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# *South American Regionalism*

## *Assessing the Impact on Trade*

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## Abstract

This study examines the impact the Andean Community and Mercosur have had on the respective member countries' trade. Through the use of the gravity model the effects on trade from regional integration in South America are assessed. After a long period of economic isolation the South American nations began a process of reintegration into the world economy in the 1980s. Alongside an overall trade liberalization a process regional integration led to the reinvigoration of the Andean Community and the creation of Mercosur in the 1990s. Since then intra-bloc imports have increased substantially in the Andean Community and Mercosur and the degree of intra-bloc imports are in both cases found to be more intense than what can be explained by natural determinants of economic interaction. A positive impact on trade from regional integration is established. A comparison between the two regional trading agreements find the Andean Community to be relatively more trade creating than Mercosur during the 1990s, while by 2004 the relationship is the opposite. These findings are ascribed to the earlier start of the Andean Community while the relatively deeper integration process of Mercosur has by 2004 produced greater effects on trade.

*Keywords:* Andean Community; Gravity model; Mercosur; Regional integration

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# 1. Introduction

*Half-naked and shivering with fever he suddenly with a loud voice began to, step by step, declare his future pursuit: immediately conquer Angostura, cross the Andes and liberate New Granada and then Venezuela, found Colombia, and finally conquer the vast areas in the south, to the outer border of Peru. “We shall ascend the peak of Chimborazo and hoist the tricolor for a united, free Spanish America, for ever, for eternity”, he finished. Those who listened to him also thought he had become completely insane, and yet his prophecy would be fulfilled accordingly, step by step, in less than five years.*

In the novel *The General in his Labyrinth* Colombian writer Gabriel García Márquez paints a vivid portrait of the South American liberator Simon Bolívar. During the last months of his life, Bolívar saw the disintegration of the united Spanish America and the consolidation of many of the nation states today existing on the continent.

Unlike his creation, the pan-American legacy of Bolívar has never really left the continent. During the twentieth century a process of reintegration began in South America and by the end of the century the Andean Community (CAN) and Mercosur had emerged as two regional integration areas of significance.<sup>1</sup>

After years of authoritarian dictatorships and economic isolation, the South American nations are now part of the international economic playing field. Also within the continent, economic interactions have become increasingly intense and the integration projects of the Andean Community and Mercosur are the areas of study for this thesis.

The purpose of the thesis is to *asses the impact of the regional trading agreements of the Andean Community and Mercosur* on the respective member countries' trade. Departing from economic integration theory, effects of integration will be assessed through use of the gravity model. In order to fulfill this purpose the following two objectives have to be met: i) account

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<sup>1</sup> The Andean Community was formerly known as the Andean Group. The terms Andean Community and CAN will be used interchangeably throughout the paper. See section 2.4 for further presentation of the Andean Community and Mercosur.

for central concepts in the theory of economic integration and contextualize these in a South American setting; and ii) assess the impacts through the use of gravity modeling and evaluate the effects on trade.

The thesis is organized as follows. The following section begins with a presentation of central concepts of economic integration theory, and then moves on to give a brief account of the South American economic history as well as an introduction of the Andean Community and Mercosur. The third section introduces the gravity model, its theoretical underpinnings and empirical implementation. The fourth section presents and evaluates the results, and the fifth and final section concludes.

## 2. South American Regionalism

### 2.1. Regional Economic Integration

Economic integration is the process of gradual elimination of trade barriers between member countries partaking in the integration process. The general motive of economic integration is to attain economic and political gains. These in turn depend on the degree of integration the participant countries choose to aim for. While political gains come in form of closer cooperation and regional stability, economic gains refer to more efficient resource allocations due to specialization, exploitation of scale economies and increased competition.

Jan Tinbergen (1965) offers a conceptual division of two types of integration. The term negative integration denotes those aspects of economic integration that involves the removal of discrimination and restrictions of movement, analogous with trade liberalization. This is contrasted with positive integration implying the modification of existing instruments and institutions and the creation of new ones to enable the integration process to function more effectively and to promote other broader policy objectives in the integration area. (Robson 1998a:2)

The Hungarian economist Béla Balassa introduced a six-stage model of economic integration. The weakest form of integration, preferential trading area, is a trading bloc giving preferential access to certain products from certain countries through a reduction in tariffs. The next stage is a free trade area (FTA) where a designated group of countries agree to eliminate tariffs, quotas and preferences on (most) goods between them. Each member still acts individually upon policies toward non-members. The third stage, customs union (CU), is a free trade area where the integration process is taken a step further by the participant countries setting a common external trade policy. The fourth step identified by Balassa is the common market, meaning common policies on product regulation and freedom of movement for goods, services, capital and labor. Fifth, economic and monetary union is the same as the former with the addition of a common currency for the member countries. Complete economic integration is the sixth and final stage. Here the integrated units have no or negligible control over economic policy, including full monetary union and complete or near-complete fiscal

harmonization. Unless explicitly referred to any of the above, I will in this paper use the generic terms regional trading agreement (RTA), regional grouping and trade bloc.<sup>2</sup>

The resource allocation effects caused by economic integration have traditionally been analyzed in terms of trade creation and trade diversion, concepts introduced by Jacob Viner (1950). In Vinerian analysis trade creation takes place when a member country, due to integration, replaces goods produced domestically at relatively high costs with goods imported from another member country at relatively low costs. Within the RTA resources are thus re-allocated from a less efficient to a more efficient producer and consumers can enjoy lower prices. Trade diversion occurs when low cost goods that prior to integration were imported from a third country are replaced by imports from an RTA member at relatively higher costs, due to a common external tariff (CET) distorting the efficient trade patterns. (Robson 1998a:7ff)

