

Reciprocity in Free Trade Agreements

PRELIMINARY DRAFT

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Is reciprocity important in regional trade agreements? In a repeated game framework, we show that trade preferences granted are positively related to preferences received and to the trade partner's market size. This implies that countries can extract greater concessions if they have higher external trade barriers. However, we also find that if a country's trade barriers are too large then it will not be able to commit to the trade agreement. Thus, there is a reciprocity-credibility tradeoff. We use detailed trade, tariff, and income data for countries involved in 79 trade agreements negotiated since 1980 to test for reciprocity. The results offer strong evidence of reciprocity in North-North and South-South free trade agreements, but there is little empirical support for reciprocity in North-South trade agreements. We also find evidence that large countries extract greater trade concessions from small countries. This leads to a modified form of reciprocity in North-South agreements; a large increase in access to the developing-country market leads to only a small increase in access to the rich-country market.

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I. Introduction

The two pillars of the GATT are nondiscrimination and reciprocity. Article XXIV of the GATT, which allows for the formation of trade blocs, has been derided as antithetical to the GATT because it permits members of a trade bloc to discriminate against nonmembers. What is less clear, however, is whether article XXIV is in sync with the other pillar of GATT—reciprocity. The language on reciprocity in the body of the GATT is clear: governments seek a "balance of concessions" and when presented with the withdrawal of a trade concession, its trade partner is permitted to withdraw a "substantially equivalent concession". Article XXIV includes language that could be interpreted as pertaining to reciprocity, in that it calls for trade barriers "to be eliminated with respect to substantially all trade between the constituent territories." Thus, by definition, preferential trade agreements involve some degree of reciprocity because both sides are expected to make full trade concessions. But, unlike traditional multilateral negotiations, this does not necessarily yield *equivalent* concessions since an agreement can involve members of various sizes with vastly different trade barriers, yielding gains in market access that are far from symmetric. In addition, some sensitive sectors are typically excluded, and many other types of trade barriers, such as antidumping claims or technical standards can remain in place, or even increase to offset tariff concessions.

The purpose of this paper is to examine theoretically and empirically what role reciprocity has played in regional integration agreements. The importance of reciprocity in the GATT, and in multilateral tariff negotiations is understood.¹ In a series of papers,

¹ See Bagwell and Staiger (2000) for a summary of the literature.

Bagwell and Staiger show that terms-of-trade motives provide countries with incentives to have positive tariffs, creating a prisoner's dilemma, whereby all countries would be better off if they could cooperate and reciprocally lower tariffs. They argue that the articles of the GATT offer negotiating rules that help governments undo inefficient trade restrictions generated by the terms-of-trade externality. In other words, reciprocal tariff reduction allows countries to credibly commit to lower tariffs and reach a higher welfare level.

The value of reciprocity in regional agreements is less clear. Unlike in multilateral negotiations, where reciprocity enhances overall trade liberalization, reciprocity in regional agreements (by definition) furthers discriminatory tariff reduction. Reciprocity may be especially damaging in North-South agreements, where asymmetries in size and bargaining power suggest that low-income countries will have to make relatively larger trade concessions to achieve an agreement with a high-income country. A need for reciprocity also implies that some agreements should be infeasible; for example, a large country would gain too little from a free trade agreement with a very small low-tariff country to make the agreement worthwhile. Finally, reciprocity could provide incentives for low-income countries to maintain higher trade barriers in order to obtain preferences from high-income countries, and as a result generate greater trade diversion.

In this paper, we examine both theoretically and empirically whether reciprocity is important in free trade agreements. We follow Bagwell and Staiger and use a repeated game model to analyze the question of what types of regional agreements are sustainable. In order to achieve a trade agreement, countries must have an incentive to sign the

agreement and the agreement must be self-enforcing. Using an oligopolistic model of trade, we show that it is easier to form an agreement with a large country or with one that has high tariffs. However, we also find that a country's credibility in enforcing the agreement is decreasing in its tariff level. Thus, there is a reciprocity-credibility trade-off; larger tariff reductions at home yield larger trade concessions abroad, but larger tariff cuts are less likely to be self-enforcing.

To examine reciprocity empirically, we use three measures of trade preferences. The first uses detailed tariff and trade data to calculate the bilateral trade-weighted tariff for each country-pair in a trade agreement. The second uses the same data to calculate the tariff revenue that will be lost as a result of a trade agreement; it is effectively a measure of the gain in producer surplus in the exporting country. The third focuses on changes in market access subsequent to the formation of a trade agreement, where market access is measured as changes in trade intensity indices (essentially trade shares adjusted for income growth) following a regional agreements. Using all three measures, we find that changes in preferences are highly correlated across country pairs. Controlling for relative country size and separately also for country fixed effects, we find that preferential access is the single most important variable determining preferences granted. Because of issues of simultaneity, we also instrument for preference with country fixed effects. The results are robust to this innovation.

