

Endogenous Tariff Formation: The Case of Mercosur

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Mercosur appears as an interesting case study for analyzing the determinants of exceptions in regional trade agreements. Its member countries—Argentina, Brazil, Paraguay, and Uruguay—intended to make Mercosur a full customs union by January 1995. This goal turned out to be too ambitious, and the Protocol of Ouro Preto and other agreements signed in December 1994 led to a hybrid solution. Overall, out of a total of 9,119 tariff lines, around 30 percent are subject, in at least one member country, to either external deviations from the common external tariff or internal deviations from free trade. Thus an important set of holes remains under the existing agreement, leading some authors to consider Mercosur an incomplete customs union.

This article compares the results of the theoretical literature on endogenous tariff formation with evidence from Mercosur. The results show that Mercosur's common external tariff and member countries' deviations from it and from internal free trade can be explained by sector or industry lobbying as predicted by the endogenous tariff literature. If a viable political economy is a key to success, then Mercosur is here to stay.

Several analysts argue that regional trade agreements (RTAs) allow for more far-reaching liberalization, in a regional context, than multilateral trade agreements. Some suggest that the North American Free Trade Agreement or the European Community would not have achieved their degree of intrabloc liberalization if member countries had relied on multilateral negotiations because smaller groups find it easier to agree. Although it seems theoretically valid, Hoekman and Leidy (1992) challenge this view on empirical grounds. They argue that the same political forces that block far-reaching liberalization in the multilateral context are also present in regional negotiations and that the outcomes are relatively similar.

Mercosur appears as an interesting case study for analyzing the determinants of exceptions ("holes" in Hoekman and Leidy's terminology) in RTAs. Mercosur's

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member countries—Argentina, Brazil, Paraguay, and Uruguay—intended to make Mercosur a full customs union (a common market as specified in the Treaty of Asunción) by January 1995. This goal turned out to be too ambitious, and the Ouro Preto protocol and other agreements signed in December 1994 led to a hybrid solution. A common external tariff (CET) was established, but countries were allowed to deviate (upward and downward) in some tariff lines until the beginning of the next century. Intra-Mercosur free trade has not been achieved. Overall, out of a total of 9,119 tariff lines, around 30 percent are subject, in at least one member country, to either external deviations from the CET or internal deviations from free trade. Thus an important set of holes remains under the existing agreement, leading some authors to consider Mercosur an incomplete customs union.

This article compares the results of the theoretical literature on endogenous tariff formation with evidence from Mercosur. Does Mercosur's CET reflect sector or industry lobbying? Are member-country deviations from the CET and from internal free trade consistent with the literature's predictions? The answers to these questions may provide some insight about the potential durability of the Mercosur agreements. Tariffs and trade agreements are subject to change, but if today's Mercosur structure of protection and its expected evolution to the CET (and internal free trade) reflect the interests of the private sector and average voters, then Mercosur will face fewer political challenges and may be politically viable in the long run.

To our knowledge, this article is the first attempt to explain empirically deviations from the CET and from free trade within an RTA. It also analyzes the structure of the CET in light of recent findings in the theoretical literature on the endogenous formation of trade policy. It emphasizes these new theoretical results in the empirical sections.

Section I describes Mercosur's tariff structure and deviations from the final objectives of internal free trade and a CET. Section II discusses the theoretical literature's predictions. Section III sets out the empirical model to be tested, and section IV presents the empirical results. Section V offers some concluding remarks.

I. SOME FACTS ABOUT MERCOSUR

The Treaty of Asunción, signed in March 1991, established a framework for achieving a common market among Argentina, Brazil, Paraguay, and Uruguay, known as Mercosur. The region represents 75 percent of the gross domestic product (GDP) of South America (excluding Guyana), 60 percent of its population, and 65 percent of its geographic area. This makes Mercosur geographically the largest customs union in the world. Mercosur's geographic area is almost four times larger than that of the European Union. Its GDP per capita in 1994 was around \$3,800.

The relatively small size of member countries' national markets (Paraguay's GDP is smaller than that of the canton of Geneva) was obviously an important

factor calling for regional integration. Mercosur's internal market remains relatively small (around half of France's GDP). Its member governments recognize the necessity of employing Mercosur's market as a tool to integrate their economies into the world economy. The governments have made an official commitment to further trade liberalization.

Mercosur signed free trade agreements with Bolivia in December 1996 and Chile in October 1996. Bolivia cannot enter Mercosur as a full member because it has been a member of the Andean Pact (recently renamed the Andean Community) since its beginnings. Chile, which has a uniform tariff structure, was not interested in adapting to Mercosur's nonuniform CET structure. In December 1995 Mercosur signed a Framework Cooperation Agreement with the European Community, which, among other things, is intended to lead toward reciprocal liberalization of all mutual trade. Apparently, even China and Russia have approached Mercosur authorities to engage in bilateral trade agreements.

Since the agreement was signed, intraregional trade has increased at an average rate of 28.5 percent a year. The increase represents three times the rate of growth of the region's total trade and five times the rate of growth of world trade (Mercosur Secretariat 1996).

Table 1 gives the World Bank's indicator for Mercosur's rate of integration with the world, Mercosur, and the rest of the world. This indicator is calculated as the difference between the rate of growth of total trade and the rate of growth of GDP. Mercosur's GDP grew at an average rate of 1 percent in the 1980s and 3.8 percent in 1991-95. For Mercosur's member countries, the rates of integration with the world and with Mercosur were 10 times larger in 1991-95 than in the 1980s. Thus Mercosur has been a success in terms of volume of trade.

The Treaty of Asunción established nontrade-related objectives including coordination of macroeconomic and investment policies and free factor mobility. Member governments also see as important objectives cooperation in education and transport policies and consolidation of the democratic process in the region. Moreover, as suggested by Schiff and Winters (1997), trade within Mercosur may reduce regional tensions in the framework of the nonaggression pact signed by Argentina and Brazil. From the last column of table 1, in absolute terms, the rate of regional integration has increased twice as much as the rate of integration with the world. This may be explained by the fact that Mercosur members are geographically natural trading partners, that is, close neighbors. Yeats (1997)

Table 1. *Mercosur's Rate of Integration, 1980-90 and 1991-95*

| <i>Region</i> | <i>1980-90</i> | <i>1991-95</i> | <i>Change</i> |
|-------------------|----------------|----------------|---------------|
| World | 1.1 | 13.1 | 12.0 |
| Mercosur | 2.4 | 24.7 | 22.3 |
| Rest of the world | 0.9 | 11.0 | 10.1 |

Note: The Mercosur countries are Argentina, Brazil, Paraguay, and Uruguay. The rate of integration is estimated as the difference between total trade and GDP growth.

Source: Mercosur Secretariat (1996) and Cámara de Industrias del Uruguay (1996).

provides an alternative explanation based on internal and external tariff discrimination.

