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Regionalism as Industrial Policy: Evidence from MERCOSUR

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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. Results show that Mercado Común del Sur (MERCOSUR) preferences obtained by Brazilian exporters have led to an increase in exports of relatively sophisticated products in which Brazil does not enjoy a global comparative advantage. On the contrary, smaller members of MERCOSUR export to the region products in which they have strong comparative advantages and with relatively low levels of sophistication. This suggests that MERCOSUR has helped Brazil achieve its industrialization objectives, but has not contributed to the industrialization of its smaller members.

1. Introduction

The early economic literature on regionalism worried very little about its impact on the multilateral system [perhaps because of the relative weakness of the General Agreement on Trades and Tariffs–World Trade Organization (GATT–WTO) system at the time] and focused rather on the conditions under which regional blocks are likely to enhance world and the block's welfare (Viner, 1950; Kemp and Wan, 1976; Panagariya and Krishna, 2002; Ohyama, 2007). A small part of this literature looked at the distribution of gains within regional blocks.[1] An example of this approach 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 smaller range of industrial products in which they are relatively more competitive. Thus, the exogenous or politically determined level of industrial production can be reached at a lower cost thanks to the creation of a larger regional market.[2]

One problem recognized by Cooper and Massell (1965) is that depending on the cost structure of block members and the external protection structure chosen by members of the regional block this may lead to the reallocation of industries within

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a single country, leaving all other members paying for part of the industrialization process of the former.[3] In other words, external protection can be chosen so that the relatively more industrialized country can impose the costs associated with its industrialization on 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.

Monetary compensation mechanisms can also be designed within preferential trade agreements, but as pointed out by Cooper and Massell (1965), it is possible that there may not be enough income to compensate losers when part of the respective government's value in their objective function is industrialization, which does not necessarily generate income.[4]

Whether the industrialization objective makes economic sense is a question that we will not address and we will take this objective as given. Note however that Hausmann et al. (2007) have shown that countries that produce certain types of goods tend to grow faster: what you export (or produce) matters. Hwang (2006) suggests that goods produced by fast growing countries tend to be more heterogeneous allowing for a higher degree of vertical differentiation. This potential for upgrading is the engine behind faster growth. Countries that are stuck producing more homogeneous goods (e.g. agriculture) will have less scope for faster growth. Krishna and Maloney (2010) show that this may actually not be the full story behind the findings of Hausmann et al. (2007) as they observe within products very little convergence in the quality of goods exported by different countries. Nevertheless, this does not rule out that industrialization may actually be an economically desirable objective.

Our objective is to explore the extent to which MERCOSUR—a customs union (CU) between Argentina, Brazil, Paraguay and Uruguay—may have been used by its partners, especially Brazil, to achieve their industrialization objectives and if this could imply an economic cost for the other 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? In order to answer these questions we develop an empirical methodology to explain the impact of MERCOSUR tariff preferences on the characteristics of intra-regional export bundles, based on their relative degree of sophistication and comparative advantage.

Results suggest that preferences obtained by Brazil's exporters have contributed such that goods that are relatively sophisticated and in which Brazil does not enjoy a global comparative advantage, increased their weight into Brazil's exports to MERCOSUR's partners vis a vis what happened with exports to other markets where Brazil's exporters do not enjoy a preferential treatment. However, for the smaller members of the agreement, preferences have played a less important role in changing the structure of exports to other MERCOSUR partners vis a vis exports to non-preferential markets. This suggests that MERCOSUR has helped Brazil achieve its industrialization objectives, but has not contributed to the same degree to the industrialization of its smaller members.

2. MERCOSUR in the context of Latin American Integration

The first attempts of integration among Latin American economies can be traced back to the late 1950s. After the end of World War II, the largest economies in the

