

Regionalism as industrial policy in developing countries^{*}

Pedro Moncarz[†]
Marcelo Olarreaga[‡]
Marcel Vaillant[§]

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Abstract

This paper empirically explores whether trade preferences can be used as a substitute for industrial policy and help countries achieve their industrialization objectives, at the expense of other regional members. It illustrates the heterogeneity that may exist in terms of reaching industrialization objectives with the help of preferential trade between small and large members of these trade agreements. The focus is on Brazil's regional preferences within MERCOSUR. Results show that MERCOSUR preferences obtained by Brazilian exporters have led to an increase in exports of relatively sophisticated products where Brazil does not enjoys a global comparative advantage, whereas the smaller members of MERCOSUR are more likely to export within the region products in which they have a strong comparative advantage and with relatively low levels of sophistication. Thus, MERCOSUR has helped large members achieve their industrialization objectives.

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[†]Facultad de Ciencias Económicas, Universidad Nacional de Córdoba, Córdoba, Argentina, Av. Valparaiso s/n. CP 5000. Tel. (+54)351-4437300. e-mail: pedro.moncarz@gmail.com.

[‡]University of Geneva, 40 bd Pont d'Arve, 1211 Geneva 4, Switzerland, and CEPR, London, UK; Tel. (+41-22)379-8286; e-mail: marcelo.olarreaga@unige.ch

[§]Departamento de Economía, Facultad de Ciencias Sociales, Universidad de la República, Montevideo, Uruguay; Tel. (+598-2)410-6449 int 678; e-mail: marcel@decon.edu.uy

1 Introduction

Recently, the economic literature on regional integration has devoted great effort towards the understanding of the effects of regionalism on multilateralism, or as put by Jagdish Bhagwati on whether regionalism is a stumbling or building block towards global free trade (quote theory and empirical studies). (Kemp and Wan, 1976, Panagariya and Krishna, 2001, etc..). More recently, and pragmatically recognizing that regionalism is here to stay, Richard Baldwin and Patrick Low (2009) have focused on how we can ‘multilateralize’ regionalism, where the objective is to make existing or future regional integration agreements as WTO friendly as possible.

On the other hand, the early economic literature on regionalism worried less about its impact on the multilateral system (perhaps due to its relative weakness at the time) and focused rather on the conditions under which regional blocks are likely to enhance world and block’s welfare (Viner, 1950, Lipsey, 1957, 1960, Kemp and Wan, 1976, Panagariya and Krishna, 2001). A small part of this literature looked at the distribution of gains within regional blocks.¹ An example of this small literature is Cooper and Massell (1965) where they argue that regional integration schemes among developing countries could be used to achieve industrialization objectives in the spirit of Prebisch (1959) at a smaller economic or efficiency cost for their members. The idea is simple: facing a larger *regional* demand through regional preferences, member countries can specialize their industrial production in a few products in which they are relatively more competitive rather than producing a larger number of products in which they are relatively less competitive within the domestic market. Thus, the desired level of industrial production can be reached at a lower cost after the creation of the regional block.

One problem recognized by Cooper and Massell (1965) is that depending on the cost structure of block members, this may lead to the reallocation of industries within a single country, leaving all other members paying for the industrialization process of the former. In other words, the relatively more industrialized country can impose the negative externality associated with the protection of the industrial sector on consumers in the rest of the block. Note that this may be efficient at the regional level, but it will have redistributive consequences across countries within the regional block. The risk of this happening is likely to be stronger if the more industrialize country is also the largest country, which is likely to shape the structure of protection at the regional level. Note

¹For a recent and comprehensive survey of the regionalism literature, see Panagariya (2004).

that even in such a case this need not happen as the structure of protection can be designed to compensate other members. For example, Cadot et al. (2001) show how a free trade area can be designed in order to achieve its industrialization objective (or be politically viable in Cadot et al. terminology), and be welfare-enhancing for all members. The mechanism is associated with an exchange of protection between member countries (some countries will protect some sectors while others will protect others in order to achieve the industrialization objective while allowing consumers of some goods in some countries to import at world prices). Note that a customs union will impose some constraints on these exchange of protection as all countries will have a common external tariff by definition, but but it may still be possible to achieve a balanced outcome through the exchange of mutual market access. Moreover, contrary to a free trade area where external protection is in principle not part of the agreement, customs union by definition deal with levels of external protection. Monetary compensation mechanisms can also be designed within preferential trade agreements, but as pointed out by Cooper and Massell, it is possible that there may not be enough income to compensate losers as part of the what is value in government's objective function is industrialization which does not necessarily generate revenue.²

The objective of this paper is to investigate the extent to which regional integration has been used by some Latin American countries to achieve industrialization at the expense of other members. We will focus in particular on the case of Brazil which has a large web of preferential trade agreements, and is with Mexico one of the region's most industrialized countries. Has Brazil's industrialization been undertaken at the expense of other Latin American countries? or has the exchange of industrialization process been balanced?

Section 2 offers an historical overview of Latin America's preferential trade agreements and the role of Brazil. Section 3 provides a theoretical framework to illustrate how trade preferences can be used as a substitute to industrial policy based on Cooper and Massell's paper, but also some alternative explanations such as the Grossman and Helpman (1995) predictions for trade diverting preferential trade agreements or Venables (2003, 2005) predictions for countries at different points of the factor abundance distribution. These will help us confront Cooper and Massell to other

²A solution to explore in this setting is one of 'regional' subsidies, where countries can subsidize production within the region to achieve industrialization objectives, while allowing consumers (of final and intermediate goods) to purchase at world prices. This will ensure that large countries do not impose on rest of the block consumers the negative externality of protecting the industrial sector of the large country. While global subsidies are clearly forbidden by GATT and GATS, regional subsidies may be WTO consistent.

alternative explanations which may be consistent with some of the observed patterns. Section 4 presents the empirical framework and section 5 discusses the results. Section 6 concludes.

2 Why study Brazil's Preferential Trade Agreements?

Brazil is the largest economy in Latin America. Like many other Latin American countries, after a long period of import-substitution trade policies, Brazil starting in the late 1980s pursued a mix of unilateral trade reforms and multilateral and preferential trade agreements (PTAs). Contrary to other large economies in the region, such as Mexico and Chile, Brazil's PTAs involved countries smaller partners with similar or lower levels of development. All of them involved Latin American countries and were signed within the Latin America Integration Association (LAIA) as shown in Table 1. Interestingly only MERCOSUR has been notified to the WTO as other PTAs enter within the legal umbrella of LAIA's plurilateral regional agreement.

In terms of trade volumes these preferential agreements are not marginal, as they represent 22% of Brazilian exports in 2007 (see Table 2). Argentina is the most important preferential destination with around 40% of Brazil's preferential exports. It is also important to note that for other Mercosur members (Argentina, Paraguay and Uruguay) Brazil is the largest market in terms of preferential exports. Brazil represents between 35 and 50% of their preferential exports. So preferences granted within Mercosur are likely to be an important determinant of these countries structure of preferential exports.

The degree of trade liberalization varies by agreement. Table 3 measures the level of trade liberalization for the set of PTAs signed by Brazil that can be considered free trade areas in the sense of GATT's article XXIV (universal liberalization with 100% preference at the end of the process). MERCOSUR is the oldest agreement and the one with the highest preference given and obtained by Brazil. Another interesting aspect of Mercosur is that members have a common external tariff (CET), and therefore the level of preference is partly determined jointly by the four members as they have to agree on the level of the CET.³

Partly for this reason we will restrict our analysis to MERCOSUR countries and explore the heterogeneity of the impact of preferences on the type of goods that are traded within the agreement

³Note that there are limits to this type of arguments in the case of Mercosur as the CET is not always "common" given the numerous exceptions to the CET.

by different members. Has Mercosur helped Brazilian firms diversify their exports towards more sophisticated products where it does not really have a comparative advantage? What about other Mercosur members? More pragmatically, we only study the heterogeneity within Mercosur because we do not have access to electronic data regarding the preferences granted by Brazil and its partners outside MERCOSUR, due to the fact that some of these agreements were established in older classification than the harmonized system classification used by Mercosur members.