The Protocol of Ouro Preto and other agreements signed in December 1994 quantified objectives and completed procedures for establishing the customs union aspects of the proposed common market. The governments negotiated a CET for all products but implemented it for only 75 percent of the total tariff lines in 1995. The remaining 25 percent includes mainly capital goods, computer products and telecommunications equipment, automobiles, and sugar, for which special regimes have been negotiated. Convergence to the CET should be achieved at the latest by the year 2006 for telecommunications equipment. For sugar and automobiles, there has been no agreement on dates for final convergence. A list of other goods—a maximum of 300 tariff lines from a universe of 9,119 (3.3 percent) for Argentina, Brazil, and Uruguay and a maximum of 399 (4.3 percent) for Paraguay—should also converge to the negotiated CET by the year 2000. Total deviations from the CET represent 16.9 percent of all tariff lines for Argentina, 17.6 percent for Brazil, 23.0 percent for Paraguay, and 21.0 percent for Uruguay. Because the CET has been implemented for 75 percent of the tariff lines, most member-country deviations from the CET occurred for the same items (essentially under the special regimes).

Deviations from the CET go beyond the ones specified at Ouro Preto; they include dozens of special regimes allowing for tariff-free or tariff-reduced imports as part of several promotional schemes existing in the member countries. This is a result of preexisting preferences granted to other members of the Latin American Integration Association (LAIA), except Chile and Bolivia, where recent agreements have regionalized concessions formerly granted by individual Mercosur countries, or the peculiar status of Manaus and Tierra del Fuego (tax-free areas) that has been preserved until 2013. To make things harder, Mercosur has made little progress in applying a truly common external trade policy. Moreover, a certain number of import quotas are still in place at the national level, in spite of the commitment taken in the Treaty of Asunción to eliminate quantitative barriers to trade or to harmonize them when necessary, as for example within the Multifibre Arrangement of the World Trade Organization (WTO). However, due to the lack of reliable data, this article only analyzes the Ouro Preto tariff agreements.

The textile sector illustrates the differences from the CET. Argentina assesses tariffs for more than 600 textile items, employing “minimum specific duties” that result in specific duties for the lower price range and ad valorem duties for the top of the price scale. These duties are under WTO examination, at the request of the United States. Uruguay assesses tariffs for more than 100 textile items using “precios mínimos de exportación” that result in a combination of variable levies, specific duties, and ad valorem tariffs (see Changanaquí and Messerlin 1994). Brazil originally included a number of textile tariff items on a list of exceptions to the CET with duties up to 70 percent. It has recently begun to use the special safeguard provision of the

textile agreement that results in quotas for specific products from specific origins.

Article 5 of the Treaty of Asunción calls for the elimination of nontariff restrictions or equivalent measures. The elimination of quantitative barriers to trade is probably explained by the commitments made during the Uruguay Round and not by endogenous political choice. For a discussion of the political choice of the means of protection, see chapter 7 in Hillman (1989).

Internal tariffs (tariffs applied to imports from other member countries) pre-exist the Ouro Preto protocol under the list of exceptions of the Treaty of Asunción. Almost all tariff lines outside the list of exceptions reached the Treaty of Asunción's target of free trade on schedule at the beginning of 1995 (see Laird 1997). The Ouro Preto protocol decided, under what has been renamed the "adecuación" regime, that items in the list of exceptions should converge to internal free trade by 1999 for Argentina and Brazil and by 2000 for Paraguay and Uruguay. In 1996 deviations from internal free trade only corresponded to 0.2 percent of total tariff lines for Brazil, 2.5 percent for Argentina, 3.3 percent for Paraguay, and 4.4 percent for Uruguay.

Table 2 reports average external and internal tariffs and the average CET for 1996 (simple averages of the whole and exempted universe and import-weighted averages). The tariffs indicate that Argentina and Brazil are on average converging downward to the CET, whereas Paraguay and Uruguay are converging upward to it. The simple average external tariff rates over their exempted universe are 6.83 percent in Paraguay and 5.92 percent in Uruguay; they reach 21.39 percent in Brazil.

Mercosur's members have experienced a significant liberalization effort in the past decade. In 1986 the average tariff was close to 80 percent in Brazil, 41

Table 2. *Average Tariffs in the Mercosur Countries, 1996*

| Country | Average tariff | | Average import-weighted tariff | | Average unweighted tariff on exempt items | |
|-----------|----------------|----------|--------------------------------|----------|---|-----------------------|
| | External | Internal | External | Internal | External ^a | Internal ^b |
| Argentina | 11.78 | 0.36 | 13.37 | 0.86 | 14.33 | 11.69 |
| Brazil | 13.14 | 0.02 | 15.44 | 0.02 | 21.39 | 10.20 |
| Paraguay | 8.79 | 0.80 | 5.18 | 0.37 | 6.83 | 24.91 |
| Uruguay | 10.78 | 0.88 | 11.01 | 1.77 | 5.92 | 19.73 |
| Mercosur | 11.15 | 0.00 | 11.09 | 0.00 | n.a. | n.a. |

n.a. Not applicable. There are no exemptions for Mercosur.

Note: Import-weighted tariffs tend to be downward biased because sectors with high tariffs tend to import less. For Mercosur, external tariff data are the common external tariff (CET) to be achieved once the Ouro Preto objectives are reached; internal tariff data reflect the objective established in Ouro Preto, that is, free trade.

a. For Argentina, 1,540 tariff lines (16.9 percent of the total universe); for Brazil, 1,605 (17.6 percent); for Paraguay, 2,101 (23.0 percent); and for Uruguay, 1,961 (21.5 percent).

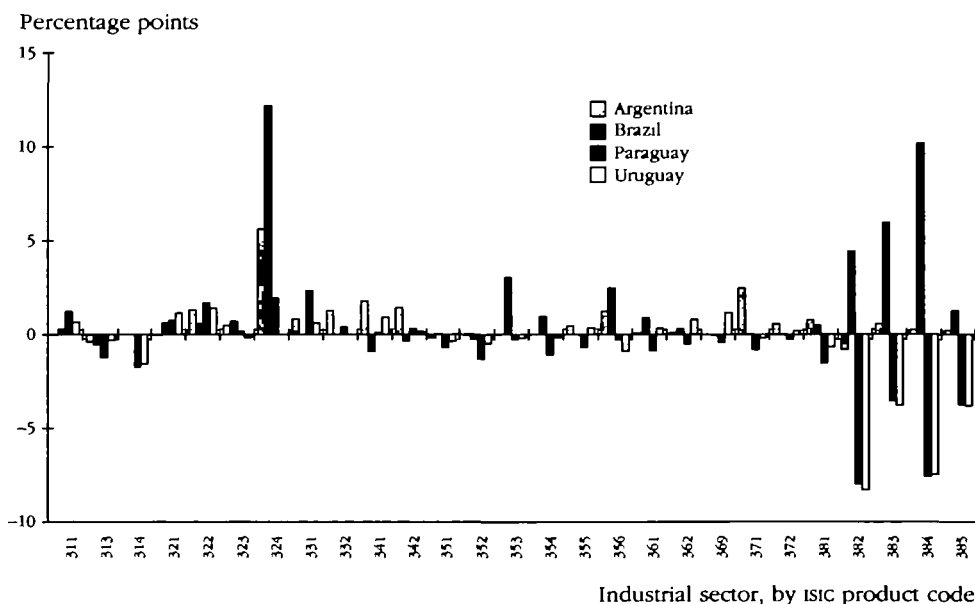
b. For Argentina, 231 tariff lines (2.5 percent of the total universe); for Brazil, 17 (0.2 percent); for Paraguay, 293 (3.2 percent); and for Uruguay, 407 (4.4 percent).

