The Limits to Integration

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MoFiR working paper n° 20

March 2009

This draft: March 11, 2009

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Abstract

Distance and national borders are a big hurdle to the expansion of cross-border trade. Further constraints on integration come from heterogeneity in culture and institutions and from the forces of geography, defined as continents and oceans. Of the three sets of factors, the forces of geography are the most potent on integration. Continents act as 'natural' integrators and oceans as common water border. Countries in the same continent trade a quarter more than those located in different continents; and countries sharing the same ocean trade a half more than those that do not have a common water border. A certain degree of substitution exists between the effects on trade of continents and regional trade agreements (RTAs). This substitution is most evident in the presence of political blocs like the Soviet Union. With an active political bloc, the continent loses some of its integration property, leaving more room for the sub-continental RTA to enhance trade. When the political bloc withers away, on the other hand, the continent rises as an integration force relative to the RTA.

Keywords: integration, continental blocs, culture, geography, institutions, regional trade agreements.
JEL Classification: F13, F15, F18.

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The Limits of Integration

I. Introduction

According to much of the academic, business and policy communities, globalization appears to best describe today's economic environment in the world. In a loose sense, globalization means that international trade is not choked by man-made restrictions and that most countries exploit and gain from cross-border transactions. In a strict sense, globalization implies that transactions among residents of distant countries are just as likely and intense as transactions among residents of neighboring countries or among residents of communities located inside a country. The facts are clearly more consistent with the loose concept of globalization than with the strict one. International trade is far from being perfectly globalized. Consumption retains a strong domestic bias and multinational corporations, the big engine of much trade and foreign direct investment, do not have a global reach, but rather focus their activities within an area surrounding the home market; see, for example, Rugman (2005), Fratianni (2006) and Fratianni and Oh (2009 forthcoming). Using the looser perspective, it is better to characterize economic environments by degrees of globalization. Even a cursory reading of history suggests that globalization is not a constant but a time seires with its ups and downs; see Findlay and O'Rourke (2007). Globalization rises in times of relative peace, especially if peace is "enforced" by a hegemonic power. During the *Pax Romana* of the first and second century AD trade in goods but also movements of factors –predominantly slaves– thrived in the territories controlled by Rome. The Mongol Empire, between 1250 and 1350, achieved a high degree (for the time) of globalization in Euroasia. Under the British Empire in the 19th century and all the way up to WW I, international commerce and capital mobility reached a higher point. The inter-war years were instead a period of sharp de-globalization. Globalization resumed after WWII, under the *Pax Americana*, and climbed to even higher grounds in the latter part of the 20th century and the first few years of the 21st century. From 1980 to 2005, total real exports have grown considerably faster, on average, than the world real GDP.

With this background, we can now state the purpose of our paper. Given the existing regime of globalization –a regime that can be influenced by a myriad of political, economic and social factors (Findlay and O'Rourke 2007, especially ch. 10)– what are the limits to further integration? What factors, conditional on the existing trade regime, constrain the expansion of cross-border transactions: heterogeneous culture and institutions, or the forces of geography? By culture, we mean affinity due to shared values and history; a common language being the obvious example. By institutions, we mean man-made arrangements that are potentially trade enhancing; a regional trade agreement (RTA) being the obvious example. By geography, we mean the endowments of nature, such as continents and oceans.

Our main conclusion is that, while heterogeneity in culture and institutions pose limits to further integration, the forces of geography are the most potent. Continents act as 'natural' integrators and oceans as common water border. Countries in the same continent trade a quarter more than those located in different continents; and countries sharing the same ocean trade a half more than those that do not have a common water border. A certain degree of substitution exists between the effects on trade of continents and RTAs. This substitution is most evident in the presence of political blocs like the Soviet Union. With an active political bloc, the continent loses some its integration property, leaving more room for the sub-continental RTA to enhance trade. When the political bloc withers away, on the other hand, the continent rises as an integration force relative to the RTA.

The rest of the paper is organized in five sections. We begin by discussing the significance of geography, culture and institutions in international trade in Section II. In Section III, we develop the gravity equation methodology, which is the engine of our empirical work. Section IV is devoted to data. Findings are analyzed in Section V. Conclusions are drawn in the last section.

II. Trade costs, culture, geography and institutions

In the literature on international trade, transportation costs are the most important trade-reducing factor. Krugman (1980), the leader of the 'new economic geography,' develops a monopolistic competition model with economies of scale in production, zero costs of product differentiation, and 'iceberg-type' transportation costs. In this model, there are two incentives for production agglomeration. The first is that concentration achieves production scale economies. The second is that transportation costs are minimized by the firm locating near the largest market. The upshot is that countries with dissimilar tastes will specialize in industries with relatively larger domestic market and that a country will be a net exporter of the product in which it specializes. Relaxing the assumption of symmetry between countries (and firms), the core-periphery model can be extended to heterogeneous areas (Krugman 1991).[1] The interaction of transportation costs with scale economies in production remains critical. For Summers (1991), geographical proximity is the dominant explanation for the high concentration ratios in trade. Not surprisingly, geography, transportation costs, and agglomeration play a key role in many international trade models; see, for example, Venables (1996, 2005) and Martin and Ottaviano (2001).

Despite their importance, it is difficult to measure directly transportation costs (Hummels 2001). A popular proxy of such costs is the physical distance separating trade partners. But while it is true that transportation costs rise with distance, there are other unobservable trade costs (TC) that are affected by distance, such as cultural affinities and common institutions. A common language is the obvious example of cultural affinity. It is trade enhancing because it fosters "a greater sharing of literature, radio and television communications, and even educational exchanges, and with all of

[1] The core-periphery model features a sector, agriculture, with constant returns to scale and an immobile factor of production, land, and another sector, manufacturing, with increasing returns to scale and a mobile factor, labor. Pecuniary spillovers trigger a "circular causation" process whereby manufacturing tends to concentrate in locations with large markets that, in turn, lead to more concentration because those locations enjoy lower effective prices and attract mobile labor. The outcome is the endogenous formation of a richer industrial core and a poorer agricultural periphery, or more generally regional economic differences. The income differences result from differences in prices, with workers in the core enjoying higher real wages than in the periphery. Agglomeration accentuates as transportation costs decline, giving more incentive to footloose manufacturing to relocate.

these come grater knowledge of institutions, networks and individuals of a sort likely to forge tighter economic ties" (Helliwell 1997, p. 175). Hutchinson (2002) finds a strong impact of language on trade, in particular when the second language is English. Melitz (2008) refines the use of a common language by distinguishing between ease to communicate through translation and outright ability to communicate directly. While the latter appears to be the more cost-reducing and thus more trade enhancing, the former plays a role as well. In fact, both of them do better in explaining bilateral trade than either. Shared religion, like language, is a type of cultural affinity that tends to boost trade (Kang and Fratianni 2006).

Beyond language and religion, countries with common colonial roots trade with each other more than twice as much as countries without such roots (Rauch 1999). Immigration is a vehicle to foster affinities and consequently trade between the host and the home country (Gould 1994; Head and Ries 1998). Diasporas are diffused migrations from the ancestral homeland and can generate efficient information networks: Rauch and Trindade (2001) find that the presence of Chinese communities in Southeast Asian countries raises bilateral trade flows of differentiated products by approximately 60 percent.

