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Does Regionalism Affect Trade Liberalization toward Non-Members?

Antoni Estevadeordal
Caroline Freund
Emanuel Ornelas

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Abstract

This paper examines the effect of regionalism on unilateral trade liberalization using industry-level data on applied most-favored nation tariffs and bilateral preferences for ten Latin American countries from 1990 to 2001. The findings show that preferential tariff reduction in a given sector leads to a reduction in the external (most-favored nation) tariff in that sector. External liberalization is greater if preferences are granted to important suppliers. However, these "complementarity effects" of preferential liberalization on external liberalization do not arise in customs unions. Overall, the results suggest that concerns about a negative effect of preferential liberalization on external trade liberalization are unfounded.

This paper—a product of the Trade Team, Development Research Group—is part of a larger effort in the department to understand the consequences of regionalism. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at cfreund@worldbank.org.

DOES REGIONALISM AFFECT TRADE LIBERALIZATION TOWARD NON-MEMBERS?*

Antoni Estevadeordal
Inter-American Development Bank

Caroline Freund
World Bank

Emanuel Ornelas
London School of Economics

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I. Introduction

In 1991, Larry Summers proclaimed that countries should pursue trade openness via all types of tariff reduction, be they unilateral, multilateral, or bilateral. He argued that while global liberalization may be better, regionalism is very likely to be good and could just as easily accelerate general liberalization as retard it. Policymakers seem to agree, choosing regionalism as the preferred mode of liberalization. According to the World Trade Organization (WTO), there are over 250 regional trade agreements (RTAs) currently in force. Most of these agreements have been concluded in the past 15 years, and many new agreements are under negotiation.

Some prominent trade economists, however, are concerned with this rise of regionalism, viewing preferential trading arrangements as inimical to the world trade system.[1] In their view, regionalism will reduce the incentives of governments to liberalize trade vis-à-vis non-member countries. The large theoretical literature is ambiguous, showing that regional agreements could provide incentives for or against unilateral liberalization to non-members. In light of this theoretical deadlock, empirically evaluating the consequences of regionalism for external tariff liberalization is the natural way to advance.

Assessing the impact of a regional trade agreement on the tariffs its members impose on outsiders is critical to determine the welfare consequences of the bloc.[2] This issue is especially important in developing countries: over eighty percent of the agreements notified to the GATT/WTO involve at least one developing country. Latin America, in particular, provides an excellent arena for this study because several regional agreements have been implemented in that

[1] See for example Bhagwati and Panagariya (1999).
[2] As Kemp and Wan (1976) show, in any customs union there is a set of external tariffs that leaves welfare of non-members unaffected. If external tariffs fall below that level, then excluded countries benefit from the arrangement. Panagariya and Krishna (2002) extend this result to incorporate free trade areas.

region within the last 15 years, including NAFTA and MERCOSUR. In fact, the World Bank (2005) estimates that 88 percent of trade in Latin America is now potentially eligible for preferential treatment. In addition, while applied tariffs in Latin America are normally high relative to those in advanced countries, in about 98 percent of cases (in our sample) they are set well below their bound levels at the WTO. This implies that those countries have ample room to either raise or lower their applied tariffs subsequent to the formation of a regional agreement, making it easier to identify the influence of RTAs.

We use data on preferential and most-favored nation (MFN) applied tariffs in ten Latin American countries and 100 ISIC 4-digit industries over the period 1990-2001. The data are unique because they include preferential tariffs across partners, industries, and years. We examine whether sectors with relatively large preferences have been liberalized or protected to the same extent as other sectors, and whether these effects differ by type of RTA, free trade areas (FTAs) or customs unions (CUs). Typically, CUs are distinguished from FTAs because they presume a coordination of the external trade policies of their members.

Our results imply that regionalism is a building bloc to free trade in Latin America. There is no clear evidence that trade preferences lead to higher tariffs or smaller tariff cuts in our sample. There is strong evidence that preferences induce a faster decline in external tariffs in free trade areas. The results are both statistically and economically significant. For example, if a country that follows a strict policy of non-discrimination offers free access to another country in a sector where it applies a 15% MFN tariff (the average in our sample), it would tend to subsequently reduce that tariff by over three percentage points. On the other hand, extending preferences in customs unions does not seem to lead to any significant change in multilateral tariffs; at best, it could induce a reduction in the MFN tariff that is considerably smaller than the

one induced by the same policy in an FTA. Still, if the main concern about regionalism is its potential negative effect on liberalization against excluded countries, then this concern seems to be unfounded.

There are several reasons why regionalism may be correlated with external trade liberalization in developing countries. First, since the multilateral system has had only a limited impact on tariff reduction in developing countries, regional agreements may serve as an enforcement mechanism for a broader reform package. Second, theory implies that with high external tariffs, the possibility of costly trade diversion resulting from an RTA could provide governments with an incentive to liberalize, and a shrinking import-competing sector could realign political interests away from protection. Third, it may be that some products are easier to liberalize than others, and trade in those products tends to be liberalized both regionally and multilaterally.

This final case is qualitatively very different from the previous ones. It implies that regionalism and multilateralism are correlated though causation does not follow. In contrast, the first two arguments put regional agreements as a force behind external tariff liberalization. We use three distinct strategies to determine if this is a causal effect and find strong evidence that it is. First, as we pointed out above, our results depend critically on the type of agreement, whether FTAs or CUs. If the relationship between preferential and MFN tariffs were simply a result of country-industry specific shocks driving liberalization at all fronts, there would be no reason for those shocks to operate distinctly in different types of agreements. We therefore interpret the differential results for FTAs and CUs as indicative that causal forces, as those analyzed in the theoretical regionalism literature, have been at work in Latin America's RTAs.

Second, the regionalism literature indicates that the effect of a trading bloc on external

tariffs depends not only on the preferential rates, but also on the relative importance of preferential imports. When we include the share of preferential imports in our empirical analysis interacted with the presence of a preference margin,[3] we obtain further evidence of tariff complementarity in FTAs (i.e., a larger share of preferential imports induces a larger reduction of MFN tariffs) and of no discernible effect in CUs. We interpret those results as additional evidence of a causal relationship between preferential and external trade liberalization.

Third, we employ an instrumental variables approach that takes advantage of the richness of our dataset. Since preferential liberalization in Latin America is often reciprocal, we use the preferential tariffs of a country's trading partners as an instrument for the country's own preferential tariff. We also report results instrumenting preferential adjustment and lagged preferential adjustment with two lags. If anything, our IV estimations strengthen the tariff complementarity in free trade areas obtained with the OLS estimations.

The paper proceeds as follows. The next section discusses the related literature. Section III develops our empirical strategy. Section IV describes the data. Section V reports the results. Section VI concludes.

II. Related Literature

Theory

Theoretical analyses of how the formation of an RTA affects the incentives of governments to set external tariffs have identified several forces linking preferential and external tariffs.[4] However, many of these forces go in opposite directions, and there is no consensus on

[3] We actually use the *pre-agreement* import shares of the preferential partners, to avoid endogeneity issues between preferential tariffs and imports that emerge once the agreement enters in force.

[4] A large literature has addressed also the related questions of whether allowing countries to form RTAs help or hinder the viability of a multilateral free trade agreement (Levy 1997; Krishna 1998; Aghion, Antràs and Helpman 2007, Saggi and Yildiz 2007); how RTAs affect the efficiency properties of the multilateral trading system (Bagwell

what the net effect should be.

Several authors suggest that countries are likely to reduce their external trade barriers after forming a free trade area. Bagwell and Staiger (1999a) dub this the "complementarity effect" of preferential tariff reduction. This result has been derived both under the assumption that governments set tariffs to maximize national welfare (Bagwell and Staiger 1999a; Freund 2000a; Bond et al. 2004) and in political-economy settings (Richardson 1993; Ornelas 2005a). The general intuition in those studies is that a preferential tariff induces trade diversion; since this diversion is costly, external tariffs decline to shift some imports back to their original source, thus moderating the extent of trade diversion.[5]

Cadot, de Melo and Olarreaga (1999) point out, however, that at least one member of an FTA could want to raise external tariffs if general equilibrium effects that travel through the wage rate are sufficiently strong. Similarly, Panagariya and Findlay (1996) show that, if tariffs are a function of the labor allocated into lobbying activities, then an FTA lowers the wage rate by making lobbying for tariffs against the partners innocuous. This, in turn, lowers the cost of lobbying against FTA outsiders, generating higher external tariffs in equilibrium.

When regional integration takes the form of customs unions, new forces arise because of the harmonization of external trade policies.[6] In particular, the common external tariff allows CU members to exploit their joint market power in world markets, leading to higher external tariffs (Bond and Syropoulos 1996; Syropoulos 1999). The incentives to reduce external tariffs to

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and Staiger 1999b); how the efficiency properties of free trade differ when it is preceded by RTAs (Freund 2000b); how political economy motivations alter the willingness of governments to engage in RTAs (Grossman and Helpman 1995; Ornelas 2005b).

[5] Schiff and Winters (2003) summarize the empirical literature on trade diversion in RTAs. In general, trade diversion tends to be small, which is consistent with endogenous tariff changes that reduce costly diversion. In some sectors and some countries there is evidence of significant trade diversion.

[6] According to the WTO, over ninety percent of the existing RTAs are FTAs, where member countries maintain autonomous external trade policies. On the other hand, prominent RTAs, such as the European Union and Mercosur, are CUs, where members are supposed to share a common external tariff structure.

moderate trade diversion may be weaker in CUs, as well. Since lower external tariffs imply lower preferential margins, they reduce the partners' gains with the agreement. When external tariffs are negotiated, as in CUs, this effect tends to be internalized by bloc members, thereby leading to higher external tariffs (Bagwell and Staiger 1999a; Freund 2000a; Ornelas 2007). In contrast, if one considers that free-riding problems in lobbying activities are aggravated in customs unions, as Richardson (1995) and Panagariya and Findlay (1996) do, then this would constitute a force toward lower external tariffs in CUs, relative to FTAs.

Regardless of the type of agreement, Limao (2007) shows that an RTA could generate higher tariffs against outsiders when the goal of a country with the agreement is to induce cooperation of its RTA partner(s) in "non-trade" areas, such as cooperation on drugs or labor standards issues. Since lower external tariffs would erode preferences, they could induce the receiving countries to withdraw their non-trade concessions. Higher external tariffs, on the other hand, would provide greater preferential access and therefore greater incentives for cooperation. In Appendix A3, we develop a simple model that highlights the sources of both tariff complementarity and tariff substitutability.

Finally, another issue that can affect changes in external tariffs is their bindings in the WTO. There is a new literature that seeks to understand why governments often negotiate tariff ceilings, rather than exact tariff levels, and why applied rates are in many cases set below the ceilings.[7] While there is no theoretical analysis that looks specifically at how tariff bindings affect the incentives of countries to adjust their external tariffs in a regional trade agreement, it is

[7] For example, Bagwell and Staiger (2005) show that, if there is uncertainty about (privately observed) future levels of political pressures, negotiation of tariff ceilings is preferable because they provide governments with flexibility to adjust protection levels according to the realized levels of political pressure. Horn, Maggi and Staiger (2006) point out that permitting discretion to choose tariffs below their ceilings is an optimal response of governments to the existence of contracting costs. And Maggi and Rodriguez-Clare (2007) show that the negotiation of tariff ceilings (rather than of applied rates) in trade agreements is optimal because they keep lobbying activities alive, which in turn can mitigate overinvestment in protected sectors.

clear that the presence of ceilings would matter in that context. This would be the case if an agreement induces a country to raise the tariff in a sector where the applied rate is close to/at its ceiling, as well as if an agreement induces a country to lower the tariff in a sector where the ceiling is set sufficiently below the country's optimal tariff.

Empirics

Because of data limitations, this extensive and controversial theoretical debate has been conducted with only limited empirical support. For example, Magee and Lee (2001) study whether the formation of the European Economic Community led its members to adopt higher or lower external tariffs. They find that the formation of the EEC induced members to reduce external tariffs. However, their analysis is based on a dataset that includes only 51 observations of changes in the average external tariffs of 51 industries between 1968 and 1983.

Recent studies by Limao (2006) and Karacaovali and Limao (2008) address a related question: whether preferential liberalization by the United States and the European Union hindered multilateral trade liberalization at the Uruguay Round. Both papers find that liberalization was relatively smaller in products where preferences were utilized. The intuition is that, because the U.S. and the E.U. offer preferences on a unilateral basis to extract concessions from the recipients in non-trade areas, they would tend to resist liberalization to prevent erosion of preferences.