Source: See appendix B.

percent in Argentina, 20 percent in Paraguay, and 36 percent in Uruguay (Mendoza 1996). Table 2 indicates that tariff levels averaged between 9 and 13 percent for 1996. Internal tariffs were particularly low for Argentina and Brazil, calculating averages over the entire universe of more than 9,000 tariff items. However, considering the averages over the exempted universe only, they were close to 10 percent and reached a high of 25 percent in Paraguay. These internal tariffs may be subject to some discussion, as suggested by an anonymous referee. Smuggling accounts for a large share of Paraguay's trade. Connolly, Devereux, and Cortes (1995) estimate that the unreported trade in Paraguay accounts for 58 percent of its total exports. However, the convergence to internal free trade will reduce the incentives in Paraguay to smuggle goods to its larger neighbors.

Figure 1 illustrates deviations from the negotiated CET in percentage points in Argentina, Brazil, Paraguay, and Uruguay for the 27 sectors of the International Standard Industrial Classification (ISIC) three-digit codes. (See appendix A for the sectors and appendix B for data sources.) The negotiated CET differs from the external tariff due to national exceptions. Figure 1 shows that Argentina tends to deviate upward for wearing apparel, footwear, furniture, paper and paper products, printing and publishing, plastic products, and iron and steel. Argentina is relatively close to the CET for the rest of the ISIC three-digit classification. Brazil deviates upward for footwear, plastic products, machinery, electric machinery, and transport equipment and remains close to the CET for the rest of the ISIC three-digit classification. Paraguay deviates upward for wearing

Figure 1. *Deviations from Mercosur's Common External Tariff, 1996*



Note: See Appendix A for the industries corresponding to the ISIC product codes.

Source: Authors' calculations.

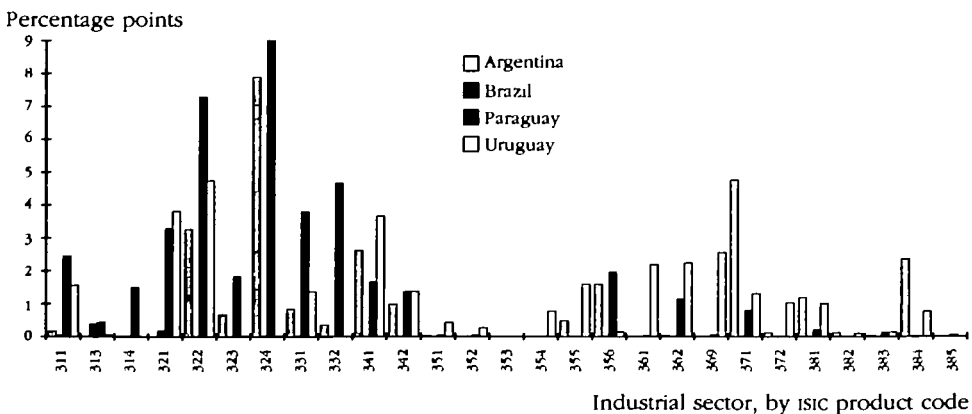
apparel, footwear, and wood products. Uruguay deviates upward for textiles, wearing apparel, and nonmetallic mineral products. Paraguay and Uruguay deviate downward for machinery, electric machinery, transport equipment, and professional and scientific equipment.

Figure 1 also shows the asymmetry between the deviations in Brazil and the deviations in Paraguay and Uruguay for the last four products of the ISIC three-digit classification. Indeed, Brazil is a relatively large producer of these products and deviates upward from the CET, whereas Paraguay and Uruguay are relatively small producers and deviate downward from the CET. Not surprisingly, these products have been relatively sensitive in the Mercosur negotiations on the CET. These industries mainly correspond to the sectors where special regimes have been negotiated, for example, automobiles, computer products, and capital goods. Uruguayan negotiators apparently put great effort in trying to lower the CET on capital goods because Uruguay's external tariff was set at zero for most of these products before the Ouro Preto negotiations.

Internal deviations from free trade for the four member countries are illustrated in figure 2. Brazil's deviations are almost nonexistent at this level of aggregation. Argentina, Paraguay, and Uruguay have relatively high internal tariffs. Internal deviations seem to be more important for the seven categories of items from textiles to paper and paper products (see appendix A), with a high of 9 percent for footwear in Paraguay. Internal tariffs are also relatively high for iron and steel and transport equipment in Argentina.

In general, tariff levels may seem relatively low, but these are simple average tariffs at a high level of aggregation (27 sectors). For example, using the two-digit harmonized system that includes 97 sectors, Brazil's external tariff is 70 percent for articles of apparel and clothing and 50 percent for vehicles, footwear, and prepared vegetables. Internal deviations from free trade reach a high

Figure 2. *Deviations from Internal Free Trade, Mercosur, 1996*



Note: See Appendix A for the industries corresponding to the ISIC product codes.

Source: Authors' calculations.

of 28 percent for vehicles in Argentina and for articles of apparel and clothing in Argentina, Paraguay, and Uruguay.

II. PREDICTIONS OF THE ENDOGENOUS TARIFF LITERATURE

The theory of endogenous protection describes how a combination of agents' preferences on trade policy and the weight given to different groups' preferences on policy determination may translate into deviations from first-best trade policies. This literature is extremely rich and has followed different approaches. Rodrik (1995) reviews the empirical and theoretical literature, and Rama (1994) provides an empirical application to the region. For alternative approaches to the theory of endogenous protection based on social insurance, see, for example, Hillman (1989).

As recently suggested by Helpman (1995), however, the different approaches tend to generate the same predictions. This section summarizes the main results of the theoretical literature, starting with the general results, then turning to the new predictions of the theoretical literature on the endogenous formation of RTAs.