region (Argentina, Brazil, Chile and Mexico), and to some extent other smaller economies (Uruguay), started to implement a strategy of industrialization based on import substitution. As Sloan (1971) points out this resulted in a duplicative, light industrial development, which was oriented almost completely to the internal market, while foreign exchange was earned through the sales of primary commodities.[5] When this strategy of import substitution started to display signs of exhaustion, some of the economies in the region searched for new means to accelerate their economic development through the creation of a protected regional market. This ended in the creation of the Latin American Free Trade Association (LAFTA), which was established by the Treaty of Montevideo in 1960 and came into effect in January 1962. The founding members were Argentina, Brazil, Chile, Mexico, Paraguay, Peru and Uruguay. Bolivia, Colombia, Ecuador and Venezuela joined a few years later. The LAFTA treaty contained three agreements: (i) trade liberalization among country members; (ii) the establishment of industrial complementation agreements; and (iii) preferential treatment to the less developed members. However, LAFTA failed to deliver. As explained by Sloan (1971), this was due to the incapacity to advance with a wide and general liberalization of trade among members. Instead of following the experience of the European Economic Community (EEC) in which the general principle of liberalization was that any sector not explicitly excluded was subject to free trade, the LAFTA adopted a restrictive approach of item-by-item negotiation, usually with the establishment of limiting quotas associated with preferential access.

In 1980 LAFTA was replaced by the Latin American Integration Association (LAIA). LAIA introduced a relevant innovation. The failure of the previous process was associated with the principle of most favored nation (MFN) that implied the necessity of a common preference applied to the whole region. This was a huge restriction to the deepening of the liberalization process, both in its intensity and its coverage. The new framework allowed for the possibility to subscribe preferential agreements, and in particular bilateral agreements, among any subset of members.[6] However, because of the volatility of the 1980s, both in economic and political terms, the integration process among Latin American countries stalled until the late 1980s and early 1990s.

MERCOSUR was created in 1991 with the signature of the Treaty of Asunción. The aim of MERCOSUR is the establishment of a CU between Argentina, Brazil, Paraguay and Uruguay. In the year 2000 all intra-MERCOSUR imports were subject to a 0% tariff, with the exception of the automotive and sugar sectors that until today are deliberately left out of MERCOSUR. However, the convergence to a common external tariff (CET) has been more difficult with still applying different external policies to a large part of the tariff universe (Vaillant and Vaillant, 2013).

3. Intra- and Extra-regional Export Patterns

In order to examine whether MERCOSUR has contributed to the industrialization of its members we need to measure the degree of "industrialization" of different export bundles. We proxy "industrialization" with a measure of product sophistication provided by Hausmann et al. (2007). Their idea is that the degree of sophistication of a product (*PRODY*) depends on the average level of per capita income (*GDPpc*) of countries exporting this good. More formally, it is given by:[7]

$$PRODY_g = \sum_c GDPpc_c \frac{x_{gc}/x_c}{\sum_c x_{cg}/x_c} \quad (1)$$

where g (index goods), c (countries), x_c are total exports of country c, and x_{cg} 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 the weights capture the importance of this good into each country's export bundle. The rationale for using the share in each country exports 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 sizes. We compute *PRODY*s using six-digit data of the 1992 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 Hausmann et al.'s *EXPY* measure. It is given by:

$$EXPY_c = \sum_g PRODY_g \frac{x_{gc}}{x_c}. \quad (2)$$

In Table 1 we provide measures of *EXPY* for MERCOSUR countries export bundles to different destinations. Brazil has 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 1.36 times larger than Brazil's overall *EXPY*. On the contrary, Brazil's *EXPY* to the rest of the world (ROW) is 0.91 of Brazil's *EXPY* to the world. So, Brazil's exports to Argentina have a degree of sophistication as measured by *EXPY* that is 53% higher than Brazil's exports to the ROW. The general picture that emerges from the evidence above is that Argentina, Brazil and Uruguay's exports more sophisticated goods to the region than they do to the ROW.

In order to explore this further we construct an index of trade intensity (*ti*) at the six-digit HS level for each MERCOSUR member, which captures the relative importance of a particular good in the export bundle to countries where preferences are granted, relative to non-preferential markets.

Table 1. EXPY by Country (US$ and Ratios)

	Exporter			
Destination	*Argentina*	*Brazil*	*Paraguay*	*Uruguay*
World (US$ 000)	7,530	8,347	4,316	7,660
ROW*	0.82	0.91	0.95	0.90
Argentina*		1.36	1.05	1.31
Brazil*	1.34		0.97	1.06
Paraguay*	1.09	1.09		1.08
Uruguay*	1.33	1.19	0.88	

Note: *Relative to World.
Source: Own based on World Integrated Trade Solution (WITS) and World Development Indicators (WDI).

