Increasing Latin America's Trade Presence in the World Economy: Competitiveness and Market Access

Report for the Corporación Andina de Fomento

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Contents

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1 Introduction

Developing countries have largely increased their role in the world trade in the last twenty years. In Latin America, the import substitution policies were abandoned and trade policiy was reformed to follow this movement. However, Latin American exports as a whole did not reach the competitiveness levels of other developing countries, in particular those of the South-East of Asia, which world market shares are constanly increasing over time. The

objective of this work is to explore the reasons of this poor performance in the international scene.

The first section analyses the world exports growth disentangling competitiveness and structural factors, geographic and sectoral specialisation patterns. Latin American competitiveness can be then compared with the other countries by a shift-share analysis on the growth of the bilateral and sectoral exports in the period 1995-2002. The objective is to evaluate the importance of the geographic and sectoral initial specializations of the countries like the own dynamism of each exporter that we will call competitiveness. The aptitude to position itself in the markets with greater growth is one of the keys of a good commercial performance. This constant market share analysis show that in Latin America the improvement in the competitiveness just offset the major handicap of their sectoral specialisation.

Given the high level of world protection of sectors in which the continent is specialised, the poor Latin American performances can also be explained by the difficulties encountered in the access to exports markets. The second and third sections of this work analyse these difficulties using measures, mostly indirect, of trade protection. To calculate tariff equivalents of the set of protective instruments is a delicate work: To the problems of comparability of these barriers are added the question of weights, of measures of the dispersion of the protection and those of the take into account of the intermediary goods. The direct measurement of the protection is really a difficult and questionable exercise: There are tariff peaks, geographic dispersion of the barriers, and new forms of nontariff barriers that appear... For that reason the indirect measures of the protection, capturing all impediments to trade, are interesting and we propose an original methodology on each chapter. The second chapter proposes an original indicator based on the distortions in the geographic structure of the imports of an elementary market (country x product). This measurement of revealed commercial discrimination, that displays the advantage to cover all the obstacles to the commerce (even informal) can be used in the preparation of the commercial negotiations. The second indirect measurement from access to markets is the border effects methodology presented in the third chapter. This methodology, that

compares the bilateral commerce to "the internal" trade to each country using production data, has a solid theoretical base and presents several advantages for the study of regional integration, subject of particular relevance in Latin America.

2 Latin American Trade Competitiveness: A Shift-Share Analysis of World Exports Growth

International trade in goods is now driven mainly by the Souths exports and imports. As emerging economies, these countries are naturally winning shares of the world market in manufactured goods from the old industrialised countries. This trend has accelerated in recent times without a significant improve for Latin American competitiveness. This question can be studied over the period 1993-2002 using a detailed and exhaustive database on world trade: BACI[1].

A **market-share** approach addresses the share of a countrys exports in global imports of a given product. The trend in this market share depends on the sectoral and geographical structures of world demand and the supply and competitiveness of the country concerned. The method used is based on a breakdown comparable to a constant market share analysis; The difference is that we have opted for an econometric approach drawing on the great volume of information in world trade figures broken down by about 5000 products. From the trend in market share, it is possible to discern the initial position held by exporters on their various markets (both sectoral and geographical), their capacity to adapt to changing conditions of world demand and, lastly, the competitiveness of exporters. The methodology is detailed in the Appendix A.1.

2.1 The new driving force of world trade is in the South

Until the mid-90's international trade was mainly driven by the developed economies. The rapid development of emerging economies, as well as new trends in the international

[1] http://www.cepii.fr/anglaisgraph/bdd/baci.htm

Table 1: Growth in world trade in volume terms, 1995-2002 (exports in rows and imports in columns)

Average Annual Growth Rate, in %				Market Share in 2002 (in%) and its variation over the period (in p.p.)					
Exporter	North	South	World	Exporter	North		South		World	
North	4.4	5.4	4.7	North	53.7	(-4.8)	16.3	(-0.5)	70.0	(-5.3)
South	9.7	8.5	9.4	South	22.6	(4.3)	7.4	(1.0)	30.0	(5.3)
World	5.8	6.3	5.9	World	76.3	(-0.5)	23.7	(0.5)	100	

division of labour have recently changed dramatically the respective contributions of the North and the South to international trade. Outsourcing and more generally the vertical strategies of multinational companies have fostered trade in parts and components and have widely opened intra-firm markets to products manufactured in the South. Besides, the own dynamics of trade among developing economies in Asia has fuelled this growth in world imports .

The period from 1995-2002[2] was characterised by a marked slowdown in the growth of world trade expressed in dollars: Up by an annual average of 2.6% as compared to 12% for the previous 10 years. A large part of this slowdown stems however from the dollar fluctuations, which rose by 28% (in effective terms) over the period, compared to a 39% depreciation in the previous 10 years. A rise in the dollar leads to a fall in the dollar value of trade carried out in other currencies (while a depreciation increases the value). The unit values for bilateral trade flows available in BACI allow prices indices and trade flows data expressed in prices and exchanges rates of 1995. The slowdown in world trade expressed in volume terms is thus far more moderate: Annual growth stood at 5.9% for 1995-2002, compared to 6.2% for the 10 previous years[3]. The strength of exports from the "South"

[2]To reduce business cycle effects, growth rates are calculated at the beginning and end of the period using a two-year average (i.e. growth for 1995 = average of 1995-1996, for 2002 = average of 2001-2002).

[3]The growth in the volume of trade for 1985-1995 is calculated using figures provided by the WTO, covering manufactured goods and agricultural products (see WTO International Trade Report 2003, http://www.wto.org/english/news_e/pres03_e/pr348_e.htm).

is remarkable: Annual average growth stood at 9.4%, leading to a rise in the share of the world market of 5.3 percentage points (Table 1).

Table 2: Changes (in %) in volume terms of market shares and their components by major zone, 1995-2002

	Growth in market share	Demand effects		Performance			
				Total	Adaptation		Competitiveness
		geographical	sectoral		geographical	sectoral	
	1	2	3	4=1-2-3	5	6	7=4-5-6
Developed countries	-5.2	-0.6	-1.4	-3.2	-1.6	-0.1	-1.5
CEEC-Turkey	31.4	0.9	-11.2	41.7	-4.1	1.0	44.8
Developing Asia	22.3	-6.7	-12.4	41.4	-0.4	1.2	40.7
Latin America	-0.9	1.3	-20.1	17.9	-1.3	0.7	18.4
Africa, Mid. East	-21.5	-1.2	-22.7	2.4	-4.1	-3.4	9.8

Note: The figures for each zone are the average results for the countries. For each item, the weighted sum of the country adds up to zero: the gains and losses of market shares, as well as their various components, compensate each other at the world level. But to be representative of the situation in the various countries in a region, the zone averages given here are simple averages: they do not sum at the world level.

Leaving aside this overall trend, the performances of different countries, from the "North" as well as from the "South", differ. Table 2 shows that the increased market shares of the "South" have mainly come from the Central and East European Countries along with Turkey (31.4%) on the one hand, and the emerging Asian countries (22.3%) on the other hand. Latin American countries keep their market shares almost constant in the period (-0.9%) while African and Middle East countries dramatically reduced their market shares (-21.5%). The gains or losses of world market shares by individual countries are often considered as an index of their trade competitiveness. But given changes in demand, the relative medium-term inertia of geographical and sectoral specializations affects such outcomes. It is therefore interesting, to be able to distinguish the impact of a country's initial position in different markets relative to its capacity to adapt and to its competitiveness. Table 2 also disentangle competitiveness and structural factors, geographic and sectoral specialisation patterns. The methodology is the same that Cheptea, Gaulier and Zignago (2004) and is explained in the Appendix A.1. The following section presents the results by countries.

2.2 Decomposition of exports growth: Results for Latin America

Grouping the countries into large zones shows that the increased market shares of the "South" have mainly come from the Central and East European Countries along with Turkey on the one hand, and the emerging Asian countries on the other hand. These gains are mainly explained by the competitiveness of these countries, which largely compensates disadvantages linked to their specialisation at the start of the period (sectoral demand effect, as shown in Table 2). In Latin America, the improvement in the competitiveness just offset the major handicap of their sectoral specialisation. African and the Middle East countries accumulate both unfavourable geographic and sectoral specialisations, as well as a poor adaptation to dynamic markets. Their competitive gains are insufficient to prevent a pronounced decline in trade.

The geographic effects are generally less important than sectoral effects. The geographical structural effect reflects the original exports orientation toward the most dynamic markets of the period. For instance, countries having large market shares in the United States or China have benefit from a positive geographical effect. It is the case from North and Central America countries at the beginning of the period, from Asian countries afterwards. Their performances, except structural effect, are contrasted: For the Central America and Mexico they are positive, Hong Kong shows on the other hand negative performances. In other words, geographical effects result from the fact that regional trade flows- which may be a crucial vector to trade development- and their intensification are situated in an environment that is more or less dynamic. As a result, all countries in East and South-East Asia, beginning with China, experienced a negative geographical demand effect due to the regional consequences of the 1997-98 financial crisis and the chronic weakness of Japanese demand. Similarly, given the weakness of import demand, the dependency with respect to European outlets is a major handicap for countries in the Europe-Africa region. But this regional orientation has not prevent, rather has favoured, the integration to international trade for certain countries, especially among the CEECs and Turkey. As for countries in North America, the intensification of regional trade within the NAFTA facilitate the provision of the demanding american market.

The decomposition of exports growth by country is given in Table 3. China presents the larger performance exceeding their market share growth largely compensating a very negative geographic demand effect. Mexico presents the most favourable geographical structure effect: A good part of its exports growth is attributable to the increase of its principal client demand.

Table 3: Decomposition of exports market share growth
1995-2002

Country	Market share growth	Geographic demand effect	Sectoral demand effect	Geographic adapta-	Sectoral adapta-	Competi- tiveness
European Union	*1.1*	*1.1*	*0.4*	*-1.8*	*0.3*	*1.1*
Germany	7.8	2.6	1.6	-1.6	-0.2	5.5
United Kingdom	-11.7	1.1	4.1	-1.3	1.0	-16.6
France	-0.9	1.7	1.1	-2.0	0.5	-2.2
Italy	-9.0	0.2	-3.3	-1.1	-0.7	-4.1
Netherlands	-3.9	0.6	-1.4	-2.7	-0.0	-0.5
Belgium	7.0	-0.4	-1.9	-2.4	0.6	10.9
Spain	15.1	0.5	-0.8	-1.2	-1.1	17.7
Sweden	-9.6	-0.2	2.9	-2.6	-1.2	-8.5
Ireland	49.2	0.4	6.2	-2.9	7.4	38.1
Austria	12.2	1.0	-1.4	-2.5	-0.7	15.6
Denmark	-2.7	-1.8	-0.9	-2.9	1.1	1.9
Finland	-0.1	-1.8	-2.8	-1.7	1.4	4.7
Portugal	-2.5	2.6	-6.2	-1.8	0.3	2.7
Greece	-21.6	0.2	-13.6	-1.9	2.5	-8.7
USA	*-12.8*	*4.5*	*1.8*	*7.5*	*0.1*	*-26.7 ¿*
Japan	*-18.3*	*-1.0*	*5.4*	*-0.6*	*-2.3*	*-19.8 ¿*
Others North	*-9.1*	*0.1*	*0.2*	*-0.9*	*-0.5*	*-8.0*
Canada	-10.0	5.6	-0.4	-2.4	-0.3	-12.5
Taiwan	-6.4	-1.4	-0.1	4.2	0.7	-9.8
Singapore	-10.3	-5.9	8.5	-1.6	-2.5	-8.9
Switzerland	-7.1	-1.7	3.3	-2.0	-0.9	-5.7
Norway	-10.6	-0.2	4.7	-2.8	-0.1	-12.2
Australia	-5.0	-8.6	-13.9	-1.5	0.9	18.2
Hong Kong	-22.5	5.3	-3.4	-1.6	-2.1	-20.7

Table 3: Decomposition of exports market share growth 1995-2002 (continued)