General Results

Here we focus on seven predictions of the correlates of expected cross-sectoral variations in tariff protection. These results are well documented in the empirical literature on endogenous tariff formation (see Rodrik 1995). However, both the theoretical and empirical results are somewhat partial equilibrium results because they do not necessarily account for simultaneity bias. For an empirical study that accounts for the simultaneity bias between imports and tariffs, see Trefler (1993). Other things being equal, the level of protection received by an industry is higher if any of the seven conditions hold.

The first condition is that the level of industry concentration is high. Rodrik (1987) provides a theoretical justification, and Trefler (1993) and Marvel and Ray (1983) present empirical examples. This condition captures the type of free-riding incentives in Olson (1965). However, both empirical and theoretical evidence indicates that this condition need not hold. On the one hand, industry concentration might solve the free-riding problem. On the other hand, an increase in group size may result in higher contributions of the group (see Cornes and Sandler 1996). Moreover, the theory is not well founded in empirical measures of industry concentration, as shown by Hillman (1991) and van Long and Soubeyran (1996). Baldwin (1984) presents ambiguous evidence on the relation between protection and industry concentration. Bilal (1995) reviews the literature on seller concentration and protection. In general the literature presumes that industry concentration leads to higher levels of protection, and this is confirmed in section IV.

The second condition is that the import penetration ratio is low. The lower the import penetration ratio, the lower is the relative weight of consumers com-

pared with producers in the government's objective function.¹ Grossman and Helpman (1994) provide a theoretical justification for this condition. This result has been generally challenged on empirical grounds, as discussed by Rodrik (1995). For empirical examples, see Anderson (1980) or Finger and Harrison (1994).

The third condition is that the proxy for input sales—the share of sector production that is purchased by other sectors as intermediates—is low. Cadot, de Melo, and Olarreaga (1997) provide a theoretical justification for this condition, and Ray (1991) and Marvel and Ray (1983) present empirical examples. This condition captures lobbying rivalry. If sector j purchases goods from sector i , then sector j will counter-lobby any increase in sector i 's level of protection. Thus the higher the share of sector i production that is purchased by other sectors, the smaller is the endogenous tariff. As long as consumers are not organized, other things being equal, consumer goods receive higher levels of protection than intermediate goods.

The fourth condition is that the labor/capital ratio is high. For empirical evidence, see, for example, Finger and Harrison (1994) and Rodrik (1995). Cadot, de Melo, and Olarreaga (1997) explain this condition. They show that tariffs are higher in sectors where the share of capital remuneration in value added is large, after introducing lobbying rivalry in the labor market. A higher labor/capital ratio, other things being equal, has two opposing effects on the share of capital remuneration in value added. On the one hand, the direct effect tends to reduce it, because a higher labor/capital ratio obviously implies a smaller capital/labor ratio. On the other hand, a higher labor/capital ratio implies a higher marginal productivity of capital relative to labor, which in turn raises the share of capital remuneration in value added. Under suitably general conditions, the latter effect dominates the former if the elasticity of substitution between labor and capital is smaller than 1 (which is a generally accepted value in the empirical literature).²

The fifth condition is that the share of intraindustry trade is small. Cadot, de Melo, and Olarreaga (1997), Levy (1997), and Marvel and Ray (1987) provide theoretical explanations; Marvel and Ray (1987) provide an empirical example. Cadot, de Melo, and Olarreaga (1997) argue that the larger the share of intraindustry trade in total trade, the larger is the elasticity of import demand for goods produced in the domestic economy. Following the Ramsey pricing rule, this larger elasticity will make the tariff lower because the efficiency cost of a tariff is relatively large compared with the producers' gain. Marvel and Ray

1. To see this, $m/y = (c - y) / y = (c / y) - 1$, where m denotes imports (or net imports), c is consumption, and y is the level of production.

2. In a two-factor sector, the share of capital remuneration in value added is given by: $b = rk / (rk + \omega l) + 1 / [(wl / rk) + 1]$, where r is capital wage, k is the amount of capital, ω is labor wage, and l is the amount of labor. Then $\partial b / \partial (l / k) = \{1 / [(wl / rk) + 1]\}^2 \{\omega / [r(1 + s)]\}$, where s is the elasticity of substitution between labor and capital and the right-hand side is larger than zero if $|s| < 1$. The empirical estimation of the elasticities of substitution between labor and capital generally yield values below 1.

(1987) suggest an alternative explanation based on intermediate inputs and counter-lobbying. They argue that intraindustry trade essentially arises among producers (who purchase intermediate goods), and because producers are more concentrated than consumers, they tend to be more efficient in combating protectionist pressures. Levy (1997) argues that an increase in intraindustry trade benefits all agents, whereas an increase in interindustry trade has the usual Stolper-Samuelson redistributive effects and therefore is subject to more conflict and higher lobbying pressures.

Assuming that labor markets are segmented in the sense that labor is better conceived as being mobile across a particular group of industries than across the economy as a whole, two additional conditions are relevant. The level of protection received by an industry is higher if either the sixth or the seventh condition holds.

The sixth condition is that the equilibrium wage in the sector is low. Cadot, de Melo, and Olarreaga (1997) provide a theoretical justification, and Anderson and Baldwin (1987) and Ray (1991) provide empirical examples. Cadot, de Melo, and Olarreaga (1997) show that the optimal endogenous tariff for each sector is positively related to the share of specific capital in total sales. The larger the wage in sector i (controlling for output and labor/capital ratios), the smaller is the share of capital in total sales and therefore the smaller are the incentives to lobby in the political game.

The seventh condition is that the share of labor in this sector is large relative to total employment in the economy. Cadot, de Melo, and Olarreaga (1997) provide a theoretical justification, and de Melo and Tarr (1994) present an empirical example. If labor unions are organized, then the share of employment in the sector will be larger, the larger is the political weight of this sector's labor union. Alternatively, it may be the case that votes matter and that a high labor/capital ratio indicates the presence of voters (see, for example, Potters, Sloof, and van Winden 1997).

New Results on the Endogenous Formation of RTAs

The endogenous trade policy literature has recently shed some light on the endogenous formation of RTAs. (There are other results in that literature that are not subjected to testing here; see, for example, Cadot, de Melo, and Olarreaga 1996, Ethier 1996, Hillman, Long, and Moser 1995, and Winters 1996 for a review.) The two results that are to be examined in the empirical section are listed here.

First, Grossman and Helpman (1995) suggest that deviations from internal free trade in RTAs are more likely to occur in sectors where trade creation is more likely. This is explained by two interrelated forces. First, and perhaps most important, from the perspective of the importing country, the political cost of trade diversion is higher than the political cost of trade creation. This is due to the fact that trade creation entails larger domestic price reductions in the importing country than trade diversion, other things being equal. (Alter-

natively, one can argue that trade-creating sectors create the import competition that harms the domestic producers' interests in a country and that are accordingly resisted by protectionist pressures if the endogenous deviations from internal free trade are determined by the producers' interests.) Second, and for the same reason, from the perspective of the exporting country, the political gains (producer gains) are higher in the case of trade diversion than in the case of trade creation. Thus, when countries negotiate over which sectors to exclude from internal free trade, they prefer to create exceptions for trade-creating sectors that would result in higher costs for the importing country and lower gains for the exporting country.