The same principle works for common institutions. For example, national borders –a discrete jump in common institutions (e.g., legal systems)– are a big impediment to trade. The economic size of the national border is at center stage in McCallum (1995), who applied a simple gravity equation (GE) to 1988 exports and imports among ten Canadian provinces and thirty U.S. states, coding a dummy variable equal to one for inter-provincial trade and zero for province-to-state trade. The point estimate of the dummy variable, the size of the border effect, is approximately 3, implying that inter-provincial trade is approximately twenty times larger than trade between provinces and states. Helliwell (1996) confirmed these findings with data for the province of Quebec, with the obvious intent of underscoring the implied trade consequences of a possible separation of this province from Canada. Anderson and van Wincoop (2003) criticized McCallum's findings of very thick borders for ignoring the asymmetric impact on trade of barriers between

small and large economies and multilateral protection levels. They re-estimated the gravity equation, using McCallum's exact specification and data, alternatively from the viewpoint of Canada and the United States, and found that the border from the Canadian viewpoint is ten times as wide as from the viewpoint of the United States. Since Canada's economy is approximately one-tenth of the United States', the level of protection imbedded in a border is a positive function of the size of the economy. Using a GE specification that imbeds multilateral resistance factors, Anderson and van Wincoop (2003) arrive at an estimate that national borders reduce trade in the range of 20 to 50 percent; much smaller than McCallum's but still sizeable.

Money is a cost-reducing institution. Countries that share the same money are expected to trade more than countries that have different monies. Rose (2000) and Frankel and Rose (2002) have questioned the traditional direction of causality from "real" integration to monetary integration and have proposed instead the opposite hypothesis of monetary unification enhancing economic integration, not only through a higher degree of price transparency and lower transaction costs, but also through more predictable costs and product differentiation. Rose (2000) found that countries that share the same money trade 235 per cent more than countries that do not share the same currency; see also Rose and van Wincoop (2001) and Frankel and Rose (2002). This finding is controversial, not so much on the 'quality' of the prediction as to its extremely large quantitative impact on bilateral trade. Furthermore, monetary unions are not driven exclusively by trade consideration, as the history of monetary unification well attests.

In addition to national borders, we have regional borders defined by RTAs. The latter, while they have existed since the middle of the 19th century as an offspring of colonialism, have proliferated over the last two decades; see, for example, Panagariya (2000) and Fratianni and Pattison (2001).[2] The traditional question is whether RTAs are "building" or "stumbling" blocs,

[2] RTAs stand in contrast to the principle of non-discriminatory trade policy adopted by the GATT/WTO system. The latter, however, accepts three alternative forms of trade preferences: one-way trade preferences from developed to developing countries; the so-called Enabling Clause granting developing countries partial preferences across a range of goods; Article XXIV of GATT on free trade areas (e.g., the EU and NAFTA) and monetary unions (e.g., EU countries participating in the European Monetary Union).

where "building" refers to the case of expanding world trade and "stumbling" to the case of contracting world trade (Bhagwati 1991; Panagariya 2000, Section 7).[3] Baier and Bergstrand (2007) find that bilateral trade between members of the same RTA doubles, on average, after a 10-year period from RTA creation. This finding, in itself, has little to say about the impact of RTAs on trade between members and nonmembers and trade among nonmembers. The new question is whether larger internal markets resulting from expanding RTAs may make it easier to implement beyond-the-border liberalization programs, as the European Union did in the 1980s with its internal market initiative. Trade creation rises, but trade diversion may rise as well. Since larger RTAs tend to have a higher ratio of internal trade to GDP than smaller RTAs, the pressure to liberalize trade with non-members may decline. On this issue, Fratianni and Oh (2009 forthcoming) arrive at two conclusions: "the macro conclusion is that RTAs have produced a mixed record with respect to the important issue of whether they enhance or hamper freer trade in the world[; t]he micro conclusion is that the RTA environment has fostered a regionalization strategy of MNEs [multinational enterprises]." (p....).

An interesting aspect of research on RTAs is the link between their numbers and welfare. In Krugman's (1993) model of RTAs welfare is highest at the extremes of one RTA and many RTAs and is lowest with a few RTAs, that is welfare is described by a U-shaped function of the number of RTAs. This outcome is due to the power of blocs to change terms of trade in their favor, a power that is irrelevant when the bloc is the world and zero when the bloc is small; on the other hand, large blocs can effectively discriminate against outside members.[4] The ability to discriminate is a

[3] A pure building bloc occurs when RTA members' trade with one another in excess of the trade flows implied by a reference model and without any reduction of trade flows between members and non-members, again beyond the trade flows implied by a reference model. This corresponds to the case of trade creation without trade diversion in Viner's (1950) classic study of customs unions. If trade diversion occurs, the RTA expands world trade only if trade creation exceeds trade diversion; we may call it a weak building bloc. If trade diversion fully offsets trade creation, the RTA fully reallocates trade from outsiders to insiders; we may call it a weak stumbling bloc. If trade diversion more than fully offsets trade creation, the RTA is a pure stumbling bloc.

[4] A single bloc maximizes welfare of each country because it is equivalent to worldwide free trade. With two equal-sized blocs, each country trades more within the bloc at the expense of trade with countries from the other bloc. With no trade creation to offset this trade diversion, welfare declines. By adding a third bloc one

function of transport costs. The higher those costs between bloc and non-bloc members, the less is trade diversion. Under the limiting assumption that intercontinental transport costs are infinite relative to intra-continental ones, one arrives at the intuitive result that that the continent is an optimal RTA, call it a natural continental bloc. But natural continental blocs can occur even in less extreme situations, an issue that is explored by Frankel, Stein, and Wei (1995) who find that for a relatively small values of intercontinental transport costs the creation a natural RTA improves welfare.[5] On the other hand, unnatural RTAs –defined when one country from one continent creates an RTA with a country from another continent– lower welfare for small values of intercontinental costs.[6] The point is that the geography of importer and exporter countries is quite relevant. Recent work has shown a renewed interest on the geography of trade. For example, the latitude of a country --by influencing the length of daylight, strength of sunlight, temperatures and seasons-- can also influence differences in factor endowment and, hence, opportunities for profitable trade; for example, Melitz (2007) shows that differences between North and South promote international trade. In addition, large historical evidence underscores the importance of seas and oceans in trade. The economic fortunes of medieval Italian city-states like Venice and Genoa, Antwerp in the first half of the 16th century, and Amsterdam and London for much of the 18th century were derived to no small degree from being maritime trade powers (Braudel 1992; Kindleberger 1996). The strong trade orientation of Western Europe cannot be divorced from being located on the western rim of Eurasia and being in a position to exploit "the favourable winds and currents" of the Atlantic ocean; see Fernández-Armesto (2006), cited in Findlay and O'Rourke (2007, pp. 360-1). The strong economic growth of Chinese coastal provinces and Indian southern states are modern examples of

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generates trade creation as well as trade diversion. The former comes from the decline in trade with countries that have moved out to create the new bloc. The latter comes from an expansion of trade with countries that were already outside the bloc and thus subject to an external tariff. The net effect on welfare is ambiguous. As the number of blocs grows, the representative bloc becomes smaller and most of its trade occurs with outside countries. This expansion of trade dominates the contraction of trade with countries that moved out to create new blocs. The net effect is a rise in welfare.