The merits of an RTA are evaluated through the relative magnitudes of trade creation and trade diversion. If trade creation outweighs trade diversion there is a net gain from integration, whereas an RTA that is on balance trade diverting is regarded as detrimental. Important to point out, however, is that welfare gains due to resource allocation can be deconstructed and analyzed from the point of view of the member country, the integration area, third country or the world as a whole, and thus reveal a more complex picture of potential welfare effects of economic integration. (Panagariya 1998:9ff; Robson 1998b:391)

In addition to the static effects shown in the Vinerian analysis, economic integration may also produce dynamic effects. These refer to effects leading to economic growth such as economies of scale and efficiency gains. Larger market size and fiercer competition due to integration trigger these dynamic effects, although some degree of positive integration is generally necessary in order to achieve these. (Jovanovic 1998:311ff)

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<sup>2</sup> For a critical discussion on the matter see e.g. Panagariya (1998).

## 2.2. South-South Integration

When discussing South-South integration, the issue of regional integration needs to be approached in a context considering some characteristics specific to developing countries. According to Robson (1998b) the static Vinerian analysis only has a limited bearing when evaluating the gains from integration among developing countries. While Vinerian analysis departs from the standpoint that it is the move towards free trade that is the source of gains from integration, South-South integration must be analyzed in a slightly more nuanced fashion in order to fully comprehend its rationale.

For developing countries, it has been argued that there is a valid case for protecting certain activities, particularly industry. The reasons may be of economic and non-economic character, but the important aspect here is that both form part of a broader development strategy. Most developing countries have equated the expansion of the industrial base with economic development, i.e. industrialization has been regarded as a rational social choice (Langhammer and Hiemenz 1998:418f). Given this social preference developing countries are willing to bear the costs of the income foregone by not importing from the cheapest available source or by specializing in sectors where they do not have a comparative advantage. In terms of economic integration, the resulting larger domestic market size may facilitate an import-substitution industrialization agenda (see section 2.3.) and the larger the social preference for a certain industry of a potential RTA member country is, the less important is the Vinerian welfare-reducing effect of trade diversion (*ibid*).

Another motivation for economic integration that is more specific for South-South arrangements is the reduction of external vulnerability. Following the hypothesis that regional integration facilitates the structural change in production from the primary to the secondary sector, and within the export sector towards manufactured goods, the price fluctuations in primary commodities would be less detrimental for the developing countries' import capacity (Langhammer and Hiemenz 1998:420f).

Turning to Tinbergian positive integration, South-South integration schemes generally need to pay more attention to institutional issues than do RTAs among more advanced market economies in the developed world. Again, the link to the member countries' individual

development strategy plays an important role. As Venables (1999) points out, South-South arrangements may, due to agglomeration effects occurring at the level of the industry as a whole, favor the most developed areas of an FTA, thus fostering an income divergence (Venables 1999:17f). When forming an RTA consisting of developing countries the direction of industrial development and the character of regional specialization must be evaluated in terms of comparative advantages of the regional grouping as a whole and of particular countries within it, and moreover these evaluations must take individual countries' development strategies into consideration.

Finally, raising the collective bargaining power vis-à-vis industrialized countries is facilitated and made more credible when forming an RTA (Langhammer and Hiemenz 1998: 421f). This is a trend that has become increasingly more visible over the last few years.

### 2.3. South America – Disorientation and Dependency

Economic growth in South America in the nineteenth and early twentieth centuries was closely linked with free trade and integration in the world economy (Gwynne 1999:70). Export-led growth, where the South American countries exported primary products and imported manufactured goods was the policy favored by the South American governments.

In the aftermath of World War I and the Depression when Europe engaged in protectionism, South America followed and closed its economies and began pursuing a policy of inward orientation and state intervention. The crisis in the world economy had demonstrated the vulnerability of the South American economies and the deteriorating terms-of-trade signaled a deep dependency on the core economies. Along the lines of the infant-industry argument, entry from foreign competitors was made expensive or impossible through tariffs, quotas or exchange controls. Entrepreneurs observing the scarcity of goods and the level of protection began to produce or increase the production of goods previously imported. As a result industrial production and employment increased in most South American countries. (ibid: 71)

In the 1950s structuralist- and dependency theories grew strong in South America. The 'periphery' was thought to be drained of its resources by the 'core' and to stop this resource

drain the peripheral countries needed to de-link themselves from the world capitalist system, and instead engage in intra-periphery trade.<sup>3</sup> Empirical evidence supported the Prebisch-Singer Thesis stating that the terms-of-trade between primary products and manufactured products tend to deteriorate over time. Exporters of primary products, usually the developing countries, are thus able to import less and less for a given level of exports.

In the 1950s many South American countries thus began to pursue what is called import substitution industrialization (ISI). In the ISI-model the state played a key role as the main investor and conductor of the development process. Sectors deemed to be strategically important enjoyed generous subsidies and high protection against foreign competition. The ISI growth strategy led to inefficient and noncompetitive economies insulated from world markets. Primary product export incomes financed the import substituting industry sectors and the population bore the costs through prices, inflation and government expenditures. Although the ISI-model yielded growth rates in Latin America above world averages between 1950 and 1980, this closed growth strategy was in the long run unsustainable generating trade and budget deficits, accelerating rates of inflation and recession. (Paiva and Gazel 2003:118f; Gwynne 1999:72)

The period of inward orientation brought a major decline of South American participation in world trade. Overvalued exchange rates made price sensitive export sectors such as manufacturing and agriculture hard to expand, while theoretically cheap imports were prevented by high tariffs and quota restrictions.