To illustrate the factors that influence the political costs of trade creation and trade diversion, assume that the production of an exporting country in an RTA is sufficiently large to satisfy the whole demand at world prices for an importing country in the RTA. After the RTA is formed, domestic prices in the importing country drop to world levels, which implies that producer surplus in the import-competing industry is significantly reduced if this industry was protected before the RTA is formed. By contrast, exporters in the RTA partner receive the same price as before. If industry directly links its political contributions to the price that producers receive, such a trade-creating RTA may have high political costs. The political cost would be smaller if the exporting country could not satisfy its partner market at world prices, in which case producer prices in the RTA may be above world prices and some trade diversion may exist. The idea is that trade creation, unlike trade diversion, offers no extra benefits to the exporting producer. Ray (1987) indirectly tests this result for the U.S. preferential agreements. He shows that these agreements have failed to offset the protectionist bias in the United States against competitive imports from developing countries.

Thus the first new result to be verified is that *trade-creating sectors tend to be exempted from internal free trade.*

Cadot, de Melo, and Olarreaga (1996) suggest that the negotiated CET in a customs union is a weighted sum of member countries' politically optimal tariff vectors. The endogenous weight given to country j in the determination of the CET in sector i equals the size of sector i in country j relative to its size in other member countries. A country with large output in one particular industry would lobby more aggressively to protect its large industry in the negotiations for a CET. Technically, this result occurs because lobbies determine their contributions such that the marginal gain from a tariff increase equals its marginal cost. The marginal gain is given by the derivative of the profit function with respect to prices, which, in a competitive environment, equals the level of production (by Hotelling's lemma).

Thus the second new result to be tested is that *the CET is determined by the production-weighted sum of the political economy variables in member countries. The CET in sector i mainly reflects the preferences of the member country that has the largest level of production in sector i .*

For other new results in the literature that are not tested here, see, for example, Cadot, de Melo, and Olarreaga (1996); Ethier (1996); Hillman, van Long, and Moser (1995); and Winters (1996).

III. THE EMPIRICAL MODEL

The first step of the empirical study is to verify that a set of Mercosur's political variables can explain the structure of Mercosur's CET. The CET equation is:

$$(1) \quad \log CET_i = \alpha_0 + \sum_{k=1}^n \alpha_k \log \sum_{j=A}^U \theta_j^i PV_{i,k}^j + \mu_i$$

where subscript i refers to the industry (from the 27-industry aggregation of the ISIC three-digit classification, see appendix A); CET_i is the CET in sector i ; α s are parameters; θ_j^i is the share of country $j = A$ (Argentina), B (Brazil), P (Paraguay), or U (Uruguay) in total production of good i in Mercosur; $PV_{i,k}^j$ is the political economy variable k in sector i in country j ; and μ_i is the error term. The political economy variables are listed in appendix C, along with an explanation of how the variables are constructed and their expected signs. The weights given to each country's political variables should not be imposed but should be estimated empirically (Cadot, de Melo, and Olarreaga 1996). However, given the lack of industrial data at a high level of aggregation, this is empirically infeasible. In section IV we discuss some alternative determinations of the CET.

The second step is to verify that member countries' deviations from the CET can be explained by deviations in the political structure of each country from Mercosur's political structure (weighted averages). The equation to be estimated for each country is:

$$(2) \quad \log \frac{ET_i^j}{CET_i} = \beta_0 + \sum_{k=1}^n \beta_k^j \log \frac{PV_{i,k}^j}{\sum_{j=A}^U \theta_j^i PV_{i,k}^j} + \varepsilon_i^j$$

where ET_i^j is the external tariff in country j for sector i . There are four CET-deviation equations to be estimated, one for each member country.

The last step is to verify that member countries' deviations from internal free trade can also be explained by the political structure of each member country. The equation to be estimated for each country is:

$$(3) \quad \log IT_i^j = \gamma_0 + \sum_{k=1}^n \gamma_k^j \log PV_{i,k}^j + \gamma_{n+1} TC_i^j + v_i^j$$

where IT_i^j is country j 's internal tariff in sector i , and TC_i^j is the expected level of trade creation in the importing country j in sector i . Ideally, there are four internal tariff equations to be estimated, one for each country.

IV. RESULTS

There are nine equations to be estimated. Equation 1 determines the CET, equation 2 (for the four countries) determines member countries' deviations from the CET, and equation 3 (for the four countries) determines member countries' deviations from internal free trade. Because the error terms in these different equations turn out to be correlated, we use a seemingly unrelated regressions (SUR) technique. The correlation between the error terms is probably due to omitted variables, like the influence that the World Bank, the International Monetary Fund, or the WTO may have over trade policy and other environmental variables in these countries. However, the industrial data lack disaggregation: each member country has only 27 sectors (observations). Therefore, a panel estimate for external deviations from the CET and internal deviations from free trade seems more appropriate. We estimate these panel regressions using a SUR technique. Panel estimation is not possible for the CET because, by definition, the CET is common to all member countries. We estimate equation 1 using a SUR technique including the external and internal deviation equations for each country. All equations are estimated over the whole tariff universe (that is, the full range of tariff lines aggregated to the 27 sectors of the ISIC three-digit classification).

The endogenous variables in all equations reported here are import-weighted average tariffs. The explanatory power of the whole set of regressors improves in all equations when import-weighted tariffs are used rather than simple averages to translate the eight-digit harmonized tariff system data into the three-digit classification system of the United Nations Industrial Development Organization (UNIDO; see appendix A for sectors and appendix B for details on data). The results of the analysis exclude primary products and only correspond to industrial products. In the four member countries, industrial imports account for no less than 80 percent of total imports. All regressions are run in a double-log form except for the net import penetration term (which can take negative values).

Determining Mercosur's CET

This section explores alternative determinations of the CET to test indirectly the prediction that the relevant variables in the determination of the CET are the production-weighted political economy variables (Cadot, de Melo, and Olarreaga 1996). It then reports the SUR estimation of the CET equation.

ALTERNATIVE DETERMINATIONS OF THE CET. To examine alternative determinations of Mercosur's CET, we test whether the Mercosur political variables have a better explanatory power than any other combination of member countries' political variables. To this end, we use the Davidson and MacKinnon (1981) *J* non-nested test. (An unfortunate feature of this test is that, in testing whether one set of regressors is more appropriate than another, it allows rejection or acceptance of both sets of regressors.)