[5] The range of transport costs is comprised between 0 and 1. A natural continental bloc occurs with costs starting at 0.15; see their Fig 2.

[6] Frankel et al (1996) carry out several other interesting simulations, which are beyond the focus of this paper.

the advantages derived from having ready access to land or sea routes (Venables 2005, p. 3). Conversely, being landlocked implies high transportation costs: Raballand (2003), for example, finds that landlocked countries trade 80 percent less than open countries. In contrast, Panagariya (1998) rejects the notion that one should emphasize transport costs over other types of costs, and, like Bhagwati, "the overall impact of PTAs [Preferential Trade Agreements] is harmful" (p. 298); see also Bhagwati and Panagariya (1996).

In the rest of the paper we test what are the limits to integration. Our main finding is that culture, geography, and institutions matter but geography matters the most. Our research strategy is to estimate GE using bilateral trade flows between 141 countries and compare the relevant strengths of culture, geography and institutions as trade-enhancing factors. Continental perimeters act like a super-border that hinders inter-continental transactions, while facilitating intra-continental ones. On the contrary, oceans are viewed as common water borders similar to common land borders.

II. The Gravity Equation Model

The GE is the workhorse of empirical analysis in international trade. It is typically used to explain cross-sectional variation in country pairs' trade flows in terms of the countries' incomes, bilateral distance, and dummy variables for trade-enhancing factors. There is an obvious parallelism between GE used in physics and GE used in international trade: countries' incomes act as centripetal forces and physical distance separating the countries as a centrifugal force. However, unlike Newton's universal gravity constant, in the trade GE there is an "un-constant" due to different forces at work.

Considerable advances have occurred in the last three decades in providing a respectable theoretical foundation to the GE. Here, we shall mention only a few references.[7] At the end of the seventies, Anderson (1979), relying on the assumption of goods differentiated by country of origin and complete specialization (Armington 1969), derives a simple GE from a linear expenditure system in which the preferences for a country's good are assumed to be homothetic and uniform

[7] See Fratianni (2009) for the development of the GE in international trade.

across importing countries. A few years later, Bergstrand (1985), also starting from complete specialization and identical consumers' preferences, develops what he calls a generalized GE that includes distance, as proxy for shipping costs, and price terms. Helpman (1987), drawing on his work with Krugman (Helpman and Krugman 1985, ch. 8), generates a GE that addresses the important issue of intra-industry trade, the key testable implication being that intra-industry trade responds positively, not only to the level of aggregate income, but also to the degree of income similarity among trading partners. Deardorff (1998) shows that the GE can be derived from several models. Finally, Anderson and van Wincoop (2003) address the problem of "multilateral resistance": bilateral trade flows are influenced, not only by what goes on between a given country pair, but also by the interaction of a given country with the rest of the world. More specifically, general-equilibrium considerations dictate that trade flows from region *i* to region *j* depend, among other factors, not only on bilateral TCs but also on multilateral ones. When multilateral costs rise relative to bilateral costs, trade flows rise between *i* and *j*. These authors derive the following operational GE (see their equation 13):

$$x_{ij} = \frac{y_i \cdot y_j}{y^W}\left(\frac{t_{ij}}{P_i \cdot P_j}\right)^{1-\sigma}, \tag{1}$$

where x = exports from i to j, y = nominal income, t = bilateral TC factor, P = multilateral TC factor (i.e., consumer price index), σ = elasticity of substitution among goods, and i, j, and W indicate, respectively, exporter country, importer country and the world. Assuming that t_{ij} is a function of bilateral distance and one plus the tariff-equivalent bilateral border barrier, Anderson and van Wincoop estimate with nonlinear least squares a simultaneous system of equations on cross-section data. Their main result is that borders reduce trade in the range of 20 to 50 percent, that is much less than the border found by McCallum.

However, the estimation procedure of Anderson and van Wincoop is rather cumbersome and other authors have sought simpler alternatives. Baier and Bergstrand (2009) obtain virtually identical results with *bonus vetus* (good old) OLS using a first-order log-linear Taylor series

expansion to approximate multilateral resistance with appropriate exogenous variables captured by country fixed effects (FE, henceforth). Baldwin and Taglioni (2006) take a broader look at the issue and identify three common estimation errors with empirical GEs, stemming primarily from multilateral trade factors. To each error the authors assign prizes in the form of Olympic medals. The bronze medal goes for using real GDPs, as opposed to nominal GDPs. In this case, the multilateral TC factors are not well identified and the model errors fail to be orthogonal to the regressors, with the consequence that the OLS estimator is asymptotically downward biased. Further problems arise also from differences among price deflators (traded and non-traded goods) and price indices of traded goods. A more serious error, for which a silver medal is assigned, goes for employing two-way bilateral trade. Since the GE is a modified expenditure function with a market-clearing condition, the theory explains only one-way bilateral trade and not two-way trade. This error leads to an overestimate of bilateral trade and larger error variance, which is particularly severe in panel data. Finally, the gravest error, for which the gold medal is assigned, occurs when the multilateral resistance factor are omitted altogether. Following Rose and van Wincoop (2001), Feenstra (2003), and Cheng and Wall (2003), Baldwin and Taglioni propose country dummies in cross-section data and country-pair FE in panel data to avoid the gold medal error. However, country-pair dummies (simply, pair dummies) are time-invariant and consequently are only part of the answer; serial correlation remains. It should be added that pair dummies capture all FE, including distance elasticity, making it impossible to distinguish among parameters of various time-invariant variables. The alternative is provided by Carrère (2006) who shows the merit of modelling pair dummies as random variables (RE, henceforth); in sum, employing RE pair dummies one can dodge the gold medal bullet and yet estimate the impact of distance on trade.

Having addressed some of the econometric issues, we can proceed with the further specification of (1). We concentrate on trade-enhancing factors. In the base version of the GE, TCs are a log-linear function of bilateral distance d_{ij}, that is $t_{ij} = d_{ij}^{\beta}$. Trade-enhancing factors –i.e.,

cultural affinities, common institutions and geography– enter in multiplicative form. We define TCs of the i^{th} exporter country to the j^{th} importer country (see equation 6 in Carrère 2006) as follows:

$$t_{ijt} = d_{ij}^{\beta} \cdot e^{[\gamma\ CULTURE_{ijt} + \delta\ INSTITUTIONS_{ijt} + \lambda\ GEOGRAPHY_{ij}]}, \tag{2}$$

where *CULTURE*, *INSTITUTIONS* and *GEOGRAPHY* indicate respectively a vector of cultural, institutional and geographical dummy variables. *CULTURE* includes three dummies: *LANGUAGE*, *COLONIZER*, and *COLONY* that assume a value of one when *i* and *j* share, respectively, the same main language, had a common colonizer in the past, or were involved in a colonial relationship with each other; otherwise the dummies are equal to zero. *INSTITUTIONS*, as well, consists of three dummies: *BORDER*, *MONEY* and *RTA* that assume a value of one when the country pair share, respectively, a common land border, the same currency, and are members of the same RTA; otherwise, the dummies are zero. Finally, *GEOGRAPHY* includes the dummies *CONTINENT* and *OCEAN* that acquire a value of unity when the country pair, respectively, belong to the same continent and share the same ocean; otherwise the dummies are equal to zero. Note that whereas cultural and institutional dummies can vary over time, geography is constant.

