CONTINENTAL BIAS IN TRADE

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Abstract

This paper investigates the potential existence of a *continental bias* in world trade flows. Using the Helpman, Melitz and Rubinstein two-stage estimation procedure on a sample of 182 countries over the period 1990-2006, we find evidence of an economically significant *continental bias*. A continent-by-continent analysis reveals that countries located in Asia, Oceania, America and Europe can be considered natural trading partners, whereas this is not the case for Africa. For the latter, results suggest that the relationship between inter and intra-continental trade costs is relatively low, although this fact seems to revert over the last years.

Key words: Continental bias, gravity equation, intercontinental and intra-continental trade costs.

JEL Classification numbers: F14.

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1. Introduction

Since the path-breaking paper by McCallum (1995), there has been a notable academic interest in researching the so-called *border effect*, that is, the negative impact of national borders on trade flows. Using the gravity equation, McCallum found that trade among Canadian provinces exceeded province's trade with US states by more than a factor of 20. Subsequent studies have investigated the size of the *home bias* across space and time, documenting that international borders strongly diminish trade. Among the likely causes of the *border effect* are national trade barriers (tariffs, quotas, exchange rate variability, regulatory differences, etc.), as they generate additional transaction costs for inter- versus intra-national shipments.[1]

The goal of this paper is to investigate the possible existence of a *continental bias* in trade, in a similar fashion to the *home bias*, based on differences in trade costs between and within continents. These differences have been considered by the economic geography literature in the context of the theoretical welfare analysis of preferential trade agreements (PTAs). In particular, the relationship between intra-continental and intercontinental trade costs is a central element of the hypothesis of "natural" trading partners with clear welfare implications.[2] With zero intercontinental transport costs, continental PTAs decrease welfare (Krugman, 1991a). With prohibitive intercontinental transport costs, such agreements increase welfare (Krugman, 1991b). However, in the intermediate realistic case where intercontinental transportation costs are neither zero nor prohibitive (but greater than transportation costs within continents) the relationship between intercontinental and intra-continental transportation costs determines the net impact of PTAs on welfare (Frankel, Stein and Wei, 1993, 1995 and 1996). If there is a positive *continental bias* in trade, countries located on the same continent can be considered "natural" trading partners and therefore preferential trade

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[1] Despite technological progress in transport and communications and negotiated reductions in trade barriers, market segmentation continues to exist and political boundaries shape the geographical pattern of trade. See, among others, Helliwell (1996, 1997, 1998), Wei (1996), Anderson and Smith (1999a, 1999b), Nitsch (2000), Head and Mayer (2000), Helliwell and Verdier (2000), Hillberry (2002), Anderson and van Wincoop (2003), Evans (2003), Okubo (2003), and Chen (2004), Gil *et al* (2005), Gil, Llorca and Martínez-Serrano (2006).

[2] 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).

agreements among them are more likely to be welfare-improving.[3] On the contrary, the evidence of a negative *continental bias* in trade would suggest that continental preferential agreements may be welfare decreasing. Continental trading blocs that reduce welfare are called "super-natural".[4]

In particular, this paper aims at answering two main questions. First, all other things equal, countries on the same continent trade more with each other than countries located on different continents? That is, is there *a continental bias* in trade? Second, are there differences in the size and sign of the *continental bias* across continents? To the best of our knowledge, there is no study in the literature that has tried to investigate the possible existence of a *continental bias* in trade.[5]

In order to explore *continental bias* in trade we estimate gravity equations following the two-stage estimation procedure recently proposed by Helpman, Melitz and Rubinstein (2008). This framework allows us to correct for selection bias and to account for exporter heterogeneity. The sample covers 182 countries over the period 1990-2006.

To preview our results, we find a positive *continental bias* for Asia, Oceania, America and Europe. Africa is a peculiar case. The results for the African continent reveal a negative continental bias suggesting that intra-continental trade costs are not relatively lower than intercontinental ones. However, some changes are observed over time if the analysis is carried out by sub-periods.