Table 3 gives results of the Davidson and MacKinnon test. The first row, for example, tests the hypothesis that Argentina's political economy variables taken alone are as appropriate a set of regressors as Mercosur's weighted average of political economy variables. In the first column, we report the *t*-statistic coefficient obtained for the first hypothesis, that is, assuming that Argentina's political economy variables are a better set of regressors than Mercosur's. In the second column, we report the *t*-statistic coefficient obtained for the second hypothesis, that is, assuming that Mercosur's political economy variables are a better set of regressors than Argentina's. In the case of Argentina, the first hypothesis can be rejected, whereas the second hypothesis cannot be rejected with 99 percent confidence. This implies that Mercosur's set of regressors has better explanatory power. When both *t*-statistics are statistically significant or insignificant, the test is inconclusive. When only one of these tests is significant, a conclusion can be drawn. The last column in table 3 specifies the better-performing sets of regressors.

Two main conclusions follow from the results of the Davidson and MacKinnon non-nested tests for the determination of the CET. First, Mercosur's political variables (weighted averages) have a higher explanatory power than those for Argentina, Paraguay, or Uruguay taken one by one. Mercosur's political variables also have greater explanatory power than any combination of these three countries. Second, the analysis does not reject the hypothesis that the set of regressors for Brazil by itself, or any combination that includes Brazil, is as appropriate as Mercosur's political economy variables (weighted averages). This result from the non-nested tests indicates that Brazil had an important role in determining Mercosur's CET. Because Brazil represents, in all sectors, at least 70 percent of Mercosur's production, it is not surprising that the CET closely reflects Brazil's interests.

These results may be seen as an indirect test of the proposition that the CET should reflect a production-weighted average of member countries' political vari-

Table 3. *The Explanatory Power of Different Sets of Political Economy Variables in Determining Mercosur's Common External Tariff*

| Country | <i>The political economy variables that are assumed to be the better set of regressors</i> | | <i>The better-performing set of regressors</i> |
|----------------------------------|--|---------------------|--|
| | <i>Country set</i> | <i>Mercosur set</i> | |
| Argentina | 0.69 | 3.47*** | Mercosur |
| Brazil | 0.91 | 1.06 | Inconclusive |
| Paraguay | 1.44 | 3.85*** | Mercosur |
| Uruguay | 0.37 | 3.46*** | Mercosur |
| Argentina and Brazil | 1.13 | 1.47 | Inconclusive |
| Argentina, Paraguay, and Uruguay | 0.33 | 2.49** | Mercosur |

** Significant at 95 percent.

*** Significant at 99 percent.

Note: Results are based on Davidson and MacKinnon (1981) *J* non-nested tests.

Source: Authors' calculations.

Table 4. *Estimation of the Common External Tariff for Mercosur*

| <i>Variable^a</i> | <i>Regression including all variables</i> | <i>Regression including only significant and robust variables</i> |
|-------------------------------------|---|---|
| Constant | 2.47*** (6.26) | 2.49*** (6.57) |
| Labor/capital ratio | 0.67*** (3.42) | 0.58*** (3.74) |
| Wage | -0.40** (-2.02) | -0.41* (-1.77) |
| Industry concentration index | 0.21** (2.37) | 0.14** (2.02) |
| Net import penetration ratio | 0.43 ^b (1.23) | |
| Input sales proxy | -0.33 ^b (-0.84) | |
| Labor union proxy | 0.06 ^b (0.57) | |
| Intraindustry trade proxy | 0.03 ^b (0.42) | |
| R ² | 0.58 | 0.51 |
| F-test of SUR | 222*** | 224*** |
| Number of observations ^c | 27 | 27 |

* Significant at 90 percent.

** Significant at 95 percent.

*** Significant at 99 percent.

Note: The dependent variable is log (CET). All independent variables are in logs except for the net import penetration ratio. The regression is estimated using a SUR technique. Standard errors are White-robust. *t*-statistics are in parentheses. The R² is estimated using the covariance matrix of the residuals.

a. For variable construction, see appendix C.

b. The coefficient changes sign when performing an outlier analysis over the 27 observations.

c. The 27 observations are for the 27 industries listed in appendix A.

Source: Authors' calculations.

ables (Cadot, de Melo, and Olarreaga 1996). Therefore, in the remainder of this article, we consider the CET for Mercosur as being the production-weighted average of member countries' political economy variables.

ESTIMATION OF THE CET. Table 4 reports the results of the SUR estimation of the CET.³ The first column in table 4 shows the results when the regression includes all the explanatory variables discussed in section II, whereas the second column gives the results when only the significant and robust variables are included. It appears that the most statistically significant variables in the determination of the CET are the labor/capital ratio, the wage level, and the index of industry concentration. The proxy for input sales is statistically insignificant, as are the import penetration ratio, the labor union proxy, and the intraindustry trade variable. All coefficients have the expected sign except for the import penetration

3. The SUR estimates for internal and external deviations are relatively less efficient than the ones obtained with a panel technique and are not reported here.

ratio and the intraindustry trade variable. In addition, all the insignificant variables change signs in an outlier analysis over the 27 observations.

The explanatory power of the political variables is relatively high and accounts for 58 percent of the CET total variation in the first column of table 4 and 51 percent in the regression on only the significant and robust variables.

Deviations from the CET and from Internal Free Trade

We estimate the deviation equations using a fixed-effects model and a SUR technique. Table 5 reports the results. The overall explanatory power of the political variables oscillates between 21 and 51 percent for internal deviations, depending on whether industry and country dummies are included. For external deviations, the explanatory power is 49 percent. The relatively low explanatory power of the internal deviations regression is probably due to the fact that Brazil's

Table 5. *Deviations from Mercosur Objectives, 1996*

| Variable ^a | Deviations from internal free trade | | Deviations from CET, industry and country dummies |
|-------------------------------------|-------------------------------------|-----------------------------|---|
| | Industry and country dummies | No dummies | |
| Constant | 0.14 (0.03) | 3.45 (1.37) | -0.27* (-1.76) |
| Labor/capital ratio | -0.87 (-1.07) | -0.41 (-0.54) | 0.15*** (2.85) |
| Labor union proxy | 2.35*** (3.25) | 2.04*** (3.29) | 0.09** (2.42) |
| Net import penetration ratio | -0.01 (-0.56) | -0.02** (-2.10) | 0.0001** ^b (2.09) |
| Industry concentration index | 1.43* (1.71) | 0.08 ^b (0.12) | 0.11** (2.13) |
| Trade creation term | 0.85* (1.72) | 1.18*** (4.75) | |
| R ² | 0.51 | 0.21 | 0.49 |
| F-test of SUR | 216*** | 216*** | 216*** |
| Number of observations ^c | 108 | 108 | 108 |
| F on country dummies | 1.86 | | 2.99** |
| F on industry dummies | 1.12 | | 1.69** |
| F on all dummies | 1.49 | | 1.78** |

* Significant at 90 percent.