A first step towards answering the questions above is to have a measure of product sophistication. Hausman, Hwang and Rodrik (2007) (HH&R hereafter) provides us such a measure. The degree of sophistication of a product (*PRODY*) depends on the the average level of per capita income (GDPpc) of countries exporting this good. More formally, it is given by:

$$PRODY_g = \sum_c GDPpc_c \frac{x_{g,c}/x_c}{\sum_c x_{g,c}/x_c} \quad (1)$$

where g index goods, c countries, x_c are total exports of country c , and $x_{g,c}$ are exports of good g by country c . Thus *PRODY* is just the weighted average of the GDP per capita of countries exporting good g where s, where the weights capture the importance of this good in each country's export bundle. The rationale for using the share in exports in each country as a weight rather than the share in total world exports is to ensure that the product sophistication measure is not affected by differences in country size.

We compute *PRODY*s using data at the six digits of the 2002 Harmonized System (HS). In order to assess the degree of sophistication of the export bundle of each Mercosur member we can construct a synthetic measure of the degree of sophistication of each country's export bundle following HH&R's *EXPY* measure. It is given by:

$$EXPY_c = \sum_g PRODY_g \frac{x_{g,c}}{x_c} \quad (2)$$

HH&R shows that developing countries have an *EXPY* that is lower than in developed countries, and that there is a positive correlation between *EXPY* and per capita income. In table 4 we provide measures of *EXPY* for MERCOSUR countries export bundles to different destinations (preferential and not preferential), and compare them with the sophistication of their export basket oriented to the world. According to HH&R estimates the mean *EXPY* in the world is around USD

10,700 in 2003. The median *PRODY* in our sample is USD 11,800. All Mercosur countries have an *EXPY* to the world below these average levels. Brazil has the the highest *EXPY* and Paraguay the lowest. Interestingly, all MERCOSUR countries have a higher *EXPY* in their export bundle to preferential markets. For example, the *EXPY* of Brazil to Argentina is 1.4 larger than the average *EXPY* of Brazil to the world. On the other hand, Brazil’s *EXPY* to non preferential markets (row) is 0.9 of Brazil’s *EXPY* to the world . So, Brazil’s exports to Brazil have a degree of sophistication as measured by *EXPY* that is fifty percent higher than Brazil’s exports to the rest of the world.

Another interesting trend given in Table 4 is given by the evolution of *EXPY*s across time. Brazil experienced an increase of the *EXPY* to non preferential markets in the period 2003-2007 (see bottom panel of Table 4). This probably indicates a “regional platform” effect, or “regionalism as industrial policy” where Brazil first took advantage of regional preferences to export a more sophisticated export bundle to the region, which included products in which Brazil did not really had a global comparative advantage. And then as the process matured it started exporting these more sophisticated products to the rest of the world.

In order to explore this further we construct Balassa indices of Revealed Comparative Advantage (RCA) at the six digit level of the HS for each MERCOSUR member,⁴ as well as an index of trade intensity (*ti*) which captures the relative importance of a particular good in the export bundle to countries where preferences are granted relative to non-preferential markets (the rest of the world).⁵ Following conventions we consider that country *c* has a comparative advantage in good *g* in year *t* if its RCA index is larger than one. We also assume that a good *g* with a *PRODY* value above the median for the period 2003-2007 is considered as a good with a high degree of sophistication.⁶ Logically, a positive *ti* indicates that the good is relatively more important in the preferential basket, and a negative *ti* indicates that the good has a stronger weight in the export bundle to the

⁴The Balassa index is given by:

$$RCA_{g,c} = \frac{x_{g,c}/x_c}{\sum_c x_{g,c}/\sum_c \sum_g x_{g,c}}$$

where export flows of MERCOSUR members do not include preferential trade flows.

⁵*ti* the share of exports of good *g* by country *c* to a preferential partner *p* at time *t* in total exports to preferential partner *p* minus the share of exports of good *g* by country *c* to all other non preferential countries, here called “row”. More formally:

$$ti_{g,c} = \frac{x_{g,c,p,t}}{x_{c,p,t}} - \frac{x_{g,c,\neq p,t}}{x_{c,\neq p,t}}$$

⁶The median *PRODY* is USD 11789.

rest of the world.

Table 5 summarizes this information for the four MERCOSUR members. More than two thirds of Brazilian exports to MERCOSUR countries are explained by goods in which Brazil does not have a RCA and the trade intensity index is positive. When it comes to Brazilian exports to Argentina most of them are goods with a high level of sophistication (47%). That is Brazil exports to Argentina mainly relatively sophisticated goods in which Brazil does not have a comparative advantage, and that therefore it does not export to the rest of the world. Indeed, only 2 percent of Brazil's exports corresponds to exports to the rest of the world of goods with a high *PRODY*, and in which Brazil does not have a comparative advantage.

The pattern is not so strong for the other three MERCOSUR members. In Uruguay exports with a low RCA, a positive *ti* and a high *PRODY* represent only 17% of Uruguay's exports to Brazil. They represent only 3% of Paraguay's exports to Brazil. In the case of Argentina they reach 32%, but this is significantly smaller than the 47% of Brazil's exports to Argentina. While Argentina may be using the regional market as part of its industrialization strategy, the evidence seems a bit weaker.

3 Theoretical framework

There are at least three different theoretical models that can at least partially explain the *prima-facie* evidence reviewed in the previous section that suggests that Brazil has been exporting to its MERCOSUR partners relatively sophisticated products on which it does not really have a comparative advantage, whereas the opposite does not seem to be observed for the other smaller members of MERCOSUR. The first one has to do with industrial organization arguments; the second one is related to factor abundance arguments in an Heckscher-Ohlin type of world the second with political economy arguments; and the third one with political economy arguments. They are discussed in turn below and in the empirical section we will provide a horse-race between these alternative explanations to the observed patterns.

Regarding arguments based on industrial organization, in a very influential paper Cooper and Massel (1965) suggest that policy maker may have an embedded preference for industrialization, and therefore may be willing to pay a certain cost in terms of static forgone income in order to

achieve this industrialization objective. The rationale behind this industrialization objective is not very clear in Cooper and Massel, but it can be partly rationalized by the recent evidence in HH&R that suggests that what you export and therefore produce matters in terms of potential economic development. Regardless of the rationale for the industrialization objective, governments may want to protect part of their industry in order to achieve a certain level of industrial production that is consistent with their industrialization objectives, even though it will clearly create economic inefficiencies. Interestingly, Cooper and Massel show that in such a setup, a customs union can help countries achieve their industrialization objective at a lower cost. Indeed once the markets are pooled together, the industrialization objective that can be read in terms of a given level of production can be achieved with a lower level of tariff protection because “regional demand” for relatively more efficient industrial producers is larger than “national demand”. In other words there is more demand in the customs unions for those producers that are relatively more efficient and therefore there is no need to induce relatively inefficient firms to produce in order to achieve a certain degree of industrial output. Thus trade diversion has a positive counterpart in this world which is associated with the possibility of achieving industrialization objectives at a lower cost. The problem in this logic arises when the exchange of market access is asymmetric. As part of the cost of the industrialization objective is now on the partner’s shoulder. So industrialization can be achieved at a lower cost for one of the members, and even for the region as a whole, but the distribution of gains can be asymmetric as the importer will be carrying part of the cost without benefiting from the potential gains if it doesn’t have industrialization objectives.

A second mechanism explored by Venables (2003, 2005) extends the Cooper and Massel’s argument to a traditional factor abundance trade model (HOS). In this type of world, the costs of trade diversion could be unevenly distributed across members of a PTA. In particular, in a PTA between developing countries (South), the poorest countries (or rather the least capital abundant) are the ones that bear the costs of trade diversion, which magnifies initial income disparities. MERCOSUR is an example of South-South agreement, and one could then observe an uneven distribution of trade diversion costs among members. In order to illustrate Venables (2003 and 2005) model let us assume three countries (Brazil, Paraguay and ROW) and two goods (A and M). Let us also assume the ROW has a comparative advantage on the capital intensive good M, while Paraguay has a comparative advantage in the natural resource intensive good A, and Brazil

factor abundance is somewhere in between Paraguay and the ROW. Then, a trade agreement between Brazil and Paraguay means that part of Paraguay's imports of good M that were previously imported from the ROW are now at least partially replaced with imports of good M from Brazil. Thus, because of the rankings of relative factor abundance with respect to the rest of the world, the more capital abundant country (Brazil) benefits from these trade diversion, while the natural resource abundant country (Paraguay) suffers.⁷

Finally and using a political economy model, Grossman and Helpman (1995) show that a free trade area (FTA) can be made politically viable by excluding certain sectors from internal liberalization. Unfortunately, those products that need to be excluded to make a potential FTA politically viable are precisely those in which trade creation is to be expected, and therefore those which would have provided a larger increase in regional welfare. Thus trade diversion is more likely to be observed in those FTAs that are politically viable. This occurs through the exchange of trade diversion among regional inefficient exporters who benefit to a large extent from preferential access into the partner's markets, while not taking too much of the partner's domestic firms market share (due to the relative inefficiency of regional exporters). On the other hand very efficient exporters are not likely to benefit much from preferential access as they are selling in world markets and are very likely to hurt to a large extent the partner's domestic firms by taking a significant share of their domestic market (due to the relative efficiency of regional exporters). Thus in equilibrium trade diverting FTAs are more likely to be observed.

