

# 16-12 Preferential Liberalization, Antidumping, and Safeguards: “Stumbling Block” Evidence from Mercosur

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October 2016

## Abstract

There is no consensus in the literature on trade agreements as to whether preferential liberalization leads to more or less multilateral liberalization. Research has focused mostly on tariff measures of import protection. We develop more comprehensive measures of trade policy that include the temporary trade barrier (TTB) policies of antidumping and safeguards. Studies in other contexts have similarly shown how these policies can erode some of the trade liberalization gains that appear based on an assessment of tariffs alone. We examine the experiences of Argentina and Brazil during the formation of the Mercosur customs union (1990–2001) and find that an exclusive focus on applied tariffs may lead to a mischaracterization of the relationship between preferential liberalization and liberalization toward nonmember countries. We find that any “building block” evidence associated with a focus on tariffs during the period in which Mercosur was a free trade area can disappear once we include changes in import protection from TTBs. Furthermore, there is evidence of a “stumbling block” effect of preferential tariff liberalization for the period in which Mercosur became a customs union, and this result tends to strengthen upon inclusion of TTBs. Finally, we provide a first empirical examination of whether market power motives can help explain the patterns of changes to import protection that are observed in these settings.

**JEL Code:** F13

**Keywords:** preferential trade agreements, tariffs, MFN, antidumping, safeguards, temporary trade barriers, Argentina, Brazil, Mercosur

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## 1. INTRODUCTION

There is a well-established theoretical literature examining the nexus between preferential trading arrangements and multilateral liberalization. Depending on the underlying model, however, theory predicts that preferential liberalization could act as either a stumbling block or a building block to further multilateral liberalization.<sup>1</sup> Beginning in the mid-2000s empiricists began to provide empirical evidence of the relationships for whether preferential tariff cuts are building blocks or stumbling blocks to subsequent MFN liberalization; nevertheless, even this evidence has left us with a number of puzzles.

The first puzzle is that some environments have identified clear evidence of stumbling block relationships arising in the data, whereas others found evidence of building block effects. The major evidence of stumbling block effects includes Nuno Limão (2006) and Baybars Karacaovali and Limão (2008) for the effect on Uruguay Round negotiated tariffs for the United States and European Union, respectively, whereas Estevadeordal, Freund, and Ornelas (2008) find evidence of a building block effect for the free trade areas (FTAs) arising for 10 Latin American economies during the period 1990–2001.<sup>2</sup> The empirical answer as to whether preferential liberalization leads to multilateral liberalization is thus still substantially unsettled.<sup>3</sup> The natural question that arises is, What is the explanation for the differences in results?

A second puzzle associated with the rich, cross-country setting of Latin America is that, although the building block result of Estevadeordal et al. (2008) is robust across the countries involved in FTAs, there is no evidence of such a result for the region's countries that go "beyond" an FTA to adopt a common external tariff and ultimately form a customs union. This is arguably important for a number of reasons, including that Argentina and Brazil are two of the main countries driving this particular result, through their ultimate formation of the Mercosur (the Mercado Común del Sur, or Southern Common Market) customs union. First, Argentina and Brazil are two of the largest economies in Latin America. Second, unlike other countries in the region whose trade liberalization efforts continued well beyond the Estevadeordal et al. (2008) sample period and into the 2000s, trade liberalization for Argentina and Brazil has largely stalled—the levels of MFN tariffs that each applies in 2014 are roughly the same as in 1995. Third, a previously unexplored feature of the experience for Argentina and Brazil is that each also started using the temporary trade barrier policies of antidumping and safeguards with greater regularity in the early 1990s, alongside their initial steps toward tariff liberalization. Fourth and finally, as a customs union in which the two countries share a common external MFN tariff for outsiders, there may be separate market power motives contributing to the differences in experience from those of FTAs.

The purpose of our paper is to use the richness of the Argentine and Brazilian trade policy environment under Mercosur to investigate these questions, some of which are addressed for the first time. We augment the approach of the existing literature by expanding along two additional dimensions. First, we develop measures of import protection that are more expansive than applied tariffs, taking into consideration use of the discretionary policy instruments of temporary trade barriers (TTBs), which other studies have shown can erode the trade liberalization gains that appear to occur based on an examination of tariffs alone.<sup>4</sup> Second, to our knowledge, we provide the first empirical examination of whether market power motives can be used to explain patterns of changes to import protection.<sup>5</sup>

Our approach focuses on Argentina and Brazil in 1990–2001. By focusing on just two countries we can control for institutional differences that might be important determinants of differences resulting from a cross-country analysis. And by identifying sources of variation in their trade policies during the selected period we illustrate why this is a sufficiently rich environment to analyze the questions in depth. Argentina and Brazil underwent two distinct episodes during this decade: a

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1. Theoretical surveys include Panagariya (2000) and Baldwin and Venables (1995).

2. See also Tovar (2012) for the Central American Free Trade Agreement (CAFTA) countries; Calvo-Pardo, Freund, and Ornelas (2011) for ASEAN; Ketterer, Bernhofen, and Milner (2015) for Japan; and Ketterer, Bernhofen, and Milner (2014) and Mai and Stoyanov (2015) for Canada.

3. Recent surveys include Freund and Ornelas (2010) and Limão (forthcoming).

4. For example, in an earlier study we found that much of India's MFN tariff liberalization during its unilateral liberalization of the 1990s was offset by the early 2000s through its reapplication of import protection through antidumping and safeguard import restrictions (Bown and Tovar 2011).

5. In related work on the Latin American countries in the Estevadeordal et al. (2008) study, Crivelli (2014) examines how differences in initial levels of external protection captured by applied MFN tariffs explain external liberalization after formation of the PTA. Bohara, Gawande, and Sanguinetti (2004) examine Argentina's experience during 1991–96 under Mercosur and find that increased imports from Brazil led to the lowering of MFN tariffs in the same industries, which is consistent with the theoretical work of Richardson (1993). We note that neither of these empirical studies examines TTBs or market power motives.

five-year period during which their relationship was characterized by a free trade area only, and a five-year period in which they adopted a customs union and applied a common external tariff toward nonmember third countries.

Furthermore, we characterize the substantial variation in how each country independently applied its TTB policies. We find that Argentina and Brazil applied them independently of one another—i.e., on imports of separate products from different trading partners. Given the lack of harmonization of policies applied to Mercosur nonpartners during the customs union period, this raises the question of the extent to which the Mercosur institutional environment created the incentives that one might expect of a customs union during 1995–2001. Finally, the fact that Argentina frequently imposed TTBs on imports from Brazil raises a more basic question about the extent to which Mercosur created the incentives that one might expect of a free trade area.

After we introduce our estimation equation and the data used in the econometric analysis in section 3, we turn in section 4 to our results. Using instrumental variables (IV) estimates of an ordered probit model we replicate many of the essential features of the Estevadeordal et al. (2008) results for Argentina and Brazil, and show how during their FTA period (1990–94) there is evidence of a building block effect of preferential tariff liberalization that disappears in the second period (1995–2001) during the formation of the customs union.

However, we also present evidence that a focus on applied tariffs alone for Mercosur may lead to a mischaracterization of the complexity of the relationship. In particular, we find that the results are affected considerably when we implement our more comprehensive measures of import protection that include Argentina’s and Brazil’s use of additional policy instruments through TTBs. When we include changes in import protection through TTBs, we no longer find evidence of a building block effect of preferential liberalization for the period in which Mercosur was an FTA, and we find evidence of a stumbling block effect during the period in which it was becoming a customs union.

In section 5 we explore whether measures of import market power can help to explain this new pattern of results. This is motivated in part by recent evidence, from various trade policy settings, that market power motives can affect trade policy determination.<sup>6</sup> We use newly available data on inverse foreign export supply elasticities (Nicita, Olarreaga, and Silva 2015) to examine the theory that changes in Argentina’s import market power—as might result from the customs union with a larger trading partner (Brazil)—may have acted as the stumbling block, discouraging further MFN liberalization. We find only very weak evidence of this effect.

We conclude in section 6 with a potential institutional explanation for this (non-) result by questioning the extent to which Argentina and Brazil really have formed a common external trade policy (that is jointly responsive to economic shocks), given that each country can (and does) implement its TTB policies toward third countries independently from the other, resulting in substantial deviations from a common MFN tariff.

This paper is one of only a handful that has attempted to consider the interplay between TTBs (in particular, anti-dumping) and preferential trade agreement (PTA) implementation. Notable papers include those of Bruce Blonigen (2005), on the impact of NAFTA on US antidumping, and Thomas Prusa and Robert Teh (2010), a cross-country study of the effects of PTAs on the incidence of new antidumping (AD) import restrictions, finding that they increase for PTA outsiders (relative to insiders).

This paper also contributes to the literature on the intertemporal substitution of trade policy instruments, a phenomenon that may be associated with different types of shocks. For example, Turkey moved away from tariffs and toward a broad class of nontariff barriers after its WTO accession in 1995 and its formation of a customs union with the European Union (Limão and Tovar 2011). The “exogenous” shock of India’s MFN tariff liberalization in the early 1990s was used to examine its adoption of antidumping and safeguards (TTBs), using the “protection for sale” framework of Gene Grossman and Elhanan Helpman (1994) (Bown and Tovar 2011). Finally, a number of studies examine how multilateral commitments

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6. Broda, Limão, and Weinstein (2008) provided the first direct evidence that countries exploit their market power in trade when setting tariffs outside of GATT/WTO constraints. Their results indicate that even countries thought to be small (in GDP terms) can have some market power for certain products. Bagwell and Staiger (2011) find that countries that joined the WTO in 1995–2005 set their pre-accession tariffs in a way consistent with manipulation of their terms of trade. Ludema and Mayda (2013) find that the MFN tariffs that WTO members set in the Uruguay Round are consistent with the terms-of-trade hypothesis. Bown and Crowley (2013a) also provide evidence of the role of the terms-of-trade motive in the determination of time-varying trade policy through a study of US TTBs in use during 1997–2006. Bown (2015a) provides a survey of the empirical literature on this topic.

in the GATT/WTO system—i.e., tariff bindings—act as a constraint on applied tariffs and result in a shift toward policies such as TTBs in response to trade volume or macroeconomic shocks.<sup>7</sup>

Section 6 concludes with a more expansive discussion of the interpretation of the results in light of this literature, additional puzzles and questions, and some directions for future research.

## **2. THE TRADE POLICY INSTITUTIONAL ENVIRONMENT FOR ARGENTINA AND BRAZIL, 1990–2001**

### **2.1 Mercosur Free Trade Area (1990–94) and Customs Union (1995–2001)**

Mercosur originated as a free trade agreement among Argentina, Brazil, Paraguay, and Uruguay under the Treaty of Asunción, which was signed on March 26, 1991.<sup>8</sup> After a substantial drop in internal tariffs in 1991 (see figure 1), the agreement included successive tariff reductions to achieve a zero tariff on most goods by the end of 1994 (see Annex 1 of the Treaty of Asunción). The treaty established the intention of forming a common market by December 31, 1994, which would include the establishment of a common external tariff (Article 1 of the Treaty of Asunción).

The second major step in the integration process took place with the Protocol of Ouro Preto, signed on December 16, 1994. The protocol “amended the Treaty of Asunción with regard to the institutional structures of the economic bloc, transforming Mercosur from a Free Trade Area to a Customs Union” (MSU 2016).<sup>9</sup> It also created the Comisión de Comercio del Mercosur, which would be in charge of overseeing the application of members’ common trade policy instruments (Article 16 of the protocol).

Figure 1 shows the average applied MFN tariffs of Argentina and Brazil as well as the bilateral preferential tariff that each granted to the other under Mercosur. The two countries’ applied MFN tariffs differ substantially before the customs union period, before converging around 1997, and decline only modestly after 1995. Indeed, in the period after the estimation sample that we introduce below, these tariffs are virtually unchanged: Argentina’s average MFN tariff was 13.8 percent in 2002 and 13.1 percent in 2013, and Brazil’s was 13.8 percent in 2002 and 13.2 percent in 2013. This suggests that it may be important to understand what took place in the 1990s, as it may have stalled further MFN liberalization.<sup>10</sup>

### **2.2 Temporary Trade Barrier Policies: Antidumping and Safeguards**

Argentina’s antidumping legislation dates from 1972 (Moore 2011), and during some of our period of study the country also had policies concerning countervailing duties (CVDs) and safeguards (SGs), although these were used much less frequently than AD measures. In 1994 the government modified its legislation on TTBs to begin bringing them in line with the new WTO agreements. It also created the Comisión Nacional de Comercio Exterior (CNCE), which started operating in 1995 and was tasked with determining injury (associated with AD, SGs, and CVDs) and recommending to the Minister of Economy whether to impose new measures. The subsidy and dumping margins are determined by the Secretariat of Industry and Trade (Nogués and Baracat 2006). Since the introduction of new AD regulations and the creation of the CNCE, Argentina has become one of the major world users of AD measures.