A couple of papers examine the relationship between regionalism and external trade liberalization in developing countries. Foroutan (1998) provides a general account of how countries forming regional trade blocs have adjusted their external tariffs. She examines trade and trade policy in over fifty developing countries and finds that integrating countries have been more active in reducing multilateral trade barriers than non-integrating countries. However,

Foroutan does not control for other factors that may have induced countries to behave as they did, making it impossible to disentangle the effect of trade agreements from other global, regional or sectoral trends.

Using a detailed cross-industry dataset on Argentina for 1992, 1993 and 1996, Bohara, Gawande and Sanguinetti (2004) examine the influence of imports from Mercosur's partner Brazil on Argentina's external tariffs. They find that increased preferential imports vis-à-vis the value added of the domestic industry led to lower external tariffs in Argentina, especially in industries that experienced trade diversion. The study of Bohara et al. concentrates on the effects of increases in preferential imports, however, and does not address the direct effect of preferential tariffs. Additional concerns are that their dataset begins in 1992, a year after the establishment of Mercosur, and that they do not account for the effect of Mercosur becoming a customs union in 1995.

Interestingly, results from Limao (2006) and Karacaovali and Limao (2008) are opposite of those in Bohara et al. (2004), making it difficult to draw broad conclusions. One important distinction between the two sets of studies is the country sample: while the former studies the two majors, the latter analyses a developing country. It may be that the incentives generated by preferences are very different in these contexts. In particular, since developing country tariffs are usually much higher than U.S. or E.U. tariffs, the cost of trade diversion and the resulting incentive to liberalize vis-à-vis outsiders can be far greater in the former. A second important difference is the type of liberalization: Limao (2006) and Karacaovali and Limao (2008) examine external liberalization resulting from a multilateral trade round, while Bohara et al. (2004) examine unilateral external liberalization. A final but not less important distinction is the purpose of the preferences. As Limao highlights, industrial countries often use preferences to extract

concessions in non-trade areas. In contrast, preferences in developing countries tend to be reciprocal and aimed mainly at trade goals. This could generate very different incentives regarding external trade policies.[8]

In sum, the context in which research in this area currently stands is one of severe theoretical divergences and only limited empirical support. In addition, despite considerable theoretical literature implying that the type of RTA matters, there are no tests of differences between FTAs and CUs. In this paper, we provide new empirical evidence from ten Latin America countries through twelve years during which the intensity in the formation of preferential trading blocs has been unprecedented.

III. Econometrics Specification

As indicated in the previous section, several theoretical models seek to explain how preferential integration affects the external tariffs of a country. We use those models as a guide to help us identify and interpret the relationships between preferential and external liberalization. However, they do not provide structural equations relating MFN and preferential tariffs that can be taken directly to the data.

Existing theoretical analyses often also disregard two central features of actual RTAs. First, preferential tariffs are frequently *not* reduced to zero. The conventional theoretical approach is to assume that countries within an RTA fully (and immediately) eliminate trade barriers among themselves. This is broadly consistent with Article XXIV of the GATT, which requires members of RTAs to "eliminate [duties and other regulations of commerce] on

[8] In a very recent paper, Baldwin and Seghezza (2007) study the relationship between preferential and MFN tariffs in 23 developed and developing countries and find a positive relationship, suggestive of tariff complementarity. However, since their dataset is a cross-section (for 2005), Baldwin and Seghezza note that they cannot assess whether their result arises from a causal relationship or is just a consequence of, say, fixed effects that affect both preferential and multilateral tariff levels.

substantially all trade between the constituent territories." Article XXIV is, however, perhaps the least enforced article of the GATT, and in reality the complete elimination of internal tariffs is the exception, rather than the rule, in most operative RTAs.[9] Moreover, RTAs among developing countries are often initiated under the Enabling Clause, which does not include such requirements.[10] Accordingly, if one wants to estimate the consequences of preferential liberalization, one must account for the (often large) differences in internal liberalization across industries, time, and member countries.

The second important practical feature of RTAs that the theoretical literature typically bypasses is that countries engage simultaneously in multiple RTAs. Increasingly, tariff preferences are granted to multiple countries, with the margin of preferences varying across recipients and across time. This implies that we need to define a measure of preferential liberalization to use.

We choose to use the minimum preferential rate offered to partners as our measure of preferential liberalization for a country in each sector and period. Thus, we define the preferential tariff of country *j* in industry *i*, year *t*, as

$$PREF_{ijt} \equiv \min_{k}\{\tau_{ijt}^{k}\},$$

where τ_{ijt}^{k} represents the preferential tariff set by country *j* on sector *i* imports from RTA partner *k* in period *t*, and where a country is defined as *partner* when it can export sector *i* goods to country *j* under tariffs strictly below country *j*'s correspondent MFN rate.[11] Since we will be interested only in how *changes* in *PREF* affect changes in MFN, we also set $PREF_{ijt} = MFN_{ijt}$ in

[9] See McMillan (1993) for a discussion of the drawbacks and the imprecisions of Article XXIV.
[10] For example, Mercosur and the Andean Community (CAN) were initiated under the Enabling Clause, whereas NAFTA was initiated under Article XXIV.
[11] Results would be qualitatively equivalent if we aggregated preferential tariffs weighted by shares of preferential imports. Such a measure would generate additional difficulties, however, because of the endogeneity of import shares. Furthermore, we would be unable to use observations in which tariff data are available but trade data are not.

the period before country *j* offers the first preference in sector *i*. This allows us to capture the effect of the initial concession of preferences. Similarly, we set the change in *PREF* to zero (i.e., $\Delta PREF_{ijt} = 0$) whenever country *j* does not offer preferences in sector *i* in years *t* and $t - 1$, since in that case any change in MFN_{ijt} is obviously unrelated to preferences. While there are relatively few observations in which there are no preferences in our dataset, they provide a useful benchmark for situations in which MFN tariffs change for reasons unrelated to preferential liberalization. Finally, we drop 153 observations in which MFN tariffs are set at zero. When MFN tariffs are zero, preferential tariffs must be zero as well, and this would lead to a positive bias on the estimate of $\Delta PREF$.

When a group of countries forms a free trade agreement, the most important issue is the negotiation of the tariff reductions within the bloc—or more commonly, the *schedule* for such reductions. After that negotiation, individual governments are not allowed to set preferential rates above the levels defined on the schedule.[12] Governments occasionally re-negotiate specific preferential rates, but only if "significant" events take place—e.g. a surge of imports in politically sensitive sectors or a sharp appreciation of a member's currency. The tariffs that each member applies to imports from non-members, on the other hand, can be altered independently and at a faster pace. If renegotiation is costly, as it likely is (see for example the discussion in Horn et al. [2006]), then this suggests a specific timing in the determination of tariffs, where preferential rates are *pre-determined* relative to MFN rates.

Following this reasoning, the simplest structure to study the impact of preferences on MFN tariffs is

$$MFN_{ijt} = \beta_1 (PREF_{ijt-1}) + \varepsilon_{ijt}, \quad (1)$$

[12] Generally, governments can lower preferential rates ahead of the schedule, but doing so is typically not in their best interest—otherwise they would have lowered them even before the agreement.

where MFN_{ijt} represents the multilateral (MFN) tariff of country *j* in industry *i*, year *t*, and $PREF_{ijt-1}$ is the corresponding preferential tariff, as defined above, but lagged one period. Using lagged preferences to estimate MFN tariffs reflects the idea that preferences are pre-determined relative to MFN tariffs and MFN tariffs may react with a lag. It also reduces simultaneity bias from, for example, an overall reduction in all tariffs in some industries.

In equation (1), $\beta_1 > 0$ would lend support for a "building blocs" view of preferential liberalization, where countries reduce their MFN tariffs as they lower preferential tariffs. On the other hand, $\beta_1 < 0$ would support a "stumbling blocs" view of preferential liberalization, where countries raise (or lower by less) their MFN tariffs as they lower preferential tariffs.

Now, specification (1) is clearly too parsimonious, disregarding other forces that may help shape the tariffs of countries, such as political economy considerations, fiscal needs, and historical trade policy. However, rather than incorporating those variables explicitly in our estimating equation (and deal with the issues raised by the extra variables, such as endogeneity, lack of adequate and comparable data across countries, etc.), we take advantage of the panel structure of our dataset and use a very broad set of "fixed effects" to capture the forces beyond those dictated by preferential liberalization. Since we are not interested in the particular components of those forces, we lose nothing in bundling them together in a set of dummy variables.

Expanding equation (1) to incorporate such fixed effects, we obtain

$$MFN_{ijt} = \alpha_{jt} + \alpha_{ij} + \alpha_{ij}t + \beta_1(PREF_{ijt-1}) + v_{ijt}\,. \tag{2}$$

In equation (2), α_{jt} denotes a country-year fixed effect. It picks up the impact of broad programs of trade liberalization that took place in several Latin America countries during the 1990s, as well as balance of payments and other macro shocks that can affect tariffs across industries in

specific countries and periods. In turn, α_{ij} is a country-industry fixed effect that is meant to capture overall economic, political and historical factors that influence the level of protection across industries in a given industry and country. The term $\alpha_{ij}t$ captures trends in those factors. It reflects also how distinct countries absorb the impact of sectoral multilateral agreements and the difficulties in multilateral liberalization experienced in some industries (such as agriculture). This broad set of controls helps to ensure that the estimated effect of preferential liberalization on external tariffs will indeed reflect only that, rather than other forces that also affect external tariffs. To eliminate the unobserved heterogeneity α_{ij}, we take first differences in (2). This gives us

$$\Delta MFN_{ijt} = \gamma_{jt} + \alpha_{ij} + \beta_1(\Delta PREF_{ijt-1}) + u_{ijt}, \quad (3)$$

where $\gamma_{jt} \equiv \alpha_{jt} - \alpha_{j,t-1}$ and $u_{ijt} \equiv v_{ijt} - v_{ij,t-1}$.

Now, there remains a concern about the exogeneity of the variable $\Delta PREF$. The correlation between changes in lagged preferential tariffs and changes in external tariffs may not reflect a causal relationship, but be a consequence of, for example, unobserved fluctuations of domestic or international political and economic pressures that induce governments to adjust both preferential and MFN tariffs (with a lag). To deal with this potential simultaneity problem, we proceed in two alternative ways. One is to use instrumental variables. In general, it is recognizably difficult to find good instruments to measure the effect of RTAs.[13] In our case, there is an extra difficulty because we look at preferential tariffs directly, and the variables typically used in the trade literature as instruments for tariffs (such as capital-labor ratios and political-economy variables) are correlated with both preferential and MFN tariffs—and therefore also with the error term in (3).

[13] See Baier and Bergstrand (2007) for a broad discussion of this issue.

We can, however, take advantage of the multi-country dimension of our dataset, which allows us to use instruments that others studying the effects of preferences in a single country usually cannot: the preferential tariffs of RTA partners. That is, we instrument the (lagged) change in *PREF* of each country with the corresponding (lagged) change in *PREF* of its *partners* in the same industry.[14] This is a valid approach because many RTAs, including the ones in Latin America that we study, are reciprocal, in the sense that preferences are offered in exchange for preferences received. Preferential tariffs vary by country and sector, but in general they are highly correlated within preferential agreements (Kowalczyk and Davis 1998). But if the preferential tariffs of the trading partners of a country in a year are not affected by the same forces that shape the country's own MFN tariffs in the subsequent year, these instruments would be appropriate.

This approach would not be entirely satisfactory, however, if there were shocks that affect the incentives of all members of an RTA to liberalize or restrict trade both multilaterally and preferentially. Thus, to distinguish between the hypothesis that (H1) countries lower tariffs on outsiders because they are offering preferential treatment and the hypothesis that (H2) unobserved sector-specific shocks induce countries to liberalize or restrict trade generally,[15] we also employ an empirical strategy more grounded on insights from the regionalism theoretical literature.

First, as the discussion in Section II indicates, the regionalism literature argues that the effect of a preferential trading bloc on the external tariffs of its members depends on the type of

[14] We use the preferential tariffs of the three main preferential partners of each country. For each Mercosur and CAN member, we define the "main partners" of the country as the other three members of the bloc in our sample. For Chile, we define the main partners to be Colombia, Mexico, and Peru. For Mexico, they are Chile, Colombia, and Venezuela.