Country	Market share growth	Geographic demand effect	Sectoral demand effect	Geographic adaptation	Sectoral adaptation	Competitiveness
Israel	11.1	0.1	-0.6	-1.2	0.4	12.4
New Zealand	-14.6	-5.3	-14.2	-0.2	-1.3	6.4
China	*59.0*	*-10.9*	*-6.2*	*0.1*	*1.8*	*74.2*
Emerging	*12.1*	*-4.2*	*-4.4*	*0.1*	*0.9*	*19.6*
South Korea	8.6	-3.2	-0.6	2.7	1.8	7.8
Malaysia	3.5	-8.1	3.9	-0.0	-0.0	7.7
Indonesia	3.1	-7.7	-5.8	-1.6	-0.5	18.8
Thailand	11.4	-6.4	-4.1	0.0	0.9	21.0
India	13.4	-4.7	-12.0	-0.2	0.4	29.9
Poland	33.8	-1.7	-6.7	-1.5	3.2	40.4
Turkey	36.7	-1.3	-13.9	-1.3	1.9	51.3
Chile	-3.2	-5.2	-14.7	6.1	-1.5	12.2
Hungary	72.3	-0.2	-3.0	-2.7	6.4	71.8
Slovakia	28.7	9.0	-6.1	-6.8	2.6	30.2
Slovenia	4.7	1.1	0.4	-3.0	0.3	5.9
Viet Nam	79.5	-9.1	-13.0	2.1	0.9	98.6
Egypt	-36.9	2.4	-1.9	-2.7	-8.2	-26.5
Pakistan	5.3	-3.3	-21.9	2.0	-0.6	29.2
Ecuador	-21.9	1.3	-7.8	-5.6	-0.2	-9.7
Tunisia	5.1	2.5	-13.5	-3.8	-0.4	20.3
Bangladesh	11.1	1.6	-18.8	-3.0	-2.2	33.6
Croatia	-18.9	2.4	-4.7	-3.8	1.4	-14.2
Costa Rica	20.9	6.7	-15.6	-0.9	10.3	20.4
Sri Lanka	11.5	1.5	-16.9	-3.3	-2.1	32.3
Lithuania	16.8	-3.9	-10.6	-1.0	3.4	28.9
Mauritius	-12.2	1.5	-20.2	-4.1	-0.9	11.5
Uganda	-42.7	0.7	-29.3	-9.1	2.0	-6.9
Sudan	281.7	-0.5	-29.3	20.9	33.4	257.2
Mozambique	175.7	0.3	-20.7	-6.0	4.9	197.3
Non emerging	*13.5*	*-0.4*	*-2.2*	*-1.4*	*0.1*	*17.4*
Russia	0.9	4.0	-1.4	-2.4	1.0	-0.4
Mexico	70.8	5.3	4.5	-2.7	0.5	63.3
Saudi Arabia	28.3	-5.5	12.0	-3.4	-2.4	27.7
Brazil	-2.4	-6.1	-13.1	3.8	1.4	11.6

Table 3: Decomposition of exports market share growth 1995-2002 (continued)

Country	Market share growth	Geographic demand effect	Sectoral demand effect	Geographic adaptation	Sectoral adaptation	Competitiveness
Philippines	13.5	-5.7	1.1	-0.3	1.7	16.7
South Africa	1.3	-6.6	-13.7	0.5	0.4	20.7
Argentina	-11.0	-8.6	-11.8	0.8	0.4	8.3
Venezuela	-18.0	3.5	7.5	-0.5	-2.6	-25.8
Czech Republic	35.7	1.3	-5.4	-3.6	3.8	39.7
Nigeria	-12.5	3.9	10.8	-5.6	-1.5	-20.1
Algeria	-10.7	3.7	15.2	-2.1	-2.4	-25.1
Colombia	-16.1	3.8	-10.0	-0.5	1.3	-10.7
Ukraine	1.9	-3.9	-15.4	1.4	-1.1	20.9
Romania	25.6	0.9	-11.6	-1.2	-0.1	37.6
Morocco	1.0	3.4	-16.3	-3.5	0.3	17.2
Peru	11.9	2.7	-16.3	-3.0	-3.7	32.2
Bulgaria	-11.9	0.2	-11.1	-0.5	-2.1	1.7
Kazakhstan	14.2	-7.9	-13.7	4.5	7.1	24.1
Cte d'Ivoire	-34.8	1.8	-22.5	-2.7	-7.4	-3.9
Syria	23.4	1.8	4.1	-5.9	-3.0	26.3
Guatemala	-4.5	8.3	-19.9	-2.6	-0.3	9.9
Uruguay	-35.4	-10.7	-17.7	1.2	-0.1	-8.2
Cameroon	-26.6	5.4	-13.7	0.1	2.2	-20.6
Ghana	-54.8	-0.7	-21.5	-1.6	-2.2	-28.7
Zimbabwe	-25.0	-3.7	-20.3	-4.1	-4.0	7.1
El Salvador	22.1	9.3	-16.6	-2.0	-1.9	33.3
Kenya	-22.9	-5.0	-19.7	-5.1	3.0	3.8
Paraguay	-25.0	-12.4	-23.6	-13.0	1.7	22.2
Zaire	-21.4	3.3	-8.5	-1.6	0.3	-14.9
Bolivia	-6.9	-9.1	-14.0	-1.4	2.0	15.5
Zambia	-53.3	-13.9	-11.3	3.3	-4.4	-27.0
Madagascar	-2.9	-1.4	-20.6	-2.5	-2.7	24.2
Senegal	-0.5	0.4	-17.9	-3.1	-0.2	20.3
Tanzania	-12.4	-3.1	-25.1	-2.9	0.8	17.9
Ethiopia	-28.9	-4.0	-25.0	-1.0	-2.8	3.9
Mali	-85.1	1.4	-38.6	10.2	6.1	-64.1
Burkina Faso	-39.7	-16.8	-36.5	11.9	-1.4	3.0

3 The revealed trade discrimination

Despite complex and sometimes wide-ranging preferential access granted by rich countries to the exporters of the developing world, there are claims that market access remain limited. Those claims have been an important component of the arguments of developing countries in the recent steps of multilateral trade liberalization talks as the WTO Cancún ministerial meeting in September 2003 has shown. At Cancún, the G22, in which almost all the Latin-American countries are, suddenly emerged as a key actor, alongside the EU and the United States, thus putting the North-South divide at the heart of the negotiations. Leaders of the developing world insist that access to Northern countries' markets is a much needed pre-requisite to further progress in the talks. The frustration of those countries is of course important for agricultural goods, but there is also a widespread feeling that, even for manufactured goods, the market access commitments of the Uruguay Round have not been fully implemented[4].

Table 4: Tariffs spreads, tariffs and shares of Latin American exports in large markets(in reference to middle income countries, in %)

Exporters		Markets										
		MSur	Mex	Chile	AndCom	CentAm	Carib	OthLAC	USCan	EU	EAsia	RoW
Mercosur	Tariff spread	**-11**	**-3**	0	0	0	**1**	0	0	**2**	**2**	0
	Share of exports	**17**	3	5	5	1	1	0	**21**	**22**	**12**	**12**
Mexique	Tariff spread	0		**-7**	0	-1	0	0	**-2**	0	**1**	**2**
	Share of exports	1		0	1	1	0	0	**89**	4	2	1
Chile	Tariff spread	0	**-18**		0	**-1**	0	0	**-1**	1	-1	0
	Share of exports	8	5		8	1	0	0	**21**	**24**	**28**	5
Andean Community	Tariff spread	0	**-9**	0	**-11**	0	**3**	1	-1	-1	**4**	1
	Share of exports	4	2	2	**12**	4	3	2	**49**	**14**	6	5
Central America	Tariff spread	0	**-12**	0	0	**-4**	**5**	**4**	-1	0	**4**	**2**
	Share of exports	0	2	0	3	**19**	2	0	**53**	**12**	5	4
CARICOM	Tariff spread	0	**-2**	0	0	1	**-14**	**-8**	**-1**	0	**-1**	0
	Share of exports	0	2	0	1	1	6	2	**66**	**15**	3	4
Middle income	*Tariff*	*12*	*21*	*7*	*12*	*8*	*17*	*18*	*3*	*2*	*14*	*14*

Which are the most impeded Latin American exports and on which markets? A first answer to these questions can use the *ad-valorem* equivalent measure of applied protection from MacMap database (Bouët et al., 2004). The MAcMap dataset provides a disag-

[4]Bchir et al. (2005) analyze the consequences of liberalising all world trade in manufactured goods and confirm this statement: World exports of manufactured products would rise by more than 12% and this growth would be more than 30% for Argentina, India, the Maghreb, South Asia and Brazil.

gregated, exhaustive and bilateral measurement of applied tariff duties, taking regional agreements and trade preferences exhaustively into account for 2001. This direct measure of protection encountered by Latin American exports is summarized in Tables 4 and 5, which respectively aggregate the bilateral and disaggregated data into principal markets and ISIC sectors. We consider the tariffs applied to the group of middle income countries (as defined by the World Bank classification of economies) like the reference to which to compare the tariffs applied to Latin American exports. Then, Tables 4 and 5 provide the tariff applied to middle income countries, tariffs spread applied to Latin American countries, or group of Latin American countries, and the shares of exports, which give an idea of importance of each market or sector for each exporter.

When only important markets (more than 10% of exports, in black in the Tables) are considered, Latin American countries generally do not face higher tariffs than middle income countries. One important exception is Mercosur on the EU and East Asian markets in which the average tariff is two points higher than for middle income countries as a whole. This means a tariff twice higher in the case of the EU. In this two markets tariffs are very high in agriculture and food products and Mercosur has a strong specialization in those sectors. Even if this means an incentive for Latin American countries to ask for further liberalization of the access to these markets, it also means that difficulties to export do not only come from a tariff discrimination that would disfavor them.

In the other highly protected sectors like beverages, tobacco and wearing apparel, Latin American countries export very little (with the exception of the Caribbean and Central American countries in wearing apparel). This implies that they are not disadvantaged as far as tariffs are concerned.

However, the evidence associated with a direct measure of protection remains questionable. First, average tariffs figures mask a reality plagued with numerous tariff peaks (Hoekman et al., 2002). The associated dispersion in tariffs has led to the diagnosis of "unfinished business" concerning market access (WTO, 2002). Second, tariffs applied to different exporters by a given importer can vary widely: This is another dimension of the dispersion in tariffs. Being less protectionist on average can coincide with a highly

Table 5: Tariffs spreads, tariffs and shares of Latin American exports by ISIC sectors (in reference to middle income countries, in %)

