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A South American Perspective: Regional versus Global Trade Patterns

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Abstract

This study presents evidence of the increasing regionalization of the international trade of ten South American countries from 1980 to 2001. We found that the regionalization of trade in South America is best described as an increasing trade among Spanish-speaking countries and increasing trade within the two regional agreements: Andean Community and Mercosur. We also find evidence of border erosion in the continent, especially among the Mercosur members. These results are evident in a simple statistical analysis and are also economically significant when tested in a consistent gravity equation that controls for a set of macroeconomic and geographic variables.

Introduction

The 1980s marked a radical shift in Latin American economic development strategy.

Inward oriented policies of import substitution were transformed into outward oriented

open-market-based development strategies. Amid debt crises the countries of the region

were forced to implement stabilization and structural adjustment packages, which

brought restrictive macroeconomic polices, market deregulation and the adoption of unilateral policies aimed toward opening up their economies to neighboring countries and the rest of the world. (Chudnovsky, 1997) Although regional integration was not new within South America, the 1990s marked a period of renewed interest, reinvigorating the promotion of earlier integrationist processes. Since then, these countries have also exerted an interest in adopting policies to open their economies toward global trade. This openness has been seen as an essential mechanism for Latin American governments to gain markets and to advance their region on the global map.

  During the past three decades Latin American trade has progressed along two parallel paths. The promotion of closer trade relations among neighbors has stimulated a regional level of integration among countries. At the same time there has been a diversification and deepening of commercial relations with countries outside the region, and thus further integration into the global market economy. In light of these dual directions, our research focuses specifically on the countries of South America,[2] and their regional trade agreements (RTA). We will assess whether these countries' trade of goods has become more regional, and, or more global, from 1980 to 2001.

  The principal argument advanced here is that South American trade, between 1980 and 2001, gradually became more regionalized relative to extra-continental trade. Intra-continental activity was driven by trade within the two major RTAs in the southern American hemisphere, Mercosur and the Andean Community, and to a lesser extent by trade between these two RTAs and Chile. Trade between the Mercosur and the Andean Community was not a contributing factor.

South America is one of the lesser trading regions in the developing world. The impact of RTAs on this continent has been small relative to what has happened elsewhere. Nonetheless, over our period of study South America shares the trend towards regionalization of trade reported for the G7 countries, rather than globalization, as presented in Chapter 5 of this Volume.

Using the results of the gravity equation, South American regionalization can be best characterized as taking place between Spanish-speaking countries, that is, trade has grown primarily among countries speaking Spanish in South and Central America and Mexico. The results also indicate that Chile has been more open to trade, whereas Colombia and Ecuador have been the least open. Regarding borders, we find that Argentina has traded less than one would expect with Chile, Brazil and Uruguay; at the same time Colombia, Venezuela and Ecuador have also been relatively isolated from their neighbors. Overall most of the borders within South America have eroded over time, especially between members of Mercosur.

The gravity equation has been applied extensively, to describe the trade of South American countries as well as worldwide trade. Frankel, Stein and Wei (1995) study the impact of RTAs around the world from 1965 to 1990 (every five years) including the Andean Community and Mercosur, but their analysis doesn't include the 1990s, when most regional trade agreements took place. Carillo and Li (2002) study the industrial effects of RTAs in South America, but dealing only with the intra-continental trade, which represented by 2002 less than 15% of the total trade of the continent. Probably the two studies whose findings are most related to the present research are Croce et al (2004) and Carrere and Schiff (2004) since both measure the role of distance on international

trade. The former finds evidence of an increasing trade between the members of the

same RTA, and between bordering countries in the Western Hemisphere. The latter finds

evidence of a decreasing average distance of trade for world wide trade. Nonetheless,

neither of those two studies uses the standard approach of the gravity equation which cast

doubt on their results.

This study intends to overcome several of the shortcomings noted above. First, it

covers a longer period of time, from 1980 to 2001. This is important because during the

1990s the regionalization processes in Latin America were being created or revamped.

Second, we employ the consistent version of the gravity equation, as proposed by

Feenstra (2002) and used by Rose (2004). In addition, we use the data of international

trade at the country level provided by Statistics Canada, from 1980 to 2001, for each

South American country with its trade partners, as listed in Appendix A of Chapter 5, this

Volume.

Following a historical overview of the main issues that have affected the countries

of South America throughout the last three decades, we focus our attention on two

regional integrationist initiatives: the Mercosur and the Andean Community. The

subsequent section presents the results obtained from the summary statistics and then

proceeds to present the gravity equation results. Our conclusions are accompanied by

proposed directions for further research.

Defining Concepts: Regionalization and Globalization

The definitions of globalization and regionalization adopted in this study draw upon the

international trade literature. Globalization will be defined as increased trade over longer

distances, and regionalization as increased trade at shorter distance, as discussed in Chapter 5, this volume. Three further complementary definitions provide a more comprehensive view of regionalization. Regionalization can be understood as increasing trade with bordering countries, leading to borders becoming *thinner,* as suggested in Chapter 2. A third definition of regionalization considers the increasing trade between members of the same RTA as in Croce et al (2003), Soloaga and Winters (1999), and further discussed in Chapter 2, this volume. Finally, regionalization can be defined as increasing trade between countries that share a common language as long as those countries are relatively close to each other, as is the case for all South American countries except Brazil[3]. .

These four distinct regionalization definitions can overlap with each other or provide conflicting results, for example regionalization might hold in terms of distance, borders and RTA, but not in the lingual sense. Thus, by including these four definitions in the empirical model we are measuring regionalization along different dimensions, and at the same time making them compete to find out which one(s) better describes the dynamics of trade in South America.