We achieve a testable GE as follows. First, we substitute (2) in (1) and apply a logarithmic transformation that yields a GE that is similar to Anderson and van Wincops's (2003) equation 19:

$$\ln x_{ijt} = A + \ln y_{it} + \ln y_{jt} + (1-\sigma)\rho_0 \ln d_{ij} + \sum_{f=1}^{F}(1-\sigma)\rho_f Z_{f,ijt} + u_{ijt}, \tag{3}$$

where $A = \ln\left(y_t^W P_{ikt}^{1-\sigma} P_{jkt}^{1-\sigma}\right)$ is the multilateral TC factor; Z_f and ρ_f indicate, respectively, a generic trade-enhancing factor and its semi-elasticity; and $u_{ijt} = \mu_t + \varepsilon_{ijt}$, where μ_t is a year dummy and ε_{ijt} is an idiosyncratic error. Secondly, we specify cultural, institutional and geographical factors according to the eight dummy variables previously described. Our testable GE is as follows:

$$\ln x_{ijt} = \alpha'_0 + \alpha'_1 \ln y_{it} + \alpha'_2 \ln y_{jt} + \beta' \cdot \ln d_{ij} \qquad \text{(BASE)} \tag{4}$$

$$+ \gamma'_1 LANGUAGE_{ijt} + \gamma'_2 COLONIZER_{ijt} + \gamma'_3 COLONY_{ijt} \qquad \text{(CULTURE)}$$

$$+ \delta'_1 BORDER_{ijt} + \delta'_2 MONEY_{ijt} + \delta'_3 RTA_{ijt} \quad \text{(INSTITUTIONS)}$$

$$+ \lambda'_1 CONTINENT_{ij} + \lambda'_2 OCEAN_{ij} \quad \text{(GEOGRAPHY)}$$

$$+ \mu_t + \varepsilon_{ijt} . \quad \text{(STOCHASTIC ERROR)}$$

Bilateral distance elasticity $\beta' = (1-\sigma)\beta$ is negative since the elasticity of substitution σ is larger than unity. The three cultural semi-elasticities $\gamma'_f = (1-\sigma)\gamma_f$ are positive. As to the institutional semi-elasticities $\delta'_f = (1-\sigma)\delta_f$, *BORDER* has been consistently estimated as being positive, while the findings for *MONEY* and *RTA* have been mixed. One reason is that an RTAs may be a step towards a monetary union, making the two institutions highly collinear (Panagariya 2000). Another reason is that RTA generate significant trade-diversion (Carrère 2006). A third reason is that RTAs, while contributing to bilateral trade flows initially, expand beyond their optimal size (Fratianni and Oh 2009). A careful examination of these issues is beyond the scope of our study.[8] The two geographical semi-elasticities $\lambda'_f = (1-\sigma)\lambda_f$ are expected to be positive.

III. Data and Descriptive Statistics

Our data set consists of 215,500 annual observations covering 143 countries over the period 1980 to 2003.[9] Country-level bilateral exports in U.S. dollars come from the World Trade Analyzer by Statistics Canada. The remainder of the data, with the exception of currency unions and RTAs, come from Rose (2005) for the period 1980-1999 and Oh (2006) from 2000 to 2003.

Table 1 presents descriptive statistics of our dataset. The mean value of bilateral exports is 346 million U.S. dollars, with a range spanning from one thousand to 204 billion dollars. The mean value of GDP is 299 billion dollars for exporting countries and 290 for importing countries. The poorest country in dataset has a GDP of 21 million dollars; the richest 11 trillion dollars. The

[8] Three other technical issues are also beyond the scope of the study: the so-called zero bilateral trade flow problem (Linders and De Groot 2006), the linearity of GE (Santos Silva and Tenreyro 2006), and the importance of modelling dynamics in GE (Bun and Klaassen 2002). The debate in the literature on these issue is very open (Martinez-Zarzoso, Nowak-Lehmann, and Vollmer 2007).

[9] See the Indiana University CIBER Website (http://www.kelley.iu.edu/ciber/research.cfm) for more details.

average value of distance is 4,589 miles, with a range spanning from 55 miles (Bahrain and Qatar) to 12,351 miles (Guyana and Indonesia). Cultural affinities are relevant in that 21.4 per cent of trade partners share the same language, 8 percent a common colonizer, and 2.3 percent have a colonial relationship.

[Insert Table 1 here]

On institutions, country-pair observations with a common land border represent, on average, 2.7 per cent of the sample; those with a common currency a very small 0.9 per cent; and those belonging to the same RTA 2.6 per cent. We identify eleven RTAs: ASEAN (Association of South East Asian Nations), CARICOM (Caribbean Community and Common Market), EU (European Union), NAFTA (North American Free Trade Agreement), ANDEAN (Andean Community of Nations), ANZCERTA (the Australia-New Zealand Closer Economic Relations Trade Agreement), CACM (Central American Common Market), MERCOSUR (Southern Common Market), PATCRA (Papua New Guinea-Australia Trade and Commercial Relations Agreement), SPARTECA (South Pacific Region Trade and Economic Cooperation Agreement), and USIS (the United States-Israel Free Trade Agreement). These RTAs account, on average, for 40 percent of world trade. EU has the the highest number of trade flows (1.2 percent), followed by ASEAN (0.43 percent) and CARICOM (0.39 percent). The first four of the eleven RTAs have expanded since 1980. SPARTECA and ANZCERTA were created respectively in 1981 and 1983; USIS in 1986; ANDEAN and NAFTA in 1988-1989; CACM and MERCOSUR in 1991-1992; the other RTAs were established before 1980.

Finally, we identify six continents and four oceans under the rubric of geography. The continents are Africa, Asia, Europe, Oceania, North and South America, but not Antarctica. The Panama channel divides North from South America, thus placing Caribbean countries in North America. Consequently, North America includes NAFTA, CACM, and CARICOM while South America includes ANDEAN and MERCOSUR. Oceans are Atlantic (inclusive of Baltic Sea), Pacific, Indian and Mediterranean (inclusive of Black Sea). The Strait of Malacca separates the

Indian from the Pacific Ocean. We have ignored the Arctic and Antarctic Oceans and the Caspian Sea. Again looking at Table 1, we find that 21.6 percent of international trade occurs, on average, among countries located in the same continent: of which, 7.1 percent within Asia, 5.4 percent within Africa, 5.1 percent within Europe, and 4 percent in the remaining continents. Approximately a third of all bilateral trade flows is between coastal countries: the Atlantic is the most important, with 18.2 percent, and generates 50 percent more trade than the Indian and Pacific oceans combined.

IV. Results

Methodology

All our panel estimates use a cluster correction for country pairs and robust standard errors. The former reduces potential pair serial correlation and the latter corrects for potential heteroschedasticity. Exports and country incomes are expressed in logarithms of nominal U.S. dollars and thus avoid one of the medals in the Baldwin-Taglioni (2006) mistake race.