Exporters	**AndCom**		**Carib**		**CentAm**		**Chile**		**MerSur**		**Mex**		*Middle*
	TS	SE	TS	SE	TS	SE	TS	SE	TS	SE	TS	SE	*Tariff*
Agriculture and Hunting	-1	9	-3	3	-1	17	3	9	-2	13	-2	2	*13*
Beverages	16	0	-6	3	31	1	-11	4	10	1	-3	1	*34*
Coal Mining	-2	3	-2	0	-1	0	-2	0	0	0	-2	0	*5*
Crude Petroleum and Natural Gas	-2	41	-4	8	1	1	-2	0	-2	4	-2	8	*9*
Fabricated metal products	-2	1	-1	1	-1	1	-2	1	-1	2	-2	4	*11*
Fishing	-2	0	-2	0	0	1	0	1	-1	0	-1	0	*11*
Food products	-4	8	2	8	3	12	-3	15	3	20	-2	2	*16*
Footwear except rubber or plastic	-3	0	-2	1	-3	1	-2	0	-2	2	-4	0	*16*
Forestry and logging	1	0	-1	0	2	1	-1	1	-1	0	-1	0	*7*
Furniture except metal	-3	0	-2	0	-2	0	-2	0	-3	0	-2	0	*12*
Glass and products	-2	0	-2	0	-2	0	-3	0	-1	0	-2	1	*10*
Industrial chemicals	-1	4	-1	8	-1	1	-1	5	-1	4	-1	2	*6*
Iron and steel	-2	3	-2	4	-1	1	-1	0	-1	5	-1	1	*7*
Leather products	-3	0	0	0	-2	0	-3	0	-4	3	-2	0	*10*
Machinery electric	0	1	-2	4	0	9	1	1	-1	4	-1	26	*9*
Machinery except electrical	-1	1	-1	1	-1	6	-1	1	-1	5	-2	12	*6*
Metal Ore Mining	-1	3	-1	1	-1	0	-1	14	0	4	-1	0	*5*
Non-ferrous metals	-2	8	-2	10	-1	1	-2	29	-1	4	-1	1	*6*
Other chemicals	-2	2	-1	1	-1	4	0	1	-2	3	-2	2	*9*
Other manufactured products	-5	1	-1	2	3	1	-8	0	-3	0	-5	1	*16*
Other Mining	-1	1	-1	0	-1	0	-1	0	-1	0	-1	0	*6*
Other non-metallic mineral products	-1	1	-2	1	-1	0	-1	0	0	1	-1	0	*9*
Paper and products	-1	1	-1	1	0	1	-4	7	-2	3	0	0	*8*
Petroleum and coal products	-1	5	-1	4	-1	0	-1	1	0	2	-1	0	*7*
Plastic products	-2	1	-1	1	-1	1	-1	0	-2	1	-2	1	*11*
Pottery china earthenware	-2	0	-2	0	-2	0	-3	0	-2	0	-2	0	*12*
Printing and publishing	-1	1	-1	0	1	0	-1	1	-1	0	-2	0	*7*
Professional and scientific equipment	-2	0	-2	4	-1	2	-1	0	-1	1	-1	3	*7*
Rubber products	-1	0	-1	0	-1	1	0	1	0	1	-1	0	*10*
Services, Electricity, Gas	0	0	0	0	0	0	0	0	0	0	-1	0	*5*
Textiles	-3	2	-1	6	-1	12	-3	1	-4	2	0	3	*13*
Tobacco	1	0	-26	2	-15	1	9	0	-3	0	0	0	*55*
Transport equipment	-1	2	-1	4	-1	3	-1	2	2	13	3	21	*10*
Wearing apparel except footwear	-2	2	-3	18	-2	18	-2	0	-1	0	-3	4	*18*
Wood products except furniture	-1	1	-1	0	-1	1	-1	6	-1	2	-1	0	*9*

TS = Tariff Spread (%)
SE = Share of Exports (%)

distortive trade policy, in which exports of non-preferred efficient trade partners can be deterred. Lastly, even limited tariffs can be protective if the price elasticity of imports is sufficiently large.

Considering this background of large and persistent difficulties in the *direct* measurement of protection, an *indirect* assessment of protection policies can be contemplated. As detailed in the recent survey on trade costs proposed by Anderson and van Wincooop (2004), international price differentials/distortions and deviations from expected trade patterns are two alternative research strategies to measure those trade costs.[5]

The second strategy based on deviations from expected trade patterns uses different versions of the gravity equation as the benchmark of what trade volumes "should be". There is a large and old empirical literature on this topic, which has been focused in particular on assessing the impact of regional integration on trade flows (Frankel et al., 1997, is an example of such a study with very large coverage of regional agreements). This type of work has been recently renewed in two related aspects: First through a narrowing of the gap between the empirical investigations and its theoretical foundations (see notably Feenstra, 2003, for one of the most complete overview of the theoretical foundations of the gravity equation). Second, through the emergence of the border effect literature. This methodology inverses the logic in the measurement of international commodity markets' integration. Suppose that two countries are suspected of being highly integrated, how can one assess the level of this integration? The border effect literature initiated by Mc Callum (1995) and Wei (1996) does so by comparing their bilateral trade with the volume of trade taking place within their own borders and not with trade flows occurring between other pairs of countries chosen as a reference group, as was done traditionally in gravity equation approaches. The results have consistently shown strikingly low levels of international integration. Even the latest work by Anderson and van Wincoop (2003), focused at correcting an upward bias in the original McCallum estimate, show that the USA-Canada border makes 1993 trade

[5]Among the recent studies using the first strategy, Bradford (2003) relies on a detailed comparison of prices within the OECD (associated with Purchasing Power Parity calculations by the OECD) in order to derive price differentials between domestic and world markets. He concludes that protection levels revealed by this method are very large and disproportionately larger than those suggested by the simple measurement of tariffs.

between Canadian provinces 10 times larger than trade with US states, everything else equal.

However, the need of production data to the calculation of internal flows in the border effects methodology conducts to estimations by industry and not by product. To solve this shortcoming, Gaulier and Zignago (2002) propose another indirect measure of trade openness revealing trade distorsions at the finest level (more than 5000 products of the Harmonised System). This measure of market access difficulties includes the formal protection but, as the border effect methodology, is more large and do not distinguish protectionnist measures than their impact (different following the market structure). The indicator of revealed trade discrimination presented in Chapter 3 is based on the evaluation of the degree of distorsion in the geographic distribution of imports.

3.1 A disaggregated measure of market access: The revealed trade discrimination indicator

Contrary to the other gravity models using the trade levels, Gaulier and Zignago (2002) focus on the geographical distribution of inflows by elementary market (country x product). The geographical diversification of imports is compared to the world geographical distribution of each product sales, which is a proxy of what trade volumes should be in an ideal world without trade barriers. In the presence of trade barriers, only some exporters will accept to support these trade costs, even if the latter are the same for all exporters (there is no *ex ante* discrimination). These prediction is then based in the heterogeneity of exporters, which can be due for instance to differences in their production costs or to a vertical differentiation of products. By extension, more important are the barriers, more the imports will be concentrated on a small number of trade partners and more the market shares will be different of world market shares. In these cases the discrimination indicator, which measure the distance between the observed distribution and a natural or normal distribution, will be high, revealing an *ex post* discrimination.

In a first time, the bilateral trade flows dispersion is evaluated using the relative intensities (RI). The relative intensity of trade is the ratio of the observed market share and

of a theoretical market share for a given product, in a given market and a given exporter. Omitting product indices, the relative intensity formula is the ratio of the share of exports from i to j (V_{ij}) in the world trade (V_w) on the weight of total exports of country i (V_i) and the weight of total imports of country j (V_j) in the world trade[6]:

$$RI_{ij} = \frac{V_{ij} \cdot V_w}{V_i \cdot V_j} \tag{1}$$

The relative intensity indicator neutralize the trade partners weights but is clearly affected by the geography relying partners. To have relative intensities indicating trade relationships insufficiently or excessively intense compared to trade potentials of countries but also to their geography, the relative intensities are explained by a gravity model. A such specification can be formally derived departing from a HOS model. Deardorff (1998) shows that a standard gravity model is a reduced form of a HOS model. In the case of Cobb-Douglas preferences, relative intensities are explained by bilateral transport costs (t_ij) and by market potentials of each partner. Indeed, if Y_i, Y_j and Y_w are the value added of countries i, j and of the world respectively, the bilateral trade (FOB) is:

$$V_{ij} = \frac{Y_i \cdot Y_j}{t_{ij} \cdot Y_w} \tag{2}$$

If $\omega_i = Y_i/Y_w$ and i market potential is $MP_i = \sum_j Y_j/t_{ij}$ then $V_i = \sum_j V_{ij} = \omega_i \cdot MP_i$. Similarly $V_j = \omega_j \cdot MP_j$ and then RI is:

$$RI_{ij} = \frac{{t_{ij}}^{-1}}{MP_i \cdot MP_j}(V_w \cdot Y_w) \tag{3}$$

[6]The formula we use is sensitive to differences in sizes of both exporter and importer. In order to remove this remaining bias it is necessary to implement an iterative procedure as explained in Freudenberg, Gaulier and Unal-Kesenci (1998 a, b).

The product between parentheses being constant, the estimable equation is as follows[7]. More than 5000 estimations are runned.

$$\ln RI_{ij} = \beta_0 - \beta_1 \ln t_{ij} - \beta_2 \ln MP_i - \beta_3 \ln MP_j + \epsilon_{ij} \tag{4}$$

Transport costs are proxied by geographic distance, d_{ij}, and market potentials can be interpreted as an indicator of the proximity for a country to the world markets. For a given country, the market potential is the average of bilateral distances weighted by partners GDP: $MP_i = \sum_j GDP_j/d_{ij}$. Internal distances are evaluated following an often used measure of average distance between producers and consumers in a country: $d_{ii} = .67\sqrt{\text{area}/\pi}$[8].

Coefficients on distance and market potentials differ by HS-6 digit product mais signs are generally negatives as theory predicts and significant in most cases. Distance elasticities are centered on -1.04 (with an standar error of 0.28) wich is exactly the expected value since we suppose a linear relation between distance and transport costs. Market potentials elasticities are in average of -0.70 and -1.23 for the exporter and the importer respectively (standard errors of 0.53 and 0.57).

A non unitary relative intensity does not reveal at this stage the existence of discrimination. It can results of "natural" preferences dues to history or culture, or to firms strategies. A bilateral indicator of discrimination is subject to multiple possible explanations and error measures. The agregation of relative intensities in the exporter dimension for each elementary market reduce these problems. The discrimination indicator can be then interpreted as a variance measure of RI. There is discrimination if imports are concentrated on a limited number of exporters over-represented, with other important exporters in the world market having marginal market shares. In this case the RI distribution diverge from the theoretical distribution (unitary corrected RI *vis-à-vis* all the exporters). The discrimination is then

[7]With regard to the standard form, this specification in terms of relative intensities not need desagregated sectoral information on partners sizes because the principal component of market potentials is the distance.

[8]See Head and Mayer (2002) for more on this topic

a weighted[9] average of a fonction f of differentials to one of RI (residus of the previous gravity equation):

$$Discri_i^k = \sum_i w_i^k \cdot f(\epsilon_{ij}^k)$$

with $f(\epsilon_{ij}^k) = \overline{f}^k = f(\overline{\epsilon}^k)$ if $\epsilon_{ij}^k > \overline{\epsilon}^k$ or $\epsilon_{ij}^k < 1/\overline{\epsilon}^k$. Gaulier and Zignago (2002) choice $f(\epsilon_{ij}^k) = (\ln \epsilon_{ij}^k)^2$ permiting a symetric treatment of insufficient or excessive RI[10]: A RI twice two weak (0.5) adds to the indicator the same value than a RI twice two big (2). The addition to the discrimation is also all the more important than ϵ is important (the slope of the considered fonction is zero for an unitary RI and growing at left and rigth[11]): A weak ϵ can be reflecting a measure error.

Since for big countries is easier to diversify their imports by origin, they appear less discriminatory in the sense of the indicator[12]. The discrimination indicator is adjusted for size using the following equation estimated by OLS:

$$Discri_j^k = \alpha + \beta_k \cdot GDP_j + \varphi_j^k$$

with φ_j^k is the residu and so the adjusted discrimination[13]. The size correction have in general a big impact and the GDP variable has a significant and negative sign for most of products[14]. The value of the adjusted indicator being difficult to interpret in level, four classes of revealed discrimination can be constructed using the indicator distribution

[9]The weights are the world market shares of exporters: The absence of a big exporter seems more distorsive than an absence of a minor exporter.

[10]Several alternative specifications have been tested. As for weights, results seem robust to this choice.

[11]For each product distribution an upper boundary is imposed at the 95th percentile of observed RI and at its inverse in the case of RI lower than 1. Thus, if for a given product only 5% of RI are beyond 10, then all RI lower than 1/10, including those equals to zero, are pull up to 1/10 before the discrimination indicator calculation.

[12]First column of Table ?? shows indeed that biggest countries seem the more open. Technically, the residu of a gravity equation is not a ?? random disturbance *iid*. Market potentials, or GDP in a standard gravity equation, capture differences in the mean of trade values by the variance differences. An estimation robust to the heteroscedasty modifies only the standard errors and do not solve this problem.

[13]More flexible forms, as the add of squared or cubic GDP, are allowed when the adjustement is improved.

[14]The use of other size proxies as populations do not modifie significantly the results. The more little countries (GDP below that of Rwanda) are excluded of the estimation.

quartiles (all products and markets).