The ISI-policy which was thought to reduce the South American countries' dependency on the global economy had, in retrospect, an opposite outcome. In the 1970s the policy of inward orientation survived only because the huge inflow of capital from international banks recycling their petrodollars. When the system collapsed in 1982, there was no alternative but to turn to multilateral institutions such as IMF and the World Bank for external finance, and this time with strings attached. Like in the 1930s it was an economic crisis that led to a major change in economic policy.

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<sup>3</sup> See e.g. Cardoso (1972); Frank (1969)

What has later become known as the lost decade, post-debt crisis 1980s was a decade of reforms. The reforms, which were continued in the 1990s, followed the standard Washington consensus recipe of outward orientation, reduced government intervention in the economy, deregulation and fiscal discipline.

It was in the context of an overall trade liberalization we saw the emergence of new regionalism in South America. Table 2.1. shows the gradual decline of average tariffs in South America during the 1990s.

Table 2.1. Evolution of Average Tariffs in Percent

	<i>1990</i>	<i>1998</i>	<i>2000</i>
<i>Argentina</i>	20.9	13.9	13.7
<i>Bolivia</i>	9.7	9.7	9.7
<i>Brazil</i>	30.2	14.6	14.2
<i>Chile</i>	15.0	11.6	9.0
<i>Colombia</i>	15.0	10.9	11.6
<i>Ecuador</i>	32.9	15.5	17.7
<i>Paraguay</i>	16.9	11.5	11.6
<i>Peru</i>	25.9	13.5	13.5
<i>Uruguay</i>	27.7	12.2	12.4
<i>Venezuela</i>	17.6	11.9	12.3
<i>Andean Community</i>	20.2	12.3	13.0
<i>Mercosur</i>	23.9	13.1	13.0

Source: Inter-American Development Bank (2000)

The open economies made the South American countries vulnerable to external crises, as was the case with the Mexican peso crisis in 1994 and the East Asian financial crisis of 1997. Internally, South America also had its share of economic crises. In 1999 Brazil devaluated its currency, causing competitive imbalances within the Mercosur, especially in relation to Argentina, where by 2002 four years of recession culminated in economic implosion as the economy collapsed under the weight of rising internal fiscal and external trade deficits. (Todaro and Smith 2006:126ff)

## 2.4. Regional Trading Agreements in South America

As we know, the South American economies did only recently embark on economic integration into the world economy. Likewise is intraregional economic integration a fairly recent phenomenon. On the South American continent, two sub-continental integration areas are found: the Andean Community and Mercosur.

Figure 2.1. Map of South America



Source: Wikipedia

### 2.4.1. *Andean Community*

Following the Agreement of Cartagena the Andean Community started operating formally in 1969, consisting of Bolivia, Chile, Colombia, Ecuador and Peru. In 1973 Venezuela<sup>4</sup> acceded to the group while Chile withdrew its membership in 1976.

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<sup>4</sup> On April 19 2006 Venezuela under the Chavez administration announced its secession from CAN, instead advancing for a full membership in Mercosur. It is however beyond the scope of this study and Venezuela is therefore included when referring to CAN.

Table 2.2. shows that oil-exporting Venezuela has the highest GDP and GNP per capita. Colombia is the second largest economy, while in terms of per capita income it reports figures comparable to those of Ecuador and Peru. Bolivia lags behind both in terms of total GDP and per capita GNP.

Table 2.2. Characteristics of the Andean Community Countries (2004)

	Bolivia	Colombia	Ecuador	Peru	Venezuela
Area (sq. km)	1 098 580	1 138 910	283 560	1 285 220	912 050
Population (million)	9.0	44.9	13.0	27.6	26.1
GDP (billion US\$)	8.8	97.7	13.0	68.6	110.1
GNP/capita (US\$)	960	2 020	2 210	2 360	4 030

Source: WDI

Going slow from the beginning the integration process eventually stagnated and the community suffered setbacks during the ‘lost decade’ of the 1980s. In the wake of new regionalism in the 1990s CAN was reinvigorated and sped up the integration process. In 1993 Bolivia, Colombia, Ecuador and Venezuela removed the final tariffs and restrictions on the reciprocal trade in goods and an FTA was established. Peru started its gradual incorporation into the FTA in 1997, becoming a full member in 2005. The Andean FTA is universal, i.e. it has removed the tariffs on all goods without exception. (Comunidad Andina; Gwynne 1999:92ff; Lamelas, Aguayo and Cancelo 2005:2)

A customs union, however an imperfect one, has been in operation since 1995. Also here all CAN members besides Peru are partaking, who decides its national tariff with complete autonomy.<sup>5</sup> Furthermore each country is free to negotiate trade agreements with third countries. (Comunidad Andina; Lamelas, Aguayo and Cancelo 2005:2)

<sup>5</sup> Bolivia maintains its own tariff, subject to Community administration.

Table 2.3. Intra-Andean Community Nonfuel Imports

	Millions of US\$			Percentage of Total Imports		
	1990	1997	2004	1990	1997	2004
<i>Bolivia</i>	30	165	208	0.4	9.3	11.9
<i>Colombia</i>	474	2226	1852	9.0	14.9	11.0
<i>Ecuador</i>	119	843	1904	6.7	20.4	30.0
<i>Peru</i>	341	1572	2266	14.8	20.5	27.1
<i>Venezuela</i>	213	1027	2013	3.3	8.1	13.9
<i>Total</i>	1177	5833	8243	7.2	14.2	17.1

Source: Author's calculations based on data from UN-Comtrade and UNCTAD databases

Studying table 2.3. we can see that intra-Andean Community imports grew from 1177 to 8243 million US\$ between 1990 and 2004, signifying a 600 percent increase. During the first seven year period from 1990 to 1997, showing a 396 percent increase in imports, the growth rate of intra-CAN imports was about ten times that of the second seven year period.