The Argentine government included a national interest clause that allows it to deny AD measures even if dumping and injury are found. Argentina’s AD legislation also allows the freedom to apply a lesser duty. Initially, AD measures were usually applied for two to three years but, since 1998, the duration has increased and some measures are imposed for five years. The

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7. Bown and Crowley (2013a) use the US environment in which applied tariffs are constrained by WTO commitments to show how use of antidumping and safeguards can be interpreted as responding to terms-of-trade incentives and trade volume shocks consistent with the repeated game model of Bagwell and Staiger (1990). Using aggregate data in cross-country analyses covering high-income and developing countries, Bown and Crowley (2013b, 2014, respectively) also document how, as WTO commitments have constrained applied tariffs over time, countries use TTBs in response to real exchange rate appreciations, increases in unemployment, and slowdowns in economic growth.

8. It built on previous agreements that shaped the integration agenda between Argentina and Brazil since 1986; however, no major regional tariff liberalization took place until the end of 1990 (Bohara, Gawande, and Sanguinetti 2004). Venezuela joined in 2006 and Bolivia is in the process of becoming a member. The treaty is available at [www.sice.oas.org/trade/mrcsr/mrcsrtoc.asp](http://www.sice.oas.org/trade/mrcsr/mrcsrtoc.asp).

9. See also Bohara, Gawande, and Sanguinetti (2004). Some products would enjoy temporary exemptions from the common external tariff.

10. While not discussed here, this experience is much different from that of other Latin American countries in Estevadeordal et al. (2008). For example, Chile, Colombia, Peru, and Mexico had much lower average MFN tariffs in 2013 than in 1995 or 2002.

Treaty of Asunción allows its members to use AD and CVD measures against Mercosur partners. The agreement did not include its own (internal) SG mechanism, and the use of SGs among members is banned (Nogués and Baracat 2006).<sup>11</sup>

Brazil's trade reform, initiated in the late 1980s, was also accompanied by an increase in its use of TTBs (Olarreaga and Vaillant 2011). The government introduced legislation governing TTB use so as to manage potential changes in economic or political conditions associated with trade liberalization. In 1987 Brazil ratified the GATT Tokyo Round Codes on Antidumping and CVDs, and the country's Customs Policy Commission (CPA) was charged with implementing the agreements and setting AD and CVD policies. In 1995 the government created the Chamber of Foreign Trade (CAMEX), an overview agency governed by a council of six ministers and presided over by the Ministry of Development, Industry, and Commerce. TTB investigations are conducted by the Department of Commercial Defense in the Ministry of Development, Industry, and Foreign Trade. The decision of whether to impose a duty is made by CAMEX. The first decree concerning SG measures was introduced in 1995 and Brazil's first SG investigation took place in 1996. In 1995 Brazil also added a national interest provision that allows CAMEX not to impose an AD measure even if the investigation's determination is affirmative. It also added a lesser duty rule (Kume and Piani 2006).

Argentina and Brazil both became major users of TTBs during the 1990s, joining the ranks of the European Union and United States as well as emerging market economies such as China, India, Mexico, and Turkey (Bown 2011). Figure 2 shows the percentage of imports covered by TTBs (solid lines) and by AD measures only (dotted lines) in Argentina and Brazil in 1990–2013. While figure 1 shows a decrease in applied (MFN and preferential) tariffs in the 1990s in the two countries, figure 2 shows that their stock of TTBs increased during the same period, but that Argentina has been a more active user than Brazil.

The TTB figures for Argentina and Brazil suggest that an empirical focus on applied tariff data alone during the 1990–2001 period may not capture the full picture of their import protection policies. Furthermore, beyond the level differences apparent in figure 2, Argentina and Brazil differ in their use of these TTBs in additional ways that are economically important for our analysis. For these reasons it is important to take into account the use of these discretionary policy instruments in addition to applied import tariffs when examining the countries' trade liberalization.

As indicated in table 1, there are sharp differences in some of the trading partners targeted by each country's AD cases over the period. Argentina initiated a total of 215 AD investigations in 1990–2001, of which 50 were against Brazil (22 in 1990–94 and 28 in 1995–2001). In contrast, Brazil initiated 150 AD investigations in 1990–2001, but only three targeted Argentina (one in 1990–94 and two in 1995–2001).<sup>12</sup> Thus, although both countries were frequent AD users, Argentina targeted Brazil frequently, while Brazil rarely used AD against Argentina.

One important implication is that, in 1995–2001, Mercosur was not a "pure" FTA between these two countries. A number of significant import barriers impeded trade between them, even for products whose bilateral tariff may have been reduced to zero.

Setting aside their use of TTBs against each other, is there a common pattern to the TTBs that each country applied to its Mercosur nonpartners? Importantly, is there any evidence of coordination in their use of TTBs during the customs union period? There is little evidence in table 1, as Argentina and Brazil used TTBs to target imports from different countries. The top export targets for each country were quite different during the customs union period. Only China (a common target worldwide) and the European Union are among the top five targets for both countries; and in the latter, Argentina and Brazil tend to target different exporting countries.<sup>13</sup>

There are also considerable differences in the sectors that each country has subjected to TTBs. In 1990–94 Argentina tended to concentrate its AD activity in metals (18 investigations), machinery/electrical (17), and textiles (6), whereas Brazil targeted chemicals (18 investigations), metals (17), and vegetable products (6). Even during the customs union period (1995–2001) important sector-level differences remained: Argentina used AD primarily in metals (44 investigations) and machinery/electrical (31), while Brazil targeted chemicals (28 investigations) and plastics/rubbers (26).

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11. The use of SGs among members was permitted only until the end of 1994 and under exceptional circumstances (see Annex IV of the Treaty of Asunción).

12. There are similar patterns in AD import restrictions. Argentina imposed 16 AD measures against Brazil in 1990–94 and 26 in 1995–2001, whereas Brazil imposed only one AD measure (a price undertaking) against Argentina in each period.

13. Argentina targeted Spain the most (with 6 initiations), while Brazil targeted mainly Germany and the United Kingdom (with 4 initiations against each).

Regarding safeguards, there were no initiations during the FTA period (1990–94). In the customs union period, Argentina initiated five SG investigations, four of which led to the imposition of measures, and Brazil initiated two SG investigations, both leading to the imposition of measures. In Argentina’s case, measures were imposed on imports of footwear, motorcycles, and peaches<sup>14</sup>; Brazil imposed import restrictions on toys and coconuts.

The differences in the products and trade partners targeted by Argentina’s and Brazil’s TTBs show the lack of coordination in their TTB use even during the customs union period. We return to this important evidence below when we ask whether it is really feasible to expect that the two countries were exploiting (joint) market power given that they were not applying the same external trade policy. Such variation differentially affects both the explanatory variable (that measures preferential liberalization) and the dependent variable (changes in trade policy toward nonmembers of Mercosur) that we introduce next.

### 3. ECONOMETRIC METHODOLOGY AND DATA

#### 3.1 Econometric Model

We are interested in the relationship between changes in the level of import protection that country  $j$  offers to country  $k$  under its preferential trade agreement in industry  $i$ , and changes in the level of import protection that country  $j$  offers to non-PTA trading partners ( $-k$ ). We begin with the general estimation equation, a slight variant of the model in Estevadeordal et al. (2008), given by

$$\Delta\tau_i^{-k} = \alpha + \beta(L\Delta Pref_i^k) + \mathbf{x}_i\theta + \varepsilon_i. \quad (1)$$

In equation (1),  $\Delta\tau_i^{-k}$  represents the change in the level of import protection that country  $j$  offers to PTA outsiders (countries  $-k$ ) in industry  $i$ , and  $L\Delta Pref_i^k$  denotes the lagged change in applied bilateral import protection—i.e., typically capturing preferential *liberalization*, given the time period chosen for the study—that country  $j$  offers to PTA member country  $k$  in industry  $i$ . The vector  $\mathbf{x}_i$  incorporates other variables that may influence changes in trade protection, and  $\varepsilon_i$  denotes the error term.

The main coefficient of interest in equation (1) is  $\beta$ . If  $\hat{\beta} > 0$ , then after liberalizing preferentially toward  $k$ , country  $j$  also reduced its levels of import protection toward countries  $-k$  in industry  $i$ . Preferential liberalization is interpreted as a *building block* for trade liberalization for PTA outsiders. Conversely,  $\hat{\beta} < 0$  would indicate that the country increased its levels of import protection toward PTA outsiders after an episode of preferential liberalization, and would thus be evidence of a *stumbling block* effect of preferential liberalization.

The literature thus far, and in particular the Estevadeordal et al. (2008) approach from which we build, has defined  $\Delta\tau_i^{-k}$  to be the change in the MFN tariff that country  $j$  applies to imports from PTA nonpartners and  $L\Delta Pref_i^k$  to be the lagged change in the preferential tariff that country  $j$  applies to imports from PTA partner  $k$ . Our paper redefines these measures of import protection so that they not only include MFN and bilateral applied tariffs but also reflect country  $j$ ’s potential application of temporary trade barriers (i.e., antidumping and safeguards) on imports in industry  $i$ .

The decision to examine the impact of more expansive measures of import protection is motivated by the data for Argentina and Brazil that we reported in section 2. At the same time that each was reducing its tariffs toward the other and implementing applied MFN tariff changes to Mercosur nonpartner countries, it was also independently implementing its own new import protection through the application of TTBs.

Ideally, countries would apply their TTBs as ad valorem tariffs. If this were the case we could simply redefine  $\Delta\tau_i^{-k}$  and  $L\Delta Pref_i^k$  to reflect the sum of the applied ad valorem tariff plus the ad valorem temporary trade barrier. Unfortunately, many (if not most) of the TTBs that Argentina and Brazil applied during this period were not ad valorem; they included

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14. The SG on footwear was imposed in 1997, after an almost 25 percent increase in the value of imports between 1993 and 1997. In the same period, and following the tariff cuts toward Brazil implemented under Mercosur, there was a substantial compositional change in the source of those imports. Imports from Brazil increased by about 500 percent, while imports from the rest of the world actually fell by 15 percent (and Argentina’s MFN tariff had increased from 20 percent in 1993 to 33 percent in 1998). However, in the application of the SG, Argentina made the controversial decision to exempt imports from its Mercosur partners. Imports from Brazil then continued to increase in the following years, as imports from non-Mercosur partners declined. For further discussion of this case, see Bown, Karacaovali, and Tovar (2015).

tariffs as specific duties, negotiated price undertakings with foreign exporters, and even quantitative restrictions (tariff rate quotas).<sup>15</sup> The implication is that, while the data reveal the year, product, and trading partner affected by Argentina’s and Brazil’s TTBs, we do not know the exact (ad valorem equivalent) magnitude of these barriers so as to simply add them to applied tariff levels and construct more comprehensive measures of import protection.

We propose two modifications that allow us to include the potentially valuable information on TTBs that we do have. The first involves redefining the dependent variable of the change in the level of protection for imports from PTA nonpartners. We construct an ordered, categorical variable that combines information on the direction of the change in applied MFN tariff with information on potential newly imposed TTBs against PTA nonpartners. As shown in table 2, we define this change in import protection variable as falling into one of three categories, where the highest value captures an increase in import protection applied to outsiders, the lowest a decline in such protection, and the middle no change.