An important caracteristic of this indicator is that evaluates the *de facto* discrimination independently of an eventual *ex ante* discrimination (preferential agreements, specific regimes etc.). A high tarif applied to all exporters (application of the most favoured nation clause) will conduce to high entry costs and a demand concentration on a few number of exporters, not necessarily the most competitive. The discrimination is affected by the market access in their multilateral and bilateral dimensions. The existant preferences must to be revealed when they are distorsive but their presence is not necessary to have trade barriers. The definition of obstacles to trade consistent with our outcome-based methodology is very large: it should take into account formal barriers (tariffs, quantitative barriers like quotas, etc.), technical barriers or other national regulations, as well as informal barriers such as specific distribution networks and other non-competitive strategies of firms. Maybe more problematic are cases where differences in tastes translate into revealed discrimination. These cases are likely to be easily identified, but they point to the necessity to combine our results with expert knowledge on markets when the analysis is conducted at the product level.

3.2 Results for Latin American countries

This methodology can be extended to provide trade potentials at a highly disaggregated level, being able to prove to be useful in the trade negociations. The Appendix A.2 details the calculation of these trade potentials. The extension of the methodology needs the allocation a tariff equivalent to each elementary market, from the crossing between the measurement of revealed discrimination and tariffs into force. An assumption on the value of the elasticity-prices then made it possible to evaluate the value of the imports impeded by the protection. Finally, we need a plausible scenario of redistribution of the market shares on the assumption of an elimination of protection and thus of the discrimination which it induces. A better access to an elementary market (country, product) supposes the entry of new exporters on this market (basic idea of the indicator), which involves a new sharing of market. Thus, a distortion in the access to the market, although negative for

the potential exporters as a whole, can appear positive for those which succeeded *in fine* in selling on this market, so that liberalization will be prejudicial for them in terms of loss in shares of market.

What would be the outcome of cancelling all tariff equivalents of tariffs and revealed NTBs, under conservative assumptions regarding the associated elasticities? The multilateral potential increase in world trade flows resulting from such "total liberalisation" of trade is US$ 488 billion, that is to say 9.5% of world trade. Of which about 1/3 is associated with the cancellation of tariffs, the rest being, by nature, a residual, which is the result of elimination of non tariffs barriers and other obstacles to trade. As far as the Latin American countries are concerned, this scenario of liberalisation is threefold: Latin American exporters would benefit from a free access to third countries markets; Third countries would compete with Latin American exporters in these markets; All countries would access freely to Latin American markets, including Latin American exporters themselves.

Table 6: Matrix of trade potentials for Latin American exports (in %)

Exporter		Mercosur	Mexico	Chile	Andean Community	Central America	Caribbean Community	Other LAC	USA & Canada	EU	East Asia	RoW
Mercosur	USD Mio	1999	526	255	770	42	88	22	1583	2894	2226	1812
	%	*10.1*	*39.2*	*8.2*	*21.1*	*8.3*	*22.5*	*5.0*	*11.1*	*14.8*	*21.7*	*19.1*
Mexico	USD Mio	322		77	254	194	95	-7	2618	639	1150	324
	%	*18.3*		*9.0*	*15.9*	*12.5*	*18.3*	*-1.1*	*2.5*	*14.0*	*37.7*	*24.3*
Chile	USD Mio	312	67		200	23	8	6	316	271	368	145
	%	*18.1*	*11.1*		*17.7*	*21.9*	*19.9*	*20.9*	*10.5*	*7.1*	*7.1*	*24.4*
Andean Com.	USD Mio	195	104	111	721	29	25	32	648	1195	607	305
	%	*10.2*	*14.0*	*14.0*	*19.0*	*8.0*	*12.2*	*28.0*	*3.0*	*18.1*	*23.8*	*29.5*
Central America	USD Mio	22	101	14	12				1598	995	191	121
	%	*31.4*	*42.8*	*26.5*	*9.8*				*15.7*	*33.6*	*21.3*	*26.2*
Caribbean Com.	USD Mio	8	49	1	2				1007	339	76	40
	%	*14.7*	*61.2*	*24.7*	*7.2*				*13.8*	*17.6*	*30.3*	*9.7*
High income	USD Mio	9992	15546	1158	4519	1687	1788	308	43548	51444	70696	52956
	%	*18.6*	*15.2*	*13.1*	*18.1*	*8.2*	*15.3*	*5.7*	*6.1*	*3.1*	*9.5*	*9.8*
Middle income	USD Mio	1674	3266	261	478	553	232	49	14529	21981	22804	15682
	%	*18.3*	*65.7*	*16.6*	*25.6*	*12.4*	*25.6*	*6.1*	*9.2*	*8.6*	*6.8*	*12.7*
Low income	USD Mio	406	567	118	110	44	20	3	3716	3144	4234	3389
	%	*20.2*	*65.7*	*29.1*	*31.0*	*21.4*	*38.4*	*6.6*	*12.3*	*6.7*	*7.4*	*11.8*

The first question we have in mind is what are the countries with the biggest potential for trade? The answer appears to result from two main factors: The initial size of the market and the initial intensity of trade distortion. A small distortion in a large market may be more important than a very large distortion in a very small market. This is why large and opened economies, such as the United States, appear in our ranking. Table 6 show tne

matrix of trade potentials for Latin American exports and for high, middle and low income countries to comparison. As expected, the large markets are those in which the trade potentials are the most important, especially in millions of dollars. However, potentials gains appear in the flows between Latin-American countries, revealing important efforts to accomplish in terms of reduction of barriers. The Mercosur is the group of countries with the largest export potentials, mostly in the European and East Asian markets but also in their own regional market considering the increase in millions of dollars. If we consider the growth of exports, relatively to the initial flow, the Mexican market is also promising to Mercosur exports with almost 40% of potential additional exports. Mexican exports would be benefit also largely from this total liberalization. Even if the largest gains are in the North American market, important increases are to be expected in the East Asian markets (38% on average). Because the Central American and Caribbean countries export mostly to the United States, the most important growth rates of their exports are to be expected in the other markets, in particular the European one.

Taking the Latin American countries individually, largest gains concern the Argentinean, Brazilian and Mexican exports because their initial performances. Table 7 give the top 10 more promising markets for each of these exporters and the contribution of tariffs for their potential gains. It is interesting to note that this contribution is not negligible in the case of intra-Mercosur trade. Inversely, even in the case in which there is no more tariffs, as in the case of intra-NAFTA exchanges, potential gains remain to be expected for the suppression of other non-tariff barriers. Table 8 give the top 10 untapped potentials at the product level for the three more important Latin American exporters. We find primarily agriculture products for the Argentinean exports, but also automotive products. For the Brazilian exports, agriculture products are also the most promising, together whit the iron. On the contrary, Mexican potential exports are more manufactured, especially in the automotive sector and in the wearing apparel.

Table 7: The top 10 market potentials for selected Latin American countries

	Market Potential		Contribution of tariffs
	1000 USD	%	% of MP
Argentina			
European Union	842 247	18.5	77.5
Brazil	730 603	9.6	59.7
United States of America	361 051	14.5	38.7
China	246 055	37.6	85.2
Colombia	207 745	103.7	96.8
Mexico	161 630	64.5	63.9
Japan	133 073	23.8	60.8
Chile	128 582	6.9	68.1
India	93 393	27.5	86.1
Pakistan	74 597	56.5	98.5
Brazil			
European Union	1 792 546	12.6	78.1
United States of America	936 219	9.0	52.5
Argentina	846 907	13.0	37.1
China	585 737	49.6	71.6
Japan	449 228	16.2	39.7
Mexico	325 383	31.1	71.4
Canada	209 070	25.6	14.0
Russian Federation	167 228	22.7	71.8
Paraguay	144 707	12.6	23.3
Venezuela	134 118	20.1	71.8
Mexico			
United States of America	2 314 747	2.3	0.0
European Union	639 243	14.0	53.9
Japan	359 298	29.6	29.2
Canada	303 120	11.6	0.0
China	234 014	145.6	59.7
Hong Kong	213 961	96.6	0.0
Brazil	180 110	16.4	79.9
Argentina	133 135	23.0	85.3
Colombia	95 225	16.5	80.9
Venezuela	92 785	14.7	81.1

Table 8: The top 10 product potentials for selected Latin American countries

HS2	HS6		Market Potential		Contribution of tariffs
		Argentina	**1000 USD**	**%**	**% of MP**
15	150710	Soya-bean oil crude, whether or not degummed	331 271	27.6	81.8
10	100590	Maize (corn) nes	313 293	26.6	90.9
2	20130	Bovine cuts boneless, fresh or chilled	243 945	73.4	86.4
15	151211	Sunflower-seed or safflower oil, crude	227 188	27.8	59.5
87	870421	Diesel powered trucks with a GVW not exceeding five tonnes	207 183	49.0	79.0
23	230400	Soya-bean oil-cake&oth solid residues,whether or not ground or pellet	161 233	8.5	67.9
12	120100	Soya beans	131 623	30.4	85.5
87	870323	Automobiles w reciprocatg piston engine displacg > 1500 cc to 3000 cc	129 662	12.9	100.0
2	20230	Bovine cuts boneless, frozen	116 637	67.2	89.6
10	100190	Wheat nes and meslin	84 999	6.4	60.3
		Brazil			
17	170111	Raw sugar, cane	684 320	61.2	66.2
20	200911	Orange juice,unfermentd&not spiritd,whether/not sugard/sweet,frozen	476 995	38.3	82.7
12	120100	Soya beans	354 691	18.0	83.3
24	240120	Tobacco, unmanufactured, partly or wholly stemmed or stripped	343 287	40.4	69.4
17	170199	Refined sugar, in solid form, nes	285 978	37.8	71.5
2	20230	Bovine cuts boneless, frozen	270 064	135.7	91.3
26	260111	Iron ores&concentrates,oth than roasted iron pyrites,non-agglomerated	230 405	9.3	11.5
23	230890	Veg mat,waste,residues&by-prod nes pelletd or not,usd in animal feedg	228 984	457.0	96.5
26	260112	Iron ores & concentrates,other than roasted iron pyrites,agglomerated	219 571	20.3	5.1
23	230400	Soya-bean oil-cake&oth solid residues,whether or not ground or pellet	194 336	10.2	39.9
		Mexico			
87	870421	Diesel powered trucks with a GVW not exceeding five tonnes	436 555	46.5	1.1
62	620342	Mens/boys trousers and shorts, of cotton, not knitted	355 048	29.2	5.5
87	870431	Gas powered trucks with a GVW not exceeding five tonnes	351 803	13.4	5.7
17	170199	Refined sugar, in solid form, nes	142 358	123.9	88.6
85	854430	Ignition wirg sets&oth wirg sets usd in vehicles,aircraft etc	123 678	4.0	10.9
87	870324	Automobiles with reciprocating piston engine displacing > 3000 cc	120 098	4.1	15.1
87	870323	Automobiles w reciprocatg piston engine displacg > 1500 cc to 3000 cc	108 010	1.5	68.5
85	852990	Parts suitable f use solely/princ w the app of headings 85.25 to 85.28	97 748	7.1	13.6
22	220890	Undenatrd ethyl alc <80% alc cont by vol&spirit,liqueur&spirit bev nes	79 222	29.4	31.6
62	620462	Womens/girls trousers and shorts, of cotton, not knitted	77 724	8.0	43.7

4 Border effects and regionalism

The proliferation of new regional trading arrangements and deepening of existing integration experiences is probably one of the main phenomenon that has characterized the global trade environment in the last decade. The most important manifestations of this trend have been the formation of NAFTA and Mercosur at the beginning of the nineties, almost in conjunction with the completion of a major integration phase in Western Europe.

Those three groups of countries (NAFTA, Mercosur and the EU) enjoy of relatively free movement of goods (with nevertheless important differences in the degree of trade integration) inside each group, while maintaining non-negligible barriers to trade between themselves. As the experience of the multilateral trade negotiations held in Cancún has shown, those three groups are key players in trade liberalization talks, with sometimes conflicting

interests. Those events might even be interpreted as a confirmation of fears expressed by part of the economists' profession that the multiplication of regional arrangements would result in the formation of regional "blocks", deepening their internal integration, while making global trade talks increasingly difficult and slow.

This chapter mostly tries to give a rigorous description of the level of integration within and between each of the three "blocks" forming the *Atlantic Triangle*, an expression sometimes used to refer to their common geographic feature of access to the Atlantic Ocean. We evaluate the ease of access to each of those markets from each other based on a benchmark consisting of trade *within* countries. This border effects methodology, furnishes a new tool for the estimation of regional integration and market access in general. This is used here in particular to assess the access to Northern markets of Southern producers (Mercosur exporters' access to NAFTA and EU markets here), a very sensitive question in the prospect of the new WTO–development–round negotiations.