Trade intensity (*ti*) is 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:

$$ti_{g,c,p,t} = \frac{x_{g,c,p,t}}{x_{c,p,t}} - \frac{x_{g,c,\neq p,t}}{x_{c,\neq p,t}} \tag{3}$$

where *x* are exports, and subscripts *g*, *p* and *t* indicate goods, partners and time or year, respectively.

Logically, a positive *ti* indicates that the good is relatively more important in the preferential market and a negative *ti* indicates that the good has a stronger weight in the export bundle to the ROW. Table 2 summarizes this information for the four MERCOSUR members by export market. Each cell in Table 2 shows the percentage of exports explained by goods with certain characteristics in terms of revealed comparative advantage (*RCA*), *PRODY* and the sign of *ti*.

Most of Brazilian exports to MERCOSUR countries occur in goods in which Brazil does not have a *RCA* and for which the share in exports to preferential partners is larger than the share in exports to the ROW ($ti > 0$). Moreover, most of Brazilian exports to Argentina and Uruguay are in goods that have a high degree of sophistication (above the median). For example, 46% of Brazilian exports to Argentina occur in goods in which Brazil has no comparative advantage ($RCA \leq 1$), are over-represented in the bundle of exports to Argentina ($ti > 0$), and have a relatively high degree of sophistication. In contrast, only 2.2% of exports to the ROW are in goods with similar characteristics. In the case of exports to Paraguay, the goods explaining most of Brazil's exports are goods for which Brazil does not have a comparative advantage, but contrary to Brazilian exports to Argentina, these are goods with a low level of sophistication. A similar pattern is observed for Argentina, and to a lesser extent Uruguay. Paraguay shows almost the complete opposite picture in its intra-MERCOSUR exports.

From this preliminary evidence the segmentation of trade orientation is clear. In one extreme is Paraguay that concentrates its exports in goods with high *RCA* and low *PRODY*, which are similarly oriented to the region and to ROW. Brazil orients its exports in goods without *RCA* in the regional market and, in particular, the ones with high *PRODY*. Argentina is in between these two patterns. Finally Uruguay is in between Argentina and Paraguay. We may preliminarily conclude that even when Argentina may, like Brazil, be using the regional market as part of its industrialization strategy, the effect is weaker. These results are in line with the findings of Yeats (1998), who showed that during the first phase of MERCOSUR, the most dynamic products in MERCOSUR's intra-regional trade were capital-intensive goods in which members did not display a strong export performance in foreign markets. However, unlike our work in the next sections, Yeats (1998) did not explore the causality, neither did he distinguish between goods with different levels of sophistication.

4. Theoretical framework

As the *prima facie* evidence presented before shows, Brazil has been exporting to MERCOSUR partners relatively sophisticated products in which it does not have a global comparative advantage, whereas the opposite does seem to be observed for

Table 2. Structure of exports by partner, RCA and PRODY

		*RCA**				
		No RCA		*RCA*		
		*PRODY***		*PRODY***		
Destination	*Trade intensity (ti)*	*Low (%)*	*High (%)*	*Low (%)*	*High (%)*	*US$m (Annual average)*
(a) *Argentina*						
Brazil	Negative	0.9	0.4	5.3	1.2	511.6
	Positive	18.7	32.0	31.1	10.5	6,115.0
Paraguay	Negative	2.2	0.5	2.2	1.2	32.5
	Positive	30.1	18.7	43.0	2.1	500.4
Uruguay	Negative	0.7	0.5	8.8	0.8	88.3
	Positive	37.4	35.2	13.9	2.6	724.1
Mercosur	Negative	0.9	0.4	5.4	1.2	632.4
	Positive	21.3	31.5	30.2	9.1	7,339.5
ROW†	Negative	3.7	3.1	9.4	2.5	3,883.9
	Positive	2.4	1.0	71.7	6.1	16,800.5
(b) *Brazil*						
Argentina	Negative	0.8	0.8	6.5	2.7	827.4
	Positive	20.8	46.0	10.4	12.0	6,834.9
Paraguay	Negative	0.4	1.7	4.5	1.7	78.3
	Positive	44.7	26.0	12.4	8.5	859.4
Uruguay	Negative	0.3	1.3	6.4	1.4	69.3
	Positive	32.2	32.3	15.5	10.4	663.0
Mercosur	Negative	0.7	0.9	6.3	2.5	975.0
	Positive	24.1	42.9	11.0	11.5	8,357.3
ROW†	Negative	3.0	6.4	4.2	4.6	13,319.8
	Positive	4.9	2.2	62.7	11.9	59,466.0
(c) *Paraguay*						
Argentina	Negative	0.0	0.1	15.8	0.0	23.2
	Positive	31.5	3.6	48.8	0.2	122.8
Brazil	Negative	0.0	0.1	17.9	0.0	64.9
	Positive	24.7	1.8	55.4	0.1	295.6
Uruguay	Negative	0.1	0.0	8.0	0.0	23.6
	Positive	25.8	1.2	64.8	0.0	265.9
Mercosur	Negative	0.0	0.0	13.9	0.0	111.8
	Positive	26.4	1.9	57.6	0.1	684.3
ROW†	Negative	0.4	0.2	15.0	0.0	83.0
	Positive	0.3	0.6	82.2	1.2	446.8
(d) *Uruguay*						
Argentina	Negative	0.8	0.2	6.3	1.1	22.8
	Positive	37.5	42.2	8.3	3.7	250.5
Brazil	Negative	0.3	0.2	6.5	1.5	43.0
	Positive	29.1	19.8	35.3	7.4	468.6
Paraguay	Negative	0.1	0.1	5.4	0.4	3.8
	Positive	36.8	15.4	41.1	0.7	60.0
Mercosur	Negative	0.4	0.2	6.3	1.3	69.6
	Positive	32.4	26.7	27.1	5.7	779.1