For the econometric estimation, we provide the following equation for an ordered probit model:

$$y_i^* = \beta(L. \Delta Pref_i^k) + \mathbf{x}_i \theta + \mu_i, \quad (2)$$

where  $y_i^*$  is a latent variable that represents  $\Delta \tau_i^{-k}$  (which is unobserved), such that

$$\begin{aligned} y_i &= 0 \text{ if } y_i^* \leq \alpha_1 \\ y_i &= 1 \text{ if } \alpha_1 < y_i^* \leq \alpha_2 \\ y_i &= 2 \text{ if } y_i^* > \alpha_2 \end{aligned}$$

Here  $\alpha_1$  and  $\alpha_2$  are unknown cutoff points, and the three possible outcomes are assigned as described in table 2.<sup>16</sup>

The second modification involves redefining the key explanatory variable of interest to allow for the potential influence of country  $j$ ’s implementing a TTB against PTA partner  $k$ . Again, while the data reveal the product and timing of all such TTBs in sector  $i$ , we are not able to measure the (ad valorem equivalent) *size* of the TTB. We therefore continue to define  $L. \Delta Pref_i^k$  as the lagged change in the level of bilateral import tariff if country  $j$  does not apply a TTB to imports from partner  $k$  in sector  $i$ . If it does, then we have  $L. \Delta Pref_i^k \equiv 0$ —i.e., we assume there is no change in the lagged bilateral level of import protection.<sup>17</sup> We summarize the complete characterization of the key explanatory variable in table 2.<sup>18</sup>

### 3.2 Econometric Methodology, IV Estimation, and Data

The literature has identified a number of econometric issues that arise when estimating models of the relationship between changes in levels of import protection that a country applies to PTA insiders and outsiders. We briefly review them here; for a more in-depth discussion see Estevadeordal et al. (2008).

We first consider the measures of import protection. We lag  $L. \Delta Pref_i^k$  one year, since the bilateral tariff component is scheduled by the terms of the Mercosur agreement and thus predetermined relative to MFN tariffs (or TTBs). In addition, adopting a lag helps lower simultaneity bias. Second, we define the preferential tariff in industry  $i$  in a given year as the minimum of the preferential tariff that the country applies on sector  $i$  in that year against any of its Mercosur partners. Finally, we drop observations for which MFN tariffs are set at zero: if the MFN tariff is zero, the preferential tariff would also have to be set at zero and that may bias the results.

15. Price undertakings are an outcome in AD investigations that is similar to a voluntary export restraint. The exporter “voluntarily” agrees to raise its price above some threshold that the policy-imposing government determines, and if the price falls below that level the government imposes a duty instead. Relative to the approach in Bown and Tovar (2011), which focused on how TTBs affected India’s MFN liberalization, during this period for Argentina and Brazil there were many more instances in which they implemented TTBs in such a way that direct ad valorem equivalent measures are not available.

16. For more details about the ordered probit model, see, for example, Wooldridge (2010).

17. This assumes that the size of the ad valorem equivalent to the AD/SG import restriction is equal to the size of the preferential tariff cut. In some instances, countries impose TTBs that are much larger than the preferential tariff cuts, which would indicate that this assumption is conservative. On the other hand, these TTBs are typically applied on only a subset of products within an ISIC 4-digit industry, for which case the assumption would be stringent.

18. In theory it is also possible for a third category to exist, whereby a country increases its applied levels of bilateral tariff. However, there are no instances in our data for which the bilateral tariff (only) increases during the sample; it either decreases or remains unchanged.

The preferential tariff data in  $L\Delta Pref_i^k$  come from the Mercosur tariff schedules, which establish how tariffs are to be reduced over time for each country and product. The tariffs are aggregated as simple averages into roughly 100 four-digit ISIC industries.<sup>19</sup> In the period preceding the year in which a country grants the first preference in a given sector, the preferential tariff is set equal to the MFN tariff, and in that way the impact of the first reduction in a preferential tariff is captured. When a country does not offer any preference in a given sector in years  $t$  and  $t - 1$ , we set the change in the preferential tariff at zero, since a change in the MFN tariff in such a case would *not* be related to preferential tariff changes. The data required for the applied MFN tariff component of the dependent variable,  $\Delta\tau_i^{-k}$ , are from UNCTAD (Trade Analysis Information System, TRAINS) and the WTO, and made available online by the World Bank (via the World Integrated Trade Solution, WITS).

In our main specifications of interest, our measures of changes in levels of import protection,  $\Delta\tau_i^{-k}$  and  $L\Delta Pref_i^k$  include not only the change in the MFN applied and preferential tariffs, respectively, but also the TTBs (AD and SG import restrictions) imposed on the rest of the world as well as the Mercosur partner. For example, if Argentina lowers its preferential tariff on Brazil under Mercosur but then imposes AD or SG restrictions on Brazil for the same product, it is offsetting some of the tariff liberalization. Similarly, we assume that if Argentina (or Brazil) imposes an AD or SG duty on a non-Mercosur country, it reverses any MFN tariff cut associated with preferential liberalization. The dependent variable is defined similarly. (See again table 2.) The data on AD and SG import restrictions are from government sources from those countries, as described in the *Temporary Trade Barriers Database* (Bown 2015b).

Second, we adjust the baseline Estevadeordal et al. (2008) approach by examining changes in the variables defined as long differences. Long differences allow us to take into consideration newly imposed TTBs, since we are interested in determining whether, at the end of each period, the accumulated effect was of a building block or stumbling block.<sup>20</sup> The estimation sample uses changes in bilateral import protection (potential preferential liberalization) from 1990 to 2000, which we split into two subperiods: 1990–94 and 1994–2000. The 1990–94 period captures Mercosur as an FTA, and 1994–2000 captures it as a customs union.<sup>21</sup> When Argentina, for example, imposes an AD or SG import restriction on Brazil in a given sector during the period under consideration (i.e., 1990–94, 1994–2000, or 1990–2000), we treat that as an indicator that the preferential tariff cut during that period was reversed.

A third concern is the potential for the endogeneity of changes in preferential and external levels of import protection, especially if preferential liberalization is subject to reverse causation. Since bilateral tariffs are negotiated in the agreement and their reductions take place over time under an agreed schedule, the changes in preferential tariffs are determined prior to changes in MFN tariffs and the imposition of AD or SG import restrictions. But if some MFN tariff changes were expected at the time the preferences were negotiated, they could have affected the level of those preferences. To address this, we follow Estevadeordal et al. (2008) by employing an IV approach, whereby we instrument for a country’s changes in levels of liberalization toward its PTA partner by using the preferential tariff changes implemented by its PTA partners.<sup>22</sup> The correlations of the preferential tariffs in an agreement are generally high, and they are valid instruments as long as the preferential tariffs of a country’s *partners* are not influenced by the same factors that determine that country’s *own* MFN tariffs or TTBs.

In some of the specifications that define preferential liberalization over 1990–94 or 1990–2000, the preferential tariff changes of the country’s partners may not be highly correlated with the country’s own preferential tariff changes, because in 1990 the preferential tariff was effectively the MFN tariff, which may vary more among Mercosur countries. In these

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19. We thank Estevadeordal, Freund, and Ornelas for sharing their data. As explained in Estevadeordal et al. (2008), the preferential tariff data had to be converted into a common nomenclature using the 4-digit ISIC classification, because the PTAs negotiated during the sample period used different tariff nomenclatures (e.g., NANDINA, NALADISA, HS) and tables for conversion were available only for ISIC codes.

20. The Estevadeordal et al. (2008) approach involves a panel structure at the annual frequency. Since they are interested in exploiting the cross-country aspects of their data in ways that are less relevant for the questions under investigation here, the higher-frequency data allow them to use industry fixed effects. By examining long differences, we do not need to control for other determinants (e.g., macroeconomic shocks, trade volume shocks, political-economic shocks) that the literature has shown affect intertemporal variation in TTB use at higher frequencies. See, for example, the discussion in Bown and Crowley (forthcoming).

21. The changes in the dependent variable are defined one year forward relative to the preferential liberalization, that is, from 1991 to 1995, 1995 to 2001, or 1991 to 2001.

22. We use the preferential tariff changes of the three main preferential partners of the country, as in Estevadeordal et al. (2008), which for Argentina and Brazil are the other Mercosur members.

cases we resort to other instruments.<sup>23</sup> We use the changes in the indexes of revealed comparative advantage (RCA) for the Mercosur partners in 1990–94 to instrument for the preferential liberalization of Argentina (or Brazil) in each sample period.<sup>24</sup> If a partner has a larger comparative advantage in a certain good, that may affect the preferential tariff that Argentina gives to that partner, since the partner stands to benefit more from a preference in that good. We thus calculate an index of RCA (based on Balassa 1965) for each 4-digit ISIC sector and country. The index is given by  $RCA = (X_{ij}/X_{tj})/(X_{iw}/X_{tw})$ , where  $X_{ij}$  and  $X_{tj}$  denote exports of product  $i$  by country  $j$  and total exports by country  $j$ , respectively, and  $X_{iw}$  and  $X_{tw}$  are the world's exports of product  $i$  and total exports, respectively. A value greater than one indicates that the country has a revealed comparative advantage in that product relative to the world. We obtain the bilateral export data needed to construct the indexes of revealed comparative advantage from UN Comtrade.

The fourth issue involves the other potential contribution of our paper: identification of the potential causes of variation in relative trade liberalization outcomes that we observe for Argentina and Brazil. In particular, since Mercosur became a customs union during this period, we explore whether its members may be able to exploit their joint market power via the common external tariff. Theoretical papers have shown that customs unions may create new incentives for members to increase external levels of import protection relative to when the agreement was “only” a free trade area.<sup>25</sup>

To capture this potential effect, we introduce measures of market power that rely on estimates of the inverse of the export supply elasticity that the policy-imposing country faces in an industry. For this we use the foreign export supply elasticities provided by Alessandro Nicita, Marcelo Olarreaga, and Peri Silva (2015). Since there are no estimates of the export supply elasticities faced by Mercosur as a block, we proxy for the change in market power due to the customs union formation by calculating the minimum of the export supply elasticities faced by the four Mercosur members, and then measuring the change in the inverse export supply elasticity, from that of the policy-imposing country to the inverse of the minimum export supply elasticity among the Mercosur members. We include this variable on the change in market power in  $\mathbf{x}_i$  in estimates of equation (2), described in section 5.

Table 3 provides summary statistics for the data measured over each of our estimation periods.

## 4. ESTIMATION RESULTS

This section presents estimates of the baseline model using data from changes in the trade policies of our two focus countries.

### 4.1 Estimates for Argentina

Table 4 reports results from estimating the basic ordered probit model for Argentina. To facilitate interpretation, we present estimates of marginal effects of the highest categorical outcome of an increase in import protection on countries that are not Mercosur members ( $-k$ ). The key explanatory variable in this basic regression is  $L\Delta Pref_i^k$ , or the lagged change in Argentina's applied import protection toward its Mercosur partners. Columns (1)–(3) show the results for the long differences over the first subperiod, reflecting changes in Argentina's external import protection in 1991–95 as a function of its preferential liberalization in 1990–94. Columns (4)–(6) reflect the second period (1995–2001), and columns (7)–(9) the full sample period (1991–2001).

For column (1), the dependent variable is the ordered variable corresponding only to the change in the MFN tariff, and the explanatory variable is only the change in the preferential tariff. Because this specification does not yet include information on TTBs, it is closest in spirit to Estevadeordal et al. (2008), albeit estimated in long differences (instead of annual

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23. It is difficult to find instruments for preferential tariffs, as Estevadeordal et al. (2008) also discuss. Tariffs are usually instrumented using variables such as capital-labor ratios, or other industry characteristics of the importing country; these would be inappropriate as they relate to both preferential and MFN tariffs.

24. Export data from WITS are available for most countries starting around 1990. We exclude Uruguay because its export data are available only since 1994.

25. For example, Kennan and Riezman (1990) show the existence of a tariff externality under a customs union. When a country imposes a tariff, another member's terms of trade improve when it is an importer of that good, and this externality is internalized under a customs union because tariffs are set jointly. By coordinating tariffs, members will want to raise their external tariffs to shift their terms of trade in their favor. Krugman (1991) shows that external tariffs rise after the formation of a customs union because members want to take advantage of the increased size of the bloc to improve their terms of trade. See also Bond and Syropoulos (1996) and Syropoulos (1999).

changes) and not yet with instrumental variables. The estimates show what could be interpreted as a building block effect, since the marginal effect of the change in the preferential tariff is positive and significant at the 5 percent level.