Three important trade liberalization negotiations are entering into a new and crucial phase for the Mercosur: The European Union-Mercosur Association Agreement, the Free Trade Area of the Americas (FTAA) and the Doha Round of the WTO. Most of the studies trying to assess trade effects of "North-South" free trade agreements between Mercosur and the EU and Mercosur and NAFTA are based on computable general equilibrium models and show that in the area of trade in goods, simultaneous preferential trade negotiations have the potential to provide significant market access gains, as a result of the fact that the structure of protection in the US and the EU is strongly biased against sectors and products where Mercosur countries have clear comparative advantages[15]. Clearly, a large determinant of the size and sharing of potential benefits from the prospective agreements depend upon the degree of inclusion of agricultural products in the negotiations. We will here however focus on market access measurement for manufacturing industries. This is a sensitive and important topic on several grounds. It relates in particular to the traditional

[15]See for instance Lacunza, Carrera and Cicowiez, 2003, for the effects on Mercosur of the prospective FTTA and EU agreements ; Bouët, Laborde, Tarascou and Yapaudjian-Thibaut (2003) for the costs of the FTAA for the European Union with and without an agreement with Mercosur ; Bchir, Decreux and Guérin (2003) for the consequences of a free-trade agreement between the EU and Mercosur, or Flôres (2003) for the costs and opportunities of different scenarios for Brazil.

arguments about the necessary protection of infant industries in developing countries. Because of EU apparent competitive position in those countries (Castilho, 2003, shows that the EU accounts for around 28% of Mercosur's imports despite Mercosur's high protection in manufactured goods), trade liberalization agreements of the North-South type is sometimes thought to represent an important threat to local production. We provide here a detailed empirical account of the measured market access for different industries in those North-South trade relationships.

4.1 The model and estimable equation

The measure of the degree of international fragmentation of market is by nature linked to the assessment of the impact of national borders. For that assessment, a model of bilateral trade flows is needed to describe what a "normal" trade flow should be. The *gravity equation* is the ideal candidate for this comparison thanks to its old empirical success in describing bilateral trade volumes. This methodology of adding intra-national trade flows to a classical trade equation in order to measure the impact of national borders was the motivation behind the seminal work of McCallum (1995) soon followed by the application and extension of the framework by Wei (1996) for the cases where data on trade flows between sub-national regions do not exist. Indeed, even in the absence of flows between sub-national regions, you can still measure the *total* volume of trade occurring within a country. This is simply equal to the overall production of the country minus its total exports, which gives the total value of goods shipped from a country to its own consumers. Inserting this observation in a bilateral trade equation, the researcher can contrast internal flows with international flows. Everything else equal, the excessive trade observed inside a country provides an estimate of the fragmentation of international markets.

We use the same modeling strategy as in Fontagné, Mayer and Zignago (2004), that is a specific form of the Krugman (1980) model of monopolistic competition and trade in an N-country setting, which yield very simple estimable predictions for trade volumes directly extracted from theory:

$$\begin{aligned}\ln(\text{relflow}_{ij}) &= \beta_1 \ln(\text{relprod}_{ij}) + \beta_2 \ln(\text{relprice}_{ij}) + \beta_3 \ln(\text{reldis}_{ij}) + \beta_4 C_{ij} + \beta_5 L_{ij} \\ &\quad -(\sigma-1)\ln(1+\text{tar}_{ij}) - (\sigma-1)\ln(1+\text{ntb}_{ij}) + \beta_7 \text{RIA}_{ij} \\ &\quad +\beta_0 + \epsilon_{ij}, \end{aligned} \tag{5}$$

Most variables are expressed in relative terms: relflow_{ij} gives the imports of j from i relative to imports from self of country j, reldis_{ij} is the corresponding ratio for distances. relprod_{ij} relates the value of output of i over j, while relprice_{ij} gives the ratio of producers' prices.

While relative distances proxy for transport costs, the estimated equations also includes "borders-related costs", which in the more general case can consist of tariffs (tar_{ij}) or broadly defined Non Tariff Barriers (ntb_{ij}, quantitative restrictions, administrative burden, sanitary measures...). We account for the reduction in trade barriers due to Regional Integration Arrangements, RIA_{ij}. Sharing a common language (L_{ij} equals to 1) and a common border (C_{ij} equals to 1) is also assumed to mitigate trade barriers. The remaining impact of crossing national borders is estimated trough the intercept of the equation, β_0, which gives the remaining level of excessive intra-national trade, everything else (productions, distances and prices notably) equal. This estimate incorporates all remaining border-related hindrances to international commerce, such as *home bias* in consumption, the effect of holding different currencies, or unmeasured protectionist instruments. We estimate several versions of (5) below, some of which imposing the theoretically-consistent constraint that the coefficient on relative production should be unitary, some considering reciprocity issues...

We estimate equation (5) in order to capture border effects characterizing each of the possible bilateral combinations of trade partners in the Atlantic Triangle. The needed data involves primarily bilateral trade and production figures in a compatible industry classification ((Appendix **??**).

4.2 The impact of regional agreements in the Atlantic Triangle

Among the objectives of this section, we first wish to compare the respective impacts of Mercosur, European Union and NAFTA agreements on trade volumes and intra-regional estimated integration. We also want to compare Mercosur's estimates with other RIAs involving developing countries. In this purpose, we add ASEAN member countries in the sample as well as the Andean Community. We run regressions for different time periods over the whole time frame, with dummy variables capturing the lower (or higher) impact of borders on trade inside each RIA, and thus characterizing the extent of integration of the zone, compared to trade taking place in the rest of the sample.[16]

The five RIAs considered have different levels in formal integration, history and duration. The European Union (EU) is undoubtedly the largest experiment of regional integration in the recent period, characterized by a long term commitment of member countries to achieve *wide-range integration*.[17] NAFTA is a free trade agreement that entered into force between the USA, Canada and Mexico in January 1994: Tariff reductions among member countries were scheduled on a 10/15 years agenda. Mercosur is a customs union signed in 1991 between Brazil, Argentina, Paraguay and Uruguay but implemented in 1995, with member countries substantially liberalizing their internal trade during the transition period. The CET concerned 85% of tariff lines in 1995 and a schedule for convergence towards complete CET and free trade was then agreed upon but significantly disturbed by the macroeconomic problems in Brazil and Argentina. The Andean Community is a rather old regional trade agreement, but is usually seen as having been less effective in true reductions of the level of protection in those countries. Finally, ASEAN is officially a free trade agreement between Indonesia, Malaysia, Singapore, Thailand and the Philippines since 1977, but intrabloc trade liberalization was really implemented on a large scale starting with AFTA in 1992 (Soloaga and Winters, 2001).

Table 9 gives results for three different time periods such that we can see the evolution of

[16]The remaining trade flows are taking place between the RIAs but also with and between countries from the rest of the world.

[17]EU will usually be here EU15 over the whole period.

Table 9: Border effects among the large integrating regions

	Dependent Variable: Ln Imports Partner/Own		
Model :	83-88	89-94	95-99
Border	-4.83^a	-4.85^a	-4.06^a
	(0.05)	(0.05)	(0.05)
Rel. Production	0.81^a	0.81^a	0.86^a
	(0.01)	(0.01)	(0.01)
Rel. Prices	-0.43^a	-0.46^a	-0.58^a
	(0.02)	(0.02)	(0.02)
Rel.Distance	-0.93^a	-0.87^a	-1.06^a
	(0.02)	(0.02)	(0.02)
Contiguity	0.23^a	0.54^a	0.60^a
	(0.04)	(0.03)	(0.03)
Common Language	0.32^a	0.51^a	0.53^a
	(0.02)	(0.02)	(0.02)
Mercosur	0.14	0.33^a	0.83^a
	(0.11)	(0.12)	(0.10)
EU15	1.66^a	1.88^a	1.63^a
	(0.03)	(0.03)	(0.04)
NAFTA	0.62^a	1.20^a	1.23^a
	(0.09)	(0.08)	(0.09)
ASEAN	0.47^a	1.09^a	1.20^a
	(0.10)	(0.08)	(0.11)
Andean Community	-1.47^a	-1.02^a	-0.32^a
	(0.08)	(0.07)	(0.08)
N	246188	343770	318713
R^2	0.436	0.432	0.477
RMSE	2.83	2.814	2.745

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels. The reported standard errors take into account the correlation of the error terms for a given importer.

coefficients over time. Note first that the level of border effects in this world matrix of trade flows is very high: Two countries that do not belong to one of the RIA trade on average 58 times (exp(4.06)) less between themselves than within themselves in 1995-1999. The trend is however clearly one of falling importance of borders over time, which is consistent with a move towards a global integration of industrial products' markets, even outside regional agreements. This can be interpreted as evidence of a trend of global increase of markets' integration.

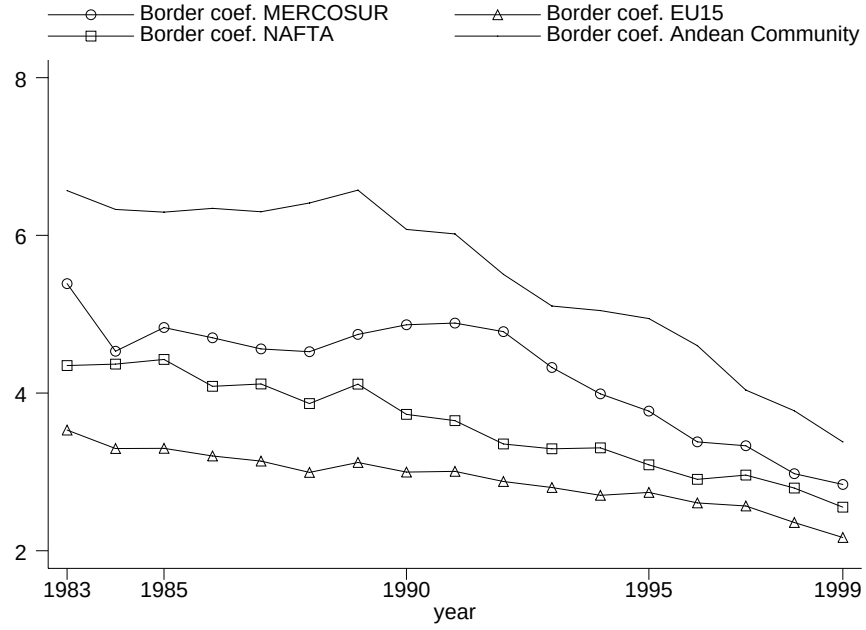
Let us consider now the effects of various regionalization experiments. For the most recent period, there seems to be a clear ranking of integration with EU countries being the most integrated zone followed by NAFTA and ASEAN. Figure 1 graphs the evolution of border effects coefficients (equal to minus the sum of the border coefficient and the coefficient on the RIA) inside the three RIAs of the Atlantic Triangle and the Andean Community for comparison. This representation offers a richer picture of how market fragmentation is receding in each of those regional arrangements. A striking characteristic is the apparent convergence of integration over time. The EU starts far more integrated than the other zones, but those gradually catch up, mostly NAFTA and Mercosur. The timing of the NAFTA effect is insightful. The mid eighties witness the start of a rather sharp increase in the surplus of trade flows inside NAFTA. This seems to correspond to a widely known sequence of trade liberalization in the zone: Mexico unilaterally liberalized trade in 1985, the United States and Canada signed their free trade agreement in 1989, with NAFTA becoming effective in January 1994. The commercial relationships between Mercosur members do not seem to exert a significant effect before 1993,[18] which corresponds also to the timing of openness of this region. The evolution of the Andean Community reveals a downward trend of internal fragmentation and seems to follow the more general evolution of border effects at the global level as shown in Table 9.