4 Empirical framework

In order to understand how regional preferences affect the composition of MERCOSUR countries' export bundle we propose the estimation of the following equation for each MERCOSUR member:

⁷According to Venables, a welfare enhancing response to this outcome by country 1, is trade liberalization with the ROW. An additional reason for observing an increase in the share of Brazil's intra-MERCOSUR exports of more sophisticated goods is based on the predictions of the New Economic Geography models, which show that for positive but not prohibitive trade costs, the larger country has a more than proportional share of the production of goods exhibiting increasing returns to scale (i.e. manufactures), and therefore becomes a net exporter of these goods, and a net importer of goods produced under constant returns to scale (Venables 2003). Then, a CU between countries of different sizes, may induce a further concentration of the production of manufactures in the larger partner.

$$\begin{aligned}
ti_{g,p,t} = & \beta_1 RCA_{g,t} + \beta_2 PRODY_{g,t} + \beta_3 Pref_{g,p,t} + \beta_{1,2} RCA_{g,t} \times PRODY_{g,t} + \\
& + \beta_{1,3} RCA_{g,t} \times Pref_{g,p,t} + \beta_{2,3} PRODY_{g,t} \times Pref_{g,p,t} + \\
& \beta_{1,2,3} RCA_{g,t} \times PRODY_{g,t} \times Pref_{g,p,t} + \alpha_g + \alpha_p + \alpha_t + \mu_{g,p,t}
\end{aligned} \tag{3}$$

where as previously defined in section 2 $ti_{g,p,t} = [x_{g,p,t}/x_{p,t}] - [x_{g,\neq p,t}/x_{\neq p,t}]$ is given by the share of exports of good g to a preferential country p at time t in total exports to preferential country p minus the share of exports of good g to all other non-preferential countries, noted $\neq p$ (x are exports where subscripts g indicates goods, p partners, and t the time or year). $RCA_{g,t}$ is the revealed comparative advantage in good g at time t . $PRODY_{g,t}$ is the indicator of the degree of ‘export sophistication’ as in HH&R above. $Pref_{g,p,t} = t_{g,p,t}^{MFN} - t_{g,p,t}^p$ is the preference margin received from country p on exports of good g measured as the difference between the two tariffs. Finally, α_g are good specific fixed effects, α_p are partner specific fixed effects and α_t are time specific fixed effects.

Equation (3) is estimated separately for each of the four MERCOSUR members, considering exports to all other MERCOSUR countries for the period 2003 to 2007. Goods g are defined at the six digits of the 2002 version of the Harmonized System. We exclude from the sample all tariff lines where exports are not consistently exported throughout the five year period. After cleaning the data, our sample represents around 85 percent of total exports.⁸

In terms of predictions, we are interested in disentangling whether tariff preferences lead to higher exports in goods with a strong comparative advantage and/or with a strong degree of export sophistication. Thus we are interested in the sign of the interaction terms between preferences and the indicators of comparative advantage and degree of sophistication, including the sign of $\beta_{1,2,3}$. A positive sign of $\beta_{1,3}$ would indicate that preferences tend to lead to higher relative exports within the region in sectors in which the country has a comparative advantage, helping the country specialize in those sectors in which it is relatively competitive. A positive sign $\beta_{2,3}$ would indicate that preference help increase relative exports within the region in sectors with a certain degree of export sophistication. A positive sign of $\beta_{1,2,3}$ would indicate that tariff preference tend to lead to a higher level of regional exports the strongest the comparative advantage of the exporting country

⁸The results we present in the next section are qualitative robust to the inclusion all six digit tariff lines, although standard errors tend to be larger.

in that particular good and the higher the degree of export sophistication of that good. A negative sign would indicate that a higher preference will lead to higher exports in goods with a low degree of product sophistication and/or with a comparative disadvantage.

More generally, in order to know how an increase in tariff preferences will affect the ratio of exports of a particular country towards goods in which it has a comparative advantage or more sophisticated export goods, we take the derivative of $ti_{g,c,p,t}$ with respect to $Pref_{g,c,p,t}$, which is given by:

$$\frac{\partial ti_{g,c,p,t}}{\partial Pref_{g,c,p,t}} = \beta_3 + \beta_{1,3}RCA_{g,c,t} + \beta_{2,3}PRODY_{g,t} + \beta_{1,2,3}RCA_{g,c,t} \times PRODY_{g,t} \quad (4)$$

Using the estimates of (4), we can then solve for the zero isoquant that ensures that the relative importance of exports increase after receiving preferences within a regional agreement:

$$RCA = \frac{-\beta_3 - \beta_{2,3}PRODY}{\beta_{1,3} + \beta_{1,2,3} \times PRODY} \quad (5)$$

Note that this function may be non monotonic depending on the sign and size of the estimates of the different β s. Typically⁹ observations that are above the isoquant will be those where an increase in tariff preferences will lead to an increase in exports. Thus, depending on the sign of the different β estimates this will corresponds to goods with more or less export sophistication or goods in which the country enjoys a strong or weak comparative advantage.

One can establish a link between the theoretical models presented in the previous section on the one hand and the estimated coefficients of equation (3)) and the resulting isoquant in (5) on the other hand. As discussed in the theoretical section, there are three main effects to be identified. The first effect is associated with the C&M view of trade agreements as an instrument to achieve industrialization objectives at a lower cost. Thus, we identify a C&M like result if the effect of preference on trade intensity is greater than zero for products with a higher sophistication index (i.e., $\beta_{2,3} > 0$). But for this to capture C&M rationale for a trade agreement, this impact has to be strongest when the country has no comparative advantage in these more sophisticated products that it is heavily exporting within the region (i.e., $\beta_{1,2,3} < 0$). In this case the PTA becomes an instrument to achieve a more sophisticated export and production structure than the one that

⁹That is ignoring some non-linearities.

would be suggested by its comparative advantage.

The second effect is related to Venables (2003) argument that member countries with a comparative advantage at the extreme of the distribution are more likely to suffer from trade diversion from preferential partners with a comparative advantage which is closer to the world average. The partner which is closer to the world average is therefore more likely to benefit from preferential agreements with partners at the extreme of the distribution, as their preferential imports from the partners are likely to be trade creating. So one would expect preferences granted to partners at the extreme of the distribution to have a larger impact on their intra-regional exports of goods on which they have a strong comparative advantage ($\beta_{1,3} > 0$), but this will occur given their extreme comparative advantage in products with a low degree of sophistication (i.e., $\beta_{2,3} < 0$). On the other hand for the country with a comparative advantage closer to the world average, one will expect their intra-regional exports to occur in sectors where it has a low comparative advantage ($\beta_{1,3} < 0$), and in products with a higher degree of sophistication (i.e., $\beta_{2,3} > 0$). Both cases are consistent with $\beta_{1,2,3} < 0$. In the first case this is because of the low degree of sophistication and in the second case because of the low comparative advantage.

The third effect is associated with the political economy model of trade policy applied to the case of PTAs (G&H 1995). To be politically viable a PTA requires an exception list that excludes from the liberalization those goods where trade creation is greater and therefore where countries have a stronger comparative advantages. In our specification this means that the impact of preference on trade intensities is larger in sectors that have a relatively low comparative advantage ($\beta_{1,3} < 0$). It also means that the effect of tariff preferences on trade intensities do not differ depending on the level of sophistication of the goods included in the agreement and therefore the isoquant defined by (5) is horizontal ($\beta_{2,3} = 0$. and $\beta_{1,2,3} = 0$.