Similar Journeys, Different Paths

In the past thirty years the countries of South America have undergone intense political and economical transformations. In the political realm many countries of the region engaged in transitions to democracy. In the economic sphere, by the mid-1980s these countries moved away from protectionist policies of import substitution to policies aimed toward opening up their economies, reducing trade barriers, eliminating non-tariff

barriers, and implementing export promotion strategies. (Weaver, 2000) These policies enabled the countries to engage in regional integrationist processes as well as to participate more intensively in multilateral initiatives. (Rodriguez-Mendoza and Kotschwar, 1999)

Trade reforms in South America were implemented differently in different countries, although generally import substitution models gave way to trade liberalization policies. In Brazil, trade liberalization began during the 1980s and was intensified during the government of president Collor de Mello who radically reduced or eliminated non-trade barriers and tariff barriers. (Da Mota Veiga, 1990) Brazil sees itself as a leader of Latin America and the developing world. This was evidenced in the period of *grandeza* —greatness— when the military regime of the 1960s and 1970s made clear that they would not follow the United States' lead. (Selcher, 1981)This position shifted during the 1980s, when Brazil began aligning with the U.S. Brazil, the only Portuguese speaking country in South America, was perceived with suspicion by neighboring states. (Roett, 1999**)**

In contrast to Brazil, Argentina did not launch market and trade reforms until the start of the 1990s. Argentina has had a long history of political and economic turbulence. In 1991, it implemented a strong currency reform which came to a halt in 2001 when a massive debt default of over $130 billion U.S. dollars was declared. This crisis forced former President the La Rúa to step down. In 1991, the government fixed the exchange rate of the peso one to one with the dollar, through the Convertibility Act. The crisis was the result of a combination of factors including a greater rate of imports than exports produced by import liberalization policies, the appreciation of the currency; and the

financing of trade deficit with foreign savings. (Tussie, Casaburi, and Quliconi, 2004:79)

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Chile is frequently cited for its remarkably diversified international trade relations and for being a successful export-led economy. Chilean liberal economic reforms began in 1973 by a military government have continued until today, with the exception of the 1982 debt crisis, when the country's flat trade tariff was raised from 10 to 35 percent until 1985. (Silva, 2004) Uruguay opened up its economy in 1973, also under a military rule. Because of its small population (the smallest in Latin America after Panama), this country's openness to their neighbors' economies became a vital trade strategy, which gave it access to its neighbors' markets, otherwise this country would have been excluded from the group. Colombia and Venezuela liberalized later: in Venezuela unilateral trade liberalization began in 1989-1991, in Colombia in 1990-1991. Peru's economic liberalization processes can be traced as far back to the 1948 Odría coup, which adopted an open, export-led economic growth model. However, subsequent governments halted these reforms. Nevertheless, in the 1990s this country embraced trade initiatives at different levels: unilateral, regional, and multilateral. The liberalization process began during this period by adopting gradual tariff reductions, though this country has been one of the most radical in Latin America . (Reynoso, 2004)

South American RTAs

Since the time of Simón Bolivar[4] the idea of an integrated Latin America has ebbed and flowed. Two centuries have passed since the dreams of unification of *El Libertador*, and numerous visions and initiatives have been proposed and implemented across the course

of time. The first attempt to build a unified Latin America goes back to Simón Bolivar's

1826 proposal for a confederation of the Republics of Latin America. The proposal

failed; a new rhetoric followed, embodied in the pan-American movement of the mid-

1880s. In contrast to Bolivar's plan, this movement aimed at closer cooperation within

Latin America and across the American continent.

Renewed interest in Latin American integration emerged in the 1950s and 1980s.

The Latin American Free Trade Association (ALALC) was created in the 1950s under

the leadership of Raul Prebisch. It sought the formation of a free trade area as well as

economic development through import substitution policies. In 1980, ALALC gave birth

to a new association, the Latin American Integrationist Association (ALADI). These

institutions would eventually be known as 'old regionalism'.

Many commentators and scholars have written on the failures of old RTAs.

Among the most commonly cited reasons are the incomplete removal of barriers, the

restrictive nature of liberalization plans, and the poor implementation and reneging of the

agreements. (Van Klaveren, 1993) In the 1960s and the 1970s, regionalization efforts

were motivated by achieving independence from developed countries. *Dependistas*

advanced the view that Latin American development has been conditioned by the

interests and interventions of the dominant developed countries, prompting some

orthodox authors within the core—periphery debate to maintain that dependency and

development are incompatible. (Wise, 1999)   The *dependista* Fernando Cardoso asserted

that it was possible to be dependent and to integrate.[5]   But the facts showed that north-

north (i.e., developed nations with developed nations) trade growth was higher than

south-south (i.e., developing nations with developing nations) trade growth. Policy reformulations followed. (Tussie, 1998: 85)

In the 1990s, regional integration received new attention and brought about the launch of Mercosur and the deepening of the Andean Community. This resurgence in integration was called new regionalism.(Carranza, 2000; Hettne, 1999) New regionalism, inspired by market-friendly principles, was characterized by an emphasis on export promotion, trade liberalization, and non-discrimination against the rest of the world, global competition, north-south membership and overlapping membership within integration proposals.(Bhalla and Bhalla, 1997:21) . The regionalism of the eighties and nineties sought to deepen integration through the establishment of closer economic ties and formal trade links among the countries of Latin America and the rest of the world. These integrationist agreements and undertakings represent important qualitative departures, including the introduction of a bold emphasis on market forces, export promotion and trade liberation, global competition through scale, open trade, investment and growth. Along with other regional agreements around the world, Latin American efforts became broad-based strategies to confront perceived and real political and economic changes, tools for widening and expanding domestic markets while strengthening political and economic ties with the international system. There has been a proliferation of agreements in Latin America, almost schizophrenic. (Pastor, 2000) The two most comprehensive RTAs are the Andean Community and Mercosur.

The Andean Community and Mercosur

The Andean Community includes Colombia, Venezuela, Peru, and Bolivia.[6] Created in 1969 by the Cartagena Agreement after the poor-performing Latin American Free Trade Association, the Andean Community covers a joint population of 118 million people (2005 data) living in an area of 4,700,000 square kilometers, with a Gross Domestic Product amounting to 650 billion dollars.[7] It is one of the oldest integrationist institution in Latin America and follows. In 1969, through the Agreement of Cartagena, Colombia, Ecuador, Peru, Bolivia, and Chile committed to the elimination of trade barriers and the creation of a common union by 1980. In 1973, Venezuela joined the group; in 1976, Chile withdrew from it. Even though a common external tariff was adopted by 1976 and all internal tariffs were eliminated by 1982, it was not until the 1990s that the group made its most important advances. By this time these countries had adopted neo-liberal policies that propelled the integrationist process and left behind the import substitution policies. In 1991, Colombia, Venezuela, Ecuador, and Bolivia began reducing trade barriers, and by 1993 these four countries were able to create a free trade area. By 1995, Colombia, Ecuador, and Venezuela established a common external tariff. This integrationist group has been marked by their internal fragmentation as a result of domestic political instability (e.g.,. Peru), or strategic reasons (i.e. Bolivia), as well as domestic conflicts (e.g., Colombia and Venezuela).