Those results point to expected and reasonable estimates of the effect of trading arrangements, somehow more reassuring than those of Soloaga and Winters (2001) for instance who

[18]Production data for Brazil is missing in 1991 and 1992. The estimates for these years should therefore be considered with caution.

find an overall *negative* and significant impact of EU membership, no significant impact for NAFTA or ASEAN and an extremely important positive impact of Mercosur, roughly constant since 1980. ASEAN is found here to have a sizeable impact on trade volumes, that is growing over time, the order of magnitude of the effect is comparable to what is found in Frankel (1997) and points to the dynamism of international trade in the region. Note that this revealed dynamism might have much less to do with the impact of the agreement per se than with the emergence of new trade linkages inside the region based on the fragmentation of the production process that has developed a great deal recently (see Yi, 2003 for an empirical account). Overall, taking the right benchmark to assess regional integration therefore seems crucial. The puzzling results in the previous literature where the deepest integration experiences did not seem to yield consistent important surpluses of trade are here challenged. The border effect methodology gives us a picture which seems more in line with the priors, with EU and NAFTA having a large impact on trade flows (although it should again be noted that those areas are still far from perfectly integrated even in recent years).

Figure 1: Border effects over time in large RIAs of America and Europe



4.3 Reciprocal Market Access in the Atlantic Triangle

Regional integration agreements can be associated with important fears in non member countries. This was the case in the European integration movement (with claims of a construction of a "Fortress Europe" among Japanese and US authorities) but also in the NAFTA and Mercosur construction. The main concern is that the withdrawal of remaining barriers to trade between member nations would be made at the expense of restricted access of external trade partners to the enlarged market. Indeed, there are some theoretical foundations to those fears. There is first the traditional optimal tariff argument which can be used here. A deepening of a RIA level of integration is very similar to a rise of the size of this RIA on the world market. Consequently, the terms of trade gains from increased protection with respect to third countries are higher, which can be the basis for a more restrictive trade policy. However, the process of multilateral negotiations makes it (almost) impossible for WTO members to raise tariffs. The restricted access will therefore have all the chances to take the form of increased NTBs, which are almost impossible to measure accurately directly, but are indirectly detected through a rise in the border effect of third countries. The second possible channel is through the political economy of protection. Regional integration advances represent major shocks of increased openness for member countries. There might be a temptation to alleviate or at least reduce the adjustment costs of such a move by reducing the access of third country products to national markets in the same time. Associated with those adverse effects for countries outside each of the blocks, are important concerns about *reciprocity* in market access. Those are in particular central in trade talks and negotiations and constitute a frequent cause of trade disputes.

The dataset used here offers a new opportunity to investigate those issues of adverse effects and reciprocity of market access, with a particular focus on the Mercosur countries with its two most important partners in the international trading system (the EU and NAFTA). Table 10 gives results of regressions pooled over all industries with dummy variables capturing each of six different possible flows between those three RIAs and three dummy variables concerning intra-RIA flows (first column[19]). We drop the constant of

[19]This first column restricts the sample to those observations for which tariffs are available to allow the

Table 10: Border effects between Mercosur, European Union and NAFTA countries (1993-1999)

	Dependent Variable: Ln Imports Partner/Own				
Model :	(1)	(2)	(4)	(5)	(6)
Rel. Production	0.92^a	0.92^a	0.92^a	0.81^a	1
	(0.04)	(0.04)	(0.04)	(0.03)	
Rel. Prices	-1.01^a	-0.97^a	-0.94^a	-1.35^a	-1.66^a
	(0.31)	(0.30)	(0.30)	(0.28)	(0.32)
Rel.Distance	-0.83^a	-0.83^a	-0.84^a	-0.46^a	-0.80^a
	(0.09)	(0.09)	(0.10)	(0.15)	(0.17)
Contiguity	0.67^a	0.67^a	0.65^a	0.59^a	0.33^c
	(0.17)	(0.17)	(0.17)	(0.14)	(0.18)
Common Language	0.49^a	0.48^a	0.48^a	0.20	0.25
	(0.16)	(0.16)	(0.17)	(0.16)	(0.24)
EU15	-2.79^a	-2.78^a	-2.76^a	-4.95^a	-3.81^a
	(0.25)	(0.25)	(0.25)	(0.43)	(0.49)
NAFTA	-3.04^a	-2.98^a	-2.90^a	-5.05^a	-4.04^a
	(0.46)	(0.46)	(0.48)	(0.48)	(0.58)
Mercosur	-3.76^a	-3.63^a	-3.70^a		
	(0.36)	(0.36)	(0.32)		
EU15 → Mercosur	-4.47^a	-4.28^a	-4.33^a	-6.42^a	-5.06^a
	(0.40)	(0.41)	(0.38)	(0.47)	(0.53)
Mercosur → EU15	-4.63^a	-4.53^a	-4.51^a	-6.61^a	-5.11^a
	(0.46)	(0.46)	(0.48)	(0.69)	(0.80)
NAFTA → Mercosur	-4.57^a	-4.37^a	-4.41^a	-6.84^a	-5.70^a
	(0.40)	(0.40)	(0.37)	(0.50)	(0.58)
Mercosur → NAFTA	-4.81^a	-4.69^a	-4.59^a	-6.08^a	-5.02^a
	(0.60)	(0.62)	(0.61)	(0.57)	(0.60)
EU15 → NAFTA	-3.90^a	-3.77^a	-3.70^a	-5.73^a	-4.40^a
	(0.47)	(0.48)	(0.49)	(0.44)	(0.51)
NAFTA → EU15	-4.04^a	-3.91^a	-3.89^a	-6.38^a	-5.03^a
	(0.48)	(0.48)	(0.50)	(0.73)	(0.87)
Ln (1 + Tariff)		-1.62^a	-1.70^a	-2.19^a	-2.27^a
		(0.60)	(0.61)	(0.65)	(0.65)
Frequency index of Threat NTB			0.34	0.23	0.33
			(0.25)	(0.29)	(0.31)
Frequency index of Price NTB			-0.57^b	-0.82^a	-0.80^a
			(0.27)	(0.19)	(0.27)
Frequency index of Quantity NTB			0.57^b	-0.10	-0.07
			(0.27)	(0.29)	(0.33)
Frequency index of Quality NTB			0.02	-0.12	-0.12
			(0.22)	(0.25)	(0.25)
Ln bilateral FDI stock				0.22^a	0.16^a
				(0.03)	(0.03)
N	32290	32290	29041	19689	19689
R^2	0.907	0.907	0.906	0.911	0.895
RMSE	1.942	1.939	1.926	1.709	1.737

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels. The reported standard errors take into account the correlation of the error terms for a given importer.

those regressions in order to have the full border effect for each partner combination. The coefficient on relative production stays very stable around 0.9, which is quite near the unitary value predicted by theory[20]. The coefficient on distance is also very comparable with usual findings in gravity equations. It can be seen that speaking the same language multiplies trade volumes by 1.6 and contiguity by 2, everything else constant, in the first column.

The level of trade integration among members of a RIA seems unmatched in the other combinations considered here over the period. For instance, the 43 ($\exp(3.76) \approx 43$) figure for intra-Mercosur flows compares with 87 for European exports to the Mercosur, and 103 for the reciprocal flow. With a factor of 122, Mercosur exports to NAFTA member countries appear as the most impeded in our sample, while the EU exports to NAFTA have the lower border effect between RIAs of this sample (49). Lastly, the Mercosur access to the EU and NAFTA markets appears less easy than the reverse.

4.4 The trade policy explanation of border effects

The difficulties faced by Mercosur exporters in the access to their two major trading partners are not significantly different from each other in column (1). Moreover, we do not know, at this point, which part of the variance of the border effects can be explained by simple differences in tariff rates or NTBs and which part results from other determinants. The other columns of Table 10 consider possible explanations. Returning to our modelling framework, the coefficient on the dummy variable of column (1) in Table 10 (multiplied by -1, for ease of interpretation) Mercosur-EU for instance, has a theoretical counterpart of:

$$(\sigma^s - 1)[\ln(1 + \text{tar}_{ij}) + \ln(1 + \text{ntb}_{ij})] + \beta_0, \tag{6}$$

where i =Mercosur and j =EU. We want to introduce proxies for terms concerning actual protection in the above expression and measure the resulting fall in the estimated bor-

comparison with the second column in the next section.

[20]The last column constraints this coefficient to be 1.

der effect expected if protection actually contributes to explaining border effects.[21] While the coefficient is pooled over all industries, we observe the protection variables for tariffs (t_{ij}^s) and NTBs (ntb_{ij}^s) at the industry level. The remaining estimate of border effect (β_0) includes the above mentioned potential elements pooled over industries for a given dyad of the Atlantic triangle. Note that the coefficient on tariffs also provides an estimate of $\sigma - 1$ in our sample.

Tariffs can be measured at the bilateral level and for each product of the HS6 nomenclature in the TRAINS database from UNCTAD. Those tariffs are aggregated from TRAINS data treated by Jon Haveman[22] in order to match our ISIC rev2 industry classification using the world imports as weights for HS6 products, an extract of the data for 1999 is shown in Table 11. Even in manufactured goods, tariffs are not negligible and (important for our empirical work below) vary quite substantially across industries and countries combinations. NTBs data also come from Haveman's treatment of TRAINS.

Table 10 gives results concerning protection measures inside the Atlantic Triangle, while Table 12 generalizes the sample to incorporate countries outside the Atlantic Triangle. The estimated price elasticity (σ in our theoretical framework) is relatively high (between 2.62 and 4.83, across specifications in both Tables 10 and 12) considering the level of industry detail. This estimate of σ is slightly lower than recent estimates that have been provided in the literature, but we only have 26 industries here, where Head and Ries (2001) for instance estimate their σ around 8 with 106 industries. Second, we observe a decrease in border effects for all dyadic combinations in Table 10. Tariff barriers therefore contribute to the impact of national borders in the expected way: They tend to raise the ratio of internal to cross-border trade volumes, although this ratio remains high and significant, pointing to other important explanations.

[21] An alternative procedure would use two steps, first estimating border effects coefficients and then regressing them on the possible explanatory variables. However, this involves the undesirable feature of using an econometric estimate as the dependent variable in the second stage. In addition, exploiting the full dimension of the problem would require estimating 9 different border effects for each industry and year, which results in certain regressions having very few observations, and therefore an increased volatility in estimated border effects.

[22] http://www.eiit.org/Protection/

Table 11: Tariffs in the Atlantic Triangle (1999)

	EU			Mercosur			NAFTA		
Industry	EU	MS	NT	EU	MS	NT	EU	MS	NT
Apparel	0.00	11.26	11.82	19.84	3.33	19.84	22.05	21.74	3.64
Beverages	0.00	1.04	9.90	18.69	2.56	18.69	16.99	13.23	4.84
Food	0.00	6.84	10.22	12.70	1.41	12.70	16.38	15.05	7.18
Footwear	0.00	8.60	10.60	23.15	6.29	23.15	20.92	20.73	4.50
Furniture	0.00	1.43	1.63	13.99	1.51	13.99	10.79	9.10	1.51
Glass	0.00	4.76	5.17	12.97	1.14	12.97	9.04	7.70	1.98
Ind. Chem.	0.00	3.69	4.85	8.84	0.49	8.84	5.75	4.16	0.74
Iron/steel	0.00	2.16	2.64	10.85	0.78	10.85	5.52	5.19	1.90
Leather	0.00	2.78	4.42	15.51	2.00	15.51	13.06	11.73	2.80
Mach elec	0.00	2.01	2.58	10.91	2.07	10.91	5.68	4.90	0.71
Machines	0.00	1.00	1.14	8.47	2.26	8.47	4.69	4.18	0.57
Metal prod	0.00	2.00	2.39	16.64	2.23	16.64	8.39	7.19	1.53
Misc	0.00	2.33	2.62	16.01	1.58	16.01	8.02	6.97	1.31
Nf metals	0.00	2.32	2.48	6.17	0.15	6.17	3.95	3.45	0.57
Non-metal	0.00	2.04	2.22	9.13	0.46	9.13	8.27	6.99	1.16
Oth Chem.	0.00	1.27	2.09	10.60	0.93	10.60	6.01	4.90	1.28
Paper	0.00	1.85	2.92	11.12	0.90	11.12	4.44	3.98	1.15
Petroleum	0.00	2.26	2.45	2.23	0.12	2.23	6.35	4.08	1.18
Plastic	0.00	3.87	6.85	16.01	1.74	16.01	9.87	7.39	2.61
Pottery	0.00	6.34	6.83	17.17	1.72	17.17	12.38	9.67	1.45
Printing	0.00	1.41	1.52	8.49	1.03	8.49	4.50	3.82	0.14
Prof/Sci	0.00	1.35	1.73	11.79	1.88	11.79	6.06	5.26	0.53
Rubber	0.00	2.88	2.97	12.37	1.34	12.37	8.44	7.66	1.15
Textiles	0.00	8.98	9.46	17.77	2.34	17.77	16.50	16.08	2.85
Tobacco	0.00	35.32	51.69	19.72	4.10	19.72	112.83	30.41	8.56
Transport	0.00	6.41	6.51	15.35	5.92	15.35	8.28	7.84	1.35
Wood	0.00	1.72	1.82	8.62	0.47	8.62	6.65	6.10	1.75