We can also illustrate this different outcomes with the help of equation (5) which gives the isoquant in the (RCA , $PRODY$) good space, along which the following condition holds: $\partial ti_{g,c,p,t}/\partial Pref_{g,c,p,t} = 0$. In Figure 3 we illustrate a particular case, but one that is observed in the data as we will show in the result section below. This will also help us identify different outcomes associated with a change in tariff preferences, which correspond to the different theoretical explanations explored above.

All points above (below) the isoquant correspond to the case where $\partial ti_{g,c,p,t}/\partial Pref_{g,c,p,t} > 0$ ($\partial ti_{g,c,p,t}/\partial Pref_{g,c,p,t} < 0$). Area (4) in Figure 3 represents the C&M type of arrangement,

where preference has a positive impact on products exported within the region in goods where the country does not have a strong comparative advantage ($RCA < 1$), but that have a high degree of sophistication ($PRODY$ is larger than the median $PRODY$ given by PROSYM in Figure 3). In order to capture G&H type of arguments for explaining trade diverting FTAs we also need to add Area (3) to Area (4) ($RCA < 0$, $PRODY < PROSYM$). Finally, regarding Venables effect, the country with the relative factor abundance the furthest away from the rest of the world (Paraguay in our example in the previous section) will most likely be located in Area (1), where preferences are likely to have a positive impact on intra-regional imports in products in which the country has a strong comparative advantage but that have by definition of its relative factor abundance a relatively low degree of sophistication ($RCA > 0$, and $PRODY < PROSYM$). On the other hand the country that has a relative factor abundance that is closer to the factor abundance of the rest of the world is likely to be in Area (4) and will export goods with a high degree of sophistication in which it does not really have a strong comparative advantage. As we will see in the next section other cases may arise, but one can interpret these different outcomes in a similar fashion.

5 Results

Table 6 provides the result obtained from the estimation of equation (3) for each MERCOSUR member. We provide for each coefficient four sets of standard errors: White robust standard error, and then standard errors clustered by either partner, year or HS 6 digit. All regression include partner, year and product fixed effects to control for unobserved characteristics.

The first two coefficients provide an interesting description of the type of products that are exported by each MERCOSUR member within the region controlling for the presence of preferences. Intra-regional exports of all countries tend to be concentrated on products in which they do not have a comparative advantage ($\beta_1 < 0$), but this is after controlling for tariff preferences. Thus, this suggests that there are other rationale than tariff preferences that can explain a different pattern of trade within the region. There are two potential explanations for this. First, the optimistic view, which would rely on preferences and Linder hypothesis type phenomenons to explain it. In this case the pattern of intra-regional trade outside the global comparative advantage of MERCOSUR members is not due to tariff preferences, and therefore is not associated with trade diversion,

because there is no trade policy discrimination between imports from the regional partners and imports from the rest of the world. Second, the pessimistic view, which relies on political economy type arguments *à la* G&H. The idea is that *RCA* is a proxy for the presence of non-tariff barriers to preferential trade, and that these barriers are likely to be stronger when countries have a strong revealed comparative advantage. So the negative coefficient on *RCA* simply captures the fact that there are higher non-tariff barriers on exports of preferential partners with a strong comparative advantage.

On the other hand MERCOSUR intra-regional exports do not seem to be biased towards more sophisticated products after controlling for the presence of tariff preferences. Indeed, β_2 is either not statistically different from zero or negative in all MERCOSUR members, except Uruguay. So with the exception of Uruguay, there is no tendency to export products with a higher degree of sophistication towards regional members, after controlling for preferences. Thus, the fact that products with a higher degree of sophistication are exported by Brazil as discussed in section 2 will probably have to be explained by tariff preferences, suggesting that MERCOSUR tariff preferences are being used as an instrument for Brazil's industrialization.

Going back to the C&M rationale for regional integration agreements, this is consistent as discussed above with $\beta_{2,3} > 0$ and $\beta_{1,2,3} < 0$. This is observed in Brazil and Paraguay but the coefficient on $\beta_{2,3}$ are not statistically different from zero in both cases. And the sign and significance of $\beta_{1,2,3}$ is consistent with several alternative explanations, so it is difficult to conclude much from this evidence. In Uruguay preferences tend to increase intra-regional exports of products with a low degree of sophistication $\beta_{2,3} < 0$, which is not consistent with the C&M explanation for trade agreements. In Argentina preferences would increase exports of goods with a high degree of sophistication $\beta_{2,3} > 0$, which is consistent with the C&M explanation, but these seem to be products in which Argentina has a comparative advantage ($\beta_{1,2,3} < 0$) which is inconsistent with the C&M explanation. Therefore the evidence for Argentina and Uruguay is not consistent with the predictions by C&M.

Regarding the Venables prediction, one would expect that in countries at the extreme of the comparative advantage distribution $\beta_{1,3} > 0$, $\beta_{2,3} < 0$ and $\beta_{1,2,3} < 0$. This is indeed observed in the case of Uruguay, which will therefore be exporting to the region goods in which it has a strong comparative advantage, but with a low degree of sophistication. In the case of Paraguay, there is

a large, positive and statistically significant coefficient on $\beta_{1,3}$, suggesting that indeed Paraguay exports mainly goods in which it has a strong comparative advantage within the region, but these goods do not necessary have a low degree of sophistication as $\beta_{2,3}$ is not statistically different from zero. However, $\beta_{1,2,3} < 0$ which is consistent with Paraguay being at one of the extremes of the distribution of relative factor abundance. Thus, there is some evidence that Paraguay's case is consistent with Venables prediction for countries at the bottom of the comparative advantage distribution. For the other MERCOSUR members we have no evidence that they had benefited from tariff preferences that help them export goods in which they had a weak comparative advantage as would have been predicted by Venables (2003) for countries with intermediary levels of comparative advantage.

Regarding the G&H predictions, there is no evidence that preferences have a stronger impact on exports of goods where exporters have a low comparative advantage and therefore trade diversion is more likely. Rather the opposite, as $\beta_{1,3}$ is positive and statistically significant for all countries, except Argentina. Note that in the case of Brazil, the point estimate is very small which suggests that this effect is not very large, but again the fact that $\beta_{1,2,3}$ is negative and statistically significant in the case of Brazil suggests that any trade diversion may have more to do with the C&M industrialization objectives, than the political economy rationale by G&H.

5.1 Estimating the isoquant in (RCA ; $PRODY$) space

Figure 4 shows the empirical distribution of goods over the (RCA , $PRODY$) space according to the areas defined before in Figure 3. Table 7 computes the aggregate value over the different categories defined by the combination of the three variables considered ($\partial ti / \partial Pref$, RCA and $PRODY$).

The green line in Figure 4 plots the isoquant in (RCA ; $PRODY$) space. The vertical line provides the median $PRODY$ across all HS 6 digit categories. The horizontal line correspond to goods where $RCA=1$ (or $\ln(RCA)=0$). Each observation corresponds to the value of the derivative $\partial ti / \partial Pref$. Thus for a large majority of goods in the four member countries the marginal effect of preferences on trade intensities is above the isoquant and therefore positive (observations above the isoquant and colored in red). Moreover, this occurs in the set of goods in which countries do not have a comparative advantage ($RCA < 1$ or $\ln(RCA) < 0$). In the case of Brazil and Argentina a large share of goods falls in the area with a high level of sophistication ($PRODY$). In the case of

Uruguay, the share of goods with a low *PRODY* is more significant, and in the case of Paraguay only a few goods have a level of sophistication above the median (*PRODYM*).

In terms of the areas described in Figure 3, Brazil and Argentina's observations mainly fall in Areas (3) and (4), whereas suggesting that the impact of trade preferences is consistent with C&M, but also G&H. However, the fact that the isoquant is highly non-linear and with a large slope in most cases, suggest that most of the observed patterns should be attributed to the C&M rationale (one would expect the isoquant to be horizontal if G&H was the unique driving force). The case of Uruguay is similar, but there is a large share of observations in Area (1), which is consistent with Venables case for a country at the extreme of the comparative advantage distribution. The case of Paraguay is even more striking, as most of the observations fall in Area (1), and therefore are consistent with the regional export pattern of a country at the extreme of the distribution.