Overall, the Andean Community has been weak in coordination. Agreements have concentrated on establishing bilateral relations. The policies of this group have been unclear[8] and uncoordinated.[9] On paper, this group is committed to economic and political integration, but in reality these commitments have not been met.

Mercosur was created in March 1991 by the Asuncion Treaty and includes Brazil, Argentina, Paraguay, and Uruguay as full members, and Bolivia[10] and Chile[11] as associate members. This group is the most dynamic in Latin America and ranks third in size in the world, after the EU and NAFTA. (Preusse, 2004; Schvarzer, 2001)

Mercosur forms one of the most important economic areas within the developing world. Mercosur accounts for 44 per cent of Latin American population, running to a 235 million people with a combined gross domestic product of an estimated $2.05 trillion (2005 data), [12] which is half of the output of Latin American as a whole.

Within Mercosur, the relationship between Brazil and Argentina has determined the pace and path of this integrationist group and will be decisive for its future, as those two countries account for 96 percent of Mercosur's gross domestic product. On the subject Bhalla and Bhalla, (1997) assert that:

> …bilateral trade negotiations between Argentina and Brazil started when the two countries had political rivalries, suffered from macroeconomic instability and traded little with each other. The question then arises: what led them to believe that regionalism, which did not succeed in the sixties and in the seventies, would offer better results in the late eighties and nineties?" (pg.142)

The literature points to the joint declaration of Foz de Iguazú, September 30, 1985, between the former president of Argentina, Raúl Alfonsín and Brazil, José Sarney as the direct antecedent of Mercosur. A year later, there was a variety of protocols, programs, and accords. At the end of 1986 the Act of Democracy, Peace, and Development promoted political objectives such as integration, convergence, and mutual understanding. Then, Argentina and Brazil agreed on mechanisms for the integration of the automotive and food processing industries. In 1988, the treaty of Integration, Cooperation and Development was signed: it proposed the elimination of tariffs and other

barriers to trade. (Magariños, 2001:1) With the Asuncion treaty of March 26, 1991

Brazil and Argentina formalized their cooperation and set objectives of creating a

common market by January 2005. During the transitional period from 1991 to 1994

several arrangements were reached regarding time tables for the reduction or elimination

of tariffs and non-tariff barriers, at the same time a consensus was reached in establishing

a free trade area by 2000.

By contrast to the other South American countries, Chile is the only country in

Latin America which has signed unilateral agreements with different groups, without

however committing to full memberships. Chile has shown a reluctance to form

restrictive regional alliances. (Marques Moreira, 2000; van Klaveren, 2000)

South America and the World

Trade regionalization is not the only strategy pursued path by South American

countries. These have also followed trade opportunities with other countries of the

hemisphere and the rest of the world.

There have been numerous trade agreements within the countries of South

America and other nations of the Americas. Concerning other Latin American nations, it

is important to highlight Mexico's relationships with South American countries. This

country signed agreements with Bolivia in 1993, with Venezuela and Colombia in 1994

(the Group of Three), with Chile in 1999, with Uruguay the same year, and with Brazil in

2002. Another country that has been an active negotiator of trade agreements is Chile,

who in 1999 signed an agreement with the Central American Common Market, as well as

with Mexico as noted. Chile has signed agreements with countries outside of Latin

America, including Canada in 1996, with the European Union in 2002, and the U.S. in 2003, as well with Korea the same year. Colombia signed agreements with Costa Rica, El Salvador, Nicaragua, and Guatemala in 1984, a year later with Honduras, with Panama in 1993, and with Caricom in 1994. Venezuela also signed an agreement with the countries in Caricom (1992), with Guatemala in 1985, and a year later with Costa Rica, El Salvador, Honduras, Nicaragua, in 1989 with Trinidad Tobago, and with Guyana in 1990.

The countries of the Andean Community as a group have signed agreements with the European Union and negotiated the Political Dialogue and Co-operation Agreement in 2003. Mercosur also negotiated Interregional Framework Cooperation Agreement with the EU, and negotiations aimed to create a free trade area are currently being negotiated. Other agreements worth mentioning are the framework accord with India in 2003 and with Egypt in 2004.

The Free Trade Area of the Americas, FTAA, is another important agreement which is currently being negotiated and extends from Alaska to *Tierra del Fuego*. This would encompass the thirty-four countries of South America, Central America and the Caribbean (except Cuba), in addition to the U.S. and Canada. It includes a market of more than 800 million people, which would make it the biggest trade area in the world. The FTAA is also a unique agreement because of the asymmetry of the economies among the countries. It includes acknowledgement that the U.S. is considered the quasi-hegemonic world power, at the same time as it includes underdeveloped nations at a variety of political, social, and economic levels. The FTAA would eliminate tariffs among these countries within ten years. It also will eliminate regulatory barriers to

increase trade. The negotiations are underway; however, as these negotiations remain

secret it is not possible to know what exactly is included in the agreement. (Garay-

Salamanca, 2002; Petrash, 2000; Gudynas, 2001)

In sum, South American countries have followed two approaches. The first is to

have opened their economies and signed formal trade agreements with South American,

and Latin American countries. The second is to have built ties outside the region, in

particular with the U.S., Canada, and the European Union. In the following section we

show patterns and trends of international trade in South America.

Trade Processes in South America

We begin by describing the behavior of trade in South American in Table 1 from

1980 to 2001.[13] Rather than examine the behavior on a year-by-year basis, we average

the data for the first 5 years, 1980 to 1984, and for the last five years, 1997 to 2001, to

have representative values at the start and the end of the period, not affected by year-

specific fluctuations. Our analysis focuses principally on percentage changes across

these two time periods. The presence of the two RTAs, Andean Community and

Mercosur, and Chile which belongs to neither, imposes a natural partition of the continent

into regions, for which we also include summary data of the trade within each of the two

regional trade agreements, and the trade of the three partitions among themselves and

with North America, the European Union and the rest of the world.

Panel A of Table 1 details the distribution of trade in South America by countries

and regions. It shows that between 1980 to 1985 South American international trade is

largely explained by Brazil with a 39% share of the total, Venezuela with 25%, Argentina

with 15%, and Colombia and Chile each with 8%. The total growth of trade of 42% from 1980 to 2001 is mostly due to Brazil whose trade grew at 58% in the same period, Argentina with 89%, Chile with 136%, and Colombia with 68%. Notably Venezuela was the only country in the region whose value of real bilateral trade fell (-15%). On the other hand, while trade with non-South American partners remained most of the total over the studied period, the intra-South American trade moved from being 8 to 14% of the total, which is evidence of increasing regionalization in the continent.