Table 2 shows five different estimates of equation (3), our base model. The first is Core GE with only incomes and distance: income elasticities are very close to and yet statistically different from unity, and in line with what is reported by the empirical literature; the distance elasticity of -1.21 underscores the very strong negative impact of TC on bilateral trade. Other things the same, country pairs that are 10 per cent more distant trade 12 percent less. The second, One-way GE, adds year dummies to the Core GE. The third, Three-way GE, adds importer country and exporter country dummies to control for the atheoritical remoteness (Egger 2000). The last two models address the issue of multilateral resistance. In Pair FE, we use country-pair fixed effects, in addition to year dummies (Baier and Bergstrand 2009). In Pair RE, we use country-pair random effects, in addition to year and country dummies (Carrère 2006).

[Insert Table 2 here]

Year dummies are jointly significant under all models. The likelihood ratio test in Three-way GE reveals the importance of remoteness. Country dummies are different from zero and provide a large explanatory power relative to One-way GE. R^2 goes up from 0.593 to 0.685. However, country dummies reduce the size of exporter-country and importer-country income elasticities to 0.545 and 0.528, respectively. In Pair FE, the Hausman test compares country pair fixed effects with random effects employing the same specification, that is without country dummies. The Hausman test is consistent with fixed effects, but we do not rely on it because it could be incorrectly specified.[10] Moreover, the low value of the R^2 (0.08) does not favor the Pair FE GE.

In the Pair RE GE, the Hausman test rejects the null hypothesis of unsystematic differences in coefficients at the 1 percent level; therefore, it corroborates RE. However, in light of the noted unreliability, we give more weight to the Breusch and Pagan Lagrange-Multiplier (1979, BPLM for short) test, which rejects the null hypothesis of zero-variance implied by the FE model in favor of the alternative RE model.[11] In sum, we consider the Pair RE GE our best estimate, which yields a very statistically significant and strong economic effect of distance on trade. The high R^2=0.68 is comparable to that of the Three-way GE.

Findings

Having established our best econometric method, we now proceed with the estimates of equation (4), which adds trade-enhancing factors to the Base gravity equation (3). Table 3 presents the results, based on Pair RE estimation, when we include, step-wise, cultural affinities, institutions, and geographical characteristics. In all regressions, year and country dummies are jointly significant and the R^2 is high (around 0.7), indicating that the Pair RE model explains a great portion of the export variance.

[10] The test is based on differences between coefficients under FE and RE models. The FE model uses a within estimator that drops time-invariant variables, such as bilateral distance. Given that the FE and RE specifications are different, the dimension of the coefficient vectors is also different.
[11] BPLM is the best available test for us, although it does not test directly FE vs. RE.

[Insert Table 3 here]

Culture has a significant economic impact on bilateral trade flows: trade is approximately 2.6 times larger when country partners are involved in a colonial relationship; 66 percent higher when exporter and importer country have had a common past colonize; and more than 45 percent when they share a common main language.[12] However, the economic impact of shared characteristics at the world level must take into account of the incidence of the phenomenon. In this sense, common language is the most pervasive cultural affinity since it affects 21.4 percent of bilateral trade flows; see Table 1.

Another important trade-enhancing factor are institutions. The semi-elasticities of *BORDER*, *MONEY*, and *RTA* are positive and statistically significant at the 1 percent level, except for *MONEY* which is significant at the 5 percent level. The impact on trade of a common land border (0.47) is more than twice than of a common RTA (0.21), which, in turn, is half as great that of a common currency (0.14). If one adds the incidence of institutions at the world level, the relative importance of *MONEY* is further diminished by the fact that less than one percent of all bilateral trade flows share the property of a common currency; again, see Table 1.

Geography as well is a key driver of trade. A common water border raises trade by 54 percent. In contrast, a common land border raises trade by 74 percent. Given the higher incidence of intra-continental trade, a common land border has a higher overall impact on trade a common water border. The opposite is true in the comparison between *CONTINENT* and *RTA*; here, geography has an edge over the institution of RTAs; more on this below. Finally, it should be noted that three sets of trade-enhancing factors soak a 'fair' portion of the trade-reducing effects of distance: the distance elasticity in Table 3 drops by about one quarter with respect to the estimate of Table 2.

The left-hand panel of Figure 1 summarizes graphically the impact on average bilateral flows of the trade-enhancing factors. These are measured by $e^{semi-elasticity}-1$. Cultural affinities exert

[12] We calculate the economic impact of CULTURE as follows: $2.596 = e^{1.28} - 1$ for COLONY, $0.656 = e^{0.505} - 1$ for COLONIZER, and $0.455 = e^{0.375} - 1$ for LANGUAGE.

the strongest force on bilateral flows. However, the size of the economic impact and the relative ranking of the three sets of variables change sharply when we consider their influence at the world level. In Figure 2, we multiply the semi-elasticities by their respective average export weights; for example, the export weight for common language is the average share of trade flows between countries sharing the same language as a proportion of the sum of all bilateral trade flows. Seen from an aggregate perspective, OCEAN heads, by a big margin, the list of trade-enhancing factors, followed by BORDER, CONTINENT, LANGUAGE, COLONY, RTA, COLONIZER and in the last place MONEY. Geography, as the sum of oceans and continents, is the biggest driver to world integration. Cultural affinities and institutions are roughly comparable.

[Insert Figures 1 and 2 here]

Political events, such as the breakup of Yugoslavia between 1991 and 1992 and the collapse of the Soviet Union in1991, could have affected materially our empirical findings for at least three reasons.[13] The first is that the number of bilateral trade flows rises. The second is that the creation of new countries changed the distribution of trade-enhancing factors, the obvious example being the frequency of BORDER. The third is the demise of conflicting blocs in Europe spurred new bilateral trade flows that were previously impossible. To address the issue of a structural break, we break up our sample in pre and post 1991. The regressions of the two sub-samples are shown in the last two columns of Table 3.

In the pre-1991 sub-period, continents are less important –in terms of the size of the relevant semi-elasticity-- than a common RTA, which, in turn, is less important than shared money. Common land border and common water border have the same economic impact on bilateral trade flows. Seen from the country-pair perspective, institutions are more trade enhancing than geography. The ranking is reversed in the second sub-period, except for *BORDER*. In particular, *OCEAN* and *CONTINENT* semi-elasticities are, respectively, 47 and 36 percent higher than the

[13] To these two events we should mention German reunification in October of 1990. However, this event, while relevant for East and West Germany, had modest secondary consequences on the rest of the world.

RTA semi-elasticity; see second and third panels of Figure 1. The impact of geography comes out even stronger at the world level; see second and third panels of Figure 2. In the post-1991 period, the two geography semi-elasticities add up to 47 percent against the 22 percent of the three institutional semi-elasticities. The biggest change involves *CONTINENT* that moves up from 5.7 to 17.9 percent. The inference is that the noted political disintegration of 1991-92 has left a mark of trade patterns.

RTAs and geography

We try to gain additional insights on the significance of the 1991 structural break by allowing heterogeneity in RTAs, continents, and oceans; see Table 4. In the first column of this table we add the eleven RTAs, in addition to culture and other institutions. The highest RTA semi-elasticities are those of *SPARTECA* (1.25) and *PATCRA* (0.88), followed by *ANDEAN* (0.68), *NAFTA* (0.62), and *CARICOM* (0.54). The semi-elasticities of *ANZCERTA, ASEAN, CACM,* and *MERCOSUR*, on the other hand, are statistically not different from zero. For the EC/EU, the semi-elasticity is slightly negative albeit at the 10 percent. These findings could reflect the fact the membership of the EU has expanded very rapidly and passed its optimal size (Fratianni and Oh 2009 forthcoming). Similar considerations may apply to *ASEAN*.