However, looking at the share (or number) of goods falling in each area does not provides only little information regarding the importance of these goods in terms of export values, as well as the potential heterogeneity across export destinations. Table 7 shows explores this heterogeneity and provides and assessment of the importance of each category of goods in terms of export values. In line with the stylized facts described before, Brazil exports to MERCOSUR countries, in particular Argentina, are mostly concentrated in sectors where the impact of preferences on trade intensity is the largest in goods in which the country does not have a *RCA*, but with a high degree of sophistication: 48% of exports to Argentina fall within this category. The share of exports to Paraguay and Uruguay in this type of goods is around 30%. On the other hand, 82% of exports to the ROW are concentrated in sectors where the country enjoys a *RCA*, but only a quarter of these exports are goods with a high level of sophistication.

When looking at Brazil as a destination for other members' exports, a large share of exports correspond to goods where tariff preferences had a positive impact on trade intensities. In the case of Argentina and Uruguay's exports there is an important share of exports explained by goods in which these countries do not have a *RCA*: 42% and 33% respectively. However, while for Argentina 70% of these exports are goods with a high level of sophistication, in the case of Uruguay the percentage is just 40%. Paraguay, shows a very large concentration on goods with a high *RCA* and a low degree of sophistication (85%).

These findings confirm the idea that preferences under the MERCOSUR allowed countries,

especially Brazil, and to a less extent Argentina and Uruguay, to alter their export pattern towards goods with a higher degree of sophistication, and where these countries do not necessarily enjoy a comparative advantage. In the case of Paraguay, there is almost no difference in the country export patterns when distinguishing between MECOSUR and the ROW.

If instead of using $\partial ti / \partial Pref$, we classify goods according to their predicted trade intensities (\widehat{ti}) index, the picture that emerges is similar to the one just described (see Table 8). For Brazil an important percentage of its intra-MERCOSUR exports are in goods in which the country does not have a *RCA*, but have a high level of sophistication, and positive trade intensities. As seen before, this pattern is stronger for Brazilian exports to Argentina than to the other two MERCOSUR partners.

A similar but weaker pattern is observed for Argentina's exports to Brazil. Here the largest export category is one in which Argentina enjoys a *RCA*, and has a low *PRODY*, which is then followed by goods in which Argentina has no *RCA* and a high *PRODY*, as in the case of Brazil. In the case of exports to Paraguay and Uruguay, the latter pattern is predominant, suggesting that Argentina is doing to Paraguay and Uruguay what Brazil is doing to Argentina. Uruguay, on the other hand, concentrates most of its exports to Brazil in goods in which the country has a *RCA*, and also have a low *PRODY*. This category is followed by goods with no *RCA*, but also a low level of sophistication. As with Argentina, the pattern of exports by Uruguay to the other two members of MERCOSUR, in this case Argentina and Paraguay, is quite similar to the pattern observed for Brazil's exports to MERCOSUR. Paraguay's pattern does not suggest any important differences difference between its export patterns within and outside MERCOSUR.

Finally, all MERCOSUR member exports to the ROW are concentrated in goods countries in which we have a negative predicted trade intensity, with a high *RCA* and a low *PRODY*. The exception is Brazil where a significant share of exports to the ROW fall within the category of goods with a high level of sophistication.

6 Concluding remarks

In spite of its static (and even dynamic) economic inefficiency, governments may have industrialization objectives. Cooper and Massell (1965) showed in an important paper that these industri-

alization objectives could be achieved at lower costs by integration national markets into regional blocks, while full integration into global markets wouldn't necessarily help achieve these objectives for countries with a comparative advantage in non-industrial products.

We found *prima-facie* evidence that products that weight heavily on Brazil's export bundle to its preferential partners within MERCOSUR are products in which Brazil does not have a global comparative advantage and products with a higher degree of sophistication than products exported by Brazil to the rest of the world. While this is also present in exports of other MERCOSUR members to the region, the pattern is not as strong as in the case of Brazil

A potential explanation for this *prima-facie* evidence is that as suggested by Cooper and Massel Brazil is achieving its industrialization objectives through MERCOSUR, while other members are helping Brazil pay the inefficiencies costs associated with its industrialization. But there are also some existing alternative models which could help explain at least one of these stylized facts. The first alternative is Grossman and Helpman (1995) prediction that politically viable trade agreements are more likely to be trade diverting, as they will provide very large benefits to inefficient exporters within the region and relatively low costs to the import-competing importers within the region. Therefore it is not surprising that we observe a lot of trade in products with a low comparative advantage. The other alternative explanation relies on the model by Venables (2003, 2005) which suggests that members of a preferential trade agreement with a relative factor endowment close to the world average (Brazil in the case of MERCOSUR) is more likely to export products in which it has a low comparative advantage to its regional partners. The opposite is true for the member of the preferential trade agreement with the relative factor endowment that is the furthest away from the world average.

We then undertake a horse-race between these different explanations of MERCOSUR intra-regional exports. Results suggests that the Cooper and Massel's model fits well Brazilian data, and to some extent Argentina and Uruguay's data at least when it comes to their intra-regional exports to other countries than Brazil. There is some evidence of a Grossman and Helpman rationale, but only in terms of non-tariff barriers that have been used to block preferential exports in products in which partners have a strong comparative advantage. There is also evidence for the smallest members at the extreme of the relative factor abundance distribution that their exports to the regional partner that is the closest to the world average relative factor abundance tend to be

heavily concentrated in products in which they do have a strong comparative advantage and with a relatively low degree of sophistication, which is consistent with Venables' view of the world for this type of countries.

In sum, MERCOSUR has helped Brazil achieve its industrialization objectives through regional exports of goods in which it does not have a comparative advantage and with a high degree of sophistication. This lead to costly trade-diverting imports for the other MERCOSUR members, which have partly financed the industrialization objectives of Brazil. Moreover, Brazil benefitted from trade creation on its imports from other MERCOSUR members, which tended to be concentrated on exports on which the other members had a strong comparative advantage.

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Data Appendix

Figure 1: MERCOSUR exports by country (average 2003-2007 in millions of USD)

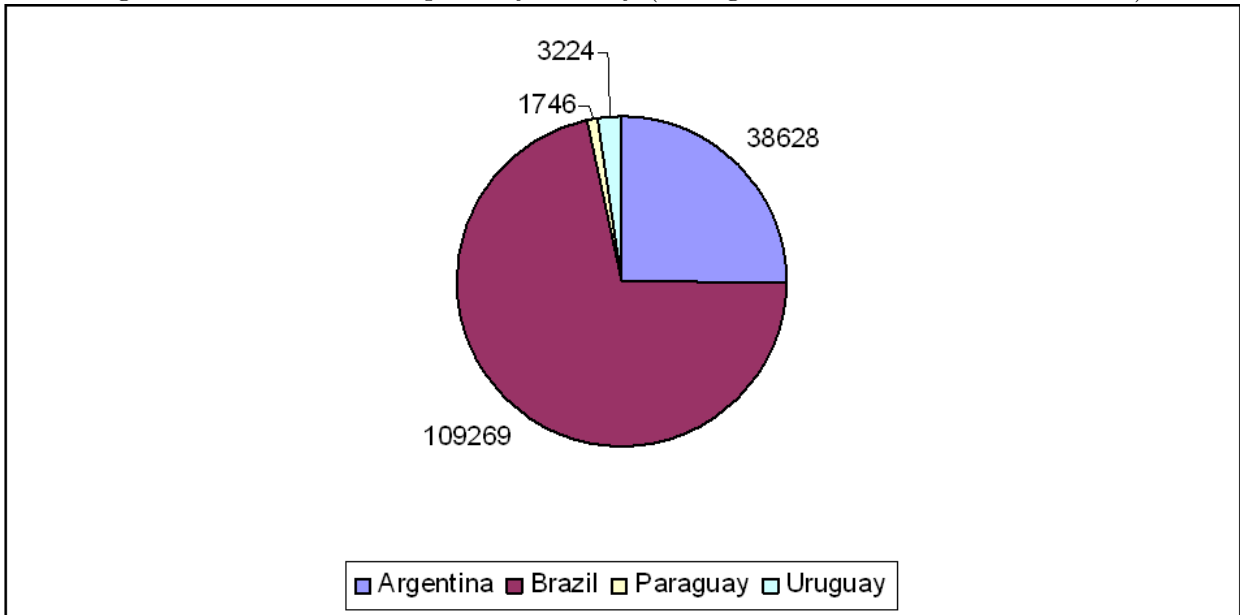


Figure 2: Export destination by MERCOSUR member (average 2003-2007 in percentage)