Besides tariffs, there are other obstacles to trade imposed by governments at the border in order to protect national industries and that will be captured by the border effects in the above regressions. Those NTBs, for which tariff equivalent are difficult to compute, take a myriad of different forms. Since we use NTBs from Haveman'treatment of TRAINS, we follow here Haveman Nair-Reichert and Thursby (2003) (using the same source data), who divide NTBs into four categories: (1) Those that have direct *price* effects such as minimum import pricing, trigger prices, and variable levies, (2) those that involve *quantity* restrictions such as quotas, seasonal prohibitions, and orderly marketing arrangements, (3) those that involve *quality* restrictions such as health, safety or technical standards, and (4) those that involve a *threat* of retaliation such antidumping and countervailing duty investigations. For a given HS6 category, each NTB variable is set equal to 1 if at least one of the underlying tariff lines in that category is subject to a NTB, and 0 otherwise. As for tariffs data, this information on NTBs is then aggregated to match with the 3-digit ISIC rev2 classification by calculating a frequency index. The third column of Table 10 shows that only price NTBs have the expected negative effect on trade flows. On the contrary, the frequency index of quantity NTBs has a positive and significant impact on the determination of trade flows. Whether this comes from poor quality of NTB data of from endogeneity problems with this type of variables (countries imposing trade protection on industries / countries that are particularly performant on their market) is unclear. Note that overall the actual protection explain only a small part of the border effect encountered by Mercosur exporters between 1993 and 1999. The part explained is 13% in the access to EU market (exp(4.63)-exp(4.51))/exp(4.51)) and goes up to 20% in the access to NAFTA markets ((exp(4.81)-exp(4.59))/exp(4.81)).

4.5 What role for FDI?

Another possible explanation of border effects that has not been subject to precise testing yet is the importance of foreign direct investment. It is well known, for instance, that European countries usually import very little volumes of American cars (even those cars that have the size and fuel consumption characteristics that actually make them suitable for

Table 12: Border Effects and FDI in Regional Agreements

	Dependent Variable: Ln Imports Partner/Own					
Model :	(1)	(2)	(3)	(4)	(5)	(6)
Border	-4.79^a	-4.25^a	-3.77^a	-5.89^a	-5.74^a	-4.91^a
	(0.05)	(0.05)	(0.05)	(0.07)	(0.07)	(0.06)
Ln Rel. Production	0.83^a	0.84^a	1	0.76^a	0.75^a	1
	(0.01)	(0.01)		(0.01)	(0.01)	
Ln Rel. Prices	-0.49^a	-0.24^a	-0.57^a	-0.64^a	-0.72^a	-1.02^a
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
Ln Rel. Distance	-0.82^a	-0.83^a	-0.97^a	-0.45^a	-0.52^a	-0.74^a
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Contiguity	0.77^a	0.78^a	0.55^a	0.91^a	0.78^a	0.51^a
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
Common Language	0.61^a	0.65^a	0.71^a	0.37^a	0.35^a	0.42^a
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
EU15	1.92^a	1.39^a	1.29^a	0.77^a	0.79^a	0.64^a
	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)
NAFTA	1.57^a	1.20^a	1.01^a	0.42^a	0.66^a	0.26^a
	(0.08)	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)
Mercosur	0.86^a	0.70^a	0.70^a			
	(0.13)	(0.13)	(0.13)			
ASEAN	1.32^a	1.60^a	1.46^a			
	(0.10)	(0.10)	(0.09)			
Andean Community	-0.30^a	-0.33^a	-0.47^a			
	(0.10)	(0.10)	(0.10)			
Ln (1 + tariff)		-5.21^a	-5.24^a	-3.41^a	-3.44^a	-3.63^a
		(0.29)	(0.30)	(0.24)	(0.24)	(0.25)
Ln bil. FDI stock				0.23^a	0.26^a	0.20^a
				(0.00)	(0.01)	(0.01)
Ln bil. FDI stock * EU					-0.03^a	0.00
					(0.01)	(0.01)
Ln bil. FDI stock * NAFTA					-0.06^a	-0.01
					(0.01)	(0.01)
Ln bil. FDI stock * Mercosur					-0.15^a	-0.13^a
					(0.02)	(0.02)
Ln bil. FDI stock * ASEAN					0.13^a	0.14^a
					(0.01)	(0.01)
Ln bil. FDI stock * Andean Comm.					-0.13^a	-0.19^a
					(0.02)	(0.02)
N	234539	234539	234539	76183	76183	76183
R^2	0.467	0.488	0.308	0.498	0.507	0.371
RMSE	2.69	2.636	2.667	2.068	2.048	2.104

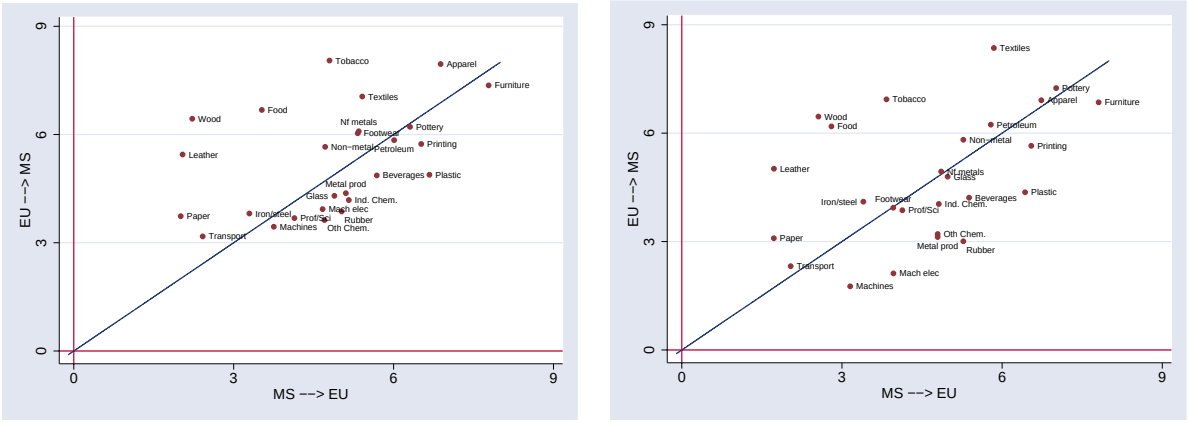
Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels. The reported standard errors take into account the correlation of the error terms for a given importer.

European streets and fuel prices). Those "missing imports" can alternatively result from actual protection by EU countries or from a home bias of EU consumers. However, it is also quite likely that the important production of cars taking place within Europe in plants owned by American firms limits the actual "need" for important trade flows. It is also likely that this last explanation is not independent from the two former: The theoretical and empirical literature on FDI/export decision suggests that American firms may have decided to produce on the European soil because of a combination of high trade protection and the imperative adaptation of American cars to local tastes and needs.

We use the bilateral stock of FDI between from the OECD database, often used in gravity-like empirical work on FDI (Wei, 2000 being a recent example), which covers the period 1980 to 2000. Although this variable lacks the industrial dimension, it has the advantage of good overall availability and reliability across the entire period. Column 4 of Table 12 introduces the stock of bilateral FDI. FDI has a positive impact, which represents a confirmation that, at such an aggregate level, FDI and trade are complements rather than substitutes. This limits the validity of the potential explanation of border effects through FDI, although more detailed data at the industry-level would be needed to confirm this result.

In columns 5 and 6 we interact the FDI variable with the five RIAs considered in this work (regression 6 constraint the coefficient on relative production to be unitary). While FDI does not seems to have an important influence on trade flows in direction of the EU or NAFTA, its impact is significant for imports of Mercosur, ASEAN and Andean Community. This additional impact is however of opposite sign for ASEAN. Indeed, the bilateral FDI stock in Mercosur has a final coefficient of 0.09 (0.26 - 0.15 in column 5) whereas the stock of FDI in countries of ASEAN has a final coefficient of 0.39 (0.26 + 0.13). This seems to reflect the differences in the motivation of FDI in each RIA: While multinational firms installed in Mercosur or Andean Community seems interested by local (or regional) market, those present in ASEAN are turned towards global markets.

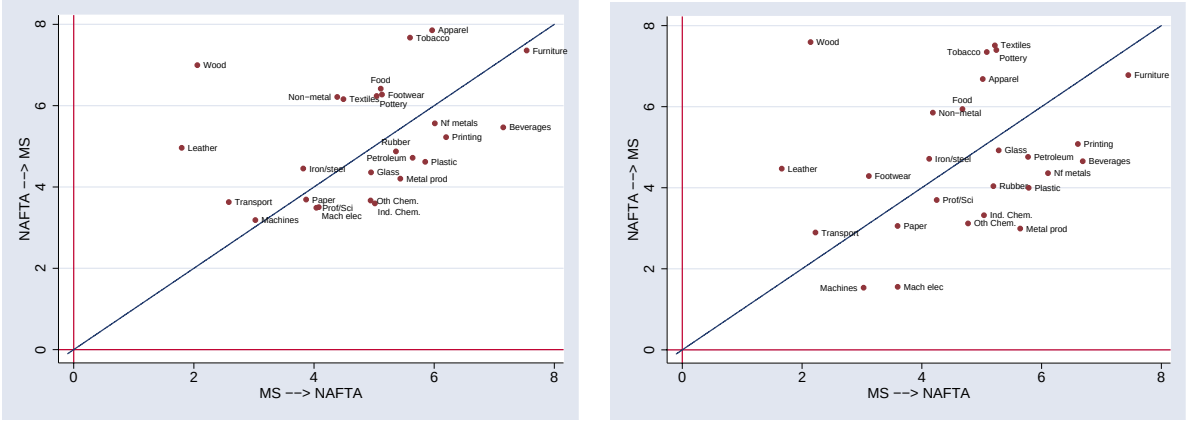
Figure 2: Industry-level market access between the Mercosur and the EU15 - Border Coefficients (1993-1999)



(a) regressions w/o tariffs

(b) regressions with tariffs

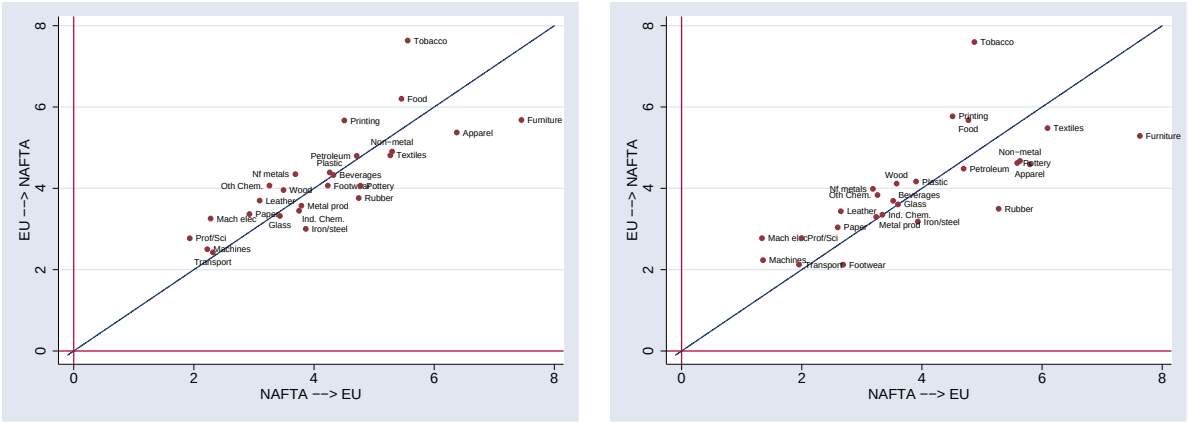
Figure 3: Industry-level market access between the Mercosur and the NAFTA - Border Coefficients (1993-1999)



(a) regressions w/o tariffs

(b) regressions with tariffs

Figure 4: Industry-level market access between the EU6 and the NAFTA - Border Coefficients (1993-1999)



(a) regressions w/o tariffs

(b) regressions with tariffs

4.6 Industry-level market access in the Atlantic Triangle

We now conduct estimations at the industry level, in order to evaluate the degree of symmetry of revealed trade obstacles in bilateral relationships between Mercosur, the EU and NAFTA. Figures (2, 3, and 4) represent bilateral symmetry in market access in the three different combinations over the years 1993-1999. For instance, in figure 2, the horizontal axis has (the log of) the border effect faced by Mercosur exporters on European markets and the vertical axis has (the log of) the border effect faced by European exporters on the Mercosur market. In this figure, industries located beneath the 45 degree line are those for which the access to European markets is more difficult than the access to the Mercosur market. For each of those figures, results are presented with and without tariffs in the regression. Results are as follows:

First, there is positive correlation between the reciprocal market access of different industries in each country pair. The most apparent correlation being between the EU and NAFTA. This can be interpreted in terms of political economy (similar countries protect their "sensitive" industries in the same way and industries tend to have the same pattern of sensitivity in the two richest blocks). An additional explanation is in terms of industry characteristics (domestic preferences are more diversified in sectors such as food, leading

to a larger border effect in all samples for this industry).