[15] Baldwin and Seghezza (2007) argue that this would be the case if in some countries/sectors there is a political consensus to foster liberal trade policies, slashing both MFN and preferential tariffs, whereas in other countries the consensus is protectionism, pushing tariffs of all kinds up.

the bloc, whether a free trade area or a customs union. By contrast, under hypothesis (H2) mentioned above there would be no reason to observe systematic differences in the relationship between preferential and external tariffs in FTAs and CUs. To determine whether the type of the agreement matters, we interact our key variable with a customs union dummy, obtaining

$$\Delta MFN_{ijt} = \gamma_{jt} + \alpha_{ij} + \beta_1(\Delta PREF_{ijt-1}) + \beta_2(\Delta PREFCU_{ijt-1}) + u_{ijt}, \quad (4)$$

where *PREFCU* is defined as its counterpart without the suffix *CU*, but is multiplied by a dummy variable *CU* that is one if the preference conceded by the country is under a customs union (i.e., $PREFCU \equiv PREF*CU$).[16] A statistically significant coefficient β_2, by showing a differential impact of preferential liberalization on the incentives to liberalize vis-à-vis non-members in CUs, would be consistent with a theoretically-based causal relationship between the two types of liberalizations, but not with a statistical relationship caused by unobserved shocks. Equation (4) corresponds to our basic specification.

Furthermore, if hypothesis (H1) is correct, external tariffs should be affected not only by preferential *tariffs*, but also by preferential *imports*.[17] As the simple model that we develop in Appendix A3 indicates, the former tends to affect external tariffs because it produces costly trade diversion, whereas the latter tends to impact external tariffs by defining the extent of the terms of trade loss incurred by the preference-giving country vis-à-vis its partners.

Figure I illustrates this point. It shows the import demand curve for a good in the *Home* country and the correspondent export supply curve of its regional trade *Partner*, along with the world price of the good, $\underline{p}$, and Home's tariff, t. When the tariff on Partner is eliminated, Partner's effective supply curve shifts out from E^* to E^*_{FTA}, replacing some of the imports from

[16] In our sample, the CU dummy is one for Mercosur and CAN members from 1995 onwards and zero otherwise. We do not include the variable *CU* alone because it is perfectly collinear with the country-year fixed effects.
[17] See for example the analyses of Richardson (1993), Bagwell and Staiger (1999a), Freund (2000a), and Ornelas (2005a).

the rest of the world. As a result, the tariff revenue that Home formerly collected on imports from Partner (the shaded area) is shifted entirely to Partner in the form of higher prices. Clearly, the larger the initial imports from Partner, the larger is this transfer. But Home could reduce this loss by lowering its external tariff, thereby shifting the rents to Partner to consumer surplus in Home. Since the magnitude of this shift is proportional to the volume of preferential imports, this suggests that, in free trade areas, larger imports from regional partners should increase the incentive to lower external tariffs. In customs unions this may not be the case, however, because members may be maximizing joint gains, and these are unaffected by terms of trade changes within the bloc. There are circumstances where the optimal tariff may actually rise in a customs union, for example if is large enough to affect the bloc's terms of trade with outsiders (Bagwell and Staiger [1999a]), or similarly, in a model with imperfect competition, if it can shifts profits away from firms in non-member countries to firms within the trade bloc (Freund [2000a]).

To capture the effects of preferential imports on the incentives to liberalize against outsiders, we then include the country's share of preferential imports in the sector, interacted with an indicator variable, MRG_{ijt}, which is unity if the preferential margin is above 2.5 percentage points, where preferential margin is defined as $MFN_{ijt} - PREF_{ijt}$. The reason for the interaction with *MRG* is that, as is well known, the costs involved in complying with rules of origin (ROOs) can be greater than the gains stemming from the preferential treatment if the margin of preference is too small. As a result, small enough preference margins can be for practical purposes equivalent to no preferences. A rule of thumb is to consider that a preferential treatment is practically irrelevant when the preferential margin is below 2 or 3 percentage points;

thus, we adopt 2.5 percentage points as our cutoff point for *MRG*.[18] Now, to avoid endogeneity issues when we include the share of preferential imports in the regression, we use the import shares of current partners, but in the first period for which we have data (defined as *period 0*, typically 1990 or 1991). That is, we include variable s^0_{ijt}, defined as the share of country *j*'s imports (by sector) in period 0 stemming from country *j*'s partners in period *t*: $s^0_{ijt} \equiv M^{Pt}_{ij0} \big/ M_{ij0}$, where M^{Pt}_{ij0} denotes country *j*'s imports of sector *i*'s goods in period 0 from all countries defined as partners in that sector in period *t*, and M_{ij0} represents country *j*'s total imports in sector *i* in period 0. Expanding equation (4) to include the interaction terms (with and without *CU*) and each individually, we obtain

$$\begin{aligned}(5)\quad \Delta MFN_{ijt} = {} & \gamma_{jt} + \alpha_{ij} + \beta_1(\Delta PREF_{ijt-1}) + \beta_2(\Delta PREFCU_{ijt-1}) + \beta_3(s^0_{ijt-1} \times MRG_{ijt-1}) + \\ & \beta_4(s^0_{ijt-1} \times MRGCU_{ijt-1}) + \beta_5 s^0_{ijt-1} + \beta_6 s^0_{ijt-1} CU_{ijt-1} + \beta_7 MRG_{ijt-1} + \beta_8 MRGCU_{ijt-1} + \beta_9 u_{ijt}.\end{aligned}$$

In equation (5), statistically significant coefficients β_3 or β_4 would provide further evidence that countries adjust their MFN tariffs as a result of preferential liberalization, whereas statistically insignificant coefficients β_3 and β_4 would cast doubt on the causal nature of the relationship. In particular, since sectors with higher preferential trade shares generate larger terms of trade losses vis-à-vis RTA partners for given preferential and MFN tariffs, governments would benefit more by shifting sourcing to non-members in those industries, rather than in industries with lower preferential trading shares. For this reason, we expect β_3 to be negative. Yet since preferential trade affects terms of trade mostly *within* the bloc, we expect this effect to be neutralized in CUs, as reflected in a positive β_4. In contrast, we expect the coefficients on β_5 and β_6 to be statistically insignificant. Otherwise, they would suggest that the size of preferential

[18] A cutoff of 2.5 percentage points is probably on the conservative side. Francois, Hoekman and Manchin (2006), for example, argue that the margin of preference would need to be at least four percentage points for traders to request preferences when exporting to the European Union. Such a higher cutoff point would not affect our results.

imports matters for changes in MFN tariffs even when *MRG* = 0, which happens if either future preferences are not yet in force or the preference is in force but the margin is very small. Since in both cases it is theoretically implausible that preferential shares would matter for changes in MFN tariffs, statistically significant β_5 and β_6 would probably reflect the workings of an omitted variable, possibly associated with forces that could lead to relationships as those underlining hypothesis (H2).

Now, since all countries in our sample are WTO members, they have most of their MFN tariffs bound at the WTO. However, unlike the industrial countries, their applied tariffs are generally set much below their bound levels, indicating that in most cases tariff bindings do not actually "bind." Still, the difference between bound and applied tariffs (the "tariff overhang") is very small in about two percent of our observations. Since that institutional constraint imposes restrictions on how countries can adjust their external tariffs, we check whether bound tariffs matter in our estimation. To do so, we use a dummy variable that is one if the difference between applied and bound tariffs is sufficiently small (less than three percentage points). We interact the dummy with $\Delta PREF$ and $\Delta PREFCU$ to see whether changes in preferential tariffs have a different effect on external tariffs in sectors constrained by WTO bindings.

We perform a series of robustness checks. We adopt an alternative estimating strategy, where we instrument the lagged change in the preferential tariff with two- and three-times lagged levels of preferential tariffs. Furthermore, to control for potential persistence in tariffs, we include a lagged dependent variable in the regression equation (instrumented by lags in two and thee periods). We report also additional robustness tests, for example using the preference *margin* (as opposed to the preferential *tariff*) to explain unilateral changes in MFN tariffs.

Comparison with Previous Work

At this point, it is worth comparing equations (4) and (5) with the estimating equations of Bohara et al. (2004) and Limao (2006).

Bohara et al. (2004) analyze the effects of regionalism on external liberalization by examining how preferential imports affect MFN tariffs. We evaluate, in addition to preferential imports, also the direct impact of preferential tariffs on MFN duties. While the motivations for changing external tariffs following the formation of an RTA are likely to be partially reflected in preferential imports, as we argued above, those imports can change also because of other factors. Moreover, if governments anticipate that preferential tariffs will induce changes in preferential imports that will in turn render a change in external tariffs beneficial, they could adjust the external tariffs even before the preferential imports change. This suggests that evaluating the impact of preferences on external tariffs directly could provide a different, complementary picture of the effects of regionalism on external trade liberalization, relative to the findings of Bohara et al. (2004). Our dataset allows us to evaluate also the effects of regionalism on a significantly longer period and for a much broader set of countries and agreements than Bohara et al. could. This permits us to assess, for example, whether the incentives to alter external tariffs depend on the type of the agreement (FTA or CU).

Limao (2006) follows yet another approach, where a dummy variable captures the effect of preferences on MFN liberalization. Specifically, Limao estimates the following equation:

$$\Delta MFN_i = \gamma + \gamma_I + \beta\, \mathrm{I}(PREF)_i + \eta X_i + u_{ijt},$$

where the dependent variable is the difference between post- and pre-Uruguay Round U.S. MFN tariff in product *i*. Parameters γ and γ_I reflect the country's tendency to liberalize in general and in the industry of which product *i* is part of, respectively. X_i captures other issues that could

affect MFN changes at the Uruguay Round, such as reciprocity and bargaining power. The main variable of interest is the dummy variable I($PREF$)$_i$, which is one iff good *i* is exported to the U.S. under a preferential treatment, of any magnitude, by any country.[19]

Thus, under Limao's (2006) approach differences in the size of preferences (as well as differences in preferential imports) are not taken into account. This absence may be of reduced importance for Limao's results, since in general the U.S. margins of preference cannot vary much (because they are limited by the U.S. MFN tariffs, which are generally very low). On the other hand, in our dataset we think it is important to account for differences in the size of preferential tariffs, since they vary significantly across time, industries, and countries. Accounting for such differences is important also if one intends to make inferences about the impact of future tariff concessions. As a robustness check, in the end of Section V we employ an empirical strategy that is conceptually similar to Limao's. Even though the results in that case are less informative, in the sense that they do not provide a direct estimation of the relationship between preferential and MFN tariffs, the conclusions are entirely consistent with our main results.

IV. Data

Regional Integration in Latin America during the 1990s

During the 1990s, a large number of regional trade agreements were formed in the world, and Latin America was no exception. In fact, it was one of the regions where regionalism forces were most clearly observed.

Within Latin America, the two main agreements are Mercosur and the Andean Community. Mercosur is formed by Argentina, Brazil, Paraguay, and Uruguay. Its negotiations

[19] Karacaovali and Limao (2008) employ a similar approach, but in their empirical model I($PREF$)$_i$ = 1 iff at least one country exports good *i* to the E.U. under a zero preferential rate.

were concluded in 1990 and it entered in force in 1991 as a free trade area. In 1994, Mercosur members decided to become a customs union, starting in 1995. Overall, Mercosur has been relatively successful in terms of achieving internal free trade and harmonizing external tariffs, although exceptions exist for each member (see the discussion in Olarreaga and Soloaga [1998]). The bloc also formed side agreements with Bolivia and Chile in 1997.

The other multi-country RTA in South America is the Andean Community. Officially formed in 1969, the agreement was effectively ignored during the 1980s. At the end of that decade, however, its members (Bolivia, Colombia, Ecuador, Peru, and Venezuela) decided to revamp the process of internal liberalization. Just as in Mercosur, internal liberalization started in 1991 and the group became a customs union in 1995. Peru left the group in 1992, but it maintained bilateral agreements with all other CAN members.[20] While relatively successful in terms of eliminating internal trade barriers, the group itself recognizes the difficulties in the implementation of their CU.[21]

Colombia and Venezuela also have a free trade agreement with Mexico since 1995 under the Group of Three, and each of them has an FTA with Chile (Venezuela since 1993, Colombia since 1994, Mexico since 1999). Chile and Mexico started agreements with other countries during the 1990s as well—Chile with Canada (1997) and Peru (1998), Mexico with Costa Rica (1995) and its North America partners under NAFTA (1994).