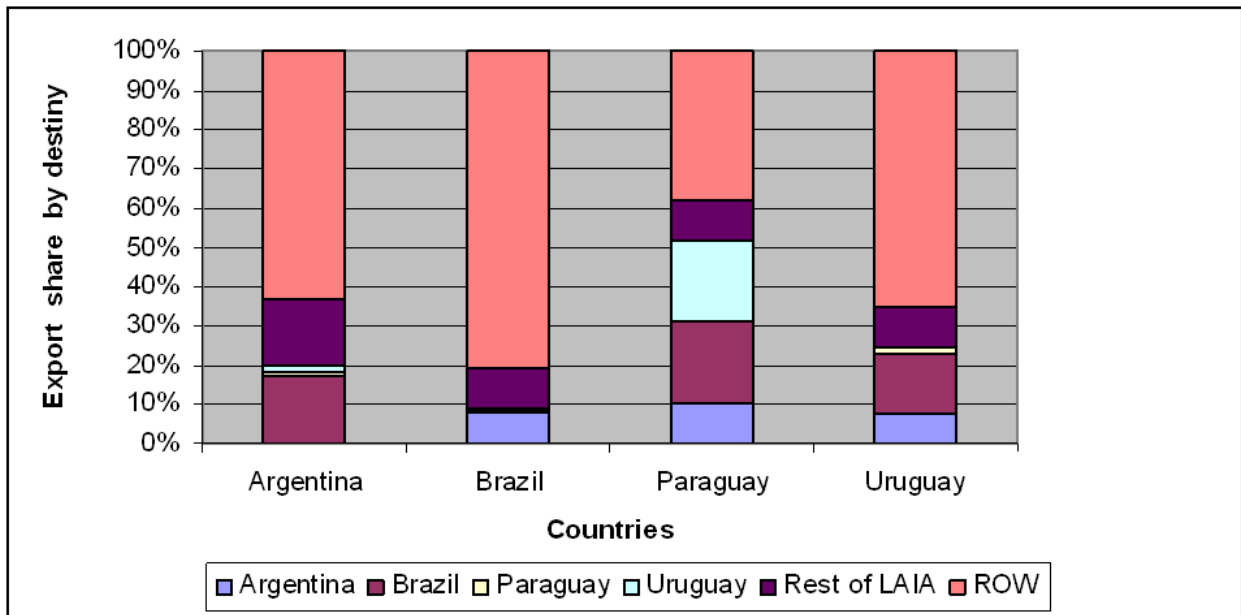


Figure 3: Isoquant for the marginal effect of preferences on regional trade intensity

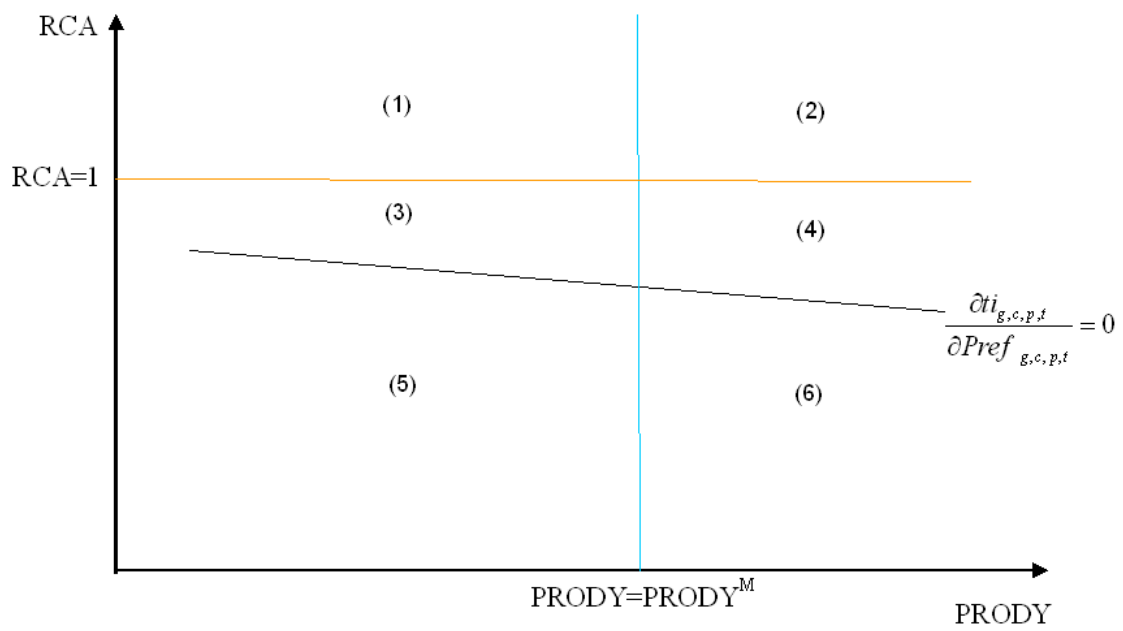
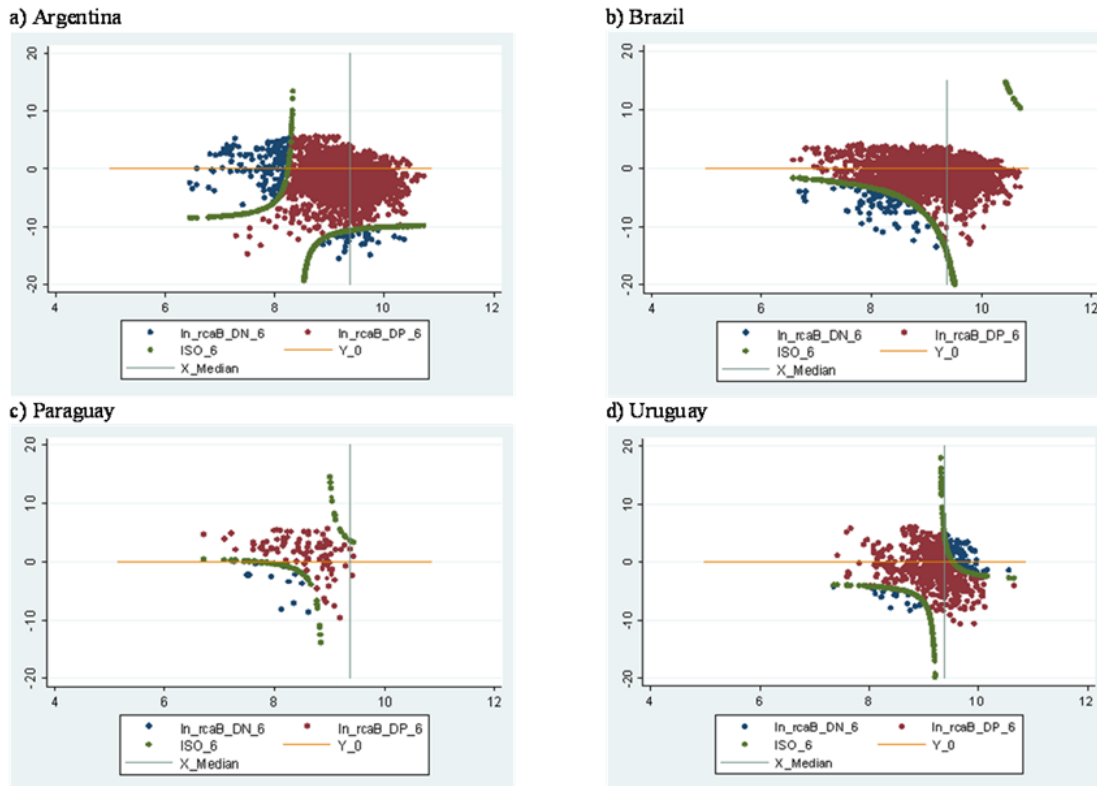


Figure 4: *RCA*, *PRODY* and the marginal effect of preference on trade intensity^a



^a Each graph is in $(RCA, PRODY)$ space. The horizontal axis is $\ln(PRODY)$. The vertical axis is $\ln(RCA)$. $\ln_rcaB_DN_X$ indicates the $\ln(RCA)$ values for which the estimated effect on \hat{t}_i of a change in $Pref_i$ is negative, for regression X . $\ln_rcaB_DP_X$ is the value of $\ln(RCA)$ for which the estimated effect on \hat{t}_i of a change in $Pref_i$ is positive, for regression X . ISO_X is the isoquant for regression X . Y_0 is the line for which $\ln(RCA) = 0$ (i.e., $RCA = 1$). X_Median is $\ln(\text{median}(PRODY)) = \ln(PRODY_M)$.