The paper is structured as follows. Section 2 presents the methodology. Section 3 describes the data. Section 4 discusses the estimation results. Finally, section 5 concludes the paper.

2. Methodology

[3] The term natural trading partner goes beyond pure distance arguments and, therefore, by transport costs we refer to any kind of trade costs.

[4] 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 costs within them. According to these authors the term "super-natural" refers to a continental PTA that is welfare-reducing on net due to relatively low intercontinental transportation costs.

[5] Frankel, Stein and Wei (1993) also draw the boundaries at continental bloc level, but they do not consider all the countries in each continent. In their paper the continents are The Americas (including only 13 countries), the European Community (11 countries) and East Asia (10 countries).

The gravity equation of trade is considered to be one of the most successful empirical frameworks in international economics. It relates bilateral trade flows to economic size (GDP), distance and other factors that affect trade barriers. [6] In particular, the literature on the *border effect* has made use of the gravity equation to estimate the size of the *home bias* in trade. In this paper, we also use that methodology to assess the existence and magnitude of the *continental bias*.

The typical gravity equation estimated in the *border effect* literature can be written as follows:[7]

$$\ln Trade_{ij} = \beta_0 + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln Dist_{ij} + \beta_4 Home_{ij} + Othercontrols + u_{ij} \quad (1)$$

where $Trade_{ij}$ is the bilateral trade flow from i to j, GDP_i and GDP_j are the gross domestic products, $Dist_{ij}$ denotes the distance between i and j, $Home_{ij}$ is a dummy variable that takes the value of one for trade flows within countries and zero otherwise, and *Othercontrols* are a set of variables that are included to capture variation in various trade costs, such as binary variables for the presence of a land border, a common language or being a member of the same trade agreement. In this set-up, the *border effect* is measured by the estimated coefficient of the dummy variable *Home*.

Despite being used in many studies on the *border effect*, equation (1) is likely to be mis-specified owing to ignoring theoretical foundations for the gravity equation. As Anderson and van Wincoop (2003) emphasize (in the context of the *border effect* literature) the gravity model theory implies that one must take into account the role of relative prices ("multilateral resistance", in Anderson and van Wincoop terminology).[8] The usual solution to the presence of such multilateral resistance is to include country

[6] Initially the gravity model lacked theoretical foundation. However, since the end of the 1970´s the situation has changed and nowadays the gravity model is backed up by sound theory. See, among others, Anderson (1979), Bergstrand (1985 and 1989), Deardoff (1998), Evenett and Keller (2002), and Anderson and van Wincoop (2003).

[7] In the equations we have omitted the subscript "t" referring to time for simplicity.

[8] While the methodological contribution of Anderson and van Wincoop (2003) is made trying to provide a "solution" to the border puzzle, it is indeed important for the proper estimation of gravity equations in other applications of the international trade literature.

fixed effects (for both the exporter and the importer countries) when estimating gravity equations.[9]

More recently, Helpman, Melitz and Rubinstein (2008) (henceforth HMR) have developed a theoretical model that generalizes the Anderson and van Wincoop (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:

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

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.[10] We include in X_{ij} the log of bilateral distance between countries as well as

[9] 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).

[10] 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.

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 preferential trade agreement. Finally, in order to estimate the *continental bias* we additionally include a dummy variable (*SameCont*) that takes the value of one for trade flows between countries located on the same continent and zero otherwise. If the fact that two countries belong to the same continent increases the probability of trade between them, the estimated coefficient should be positive and statistically significant.

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:

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

(3)

where $\bar{\eta}^*_{ij}$ is the inverse Mills ratio and $\hat{z}^*_{ij} = \Phi^{-1}(\hat{\rho}_{ij})$ in which $\hat{\rho}_{ij}$ are the estimates from the probit equation.[11] If the trading relations between countries on the same continent are stronger than those between countries located on different continents, then the estimated coefficient of *SameCont* would be positive and statistically significant.