Table 2. Continued

		*RCA**				
		No RCA		*RCA*		
		*PRODY***		*PRODY***		
Destination	*Trade intensity (ti)*	*Low (%)*	*High (%)*	*Low (%)*	*High (%)*	*US$m (Annual average)*
ROW†	Negative	0.6	1.2	7.7	2.6	209.7
	Positive	1.1	0.7	77.9	8.2	1,528.1

Notes: *RCA = "No RCA" if RCA ≤ 1; RCA = "RCA" if RCA > 1; **PRODY = "Low" if PRODY ≤ median (PRODY); PRODY = "High" if PRODY > median (PRODY). †Trade intensity defined as export share to ROW minus export share to LAIA.
Source: Own based on WITS and WDI.

the other smaller members of MERCOSUR except perhaps Argentina. A theoretical framework that can help explain these stylized facts is the one proposed by Cooper and Massell (1965). There, the authors suggest that policy makers 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 the industrialization objective. The rationale behind this industrialization objective is not very clear in Cooper and Massell, but it can be partly rationalized by the evidence in Hausmann et al. (2007) that suggests that what you export and, therefore, produce, matters in terms of potential long-run economic development.

Interestingly, Cooper and Massell (1965) show that in such a setup, a CU can help countries achieve their industrialization objective at a lower cost. Indeed, once the markets are pooled together, the industrialization objective—which can be read in terms of a given level of production—can be achieved with a lower level of tariff protection because the "regional demand" for relatively more efficient industrial producers is larger than the isolated "national demands." In other words, there is more demand in the CU 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 that 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 partners' shoulder. So industrialization can be achieved at a lower cost for one or some 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 does not have industrialization objectives or there is not some sort of "regional strategy" to spread the benefits of the industrialization.

Of course, there are other alternative explanations to the one just proposed. On the one hand, we have the model developed by Venables (2003), where he extends the Cooper and Massell argument to a traditional factor abundance trade model [Heckscher–Ohlin–Samuelson (HOS)]. In this type of world, the costs of trade diversion could be unevenly distributed across members of a Preferential Trade Agreement (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.[8] On the other hand, using a different approach, Grossman and Helpman (1995) develop a political economy model showing that a free trade area (FTA) can be made politically viable by excluding certain sectors from liberalization within the FTA. 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 that 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. Thus, in equilibrium trade diverting FTAs are more likely to be observed.