Table 1
Brazilian PTAs in force with third countries (1991-2008)

PARTNERS	YEAR	TYPE OF AGREEMENTS	
Argentina, Paraguay and Uruguay (ACE ^a , 18)	1991	Plurilateral	FTA (2001) and CU (in construction)
Chile (ACE, 35)	1996	Common with MECOSUR countries	FTA in goods
Bolivia	1997	Common with MERCOSUR countries	FTA in goods
México (ACE 53 and 55)	2003	Bilateral	Trade rules and automotive sector
Cuba	2000	Bilateral	Partial preference
Peru (ACE, 58)	2005	Common with MERCOSUR but different bilateral preference	FTA in goods (2014)
Ecuador, Colombia and Venezuela (ACE, 59)	2005	Common with MERCOSUR but different bilateral preference	FTA in goods (2018)

^a Acuerdo de Complementación Económica (Economic Complementation Agreement).

Source: LAIA data base.

Table 2
Export performance for MERCOSUR countries period 2003-2007
 (% and millions of US)

Export country/ destiny	Argentina		Brazil		Paraguay		Uruguay	
	Growth rate 2003-2007	Structure 2007	Growth rate 2003-2007	Structure 2007	Growth rate 2003-2007	Structure 2007	Growth rate 2003-2007	Structure 2007
Argentina			32,7	9,1	72,9	19,8	29,9	9,8
Brazil	22,5	19,1			7,2	20,0	11,5	16,2
Paraguay	15,0	1,4	23,0	1,0			12,6	1,7
Uruguay	22,7	2,2	33,1	0,8	2,5	9,5		
Rest of LAIA	13,1	15,8	26,2	10,6	63,2	16,0	30,8	11,7
ROW	16,5	61,5	19,7	78,5	24,6	34,7	19,3	60,5
TOTAL	17,0		21,4		23,8		19,6	
TOTAL (millions)		54860		156364		2782		4496

Source: WITS and COMTRADE.

Table 3

Level of trade liberalizations in 2006 for each of the PTAs in the class of the FTA (%)

Partner /liberalization	FTA ^{a)}	% items free trade ^{b)}		% export of the in Free Trade ^{c)}		Market access obstacle ^{d)}		% free market access ^{e)}	
		Obtained	Given	Obtained	Given	Own export weighted partner tariff		Obtained	Given
						Obtained	Given		
Argentina	18	93	89,7	80	90	10,7	9,4	62	90
Paraguay	18	93	98	80	98	8,8	9,1	72	98
Uruguay	18	93	95	80	95	9,3	11,4	70	95
Chile	35	98	93	88	93	6,2	7,1	89	93
Bolivia	36	91	93	69	93	8,7	5,1	65	93
Colombia	59	25	76	18	53	14,3	8	9	76
Ecuador	59	21	94	14	92	11,1	5,5	7	94
Perú	58	10	92	5	85	9,8	6,3	2	92
Venezuela	59	11	93	12	89	12,9	1,6	8	93

^{a)} Number of ACE (Acuerdo de Complementación Económica) of LAIA

$$\text{b) número de ítems } LC1_t^{OB} = \frac{\#\Omega^{LC_t^{OB}}}{\#\Omega}$$

$$\text{c) proporción de las exportaciones del beneficiario- } LC2_t^{OB} = \sum_{i \in \Omega^{LC_t^{OB}}} sx_i^B$$

$$\text{d) } t^{OP} = \sum_{i \in \Omega} t_i^O sx_i^B$$

$$\text{e) } LC3_t^{OB} = \frac{\sum_{i \in \Omega^{LC_t^{OB}}} t_i^O sx_i^B}{\sum_{i \in \Omega} t_i^O sx_i^B}$$

NOTA: $\#\Omega^{LC_t^{OB}}$ - Número de ítems en libre comercio entre el país otorgante O y el beneficiario B en el año t ; $\#\Omega$ -

Número de ítems totales; sx_i^B - proporción de las exportaciones a todo el mundo (intrazona) en el ítem i del país B, en el

total de exportaciones de B a todo el mundo (año 2004); t_i^O - Arancel Nación Más Favorecida del país O en el ítem i (al 31 de diciembre de 2005).

Source: Vaillant (2007).

Table 4
Value for the basket of goods exported (EXPY) by country 2003-2007

a) Average 2003-2007 (US and ratio)

Export country/destiny	Argentina	Brazil	Paraguay	Uruguay
World (USD)	8471	9.615	4955	8415
Argentina		1,4	1,0	1,4
Brazil	1,4		1,1	1,1
Paraguay	1,2	1,1		1,2
Uruguay	1,4	1,2	0,8	
Rest LAIA	1,2	1,3	1,3	1,2
ROW	0,8	0,9	0,9	0,9

b) Proporcional Change 2007/2003 (%)

	Argentina	Brasil	Paraguay	Uruguay
World	4,3	2,3	10,3	1,0
Argentina		-0,2	-27,6	-6,2
Brazil	4,3		39,1	10,9
Paraguay	11,8	-5,6		-5,0
Uruguay	8,4	0,0	0,5	
Rest LAIA	9,9	-2,0	-7,2	-0,5
ROW	-0,5	1,0	1,4	-3,2

Source: COMTRADE and WDI Indicators.

Table 5
Average 2003-2007 exports (% of bilateral exports)

a) Argentina

Trade intensity	RCA (*)				Export average 2003-2007 (:US)
	Low RCA		High RCA		
	PRODY (**)		PRODY		
	Low	High	Low	High	
Exports to Brazil					
Negative	1	0	5	1	549
Positive	16	32	36	9	6457
Exports to Paraguay and Uruguay					
Negative	1	1	5	1	105
Positive	41	31	19	3	1359
Exports to ROW					
Negative	4	3	9	2	4614
Positive	4	1	71	6	20364

c) Paraguay

Trade intensity	RCA				Export average 2003-2007 (:US)
	Low RCA		High RCA		
	PRODY		PRODY		
	Low	High	Low	High	
Exports to Brazil					
Negative	0	0	23	0	91
Positive	25	3	48	1	298
Exports to Argentina and Uruguay					
Negative	0	0	10	0	57
Positive	30	2	58	0	512
Exports to ROW					
Negative	0	0	14	0	101
Positive	0	1	83	1	591

b) Brazil

Trade intensity	RCA				Export average 2003-2007 (:US)
	Low RCA		High RCA		
	PRODY		PRODY		
	Low	High	Low	High	
Exports to Argentina					
Negative	1	1	6	3	995
Positive	20	47	11	12	8561
Exports to Paraguay and Uruguay					
Negative	1	2	5	2	164
Positive	38	30	14	10	1758
Exports to ROW					
Negative	4	7	5	5	18515
Positive	4	2	60	14	72920

d) Uruguay

Trade intensity	RCA				Export average 2003-2007 (:US)
	Low RCA		High RCA		
	PRODY		PRODY		
	Low	High	Low	High	
Exports to Brazil					
Negative	0	0	6	1	44
Positive	28	17	41	6	501
Exports to Argentina and Paraguay					
Negative	0	0	6	1	23
Positive	36	38	14	5	314
Exports to ROW					
Negative	1	1	8	2	264
Positive	1	1	81	6	1899

(*) RCA = "NO RCA" if RCA ≤ 1; RCA = "RCA" if RCA > 1. (**) PRODY = "Low" if PRODY ≤ median(PRODY)=11789; PRODY = "High" if PRODY > median(PRODY)=11789.

Source: COMTRADE data.