Looking over both periods Ecuador is the country where imports from the other CAN members grew the most, showing an impressive 1500 percent increase. In Venezuela imports grew by 845 percent followed by Bolivia who experienced a 593 percent increase. In the case of Peru figures increased by 564 percent and Colombia, the country where intra-regional imports grew the least, shows a 290 percent increase.

Turning to the share of intra-CAN imports of total imports it rose by 9.9 percentage points from 7.2 in 1990 percent to 17.1 in 2004. Also here we detect that the growth in intra-regional imports fades out somewhat between 1997 and 2004. Again, Ecuador is the country where the reinvigoration of CAN had the strongest impact, experiencing a 23.3 percentage point rise in the share of CAN partners in world imports. For Colombia, the share of imports from the Andean partner countries only grew by 2 percentage points over the period 1990 to 2004. Colombia, as the only country, reported a decrease in intra-regional imports from 1997 to 2004.

## 2.4.2. Mercosur

The Southern Cone Common Market, Mercosur, was with the signing of the Treaty of Asunción created in 1991 consisting of Argentina, Brazil, Paraguay and Uruguay. Between 1996 and 2004 all the Andean Community-countries and Chile have joined as associate members, implying reciprocal preferential access to markets.

The Brazilian economy was by 2004 about four times larger than that of Argentina, which is the second largest in Mercosur. The Argentinean GDP is in turn considerably larger than Uruguay's and Paraguay's, about eleven and twenty times respectively. By itself, Brazil accounts for nearly 78 percent of the total Mercosur gross domestic product. Along the same lines as Venables (1999), Manzetti (1993) argues that since Brazil enjoys an economy of scale potential that is far beyond its Mercosur partners to match, these face the risk of being relegated to the position of being suppliers of raw materials and intermediate products to the Brazilian industrial sector (Manzetti 1993:123f).

Table 2.4. Characteristics of the Mercosur Countries (2004)

	Argentina	Brazil	Paraguay	Uruguay
Area (sq.km)	2 780 400	8 514 880	406 750	176 220
Population (million)	38.4	183.9	6.0	3.4
GDP (billion US\$)	153.0	604.0	7.3	13.2
GNI/capita (US\$)	3 580	3000	1 140	3 900

Source: WDI

As Balassa's six-stage model of economic integration suggests, there is a hierarchy of liberalization of markets and coordination of policies which would take countries from a position of autarky into a complete economic integration. Although countries are not expected to follow Balassa's taxonomy in exact order, economic integration can be argued to follow some sort of 'natural' path from lower to higher levels of integration. While the European Union is a good example of a relatively long and gradual process, Mercosur members speeded up the integration process and the bloc now bears characteristics of a free trade area, customs union, and some advances toward a common market (Paiva and Gazel 2003:121).

Most tariffs on goods were eliminated in 1995, although exceptions for goods deemed sensitive are still present. Also in 1995, a common external tariff structure was introduced;

however incomplete, covering about 85 percent of the imports. A convergence of the tariff schedule on excluded goods, e.g. capital goods and electronic equipment, is underway. Moves toward a common market have been made in form of a gradual phase out of trade in services and harmonization efforts in some areas, including macroeconomic policy. (Mercosur; Paiva and Gazel 2003:122)

Table 2.5. Intra-Mercosur Nonfuel Imports

	Millions of US\$			Percentage of Total		
	1990	1997	2004	1990	1997	2004
<i>Argentina</i>	833	7588	8169	22.3	25.8	26.1
<i>Brazil</i>	2441	10140	6741	14.9	17.6	12.7
<i>Paraguay</i>	404	1752	1584	34.9	57.0	60.6
<i>Uruguay</i>	560	1616	1384	48.3	47.8	56.8
<i>Total</i>	4238	21096	17878	18.9	22.6	20.0

Source: Author's calculations based on data from UN-Comtrade and UNCTAD databases

Looking at Table 2.5. we get a picture of the rapid process of integration among the Mercosur countries since the inception of the integration area in 1991. Pre-Mercosur intra-imports, reflected by the 1990 column, was only 20 percent of what it was seven years later. Between 1990 and 1997 imports with Mercosur member origin grew by 811 percent in Argentina, 334 percent in Paraguay, closely followed by Brazil showing 315 percent increase. Uruguay report the most modest figures with 189 percent increase in imports from its Mercosur partners. On the regional level the recorded increase was 398 percent.

The second period shown in Table 2.5., between 1997 and 2004, show a decline in intra-Mercosur imports experienced by all countries except Argentina. The decrease was most significant in Brazil with 34 percent decrease, while the total intra-Mercosur imports fell by 15 percent. Looking over the whole study interval, from 1990 to 2004, the increase in intra-Mercosur imports showed 322 percent increase.

Turning to the share of the imports from partner countries of world imports, the impact of Mercosur on the individual countries is inversely proportional to the size of their economies in all reported years. On a regional average it rose by 3.7 percentage points between 1990 and 1997, only to fall again leaving it at 20 percent in 2004, only 1.1 percentage points above the pre-Mercosur year of 1990. The reforms following the debt crisis in 1982 consisted, as explained above, of processes transforming the South American economies into market-led,

outward orientated economies. An important point to make is that Mercosur and the process of regional liberalization came into existence in a context of overall liberalization. With Mercosur recording only a slight increase in the share of intra-bloc imports in total world imports suggests a policy of open regionalism on behalf of the Mercosur countries, also reducing the risk of trade diversion.