In sum, the 1990s marks the period where South America countries, as well as Mexico, seriously started to engage themselves in initiatives of regional trade liberalization.

[20] President Hugo Chávez has recently decided to take Venezuela out of CAN, while signing an FTA with Mercosur. This change took effect in 2005, however, well after the last year in our dataset (2001).
[21] See http://www.comunidadandina.org/endex.htm.

Data Sources and Initial Analysis

We construct a comprehensive dataset that includes data on bilateral preferential tariffs, external (MFN) tariffs, and trade for ten Latin American Countries—Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Paraguay, Uruguay, and Venezuela—from 1990 to 2001. Data on preferential and multilateral tariffs come from individual country sources. The main novelty of our dataset is the compilation of the bilateral preferential tariff rates. The compilation required consultation of the official texts of the agreements (sometimes available only in hard copies), which formed the basis for the conversion of the tariff reduction programs of each agreement into yearly preferential tariffs. Appendix A1 describes the methodological details for compiling the data and a detailed description of country sources. Data were supplemented with multilateral tariffs and trade data from the World Integrated Trade System. All data are aggregated as simple averages into ISIC 4-digit industries.

Annual tariff increases make up 22% of the sample, annual tariff declines 39%, while tariffs were unchanged the rest of the time. Given the significant number of tariff increases, we disregard any potential institutional constraint on tariff increases implied in GATT's Article XXIV in our estimations.[22] Declines in MFN tariffs are also larger on average than increases, resulting in considerable liberalization in aggregate.

Table I reports summary statistics of the key variables in the study. Overall, the average MFN tariff is 15.2% over the whole sample. The average annual external tariff liberalization was over 1 percentage point. The preferential tariff averages 4.7% over the period when preferences

[22] In addition to requiring that internal trade within RTAs should be liberalized "substantially," Article XXIV of the GATT also requires that restrictions on imports from third countries should not be higher "on the whole" than they were before the establishment of the agreement. This constraint would suggest a censored estimation of the changes in external tariffs, to rule out positive values. As noted above, however, GATT's Article XXIV is very poorly enforced, and our sample involves developing countries, which can form agreements under the much less restrictive Enabling Clause and tend to apply MFN tariffs well below their bound levels.

are in place, indicating that there was an average preference margin of about 10 percentage points. The average annual reduction in the preferential tariff was just over 2 percentage points. On average, 28% of imports come from RTA partners.

The aggregate figures are somewhat different if we consider only preferences given under customs unions. As Panel B of Table I shows, while MFN tariffs were just slightly lower, the average preferential tariff was much lower under customs unions, averaging 1.7%. In part this is because much of the preferential reduction occurred before the union was formed. The average preference margin was about 11.5 percentage points in CUs.

Before proceeding to the formal analysis, we offer a glimpse of the distribution of tariff changes over the sample period. Figure II displays kernel densities for MFN tariff changes from the first years (1991-1993) to the last years (1999-2001) in our sample. Using average data, the figure shows the kernel density of all tariff changes for goods with a preference margin above 2.5 percentage points and goods with a preference margin below 2.5 percentage points. Again, we use this threshold because margins that are too small are usually not utilized due to the additional paperwork required for compliance with ROOs regulations. The preference margin is lower than 2.5 percentage points in 41% of the observations in the first period, which are used for this graph. The figure shows that the density for goods with a meaningful margin of preference lies to the left of the density for goods without a meaningful margin of preference, indicating that the former have experienced greater tariff reduction on average.

Figure III shows kernel densities for all goods with a preference margin above 2.5 percentage points based on the import share from RTA members. If the preferential import share is above the 75^{th} percentile (above a 42% import share of partners), the good is considered to be a high-share good, where the intra-bloc transfer effect (discussed in Section III) will be greater.

We expect the MFN reduction to be larger in those sectors, if governments take this effect into account. The figure shows that the mode for high-share goods is to the left of the mode for the low-share goods, consistent with countries lowering MFN tariffs relatively more when the terms of trade loss vis-à-vis the partners is greater. The figure is similar if we use different cutoffs to define preference margin goods or different cutoffs for high preferential import share. As the preferential import share goes up, the kernel density shifts to the left. In contrast, for goods with very small preference margins, there is no distinct pattern with respect to import shares. This suggests that for goods with a meaningful preference margin, and only for them, higher preferential import shares lead to deeper MFN tariff reduction.

Figure IV shows a scatter plot of the external tariff reduction and the lagged change in the preferential tariff using annual data. The bulk of points fall in the third quadrant, indicating that lagged preferential tariff liberalization is correlated with current MFN liberalization. However, the reverse may also be true. If preferential reduction leads MFN reduction *and* MFN reduction leads preferential reduction, it would suggest that products that are easier to liberalize are liberalized both preferentially and multilaterally, with sometimes preferential and sometimes multilateral tariffs going first.

In Table II we report the results of estimating MFN changes on changes in preferential tariffs and the reverse, with country-year and country-industry fixed effects in all regressions. We find a strong contemporaneous correlation between preferential tariff reduction and multilateral tariff reduction. If we believe preferential tariffs are set on a schedule but MFN tariffs are decided over time, this implies that preferential reductions are followed by MFN reductions. Alternatively, this may reflect that some products are easier to liberalize, or that countries in an RTA tend to protect preference margins during external liberalization. This would

also be the case if countries' liberalization strategies simply called for liberalizing all tariffs (preferential and multilateral) by a given percent. On the other hand, we find that while lagged preferential reduction positively and significantly predicts MFN liberalization (columns 2-3), lagged multilateral liberalization does not positively predict preferential reduction (columns 5-6). In addition, simple correlations show that MFN tariff changes are more correlated with lagged preferential tariff changes (correlation 0.36) than with lagged MFN tariff changes (correlation 0.25). This suggests that MFN tariff cuts may be more influenced by past preferential tariff reductions than by past MFN cuts. In contrast, the reverse is not true—preferential tariff reductions are more correlated with past preferential reductions (0.20) than with past MFN reductions (0.13).

While the figures and correlations are supportive of a sanguine view of preferential liberalization, where preferential tariffs and MFN tariffs are complements, it is possible that Latin America high preference sectors simply happen to be those where multilateral negotiations were most effective in bringing tariffs down during the 1990s, for example. In the next section, we control for this and other potential factors behind changes in MFN tariffs.

V. The Effect of Regional Agreements on MFN Tariffs in Latin America

Table III reports the results from estimating equation (4). The dependent variable is the percentage point change in the MFN tariff, and the independent variables of interest are the lagged percentage point changes in the preferential tariff with and without interaction with the customs union dummy. (All variables are described in detail in Appendix A2.) We include a large set of fixed effects, for each country-year and for each country-industry pair. Standard errors are adjusted for clustering at the country-industry level.

The first column in Table III reports the results from estimating equation (4) using OLS.

The positive and statistically significant coefficient on lagged Δ*PREF* indicates that MFN tariffs fall following a reduction in preferential tariffs in FTA members. The negative and significant coefficient on Δ*PREFCU* indicates that this is not true when the bloc takes the form of a customs union. The F-test shows that MFN tariffs in customs unions increase following a decline in preferential tariffs in the base specification. However, that effect is quite small.

To control for potential endogeneity, we use the lagged values of the preferential tariffs of RTA partners as instrumental variables to estimate the impact of preferential liberalization on MFN tariffs. Specifically, $\Delta PREF_{ipj,t-1}$, $j = 1, 2, 3$ (where *pj* is an RTA partner of country *j*), are used as instruments for $\Delta PREF_{ij,t-1}$, with and without the interaction with the CU dummy. The results are reported in column (2) and first-stage regressions are reported in Table A.1.[23] The Cragg-Donaldson statistic indicates that our instruments are strong, while the p-value of the Hansen overidentification test indicates that our instruments are valid. The IV results show strong support for tariff complementarity in free trade areas. They also show that this effect is absent in customs unions: we cannot reject the hypothesis that preferential liberalization has no effect on MFN tariffs in customs unions.

In column (3), we use two- and three-times lagged levels of preferential tariffs to instrument for lagged changes. We also include the lagged level of MFN to control for the fact that high tariffs may be reduced by more, also instrumented by lagged levels in two and three periods. Again, we find strong evidence of tariff complementarity in FTAs but not in customs unions. The first stage regression from column (3) is reported in Table A.1. The instruments are not weak, as shown by the Cragg-Donaldson statistic, and the Hansen J-statistic suggests that they are valid.

[23] To estimate IV with numerous fixed effects, we demean the data by country-industry and country-year and then estimate IV on the demeaned data, hence the R^2 for IV regression does not include fixed effects.

We next perform a series of robustness tests. First, we estimate equation (4) eliminating the observations where the preference margin is too small to have a practical effect, given the costs to comply with ROOs. Thus, column (4) reports the results when we consider only cases in which the preference margin is above 2.5 percentage points. The results imply that preferential liberalization in FTAs induces a slightly deeper reduction in MFN tariffs when ROOs are less likely to bind. The effect of preferential liberalization in customs unions is statistically insignificant when ROOs are taken into account.

In column (5), to control for the alignment of tariffs in the CUs included in our sample, both formally in force since 1995, we add the following variable:

$$CUalign_{ijt} \equiv \sum_{m} \left[MFN_{imt} \frac{M_{imt}}{M(CU_j)_{it}} \right] - MFN_{ijt},$$

where $M(CU_j)_{it} \equiv \sum_{m \in CU_j} M_{imt}$ denotes total imports in year *t*, industry *i*, by members of the customs union (indexed by *m*) in which country *j* participates. This variable is the weighted-average MFN tariff in the union less the country's own MFN tariff in a given industry. It is non-zero whenever country *j* is in a customs union (i.e., whenever it is a member of either Mercosur or CAN, with the exception of Peru, and $t \geq 1995$) but external tariffs are not equalized. It is positive (negative) if country *j*'s external tariff is below (above) the average in the union. A positive coefficient on (the lagged value of) this variable would indicate that country *j*'s MFN tariffs tend to increase if they are lower than the MFN tariffs of the other CU members and to decrease otherwise. In other words, a positive coefficient indicates that members of CUs are moving toward aligning their external tariffs overtime. There are two tariff alignment variables, one for Mercosur and one for CAN. We find strong evidence of tariff alignment in the former, but not in the latter. The results on tariff complementarity in FTAs and small tariff

substitutability in CUs are very similar to those in column (1).

Finally, there may be a concern that the effects we identify are only present in the early period, when the bulk of tariff reduction took place. In the last column, we split the Δ*PREF* variable into a period-one effect (1990-1994) and a period-two effect (1995-2001). The Δ*PREF* variable in period two covers the same period as the CUs. The positive effect in FTAs is present in both periods, although it is smaller in period 2. The coefficient on Δ*PREFCU* remains negative and highly significant, so that the CU net effect, which is given by the sum of the coefficient on Δ*PREF_per2* and the coefficient on Δ*PREFCU*, is negative and significant, as the F-test on their sum indicates.

Now, as we highlighted in our discussion in Section III, the incentives to change external tariffs in an RTA should depend also on the importance of preferential imports relative to total imports. To account for that, we include in our regressions the share of the RTA partners in total imports (with and without the CU interaction term). If tariffs are simply moving together, there should be no effect of RTA import shares on MFN tariff changes. However, if external and preferential liberalizations are indeed complements, MFN tariffs should fall more both when preferential tariffs fall and in sectors in which imports from partners weigh heavily in total imports, provided that there is a meaningful preference margin. If the two types of liberalizations are substitutes, we should observe that preference margins are mostly protected in important RTA goods.

To address this issue, a natural variable to include would be the lagged import share of RTA partners. However, import shares are affected by preferential and MFN tariffs—a larger wedge between the two induces a higher preferential import share. This would bias the coefficient up, since increasing MFN tariffs would tend to increase RTA import shares, all else

equal. To avoid the endogeneity of the import share variable, we use instead a variable that is the import share of current partners in the first period of the sample, as explained in Section III. Thus, when a new partner receives a preference, we add its pre-agreement import share in the sector to the RTA import share. That variable therefore varies over time only as a result of new entrants. However, because most of the variation is across industries, we use industry (instead of country-industry) and country-year fixed effects when we include it. We interact this variable with a dummy for the presence of a preference margin that is likely to be utilized (i.e., a preference margin above 2.5).