Table 6
Results equation (1)

	Argentina	Brazil	Paraguay	Uruguay
<i>RCA</i> (β_1)	0.007379	-0.216165	-19.487131	-5.637063
robust SE (a)	[0.093467]	[0.115836]*	[7.620018]**	[1.718236]***
clustered by partner (b)	[0.079986]	[0.042583]**	[10.235271]	[2.799442]
clustered by year (c)	[0.067423]	[0.017742]***	[5.163333]**	[1.170905]***
clustered by product (d)	[0.120149]	[0.103905]**	[11.433792]	[2.706930]**
<i>PRODY</i> (β_2)	-0.131385	0.002385	-6.288238	1.748599
(a)	[0.086575]	[0.031513]	[2.729124]**	[0.776841]**
(b)	[0.080992]	[0.039534]	[3.554445]	[1.313144]
(c)	[0.085499]	[0.017696]	[2.593312]*	[0.511262]**
(d)	[0.087723]	[0.052593]	[3.725691]	[1.200976]
<i>Pref</i> (β_3)	-0.070715	0.000547	-1.147531	1.10004
(a)	[0.039193]*	[0.016992]	[1.226203]	[0.501964]**
(b)	[0.042843]	[0.031007]	[1.829584]	[0.810230]
(c)	[0.034670]	[0.012578]	[1.406423]	[0.295359]**
(d)	[0.053094]	[0.031226]	[1.214583]	[0.859540]
<i>RCA*PRODY</i> (β_{12})	-0.002889	0.021702	2.173133	0.598705
(a)	[0.009946]	[0.012879]*	[0.878068]**	[0.181223]***
(b)	[0.008173]	[0.004825]**	[1.202936]	[0.288101]
(c)	[0.007147]	[0.001919]***	[0.564238]**	[0.130982]**
(d)	[0.013089]	[0.010951]**	[1.318401]	[0.285074]**
<i>RCA*Pref</i> (β_{13})	-0.007753	0.012972	1.378531	0.307854
(a)	[0.006355]	[0.005827]**	[0.510624]***	[0.101580]***
(b)	[0.005676]	[0.002444]**	[0.692862]	[0.156019]
(c)	[0.004388]	[0.001327]***	[0.331876]**	[0.085143]**
(d)	[0.009822]	[0.006770]*	[0.788965]*	[0.183016]*
<i>PRODY*Pref</i> (β_{23})	0.008581	0.000984	0.149875	-0.115388
(a)	[0.004176]**	[0.001842]	[0.141546]	[0.052199]**
(b)	[0.004445]	[0.003605]	[0.216624]	[0.084405]
(c)	[0.003676]*	[0.001405]	[0.149687]	[0.033181]**
(d)	[0.005657]	[0.003486]	[0.143008]	[0.090397]
<i>RCA*PRODY*Pref</i> (β_{123})	0.000924	-0.001311	-0.154422	-0.033212
(a)	[0.000690]	[0.000651]**	[0.058740]***	[0.010771]***
(b)	[0.000587]	[0.000264]**	[0.080577]	[0.015847]
(c)	[0.000486]	[0.000138]***	[0.036418]**	[0.009499]**
(d)	[0.001069]	[0.000741]*	[0.090729]	[0.019424]*
<i>Constant</i>	1.08881	-0.102296	55.257115	-16.568005
(a)	[0.807962]	[0.291779]	[23.480810]**	[7.393731]**
(b)	[0.765490]	[0.335781]	[29.252231]	[12.450593]
(c)	[0.805247]	[0.160790]	[23.999218]*	[4.447303]**
(d)	[0.805358]	[0.477097]	[31.424156]*	[11.443656]
Observations	8442	12258	324	1824
R-squared	0.73	0.62	0.18	0.69

Standard errors in brackets.

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: own elaboration.

Table 7
Effect of preferences on trade intensity according to RCA and PRODY
Distribution of export shares values to each market
 (% and millions of US)

a) Argentina

$\frac{\partial ti}{\partial pref}$	RCA (*)				Export average 2003-2007 (:US)
	No RCA		RCA		
	PRODY (**)		PRODY (**)		
	Low	High	Low	High	
Exports to Brazil					
Negative	2	0	3	0	266
Positive	12	30	43	10	5,780
Exports to Paraguay and Uruguay					
Negative	2	0	4	0	72
Positive	38	29	23	4	1,071
Exports to Row					
Negative	0	0	30	0	5,827
Positive	4	4	57	5	13,380

b) Brazil

$\frac{\partial ti}{\partial pref}$	RCA (*)				Export average 2003-2007 (:US)
	No RCA		RCA		
	PRODY (**)		PRODY (**)		
	Low	High	Low	High	
Exports to Argentina					
Negative	1	0	0	0	45
Positive	19	48	17	16	8,668
Exports to Paraguay and Uruguay					
Negative	2	0	0	0	27
Positive	37	30	19	12	1,677
Exports to Row					
Negative	0	0	0	0	3
Positive	7	11	62	20	55,109

c) Paraguay

$\frac{\partial ti}{\partial pref}$	RCA (*)				Export average 2003-2007 (:US)
	No RCA		RCA		
	PRODY (**)		PRODY (**)		
	Low	High	Low	High	
a) Exports to Brazil					
Negative	1	0	0	0	4
Positive	13	0	85	1	292
b) Exports to Argentina and Uruguay					
Negative	5	0	0	0	24
Positive	8	0	86	0	395
c) Exports to Row					
Negative	0	0	0	0	0
Positive	0	0	99	1	373

d) Uruguay

$\frac{\partial ti}{\partial pref}$	RCA (*)				Export average 2003-2007 (:US)
	No RCA		RCA		
	PRODY (**)		PRODY (**)		
	Low	High	Low	High	
Exports to Brazil					
Negative	1	3	0	7	46
Positive	20	13	54	2	374
Exports to Argentina and Paraguay					
Negative	2	8	0	5	30
Positive	23	34	26	3	173
Exports to Row					
Negative	0	1	0	7	113
Positive	1	1	90	0	1,282

(*) RCA = "NO RCA" if $RCA \leq 1$; RCA = "RCA" if $RCA > 1$. (**) PRODY = "Low" if $PRODY \leq \text{median}(PRODY) = 11789$; PRODY = "High" if $PRODY > \text{median}(PRODY) = 11789$.

Table 8
Estimated trade intensity according to RCA and PRODY
Distribution of export shares values to each market
 (% and millions of US)

a) Argentina

\hat{t}_i	RCA (*)				Export average 2003-2007 (:US)
	No RCA		RCA		
	PRODY (**)		PRODY (**)		
	Low	High	Low	High	
Exports to Brazil					
Negative	0	1	6	2	584.
Positive	14	30	39	8	5,462
Exports to Paraguay and Uruguay					
Negative	1	3	7	1	135
Positive	39	26	20	3	1,008
Exports to Row					
Negative	0	1	75	3	15,066
Positive	3	3	12	3	4,140

b) Brazil

\hat{t}_i	RCA (*)				Export average 2003-2007 (:US)
	No RCA		RCA		
	PRODY (**)		PRODY (**)		
	Low	High	Low	High	
Exports to Argentina					
Negative	0	2	9	5	1,414
Positive	19	46	8	11	7,299
Exports to Paraguay and Uruguay					
Negative	1	2	5	3	188
Positive	37	28	14	10	1,516
Exports to Row					
Negative	2	2	56	14	40,336
Positive	5	9	6	6	14,776

c) Paraguay

\hat{t}_i	RCA (*)				Export average 2003-2007 (:US)
	No RCA		RCA		
	PRODY (**)		PRODY (**)		
	Low	High	Low	High	
Exports to Brazil					
Negative	0	0	33	0	99.51
Positive	14	0	52	1	196.42
Exports to Argentina and Uruguay					
Negative	1	0	69	0	293.96
Positive	12	0	18	0	125.34
Exports to Row					
Negative	0	0	83	0	308.39
Positive	0	0	16	1	64.62

d) Uruguay

\hat{t}_i	RCA (*)				Export average 2003-2007 (:US)
	No RCA		RCA		
	PRODY (**)		PRODY (**)		
	Low	High	Low	High	
Exports to Brazil					
Negative	0	0	10	1	48
Positive	21	16	44	7	371
Exports to Argentina and Uruguay					
Negative	2	1	12	1	32
Positive	22	41	15	6	171
Exports to Row					
Negative	0	0	83	6	1,247
Positive	0	1	7	1	148

(*) RCA = "No RCA" if RCA ≤ 1; RCA = "RCA" if RCA > 1. (**) PRODY = "Low" if PRODY ≤ median(PRODY)=11789; PRODY = "High" if PRODY > median(PRODY)=11789.