5. 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:[9]

$$\begin{aligned} ti_{g,p,t} = {} & \beta_1 RCA_{g,t} + \beta_2 SOPH_{g,t} + \beta_3 PREF_{g,p,t} \\ & + \beta_{1,3} RCA_{g,t} \times PREF_{g,p,t} + \beta_{2,3} SOPH_{g,t} \times PREF_{g,p,t} \\ & + \alpha_g + \alpha_p + \alpha_t + \mu_{g,p,t} \end{aligned} \tag{4}$$

where as previously defined, $ti_{g,p,t} = [x_{g,p,t}/x_{p,t}] - [x_{g,\neq p,t}/x_{\neq p,t}]$ is given by the share of exports x of good g (defined at the six-digit level of the HS classification) to a preferential partner p at time t in total exports to this preferential partner minus the share of exports of good g to all other non-preferential countries, denoted as $\neq p$. $RCA_{g,t}$ is the revealed comparative advantage of the exporter country in good g at time t; $SOPH_{g,t}$ is the indicator of the degree of "export sophistication" measured as in section 3 by the *PRODY* variable. Also, we use an alternative index of product sophistication based on the *Kp* index constructed using what Hidalgo and Hausmann (2009) refer to as the "Method of Reflections." The *Kp* index is obtained through an iterative process considering the patterns of revealed comparative advantage of all countries in the world. Intuitively, the level of sophistication according the *Kp* index is higher for goods that are exported by a small number of countries, but these are countries that have a diversified export basket. On the other extreme a good is less sophisticated when it is exported by a large number of countries, but these are countries that export a limited number of goods. An advantage of the *Kp* index over the *PRODY* index is that the latter introduces a source of endogeneity into our equation (4) since it is more likely to be affected by countries' trade policies. As shown in Hidalgo (2009) the *PRODY* and *Kp* indices produce relatively similar good rankings. For the period included in our sample, 2000–2007, the rankings of goods according to their level of sophistication using the *PRODY* and *Kp* indices are highly correlated, around 0.7. Trade preferences are measured as $PREF_{g,p,t} = t^{MFN}{}_{g,p,t} - t^{p}{}_{g,p,t}$, which defines the preference margin received from country p on exports of good g measured as the difference between the two tariffs, the MFN and the preferential tariffs. Finally, α_g are good specific fixed effects, α_p are partner specific fixed effects, α_t are time specific fixed effects and $\mu_{g,p,t}$ is an error term. Because equation (4) is estimated

separately for each MERCOSUR member we do not include fixed effects for the exporting countries.

Our aim is to test if preferences granted under MERCOSUR could help to explain the changes observed in the trade intensity index, and in particular if the effect of trade preferences varies according to the level of sophistication of each good as well as if the country has or not a *RCA* in the global market for that good. Thus we are interested in the sign of the interaction terms between preferences and the indicators of comparative advantage and degree of sophistication.

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

$$\frac{\partial ti_{g,p,t}}{\partial PREF_{g,p,t}} = \beta_3 + \beta_{1,3} RCA_{g,t} + \beta_{2,3} SOPH_{g,t}. \tag{5}$$

We can relate our empirical specification in equation (4) and the resulting impact of preferences on trade intensity given in equation (5) with the hypothesis proposed by Cooper and Massell (1965). As discussed above, the Cooper and Massell view of trade agreements as an instrument to achieve industrialization objectives at a lower cost could require that given a trade preference on certain good, the effect on trade intensity increases with the degree of sophistication, that is $\beta_{2,3} > 0$. In this case the PTA becomes an instrument to achieve a more sophisticated export and production structure than the one that would be suggested by its comparative advantage.

6. Results

We estimate equation (4) separately for each of the four MERCOSUR members for the period 2000–2007. The reason for not including the years before 2000 is that the process of intra-MERCOSUR liberalization was not fully completed until 2000.[10]

Table 3 reports the results for equation (4) when using the ordinary least squares (OLS) estimator, while in Table 4 we used an instrumental variable (IV) estimator. In the upper block of both tables we have the results when including all HS codes[11] while in the lower block we consider only HS codes corresponding to manufacturing exports.[12] The reason for running equation (4) only for manufacturing goods is that these are the type of goods governments may be more interested in promoting to achieve industrialization. In both tables, the first four columns report the results when we use the *PRODY* indicator as a measure of the level of good sophistication, while in columns 5–8 the *Kp* index is used instead. The reason for using an alternative measure for the degree of sophistication is that the *PRODY* is subject to the criticism that is endogenous to countries' trade policy, while this may not be the case for the *Kp* index as discussed earlier.