3. Data

The trade data for the dependent variable (export flows from country *i* to country *j*) come from the "Direction of Trade" (DoT) dataset built up by the International Monetary Fund (IMF). The data comprise bilateral merchandise trade between 182 countries and territories (see Table A1) over the period 1990-2006. [12] The DoT dataset provides FOB exports in US dollars. These series are converted into constant terms

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

[12] 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.

using the American GDP deflator taken from the Bureau of Economic Analysis (US Department of Commerce).

The independent variables come from different sources. GDP data in constant US dollars are taken from the World Development Indicators (World Bank). When data were unavailable from this source, the Penn World Table (University of Pennsylvania) and International Financial Statistics (IMF) were used. For location of countries (geographical coordinates), 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. The indicators of preferential trade agreements, have been built using 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).[13]

4. Empirical results

We begin by estimating the *continental bias* in trade without taking into account the existence of preferential trade agreements. 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.[14] Before discussing the empirical results, it is worth noting that the estimation of equation (2) might be subject to the incidental parameter problem and introduce a bias in the coefficients of the rest of variables (X_{ij} and Z_{ij}). However, as pointed out by Fernández-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

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[13] The list of preferential trade agreements considered is available from the authors upon request. The expression PTAs in this paper refers also to other agreements involving a higher degree of economic integration. In fact, most economic integration agreements considered in the sample are free trade agreements.

[14] 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 $\hat{\rho}^*_{ij} > 0.9999999$.

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, colonial ties and being islands or part of the same country in the past increase the probability of trade.

In the gravity equation framework, if there was nothing to the notion of *continental bias*, then a dummy variable capturing whether two countries are both located on the same continent ought not to be statistically significant. However, as we show in this paper, this is not the case. In column 1, the estimated coefficient of the variable of interest is positive and statistically significant suggesting that being on the same continent raises the probability of bilateral trade.

Using the probit regression, as explained before, we construct two variables for correcting sample selection bias and firm heterogeneity. Both the non-linear coefficient δ and the linear coefficient for $\bar{\eta}^*_{ij}$ are precisely estimated. 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 the same determinants that affect the probability of bilateral exports also impact bilateral export volumes. At this stage, we once again find a positive and significant coefficient for the *continental bias* dummy variable. In particular, the estimated coefficient is 0.293 which suggests that two countries located on the same continent trade approximately 34% more than two identical countries located on different continents.

As an important feature of the recent wave of economic integration among countries has been the proliferation of preferential trade agreements along continental lines, trade policy may contribute to the existence of a *border effect* at the continental level. Therefore, in columns (3) and (4) we control for the existence of PTAs around the world. Somewhat surprisingly, despite the estimated coefficient of PTAs being positive and statistically significant, the inclusion of this variable has little effect on the magnitude of the coefficient of interest. Therefore, other factors different from preferential trade agreements are behind the *continental bias*.

In order to analyze the evolution of the *continental bias* across time we have split the sample period into two sub-periods 1990-98 and 1999-2006. Results are reported in Table 2. From this analysis, some differences emerge with respect to the estimated coefficients of the variable of interest in both stages. Being part of the same continent affects much more the probability of trading for the sub-period 1990-1998 than in the early 2000s. On the contrary, once countries trade the estimated coefficient for *continental bias* for the sub-period 1999-2006 doubles that for the first sub-period, suggesting a deepening in the process of regionalization.

We now turn to the analysis of *continental bias* by continent. To do so, the *SameCont* dummy variable is replaced by continent-specific dummies so that five coefficients (one for each continent) are estimated. The results are reported in Table 3. Column (1) and (2) present the results for the full sample period (1990-2006). On the one hand, the first stage estimation reveals that for Africa, America and Oceania the probability of trade between a pair of countries within these continents is positive, whereas this is not the case for Asia and Europe. For Asia the coefficient is negative although it is not statistically significant at conventional levels. For Europe the estimated coefficient is negative and statistically significant at the 1 per cent level. The result for Europe suggests that countries in this continent are relatively more open to the rest of the world than countries in the other continents.