Table 2.6. Intra-Mercosur Nonfuel Exports

	Millions of US\$		
	<i>1990</i>	<i>1997</i>	<i>2004</i>
<i>Argentina</i>	1906	10043	7248
<i>Brazil</i>	1267	8705	9099
<i>Paraguay</i>	385	895	702
<i>Uruguay</i>	680	1453	831
<i>Total</i>	4238	21096	17880

Source: UN-Comtrade

Regarding the setback in intra-regional imports between 1997 and 2004 we can assume that part of the explanation lies in the crises years at the turn of the century. The decrease in Brazilian imports appears logical when we remind ourselves of the Brazilian devaluation in 1999. A weaker currency naturally limits the purchasing power of foreign goods. Conversely, a devaluated Brazilian currency and a continuing increase in the other member countries' suggest an increase in Brazilian intra-Mercosur exports. In studying Table 2.6 mirroring the import data we find this to be the case.

### 3. The Gravity Model

#### 3.1. Gravity Analysis – The Conceptual Basis

If one is to investigate the impact of trade policies on patterns of trade it cannot be done meaningfully without holding constant natural economic determinants. A situation where bilateral trade patterns are explained by these natural economic determinants is thus defined as the normal situation. Gravity analysis offers a systematic framework with which one can identify what level of trade that can be explained by the natural economic determinants and how much that can be attributed to trade policies. (Frankel, Stein and Wei 1995:69)

The gravity model is a model concerned with determinants of interaction. Inspired by Newtonian physics, and more specifically, the universal law of gravity according to which attraction is larger between larger and more closely positioned bodies, the formulation of the model (in a general fashion) explains a flow  $F_{ij}$  (of people, goods etc) from an area  $i$  to an area  $j$  as a function of the characteristics of the origin ( $O_i$ ) and the destination ( $D_j$ ) and some separation measurement ( $S_{ij}$ ):

$$F_{ij} = O_i D_j S_{ij}, \quad i = 1, \dots, I; j = 1, \dots, J \quad (1)$$

Standard gravity analysis in economics is based on the presumption that economic mass and trade costs are key explanators of bilateral trade flows. The former constitute GDP and population, while the latter include distance (between economic centers of gravity, usually capitals), adjacency and cultural similarities (usually defined by language). These explain, as mentioned above, the normal volume of trade between two countries. It can then be written as:

$$F_{ij} = G * (M_i M_j) / (D_{ij}^2) \quad (2)$$

By translating equation (1) to flows of goods between countries we derive equation (2). The model implies that trade increases with size and proximity of the trading partners.  $F_{ij}$ , again, is flow of goods from country  $i$  to country  $j$ .  $M_i$  and  $M_j$  are the economic masses of the two countries and  $D_{ij}$  is the distance between them.  $G$  is a constant. By adding more explanatory

variables to the gravity equation it can be expanded into capturing trade policy effects on the volume and direction of trade, as shall be done in this paper. (Head 2003:2; Greenaway and Milner 2002:575; Porojan 2001:266)

### 3.2. Theoretical Foundations of the Gravity Model

Developed in the 1960s, the gravity model has since been a central tool for investigations on geographical patterns of trade. Empirically the model has performed well, but its theoretical justifications have been subject to some dispute. Although, conceptually along the lines of the universal law of gravity, it can intuitively be plausible that larger countries located close to each other are likely to trade more with each other, the gravity model for long lacked a theoretical basis in standard trade models, i.e. it lacked formal representation of the roles of factor endowments, technology, demand differences and other structural differences commonly associated as determinants of international trade (Greenaway and Milner 2002:579). However, over the last twenty five years or so, various theoretical foundations for the gravity model have been provided, e.g. Anderson (1979), Bergstrand (1985, 1989), Helpman and Krugman (1985) and Anderson and van Wincoop (2003).

Anderson and van Wincoop (2003) provide theoretical underpinnings for the gravity model based on a country's bilateral trade resistance relative to its multilateral trade resistance. Along the lines of new trade theory the first building bloc for the gravity model is that all goods are differentiated by place of origin. Secondly, preferences are identical and homothetic across countries. Due to economies of scale, differentiated products and monopolistic competition, firms are then gathering its resources in one country, producing a unique variety to exercise market power. On the demand side consumers have a love for variety and preferences that are homothetic and identical across countries. The key implication is that trade between countries is determined by relative trade barriers. Trade between two countries then depends on the bilateral barrier between them relative to the average trade barriers that both countries face toward all their trading partners. If we assume the bilateral trade barrier between countries  $i$  and  $j$  as given then higher barriers between the importing country  $j$  and its other trading partners will reduce the relative price of goods from country  $i$ . Higher multilateral resistance of the importing country  $j$  thus raises its trade with  $i$ . Correspondingly,

higher multilateral resistance of the exporter,  $i$ , also raises trade. If country  $i$  faces higher trade barriers, the demand for its goods falls and consequently so does its supply price. Again, assuming a given bilateral trade barrier between  $i$  and  $j$ , this raises the level of trade between the two. (Anderson and van Wincoop 2003:176)

### 3.3. Specification of the Gravity Model

Applied to international trade the conventional gravity model states that the volume of trade between two countries depend on supply conditions at the origin, demand conditions at the destination, distance and on other forces either enhancing or restricting trade between the two countries (Nilsson 1997:3). Along the lines of Frankel, Stein and Wei (1995) the gravity equation to be estimated includes GDPs and GDPs per capita in product form. Furthermore, distance is included as an explanatory variable followed by a set of binary variables representing adjacency and RTA-membership. Due to similar cultures among all countries tested, no variable is used to capture this effect. The gravity model applied in this study is then formally stated as follows:

$$\begin{aligned} \log(m_{ij}) = & \alpha + \beta_1 \log(Y_i * Y_j) + \beta_2 \log(Y_i/pop_i * Y_j/pop_j) & (3) \\ & + \beta_3 \log(DIST_{ij}) + \beta_4(ADJ_{ij}) + \sum \gamma_k D_{kij} + \varepsilon_{ij} \end{aligned}$$