Looking at the results in Table 3, it emerges clearly that for the four countries we obtain a negative and significant coefficient for the *RCA* variable. This result is consistent with the approach of Grossman and Helpman (1995), which shows that to be politically viable a FTA requires an exception list that excludes from the liberalization those goods where trade creation is greater and therefore where countries have a stronger comparative advantage. Also, and because as explained in section 2, MERCOSUR is still an imperfect custom union, with a large number of

Table 3. Results Equation (4) (OLS Estimates)

	SOPH: PRODY index				*SOPH: Kp index*			
	ARG	*BRA*	*PRY*	*URY*	*ARG*	*BRA*	*PRY*	*URY*
	OLS: All HS codes							
RCA (β_1)	−0.00324***	−0.00436***	−0.05135***	−0.00656	−0.00327***	−0.00444***	−0.05091***	−0.00816
	[0.001]	[0.001]	[0.016]	[0.008]	[0.001]	[0.001]	[0.016]	[0.008]
SOPH (β_2)	−0.00551	−0.01082***	0.13528	−0.00495	−0.18261	−0.32527	13.87648*	1.79824
	[0.008]	[0.004]	[0.126]	[0.030]	[0.422]	[0.201]	[7.797]	[1.510]
PREF (β_3)	−0.00105	−0.00433**	0.04783	−0.00201	−0.05189	−0.13900*	0.79057	−1.10593**
	[0.004]	[0.002]	[0.059]	[0.022]	[0.161]	[0.083]	[1.771]	[0.521]
RCA×	0.00017***	0.00022***	0.00200**	−0.00009	0.00017***	0.00023***	0.00202**	0.00003
PREF (β_{13})	[0.000]	[0.000]	[0.001]	[0.001]	[0.000]	[0.000]	[0.001]	[0.001]
SOPH×	0.00044	0.00076***	−0.00392	0.00024	0.00804	0.02072*	−0.11398	0.16189**
PREF (β_{23})	[0.000]	[0.000]	[0.006]	[0.002]	[0.024]	[0.012]	[0.259]	[0.076]
Observations	73,006	94,128	12,189	28,013	73,006	94,128	12,189	28,013
Adjusted R^2	0.677	0.629	0.197	0.502	0.677	0.629	0.197	0.502
	OLS: Manufactures							
RCA (β_1)	−0.00276***	−0.00410***	−0.04160**	−0.00290	−0.00283***	−0.00422***	−0.03886**	−0.00486
	[0.001]	[0.001]	[0.017]	[0.009]	[0.001]	[0.001]	[0.016]	[0.009]
SOPH (β_2)	−0.00340	−0.00748**	0.03691	0.02005	−0.67312	−0.66113***	14.13255***	1.38114
	[0.009]	[0.004]	[0.107]	[0.038]	[0.418]	[0.215]	[4.990]	[1.768]
PREF (β_3)	0.00087	−0.00274	0.00324	0.00709	−0.16940	−0.22709**	1.90130*	−1.36328**
	[0.005]	[0.002]	[0.041]	[0.025]	[0.165]	[0.089]	[1.035]	[0.595]
RCA×	0.00013**	0.00021***	0.00153*	−0.00027	0.00014**	0.00022***	0.00139*	−0.00012
PREF (β_{13})	[0.000]	[0.000]	[0.001]	[0.001]	[0.000]	[0.000]	[0.001]	[0.001]
SOPH×	0.00026	0.00059***	0.00066	−0.00081	0.02525	0.03362***	−0.27689*	0.19945**
PREF (β_{23})	[0.000]	[0.000]	[0.004]	[0.002]	[0.024]	[0.013]	[0.151]	[0.087]
Observations	67,174	86,568	10,908	25,586	67,174	86,568	10,908	25,586
Adjusted R^2	0.685	0.508	0.428	0.495	0.685	0.508	0.429	0.496

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Robust standard errors in brackets.

Table 4. Results Equation (4) (IV Estimates)