[Insert Table 4 here]

In column two we add the six continents and the four oceans to the separate RTAs. The findings appear consistent with continents being natural blocs. With the exception of Europe, intra-continental trade is higher than inter-continental one: 15 percent more in Asia, 70 percent more in South America, 140 percent more in North America, and fifteen times more in Oceania. Moreover, continents soak up some of the RTA effects.[14]

[14] The semi-elasticities of *SPARTECA* and *PATCRA*, located in Oceania, become negative and statistically insignificant in the presence of the geography dummies. The same holds for the EC/EU. For other RTAs, their effects decline, with the exception of USIS, which is an unnatural bloc.

About oceans, the Indian ocean raises trade by a factor of two, the Mediterranean by two thirds; the Pacific by 45 percent, and the Atlantic by a third. Our prior was that the coefficients of the ocean dummies would be smaller than the coefficients of *BORDER* because of the higher heterogeneity of overseas countries. The findings are more mixed. The *BORDER* semi-elasticity is twice the *ATLANTIC*'s, half as large as the *PACIFIC*'s, close to the *MEDITERRANEAN*'s and lower than the *INDIAN*'s. In sum, the effect of continents and oceans on trade is on average larger than that of *RTA* and *BORDER*. Broadly speaking, geography beats institutions.

One apparently odd result is the negative effect on trade of the European continent. Two possible reasons come to mind. The first is that Southern European countries face the Mediterranean sea, while Northern countries face the Atlantic ocean, permitting the two water masses to erode the super border effect of the continent. The second is that 'political' blocs, such as the Soviet Union, have exert strong centripetal forces and, as a consequence, generate economic disintegration over the entire continent. To gain some insight on this issue, we resort to sub-sample estimation around the break point of 1991; see last two columns of Table 4.[15] Intra-European trade was 58 percent lower in the pre-1991 period than in the post-1991 period, a result that is consistent with the centripetal forces of the Soviet bloc. Conversely, the *EC*/EU semi-elasticity flips from positive (0.226) to negative (-0.411) and highly significant statistically. The two results are consistent with the fact that the Soviet bloc was promoting internal trade at the expense of external trade and that the EU was in part counterbalancing the Soviet policy of European economic disintegration. Once the political bloc imploded, the continent stopped playing a disintegration role.

A few examples may be useful on the economic significance of common institutions and geography. We start with the pair France and Italy, two coastal countries with a common land border, members of the same RTA, and since 1998 sharing a common currency. In pre-1991 period, *BORDER, EUROPE, EC/EU*, and *MEDITERRANEAN* provide a trade boost of 14 percent. The strongly negative semi-elasticity of EUROPE weighs heavily against the trade-enhancing forces of

[15] *CACM* (created in 1991) and *MERCOSUR* (created in 1992) were dropped from the first sub-period.

land borders, EC/EU and ocean. In the post-1991 period, institutions and geography provide a huge trade boost of 150 percent, largely due to the fact that *EUROPE* stops being a negative integration force.[16] The EC/EU instead becomes a negative force, in part compensated by the beneficial trade effects of a common money. As a second example, we take France and Poland, two costal countries without a common border and unconnected by RTA membership (in our sample period). For this pair of countries, common institutions and geography reduce trade by 42 percent in the pre-1991 period and boost it by 23 percent in the post-1991 period; the swing being almost entirely due to the effect of *EUROPE*. Finally, consider France and Hungary, two countries that share only the same continent. Here the continent is the determining factor, reducing trade by 59 percent when the Soviet Union is fully operational.

Going beyond Europe, the findings suggest that *ANDEAN* and *MERCOSUR* in the post-1991 period have eroded the 'natural' forces of integration due to the South American continent. The same holds for *SPARTECA*, *ANZCERTA*, and *PATCRA* with respect to *OCEANIA*.[17] On the contrary, there are no substitution effects between the North American continent and *CACM*, *CARICOM*, and *NAFTA*.[18] It appears that the North America continent, unlike its Southern cousin, moved towards a natural bloc. We do not explore the reasons for this difference here.

V. Conclusions

This paper has tried to answer the following question: Given the political and social factors that determine the existing international trade regime, what factors limit the expansion of cross-border transactions? Two big drivers of international trade are incomes and distance. Incomes and trade are strongly and positively correlated. For bilateral trade flows, the GE treats income exogenous relative to trade and with an elasticity of unity. At the world level, however, international trade and

[16] It is the sum of BORDER (0.512), EC/EU (-0.411), EUROPE (0), MEDITERRANEAN (0.581), and MONEY (0.236) semi-elasticities.
[17] OCEANIA was dropped due to collinearity.
[18] Note that the negative *NAFTA* (created in 1989) semi-elasticity in 1980-1991 sub-period could result from an unduly small sample.

income interact: a fall of cross-border transactions brought about by protectionist policies affects inevitably income, as the lesson of the Great Depression painfully reminds us. Distance is a proxy for a whole range of unobservable trade costs, from transportation costs to differences in legal systems and practices. Distance exerts a strong negative force on trade, giving a marked advantage to trade among close countries.

We concentrated on three trade-enhancing factors: cultural affinities, common institutions and geographical characteristics. The extent of heterogeneity in culture and institutions represent clearly a limit to integration. But geography as well acts as a limit to integration. In fact, geography poses a greater constraint on integration than cultural affinities and common institutions. In particular, continents act as 'natural' integrators and oceans as common water border. Countries located in the same continent trade a quarter more than those located in different continents; countries sharing the same ocean trade a half more than those that do not have a common water border.

Our results are in line with the literature on natural blocs; see Krugman (1993), Frankel, Stein, Wei (1995), and Frankel (1997). We find some evidence that continents act like super RTAs with their own borders. Continents enter into conflict with 'political' blocs; this is the experience of Europe with the Soviet Union. With an active political bloc, the continent loses some its integration property, leaving more room for the sub-continental RTA to enhance trade. On the contrary, with an inactive political bloc, the continent rises as an integration force relative to the RTA. Thus, to some degree, continents and RTAs are substitutes.

Finally, oceans facilitate trade between distant countries, a result that agrees with the literature on landlocked countries and with long historical evidence. Countries sharing the same ocean trade twice as much as countries located in the same continent. Oceans stretch the reach of continents, suggesting that 'natural' RTAs should form more around an ocean than within a continent.