The results are reported in Table IV. The first column shows the impact of preferential import shares, alone and interacted with the CU dummy, when meaningful preference margins are present. Column (2) adds the lagged changes in the preferential tariff variables. In column (3) we estimate equation (5) fully, including the dummy that defines whether a meaningful margin is present in the previous period and the initial import share by themselves (and their CU interactions). In all specifications, the coefficient on preferential import shares interacted with *MRG* is negative and statistically significant, indicating that higher preferential import shares are associated with reductions of MFN tariffs when meaningful preference margins are present. This effect is neutralized in customs unions. On the other hand, the preferential import share, regardless of whether it is interacted with the CU dummy, is never statistically significant by itself, showing that the effect of import share on changes in MFN tariffs is only present when there is a preference margin. Thus, goods in which preferential imports are more important tend to be liberalized faster vis-à-vis outsiders, but only in FTAs and only if a meaningful margin of preference is present.

The coefficients on *MRG* and *MRGCU* are also highly significant, showing that tariffs on

goods with meaningful preference margins tend to fall faster, although the effect is moderated in CUs (we discuss this result further in Table VII). In all cases, the complementarity between tariffs in FTAs obtained previously remains present, while changes in preferential tariffs in CUs have no significant effect on MFN tariffs. In the last column, we report results instrumenting for lagged changes in preferential tariffs with lagged changes in partners' preferential tariffs; results remain very similar.

It is important to note that the results for free trade areas are significant not only statistically, but also economically. Considering the estimates in column (3) of Table IV, a reduction of one percentage point in the preferential tariff in an FTA induces a reduction of almost 0.2 percentage point in the MFN tariff in the subsequent year. The importance of the magnitudes becomes more evident when we consider a country that does not offer any preference deciding to offer duty-free treatment to some countries in the context of a free trade area. Suppose the preferences are offered in a sector where the country has an MFN tariff of 15.2%, and where the partners account for 23% of the country's imports before the agreement (the averages in the sample). As a result of the duty-free treatment, the preference-giving country will tend to lower its MFN tariff by about 3.1 percentage points in the following year.

We proceed now to investigate the potential importance of tariff bindings for our results. Tariffs are bound at 33% on average, well above average applied MFN rates. In fact, the "tariff overhang" is below three percentage points in less than two percent of our sample. Still, such GATT/WTO restrictions may have an impact on the adjustment of applied MFN rates.

In Table V we include in our regression the (lagged) indicator variable *bind*, which is unity when the tariff overhang (MFN bound rate – MFN applied rate) is below 3 percentage points, and the same variable interacted with the CU dummy. The results in column (1) show that

restricted tariffs tend to be reduced significantly faster, though this effect is weaker in customs unions. One possible explanation is that the MFN tariffs in those sectors are on average very high (36%), and high tariffs may be easier to reduce. Furthermore, some applied tariffs are actually higher than their ceilings, indicating that some countries may have lowered tariffs overtime to comply with their WTO commitments.[24] While magnitudes are smaller, lagged changes in preferential tariffs again induce reductions in external tariffs in FTAs, but not in CUs. In column (2) we include the import share variables. As in Table IV, we find that more important products tend to be liberalized faster in FTAs. The other results remain qualitatively similar.

Column (3) includes an interaction between *bind* and the change in the preferential tariff, with and without the CU dummy, both lagged one period. Interestingly, we find that constrained MFN tariffs fall by more when FTA tariffs come down. This indicates that GATT/WTO bindings tend to be more effective in bringing applied tariffs down when a country offers preferences in the context of FTAs, suggesting a distinct way in which FTAs can help the multilateral system. Intuitively, it is possible that tariff complementarity forces predominate in some sectors while tariff substitutability forces prevail in others. However, when the tariff overhang is small, tariff substitutability forces are neutralized, as the MFN tariff cannot be raised. As a result, the 'net' tariff complementarity effect becomes stronger in bound sectors. This effect is reversed in CUs, however. In column (4) we repeat the exercise using a stricter cutoff in which the bind variable is unity only when there is no tariff overhang—i.e., MFN tariffs are at or above their bindings. The results are roughly unchanged. In column (5) we use a sample that excludes the restricted sectors; basic results change very little. Column (6) reports results

[24] In fact, applied tariffs above ceilings are observed mainly in the pre-WTO (i.e. before 1995) period. After 1995, it happens only in 1996 in Brazil (motor vehicles) and in three sectors in Mexico until the end of our sample (slaughtering, preparing and preserving meat; manufactures of dairy products; malt liquors and malt). Incidence of applied tariffs above WTO ceiling has been observed also by Bchir and Laborde (2005), the only empirical study of tariff overhangs that we aware of.

instrumenting for the lagged change in preferential tariffs with partners' lagged changes in preferential tariffs, excluding the bound sectors; again, results are similar.

Overall, the picture that emerges from Table V is that applied MFN tariffs tend to fall faster in sectors in which WTO commitments bind, possibly because Latin America countries did not adjust to their commitments instantaneously. Moreover, the reduction in MFN tariffs is larger when the WTO restrictions are combined with lower preferential tariffs in FTAs. At the same time, our findings about the effects of preferences and import shares on external tariffs continue to apply in the WTO unconstrained sectors.

As a final robustness test, we provide estimation results using the preference *margin*, as opposed to the preferential *tariff*, as our main independent variable. The preference margin—the difference between the MFN tariff and the preferential tariff—summarizes the importance of preferences by taking into account the level of the preferential tariffs relative to the level of the MFN tariff. Using the (lagged) changes in preferential margins as the main independent variable is helpful in two ways.[25] First, preference margins help address the concern that the correlation between preferential and MFN tariffs might be the result of unobservable shocks that push all tariffs in the same direction, rather than indicating causality, since it is not clear why such shocks would also affect the preference *margins*. Second, because MFN and preferential tariffs come from different data sources, measurement error could affect our results. In particular, in some industries there may be no preferences given, yet the preferential tariff may be coded as being lower than the MFN tariff because of measurement error. In this case, ΔMFN and $\Delta PREF$ would move together, and if liberalization happens gradually over time there will also be a positive correlation between ΔMFN and lagged $\Delta PREF$. Considering the preference margin as the independent variable would help to avoid this problem. The interpretation of the regression is of

[25] We thank an anonymous referee for making this suggestion.

a government that chooses preferential margins and then MFN tariffs, as opposed to preferential tariffs and then MFN tariffs.

In Table VI we show estimates analogous to those of Table III, but where the main independent variable is the lagged change in preference margin. The one exception is that we do not report the GMM results because the Hansen J-statistic indicates that the instruments are not valid. Alternatively, we use two lags of the independent variables.[26] Note that in regressions with preference margins, tariff complementarity is reflected in a *negative* coefficient (an increase in the preference margin leads to a future reduction in the MFN tariff), whereas tariff substitutability arises when the coefficient is positive.

The results in Tables VI and III are in general very similar, although there are a few differences between them. The results in Table VI suggest either no effect or a small tariff complementarity in custom unions, whereas the results in Table III point toward either no effect or a small tariff substitutability in that type of agreement. Table VI indicates that the Andean Community members moved toward harmonizing their external tariffs after becoming a customs union, in contrast with Table III. Finally, in the last column, where period effects are included, the Δ*MARGCU* coefficient is not significant. However, the coefficients on Δ*MARGCU* and Δ*MARG_per2* have the expected signs, are of similar magnitudes to earlier regressions, and are jointly significant at the 5 percent level (F-test = 3). Overall, the main message from the results of the two specifications is nevertheless identical: there is a clear tariff complementarity effect in FTAs, while in CUs the relationship between the two types of tariffs, if it exists, is much weaker.

Now, because the change in the preference margin is a function of the dependent variable, we also provide estimations where we use a dummy for high preference margins. This estimating

[26] In this regression, we also tried including twice lagged MFN tariff levels and twice lagged changes in MFN tariff. The results were similar, and only the twice lagged level was significant (not reported).

strategy is useful also in that it resembles the procedure employed by Limao (2006), making comparisons between the results in the two papers easier.

Specifically, we use two variables: the first is a dummy for a preference margin above 2.5 percentage points (*MRG*), and the second is a dummy for a preference margin above the 50th percentile in a country (*MRG*50). The former effectively compares tariff reduction in sectors where there are preference margins that are likely to be utilized with sectors where the preference margins are either non-existent or too small to have a practical effect.[27] In the second case, the comparison is between the changes in the MFN tariff of the sectors with the 50% highest and lowest preference margins. We include the full set of fixed effects employed in the previous estimations. Since we have country-industry fixed effects, our results estimate the effect of implementing a meaningful margin, or moving to the top 50th percentile, on changes in MFN tariffs the following year. Again, we distinguish between free trade areas and customs unions.

The results are reported in Table VII. For both thresholds (columns (1) and (3)), the coefficients on the lagged indicators for higher margins of preference are negative, whereas the coefficient on those variables interacted with the CU dummy is positive. This indicates that in FTAs, but not in CUs, MFN tariffs tend to fall faster in sectors where the margin of preference is larger. In columns (2) and (4), we control for the lagged level of the MFN tariff. We include a dummy that is unity when the MFN tariff is above the 25th percentile in case one and above the 50th percentile in case two—equivalent to the percentile cutoffs for the preference margin—with and without the interaction with the CU dummy. Results are qualitatively equivalent, indicating that the effect of preference margins on external tariff reduction is not a function of higher tariffs begetting higher tariff reduction.

[27] This exercise, reported in column (1), is very similar to the estimation strategy of Limao (2006), though we have more fixed effects. To estimate the average stumbling bloc effect, Limao defines a dummy variable that is unity whenever preferences, of any magnitude, were utilized, which is the case in 89 percent of his observations.

The final column includes all variables. The coefficients on the margin dummy variables are of the same sign, but only the 50th percentile remains highly significant. This implies that the effect of preference margins on external tariffs is more important when margins are large. The effect remains present for CUs, but the magnitude is reduced.

VI. Conclusion

When countries form a regional trade agreement, the tariffs they apply on each other fall, but their duties on imports from outside countries can increase, decrease, or remain unchanged. Yet knowing which way those external tariffs go is critical to assess the welfare implications of the arrangement. Since regionalism theories can explain both drops and hikes in external tariffs following an RTA, the answer to this question is an empirical matter. In this paper, we offer the first attempt to evaluate empirically the effect of preferential tariffs on external trade liberalization in a large group of developing countries.

We find that free trade areas are likely to be building blocs to external trade liberalization in Latin America, in the sense that there is a complementarity effect between preferential and MFN tariffs. Furthermore, external tariffs fall by more in sectors in which the FTA partners are more important suppliers. These effects are absent in customs unions.

These findings fit particularly well the theoretical analysis of Bagwell and Staiger (1999a).[28] In their setting, countries set optimal tariffs, an assumption that seems very appropriate in Latin America, since the large majority of applied MFN tariffs are set well below their WTO ceilings. In that context, the formation of an FTA induces a reduction of applied MFN rates, but the formation of CUs does not. An alternative explanation for the reduction of MFN tariffs subsequent to decreases in preferential tariffs is gradualism. For example, Furusawa

[28] Similar results are obtained also in the analyses of Freund (2000a) and Ornelas (2005a, 2007).

and Lai (1999) show that, because trade liberalization induces costly reallocation of workers, 'deep' reciprocal liberalization is not self-enforceable. As a result, trade liberalization is initially 'small.' However, after some labor has been relocated away from the import-competing sectors, a further round of tariff reductions becomes feasible.[29] A similar argument could be adapted to an environment where countries liberalize first preferentially and then multilaterally. However, while it is plausible that such a force has been present in the decisions to change MFN tariffs subsequent to changes in preferential rates in Latin America, it is not the main force: if it were, we would observe similar reactions in FTAs and in CUs, but our empirical analysis makes clear that this is not the case.[30]

Our results apply to sectors unconstrained by WTO commitments (the large majority in our sample) and, even more strongly, to sectors in which WTO ceilings prevent increases in applied tariffs. That is, reductions in preferential tariffs in FTAs induce deeper cuts in MFN tariffs when WTO commitments bind. From a broader perspective, those results suggest the interesting prediction that the more effective the WTO is (in having members binding their MFN tariffs at levels near the applied rates), the more desirable free trade areas become (in the sense of bringing multilateral tariffs down).