In column (1), a 1 percentage point reduction in Argentina's preferential tariff over 1990–94 is associated with a subsequent 5.2 percentage point decrease in the probability that Argentina raised its MFN tariff for the same industry. More precisely, the predicted probability of an increase in the MFN tariff when evaluated at the means of the underlying data is 61.6 percent; the effect represents a decrease from 61.6 percent to 56.4 percent. Similarly, a decrease of 1 percentage point in the preferential tariff increases the probability of a decrease in the MFN tariff (lowest category) by 5.2 percentage points, from 38.4 percent to 43.6 percent, which represents a 14 percent increase in the probability.<sup>26</sup> The point estimate for the marginal effect is consistent with the evidence in Estevadeordal et al. (2008) that found building block effects of preferential *tariff* (only) liberalization for free trade areas.<sup>27</sup>

The lower portion of table 4 reports information on the frequency of certain combinations of policy outcomes in the data. These statistics will be important in helping us to interpret some of the results, as discussed later in this section.

Beginning in column (2) and throughout the rest of the table, we instrument for Argentina's changes in applied import tariffs toward Brazil, using an IV-ordered probit model. In columns (4)–(6) we instrument using the bilateral tariff changes of Argentina's PTA partners, whereas in other specifications we sometimes use the changes in the indexes of the partners' revealed comparative advantage. For the first period and for the whole sample period for Argentina, the changes in the preferential tariffs of its Mercosur partners do not work well as instruments since the preferential tariff in 1990 was the MFN tariff. Given that this is less correlated among Mercosur members, Argentina's preferential tariff changes are not highly correlated with those preferential tariff changes of its partners for 1990–94 or 1990–2000. For those periods we use the changes in the indexes of revealed comparative advantage of Argentina's partners as instruments. We report the first-stage estimates for the IV in the Appendix.<sup>28</sup>

The IV results from column (2) also suggest a building block effect of preferential tariff liberalization on MFN tariff liberalization, as obtained in the non-IV estimation. The marginal effect implies that a reduction of 1 percentage point in the preferential tariff lowers the likelihood of an increase in a good's MFN tariff by 7 percentage points, from 60.2 percent to 53.4 percent (when the rest of the variables are at their mean values).<sup>29</sup> This effect is larger and more precisely estimated than that obtained in the regression without instrumental variables.

The estimates in column (3) reveal our first important result. To provide more comprehensive measures of import protection beyond tariffs, we redefine the dependent and key explanatory variables to include information on Argentina's AD import restrictions imposed both on non-Mercosur partners (thus affecting the definition of  $\Delta\tau_i^{-k}$ ) and on Brazil (thus affecting the definition of  $L\Delta Pref_i^k$ ).<sup>30</sup> While the estimate for the marginal effect of  $L\Delta Pref_i^k$  in column (3) is still positive, its size has been reduced substantially and it is no longer statistically different from zero. In this case, the insignificance of all marginal effects (including those not shown) indicates that a decrease in Argentina's bilateral import protection toward its Mercosur partners between 1990 and 1994 had *no effect* on the probability of an increase or decrease in the external level of protection (defined broadly to also include AD) that Argentina applied to Mercosur outsiders in 1991–95.

We interpret this as indicating that any building block effect of the preferential tariff liberalization that Argentina implemented, *even* during its FTA period, is eliminated once we take into account more comprehensive measures of import protection across PTA partners and nonpartners.

One explanation for the column (3) result is given by the statistics reported in the middle rows of table 4. Recall that the inclusion of TTBs in our consideration of the key explanatory variable (of the change in the level of bilateral import

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26. This marginal effect is not shown but it is the negative of the one shown in the table, since for Argentina in period 1, when we are using only the change in the MFN tariff as the dependent variable (column 1), there are no cases in which the MFN tariff remained unchanged (no outcome 1 occurrences), and thus the results of the ordered probit are equivalent to those from a binary probit. When we add TTBs, as in column 3, all outcomes take place.

27. Recall that in columns (1)–(3) we are focusing on changes in import protection during Mercosur's pre-customs union (FTA) period.

28. The first-stage regressions from the IV-ordered probit estimations are shown in appendix table A1; panel A shows the results for Argentina and panel B for Brazil. In columns (1)–(3), we report the results corresponding to each of our three sample periods (associated with columns (2), (4), and (7) in tables 3 and 4). The instruments are statistically significant in most cases.

29. A decrease of 1 percentage point in the preferential tariff increases the likelihood of a decrease in the MFN tariff from 39.8 percent to 46.6 percent.

30. Again, Argentina did not use any safeguard import restrictions during this period.

protection toward PTA partner  $k$ ) can result in two outcomes: preferential liberalization was either maintained or reversed. For each possibility, the table reports the share of observations in which Argentina increased its level of protection vis-à-vis non-Mercosur countries (i.e., the rest of the world, ROW).

However, because an assessment of the change in the level of external import protection requires a comparison of the size of the change in the MFN tariff and TTb, we present the percentages as an interval of possible outcomes. In column (3), we find that for the observations in which Argentina's preferential tariff liberalization is reversed, 53–60 percent also resulted in Argentina's increasing levels of import protection toward ROW.<sup>31</sup> Furthermore, even in the observations in which Argentina's preferential *tariff* liberalization was maintained, 62–65 percent resulted in Argentina's *increasing* overall levels of import protection toward ROW.<sup>32</sup> Thus there are more cases in which protection against ROW increases and fewer cases in which it falls relative to columns (1) and (2).

Next consider the period in which Mercosur became a customs union (1995–2001), as shown in the estimates for Argentina in columns (4)–(6).<sup>33</sup> Column (4) replicates the IV specification from column (2) on data from the second period and indicates evidence of a statistically significant *stumbling block* relationship. The marginal effect from the table means that a reduction of 1 percentage point in the preferential tariff *increases* the probability of an increase in a good's MFN tariff by 9.8 percentage points, from 54.1 percent to 63.9 percent. The marginal effects from that regression also indicate that a reduction of 1 percentage point in the preferential tariff reduces the probability of a decrease in the product's MFN tariff by 9.7 percentage points (not shown), from 40.0 percent to 30.3 percent. This is broadly consistent with the Estevadeordal et al. (2008) results for Latin America; they also do not find a building block effect in the case of customs unions, and in some of their specifications they find evidence of a stumbling block effect.

What is the impact of including TTbs in the measures of import protection during the customs union period? Column (5) introduces the data on Argentina's AD use for this period, reproducing the specification from column (3). In comparison to the column (4) estimates, the size and statistical significance of the results are virtually unchanged. But the marginal effect increases in column (6), which includes Argentina's application of both AD and SG import restrictions during the customs union period. A 1 percentage point decrease in  $L\Delta Pref_i^k$  (i.e., greater preferential liberalization) increases the probability of an increase in protection against nonmember countries by 11.6 percentage points (from 55.8 percent to 67.4 percent). Although not reported in the table, the probability of a decrease in protection against nonmembers falls 11.0 percentage points due to a 1 percentage point decrease in the explanatory variable, from 23.9 percent to 12.9 percent (significant at the 1 percent level).

Our second major result for Argentina is therefore that the stumbling block effect of preferential liberalization under a customs union becomes slightly larger (and more precisely estimated) once TTbs and, in particular, safeguards, are included in the measure of import protection.<sup>34</sup> Consistent with that result, the statistics in the middle rows indicate that the percentage of cases in which preferential liberalization is accompanied by an increase in protection against ROW increases from 56 percent in column (4) to 60–70 percent in column (6).

The last three columns in table 4 show the results from the long-difference estimation over the entire sample. They present Argentina's changes in protection toward nonmembers between 1991 and 2001 as a function of changes in the country's levels of preferential import protection between 1990 and 2000. The estimates for  $\beta$  are positive and statistically different from zero, though they are only half as large in columns (8) and (9) when the constructed variables include measures

31. It is possible that levels of import protection toward ROW were unchanged, but in most instances this is a rare outcome. Here, for example, it turns out that in 40–47 percent of such observations, Argentina decreased overall levels of protection toward ROW.

32. In the first case, if we assume that none of Argentina's TTbs were sufficiently large to override the change in the MFN tariff, then in 53 percent of the observations in which Argentina's preferential tariff liberalization is reversed, the country increased its overall level of import protection toward ROW. If we assume that all of Argentina's TTbs were large enough to override the change in the MFN tariff, then in 60 percent of the observations in which the preferential tariff liberalization is reversed, Argentina also increased its overall level of import protection toward ROW. Note that columns (1) and (2) in table 3 do not have statistics for this because the data do not include consideration of TTbs imposed by construction.

33. The second subperiod involves Argentina's changes in protection toward nonmember countries in 1995–2001 as a function of changes in preferential import protection in 1994–2000.

34. The non-IV regressions give a similar result, and the magnitude of the increase in the stumbling block effect is even larger and its statistical significance increases, from a marginal effect significant at the 10 percent level, indicating that a reduction of 1 percentage point in the preferential tariff increases the probability of an increase in a good's MFN tariff by 4.4 percentage points, to one significant at the 1 percent level that leads to an increase in the product's MFN tariff by 6.6 percentage points, once AD and SGs are included.

of Argentina's TTBs in addition to tariffs, again showing the impact of these more expansive measures of import protection that include additional policy instruments.<sup>35</sup>

However, before concluding that these positive estimates for  $\beta$  over the longer period are evidence of an overall *building block* effect of Argentina's preferential "liberalization," consider the patterns of variation in the data underlying the key explanatory variable. The estimation is clearly picking up a positive relationship between changes in Argentina's levels of preferential protection and in its protections applied to Mercosur outsiders. To what extent are these results driven by variation across the cases in which Argentina actually lowers—rather than increases—its levels of preferential import protection applied to its Mercosur partners?

First, once we take into consideration TTBs in addition to tariffs, Argentina actually *increased* its level of preferential import protection vis-à-vis its Mercosur partners in 24 percent of the observations over this period. Across those observations, Argentina then increased its overall level of import protection against ROW 62–86 percent of the time. Second, across the 76 percent of observations in which Argentina *lowered* its tariff preferentially (and did not reverse it through a TTB) toward its Mercosur partners, in only 28–33 percent of the instances did it reduce overall levels of import protection vis-à-vis ROW.

We conclude from these patterns that the positive estimate for  $\beta$  is not really a building block effect, as the positive relationship is mostly driven by instances in which Argentina's preferential import protection *increase* was followed by a multilateral import protection *increase*, not preferential liberalization leading to multilateral liberalization (i.e., both sets of trade policy are moving in the *other* direction).

To summarize the results for Argentina, we find that any evidence of a building block effect in the FTA period is eliminated once we introduce TTBs and thus use more comprehensive measures of changes in the levels of import protection toward both Mercosur partners and outsiders. The inclusion of Argentina's application of TTBs (particularly SGs) also magnified the size and significance of the stumbling block effect during the Mercosur customs union period. Over the entire sample period, once we include TTBs we find highly correlated acts of Argentina engaging in *market closing* toward both Mercosur partners and external partners.

## 4.2 Estimates for Brazil

Table 5 provides the results from the basic ordered probit model for Brazil's change in its external level of import protection (vis-à-vis Mercosur outsiders) as a function of the lagged change in the level of the country's import protection applied to PTA partners. Each column corresponds to the same specification and time period as the respective column in table 4.

The qualitative pattern to the results for Brazil is surprisingly consistent with what we observed for Argentina. While this consistency is somewhat reassuring, it was not obvious that this would be the case given the evidence presented above on the TTBs in use during the period. Argentina and Brazil are permitted to independently implement their own TTB policies (both toward third countries and toward each other), and the evidence is that each country actually did act independently in pursuing quite different patterns of TTB use.

Columns (1)–(3) of table 5 correspond to Brazil's FTA period. The non-IV results from column (1) indicate a building block effect of preferential liberalization on MFN tariffs. A reduction of 1 percentage point in the preferential tariff reduces the probability of an increase in a good's MFN tariff by 0.5 percentage points, less than we estimated for Argentina.<sup>36</sup> Furthermore, when we use instrumental variables (column (2)), we find that there is no effect of preferential liberalization on MFN tariffs. This holds even when we redefine the explanatory and key dependent variables to include Brazil's application of TTBs in column (3).<sup>37</sup>

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35. The marginal effect from column (7) implies that a 1 percentage point fall in the preferential tariff lowers the likelihood of an increase in the MFN tariff of the good by 6.0 percentage points, from 60.1 percent to 54.1 percent, while the one from column 8 implies a decrease in the same probability by 2.9 percent, from 58.3 percent to 55.4 percent.