The dependent variable,  $m_{ij}$ , denotes imports to country  $j$  from country  $i$  in a given year. The following three independent variables are standard gravity terms.  $Y_i$  ( $Y_j$ ) denotes GDP of the exporting (importing) country and  $Y_i/pop_i$  ( $Y_j/pop_j$ ) denotes per capita GDP of the same pair of countries.  $DIST_{ij}$  is the distance between the trading countries and  $\varepsilon_{ij}$  is the term for stochastic error. All variables are in logs. Additionally, these main variables are extended by a set of binary variables. First, a dummy variable representing a common land border,  $ADJ_{ij}$ , is applied. Second, binary variables accounting for preferential market access through regional trading agreements,  $\sum D_{kij}$ , are used. The binary RTA variables will be specified later on in conjunction to the gravity equation applied.

Potential import demand is affected by total and per capita income. The GDP variable reflects economic size and the country's absorptive capacity. Its coefficient is expected to be positive. GDP per capita is more ambiguous. A higher per capita income, for a given size, indicates a higher import demand, but as pointed out by Nilsson (2000) the population component of GDP per capita may affect trade in two ways: a large population indicates a large domestic market, a higher degree of self-sufficiency and thus less need to trade. Secondly, a large population promotes division of labor and implies the presence of economies of scale in production and therefore also opportunity and desire to trade in a greater variety of goods. The expected sign of the coefficient of per capita GDP is therefore indeterminate. Exports are supposed to increase with the exporting country's GDP, while per capita GDP of the exporting country has an indeterminate outcome analogous to the case in the importing country. Important to note is that a change in GDP also implies a change in GDP per capita. Incorporating GDP in two separate explanatory variables is justified given the two different aspects of the economic reality these reflect. While total GDP can be said to be a measurement for aggregate economic size, per capita income allows for an alternative interpretation of the absorptive capacity by including the population component and thus reflecting demand on a consumer level. Combined these offer nuanced description of a country's attractive gravitational force. Distance reflects transport and transaction costs and is therefore assumed to dampen trade, more the greater the distance is.

Table 3.1. Expected Signs of the Variables in the Gravity Model

Variable	Sign	Reason
$\beta_1$	+	Economically larger countries import more.
$\beta_2$	+/-	Depends on relative changes between population and gross domestic product.
$\beta_3$	-	Transport and transaction costs.
$\beta_4$	+	Possibility for direct overland communication.
$\gamma_k$	+	Trade preferences increase trade.

### 3.4. Empirical Implementation

The study explores intra-regional imports in South America over the period 1990 to 2004 by estimating the gravity model on three points in time during that period reflecting: i) a point in time before the creation of Mercosur and the reinvigoration of the Andean Community (1990); ii) a mid-term point in time which also occurs before the crises years (1997); and, iii) a point in time based on the most recent data (2004).

The study applies two different econometric measurements. Cross-section data represent measurements at a given point in time. Panel data is a pooled cross-section, adding a time dimension to the analysis. (Ramanathan 2002:11)

A gravity model is applied on import data encompassing all mainland Latin America (Mexico excluded). Nonfuel visible imports data is collected from the UN Comtrade Database, 2006 online edition. Data for GDP and GDP per capita is expressed in constant 1990 US-dollars. This data is gathered from the UN National Accounts Main Aggregates Database. Distance variables are collected from CEPII using the great circle formula<sup>6</sup>, measuring distances between the respective countries economic centers of gravity.

Given that the study involves developing countries there are bound to be zeros in the trade data. The gravity equation applied in the study uses intra-sample country imports involving the member countries of the Andean Community and Mercosur respectively, plus a control group consisting of Chile and the six Spanish speaking Central American<sup>7</sup> countries. The average prevalence of zeros summed up to 7.5 percent of the total observations.<sup>8</sup> These zeros were by and large concentrated among the recorded imports to the Central American control group countries, however randomly scattered among them. This must be taken into consideration when evaluating the effects of the South American RTAs later on, since these may be somewhat amplified. Since the gravity equation is estimated in logs, and the log of zero is undefined, zero imports pose a problem. This study chooses to discard zero observations. (Nilsson 1997:5; Westerlund and Wilhelmsson 2006:2)

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<sup>6</sup> Using longitudes and latitudes the great circle formula approximates the shape of the earth as a sphere, and calculates the minimum distance along the surface between two locations.

<sup>7</sup> Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama.

<sup>8</sup> Number of censored observations: 52

### 3.5. Earlier Studies

Earlier applications of the gravity model on the South American RTAs include Frankel, Stein and Wei (1995) and Soloaga and Winters (2001). The former investigate whether regional geographical clusters of countries trade more with each other even in the absence of formal trading arrangements. Both the Andean Community and Mercosur showed statistically significant signs of a regional bias in trade before the reinvigoration/creation of the respective RTA. Soloaga and Winters applies a gravity model setting testing for effects of new regionalism, again estimating effects of the revamping (CAN) or launching (Mercosur) of an RTA on intra-regional trade. Similar to Frankel, Stein and Wei (1995), Soloaga and Winters (2001) find that the members of the South American RTAs trade disproportionately heavy with their partners over the whole period from 1980 to 1996, i.e. the regional arrangements do not seem to have increased the intensity in intra-regional trade beyond the effects of the general trade liberalization.