Clearly, in Table 2 we see that the Andean trade had been concentrated with North America, Western Europe and the rest of the world, and less than 12% had been with South America. Similarly, Mercosur members did not trade much in South America in the early 80's, but in the 1997-2001 period we see that trade gaining importance, from 12% to 19% of the total trade of Mercosur[14]. The Chilean distribution of trade by regions remained somewhat stable during our study period.

When analyzing the growth of trade by regions Table 1 shows that the largest driving factors of growth of the total South American trade were the Chilean trade (growth of 136%), the intra-Mercosur trade (growth of 289%) and the trade of Mercosur with North America and Western Europe (growth of 70% and 60%, respectively). Other factors that contributed to the overall growth were the Intra-Andean trade (growth of 176%), and the trade of Mercosur with Chile (growth of 165%). Quite the opposite, the trade between Andean Community and Mercosur members only grew 6%.

These initial results suggest that the increasing trade inside both Mercosur and the Andean Community are in part responsible for regionalization, considered the increasing importance of the intracontinental trade relative to the trade with the rest of the world.

Panel C presents the average distance of trade for the countries and regions of South America with ambiguous results[15]. While the average distance of trade is shrinking for each individual country during the studied period, with the exception of Chile and Paraguay, this parameter remains mostly constant for the continent as a single unity[16]. Overall, we have to say that although the analysis of the average distance of trade is suggestive of regionalization taking each nation separately, the regionalization of South America as a whole cannot be described as a significant drop in the average distance of trade.

Panel C shows that the increasing trade with same language partners happened for all South American countries, with the sole exception of Brazil, after all, the only non-Spanish speaking country in the area. Panel E shows that, consistent with the analysis of the previous panels, with the sole exception of Bolivia, the trade with bordering countries increased for all South American countries, especially for Argentina (share went from 17% to 37%), Uruguay (27% to 43%), Ecuador (5% to 13%) and Brazil (10 to 18%).

In summary, the results of Table 1 are indicative of an increasing regionalization of the South American trade in three dimensions: an over-average growth of the trade of between the members of the same RTA as well as the intracontinental trade an increasing trade across borders and also more trade between countries with the same language. On the other hand, while the rising trade of Chile with the other South American members contributed to that overall trend, the trade between the Andean Community and Mercosur did not: it only grew 6% in real terms in the span of 22 years, against an growth of 42% for the overall trade an a 143% for the intra-continental trade. Although intuitive, the analysis of this section is by no means a rigorous one, since we are not controlling for

factors known to explain increasing trade, for example the growth of the GDP. A more

rigorous approach will be presented below using the Gravity equation.

Gravity equation

We use the gravity equation (3) of Chapter 5, this Volume, to understand the patterns of

trade of South American countries— among them and with the rest of the world. Based

on theoretical grounds Anderson and van Wincoop (2003) argues for the adoption of a

consistent gravity equation[17]. This approach is implemented by Feenstra (2002) and

Rose(2004) using country fixed-effects in the gravity equation. Thus, we include

country-fixed effects whenever possible. The variables are defined in Appendix A of

Chapter 5.

As in chapter 5, the panel data version of the gravity equation, complemented

with time interactive variables allows us to estimate the time varying effect of the

variables of interest. For example, if after adding to the model the interactive variable of

distance and time, *Logdistancext,* its coefficient result is positive and significant, we can

infer that the negative effect of distance on trade is diminishing over time. This is the

central part of our tests of regionalization and globalization – this parameter essentially

creates a test that indicates whether trade is increasing closer to home (regionalization) or

farther from home (globalization) while controlling for other relevant factors.

Table 4, columns 1 and 2, illustrates the results of the Gravity equation for two

datasets: for the entire bilateral trade of the world (145 countries) and for the subset of

developing countries, replicating the results of Table 1 of Rose (2004) [18,19]. Although we

are using a different time frame and different source for the trade data, we obtain in the

first two columns almost the same results of that paper: a positive and significant effect

from the GDPs, the GDPs per capita, the common language, border, common colonizer,

current colonizing relationship, common currency. As in Rose (2004), we also find

significant negative effects from distance, from the number of landlocked countries in the

pair, and from the product of the areas. Consistent with Rose (2004), the effect of the

RTA is much larger for developing countries than for the world as a whole, (an estimated

4.4 times larger).[20]

South American effects on trade

We investigate South America's propensity to trade by adding the dummy variable *SA*

equal to one when either of the countries in the pair is from South America, to the

gravity equation. Columns 3 and 4 of Table 2 show the results for the world and for

developing countries data, respectively. The resulting estimator confirms the basic

statistics shown earlier: South America trades less in relation to the world or developing

countries. The estimated coefficients of *SA* show that South America traded around 32

per cent less than the rest of the world.[21]

We get some insight into South America's lower propensity to trade by including

interactions between the main variables of the gravity equation and the South America

dummy variable, as presented in column 5 of Table 2. The interaction variables provide

an estimation of the additional effect of the key regressors for South America. For

example, the negative significant sign of the log of distance means that distance is a

larger negative factor for trade in South America than in the rest of the developing

countries. To illustrate this, the impact on trade of going from 1000 to 3000 miles

implies, on average, an 80 per cent reduction in trade for the developing countries but an 84 per cent for the South American countries.[22]

Furthermore, common borders are supposed to facilitate trade, and indeed the estimators of Table 2 suggest that bordering countries trade 88% more on average than non-bordering countries, controlling for all other factors, while for South America the border effect is in the order of 16 per cent.[23] These findings are an example of the historically weak trade relationship among the countries within South America, We explore this issue below and show that borders in South America have shrunk over time.

The incremental effect on trade of belonging to the RTA is three times lower for South America than for the rest of developing nations,[24] confirming the intuition that RTAs seem to have had les of an impact on bilateral trade in South America than elsewhere.

Finally, we note that while the rest of developing countries trade four times more with their former colonizer than with countries without the colonial relationship, after controlling for confounding factors, that is not the case for South America. South American countries trade on average just 1.12 times more with Spain and Portugal than with the other countries.[25] This finding is understandable since the countries of South America have been independent from Spain and Portugal since the early1800s.