	SOPH: PRODY index				*SOPH: Kp index*			
	ARG	*BRA*	*PRY*	*URY*	*ARG*	*BRA*	*PRY*	*URY*
	IV: All HS codes							
RCA (β_1)	−0.00307***	−0.00336***	−0.13680***	−0.04360***	−0.00306***	−0.00337***	−0.13450***	−0.04569***
	[0.001]	[0.001]	[0.031]	[0.011]	[0.001]	[0.001]	[0.031]	[0.012]
SOPH (β_2)	0.01027	−0.00973	0.41859	−0.04232	−0.11104	−0.32732	13.26704	0.21464
	[0.014]	[0.007]	[0.269]	[0.085]	[0.542]	[0.280]	[9.236]	[2.395]
PREF (β_3)	0.00988	−0.00332	0.22006*	−0.02012	−0.00457	−0.14319	1.19780	−1.99111
	[0.008]	[0.009]	[0.132]	[0.057]	[0.275]	[0.147]	[3.519]	[1.680]
RCA×PREF (β_{13})	0.00016**	0.00014**	0.00759***	0.00248***	0.00015**	0.00014**	0.00751***	0.00265***
	[0.000]	[0.000]	[0.002]	[0.001]	[0.000]	[0.000]	[0.002]	[0.001]
SOPH×PREF (β_{23})	−0.00073	0.00067	−0.02441	0.00284	0.00133	0.02119	−0.17818	0.28910
	[0.001]	[0.000]	[0.016]	[0.007]	[0.039]	[0.021]	[0.513]	[0.244]
Observations	73,006	94,128	12,189	28,013	73,006	94,128	12,189	28,013
Hansen (P value)†	0.787	0.764	0.748	0.057	0.978	0.746	0.834	0.055
	IV: Manufactures							
RCA (β_1)	−0.00332***	−0.00282***	−0.12608***	−0.04995***	−0.00337***	−0.00280***	−0.12906***	−0.05346***
	[0.001]	[0.001]	[0.038]	[0.015]	[0.001]	[0.001]	[0.038]	[0.017]
SOPH (β_2)	0.01995	0.00729	0.27011	0.02901	−0.84157	−0.77714**	19.03826**	−1.49325
	[0.021]	[0.007]	[0.364]	[0.126]	[0.602]	[0.347]	[8.207]	[3.359]
PREF (β_3)	0.01467*	0.00690	0.14571	0.02342	−0.26648	−0.30465*	4.65736	−2.86529
	[0.008]	[0.010]	[0.190]	[0.076]	[0.319]	[0.176]	[3.482]	[2.198]
RCA×PREF (β_{13})	0.00018**	0.00010	0.00683***	0.00289***	0.00018**	0.00010	0.00705***	0.00315***
	[0.000]	[0.000]	[0.002]	[0.001]	[0.000]	[0.000]	[0.002]	[0.001]
SOPH×PREF (β_{23})	−0.00137	−0.00050	−0.01417	−0.00100	0.03936	0.04453*	−0.68275	0.41689
	[0.001]	[0.000]	[0.020]	[0.009]	[0.046]	[0.026]	[0.508]	[0.319]
Observations	67,174	86,568	10,908	25,586	67,174	86,568	10,908	25,586
Hansen (P value)†	0.860	0.986	0.505	0.203	0.985	0.987	0.424	0.198

Notes: Brazil's 1990 and 1994 MFN rates and their interactions with ln_*RCA* and ln_*PRODY* as instruments. †Ho: instruments are valid. ***$p < 0.01$; **$p < 0.05$, *$p < 0.1$. Robust standard errors in brackets.

exceptions to the CET, the negative value for β_1 is consistent with the results of Bohara et al. (2004), who, using MERCOSUR data, test Richardson's (1995) theoretical result that external tariffs are more likely to fall in products where domestic production has been displaced by imports from a preferential partner.

The coefficient for the interaction between *RCA* and *PREF* variables is positive and significant for Argentina, Brazil and Paraguay, while for Uruguay it is negative but not significant. These results would go partially against the model proposed by Venables (2003), which shows that for 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 the South–South agreement, and one can observe an uneven distribution of trade diversion costs among members. In order to illustrate Venables (2003) 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 Brazilian 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 ROW, the more capital-abundant country (Brazil) benefits from this trade diversion, while the natural resource abundant country (Paraguay) suffers. Following this argument we could expect $\beta_{13} > 0$ for Paraguay, $\beta_{13} < 0$ for Brazil and may be also for Argentina, with the case of Uruguay being less clear.

Finally, going back to the Cooper and Massell (1965) rationale for regional integration agreements, this is consistent as discussed above with $\beta_{23} > 0$ and statistically significant. This condition is fulfilled only for Brazil when using both the *PRODY* and *Kp* indices as a measure of sophistication and Uruguay when using the *Kp* index. For Argentina we also get a $\beta_{23} > 0$, but the estimates are not significant. For Paraguay we have mostly $\beta_{23} < 0$, but as in the cases of Argentina, the estimates are not significant.