** Significant at 95 percent.

*** Significant at 99 percent.

Note: CET is the common external tariff. The dependent variable is the log of the internal tariff or the log of the external tariff/CET ratio. All independent variables are in logs except the net import penetration ratio. The regression is estimated using a fixed-effects model and a SUR technique. Standard errors are White-robust. *t*-statistics are in parentheses. The R² is estimated using the covariance matrix of the residuals.

a. For variable construction, see appendix C.

b. The coefficient changes sign when performing an outlier analysis over 12 potential outliers identified following Belsley, Kuh, and Welsch (1980).

c. For each of the four countries, there are 27 industries (see appendix A).

Source: Authors' calculations.

(and to some extent Argentina's) internal deviations from free trade are relatively rare (Brazil deviates in only 3 of the 27 sectors). For the same reason, we performed an outlier analysis following Belsley, Kuh, and Welsch (1980) to check for the robustness of results reported in table 5.

INTERNAL DEVIATIONS FROM FREE TRADE. The first column in table 5 reports the results of the internal deviations regression including country and industry dummies. The second column reports results without dummies, because neither country-specific nor industry-specific effects are significant at a 95 percent confidence level, according to *F*-tests.

Industry-specific effects may be insignificant because the *adecuación* regime for internal deviations from free trade has been inherited from the Asunción Treaty, where no special regimes per sector existed and different member countries could deviate from internal free trade in different products. Country-specific effects may be insignificant because this term is correlated with the trade creation variable, given the difference in size of the domestic markets of Mercosur's members.

The trade creation term, the labor union proxy, and the index of industry concentration are the significant political economy variables in the explanation of internal deviations from free trade (all above the 95 percent level, not including dummies). The statistically significant coefficient obtained for the trade creation variable confirms Grossman and Helpman's (1995) view that sectors with high levels of trade creation tend to be exempted from internal free trade. The precision of the trade creation term is reduced (although the coefficient is still significant at the 90 percent level) when dummies are introduced. This result is probably due to the fact that the potential trade creation term is correlated with country dummies. Given the size of its internal market, Brazil faces much lower trade creation than the other member countries. The only significant dummy variable is the one for Brazil, which has a negative coefficient. This result seems reasonable because the effect of internal trade barriers should depend on the size of the domestic market in each member country. For instance, Brazilian producers can easily inundate Uruguay's domestic markets, whereas the reverse is not possible.

Both the import penetration ratio and the labor/capital ratio are insignificant in the first column in table 5. The labor/capital ratio is probably insignificant because Mercosur's smaller members (Paraguay and Uruguay) set the barriers to internal free trade, and these countries tend to be relatively less capital abundant than the larger members (Brazil and Argentina). Smaller members set barriers in capital-intensive sectors to protect their markets from larger members. Thus the labor/capital ratio may capture something different than what was expected in section II. Results are reported for regressions excluding the three variables—the wage variable, the proxy for intraindustry trade, and the proxy for input sales—that are insignificant at the 90 percent level in all the regressions.

DEVIATIONS FROM THE CET. The third column in table 5 reports the results of the external deviations regression with both industry and country dummies. The presence of both industry and country-specific effects cannot be rejected at the 95 percent confidence level. The statistical significance of industry dummies may suggest that Mercosur members mainly deviate from the CET under the special regimes in the industries discussed in section I. (It is not possible to introduce dummies for these regimes given the level of aggregation of industrial data.) The statistical significance of the country dummies suggests that different members tend to deviate differently, as discussed in section I.

The labor/capital ratio, the index of concentration, the labor union proxy, and the import penetration ratio are the important political economy variables in the explanation of deviations from the CET. The import penetration ratio does not have the expected sign, but this is a rather common empirical result, as discussed in section II. We also introduce a variable calculated as the share of extra-regional imports in total imports (not reported here). It corresponds to the trade creation term in table 5, although it is defined differently than in the internal deviation equations. The idea is that high levels of extra-regional protection may occur in sectors with high shares of imports from non-Mercosur countries. This term is statistically insignificant; therefore we report results without including this variable.

The labor union proxy has high explanatory power in determining the deviations from internal free trade and from the CET. As the deviations were negotiated within the countries, labor unions may have had more weight in determining them than in determining the CET, which was negotiated at the regional level. Alternatively, the difference in explanatory power may indicate that the relative size of the industry helps to explain not the formation of the CET but only deviations from internal free trade and from the CET within countries.

All industry dummies have a positive coefficient (not reported here). The dummy for the scientific equipment sector of the ISIC classification is dropped from the regression, implying that all other sectors have a relatively higher deviation from the CET than that sector. The coefficient is significantly different from zero at the 99 percent level in wood products, printing and publishing, petroleum refineries, and transport equipment. Because these sectors do not necessarily reflect the comparative advantage of Mercosur countries, the (downward) convergence to the CET tariff probably tends to reduce trade diversion in the region, as preference margins are reduced.

The downward convergence to the CET is not necessarily true for Paraguay and Uruguay. However, these countries are relatively small trading partners compared with Argentina and Brazil, and, therefore, their influence on the overall picture can be minimized. The upward convergence of Mercosur's small members to the CET is confirmed by the signs of the country dummies in the external deviation equation. Indeed, the country dummies for Paraguay and Uruguay have negative coefficients, whereas the country dummies for Argentina and Brazil have positive coefficients. This confirms the fact that generally Brazil and

Argentina are downward-converging to the CET and that the opposite is true for the small members of Mercosur.

A striking feature of table 5 is that estimated elasticities tend to be much higher in the internal deviations regressions than in the external deviations regression. The coefficient of the labor union proxy, for example, is 20 times larger in the internal deviations regressions. It might be that smaller members of Mercosur tend to deviate more often than larger members (internally and externally), and lobbies in smaller members are certainly more concerned about internal barriers than external ones. In other words, it might be useless for Uruguayan producers, for example, to obtain a high external tariff if Brazilian producers can enter their market without facing any barrier.

However, this result may be better explained by the statistical techniques employed and the data structure. Internal deviations are calculated in absolute terms because the optimal situation implies internal tariffs that are nil. External deviations are calculated from an optimal situation in which the CET is always positive, and thus the endogenous variable in the external deviation regression is taken in relative (percentage) terms. The standard deviation of the endogenous variable in the internal deviation equation is 20 times larger than the standard deviation of the endogenous variable in the external deviation regression, which in turn may partly explain differences in the size of the estimated coefficients. Because some results may be driven by a small number of large deviations, we perform an outlier analysis following the procedures of Belsley, Kuh, and Welsch (1980). The main results in all regressions are robust to the exclusion of potential outliers (results that are not robust are noted in tables 4 and 5).