Globalization vs. Regionalization within South America

Table 3 deals with the regionalization issue. We run the gravity equation only with South American observations. The basic South American model is presented in column 1,[26] while models 2 and 3 incorporate time interactive variables. For example, while in

column 1 the variable *Comlang* reflects an overall positive relationship between common language and trade, the estimator of *Comlangxt* in column 2 shows that this has been increasing over time, and indeed the estimator of *Comlang* in column 2 shows that this effect was not significant at the beginning of the period. Similarly, column 3 shows an increasing effect of the RTA effect. On the other hand, the estimators of *Logdistancext* and *Borderxt*, show that the effect of distance and common border have not experienced significant changes.. These results are robust under alternative specifications, which are not reported,[27] and confirm that South America trades increasingly with countries of the same language and RTAs. There is no significant evidence of trade changing at different distances or of changes in border effects.

In the next three sections we will pursue in more depth three issues: the propensity to trade of individual South American countries, the intensity of trade of South America with different regions on the world, and border effects..

Propensity to trade

We employ dummy variables for individual countries in the gravity equation to estimate degrees of 'openness' of each South American country as presented in Table 4[28] .

Taking Ecuador as an arbitrary base (=1.0) the estimators of the gravity equation indicate that, for example, Chile trades almost 5 times more than Ecuador, and 1.6 times more than Brazil, after controlling for GDP, GDP per capita, common language, distance and border effects, being the most trade oriented country in the region. Brazil, Uruguay and Argentina appear also as countries relatively trade oriented. In contrast to the results of Table 1, the Andean countries, especially Colombia and Ecuador, appear less inclined

to trade than the Mercosur countries. Chile's strategy has historically followed a multitrack trade policy in comparison with the rest of South America, this country has striven to get access to Mercosur, Andean Community, EU, and the countries of the pacific region.

Table 4 also reports estimates of the annual change of the propensity to trade, estimated using the gravity equation. The results suggest that all the South American countries increased their propensity to trade during the period of study. The strongest rates of growth were experienced by Peru, Argentina, Colombia and Ecuador, and the lowest by Venezuela.

Intensity of Trade

Panel A of Table 5 presents the estimated average intensity of trade between the three regions of South America and the rest of the world. To estimate these variables we used fixed effects in the gravity equation for the trade between South American regions and the regions in the world, naming the intra trade of the Andean community as an arbitrary base, with a value of 1.0. Thus, for example, the trade between Chile and Western Europe is 8.4 times larger than the intra Andean community trade after controlling for GDP, distance, common language and other effects in the gravity equation. The results reflect that the trade between Chile and the Pacific Basin (East Asia, Southeast Asia, Australia and New Zealand) has been particularly intense, even after controlling for variables in the gravity equation. Moreover, the Pacific basin has been also an important partner for the international trade of the Andean Community and Mercosur. The Chile-Andean Community trade has been also very important beyond

what the proximity to Peru and Bolivia might imply, while the Chile-Mercosur trade has been relatively low. On the other hand the trade between the two regional groups and the USA, Canada and Western Europe have been in relatively normal levels according to the gravity equation (average values). All in all, the punch line of Panel A is that Chile has been a particularly active trading country with the entire world except Mercosur, and that the Andean countries have been trading relatively little between them.

In the period of study the intra-Andean trade surged with a 10% annual increment on the propensity to trade, the trade of between Mercosur members, and them with the Andean community with 5.1% and 4.4% see panel B of Table 5. Trade with Mexico, Central American and the Caribbean countries gained intensity for the entire Continent, but especially for Chile and the Andean community. Trade with the Pacific basin also increased significantly for all South America, while the trade of Western Europe with the Andeans lost some intensity. The results of the Gravity equation suggest that the intensity of trade of South America with U.S., Canada and Western Europe has not changed much in the 22 years of the study.

Border Effects

Focusing on the intracontinental trade offers some interesting questions to be explored. For example, the result of Table 5 suggests that Chile and Argentina, which share the longest frontier in the continent, have been trading relatively little. Furthermore Table 5 shows that on average, the Andean Countries, most of which share a common border, have traded far less than their proximity, common language and size would predict in a gravity equation applied to South American trade. In addition, the results of Table 2 and

5 point to a null or very small "border" effect on South America: bordering countries do not trade as much as expected. To investigate further this phenomenon, we estimate border effects between South American nations; see Table 6[29].

The first column presents the estimated border effects. To allow a relative comparison, we assigned an arbitrary value of 1.0 to the border effect between Argentina and Brazil. Thus, for example, we find that the trade between Colombia and Peru was 50% more than for Argentina and Brazil, but around half the trade between Bolivia and Peru, after controlling for GDP, distance, common language and other variables in the gravity equation. To be sure, these border effect estimators not only reflect the average infrastructure, topography or logistic conditions in the frontiers. They also capture historical, political, industrial and any other country-pair omitted factor not explicitly controlled by the gravity equation and that can be fostering or hindering trade between the two bordering countries.

The stronger border effects – i.e., more porous borders – are present in the pairs formed by Bolivia with Argentina, Bolivia and Peru, Brazil with Paraguay, Brazil with Uruguay and Bolivia and Chile. In omitted alternative specifications these results are mostly unaffected by including RTA variables, suggesting that none of those border effects are driven by the regional trade agreements. Moreover, the results are indicative that an intense trade between Brazil with Paraguay and Uruguay was already in place before Mercosur commenced officially in 1992.

On the other hand, there are borders associated with average negative effects on trade: the two most critical cases are Argentina with Chile, and Argentina with Uruguay. The estimators imply that after controlling by GDP, distance and the other variables of

the gravity equation, Argentina traded with those two countries, on average, less than 6% what has traded with Paraguay or Brazil in our period of study.

The borders of Bolivia with Paraguay, Ecuador with Peru, Brazil with Colombia, and Brazil and Peru have been also associated with less porous borders. Since the frontier line of Brazil with Colombia and Brazil with Peru is located in the Amazon Jungle, that could be a reason behind the relatively low trade between. However the frontiers between Colombia with Peru, and Brazil with Venezuela are also located in the Amazon Jungle, and those countries do not exhibit a negative frontier effect. It is evident that the border effects are gathering more than simple frontier conditions.