36. The predicted probability of an increase in the MFN tariff when evaluated at the means of the underlying data is 9.0 percent; therefore, the effect represents a decrease from 9.0 percent to 8.5 percent. Similarly, a 1 percentage point reduction in the preferential tariff increases the probability of a decrease in the MFN tariff by 0.5 percentage point.

37. As was also the case for Argentina during the FTA period, Brazil used only antidumping and did not apply any safeguard import restrictions until the customs union period.

During the customs union period of 1995–2001, we find evidence of a stumbling block effect of Brazil’s preferential liberalization, which increases once we take into account the use of both AD and SG (columns (4)–(6)).<sup>38</sup> However, this effect is significant only at the 10 percent level, in contrast to the one we found for Argentina (table 4), which was significant at the 1 percent level.

The primary qualitative difference for Brazil relative to Argentina involves the estimates for the long differences that compare the changes in the level of external import protection between 1991 and 2001 as a function of the changes in the level of import protection offered to Mercosur partners between 1990 and 2000. None of the estimates in columns (7)–(9) are statistically different from zero. The wider range in the statistics in the first of the table’s middle rows is also consistent with the finding of no effect.<sup>39</sup>

There are two points worth reiterating, given the strong similarity in the results for Argentina and Brazil. Again, the similarity is that more comprehensive measures of import protection beyond MFN and bilateral applied tariffs tend to *reverse* any potential building block evidence from the Mercosur FTA period (1990–94) and tend to *strengthen* the stumbling block evidence from the Mercosur customs union period (1995–2001).

First, we recall from section 2 that Brazil has been much less active than Argentina in using TTBs against external, non-Mercosur partners. In 1991–95 there are 13 industries (of the 93 shown in table 4) on which Argentina imposed an AD measure against ROW; in 1995–2001 there were 30 industries (out of 91) on which Argentina imposed a TTB (AD or SG) against ROW. Brazil imposed an AD measure against non-Mercosur partners in 13 industries in 1991–95, and a TTB on only 17 industries in 1995–2001, about half as many as Argentina.

Second, Brazil used TTBs against Argentina with much less frequency, whereas Brazil has been a frequent target of Argentina’s TTB use. For example, in column 3 of table 5, there were no cases in which preferential liberalization was reversed by Brazil imposing AD against Argentina during 1991–95. During 1995–2001, there were only four instances in which preferential liberalization was reversed by Brazil’s imposing a TTB (AD or SG) against Argentina (column (6)). In contrast, there were 15 cases during 1991–95 in which Argentina reversed its preferential liberalization by imposing an AD measure against Brazil, and 19 instances in 1995–2001 of such reversal by imposing a TTB.

Thus, although the overall pattern of our results for Argentina and Brazil is similar, especially once we define the changes in import protection to include policy instruments beyond tariffs, there are two differences worth highlighting. The first is in how Argentina and Brazil arrived at this similarity: a comparison of columns (1), (2), and (3) in tables 4 and 5 suggests that Argentina may have had more of a building block effect (apparent in the tariff-only data) for its TTBs to overcome than did Brazil. Second, in the raw data on TTB use, we observed a substantial difference in how each country used TTBs during this period (both overall and toward each other).

A final point worth mentioning is that our results are robust to redefining the measure of TTBs in the dependent variable in the following way. We reestimated all the specifications from tables 4 and 5 but redefined the dependent variable such that a TTB is considered an increase in protection; thus in table 2, a decrease in MFN tariff combined with the imposition of a TTB is reclassified as an increase in protection (i.e., as outcome 2). The results (available on request) are also robust to this.

## 5. DOES MARKET POWER MATTER?

In this section we explore the potential role of import market power in explaining the results identified thus far. We explain our use of terms-of-trade theory to propose how market power might affect the results, and then turn to the estimates. Our approach here is a first step; to our knowledge, these particular questions have not yet been empirically investigated.

### 5.1 Theory and Implementation

We rely on terms-of-trade theory to articulate two main channels through which measures of import market power could affect our estimated results on determinants of the changes in external levels of import protection against PTA outsiders.

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38. Notice the large percentage of cases in which preferential import protection reduction was maintained and protection against ROW increases in columns (4)–(6), consistent with the stumbling block finding.

39. I.e., there is a potentially large percentage of cases in which preferential liberalization was *reversed* and protection against ROW fell, and also a large percentage of cases (62–82 percent, not shown), in which preferential liberalization was *maintained* and protection against ROW fell.

First, terms-of-trade theory suggests that countries may be more hesitant to cut any import tariffs in products and sectors in which they have market power. Thus industries in which country  $j$  has import market power may be less likely to cut external and preferential tariffs. However, when a country adopts an FTA, there is an *institutional* expectation under the GATT that country  $j$  will liberalize tariffs on substantially all trade with PTA partner  $k$ —even where country  $j$  may have bilateral import market power relative to  $k$ .<sup>40</sup> If this is the case, then we may observe preferential tariff liberalization but not external liberalization in sectors in which country  $j$  has import market power. We examine whether country  $j$ 's level of import market power is positively related to  $\Delta\tau_i^{-k}$  to determine whether there is less external liberalization in industries in which the country has an incentive to use its trade policy to shift the terms of trade in its favor.

Second, we compare two types of trade agreements, free trade areas and customs unions, and the change in the level of import market power that country  $k$  experiences under each. There should be no change in level of import market power under an FTA, whereas country  $k$  will experience an increase in level of market power under a customs union because of the adoption of the MFN tariff toward nonpartners ( $-k$ ). Thus, if we are measuring the change in the level of import market correctly, we would expect that larger increases (changes) in market power when country  $k$  adopts the customs union will be positively related to  $\Delta\tau_i^{-k}$ .

However, suppose we introduce a naïve (and imperfect) measure of the change in country  $j$ 's import market power, defined as the difference between its individual level of market power and the highest level of market power of any of the other PTA partners. During the period that Mercosur is a customs union, the theory predicts that an increase in market power will generate terms-of-trade incentives to increase external barriers against PTA outsiders,  $\Delta\tau_i^{-k}$ . But we also anticipate this effect to be more likely for Argentina relative to Brazil based on the way we have constructed this variable. In most instances, the Mercosur partner with the most individual market power is Brazil, given that it is so much larger (in population) than the other members.<sup>41</sup> Thus, a limitation of our measure is that the change in import market power variable for Brazil is likely to exhibit less variation (around zero), which may make it difficult to identify any effect.

Finally, in addition to investigating whether the level or change in import market power affects  $\Delta\tau_i^{-k}$  directly, our approach makes it possible to examine whether the failure to include the influence of market power in our regressions in tables 3 and 4 resulted in omitted-variable bias for our estimates of  $\hat{\beta}$ . We examine whether our estimates of the impact of changes in levels of import protection offered to PTA insiders are affected by inclusion of these market power concerns.

In terms of implementation, we consider measures of import market power as a new explanatory variable in  $\mathbf{x}_i$  in our estimation equation (2). Again, we are interested in capturing the potential effect of market power on changes in external tariffs ( $\Delta\tau_i^{-k}$ ) and on the estimates of our main variable of interest,  $L\Delta Pref_i^k$ . We use the export supply elasticities estimated by Nicita et al. (2015) for each country at the 6-digit Harmonized System level. Because the elasticity estimates are at a more disaggregated level than our data, we concord them to the 4-digit ISIC level by using the median of the 6-digit HS level elasticities in each 4-digit ISIC industry.<sup>42</sup>

Since some of the theoretical predictions that we have described relate to the level of an importing country's market power, we sometimes use measures of the level of the inverse foreign export supply elasticity. However, the elasticity estimates are known to be imprecise; we therefore construct a medium-high inverse export supply elasticity indicator, which equals one for the two-thirds of products with the highest inverse elasticity values in the given country.

In some specifications we consider measures of the change in the importing country's import market share resulting from the formation of the customs union. We proxy for the change in market power resulting from the customs union formation by first computing the minimum of the export supply elasticities faced by the four Mercosur members, and then measuring the change in the inverse export supply elasticity from the importing country (either Brazil or Argentina, depending on the specification) to the inverse of the minimum export supply elasticity of the Mercosur members. And we again use a medium-high increase in market power indicator.

40. This is the basic requirement of GATT Article XXIV, which is the general exception permitting FTAs and customs unions. However, developing countries can implement FTAs and customs unions under the GATT's Enabling Clause, which does not have such a stringent requirement that internal tariffs must be liberalized on substantially all trade, and Mercosur was notified to the GATT under the Enabling Clause. Given that the exact meaning of "substantially all trade" under GATT Article XXIV, or that any limits to the exception granted by the Enabling Clause, have never been clearly defined, the impacts of this institutional constraint are an empirical question.

41. The 1994 the populations for the Mercosur countries were Argentina (34.4 million), Brazil (159.4 million), Paraguay (4.7 million), and Uruguay (3.2 million). Thus adoption of the common external tariff in 1994 increases the size of Argentina's market by nearly 500 percent (in population terms) compared to only 27 percent for Brazil.

42. The results using the mean instead of the median for the concordance are qualitatively similar.

## 5.2 Estimation Results

Table 6 provides the IV-ordered probit estimates for Argentina and Brazil based on the inclusion of different measures of import market power for the three Mercosur periods: FTA only (1990–94), customs union only (1995–2001), and the entire sample (1990–2001). With the exception of the newly added measures of market power (described in detail below), the IV-ordered probit model is estimated as presented in tables 3 and 4.

The results for Argentina when adding the inverse elasticity indicator in period 1 are shown in columns (1)–(3) in panel A of table 6. Column (1) corresponds to the non-IV specification from column (1) of table 4 but also includes this additional variable to capture the effect of the level of market power during the FTA period. The results for the preferential tariff change variable are qualitatively and quantitatively similar to those from column (1) of table 4. Moreover, the inverse export supply elasticity indicator has a positive and statistically significant effect on the change in MFN tariffs, as expected, since an increase in market power in a product provides an incentive to increase the MFN tariff on that product to benefit from the terms-of-trade improvement. In columns (2)–(9), we instrument for  $L\Delta Pref_i^k$ . The results in column (2) are similar to those of column (1). As before, when we redefine our dependent and main explanatory variables to include AD, in column (3), we find no effect of preferential liberalization on protection against ROW. The market power variable is now not significant.

For the customs union period (columns (4)–(6)) and the whole period (columns (7)–(9)), we use an indicator for the change in market power, as defined above, rather than its level. We do not find evidence that our measure for the change in market power from the formation of the customs union affected import protection against non-Mercosur countries. Equally important, our previous results regarding our main explanatory variable,  $L\Delta Pref_i^k$  (discussed in section 4), remain qualitatively and quantitatively similar.

Panel B shows the results from analogous specifications for Brazil. Again, we do not find any systematic evidence of an effect of our market power measures, and the results regarding the effect of preferential liberalization on external protection from table 5 remain unaltered.<sup>43</sup>

The elasticity of export supply in an industry can be endogenous to the level of import protection in that industry, and there is measurement error in the estimated elasticities. Therefore, we tried instrumenting for the market power variable, using the average market power in the other Mercosur countries in the same good as an instrument.<sup>44</sup> Again, we did not find any systematic evidence of an effect of market power on the dependent variable, and our previous results regarding the effect of preferential liberalization and TTBs still hold.<sup>45</sup>

One potential and likely contributing explanation behind the weakness of our results linking any influence of import market power to changes in external tariffs is due to our poor measures of import market power, which may simply be ill suited to this application. Given the necessity for our exercise to use the tariff data from the early 1990s in order to match the Estevadeordal et al. (2008) approach, the analysis had to be conducted at the relatively aggregated ISIC 4-digit level. As we have noted, measurement error for the elasticities is a generally recognized problem, and we have attempted to address it through a variety of standard techniques. Nevertheless, in this setting it may simply be that the measurement error may have been compounded given that the elasticity estimates were constructed from a slightly later time period and given the need to concord elasticity estimates from the 6-digit HS to the 4-digit ISIC level. Future work using different, and perhaps more disaggregated, data and improved measures of elasticities may be a promising avenue to pursue, given the richness of the policy variation in the underlying setting.<sup>46</sup>

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43. As a test of robustness, we used the level of the market power variable instead of the indicator. We tried both the level and the log of the inverse export supply elasticity (and their changes due to the customs union), but the variable was less significant or had the wrong sign in some cases (we also tried winsorizing the elasticities by setting the extreme values at the 5th and 95th percentiles of the distribution). Our results regarding the effects of preferential liberalization and of including TTBs in the estimations remain robust. They are also robust to working with the elasticities at the 4-digit HS level from the estimates in Nicita, Olarreaga, and Silva (2015), concurred similarly, but overall the market power variable was less significant. Furthermore, we added the interaction of the market power variable (in levels, logs, or the indicator) with the preferential liberalization variable, but the interaction was not significant.