## 4. Regionalism and Gravity

### 4.1. South American Regionalism – Effects on Trade

#### 4.1.1. Cross-section

The gravity model is applied on a scope encompassing all of mainland Latin America, excluding Mexico. Visible nonfuel intra-sample country imports are used. The gravity model used takes the following form:

$$\begin{aligned} \log(m_{ij}) = & \alpha + \beta_1 \log(Y_i * Y_j) + \beta_2 \log(Y_i/pop_i * Y_j/pop_j) \\ & + \beta_3 \log(DIST_{ij}) + \beta_4(ADJ_{ij}) + \gamma_1(CAN_{ij}) + \gamma_2(MERC_{ij}) + \varepsilon_{ij} \end{aligned} \quad (4)$$

Here,  $m$ ,  $Y$ ,  $Y/pop$ ,  $DIST$  and  $ADJ$  are as in (3).  $ADJ$  is a binary variable and takes the value of 1 if true and 0 if false.  $CAN$  and  $MERC$  are regional dummy variables indicating bilateral trade between RTA members  $i$  and  $j$  in either the Andean Community or Mercosur, also by taking the values of 1 or 0.

Table 4.1. Cross Section Gravity Model Regression Results of Intra-Latin American Imports

	1990	1997	2004
$\beta_1$	0.759856***	0.771331***	0.672104***
$\beta_2$	0.606666**	0.805619***	0.935907***
$\beta_3$	-2.003854***	-2.298573***	-2.105312***
$\beta_4$	0.009489	0.137026	0.330451
$\gamma_1$	1.491984***	0.967832***	1.591934***
$\gamma_2$	1.079642***	0.638893**	2.082941***
$\alpha$	-14.25853***	-15.61130***	-14.75432***
Adjusted R <sup>2</sup>	0.558491	0.644525	0.671966
No. of observations	226	236	206

Statistical significance: \*\*\* = 99%, \*\* = 95%, \* = 90%

The results are to a large degree those expected, the explanatory power of the model is however quite low, especially in the year 1990 dropping below 60 percent. The coefficient for the product of the country pairs' GDP has the expected sign and is significant at the 1 percent level throughout the study interval. A decrease between 1997 and 2004 suggests that the importance of GDP decreases over that period. The parameter estimates of GDP per capita are positive and significant in all periods. Moreover they are continuously increasing, indicating an increasing importance of per capita income on import demand. The distance to the exporting country appears to be a strong impediment to trade within mainland Latin America, showing negative coefficients at the highest significance level (>99%) throughout the interval.

Turning to the binary variables, the first one, adjacency, is insignificant in all periods. Thus common borders do not serve as an explanatory variable when analyzing trade in this area. Unsurprising to those familiar with the geography of the area studied, the borderlands of these countries are in many cases covered by dense forests, mountains or deserts, offering none or limited infrastructure for cross-border transportation on land. An alternative explanation could be that the explanatory of the adjacency-dummy is soaked up by the binary RTA variables, since both the Andean Community and Mercosur are regional economic integration areas that are geographically clustered together, with member countries sharing borders with each other. The insignificance of common borders raises the discussion of regionalism emanating for natural forces of proximity or by active policy choices of national decision makers, these results giving support for the latter. This suggests that CAN and Mercosur are more than formal manifestations of 'natural' geographical clusters in terms of economic interaction.

The regional dummies are both positive and significant in all time periods, an expected result since economic theory tells us that trade preferences increase trade. The positive sign indicates that these countries trade more with each other. The decrease between 1990, a point in time before the revival of the CAN, and 1997 raises doubt whether this bias in trade can be ascribed trade policy measures within the regional grouping. A similar trend is detected in the coefficient for the Mercosur dummy. These results confirm those of Frankel, Stein and Wei (1995) and Soloaga and Winters (2001), also showing a disproportionately heavy trade among the regional grouping members before the revamping/launching of the RTAs. However, if there would be no substance to the tested trade blocs the first four variables would soak up all the explanatory power. In such a scenario intra-regional trade would be due solely to the

economic mass and proximity of the countries. Since the regional dummies actually prove to be significant, these RTA effects cannot be neglected. Contrasting the RTA parameter estimates with figures in section 2.4. reporting substantial increases in nominal intra-regional imports for both CAN and Mercosur add further evidence for a positive impact of regional integration on trade.

The coefficients  $\gamma_1$  and  $\gamma_2$  estimating the magnitude of intra-RTA imports relative to the norm also contains information on the relative trade creation between CAN and Mercosur. In the first two time periods  $\gamma_1 > \gamma_2$ , indicating that intra-CAN trade is relatively more intense than intra-Mercosur trade. In 2004, however, the parameter estimate for Mercosur is larger than that of CAN, showing that Mercosur has surpassed the Andean Community in terms of intra-RTA imports relative to the norm. The relatively larger RTA impact on trade among the Andean countries in the first two periods seems logical given the longer history of the Andean Community. Mercosur being more trade creating than CAN in the last period suggests that the relatively fast going integration process between the Argentina, Brazil, Paraguay and Uruguay begin to take effect a few years after the advances toward an FTA and CU in 1995. While the reinvigoration Andean Community between 1993 and 1995 has produced an increase in intra-CAN imports, the relatively deeper integration between the Mercosur countries have by 2004 produced an impact appearing in the statistically significant greater magnitude on trade creation of Mercosur in relation to CAN.