The gravity equation also allows to estimate the trend on those border effects over time, as show in the second column of Table 6. The results indicate that for most of the part, the trade between South American bordering partners, increased more than predicted by changes in the GDP or any other variable included in the gravity equation . The two exceptions are Argentina-Bolivia, which have had a very intense commerce in the past to begin with, and Brazil-Venezuela. The intensity of trade across all the other frontiers is increasing over time, especially for those frontiers between Mercosur members, as well for those between Andean community members. The second largest change in the border effect is between Argentina and Brazil (9.2%), which attests for the increasing importance of their commercial relations since the 1980's, and confirms the result of the analysis of Table 1.

On the other hand, the border with the highest growth of trade is not between countries in a common RTA but between Bolivia and Paraguay (probably due to the fact that the two countries did not trade much in the early 1980's[30]). Bolivia presents an

interesting case: on average for the period of study, it has been trading actively with

Argentina, Peru and Chile, while not trading so much with Paraguay and Brazil. Now,

Bolivia seems to have replaced to a large extent the Argentinean trade for increased trade

with Brazil, Peru and Chile and the Andean community members, while having a

somewhat normal trade with Paraguay

Taken together, the results of Table 6 suggest that Argentina, Colombia, Ecuador

and Venezuela have traded relatively little with their border neighbors. Especially

dramatic have been the cases of Ecuador with Peru, Argentina and Chile and Argentina

and Uruguay, although these negative border effects have been diminishing over time.

These findings are very well illustrated by the words of Marquez Moreira (1999),

"It is interesting to observe that physical barriers, the lack of transportation

infrastructure capable of supporting a de facto integration, and institutional contrasts,

have not only constituted an obstacle to integration between countries, but also among

subregions within countries themselves."

Conclusions

This study presents evidence of increasing regionalization of the international trade of 10

South American countries from 1980 to 2001. We find South America to be impacted

much less by globalization than countries in other parts of the world. South American

countries trade less than other countries, distance seems to be a larger impediment to

trade, and free trade agreements seem to improve trade less there than in other parts of

the world. Regionalization can derive from several different sources – borders, distance,

free trade agreements, and common culture and language. We found that the

regionalization of trade in South America is better described as an increasing trade with

Spanish-speaking countries and increasing trade within the two regional agreements.

These results are evident in a simple statistical analysis and are also robust and

economically significant when tested in a consistent gravity equation that controls for a

set of macroeconomic and geographic variables.

Finally, a further understanding of the patterns of trade in South America, should

find out how the reported patterns of trade in South America are explained at industry

level. For example, we would like to identify the industries and products more relevant in

the growing trade of Argentina and Brazil, Chile with Mercosur and the Andean

Community, and the increasing intra-Andean trade. Is regionalization present in all

industries or are there some industries trading over increasing distances? How are our

results impacted when we consider imports and exports separately? Is South America still

mainly exporting commodities while importing manufactured products and capital

goods?[31] All those questions are left for future research.

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Table 1. Summary statistics for South American Trade

	Panel A. Total trade (M 1995 US$)					Panel B. Trade with common lang. partner			Panel C. Average trade dist			Panel D. Trade with bordering countries		
	80-85	%share	97-01	%share	Growth			Δ Share	80-87	97-03	Growth			Δ Share
Andean Community														
Venezuela	42,385	25%	36,072	15%	-15%	11%	19%	7%	3,512	3,059	-13%	7%	10%	3%
Colombia	13,781	8%	23,184	9%	68%	18%	26%	8%	3,984	3,470	-13%	13%	18%	5%
Peru	9,026	5%	13,167	5%	46%	14%	26%	12%	4,912	4,887	-1%	11%	16%	5%
Ecuador	7,186	4%	8,571	4%	19%	14%	31%	18%	4,294	3,905	-9%	5%	13%	8%
Bolivia	2,558	1%	3,123	1%	22%	37%	38%	1%	3,700	3,486	-6%	45%	41%	-4%
Intra Andean trade	1,790	1%	4,943	2%	176%	100%	100%	0%	679	766	13%	88%	78%	-10%
Andean with Mercosur	4,836	3%	5,125	2%	6%	34%	33%	-1%	1,577	1,628	3%	76%	72%	-5%
Andean with Chile	1,130	1%	1,882	1%	67%	100%	100%	0%	2,209	1,908	-14%	21%	41%	20%
Andean with North America	33,377	19%	40,315	16%	21%	1%	6%	5%	3,099	2,994	-3%			
Andean with Western Europe	17,417	10%	13,645	6%	-22%	10%	13%	3%	5,375	5,562	3%			
Andean with other	14,595	8%	13,264	5%	-9%	14%	18%	4%	5,400	6,286	16%	1%	1%	0%
Andean Total	73,145	43%	79,175	32%	8%	12%	19%	7%	3,927	3,735	-5%	8%	11%	3%
Mercosur														
Brazil	66,395	39%	104,600	43%	58%	1%	1%	0%	5,454	5,133	-6%	10%	18%	8%
Argentina	25,711	15%	48,490	20%	89%	16%	19%	3%	6,462	5,100	-21%	17%	37%	19%
Uruguay	3,779	2%	5,891	2%	56%	21%	32%	11%	5,081	4,299	-15%	27%	43%	16%
Paraguay	1,962	1%	3,930	2%	100%	24%	29%	4%	3,761	3,922	4%	49%	50%	1%
Intra Mercosur trade	4,421	3%	17,211	7%	289%	17%	12%	-5%	1,421	1,548	9%	99%	99%	0%
Mercosur with Andean	4,836	3%	5,125	2%	6%	34%	33%	-1%	1,577	1,628	3%	76%	72%	-5%
Mercosur with Chile	1,869	1%	4,958	2%	165%	37%	60%	23%	1,291	1,006	-22%	32%	56%	24%
Mercosur with North America	23,903	14%	40,724	17%	70%	2%	2%	1%	4,591	4,596	0%			
Mercosur with Western Europe	27,016	16%	43,152	18%	60%	4%	6%	2%	6,033	5,944	-1%			
Mercosur with other	31,381	18%	34,532	14%	10%	2%	1%	-1%	8,270	9,113	10%			
Mercosur Total	93,425	54%	145,701	60%	56%	6%	7%	2%	5,871	5,479	-7%	9%	16%	7%
Chile														
Chile with Andean	1,130	1%	1,882	1%	67%	100%	100%	0%	2,209	1,908	-14%	21%	41%	20%
Chile with Mercosur	1,869	1%	4,958	2%	165%	37%	60%	23%	1,291	1,006	-22%	32%	56%	24%
Chile with North Am.	3,358	2%	8,416	3%	151%	3%	16%	13%	5,058	4,959	-2%			
Chile with Western Europe	3,975	2%	7,511	3%	89%	9%	11%	2%	7,182	7,175	0%			
Chile with other	3,016	2%	8,719	4%	189%	1%	3%	1%	9,437	10,525	12%			
Chile Total	13,348	8%	31,486	13%	136%	18%	23%	5%	5,911	6,224	5%	6%	11%	5%
Trade within S.A	14,046	8%	34,119	14%	143%	46%	51%	5%	1,426	1,388	-3%			
Trade S.A. with the rest.	158,037	92%	210,277	86%	33%	54%	49%	-5%	5,582	5,829	4%			
TOTAL South America	172,084	100%	244,396	100%	42%	8%	11%	3%	5,242	5,209	-1%	6%	12%	5%