A potential drawback of the OLS estimator is the issued of endogenity of trade preferences that would render the OLS estimates biased. Based on the findings of Olarreaga et al. (1999) that show that the MERCOSUR's CET put in place in 1995 mainly reflected Brazil's political economy preferences, we use Brazil's trade barriers that were in place before MERCOSUR started and before the CET came into force, in particular we use Brazil's 1990 and 1994 MFN rates as instruments. As reported in Table 4, the IV estimator produces the same qualitative results as discussed above in terms of the coefficient β_1, moreover, now for Uruguay the coefficient β_1 is also statistically significant. In the case of coefficient β_{13}, now it is positive for the four countries. For Argentina, Paraguay and Uruguay the estimates are always significant.

Finally, in the case of the coefficient for the interaction of preferences and sophistication (β_{23}) the results change with respect to the OLS estimates. It is only in the manufacturing sample of Brazil and when using the *Kp* index as a measure of sophistication that the coefficient is positive and significant. This confirms our hypothesis that Brazil is using regionalism as an instrument to change its export pattern toward more sophisticated goods.[13]

7. Concluding Remarks

Governments may have industrialization objectives. Cooper and Massell (1965) showed in an important paper that these industrialization objectives could be achieved at lower costs by integrating national markets into regional blocks, while full integration into global markets would not necessarily help achieve these objectives for countries with comparative advantages in non-industrial products.

We found *prima facie* evidence that products that weigh 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 are products with a higher degree of sophistication than products exported by Brazil to the ROW. While this is also present in exports of Argentina to other MERCOSUR members, the pattern is not as strong as in the case of Brazil. The opposite outcome is found for Paraguay. In the case of Uruguay, the results are more ambiguous.

We systematically test these patterns and found that the marginal effect of trade preference in goods sophistication is high in Brazil's manufacturing exports towards its regional partners, but this is not the case for the regional exports of other members of MERCOSUR.

To sum up, the results suggest that MERCOSUR may have contributed to achieve Brazil's industrialization objectives through exports to the region of goods in which the country does not have a comparative advantage and which have a high degree of sophistication.

Finally a word of caution: these results must not be interpreted as implying that MERCOSUR has been welfare worsening for its smallest members, since these countries have also benefited from access to the far larger Brazilian market.

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Notes

1. For a comprehensive survey of the regionalism literature, see Panagariya (2000).
2. Krishna and Bhagwati (1997) prove formally the Cooper and Massell hypothesis.
3. Note that the Cooper and Massell (1965) argument applies to a Custom Union where preferences within the region are common. As was shown empirically in Estevadeordal et al. (2008), the complementary relationship between preferential and external tariffs that was observed for free trade areas was not observed for custom unions.
4. A 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 the 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 (General Agreement on Trade in Services), regional subsidies may be WTO consistent.
5. In the case of the largest economies of the region, Argentina, Brazil and Mexico, the strategy of import substitution also helped the development of heavy industry, as in the cases of the automotive, chemical and metallurgical sectors.
6. Complementary economic agreements in LAIA's terminology.
7. In the econometric exercise in section 6 we also use the method of reflection developed by Hidalgo and Hausmann (2009) as an alternative to measure of the degree of product sophistication. This new method uses only information about specialization without combining it with income per capita. Hidalgo (2009) shows that the results in terms of the order of products are highly correlated between the two methodologies.
8. According to Venables, a welfare enhancing response to this outcome by the least capital-abundant country, 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.

9. In terms of data sources, export and MFN tariff data are from WITS. Tariff preferences are from the MERCOSUR's Secretariat and GDP data from the World Bank's World Development Indicators.

10. Only the automotive and sugar sectors are still outside the MERCOSUR legal framework. In the first case, trade is managed through bilateral agreements, with a general principle of free trade but subject to some restrictions in terms of achieving a balanced trade between members. In the case of the sugar sector, this has been left aside from the integration process.

11. Only HS codes with a world trade of at least US$10 million are included.

12. These are sectors 15–36 of the ISIC Rev. 3 classification.

13. Note that Muriel and Terra (2009) found no evidence that Brazil's overall movement towards liberalization in the mid-1980s led to a change in the comparative advantage of Brazil as measured by the factor content of its trade flows. Our results suggest that MERCOSUR did help change the comparative advantage of Brazil.