Turning to specific industries, we can note that Tobacco, Wood and Leather industries are systematic outliers, characterized by large border effects, in particular in the access to Mercosur markets. Here different tastes, transportation issues[23] and other factors related to distribution networks might explain this result. Conversely, Machines, instruments and transport equipment for instance do face limited border effects in almost all bilateral relationships. Finally, there is an apparent correlation between the border coefficients and the comparative advantage of the region: Professional and Scientific instruments industry, for instance, seems largely more closed to Mercosur exports in Europe and North America than the reverse. Last, including tariffs in the regressions do not seem to change drastically the picture.

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[23]Those results come from industry-level regressions and therefore industry specific coefficients at least partially capture cross-industry differences in "transportability" of the good.

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A Methodological Annexes

A.1 The Shift and Share Methodology applied to growth exports

Cheptea, Gaulier and Zignago (2005) develop a quantitative methodology to breaking down the volume growth in trade for each country into three components: a geographic structure effect, a sectoral effect and a performance effect. Countries have no influence on the structural effects, which result from the growth in the markets to which they export, given their original geographical and sectoral specialisation. In contrast, the performance effect indicates the degree to which the exporting country was able to gain (or lose) market shares. This performance effect can in part be attributed to the capacity of the country to adapt its sectoral and geographical specialisations. We refer to the residual component of performance effect, which includes price and non price competitiveness, as "competitiveness".

The method used is similar to a shift-share analysis, but has the advantage of being independent of the structural breakdown with respect to the order in which the geographic and sectoral dimensions are taken into account. Furthermore, it allows the significance of the effects measured to be assessed.

The gains or losses of world market shares by individual countries are often considered as an index of their trade competitiveness. But given changes in demand, the relative medium-term inertia of geographical and sectoral specializations partly affects such outcomes. It is therefore very interesting, for a given period, to be able to distinguish the impact of a country's initial position in different markets relative to its capacity to adapt and to its competitiveness.

We apply a technique specific to the regional science literature to asses exports growth at country level. Similar studies have been carried only at the subnational level and mainly for the North American trade. The underlying feature that supports the use of this method is that exports growth rates are affected by structural effects: Countries with initial strong positions on the most dynamic markets, either geographically or by sector, benefit *ceteris paribus* from higher export growth. Accordingly, "pure" performance may be distinguished from structural effects.

The traditional tool to deal with structure effects is a "shift-share" or "constant market share" analysis. The shift-share method is one of the simplest and least expensive techniques for investigating growth rates. This method was more used in regional studies

on economic and employment growth, and much less applied to trade issues. Markusen , Noponen, and Driessen (1991) use a shift-share decomposition and estimate the shares of employment growth for export and import penetration in nine U.S. regions. Hayward and Erickson (1995) extended this model, applying it to the North American Free Trade Area. Gazel and Schwer (1998) study the growth of international exports of the U.S. states focussing on demand conditions. The emergence of the shift-share method from regional studies can explain its scarcity application to country level data.

The most related work in the applied literature[24] is the CEPII report on competitiveness in which the export growth of a given country is decomposed into a global demand effect, a sectoral composition effect, a geographical composition effect and a competitiveness effect which is the residue (CEPII, 1998). In the CEPII study the change in country i's exports from time 0 to t is expressed as follows:

$$X^t_{i..} - X^0_{i..} = rX^0_{i..} + \sum_k (r_k - r)X^0_{i.k} + \sum_k \sum_j (r_{jk} - r_k)X^0_{ijk} + \sum_k \sum_j \left(X^t_{ijk} - X^0_{ijk}(1 + r_{jk})\right)$$

with j the partner, k the product or sector, r the global growth rate (all countries in the sample except i), r_k the global growth rate for product k, r_{jk} the global growth rate of product k to country j. Countries that had good market shares in products that grew the more, benefit from a favorable sectoral effect, those having good positions in the most dynamic import countries benefit from a favorable geographic effect.

One important drawback with this method is the dependence of the results on the ordering of the structure effects: computing first geographical effects then sectoral effects or the inverse yields different results. Jayet (1993) describes an alternative method that fixes that problem and has the additional advantage of providing standard error for the estimate of effects. It consists in a weighted variance analysis. We adopt this latter approach and estimate the following equation with OLS, weighted by the initial exports volume X^0_{ijk}:

$$r_{ijk} = m + \alpha_i + \beta_j + \gamma_k + \varepsilon_{ijk}$$

m is an intercept and the α_i, β_j, γ_k are respectively country, partner and sector dummies (fixed effects).

Effects are uniquely identified with: $\sum_i \frac{X^0_{i..}}{X^0_{...}}\alpha_i = \sum_j \frac{X^0_{.j.}}{X^0_{...}}\beta_j = \sum_k \frac{X^0_{..k}}{X^0_{...}}\gamma_k = 0$.

$GEO_i = \sum_j \frac{X^0_{ij.}}{X^0_{...}}\hat{\beta}_j$ are the geographical structure or demand effects; $SECT_i = \sum_k \frac{X^0_{i.k}}{X^0_{...}}\hat{\gamma}_k$ are the sectoral structure effects, and $\varepsilon_i jk$ is the error term.

[24] To our knowledge there are few up to date similar studies on this subject using similar instruments. There are countries studies such as those produced by ITC[25] using that kind of competitive indicators. There are also studies using Computable General Equilibrium Models but which are more fitted to measure the expected effect of a tariff shock than of differing dynamism. We can quote an anterior study from CEPII (1998) which use some of the instrument.

The growth rate of country i exports, r_i can then be written as follows[26]:

$$r_i = \hat{m} + \hat{\alpha}_i + GEO_i + SECT_i$$

where $\hat{\alpha}_i$ gives an evaluation of country i performance or competitiveness on foreign markets.

A.2 The trade potentials calculation for the revealed discrimination

Using the BACI and MAcMap databases, we take for each chapter of the Harmonized System(HS with 2 digits) the percentiles 40%, 65%, and 90% of the existing tariffs (all positions HS6, countries and partners), which will be noted a, b and c. They allow the construction of four classes of tariffs: A tariff lower than a is in the first class, and so on until a tariff higher c which is in the fourth class. On average a equals to 5%, b to 12%, and a to 30%. The differences between chapters HS2 are relatively moderate but significant.

Classes of discrimination are also made up. For that we take the quartiles of the adjusted discrimination and cross the classes of discrimination and those of tariffs (after having checked the existence of a very significant correlation between the two sources of information). If discrimination is strong (the last quartile) and that the class of tariff is also we consider that discrimination reveals, to some extent at least, the existence of a tariff. To obtain thus the total tariff equivalent of protection we add to the tariff the lower limit a. If, however, the apparent openness rate is very low (openness rates are also gathered by quartiles for each HS6 product) then we add b. If the class of tariff is on the contrary low then we add b or c according to whether the openness rate is high or not. If discrimination is in the third quartile then we limit the attribution of tariff equivalents: a or b, according to the class of openness rate. Nothing is added if the class of tariff is already high. If discrimination is in the first quartile (thus weakest) then the tariff equivalent is equal to the tariff except if the openness rate is weak, in which case we add a.

For each market we calculate a "score" according to information at the product level on the diversity of supply (1, 2 or 3) and of demand (1, 2 or 3), the degree of differentiation (1, 2 or 3), and the average distance travelled by goods (1, 2 or 3), and on the country-product level on the existence or not of a comparative advantage (+1 if a comparative advantge exist, -1 if not)[27]. If this score (sum of the elements above) is rather low (lower than 8) we add tariffs more carefully (we withdraw a) because we are in a case for which our method is less relevant (because of the characteristics of the product) or because there is probably a competitive national supply which is not completely taken into account and which can explain the discrimination, which then does not reveal protection.

[26]Given a number of zero trade flows at the initial date, the export fixed effects have to be adjusted : the export growth stemming from the creation of new trade flows (not considered in the model) is attributed to the competitiveness effect.

[27]See the formulas of indicators in Gaulier and Zignago (2002)

In the energy sector (HS2=27) we do not add a tariff equivalent. Whatever the discrimination the tariff equivalent of total protection in this chapter is equal to the tariff.

Following a total liberalization of the trade, the new trade flow is calculated as $M = M_0(1 + tareq)^\sigma$, where *tareq* is the tariff equivalent. The elasticities, σ, are fixed to -1 in general except for the little differentiated products and the fragmented markets (diversity of supply) where they are of - 1,5, and for the products very differentiated on concentrated markets where they are of - 1/1,5. The tariff equivalents higher than 500% are limited to 500%.

At the bilateral level we calculate flows after suppression of the tariffs (the nontariff protection is not bilateral), i.e. that we use a similar formula but for bilateral flows and with *eqtar* replaced by tariffs. We recompute then the corresponding shares of markets on each market.

We consider this new divison of the market holding account of the tariff preferences as starting point to distribute the variations of trade between the various exporters. For this purpose, we define a procedure which corrects the shares of markets considered to be abnormal, but ensures that all the multilateral profit is redistributed. Indeed, in the event of revealed discrimination, certain exporters profit from excessive shares of market relative to their competitiveness, size and localization compared to the market of import, others on the contrary are ignored. Because this stage of the procedure is relatively *ad hoc* we define conservative rules of correction and rectify only marginally the distribution of the markets shares.

We define initially a rule which increases or decrease the market shares of the exporting countries on each elementary market. With this intention, we retain for each product two values of reference: The first (A) and the last (B) deciles of the relative intensities (RI) on the markets classified like nondiscriminatory (classes 1 and 2). A and B delimit the whole of "normal" RI , i.e. acceptable being given the impact of various factors as the distance. These RI (and the market shares associated) should not be affected by liberalization. Consequently, when we consider a market classified as discriminatory, we modify the RI when they are lower than A or higher than B, while bringing back them to these limiting values. There is an exception to this general rule: When the exporting country is not "competitive" (comparative disadvantage) we do not apply the threshold A, and consequently the RI cannot be increased.

There is no reason so that the sum of the market shares thus corrected (resulting from the new RI) equal to 1 on each market. This constraint is imposed by redistribution of the difference between the sum of the profits and the losses in market shares.

Finally, the new market shares are weighted averages of the corrected market shares, of world market shares of the exporters, and of initial market shares. The weight of the market shares observed is the most important, it is increasing with the level of openness (opposite of discrimination) and decreasing with the average distance travelled by the product (the prevalence of the regional suppliers is natural for products not being the subject of a remote trade).

The exporters can be discriminated positively like negatively. Consequently the redistribution of the market shares can lead to losses for the initially positively discriminated

exporters when the increase in the total size of the market does not compensate for the loss in the market share.