To summarize, political variables seem to explain the deviations from the CET and from internal free trade in Mercosur countries. Further, achieving the Ouro Preto convergence (that is, internal free trade and convergence to the CET) would probably make the region more trade creating and more open.

V. CONCLUSIONS

In its first five years, Mercosur achieved an important degree of integration not only within the region but also with the rest of the world. It also succeeded from a volume-of-trade perspective. Intraregional trade increased at an average annual rate of 29 percent and total trade increased at 9 percent, compared with a 6 percent increase in world trade since 1991 when the Treaty of Asunción was signed.

Mercosur seems to enjoy a relatively high level of protection against the rest of the world. Its negotiated CET is around two times higher than the tariff levels in the Organisation for Economic Co-operation and Development (OECD). However, Mercosur's average CET as established in Ouro Preto is only 0.1 percentage point higher than Chile's average tariff (this decade's Latin American example) and eight times lower than Brazil's average tariff in 1986. The

larger members of Mercosur are adjusting downward to the CET. In 1996 average external tariffs were 0.8 and 2.0 percentage points higher in Argentina and Brazil, respectively, than in Chile. This adjustment signals a liberalizing effort. It also indicates that the region will be more open once it achieves the Ouro Preto objectives.

The new results of the literature on the endogenous formation of RTAs seem to be reflected in Mercosur's structure of protection. First, as predicted by Cadot, de Melo, and Olarreaga (1996), Brazil has an important weight in Mercosur's tariff structure, given Brazil's significant share of Mercosur's production (and the intergovernmental aspect of the decisionmaking process). Second, as predicted by Grossman and Helpman (1995), internal barriers to free trade tend to be higher in the potentially trade-creating sectors. Convergence to the Ouro Preto objective of internal free trade will therefore lead to more trade creation. This may turn out to be a difficult process as deviations from internal free trade reflect lobbying pressures in member countries.

The Mercosur countries need to make a serious political commitment to the Ouro Preto objectives. However, insofar as Mercosur's tariff structure and especially the CET reflect the political economy of the member countries, they may achieve convergence more easily. Tariffs are subject to changes, but ensuring that they respect political preferences in member countries will facilitate consolidation of the integrating effort.

In sum, whether Mercosur is a step in the right direction may remain an open question, but this article shows that Mercosur is apparently here to stay.

APPENDIX A. ISIC CODES FOR THE 27 INDUSTRIES IN THE ANALYSIS

| | |
|-----|---|
| 311 | Food products |
| 313 | Beverages |
| 314 | Tobacco |
| 321 | Textiles |
| 322 | Wearing apparel, except footwear |
| 323 | Leather products |
| 324 | Footwear, except rubber or plastic |
| 331 | Wood products, except furniture |
| 332 | Furniture, except metal |
| 341 | Paper and paper products |
| 342 | Printing and publishing |
| 351 | Industrial chemicals |
| 352 | Other chemicals |
| 353 | Petroleum refineries |
| 354 | Miscellaneous petroleum and coal products |
| 355 | Rubber products |
| 356 | Plastic products |
| 361 | Pottery, china, earthenware |

| | |
|-----|---------------------------------------|
| 362 | Glass and glass products |
| 369 | Other nonmetallic mineral products |
| 371 | Iron and steel |
| 372 | Nonferrous metals |
| 381 | Fabricated metal products |
| 382 | Machinery, except electrical |
| 383 | Machinery, electrical |
| 384 | Transport equipment |
| 385 | Professional and scientific equipment |

APPENDIX B. DATA

The Mercosur Secretariat provided data on common external tariffs (official tariffs for 1996, announced in December 1995). We obtained member countries' external and internal tariffs from the country governments: for Argentina, decree no. 998/95 (December 29, 1995) and resolutions no. 649/96, 370/96, 111/96, and 735/96; for Brazil, decree no. 1767 (December 29, 1995); for Paraguay, decree no. 12056 (December 29, 1995); and for Uruguay, decree no. 466/95 (December 29, 1995) and decrees no. 242/996, 282/996, and 316/996. Tariff data are aggregated at the eight-digit level of the harmonized system (9,119 items). Trade data sources are national accounts (COMTRADE), also aggregated at the eight-digit level of the harmonized system (1994 data). We obtained the best (and more aggregated) industrial data for Mercosur countries from UNIDO's three-digit database (average from 1987 to 1993). They are disaggregated into 27 sectors (see appendix A). To convert data from the harmonized systems into UNIDO three-digit data, we used a filter provided by Jerzy Rozanski at the World Bank.

APPENDIX C. VARIABLE CONSTRUCTION AND NOTATION

Endogeneity problems can be important, as suggested in a study by Trefler (1993), because most of the exogenous variables may also be functions of tariffs. Due to data restrictions, the empirical section does not deal with endogeneity problems. All of Mercosur's political economy variables are constructed as the sector-production-weighted sum of member countries' political variables as discussed in section II. Alternative specifications for Mercosur have been tested and are discussed in section IV.

The following variables are used in the analysis. All variables are in logs except for the net import penetration ratio.

- *Tariffs*, endogenous variables, are constructed from import-weighted averages in the eight-digit harmonized system that correspond with the UNIDO three-digit classification.

- The *industry concentration index* is calculated as (number of firms in the whole economy)/(number of firms in sector i). The expected sign is positive.
- The *net import penetration ratio* is calculated as (imports – exports)/(gross output). The expected sign is negative. In estimating the equations for external tariffs, we use extra-Mercosur trade to calculate this variable, whereas in dealing with internal deviations from free trade, we employ intra-Mercosur trade.
- The *proxy for input sales* (the share of production sold to other sectors as intermediate goods) is calculated as (value added)/(total output) in sector i divided by the economywide average (value added)/(total output). The expected sign is negative. The idea is that a relatively high share of value added in total output in sector i (with respect to the economywide average) indicates that sector i purchases a relatively small amount of intermediate goods, which suggests that, on average, the rest of the economy purchases a relatively high amount of good i as an intermediate. Although this is not a good proxy, data restrictions make it impossible to construct a better one. This may explain why the variable does not perform well in the estimation.
- The *labor/capital ratio* is calculated as (number of employees)/(value added – labor costs). The expected sign is positive.
- The *intraindustry trade proxy* is calculated as [(imports – exports)²/(imports + exports)²]^{0.5}. As with the net import penetration ratio, intra- and extra-Mercosur data are used when necessary. The expected sign is positive.
- *Wages* per sector are calculated as (labor cost)/(number of employees). The expected sign is negative.
- The *labor union proxy* is calculated as (number of employees in sector i)/(total number of employees). The expected sign is positive.
- The *trade creation term* is calculated as (intra-Mercosur imports)/(total output). The expected sign is positive.

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