#### 4.1.2. Panel data

Turning to a panel data regression, the specification is again the logarithmic transform of (3) extended by a set of dummy variables representing the three time periods, replacing the constant due to multicollinearity:

$$\begin{aligned} \log(m_{ij}) = & \beta_1 \log(Y_i * Y_j) + \beta_2 \log(Y_i/pop_i * Y_j/pop_j) & (5) \\ & + \beta_3 \log(DIST_{ij}) + \beta_4(ADJ_{ij}) + \gamma_1(CAN) + \gamma_2(MERC) \\ & + \gamma_3(1990) + \gamma_4(1997) + \gamma_5(2004) + \varepsilon_{ij} \end{aligned}$$

Table 4.2. Panel Data Gravity Model Regression Results of Intra-Latin American Imports

$\beta_1$	0.745598***
$\beta_2$	0.736420***
$\beta_3$	-2.148202***
$\beta_4$	-2.148202
$\gamma_1$	1.333604***
$\gamma_2$	1.232824***
$\gamma_3$	-14.40141***
$\gamma_4$	-14.72826***
$\gamma_5$	-14.50136***
Adjusted R <sup>2</sup>	0.632073
No. of observations	668

Statistical significance: \*\*\* = 99%, \*\* = 95%, \* = 90%

All coefficients are significant at the 1 percent level except the binary adjacency variable which is insignificant. The results reflect those of the cross section regression analysis. Measuring the magnitude of the effects of RTA membership we see that on a study interval average the intra-Andean Community imports are 279 percent more than the imports from Chile and Central America, representing the norm.<sup>9</sup> Analogously, Mercosur members import 243 percent more from their regional grouping partners than from the Latin American norm. As was mentioned above, the concentration of zero observation in benchmark countries may somewhat amplify the effect of the tested RTAs. A comparison between CAN and Mercosur shows that on overall effects on trade, the impact of CAN is greater than that of Mercosur.

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<sup>9</sup> The value of the parameter estimate in percent is calculated as  $(\exp(\text{coefficient value})-1)*100$

## 5. Summary and Concluding Remarks

The purpose of this study was to assess the impacts of the Andean Community and Mercosur on the respective member countries' trade. In order to fulfill this purpose two objectives were to be met.

First, in order to comprehend the rationale of both the Andean Community and Mercosur a general understanding of the mechanisms behind the potential gains of integration must be provided. Moreover, these mechanisms must be analyzed in the context of the South American economic reality.

The slow going process of economic integration in the Andean Community, started already in the late 1960s, should be viewed in the light of the dominant paradigms at the time: structuralism and dependency theory. Rather than an imperative objective in itself, regional integration served as a second-best substitute to participation in the global economy, since the latter was assumed to cause the development of underdevelopment. However, pursuing an economic development strategy of inward orientation was in the long-run unsustainable when the system was artificially maintained through external indebtedness. The larger economies of Argentina and Brazil pursued the same agenda, however independently, and the outcome was economic collapse in 1982, affecting all of South America.

After a decade of reforms, consisting of an overall liberalization of the economies, Mercosur was created in 1991. Through a speedy process of integration a free trade area and a customs union was in operation by 1995. At the same time CAN was revamped, also making moves towards free trade and common external tariffs. Intra-regional imports grew steadily between 1990 and 1997 in both trading blocs, both recording an increase close to 400 percent. Between 1997 and 2004, a period in which both the Brazilian currency devaluation and the national bankruptcy of Argentina occurred, intra-Mercosur imports decreased, while intra-regional trade continued to grow within the Andean Community, however at a more modest rate. For CAN, the share of intra-regional imports of total world imports was rising steadily between from about 7 to 17 percent between 1990 and 2004. In the case of Mercosur, the share of

imports originating from partner countries was around 20 percent throughout the study period, suggesting a policy of open regionalism among the Mercosur members.

Through the use of gravity modeling, the impact of regional trading agreements on patterns of trade is assessed by holding constant natural determinants of economic interaction. The gravity model thus offers a systematic framework with which one can identify and quantify what level of trade can be attributed to trade policies.

By looking at a scope encompassing all of mainland Latin America, Mexico excluded, we found positive and significant effects on both the Andean Community and Mercosur, indicating that these blocs produce trade creating effects. A decline between 1990 and 1997 in both RTAs raises the question whether the bias towards intra-regional in these two blocs can be attributed to preferential treatment or not. We can however establish that the degree of trade within the regional groupings is more intense than what can be explained by the natural determinants of economic mass and proximity. Moreover, substantial increase in nominal intra-regional imports in both trading blocs provides evidence for of importance the regional integration schemes, be they coupled with open regionalism or not.

The gravity model estimation also contained information to assess differences between the two regional groupings which can provide the basis for a comparison. During the first two time periods the Andean Community was found to be relatively more trade creating than Mercosur. By the last time period, 2004, Mercosur had surpassed the Andean Community, showing a greater magnitude in intra-regional trade. The longer history of regional economic integration among the Andean countries explain the relative differences in the beginning of the study interval while relatively larger trade creation within Mercosur in the last time period can be attributed to the speedy process of regional integration among the Mercosur countries being relatively deeper than that of CAN and thus producing a relatively stronger impact on trade creation by 2004.

To conclude, the regional trading agreements of the Andean Community and Mercosur play an important role for the respective member-countries' economies, and will most certainly also play an important role in the economic development on both the regional as well as the national level. Vital for the future prospect of these arrangements is stability, both economic and political, and South America has never been blessed with either.

True to its legacy, South America is still a continent of turbulence. Argentina is recovering from its economic collapse, Venezuela has decided to secede from the Andean Community and the Free Trade Agreement of the Americas-negotiations have stranded, as have the last few WTO-rounds. After two decades of outward orientation many South American nations now seem to put their trust in regional integration rather than the multilateral arena. New political alliances are formed across countries, and as has been heard from the continent many times throughout history, South America is calling for greater independence, although it sometimes is unclear from what. Regardless, this time the voice is more unison than perhaps ever before.

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