Our findings contrast sharply with those of Limao (2006, 2007) and Karacaovali and Limao (2008), however, who find that the U.S. and the E.U. liberalized less during the Uruguay Round in sectors where preferences were granted. One reason the results may be different is because the types of countries analyzed are different. Since the multilateral system has not enforced much tariff reduction on developing countries, tariffs are relatively high there, creating

[29] Staiger (1995) develops a similar rationale, but where workers lose their rent-earning skills as they relocate. Imperfect capital mobility can lead to gradualism in some circumstances as well (Maggi and Rodriguez-Clare [2007]).

[30] On the other hand, gradualism is clearly important in the decision of countries to liberalize preferentially, as the preferential tariff reductions typically take place over several years.

a large potential for trade diversion. Lower external tariffs moderate that loss. Our results suggest that this force is important in explaining changes in MFN tariffs of Latin America countries involved in free trade areas. In addition, the line of reasoning explaining the importance of preferences in North-South agreements relies on RTAs being formed for non-economic reasons, where the maintenance of preferential treatment is critical to secure the non-economic benefits. This is not the case in RTAs that involve developing countries, where the central goal is generally to exchange market access.

Overall, our findings offer an optimistic view of the ongoing regionalism trend for the efficiency of the world trading system, at least inasmuch as liberalization toward non-members is concerned. Future work is, however, needed to explore the robustness of our results to other regions, as well as the implications of the rise of regionalism for liberalization at a multilateral level.

Appendix A1: Methods and Sources on Disaggregated Tariff Data

We construct a comprehensive tariff dataset for ten Latin American countries—Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Paraguay, Uruguay and Venezuela—from 1990 to 2001. The dataset includes MFN applied tariffs and bilateral applied preferential tariffs at the ISIC 4-digit level.

The compilation of bilateral preferential tariff rates among all of the countries in our sample involved three steps:

(1) Identification of the official text of the trade agreements "in force" during the 1990-2001 period and their corresponding tariff liberalization schedules (annexes). In many cases this information was only available as hardcopy documents and required a formatting exercise into a standard database file.

(2) Conversion of the tariff reduction programs of each agreement into yearly bilateral preferential tariff rates. This was done using the text of the agreements (see below), which in some cases listed preferential tariffs and in some cases tariff cuts. For example, tariff reductions under Mercosur are in some cases gradual, with a given different amount each year, in some cases linear with a set reduction each year, and in some cases automatic, immediately reduced to zero. All tariff reductions were converted to preferential tariff levels for each year.

(3) Conversion of product-line preferential tariff information into a single common nomenclature using ISIC Rev 2 (4 Digits), since agreements negotiated in the 1990-2001 period used different tariff nomenclatures (NALADISA, NANDINA, HS) and correlation tables were only available to ISIC codes. All conversions were done as simple averages.

The database includes a comprehensive set of preferential trade agreements among the Latin American countries in the 1990s. In particular, the following agreements are included: Partial Preferential Agreements (in Spanish "Acuerdos de renegociación del patrimonio histórico"): Colombia--Paraguay; Paraguay--Peru; Paraguay--Venezuela; Colombia--Uruguay; Uruguay--Venezuela; Ecuador--Mexico; Peru--Uruguay; Mexico--Paraguay); Free Trade Agreements (in Spanish "Acuerdos de Complementación Económica or ACE"): Brazil--Uruguay (ACE 2--1990); Argentina--Mexico (ACE 6--1993); Mexico--Peru (ACE 8--1990--1995); Argentina--Paraguay (ACE 13 /1990); Argentina--Brazil (ACE 14 /1990); Argentina--Brazil--Paraguay--Uruguay (MERCOSUR--1991); Chile--Venezuela (ACE 23--1993); Chile--Colombia (ACE 24--1994); Ecuador--Uruguay (ACE 28--1994); Ecuador--Paraguay (ACE 30--1994); Chile--Ecuador (ACE 32--1994); Mexico--Colombia--Venezuela (G3--1994); MERCOSUR--Chile (ACE 35--1996); Chile--Peru (ACE 38--1998); Brazil--Colombia--Ecuador--Peru--Venezuela (ACE 39--1998); Chile--Mexico (ACE 41--1998); Argentina--Colombia--Ecuador--Peru--Venezuela (ACE 48--2000); Brazil--Mexico (ACE ACE 53--2000); Andean Community (Colombia--Ecuador--Peru--Venezuela; Acuerdo de Cartagena 1969); Mexico--United States (NAFTA--1994) for Mexican tariffs on US products.

Compilation of MFN applied rates was straightforward using official national sources compiled by different regional institutions and other specialized information systems. In particular, the following sources were used: UNCTAD-TRAINS (Trade Analysis and Information System); WTO-IDB Integrated Data Base; Inter-American Development Bank (IADB) Hemispheric Tariff Database as well as selected national customs sources for specific countries and years provided by ALADI Secretariat and the Andean Community Secretariat. MFN tariff data were collected at the tariff line level based on national nomenclatures, which

have to be converted into 6-Digit Harmonized System nomenclature (HS) and then averaged out into a common more aggregated nomenclature based on the International Standard Industrial Classification (ISIC-Rev. 2--4 Digits), to facilitate correlation with the preferential tariff data. For more than half of the observations of MFN rates, more than one source exists. We drop observations where MFN rates from different sources differed by more than 2 percentage points.

Appendix A2: Variable Descriptions

MFN	Applied MFN tariff.
PREF	Minimum preferential tariff offered to RTA partners.
Share90	Share of total imports of current RTA members in the first period in the sample.
MARG	Difference between the MFN and the minimum preferential tariff: $MARG_{ijt} = MFN_{ijt} - PREF_{ijt}$.
MRG	Dummy variable for observations in which the preference margin is greater than 2.5 percentage points. $MRG_{ijt} = 1$ iff $MFN_{ijt} - PREF_{ijt} > 2.5$.
MRG50	Dummy variable for observations in which the preference margin is above the median preference margin in the sample.
HiMFN_x	Dummy variable for observations in which the MFN tariff is above the x^{th} percentile in the sample, x = 25, 50.
CUalign_x	Variable defined to capture the alignment of external tariffs in customs union x, x = MERCOSUR, ANDEAN COMMUNITY. $CUalign_{ijt} \equiv \sum_m \left[MFN_{imt} \frac{M_{imt}}{M(CU_j)_{it}} \right] - MFN_{ijt}$, where $M(CU_j)_{it} \equiv \sum_{m \in CU_j} M_{imt}$ denotes total imports in industry *i*, year *t*, by members of the customs union.
Bind	Dummy variable for observations in which the difference between bound and applied MFN tariff is not higher than three percentage points.
Bind_0	Dummy variable for observations in which the applied MFN tariff is not lower than the bound MFN tariff.

Prefix Δ	Represents a one period change in the variable.
Prefix L.	Represents one period lag of variable.
Suffix CU	Represents interaction with a customs union dummy.
PREFP*k*	*k* = 1, 2, 3. Represents the preferential tariffs applied by RTA *partner k* in the same year and industry.

Obs.: All variables are defined at the sector level for each country and year in the sample.

Appendix A3: Sources of tariff complementarity and tariff substitutability

To see the main channels through which tariff complementarity and tariff substitutability can operate, consider the following partial equilibrium, perfect competition model, where *Home* (no identifiers) and *Partner* (whose variables are identified by superscript *) are small countries, in the sense of taking world prices as given.[31] Consider a single sector where, under free trade, Home is an importer and Partner is an exporter. Under MFN, Home imposes a specific import tariff t on all imports. Price at Home is therefore given by $p = \underline{p} + t$, where $\underline{p}$ denotes the world price. Supply and demand at Home are represented by $S(p)$ and $D(p)$, respectively, so Home's import demand is $M(p) = D(p) - S(p)$.

Assume that Home chooses its tariff by maximizing a weighted sum of producers' surplus and national welfare, defined as the sum of consumers' surplus, tariff revenue and producers' surplus. This approach, which has become standard in the literature, can be understood for example as a reduced-form objective function where the government exchanges protection for campaign contributions. Denoting this objective function by G and setting the

[31] The model need not be like this. For example, if the RTA members could affect world prices (Bagwell and Staiger 1999a in an endowments model, Ornelas 2005b in a model with upward supply functions), or if the industry's structure were oligopolistic (Freund 2000a, Ornelas 2005a), very similar forces would arise.

weight on welfare to unity and the (extra) weight on producers' surplus to $b > 0$, it is straightforward to express the first-order necessary condition for t as

$$\text{(A1)} \qquad \frac{dG}{dt} = bS(p) + tM'(p) = 0,$$

where " ' " indicates a derivative with respect to own price. The first term in (A1), which is positive, is the political economy effect, and tends to increase t. The second term represents the standard inefficiency from a tariff, and pushes t down. Assuming that the second-order necessary condition holds everywhere (i.e. the government's objective function is concave in t), (A1) is a decreasing function of t. Solving (A1) for t then gives us Home's optimal tariff under MFN.

Suppose now that Home and Partner form a free trade area. This implies that Home and Partner will negotiate privileged access to each other's market. Let t_p denote the negotiated preferential tariff that Home sets on imports from Partner, where $t_p < t$. To make the analysis clearer, we assume that Partner does not satisfy all of Home's imports under the FTA. Partner's exporters will receive Home's domestic price minus t_p, or $p^* = \underline{p} + t - t_p$, which is more than they would receive by selling to other countries, $\underline{p}$. Given the preferential tariff t_p, the Home government then chooses the external tariff to apply on imports from the rest of the world, t. The first-order necessary condition for t under the FTA can be written as

$$\text{(A2)} \qquad \frac{dG_{FTA}}{dt} = bS(p) + tM'(p) - (t - t_p)E^{*\prime}(p^*) - E^*(p^*) = 0,$$

where E^* denotes Partner's export supply function. For a given tariff on outside imports, t, domestic variables are identical in (A1) and (A2). As a result, the only difference between them corresponds to the last two terms in (A2). Both of these terms are negative and therefore tend to induce a lower external tariff. The first corresponds to the cost of trade diversion: as Home shifts imports from elsewhere to Partner, Home collects less tariff revenue from those replaced

imports. The second term corresponds to a terms of trade loss vis-à-vis Partner: under the FTA, an increase in *t* implies that Home will pay a higher price for all of its imports from Partner. Hence, these two forces suggest that, upon the formation (or deepening) of a free trade area, external tariffs should fall, with the reduction being greater, the lower the preferential tariffs and the larger the preferential imports.

Now, if there were non-trade objectives involved in the formation of the FTA, as argued by Limao (2007), Home would likely take the interests of Partner's exporters into account when choosing *t*, in order to induce the Partner's government to strengthen cooperation in those non-trade areas. In that case, the forces identified above might be weakened, neutralized or even reversed. Similarly, if the preferences are offered in the context of a customs union, where external tariffs are supposed to be negotiated and harmonized, the interests of Partner's government will again likely play a role in the determination of the external tariffs. Thus, the forces identified above might as well be weakened, neutralized or reversed in a customs union.

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Table I
Summary Statistics

A. Full Sample

Variable	Mean	Standard Deviation	Median	Minimum	Maximum	NOB
MFN	15.24	8.47	14.20	0.10	117.33	11395
ΔMFN	-1.23	4.53	0.00	-80.42	39.83	10268
PREF	4.69	4.98	2.68	0.00	39.00	10221
ΔPREF	-2.17	5.70	0.00	-85.00	9.30	9870
Share90	0.23	0.27	0.10	0.00	1.00	9474
Share	0.28	0.28	0.16	0.00	1.00	8286
Bind	0.02	0.15	0.00	0.00	1.00	14761
Bind_0	0.01	0.12	0.00	0.00	1.00	14761
MRG	0.77	0.42	1.00	0.00	1.00	11395
MARG	9.50	6.97	8.45	0.00	117.33	10221

B. Customs Unions

Variable	Mean	Standard Deviation	Median	Minimum	Maximum	NOB
MFN	13.80	5.94	14.00	0.43	56.11	4691
ΔMFN	0.11	2.24	0.00	-28.58	39.44	4669
PREF	1.69	1.56	1.41	0.00	13.78	4691
ΔPREF	-0.82	2.64	0.00	-32.00	5.38	4669
Share90	0.23	0.25	0.13	0.00	1.00	4490
Share	0.29	0.27	0.20	0.00	1.00	4370
Bind	0.01	0.08	0.00	0.00	1.00	7107
Bind_0	0.00	0.01	0.00	0.00	1.00	7107
MRG	0.97	0.17	1.00	0.00	1.00	4691
MARG	11.53	5.66	11.23	0.39	41.14	4483

Source: Country sources and World Integrated Trade System. See Appendix A1 for a full description.