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Table 1 - Descriptive Statistics

VARIABLES	Mean	Median	St.Dev.	Min	Max
X [(a)]	346,297	5,998	2,879,401	1	204,794,176
Y_{EXP} [(b)]	299,796.9	44,581.8	966,700.0	20.8	11,150,399.9
Y_{IMP} [(b)]	290,633.9	33,957.8	965,294.5	20.8	11,150,399.9
DISTANCE [(c)]	4,588.9	4,356.8	2711.7	55.5	12351.1
LANGUAGE	0.2140	0	0.4101	0	1
COLONIZER	0.0804	0	0.2719	0	1
COLONY	0.0232	0	0.1505	0	1
BORDER	0.0268	0	0.1616	0	1
MONEY	0.0096	0	0.0973	0	1
RTA	0.0258	0	0.1587	0	1
ANDEAN	0.0015	0	0.0385	0	1
ANZCERTA	0.0002	0	0.0140	0	1
ASEAN	0.0043	0	0.0657	0	1
CACM	0.0012	0	0.0347	0	1
CARICOM	0.0039	0	0.0627	0	1
EC	0.0126	0	0.1116	0	1
MERCOSUR	0.0007	0	0.0258	0	1
NAFTA	0.0003	0	0.0180	0	1
PATCRA	0.0002	0	0.0149	0	1
SPARTECA	0.0026	0	0.0508	0	1
USIS	0.0002	0	0.0129	0	1
CONTINENT	0.2161	0	0.4116	0	1
AFRIC	0.0532	0	0.2244	0	1
ASIA	0.0716	0	0.2579	0	1
EUROPE	0.0509	0	0.2197	0	1
NORTH AMERICA	0.0258	0	0.1586	0	1
SOUTH AMERICA	0.0119	0	0.1086	0	1
OCEANIA	0.0027	0	0.0520	0	1
OCEAN	0.3315	0	0.4927	0	2
MEDITERREAN	0.0280	0	0.1649	0	1
ATLANTIC	0.1822	0	0.3860	0	1
PACIFIC	0.0703	0	0.2556	0	1
INDIAN	0.0511	0	0.2201	0	1

NOTE: (a) thousands US$; (b) billions US$; (c) miles;

Table 2 - Base Model: the Methodology. Period: 1980-2003.

	Core	One-Way	Three-Way	Pair FE	Pair RE
COEFFICIENT	(1)	(2)	(3)	(4)	(5)
Constant	-24.86***	-25.39***	0.404	-18.26***	-0.746
	(0.30)	(0.31)	(1.00)	(0.80)	(0.95)
$Ln(Y_{EXP})$	0.975***	1.000***	0.545***	0.538***	0.538***
	(0.0065)	(0.0066)	(0.025)	(0.025)	(0.024)
$Ln(Y_{IMP})$	0.812***	0.834***	0.528***	0.575***	0.569***
	(0.0068)	(0.0069)	(0.022)	(0.022)	(0.021)
Ln(DISTANCE)	-1.210***	-1.210***	-1.512***	0	-1.491***
	(0.017)	(0.017)	(0.018)	(0)	(0.018)
Observations	215500	215500	215500	215500	215500
R^2	0.579	0.593	0.685	0.0783	0.680
F Test	12876	1621	261.6	283.7	89642
$Ln(Y_{EXP})=1$	15.2	0.0	331.6	341.9	376.9
$Ln(Y_{IMP})=1$	764.3	575.7	454.3	372.5	421.5
Time=0		164.8	73.84	83.07	2021
EXP=IMP=0			34.56		9925
LR Test		7022	55039		
Prob > chi2		0	0		
LR dof		23	280		
Hausman Test				459.25	41.34
Prob > chi2				0	0.021
Hausman dof				25	25
BPLM Test					261998
Prob > chi2					0
Number of pair				15654	15654

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 3 – Advanced Models: Culture, Institutions and Geography.

	Culture	Institution	Geography	Geography	Geography
Period:	*1980-2003*	*1980-2003*	*1980-2003*	*1980-1991*	*1992-2003*
COEFFICIENT	(1)	(2)	(3)	(4)	(5)
Constant	-1.523	-2.018**	-4.417***	1.980	8.036***
	(0.95)	(0.95)	(0.97)	(1.30)	(1.48)
$Ln(Y_{EXP})$	0.538***	0.537***	0.537***	0.403***	0.206***
	(0.024)	(0.024)	(0.024)	(0.032)	(0.036)
$Ln(Y_{IMP})$	0.569***	0.567***	0.567***	0.503***	0.495***
	(0.021)	(0.021)	(0.021)	(0.027)	(0.033)
Ln(DISTANCE)	-1.424***	-1.359***	-1.138***	-1.195***	-1.193***
	(0.018)	(0.020)	(0.027)	(0.036)	(0.028)
LANGUAGE	0.375***	0.362***	0.376***	0.315***	0.426***
	(0.037)	(0.037)	(0.037)	(0.048)	(0.038)
COLONIZER	0.505***	0.486***	0.436***	0.524***	0.399***
	(0.053)	(0.053)	(0.052)	(0.069)	(0.054)
COLONY	1.280***	1.262***	1.260***	1.398***	1.117***
	(0.085)	(0.088)	(0.086)	(0.094)	(0.091)
BORDER		0.470***	0.557***	0.506***	0.507***
		(0.090)	(0.091)	(0.12)	(0.092)
MONEY		0.140**	0.141**	0.433***	0.128**
		(0.055)	(0.055)	(0.15)	(0.059)
RTA		0.205***	0.200***	0.317***	0.180***
		(0.046)	(0.046)	(0.057)	(0.065)
CONTINENT			0.235***	0.105**	0.283***
			(0.038)	(0.051)	(0.039)
OCEAN			0.432***	0.492***	0.344***
			(0.031)	(0.040)	(0.032)
Observations	215500	215500	215500	96600	118900
Number of pair	15654	15654	15654	11792	15145
R^2	0.688	0.688	0.689	0.701	0.695
F Test	93990	92121	94026	55843	85375
Time=0	2017	2018	2018	188.6	2008
EXP=IMP=0	9736	9597	9267	6726	8767
BPLM Test	239953	238912	235942	127160	55897
Prob > chi2	0	0.00965	0	0	0

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 4 - Heterogenous RTAs, continents and oceans (1980-2003)

	RTAs	Geography	Geography	Geography
Period:	*1980-2003*	*1980-2003*	*1980-1991*	*1992-2003*
COEFFICIENT	(1)	(2)	(3)	(4)
Constant	-2.229**	-4.809***	1.990	7.177***
	(0.95)	(0.98)	(1.32)	(1.48)
$Ln(Y_{EXP})$	0.539***	0.539***	0.404***	0.202***
	(0.024)	(0.024)	(0.032)	(0.036)
$Ln(Y_{IMP})$	0.569***	0.569***	0.504***	0.490***
	(0.021)	(0.021)	(0.027)	(0.033)
Ln(DISTANCE)	-1.349***	-1.106***	-1.195***	-1.146***
	(0.020)	(0.029)	(0.037)	(0.029)
LANGUAGE	0.356***	0.363***	0.305***	0.392***
	(0.037)	(0.037)	(0.047)	(0.038)
COLONIZER	0.478***	0.428***	0.543***	0.363***
	(0.052)	(0.052)	(0.069)	(0.054)
COLONY	1.235***	1.196***	1.294***	1.071***
	(0.086)	(0.084)	(0.091)	(0.089)
BORDER	0.488***	0.591***	0.544***	0.512***
	(0.089)	(0.090)	(0.11)	(0.091)
MONEY	0.213***	0.194***	0.391***	0.236***
	(0.055)	(0.055)	(0.15)	(0.059)
ANDEAN	0.682***	0.662**	0.517*	1.690***
	(0.26)	(0.26)	(0.28)	(0.30)
ANZCERTA	-0.0663	-0.0970	-0.0242	-0.557
	(0.080)	(0.083)	(0.063)	(0.36)
ASEAN	0.187	0.186	-0.0902	-0.0478
	(0.18)	(0.19)	(0.22)	(0.17)
CACM	0.0445	0.0237		1.172***
	(0.15)	(0.15)		(0.22)
CARICOM	0.539**	0.506**	0.665*	1.302***
	(0.25)	(0.25)	(0.36)	(0.24)
EC	-0.0664*	0.00363	0.226***	-0.411***
	(0.039)	(0.037)	(0.052)	(0.058)
MERCOSUR	0.129	0.114		0.911***
	(0.11)	(0.11)		(0.29)
NAFTA	0.619***	0.544***	-0.0928***	0.284
	(0.17)	(0.18)	(0.024)	(0.20)
PATCRA	0.882***	-0.206	-0.879	-0.0448
	(0.28)	(0.34)	(0.61)	(0.31)
SPARTECA	1.251***	-0.0637	0.0399	2.688***
	(0.14)	(0.14)	(0.092)	(0.28)
USIS	0.533***	0.554***	0.264**	2.258***
	(0.15)	(0.15)	(0.13)	(0.15)
AFRIC		0.395***	0.193**	0.571***
		(0.061)	(0.086)	(0.064)
ASIA		0.139**	0.267***	0.0453
		(0.068)	(0.086)	(0.068)
EUROPE		-0.244***	-0.885***	0.0588
		(0.066)	(0.086)	(0.066)
NORTH AMERICA		0.875***	0.644***	0.857***
		(0.10)	(0.12)	(0.10)
SOUTH AMERICA		0.553***	0.562***	0.237
		(0.14)	(0.16)	(0.15)