44. Since we cannot use an IV-ordered probit when the endogenous regressor is not continuous, we do not use the medium-high inverse export supply elasticity indicator. Instead, we use the level of the inverse export supply elasticity, and we set the top 5 percent of the elasticity data to the value at the 95<sup>th</sup> percentile of the distribution, and the bottom 5 percent to the value at the 5<sup>th</sup> percentile of the distribution, to deal with extreme values of the estimated elasticities.

45. The results are not shown but are available on request.

46. See, in particular, the methodological advances for estimating elasticities proposed by Soderberry (2015) and his application for estimates for the United States.

Nevertheless, a separate and important potential explanation, supported by the broader patterns in the data, is that Argentina and Brazil did not exploit their market power after formation of the customs union because, institutionally, there was no customs union. Given that each country pursued its TTB policies independently, easy access to this “escape clause” may have resulted in their inability to exploit any of their joint market power by raising their levels of import protection toward PTA outsiders in concert. Put differently, market power may have been more likely to matter if Argentina and Brazil had committed to changing the common external MFN tariff jointly or coordinating their AD and SG policies against nonmembers. But the Mercosur institutional framework did not require TTB coordination, and the result is that these countries’ TTB policy applications were clearly not coordinated (see again section 2).

## 6. CONCLUSION

We have examined the relationship between changes in a country’s external trade policy toward non-PTA partners as a function of changes in the country’s trade policy toward PTA partners. Focusing on the two major Mercosur economies, Argentina and Brazil, we estimate different effects for the period in which MERCOSUR was an FTA (1990–94) from when it was a customs union (1995–2001). Our innovation is to consider measures of trade policy that are more expansive than tariffs and that include the temporary trade barriers of antidumping and safeguards. In considering all available policy instruments, we present evidence of an economically significant stumbling block effect during the customs union period, and our results also tend to reverse any evidence of a building block effect that may have been thought to arise (based on tariffs alone) during the FTA period.

Our results are novel, but they do not completely resolve the puzzles identified in the literature. Furthermore, our analysis of the highly detailed policy data raises a number of other interesting and unaddressed questions worthy of empirical research.

First, our results call into relief the need for additional work to construct more “complete” product-level measures of import protection that take into consideration all trade policy instruments. This is something that we have noted in other settings (Bown and Tovar 2011) and for which some efforts have been made, albeit only in the cross section (e.g., Kee, Nicita, and Olarreaga 2008, 2009). One possible reason our estimates are not stronger is our reliance on categorical variables for some of the policy outcomes; construction of measures of the ad valorem equivalents for the imposed TTBs may improve the estimation considerably.

Second, we take an initial step toward examining the role of import market power on the interplay between changes in trade policy affecting PTA partners and nonpartners. Given our desire in this paper to hew relatively closely to the Estevadeordal et al. (2008) approach to make these initial results as comparable as possible, our market power variables may contain too much measurement error to have proven useful for this particular environment. The approach can surely be improved upon in other empirical settings that rely on more disaggregated trade policy data (typically available after 1995) and further refinements to the elasticity estimates.

Third, and more generally, examination of the patterns of the raw trade policy data and our results call into question whether it is accurate to state that Argentina and Brazil had either a customs union during the second period (1995–2001) or even a free trade area during the first period (1990–94), at least in the sense in which economic models define such terms. Argentina implemented a significant number of antidumping import restrictions against Brazil during 1990–94, many of which reversed the effect of its preferential tariff cuts for Brazil. Thus, even the FTA component of the Mercosur agreement from Argentina’s perspective is arguably not entirely free. Furthermore, both Argentina and Brazil implemented their own TTB policies independently toward third countries (Mercosur nonmembers) during 1995–2001 (and 1990–94), effectively eliminating much of the harmonization toward a common external MFN tariff that the two countries may otherwise have adopted.

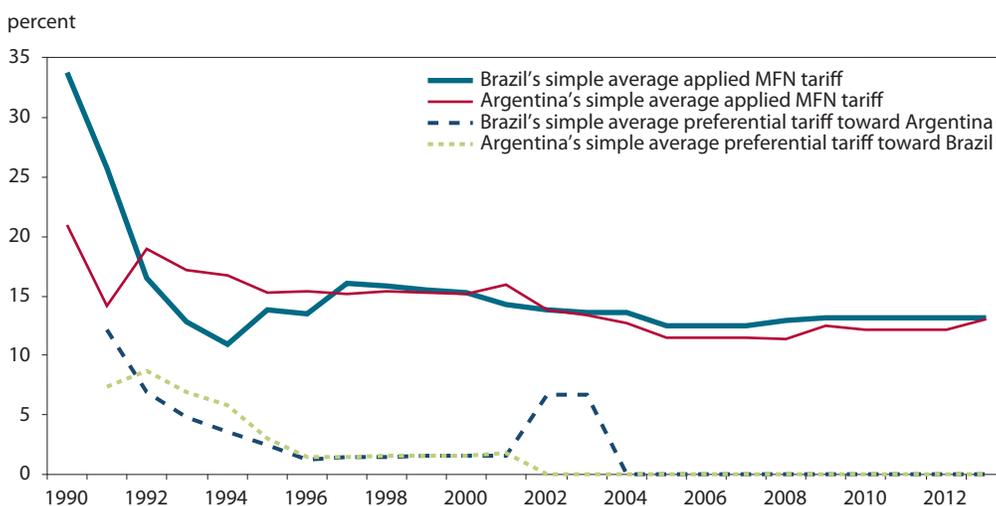
Our analysis of the details of the trade policies of Argentina and Brazil reveals substantial variation that suggests additional puzzles and potentially exciting avenues for research on the interplay of these policies within Mercosur. For example, to what extent do relationships between bilateral tariffs, MFN tariffs, and market power motives affect the variety of trade restrictions—price undertakings, tariff rate quotas, specific duties, and ad valorem duties—that these countries implement under their TTB policies?

Understanding the evolution of trade policy for Argentina and Brazil during this period is arguably extremely important. The trade liberalization that these countries began in 1990, although sizable, has stalled well short of free trade—in 2014

Argentina’s simple average applied tariff was 13.6 percent and Brazil’s 13.5 percent, both mostly unchanged from their levels in the latter half of the 1990s. A better understanding of the trade policy interplay in these countries in the 1990s may be key to any explanation of the determinants of their current trade policies.

A final important point is that, to the extent that using a more complete set of policy instruments—e.g., changes to tariffs and nontariff barriers, such as TTBs—shows additional margins of trade policy discrimination between PTA members and nonmembers, this may also contribute to explaining what Limão (forthcoming) refers to as the “PTA trade elasticity puzzle.” The puzzle is that the tariff liberalization associated with PTAs is very large relative to that expected by the impact of PTA tariff cuts alone. This might be explained by the fact that either PTAs increase the trade elasticity with respect to tariffs and/or they reduce relative trade costs through channels well beyond tariffs. To the extent that PTAs may also be associated with increased TTBs on nonmembers, this decreases the relative trade costs for PTA members relative to nonmembers.

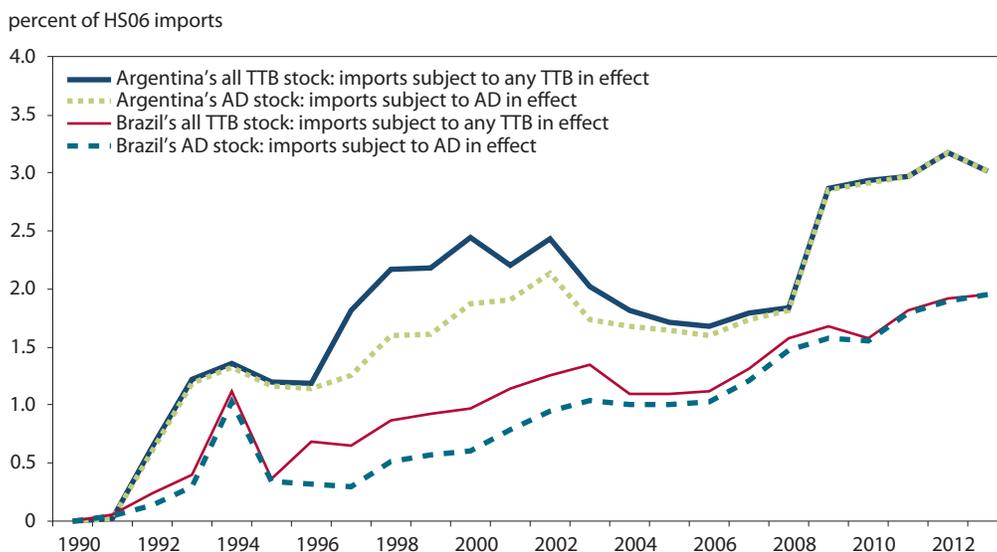
**Figure 1 Argentina’s and Brazil’s average applied MFN and preferential tariffs, 1990–2013**



MFN = most favored nation

Source: Authors’ calculations based on data from Estevadeordal et al. (2008), UNCTAD (TRAINS), and WTO.

**Figure 2 Argentina’s and Brazil’s import coverage by temporary barriers to trade (TTBs), 1990–2013**



AD = antidumping; HS = Harmonized System

Source: Authors’ calculations using data from Temporary Trade Barriers Database (Bown 2015b).

**Table 1 Argentina's and Brazil's use of antidumping (AD) by targeted exporting country**

1990-94				1995-2001			
Rank	Exporting country target	AD investigations (share of total in parentheses)		Rank	Exporting country target	AD investigations (share of total in parentheses)	
<b>Argentina</b>							
1	Brazil	22	(0.33)	1	Brazil	28	(0.19)
2	European Union	10	(0.15)	2	China	28	(0.19)
3	China	6	(0.09)	3	European Union	27	(0.18)
4	South Korea	5	(0.07)	4	South Africa	9	(0.06)
5	Mexico	3	(0.04)	5	South Korea	8	(0.05)
6	United States	3	(0.04)	6	United States	8	(0.05)
7	Colombia	2	(0.03)	7	Chile	6	(0.04)
8	Japan	2	(0.03)	8	Taiwan	6	(0.04)
9	Taiwan	2	(0.03)	9	Czech Republic	2	(0.01)
10	Australia	1	(0.01)	10	Indonesia	2	(0.01)
	Other	11	(0.16)		Other	24	(0.16)
	<b>Total</b>	<b>67</b>	<b>(1.00)</b>		<b>Total</b>	<b>148</b>	<b>(1.00)</b>
<b>Brazil</b>							
1	United States	14	(0.23)	1	European Union	21	(0.23)
2	China	5	(0.08)	2	China	11	(0.12)
3	Indonesia	4	(0.07)	3	United States	11	(0.12)
4	Russia	4	(0.07)	4	Chile	3	(0.03)
5	European Union	4	(0.07)	5	Japan	3	(0.03)
6	Bangladesh	3	(0.05)	6	South Korea	3	(0.03)
7	Ukraine	3	(0.05)	7	Romania	3	(0.03)
8	Canada	2	(0.03)	8	Venezuela	3	(0.03)
9	Kazakhstan	2	(0.03)	9	South Africa	3	(0.03)
10	Mexico	2	(0.03)	10	Argentina	2	(0.02)
	Other	17	(0.28)		Other	27	(0.3)
	<b>Total</b>	<b>60</b>	<b>(1.00)</b>		<b>Total</b>	<b>90</b>	<b>(1.00)</b>

Source: Authors' calculations using data from Temporary Trade Barriers Database (Bown 2015b).