Table II

Correlations between MFN Tariff Changes and Preferential Tariff Changes

dependent variable:		*ΔMFN*			*ΔPREF*	
	(1)	(2)	(3)	(4)	(5)	(6)
ΔPREF	0.570**	0.598**				
	[15.65]	[16.03]				
L.ΔPREF		0.150**	0.102**			
		[8.06]	[4.43]			
ΔMFN				0.705**	0.424**	
				[21.56]	[12.95]	
L.ΔMFN					-0.030**	-0.038**
					[3.75]	[3.29]
Observations	9897	9647	9745	9897	8996	8996
R-squared	0.80	0.81	0.64	0.85	0.74	0.63

Country-year and country-industry fixed effects included in all regressions. Robust t statistics in brackets adjusted for clustering at the country-industry level.
* significant at 5%; ** significant at 1%.

Table III

The Relationship between MFN Tariff Changes and Changes in Preferential Tariffs

	dependent variable: Change in MFN Tariff					
	OLS	IV-partner	GMM	ROO	CUalign	Period
	(1)	(2)	(3)	(4)	(5)	(6)
L.ΔPREF	0.122**	0.259**	0.206**	0.130**	0.124**	
	[4.86]	[8.19]	[5.43]	[3.64]	[4.92]	
L.ΔPREFCU	-0.166**	-0.243**	-0.437**	-0.152**	-0.175**	-0.076**
	[5.40]	[5.95]	[6.55]	[3.73]	[5.52]	[3.29]
L.MFN			-0.479**			
			[14.77]			
L.CUalign_andean					-0.065+	
					[1.65]	
L.CUalign_mercosur					0.262**	
					[3.25]	
L.ΔPREF_per1						0.126**
						[4.83]
L.ΔPREF_per2						0.032*
						[2.50]
Test:						
L.ΔPREF+L.ΔPREFCU=0	5.31	0.29	16.91	1.33	7.11	5.27(a)
	(0.02)	(0.59)	(0.00)	(0.25)	(0.01)	(0.02)
Hansen J-Statistic		2.64	2.47			
		(0.62)	(0.48)			
Cragg Donaldson		45.52	33.52			
Observations	9745	8410	7924	8403	9736	9745
R-squared	0.65	0.04	0.30	0.68	0.65	0.65

Country-year and country-industry fixed effects included in all regressions. Robust t(z) statistics in brackets adjusted for clustering at the country-industry level. P-values in parenthesis.

Instruments in Partner are lagged preferential tariffs of 3 partner countries, and with CU interactions.
Instruments in GMM are: L2.PREF, L3.PREF, L2.PREFCU, L3.PREFCU, L2.MFN, L3.MFN.
(a): Test that L.ΔPREF_per2+L.ΔPREFCU=0

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

Table IV

The Effect of RTA Initial Import Shares on MFN Tariff Changes

dependent variable: Change in MFN Tariff				
				IV-Partner
	(1)	(2)	(3)	(4)
L.Share90*L.MRG	-1.348**	-1.279**	-1.132*	-1.056+
	[3.90]	[3.98]	[2.18]	[1.94]
L.Share90*L.MRGCU	1.290**	1.221**	1.023+	0.782
	[3.66]	[3.75]	[1.74]	[1.19]
L.ΔPREF		0.195**	0.187**	0.219**
		[7.99]	[7.61]	[7.21]
L.ΔPREFCU		-0.180**	-0.172**	-0.193**
		[6.35]	[5.99]	[4.83]
L.MRG			-1.207**	-1.272**
			[7.77]	[6.93]
L.MRGCU			0.759**	0.938**
			[3.81]	[3.56]
L.Share90			0.399	0.359
			[0.93]	[0.79]
L.Share90CU			-0.238	-0.061
			[0.44]	[0.10]
Tests:				
L.Share90*L.MRG +				
L.Share90*L.MRGCU=0	0.27	0.31	0.11	0.37
	(0.60)	(0.58)	(0.74)	(0.54)
L.ΔPREF+L.ΔPREFCU=0		0.84	0.84	0.78
		(0.36)	(0.36)	(0.38)
L.MRG+L.MRGCU=0			10.16	2.91
			(0.00)	(0.09)
Hansen J-Statistic				7.49
				(0.11)
Cragg Donaldson				37.10
Observations	8624	8528	8528	7994
R-squared	0.48	0.51	0.51	0.08

Country-year and industry fixed effects included in all regressions. Robust t(z) statistics in brackets adjusted for clustering at the country-industry level.
P-values in parenthesis. Instruments in Partner are lagged preferential tariffs of three partner countries, and with CU interactions.
+ significant at 10%; * significant at 5%; ** significant at 1%.

Table V

WTO Bindings and the Relationship between MFN Tariff Changes and Preferential Tariff Changes

	dependent variable: Change in MFN Tariff					
	Tariff Overhang ≤3			≤0	≤3 unrestricted sectors	≤3 IV-partner
	(1)	(2)	(3)	(4)	(5)	(6)
L.ΔPREF	0.089**	0.147**	0.097**	0.099**	0.104**	0.190**
	[3.88]	[6.41]	[5.32]	[5.45]	[5.76]	[6.27]
L.ΔPREFCU	-0.122**	-0.125**	-0.077**	-0.082**	-0.085**	-0.158**
	[4.31]	[4.62]	[3.27]	[3.49]	[3.57]	[3.98]
L.Bind	-5.285**	-5.048**	-3.005**	-5.282**		
	[7.91]	[5.82]	[2.63]	[3.09]		
L.BindCU	3.160**	3.624**	1.432	0.875		
	[4.31]	[3.81]	[1.21]	[0.52]		
L.Share90*L.MRG		-1.055*	-1.013*	-0.935+	-1.184*	-1.037+
		[2.15]	[2.09]	[1.93]	[2.32]	[1.92]
L.Share90*L.MRGCU		1.01+	0.956+	0.863	1.066+	0.801
		[1.78]	[1.66]	[1.49]	[1.78]	[1.20]
L.MRG		-1.134**	-1.216**	-1.230**	-1.258**	-1.287**
		[7.56]	[7.99]	[8.15]	[8.30]	[7.03]
L.MRGCU		0.631**	0.739**	0.790**	0.803**	0.905**
		[3.27]	[3.75]	[3.90]	[3.99]	[3.36]
L.Share90		0.25	0.258	0.293	0.399	0.355
		[0.61]	[0.62]	[0.71]	[0.93]	[0.77]
L.Share90CU		-0.15	-0.113	-0.129	-0.214	-0.081
		[0.29]	[0.21]	[0.24]	[0.38]	[0.13]
L.ΔPREF*L.bind			0.196**	0.148**		
			[4.47]	[2.79]		
L.ΔPREFCU*L.bind			-0.324**	no obs		
			[5.95]			
Tests:						
L.Share90+L.Share90CU=0		0.02	0.03	0.05	0.12	0.26
		(0.88)	(0.86)	(0.82)	(0.73)	(0.61)
L.ΔPREF+L.ΔPREFCU=0	3.12	1.69	1.43	8.73	1.41	1.18
	(0.08)	(0.19)	(0.23)	(0.00)	(0.23)	(0.28)
L.MRG+L.MRGCU=0		13.45	11.53	8.73	9.60	3.52
		(0.00)	(0.00)	(0.00)	(0.00)	(0.06)
Hansen J-Statistic						3.27
						(0.51)
Cragg-Donaldson						37.25
Fixed Effects:						
country-year	X	X	X	X	X	X
country-industry	X					
industry		X	X	X	X	X
Observations	9745	8528	8528	8528	8419	7892
R-squared	0.66	0.54	0.55	0.56	0.54	0.06

Robust t(z) statistics in brackets adjusted for clustering at the country-industry level. P-values in parenthesis
Instruments in Partner are lagged preferential tariffs of three partner countries, and with CU interactions.
+ significant at 10%; * significant at 5%; ** significant at 1%.

Table VI

The Relationship between MFN Tariff Changes and Changes in Preference Margins

	dependent variable: Change in MFN Tariff					
	OLS	IV-Partner	Twice-Lagged	ROO	Cualign	Period
	(1)	(2)	(4)	(5)	(6)	(7)
L.ΔMARG	-0.336**	-0.625**		-0.323**	-0.340**	
	[11.52]	[2.93]		[10.40]	[11.58]	
L.ΔMARGCU	0.239**	0.615**		0.213**	0.291**	0.155
	[3.92]	[2.89]		[3.32]	[6.83]	[0.90]
L2.ΔMARG			-0.165**			
			[7.90]			
L2.ΔMARGCU			0.112**			
			[4.39]			
L.CUalign_andean					0.107**	
					[3.44]	
L.CUalign_mercosur					0.289**	
					[3.74]	
L.ΔMARG_per1						-0.348**
						[12.77]
L.ΔMARG_per2						-0.252
						[1.54]
Test:						
L.ΔMARG+L.ΔMARGCU=0	3.45	0.13	27.01	4.18	2.56	3.44[(a)]
	(0.06)	(0.72)	(0.00)	(0.04)	(0.11)	(0.06)
Hanson J-statistic		5.67				
		(0.34)				
Cragg Donaldson		26.57				
Observations	8944	7549	7934	7952	8936	8944
R-squared	0.58	-0.11	0.46	0.59	0.58	0.58

Country-year and country-industry fixed effects included in all regressions. Robust t(z) statistics in brackets adjusted for clustering at the country-industry level. P-values in parenthesis.

Instruments in Partner are lagged preferential tariffs of three partner countries, and with CU interactions.

(a): Test that L.ΔMARG_per2+L.ΔMARGCU=0

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

Table VII

The Effect of Preference Margins on MFN Tariff Changes

	dependent variable: Change in MFN Tariff				
	(1)	(2)	(3)	(4)	(5)
L.MRG	-1.061**	-0.938**			-0.403^{+}
	[5.13]	[4.60]			[1.94]
L.MRGCU	1.047**	0.668*			0.034
	[3.25]	[2.02]			[0.10]
L.HiMFN25		-0.544*			-0.399
		[2.05]			[1.59]
L.HiMFN25CU		0.821**			0.276
		[3.58]			[1.20]
L.MRG50			-1.501**	-1.126**	-1.110**
			[7.55]	[5.90]	[5.77]
L.MRG50CU			1.930**	0.957**	0.927**
			[8.50]	[4.49]	[4.18]
L.HiMFN50				-1.225**	-1.178**
				[6.67]	[6.46]
L.HiMFN50CU				1.561**	1.478**
				[10.01]	[9.28]
Test:					
L.MRG+L.MRGCU=0	0.00	0.12			3.70[(a)]
	(0.95)	(0.29)			(0.05)
L.MRG50+L.MRG50CU=0			10.38	2.03	
			(0.00)	(0.15)	
Observations	10268	10268	10268	10268	10268
R-squared	0.65	0.65	0.65	0.65	0.65

Country-year and country-industry fixed effects included in all regressions. Robust t statistics in brackets adjusted for clustering at the country-industry level. P-values in parenthesis. $^{+}$ significant at 10%; * significant at 5%; ** significant at 1%.
(a): Test that L.MRG+L.MRGCU+L.MRG50+L.MRG50CU=0

Table A.1

First Stage Regressions (Only Excluded Instruments Shown)

Table A.1: First Stage Regressions
(Only Excluded Instruments Shown)

dependent variable:	*L.ΔPREF*	*L.ΔPREFCU*		*L.ΔPREF*	*L.ΔPREFCU*	*L.MFN*
	(1)	(2)		(1)	(2)	(3)
L.ΔPREFP1	0.128**	-0.001	L2.PREF	-0.43**	-0.085**	0.079**
	[4.69]	[0.77]		[26.92]	[10.2]	[3.64]
L.ΔPREFP2	0.324**	0.000	L3.PREF	0.029**	0.000	-0.094**
	[7.92]	[0.13]		[3.47]	[0.06]	[5.47]
L.ΔPREFP3	0.22**	-0.002^{+}	L2.PREFCU	-0.034	-0.318**	-0.014
	[5.43]	[1.71]		[1.08]	[10.58]	[0.38]
L.ΔPREFP1CU	0.381**	0.526**	L3.PREFCU	0.056**	0.137**	0.154**
	[5.01]	[7.53]		[2.64]	[7.33]	[5.11]
L.ΔPREFP2CU	-0.07	0.263**	L2.MFN	-0.144**	0.003	0.552**
	[0.98]	[4.47]		[11.29]	[0.49]	[17.33]
L.ΔPREFP3CU	-0.169**	0.046*	L3.MFN	0.011	0.013*	-0.054*
	[3.66]	[2.20]		[1.15]	[2.37]	[2.42]
F-test of excluded instruments	74.29 (0.00)	84.91 (0.00)	F-test of excluded instruments	344.69 (0.00)	59.95 (0.00)	110.06 (0.00)
Shea Partial R2	0.25	0.32	Shea Partial R2	0.20	0.05	0.20

Robust t statistics in brackets adjusted for clustering at the country-industry level.
P-values in parenthesis. $^{+}$ significant at 10%; * significant at 5%; ** significant at 1%.