OCEANIA		2.806***	3.138***	
		(0.32)	(0.34)	
MEDITERREAN		0.527***	0.248**	0.581***
		(0.087)	(0.11)	(0.084)
ATLANTIC		0.276***	0.332***	0.210***
		(0.047)	(0.062)	(0.048)
PACIFIC		0.369***	0.473***	0.268***
		(0.061)	(0.078)	(0.062)
INDIAN		0.709***	0.791***	0.589***
		(0.070)	(0.093)	(0.070)
Observations	215500	215500	96600	118900
Number of pair	15654	15654	11792	15145
R^2	0.690	0.694	0.707	0.700
F Test	111471	113885	65743	110046
Time=0	2024	2021	186.5	2021
EXP=IMP=0	9698	9618	7121	9218
BPLM Test	220956	213810	120981	50314
Prob > chi2	0	0	0	0

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Figure 1 – Trade enhancing factors: country impact.

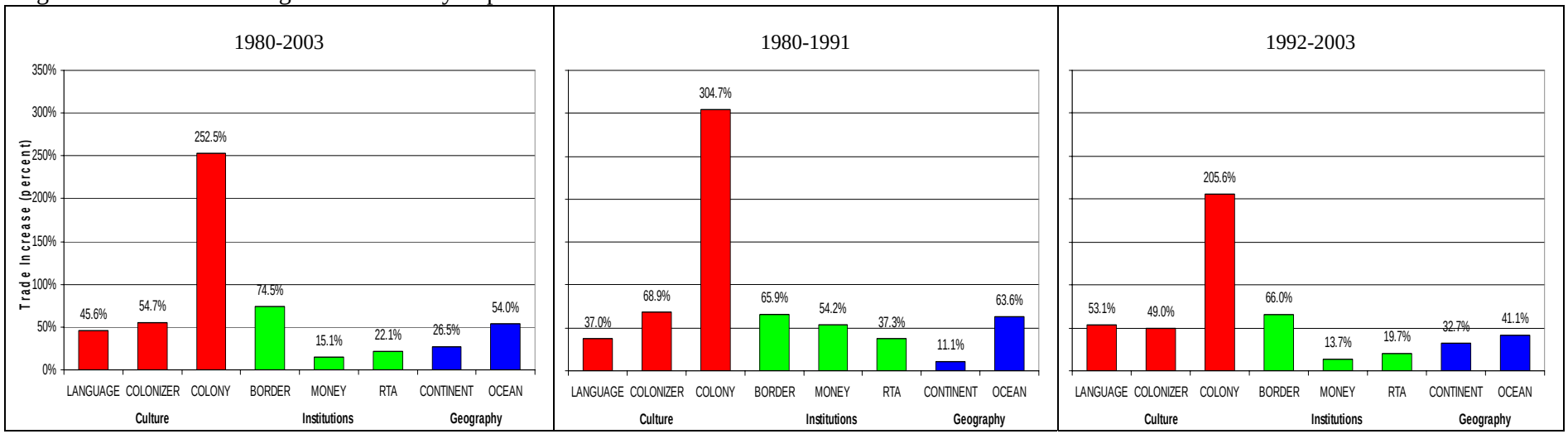
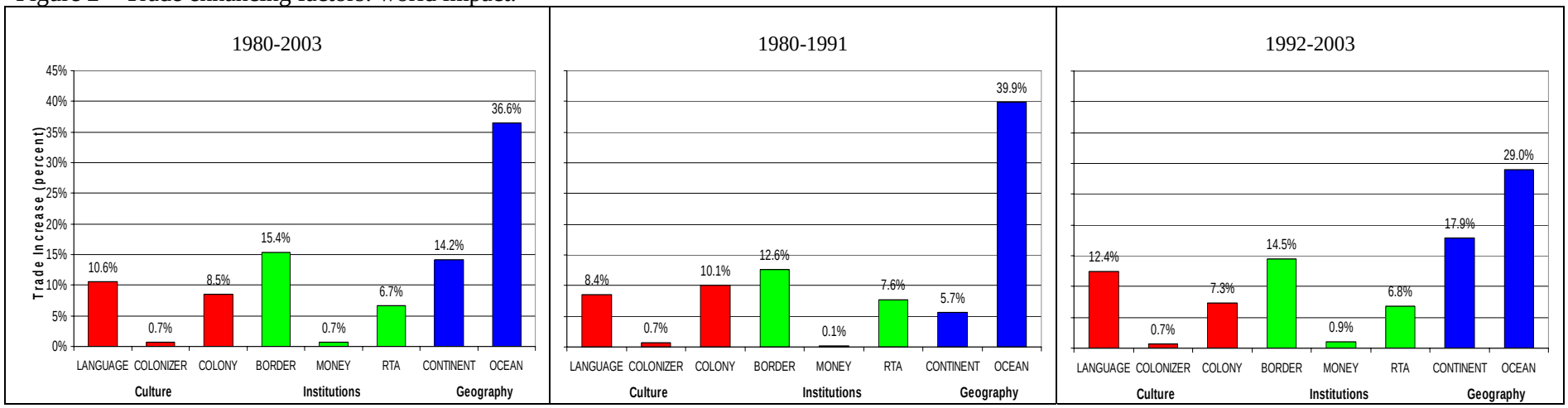


Figure 2 – Trade enhancing factors: world impact.



NOTE: CULTURE in red; INSTITUTIONS in green; GEOGRAPHY in blue. *Country Impact* = $e^{Semi\text{-}elasticity*1}$*-1; World Impact*= $e^{Semi\text{-}elasticity*Proportion}$*-1*. Semi-elasticities come from columns (3), (4), and (5) of Table 3. Proportion is the mean value of the dummy (see Table 1 for the 1980-2003 period).