On the other hand, the second stage results indicate that with the exception of Africa, every continent presents positive and statistically significant coefficients at the 1 per cent level except for Oceania (at the 10 per cent level). In particular, the point estimate of 0.658 for Asia (column 2) implies that when two countries of a pair belong to that continent, they trade 93 per cent as much [exp(0.658)-1=0.931] as would two other similar countries. The estimates for The Americas show that when two countries are both in the Western Hemisphere, their bilateral trade is 51 per cent [exp(0.414)-1=0.513] higher than it would be otherwise. A similar result is found for Oceania [exp(0.430)-1=0.537]. Finally, Europe shows the smaller *continental bias* [exp(0.244)-1=0.276]. Thus, in these four continents, the relationship between intra-continental trade costs versus intercontinental trade costs favours trade along continental lines. This suggests that countries in these continents can be considered natural trading partners. However, for Africa the coefficient for *continental bias* is -0.112 and is statistically significant at the 10 per cent level. In this case, the result suggests that intercontinental transportation costs, while not necessarily as low as intra-continental costs, are relatively low. This evidence may be explained by several factors, such as, little complementarities and high trading costs among African economies, unfavourable geographical conditions, inappropriate transport policies or poor transport facilities (Yang and Gupta, 2005).

Taking together the results of the two stages of the estimation procedure, we find that countries in the Old Continent have a greater probability of engaging in trade with countries in other continents than countries in Africa, America and Oceania. However, once trade takes place within European countries they also show a *continental bias* in trade as show countries in Asia, America and Oceania. In other words, these four continents display a positive *continental bias* in trade. However, Africa is clearly a peculiar case, being the estimated coefficient of the variable of interest negative.

When we split the whole sample period into two sub-periods (1990-98 and 1999-2006), the most relevant change relates to Africa. The corresponding coefficient is negative and significant (at the 1 per cent level) in the period 1990-98. However, for the period 1999-2006, the coefficient is not statistically significant at conventional levels. This result suggests a slight process of regionalization in international trade in this continent. Behind it there could be improvements in infrastructure and trade facilitation in recent years.

Conclusions

The recent literature about the welfare implications of PTAs clearly shows the relevance of the relationship between inter and intra-continental transportation costs. In this literature, natural trading partners are those located in the same continent whereas unnatural partners are those located on different continents. Moreover, to the extent that intercontinental costs were sufficiently low, natural partners may become "super-natural" making the corresponding PTAs welfare decreasing.

In this paper, we account for recent developments in the theoretical foundations of the gravity equation to estimate for the first time the possible existence of *continental bias* in trade. Using a two-stage estimation procedure on a sample of 182 countries over the period 1990-2006 we find a positive *continental bias* for the cases of Asia, Oceania, America and Europe. Thus, countries on these continents can be considered natural trading partners. Africa is a peculiar case. This continent shows a negative *continental bias* over the full sample period considered. This is probably a consequence of the high intra-continental trade costs in this continent that may be an obstacle to mutually beneficial intra-continental trade flows. However, some differences are observed if the analysis is carried out by sub-periods. In the 1990s, the results reveal the existence of a highly negative *continental bias* in Africa. Notwithstanding, it seems that changes in this respect have occurred over the first few years of the 21st century, where there is no evidence of continental bias in Africa.

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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	