Figure I

Partial Equilibrium Effect of Preferences

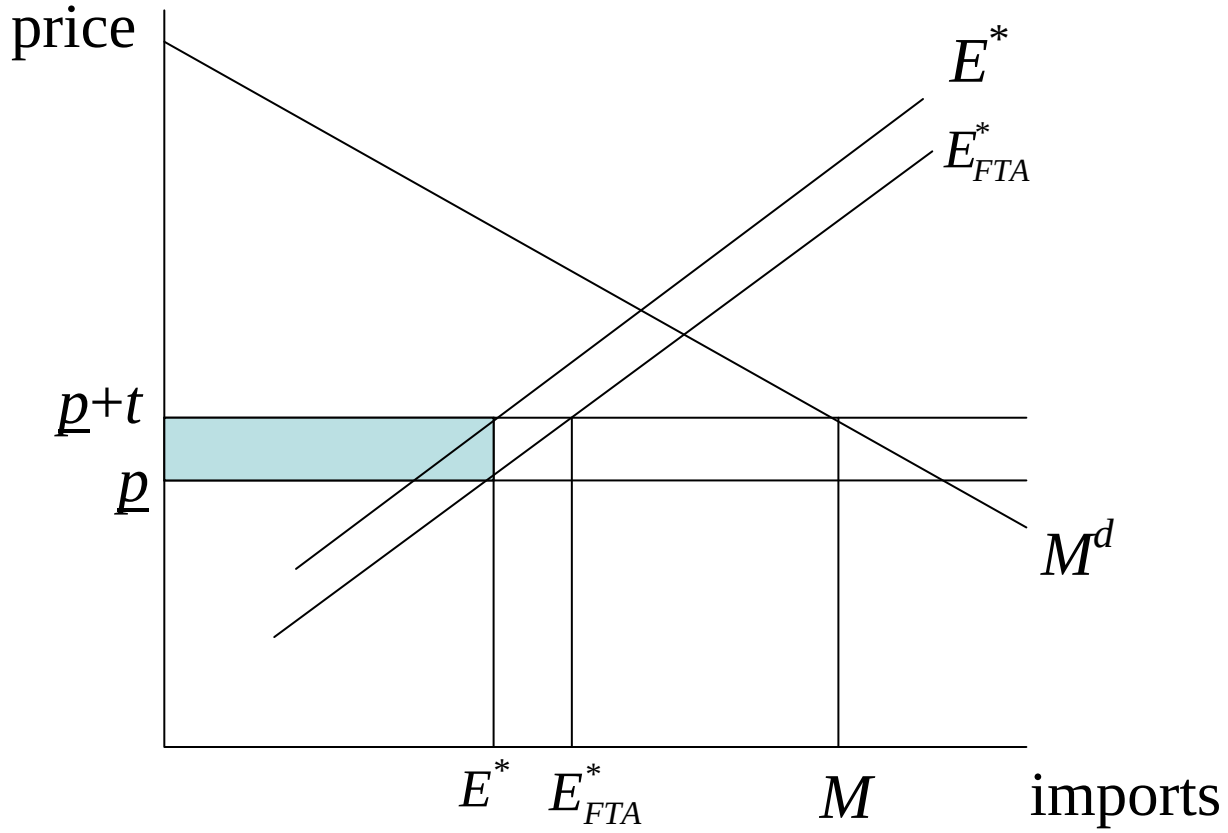
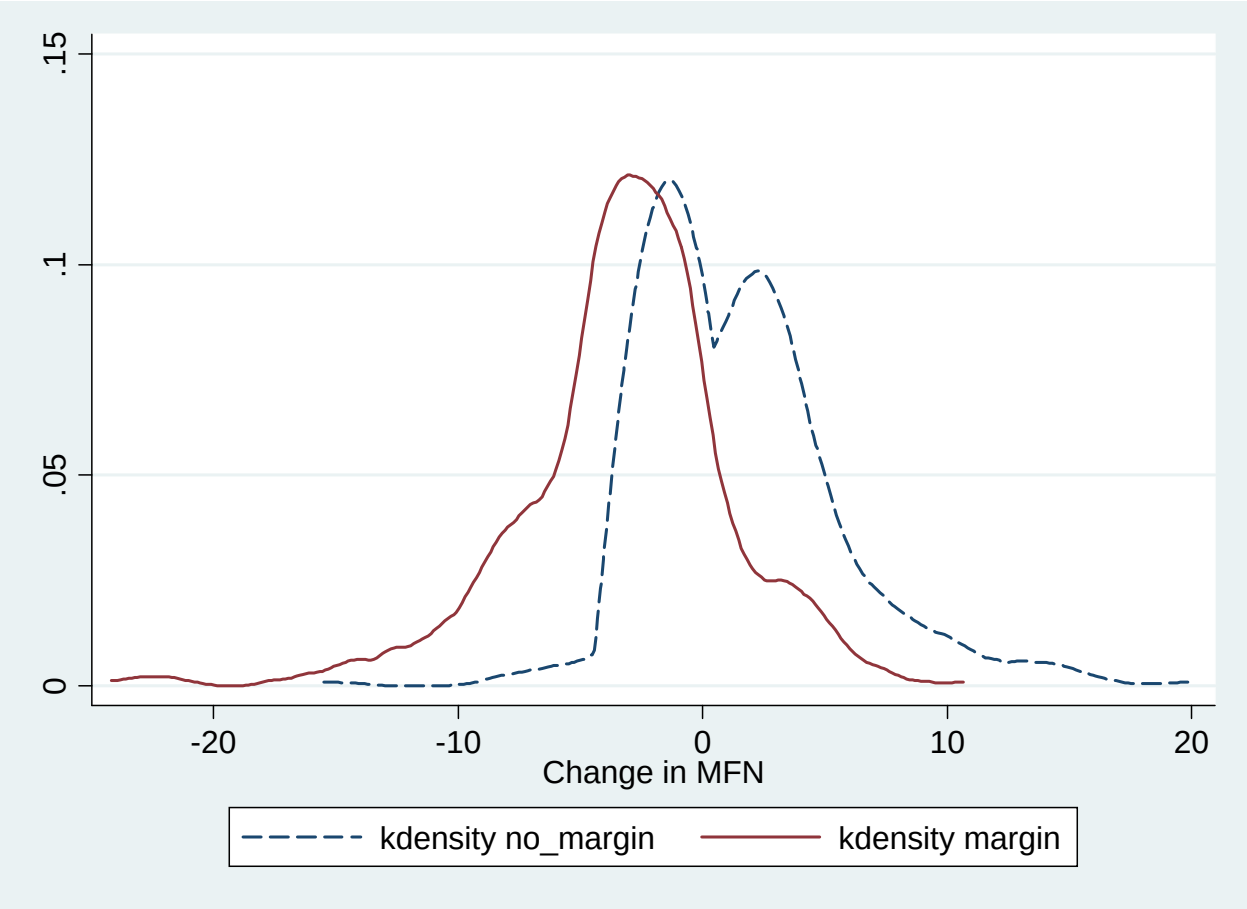


Figure II

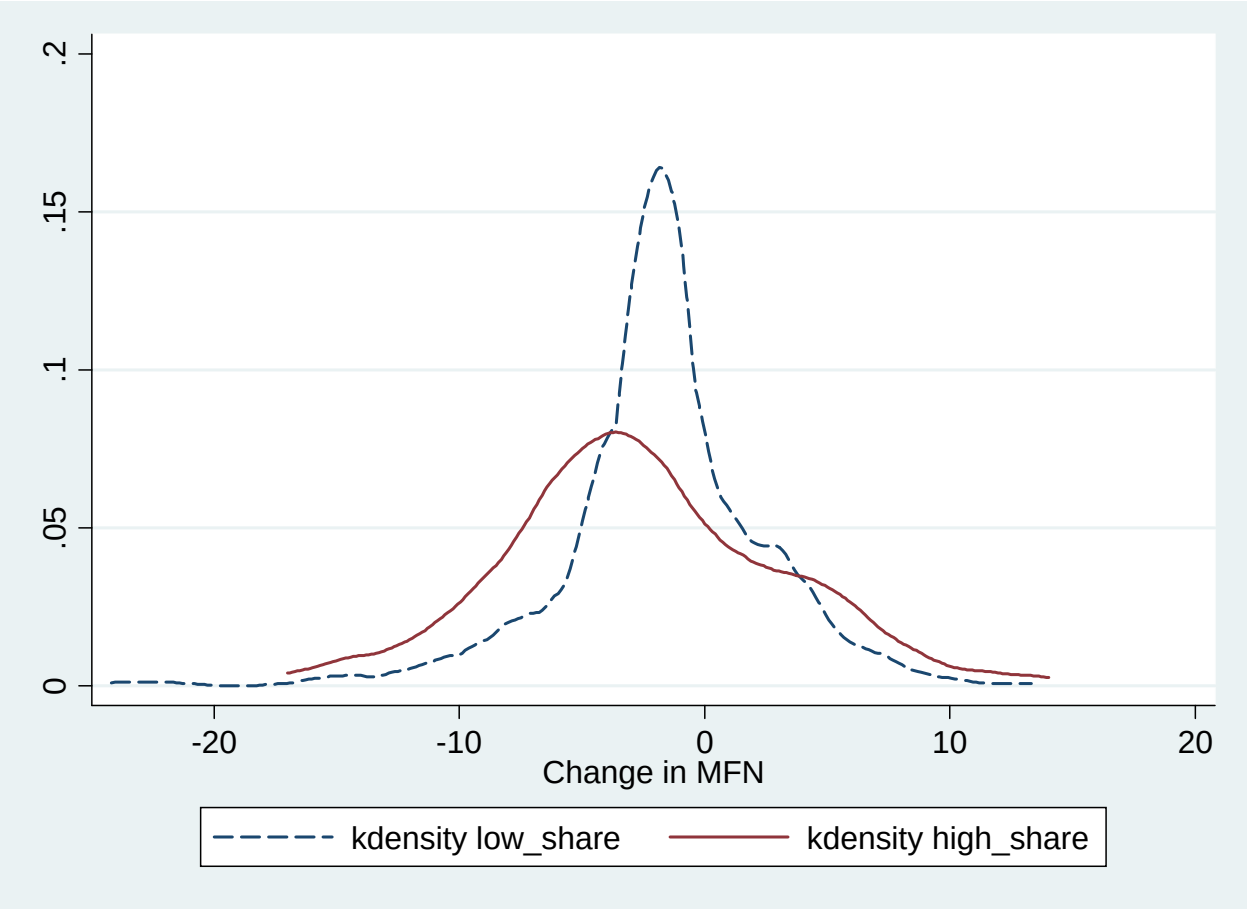
Kernel Density of MFN Tariff Changes for Goods with a Preference Margin Greater than 2.5 Percentage Points and Goods with a Preference Margin Smaller than 2.5 Percentage Points



Note: The tariff changes are from the MFN average tariff in 1991-1993 to the MFN average tariff in 1999-2001.

Figure III

Kernel Density of MFN Tariff Changes for Goods with a Preference Margin Greater than 2.5 Percentage Points by Import Share of RTA Partners



Note: The tariff changes are from the MFN average tariff in 1991-1993 to the MFN average tariff in 1999-2001. High-share (low-share) is an import share above (below) the 75th percentile (above 42 percent) in the first period of the sample.

Figure IV

External Trade Liberalization and Lagged Change in Preferential Tariffs