Table 2 . Gravity equation for the World trade and developing countries, South American effects

Variable	1	2	3	4	5
Log_prod_gdp	0.547***	0.627***	1.020***	1.035***	0.615***
Logdistance	-1.436***	-1.494***	-1.105***	-1.176***	-1.477***
Log_prod_gdppc	0.482***	0.361***	-0.012	-0.016	0.349***
Comlang	0.408***	0.385***	0.376***	0.326***	0.339***
Border	0.351**	0.571***	0.797***	0.913***	0.635***
Landlocked	-2.455***	2.738	-0.473***	-0.459***	-0.654
Island	1.852***	-1.628***	0.028	-0.03	-2.949
Log_areas	0.520***	0.469***	-0.123***	-0.133***	0.417***
Comcol	0.654***	0.650***	0.781***	0.742***	0.576***
Curcol	-0.135	0.726	-0.111	2.051***	0.713
Colony	1.142***	1.208***	1.265***	1.450***	1.356***
Comcur	0.986**	0.861**	1.090**	1.026***	0.835**
Rta	0.221	1.706***	0.834***	2.180***	1.855***
SA			-0.398***	-0.389***	-7.803***
Log_prod_gdp_sa					0.191***
Logdistance_sa					-0.191**
Comlang_sa					0.196
Border_sa					-0.487*
Comcol_sa					0
Colony_sa					-1.238***
Rta_sa					-1.178***
Constant	-26.13***	-19.60***	-27.24***	-27.02***	-15.68
N	137500	122400	137500	122400	122400
R^2	0.76	0.73	0.70	0.65	0.73
Data	World	Developing	World	Developing	Developing
Country Fixed effects	Yes	Yes	No	No	Yes

Regressand: Log of bilateral trade

Robust standard errors on clustering by country pairs.

Country and Year fixed effects not shown. Significance level: * ; 10% , ** : 5%, * 1%

Table 3 . Gravity equation for South America, time varying effects.

Variable	1	2	3
Log_prod_gdp	0.974***	0.987***	0.965***
Logdistance	-2.415***	-2.499***	-2.503***
Log_prod_gdppc	0.079	-0.047	-0.021
Comlang	0.633***	-0.018	0.02
Border	-0.273	-0.293	-0.177
Rta	0.529*	0.506*	-0.03
Log_prod_gdpxt		0.005***	0.005***
Ldistxt		0.008	0.009

Comlangxt			0.059***	0.057***
Borderxt			0.002	-0.01
Rtaxt				0.047**
Constant		-14.797	-12.872	-12.158
N		20830	20830	20830
R2		0.78	0.78	0.78

Regressand: Log of bilateral trade for South American countries
Robust standard errors on clustering by country pairs.
Country and Year fixed effects not shown. Significance level: * ; 10% , ** : 5%, * 1%

Table 4. Propensity to trade for South American countries 1980 -2001

Rank	Country	Propensity to trade 1980 -2001	
		Average	**Annual change**
1	Chile	4.94	4%
2	Brazil	3.00	3%
3	Uruguay	2.86	3%
4	Argentina	2.52	7%
5	Peru	1.65	8%
6	Venezuela	1.56	2%
7	Paraguay	1.38	3%
8	Bolivia	1.37	3%
9	Colombia	1.11	6%
10	Ecuador	1.00	5%

Average estimators obtained in a Gravity equation with country fixed effects, and assigning a value of 1.0 to Ecuador.
Annual change estimators obtained in a Gravity equation with time interactive effects of South American country fixed effects.

Table 5 . Intensity of trade with different regions in the world

South American Region	Andean Community	Mercosur	Chile	USA and Canada	Mexico, Central America and Caribbean basin	Western Europe	Pacific basin	Rest of the world
Panel A . Average intensity 1980 -2001.								
Andean Community	1.0	1.3	9.6	2.2	1.8	2.6	4.7	1.3
Mercosur		2.3	1.9	1.6	1.9	2.5	4.5	3.4
Chile				5.6	3.7	8.4	22.3	4.1

Panel B. Average annual change on the intensity 1980 -2001

Andean Community	9.7%	4.4%	-1.2%	-0.8%	2.8%	-2.0%	0.9%	0.4%
Mercosur		5.1%	0.3%	1.7%	0.8%	-0.4%	2.1%	-2.0%
Chile				-1.2%	4.5%	-0.4%	1.6%	-3.4%

Average estimators obtained in a Gravity equation with Country fixed effects for the trade between the South American sub-regions and each of the World regions, assigning a value of 1.0 to the intra-Andean Community trade.
Annual change estimators obtained in a Gravity equation with time interactive effects of sub-region-region trade.

Table 6 Effects of Borders on South American Trade

Border effect

Bordering countries	Average effect 1980-2001	Growth of border effect
Argentina -Bolivia	4.06	-5.8%
Argentina –Brazil	1.00	9.2%
Argentina –Chile	0.03	4.5%
Argentina –Paraguay	0.93	4.7%
Argentina –Uruguay	0.06	5.1%
Bolivia –Brazil	0.87	1.7%
Bolivia –Chile	1.55	1.9%
Bolivia –Peru	3.45	5.1%
Bolivia –Paraguay	0.20	18.9%
Brazil –Colombia	0.51	1.7%
Brazil –Paraguay	1.92	1.9%
Brazil –Peru	0.46	1.0%
Brazil –Uruguay	1.82	2.6%
Brazil –Venezuela	1.00	-2.0%
Chile -Peru	0.91	2.7%
Colombia –Ecuador	0.79	4.9%
Colombia –Peru	1.49	4.2%
Colombia –Venezuela	0.62	3.4%
Ecuador –Peru	0.37	6.4%

Average estimators obtained using individual border fixed effects in a Gravity equation with Country fixed effects for South American trade
Annual change estimators obtained in a Gravity equation with time interactive effects of the border effects

Notes

[2] Although the three Guyanas (English, Dutch and French) are geographically in South America, they have been culturally and economically integrated to the Antilles and Europe rather than to the rest of South America.