Table 1. HMR two-stage estimation of *continental bias*. Sample period 1990-2006

	(1)		(2)	(3)		(4)
Variables	Probit coefficient	Marginal effect	ML	Probit coefficient	Marginal effect	ML
Ln $Dist_{ij}$	-0.656 (0.014)***	-0.214 (0.005)***	-0.630 (0.046)***	-0.629 (0.015)***	-0.205 (0.005)***	-0.612 (0.043)***
$Contiguity_{ij}$	0.253 (0.077)***	0.076 (0.021)***	0.767 (0.080)***	0.202 (0.077)***	0.062 (0.022)***	0.742 (0.079)***
$Island_{ij}$	0.443 (0.035)***	0.124 (0.008)***	0.790 (0.088)***	0.442 (0.035)***	0.124 (0.008)***	0.786 (0.087)***
$Landlocked_{ij}$	-0.591 (0.035)***	-0.203 (0.012)***	-1.276 (0.081)***	-0.587 (0.034)***	-0.201 (0.012)***	-1.292 (0.080)***
$Language_{ij}$	0.407 (0.020)***	0.120 (0.005)***		0.399 (0.020)***	0.117 (0.005)***	
$Colony_{ij}$	0.231 (0.113)**	0.069 (0.031)**	0.842 (0.092)***	0.243 (0.114)**	0.073 (0.031)**	0.868 (0.092)***
$ComCount_{ij}$	0.967 (0.119)***	0.209 (0.013)***	1.415 (0.159)***	0.891 (0.119)***	0.199 (0.015)***	1.328 (0.156)***
$PTAS_{ijt}$				0.190 (0.031)***	0.062 (0.010)***	0.185 (0.037)***
$SameCont_{ij}$	0.070 (0.020)***	0.023 (0.006)***	0.293 (0.039)***	0.064 (0.020)***	0.020 (0.006)***	0.267 (0.039)***
δ			1.009 (0.073)***			0.967 (0.071)***
$\hat{\eta}^{*}_{ij}$			0.334 (0.072)***			0.318 (0.069)***
No observat.	419,749		255,212	419,749		255,212
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 bias*. Sample periods 1990-1998 and 1999-2006

	1990-1998			1999-2006		
	(1)		(2)	(3)		(4)
Variables	Probit coefficient	Marginal effect	ML	Probit coefficient	Marginal effect	ML
Ln $Dist_{ij}$	-0.654 (0.017)***	-0.232 (0.006)***	-0.640 (0.043)***	-0.640 (0.017)***	-0.183 (0.005)***	-0.600 (0.046)***
$Contiguity_{ij}$	0.217 (0.083)***	0.072 (0.026)***	0.682 (0.086)***	0.145 (0.092)	0.039 (0.023)*	0.832 (0.082)***
$Island_{ij}$	0.532 (0.042)***	0.162 (0.010)***	0.891 (0.097)***	0.390 (0.038)***	0.095 (0.008)***	0.708 (0.088)***
$Landlocked_{ij}$	-0.668 (0.043)***	-0.246 (0.016)***	-1.401 (0.091)***	-0.551 (0.038)***	-0.168 (0.012)***	-1.223 (0.079)***
$Language_{ij}$	0.454 (0.023)***	0.147 (0.007)***		0.371 (0.023)***	0.094 (0.005)***	
$Colony_{ij}$	0.498 (0.135)***	0.151 (0.033)***	0.708 (0.098)***	0.061 (0.121)	0.017 (0.033)	0.969 (0.095)***
$ComCount_{ij}$	0.997 (0.122)***	0.245 (0.016)***	1.578 (0.170)***	0.877 (0.151)***	0.163 (0.015)***	1.184 (0.161)***
$PTAS_{ijt}$	0.273 (0.040)***	0.033 (0.008)***	0.252 (0.050)***	0.154 (0.038)***	0.044 (0.011)***	0.166 (0.038)***
$SameCont_{ij}$	0.096 (0.024)***	0.097 (0.014)***	0.174 (0.045)***	0.043 (0.023)*	0.012 (0.007)*	0.360 (0.039)***
δ			0.909 (0.064)***			0.974 (0.075)***
$\hat{\bar{\eta}}^{*}_{ij}$			0.369 (0.062)***			0.374 (0.078)***
No observat.	209,639		119,431	210,087		135,781
Pseudo R^2	0.47			0.42		

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 3. HMR two-stage estimation of *continental bias* by continent. Sample period 1990-2006