**Table 2 Characterization of the trade policy variables used in the estimation**

Dependent variable: $\Delta\tau_i^{-k}$	Observed changes in MFN tariffs and TTBs
2: Increase in import protection on $-k$	<ul style="list-style-type: none"> <li>· MFN tariff increases, TTB imposed on <math>-k</math></li> <li>· MFN tariff increases, TTB not imposed on <math>-k</math></li> <li>· MFN tariff unchanged, TTB imposed on <math>-k</math></li> </ul>
1: No change in import protection on $-k$	<ul style="list-style-type: none"> <li>· MFN tariff unchanged, TTB not imposed on <math>-k</math></li> <li>· MFN tariff decrease, TTB imposed on <math>-k</math></li> </ul>
0: Decrease in import protection on $-k$	<ul style="list-style-type: none"> <li>· MFN tariff decrease, TTB not imposed on <math>-k</math></li> </ul>
Explanatory variable: $L\Delta Pref_i^k$	Observed changes in bilateral (PTA) tariffs and TTBs
Change in bilateral tariff on $k$	<ul style="list-style-type: none"> <li>· Bilateral tariff decreases, TTB not imposed on <math>k</math></li> <li>· Bilateral tariff unchanged, TTB not imposed on <math>k</math></li> </ul>
Zero	<ul style="list-style-type: none"> <li>· Bilateral tariff decreases, TTB imposed on <math>k</math></li> <li>· Bilateral tariff unchanged, TTB imposed on <math>k</math></li> </ul>

$k$  = trade agreement partner country;  $-k$  = nonpartner country; PTA = preferential trade agreement; TTB = temporary trade barrier

**Table 3 Summary statistics**

Variable	Mean	Standard deviation	Minimum	Maximum	Observations
<b>Argentina</b>					
<b>1991–95</b>					
$\Delta$ MFN	1.20	0.98	0.00	2.00	93
$\Delta$ MFN+AD	1.25	0.95	0.00	2.00	93
$\Delta$ MFN+AD+SG	1.25	0.95	0.00	2.00	93
$L.\Delta$ Pref tariff	-15.11	4.30	-24.75	0.00	93
$L.\Delta$ Pref tariff + AD	-12.82	6.60	-24.75	0.00	93
$L.\Delta$ Pref tariff + AD + SG	-12.82	6.60	-24.75	0.00	93
Market power	0.67	0.47	0.00	1.00	91
<b>1995–2001</b>					
$\Delta$ MFN	1.16	0.95	0.00	2.00	91
$\Delta$ MFN+AD	1.33	0.82	0.00	2.00	91
$\Delta$ MFN+AD+SG	1.34	0.81	0.00	2.00	91
$L.\Delta$ Pref tariff	-3.94	2.61	-13.65	1.37	91
$L.\Delta$ Pref tariff + AD	-2.99	2.78	-13.65	0.30	91
$L.\Delta$ Pref tariff + AD + SG	-2.87	2.65	-13.65	0.30	91
$\Delta$ Market power	0.66	0.48	0.00	1.00	91
<b>1991–2001</b>					
$\Delta$ MFN	1.31	0.96	0.00	2.00	93
$\Delta$ MFN+AD	1.41	0.86	0.00	2.00	93
$\Delta$ MFN+AD+SG	1.41	0.86	0.00	2.00	93
$L.\Delta$ Pref tariff	-19.42	4.18	-27.50	-7.39	93
$L.\Delta$ Pref tariff + AD	-14.77	8.93	-27.50	0.00	93
$L.\Delta$ Pref tariff + AD + SG	-14.47	8.95	-27.50	0.00	93
$\Delta$ Market power	0.67	0.47	0.00	1.00	91
<b>Brazil</b>					
<b>1991–95</b>					
$\Delta$ MFN	0.24	0.65	0.00	2.00	93
$\Delta$ MFN+AD	0.37	0.69	0.00	2.00	93
$\Delta$ MFN+AD+SG	0.37	0.69	0.00	2.00	93
$L.\Delta$ Pref tariff	-31.04	18.87	-85.00	3.00	93
$L.\Delta$ Pref tariff + AD	-31.04	18.87	-85.00	3.00	93
$L.\Delta$ Pref tariff + AD + SG	-31.04	18.87	-85.00	3.00	93
Market power	0.67	0.47	0.00	1.00	91
<b>1995–2001</b>					
$\Delta$ MFN	1.54	0.85	0.00	2.00	88
$\Delta$ MFN+AD	1.57	0.80	0.00	2.00	88
$\Delta$ MFN+AD+SG	1.57	0.80	0.00	2.00	88
$L.\Delta$ Pref tariff	-1.55	1.66	-9.10	1.16	88
$L.\Delta$ Pref tariff + AD	-1.54	1.67	-9.10	1.16	88
$L.\Delta$ Pref tariff + AD + SG	-1.42	1.63	-9.10	1.16	88
$\Delta$ Market power	0.37	0.49	0.00	1.00	88

*(table continues)*

**Table 3 Summary statistics (continued)**

Variable	Mean	Standard deviation	Minimum	Maximum	Observations
<b>Brazil</b>					
<b>1991–2001</b>					
$\Delta$ MFN	0.33	0.75	0.00	2.00	93
$\Delta$ MFN+AD	0.54	0.76	0.00	2.00	93
$\Delta$ MFN+AD+SG	0.54	0.76	0.00	2.00	93
L. $\Delta$ Pref tariff	–33.00	18.85	–85.00	–0.06	93
L. $\Delta$ Pref tariff + AD	–32.66	19.15	–85.00	0.00	93
L. $\Delta$ Pref tariff + AD + SG	–30.76	19.26	–85.00	0.00	93
$\Delta$ Market power	0.37	0.49	0.00	1.00	91

AD = antidumping; SG = safeguards

Note: See text for description of variables.

**Table 4 Instrumental variable (IV) estimates of ordered probit model for Argentina**

	Period of estimation and definition of dependent variable								
	1991–95			1995–2001			1991–2001		
	$\Delta$ MFN (1)	$\Delta$ MFN (2)	$\Delta$ MFN +AD (3)	$\Delta$ MFN (4)	$\Delta$ MFN +AD (5)	$\Delta$ MFN +AD+SG (6)	$\Delta$ MFN (7)	$\Delta$ MFN +AD (8)	$\Delta$ MFN +AD+SG (9)
<i>Marginal effects estimates of an increase in protection (Prob y = 2):</i>									
L. $\Delta$ Pref tariff	0.05** (0.02)	0.07*** (0.01)		–0.10*** (0.02)			0.06*** (0.01)		
L. $\Delta$ Pref tariff + AD			0.00 (0.00)		–0.10*** (0.02)			0.03*** (0.00)	
L. $\Delta$ Pref tariff + AD + SG						–0.12*** (0.01)			0.03*** (0.00)
Pref. liberalization reversed and protection $\uparrow$ on ROW			53%– 60%		39%– 89%	37%– 89%		62%– 86%	64%– 86%
Pref. liberalization maintained and protection $\uparrow$ on ROW	60%	60%	62%– 65%	56%	59%– 66%	60%– 67%	66%	67%– 72%	66%– 72%
Constant cut1	–2.34** (0.94)	–3.74*** (1.04)	–2.08*** (0.31)	0.88*** (0.30)	0.29 (0.29)	0.44 (0.29)	–4.05*** (0.63)	–1.81*** (0.19)	–1.80*** (0.18)
Constant cut2			–2.02*** (0.32)	1.08*** (0.29)	0.83*** (0.24)	1.00*** (0.20)		–1.66*** (0.23)	–1.66*** (0.22)
Observations	93	93	93	91	91	91	93	93	93
Pseudo R-squared	0.130								
Log pseudo-likelihood	–54.3	–317.8	–377.3	–271.2	–290.7	–284.8	–319.2	–410.2	–410.6

AD = antidumping; ROW = rest of the world; SG = safeguards

Note: Robust standard errors in parentheses with \*, \*\*, and \*\*\* indicating statistically different from zero at the 10, 5, and 1 percent levels, respectively.

Column (1) estimates of the marginal effects of the probit model do not use IV. Instruments in columns (2)–(3) and (7)–(9) are the lagged changes in the RCA indexes of the Mercosur partners. Instruments in columns (4)–(6) are the lagged changes in the preferential tariffs of the Mercosur partners.

**Table 5 Instrumental variable (IV) estimates of ordered probit model for Brazil**

	Period of estimation and definition of dependent variable								
	1991–95			1995–2001			1991–2001		
	$\Delta$ MFN (1)	$\Delta$ MFN (2)	$\Delta$ MFN +AD (3)	$\Delta$ MFN (4)	$\Delta$ MFN +AD (5)	$\Delta$ MFN +AD+SG (6)	$\Delta$ MFN (7)	$\Delta$ MFN +AD (8)	$\Delta$ MFN +AD+SG (9)
<i>Marginal effects estimates of an Increase in Protection (Prob y = 2):</i>									
L. $\Delta$ Pref tariff	0.01*** (0.00)	0.01 (0.01)		-0.08* (0.05)			0.01 (0.00)		
L. $\Delta$ Pref tariff + AD			0.00 (0.00)		-0.09* (0.05)			0.01 (0.00)	
L. $\Delta$ Pref tariff + AD + SG						-0.10* (0.05)			0.01 (0.00)
Pref. liberalization reversed and protection $\uparrow$ on ROW			—		100%	75%–100%		0%–100%	0%– 100%
Pref. liberalization maintained and protection $\uparrow$ on ROW	9%	9%	9%– 24%	74%	74%–78%	74%– 77%	16%	16%–36%	17%– 34%
Constant cut1	0.37 (0.36)	0.09 (0.76)	-0.07 (0.56)	-0.24 (0.35)	-0.32 (0.37)	-0.30 (0.38)	0.21 (0.66)	-0.25 (0.63)	-0.45 (0.68)
Constant cut2			0.46 (0.59)		-0.21 (0.35)	-0.19 (0.36)		0.50 (0.58)	0.36 (0.61)
Observations	92	93	93	88	88	88	93	93	93
Pseudo R-squared	0.12								
Log pseudo-likelihood	-29.6	-419.0	-454.4	-199.0	-207.5	-209.0	-408.6	-468.1	-466.1

AD = antidumping; ROW = rest of the world; SG = safeguards

Note: Robust standard errors in parentheses with \*, \*\*, and \*\*\* indicating statistically different from zero at the 10, 5, and 1 percent levels, respectively. Column (1) estimates of the marginal effects of the probit model do not use IV. Instruments in columns (2)–(9) are the lagged changes in the preferential tariffs of the Mercosur partners.

**Table 6 Instrumental variable (IV) estimates of ordered probit model: Temporary trade barriers (TTBs) and market power**

<b>Argentina</b>									
	1991–95			1995–2001			1991–2001		
	$\Delta$ MFN (1)	$\Delta$ MFN (2)	$\Delta$ MFN +AD (3)	$\Delta$ MFN (4)	$\Delta$ MFN +AD (5)	$\Delta$ MFN +AD+SG (6)	$\Delta$ MFN (7)	$\Delta$ MFN +AD (8)	$\Delta$ MFN +AD+SG (9)
<i>Marginal effects estimates of an increase in protection (Prob y = 2):</i>									
L. $\Delta$ Pref tariff	0.06*** (0.02)	0.06*** (0.01)		-0.10*** (0.02)			0.06*** (0.01)		
L. $\Delta$ Pref tariff + AD			0.0003 (0.0003)		-0.10*** (0.02)			0.03*** (0.00)	
L. $\Delta$ Pref tariff + AD + SG						-0.12*** (0.01)			0.03*** (0.00)
Market power	0.25** (0.11)	0.22*** (0.08)	0.0001 (0.0004)						
$\Delta$ Market power				-0.01 (0.09)	-0.01 (0.08)	0.02 (0.08)	-0.0001 (0.08)	0.19 (0.17)	-0.08 (0.07)
Observations	91	91	91	89	89	89	91	91	91
<b>Brazil</b>									
	1991–95			1995–2001			1991–2001		
	$\Delta$ MFN (1b)	$\Delta$ MFN (2b)	$\Delta$ MFN +AD (3b)	$\Delta$ MFN (4b)	$\Delta$ MFN +AD (5b)	$\Delta$ MFN +AD+SG (6b)	$\Delta$ MFN (7b)	$\Delta$ MFN +AD (8b)	$\Delta$ MFN +AD+SG (9b)
<i>Marginal effects estimates of an increase in protection (Prob y = 2):</i>									
L. $\Delta$ Pref tariff	0.01*** (0.00)	0.01 (0.01)		-0.08* (0.04)			0.001 (0.004)		
L. $\Delta$ Pref tariff + AD			0.01 (0.00)		-0.08** (0.04)			0.001 (0.004)	
L. $\Delta$ Pref tariff + AD + SG						-0.09** (0.04)			0.002 (0.005)
Market power	0.04 (0.05)	0.04 (0.07)	0.03 (0.06)						
$\Delta$ Market power				0.13 (0.09)	0.15 (0.09)	0.15* (0.09)	-0.08 (0.07)	-0.06 (0.07)	-0.08 (0.06)
Observations	90	91	91	86	86	86	91	91	91

AD = antidumping; ROW = rest of the world; SG = safeguards

Note: Robust standard errors in parentheses with \*, \*\*, and \*\*\* indicating statistically different from zero at the 10, 5, and 1 percent levels, respectively. Column (1) estimates of the marginal effects of the probit model do not use IV. Instruments in columns (2)–(3) and (7)–(9) are the lagged changes in the revealed comparative advantage (RCA) indexes of the Mercosur partners. Instruments in columns (4)–(6) and (1b)–(9b) are the lagged changes in the preferential tariffs of the Mercosur partners.