[3] The effects of the cultural proximity provided by language commonality have been recently included in the gravity equations, see for example Rose and van Wincoop(2001) and Soloaga and Winters(2001) while its time-changing effects are explored for the G7 countries in Chapter 5, this volume .

4 Simón Bolívar (1783-1830) won independence over the Spanish crown for Bolivia, Colombia, Ecuador, Panama, Peru, and Venezuela. He is seen as the "George Washington of South America."

5 It is essential to qualify Fernando Cardoso because his thought has shifted dramatically during his career

6 The original name of the Andean Community was the Andean Pact. In 1997 they changed the name to Andean Community of Nations.

7 Taken from CIA World Factbook site http://www.cia.gov/cia/publications/factbook ., on June 17th, 2005. GDP in purchasing power parity terms.

8 In the act of Barahona of December 1991, the presidents of the Andean community agreed on an external tariff; however how bilateral tariff agreements were to be compatible with a common external tariff has not been resolved.

9 In 1992 Colombia and Venezuela agreed to apply jointly a common tariff, though Peru and Bolivia continue to apply their respective regulations, while Bolivia has separate regulations.

10 After two years of complex negotiations and opposition from the private sector, in December of 1996, Bolivia reached an agreement with Mercosur. This agreement was viewed by Andean Community as a stab in the back for weakening the power to negotiate against other interest groups. In order to resolve this issue and not break the already fragile integration among the member countries of the Andean Community, this group issued special permission for Bolivia to begin negotiations with Mercosur.

11 The first agreement made by Mercosur was with Chile. After Chile declined an invitation to become a full member of Mercosur, in 1996 it signed a free trade agreement and instead became an associate member, forfeiting formal participation in the decision making processes and the policies of the common union. Even though Chile shares strong historical ties with Brazil and Argentina and is also part of the Southern Cone, Strategic international matters and internal political tensions led Chile to decide not to become a full member of Mercosur.

12 Taken from CIA World Factbook site http://www.cia.gov/cia/publications/factbook on June 17th, 2005 GDP in purchasing power parity term.

[13] See a description of the source of data in Appendix A of Chapter 5, this volume.

[14] From the numbers in Table 1: 12% = (4,421+4,836+1,869)/93,425; 19%= (17,211+5,125+4,958) / 145,701

[15] The average distance of trade for each region is defined as in Carrere and Schiff (2004), as the weighted average distance of trade for every pair of trading countries, where one or both of the countries belongs to the region. To account for the relative importance of some trading couples over others, it uses as weights the ratio between the bilateral trade of the country pair and the total bilateral trade of the region.

[16]This strange result can be better understood by observing that the fall of the average trading distance at country level is mostly due to the increasing intracontinental trade. Moreover, while the intracontinental trade is happening at increasingly shorter distance, the reverse is true for the extra-continental trade

[17] Anderson and van Wincoop (2003) advocate for the model of Anderson (1979) as a theoretical foundation for the gravity equation. They criticizes the 'traditional gravity' equation as misspecified for ignoring the "multilateral resistance" of each particular country in the estimation of bilateral trade. The notion of "multilateral resistance" can be illustrated as follows: One should expect that Australia and Indonesia trade more with each other than predicted by the "traditional" gravity equation, simply because the model lacks to incorporate the fact that Australia is relatively close to Indonesia but at the same time away from the rest of the world.

[18] Developing countries are indicated in Appendix B of Chapter 5, this volume, as defined by their inclusion in the Global Development Indicators database of the World Bank.

[19] Columns 1 and 2 of Table 2 only presents the results of the model that includes country fixed effects. Results without country fixed effects are qualitatively the same and can be obtained from the authors upon request.

[20] Comparing between the exponential of the estimated coefficients of the RTA variable in the models 1 and 2 on Table 2: $\exp(1.706)/\exp(0.221)= 4.4$

[21] $32\%= 1-\exp(0.39)$. Models 3 and 4 were regressed without country fixed effects. To include country fixed effects will mislead the estimation of the South American effect as they are highly collinear with the South America fixed effect).

[22] From the estimators of column 5 of Table 2: $-80\%= (3000/1000)^{(-1.477)} - 1$; $-84\%= (3000/1000)^{\wedge(-1.477-0.191)} - 1$

[23] From the estimators of column 5 of Table 2: $88\% = \exp(0.635)-1$, $16\% = \exp(0.635 - 0.487)-1$.

[24] $3.2 = \exp(1.855)/\exp(1.855-1.178)$

[25] From the estimators of column 5 of Table 2: $3.86 = \exp(1.36)$, $19.5\%= \exp(1.356-1.178)-1$.

[26] Regressing only South American trade a model specification analysis lead us to drop the following variables of the gravity equation of Rose(2004): *Curcol*, since none of the 10 South American countries is a current colony, and *Comcur*, since it's only relevant for one country pair-year in the sample (Ecuador-USA 2001). Besides the variables *Colony*, *Island* and *Log_areas* are discarded for having insignificant effects on South American trade. The *Landlocked variable*, although significant, is eliminated from the model for two reasons: it alters in a confusing way the estimators for the two landlocked countries in South America—Bolivia and Paraguay— and it is overridden by the country fixed effects.

[27] These results are robust to dropping the country fixed effects (thus becoming the traditional Gravity equation), to dropping Chile, the most "globalized" South American country, and to dropping Brazil, the only not Spanish speaking country and the largest economy. It also shows that the RTA effect is stronger in Mercosur than in the Andean Community. Those results are available from the authors upon request.

[28] The results are mostly unchanged under several specifications that incorporate alternatively country fixed effects for the non-south American countries, and the RTA variable. Those results are available from the authors upon request.

[29] The average results are qualitatively the same under several specifications that incorporate or exclude alternatively country fixed effects and a RTA variable. The reported average growth results effects are virtually unchanged by adding or excluding country fixed effects. Those results are available from the authors upon request

[30] Bolivia represented less than 0.01% of the trade of Paraguay, and viceversa in the early 80's.

[31] Carillo and Li (2002) provide a partial answer to some of these questions, but they use a very limited version of the gravity equation.