	1990-2006			1990-1998			1999-2006		
	(1)		(2)	(3)		(4)	(5)		(6)
Variables	Probit coefficient	Marginal effect	ML	Probit coefficient	Marginal effect	ML	Probit coefficient	Marginal effect	ML
Ln $Dist_{ij}$	-0.548 (0.017)***	-0.179 (0.005)***	-0.582 (0.044)***	-0.572 (0.020)***	-0.203 (0.007)***	-0.606 (0.044)***	-0.555 (0.020)***	-0.160 (0.006)***	-0.570 (0.047)***
$Contiguity_{ij}$	0.320 (0.077)***	0.094 (0.020)***	0.732 (0.080)***	0.335 (0.084)***	0.109 (0.024)***	0.666 (0.087)***	0.266 (0.091)***	0.068 (0.021)***	0.832 (0.083)***
$Island_{ij}$	0.413 (0.036)***	0.118 (0.009)***	0.718 (0.090)***	0.497 (0.043)***	0.154 (0.011)***	0.832 (0.099)***	0.366 (0.039)***	0.091 (0.008)***	0.628 (0.089)***
$Landlocked_{ij}$	-0.596 (0.034)***	-0.205 (0.012)***	-1.236 (0.081)***	-0.672 (0.043)***	-0.248 (0.016)***	-1.331 (0.091)***	-0.562 (0.037)***	-0.173 (0.012)***	-1.178 (0.080)***
$Language_{ij}$	0.397 (0.020)***	0.118 (0.005)***		0.457 (0.023)***	0.148 (0.007)***		0.369 (0.023)***	0.094 (0.005)***	
$Colony_{ij}$	0.238 (0.112)**	0.072 (0.031)**	0.822 (0.091)***	0.488 (0.176)***	0.150 (0.044)***	0.633 (0.097)***	0.064 (0.121)	0.018 (0.033)	0.940 (0.093)***
$ComCount_{ij}$	0.932 (0.116)***	0.206 (0.014)***	1.255 (0.161)***	1.034 (0.120)***	0.252 (0.016)***	1.468 (0.176)***	0.908 (0.145)***	0.167 (0.014)***	1.126 (0.165)***
$PTAS_{ijt}$	0.218 (0.032)***	0.071 (0.010)***	0.226 (0.039)***	0.320 (0.042)***	0.114 (0.015)***	0.347 (0.052)***	0.174 (0.038)***	0.050 (0.011)***	0.189 (0.040)***
$Africa_{ij}$	0.105 (0.028)***	0.033 (0.009)***	-0.112 (0.065)*	0.085 (0.035)***	0.029 (0.012)***	-0.261 (0.079)***	0.120 (0.032)***	0.033 (0.008)***	0.013 (0.065)
$America_{ij}$	0.503 (0.045)***	0.138 (0.010)***	0.414 (0.087)***	0.537 (0.053)***	0.164 (0.013)***	0.384 (0.095)***	0.501 (0.054)***	0.117 (0.010)***	0.460 (0.092)***
$Asia_{ij}$	-0.040 (0.041)	-0.013 (0.014)	0.658 (0.072)***	0.072 (0.047)	0.025 (0.016)	0.679 (0.080)***	-0.148 (0.047)***	-0.045 (0.015)***	0.669 (0.074)***
$Europe_{ij}$	-0.187 (0.043)***	-0.064 (0.016)***	0.244 (0.055)***	-0.205 (0.057)***	-0.076 (0.022)***	-0.021 (0.064)	-0.136 (0.052)***	-0.041 (0.016)***	0.427 (0.057)***
$Oceania_{ij}$	1.082 (0.124)***	0.222 (0.012)***	0.430 (0.259)*	1.131 (0.134)***	0.267 (0.014)***	0.170 (0.261)	1.050 (0.154)***	0.179 (0.011)***	0.729 (0.277)**
δ			1.040 (0.078)***			1.001 (0.070)***			1.031 (0.082)***
η^*_{ij}			0.320 (0.077)***			0.395 (0.069)***			0.353 (0.085)***
No observat.	419,749		255,212	209,639		119,431	210,087		135,781
Pseudo R^2	0.44			0.47			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%.