## APPENDIX A

**Table A.1 First-stage regressions**

Dependent variable is	1991–95	1995–2001	1991–2001
	L.ΔPref tariff (1)	L.ΔPref tariff (2)	L.ΔPref tariff (3)
<b>Argentina</b>			
L.ΔRCA_BRA	0.45** (0.22)		0.48 (0.33)
L.ΔRCA_PRY	0.49*** (0.09)		0.42** (0.19)
L.ΔPref tariff_BRA		0.70*** (0.14)	
L.ΔPref tariff_PRY		0.03 (0.04)	
L.ΔPref tariff_URY		0.24* (0.13)	
Constant	-14.94*** (0.43)	-0.99 (0.79)	-19.27*** (0.42)
Observations	93	91	93
<b>Brazil</b>			
L.ΔPref tariff_ARG	-0.86 (0.61)	0.26*** (0.08)	0.31 (0.52)
L.ΔPref tariff_PRY	0.11 (0.28)	-0.03 (0.04)	0.22* (0.12)
L.ΔPref tariff_URY	2.03*** (0.43)	0.16** (0.07)	1.16** (0.46)
Constant	-1.59 (13.47)	0.42 (0.58)	8.91 (8.43)
Observations	93	88	93

ARG = Argentina; BRA = Brazil; PRY = Paraguay;  
URY = Uruguay; RCA = revealed comparative advantage

Note: Robust standard errors in parentheses with \*, \*\*, and \*\*\* indicating statistically different from zero at the 10, 5, and 1 percent levels, respectively.

## REFERENCES

- Bagwell, Kyle, and Robert W. Staiger. 1990. A Theory of Managed Trade. *American Economic Review* 80, no. 4: 779–95.
- Bagwell, Kyle, and Robert W. Staiger. 2011. What Do Trade Negotiators Negotiate About? Empirical Evidence from the World Trade Organization. *American Economic Review* 101, no. 4: 1238–73.
- Balassa, Bela. 1965. Trade Liberalization and “Revealed” Comparative Advantage. *The Manchester School* 33, no. 2: 99–123.
- Blonigen, Bruce A. 2005. The Effects of NAFTA on Antidumping and Countervailing Duty Activity. *World Bank Economic Review* 19, no. 3: 407–24.
- Bohara, Alok, Kishore Gawande, and Pablo Sanguinetti. 2004. Trade Diversion and Declining Tariffs: Evidence from Mercosur. *Journal of International Economics* 64, no. 1: 65–88.
- Bond, Eric, and Constantinos Syropoulos. 1996. The Size of Trading Blocks: Market Power and World Welfare Effects. *Journal of International Economics* 40, no. 3–4: 412–37.
- Bown, Chad P. 2011. Taking Stock of Antidumping, Safeguards and Countervailing Duties, 1990–2009. *World Economy* 34, no. 12: 1955–98.
- Bown, Chad P. 2015a. *What’s Left for the WTO?* World Bank Policy Research Working Paper No. 7502. Washington: World Bank.
- Bown, Chad P. 2015b. *Temporary Trade Barriers Database*. Washington: World Bank. Available at <http://econ.worldbank.org/ttbdb/>.
- Bown, Chad P., and Meredith A. Crowley. 2013a. Self-Enforcing Trade Agreements: Evidence from Time-Varying Trade Policy. *American Economic Review* 103, no. 2: 1071–90.
- Bown, Chad P., and Meredith A. Crowley. 2013b. Import Protection, Business Cycles, and Exchange Rates: Evidence from the Great Recession. *Journal of International Economics* 90, no. 1: 50–64.
- Bown, Chad P., and Meredith A. Crowley. 2014. Emerging Economies, Trade Policy, and Macroeconomic Shocks. *Journal of Development Economics* 111: 261–73.
- Bown, Chad P., and Meredith A. Crowley. Forthcoming. The Empirical Landscape of Trade Policy. In *Handbook of Commercial Policy*, eds. Kyle Bagwell and Robert W. Staiger. Netherlands: Elsevier.
- Bown, Chad P., Baybars Karacaovali, and Patricia Tovar. 2015. What Do We Know About Preferential Trade Agreements and Temporary Trade Barriers? In *Trade Cooperation: The Purpose, Design and Effects of Preferential Trade Agreements*, eds. Andreas Dür and Manfred Elsig. Cambridge: Cambridge University Press.
- Bown, Chad P., and Patricia Tovar. 2011. Trade Liberalization, Antidumping, and Safeguards: Evidence from India’s Tariff Reform. *Journal of Development Economics* 96, no. 1: 115–25.
- Broda, Christian, Nuno Limão, and David Weinstein. 2008. Optimal Tariffs and Market Power: The Evidence. *American Economic Review* 98, no. 5: 2032–65.
- Calvo-Pardo, Hector, Caroline Freund, and Emanuel Ornelas. 2011. The ASEAN Free Trade Agreement: Impact on Trade Flows and External Trade Barriers. In *Costs and Benefits of Economic Integration in Asia*, eds. Robert J. Barro and Jong-Wha Lee. Oxford: Oxford University Press.
- Crivelli, Pramila. 2014. Regionalism and Falling External Protection in High and Low Tariff Members. Geneva School of Economics and Management, Working Paper 14-08-2.
- Estevadeordal, Antoni, Caroline Freund, and Emanuel Ornelas. 2008. Does Regionalism Affect Trade Liberalization toward Nonmembers? *Quarterly Journal of Economics* 123, no. 4: 1532–75.
- Freund, Caroline, and Emanuel Ornelas. 2010. Regional Trade Agreements. *Annual Review of Economics* 2, no. 1: 139–66.
- Grossman, Gene M., and Elhanan Helpman. 1994. Protection for Sale. *American Economic Review* 84, no. 4: 833–50.
- Karacaovali, Baybars, and Nuno Limão. 2008. The Clash of Liberalizations: Preferential vs. Multilateral Trade Liberalization in the European Union. *Journal of International Economics* 74, no. 2: 299–327.
- Kee, Hiau Looi, Alessandro Nicita, and Marcelo Olarreaga. 2008. Import Demand Elasticities and Trade Distortions. *Review of Economics and Statistics* 90, no. 4: 666–82.
- Kee, Hiau Looi, Alessandro Nicita, and Marcelo Olarreaga. 2009. Estimating Trade Restrictiveness Indices. *Economic Journal* 119, no. 534: 172–99.
- Kennan, John, and Raymond Riezman. 1990. Optimal Tariff Equilibria with Customs Unions. *Canadian Journal of Economics* 23, no. 1: 70–83.
- Ketterer, Tobias, Daniel Bernhofen, and Chris Milner. 2014. Preferences, Rent Destruction and Multilateral Liberalization: The Building Block Effect of CUSFTA. *Journal of International Economics* 92, no. 1: 63–77.
- Ketterer, Tobias, Daniel Bernhofen, and Chris Milner. 2015. The Impact of Trade Preferences on Multilateral Tariff Cuts: Evidence for Japan. *Journal of the Japanese and International Economies* 38: 31–51.
- Krugman, Paul R. 1991. Is Bilateralism Bad? In *International Trade and Trade Policy*, eds. Elhanan Helpman and Assaf Razin. Cambridge: MIT Press.

- Kume, Honorio, and Guida Piani. 2006. Antidumping and Safeguard Mechanisms: The Brazilian Experience, 1988–2003. In *Safeguards and Antidumping in Latin America's Trade Liberalization: Fighting Fire with Fire*, eds. J. Michael Finger and Julio J. Nogués. New York: Palgrave Macmillan.
- Limão, Nuno. 2006. Preferential Trade Agreements as Stumbling Blocks for Multilateral Trade Liberalization: Evidence for the US. *American Economic Review* 96, no. 3: 896–914.
- Limão, Nuno. Forthcoming. Preferential Trade Agreements. In *The Handbook of Commercial Policy*, eds. Kyle Bagwell and Robert W. Staiger. Netherlands: Elsevier.
- Limão, Nuno, and Patricia Tovar. 2011. Policy Choice: Theory and Evidence from Commitment via International Trade Agreements. *Journal of International Economics* 85, no. 2: 186–205.
- Ludema, Rodney D., and Anna Maria Mayda. 2013. Do Terms-of-trade Effects Matter for Trade Agreements: Theory and Evidence from WTO Countries. *Quarterly Journal of Economics* 128, no. 4: 1837–93.
- Mai, Joseph, and Andrey Stoyanov. 2015. The Effect of the Canada-US Free Trade Agreement on Canadian Multilateral Trade Liberalization. *Canadian Journal of Economics* 48, no. 3: 1067–98.
- Moore, Michael O. 2011. Argentina: There and Back Again? In *The Great Recession and Import Protection: The Role of Temporary Trade Barriers*, ed. Chad P. Bown. London: CEPR and World Bank.
- MSU (Michigan State University). 2016. Mercosur: History. East Lansing: MSU Broad College of Business. Available at <http://globaledge.msu.edu/trade-blocs/Mercosur/history>, accessed on April 12, 2016.
- Nicita, Alessandro, Marcelo Olarreaga, and Peri Silva. 2015. Cooperation in WTO's Tariff Waters. University of Geneva mimeo, revised.
- Nogués, Julio J., and Elías Baracat. 2006. Political Economy of Antidumping and Safeguards in Argentina. In *Safeguards and Antidumping in Latin America's Trade Liberalization: Fighting Fire with Fire*, eds. J. Michael Finger and Julio J. Nogués. New York: Palgrave Macmillan.
- Olarreaga, Marcelo, and Marcel Vaillant. 2011. Brazil: Micro- and Macro-determinants of Temporary Trade Barriers. In *The Great Recession and Import Protection: The Role of Temporary Trade Barriers*, ed. Chad P. Bown. London: CEPR and World Bank.
- Prusa, Thomas J., and Robert Teh. 2010. *Protection Reduction and Diversion: PTAs and the Incidence of Antidumping Disputes*. NBER Working Paper No. 16276. Cambridge, MA: National Bureau of Economic Research.
- Richardson, Martin. 1993. Endogenous Protection and Trade Diversion. *Journal of International Economics* 34, no. 3–4: 309–24.
- Soderberry, Anson. 2015. Estimating Import Supply and Demand Elasticities: Analysis and Implications. *Journal of International Economics* 96, no. 1: 1–17.
- Syropoulos, Constantinos. 1999. Customs Unions and Comparative Advantage. *Oxford Economic Papers* 51, no. 2: 239–66.
- Tovar, Patricia. 2012. Preferential Trade Agreements and Unilateral Liberalization: Evidence from CAFTA. *World Trade Review* 11, no. 4: 591–619.
- Wooldridge, Jeffrey. 2010. *Econometric Analysis of Cross Section and Panel Data*, 2nd ed. Cambridge: MIT Press.