We also examine whether reciprocity in North-South agreements is different from reciprocity in other agreements. Work by John Whalley and various coauthors shows that concessions in North-South trade agreements, such as NAFTA, tend to be in areas

other than tariffs.² In particular, the South gains insurance for its access to the North's market, while the North gains concessions on environment and other non-tariff areas. Similarly, Staiger (1998) notes that GATT language does not require reciprocity by small countries, suggesting that reciprocity in preferential agreements between North and South countries is unlikely to be driven by the same underlying forces as reciprocity in the GATT.³

Our results show little evidence of reciprocity in North-South agreements. In particular, among North-South partners, preferences in one country are not correlated with preferences in the other country. There is, however, a modified form of reciprocity; North countries extract significantly more market access in South countries than South countries extract from the North. Specifically, a ten percent reduction in the developing-country tariff yields only about a 2 percent reduction in the rich-country tariff; in contrast, a 10 percent reduction in the large country tariff leads to an 33 percent reduction in the poor country tariff.

The paper is organized as follows. The next section provides the theoretical framework. Section 3 examines the empirical importance of reciprocity in trade agreements. Section 4 concludes.

² Perroni and Whalley (1994) and Abrego et al. (1997).

³ Staiger's comment was made in reference to a paper by Davis and Kowalczyk (1998). They examine tariff phase-outs in Mexico and United States following NAFTA and look for evidence of reciprocity. Their main finding is that the length of tariff phase-outs by sector in both Mexico and United States is increasing in the U.S. tariff. The paper, however, analyzes a very narrow form of reciprocity because we typically think of reciprocity as being intersectoral. That is, we would expect the main trade concessions that Mexico gives the United States to be in different sectors from the concessions that the United States gives Mexico.

II. The Theoretical Framework

We use a three-country oligopolistic model of trade to evaluate the importance of reciprocity in free trade agreements. This model is appropriate for analyzing trade bloc questions because optimal tariffs are non-zero and because regional agreements expand the members' share of the world market and hence enhance profits abroad. Gaining preferential market access is an important and often clearly stated purpose of trade agreements.⁴ The model is meant to be illustrative and highlight the importance of country size and reciprocity in achieving a free trade agreement.

There is one good, which is produced by a single profit-maximizing firm in each country and segmented markets lead to trade in this good (as in Brander and Krugman (1983)). There are three countries X, Y, and Z.

We assume that the inverse demand function, $P^i(Q)$, in each country is linear. Specifically, $P^i(Q^i) = 1 - a^i Q^i$, and $Q^i = q_x^i + q_y^i + q_z^i$, where Q^i is the total quantity consumed in country i , q_j^i is the quantity produced by the firm in j for market i , and a^i varies with the size of the market, smaller countries have larger a^i 's.

Competition is Cournot. Profits to the firm from country X , in country i , π^i , are

$$(1) \quad \pi^i = q_x^i P^i(Q^i) - c q_x^i - t_x^i q_x^i,$$

where, c is a constant marginal cost of production, and t_j^i is the tariff that the firm from country j faces in market i . Solving for the profit maximizing quantity of a firm from country X in market i , we have

⁴ For example, Robert Zoellick, the U.S. Trade Representative notes that because Canada and Mexico have trade agreements with other countries in the region "U.S. businesses are losing marketshare. U.S. wheat and potato farmers, for example, are now losing markets in Chile to Canadian exports" (Robert Zoellick, May 7, 2001)

$$(2) \quad q_x^i = \frac{(1-c+t_{-x}^i-3t_x^i)}{4a^i}.$$

A sufficient condition for each firm to sell in each market is that $t_j^i < (1-c)/3$.

The government's welfare function, W , in country X , is the sum of consumer surplus, producer surplus, and tariff revenue.

$$(3) \quad W = U(Q^x) - P^x Q^x + \sum_{x,y,z} (q_x^i P^i - c q_x^i - t_x^i q_x^i) + t_y^x q_y^x + t_z^x q_z^x.$$

If there are no free trade agreements then the government maximizes welfare, equation (3) over t_y^x and t_z^x , taking other countries' tariffs as given. With symmetric countries, the tariff on Y will be equivalent to the tariff on Z , resulting in an optimal tariff of $t = \frac{3(1-c)}{10}$. Note that in this model the optimal tariff in one country is not a function

of the tariffs implemented abroad or of the size of the market (a^i). This implies that regardless of what policy other countries follow, a single country is always better off with a positive tariff. However, if each country installs its optimal tariff then all countries are worse off than they would be at free trade. Each country is made better off if some reciprocal bilateral or multilateral tariff reduction is achievable.

III. A Free Trade Agreement

Two conditions must be met in order for countries to participate in a free trade agreement. First, an incentive constraint must be satisfied, the agreement must make countries better off. Second, the agreement must be self-enforcing, long-run gains must make it worthwhile for countries to participate in the agreement. Because the focus is on reciprocity, we consider tariff reduction as opposed to a move to complete free trade.

This is a departure from traditional models, which assume that there is free trade among parties to a regional agreement. The justification is that although free trade agreements are required by article XXIV, there are still several means through which tariff reduction may be incomplete and reciprocity can sneak in. First, the time table: countries can remove tariffs on sensitive sectors very slowly. Second, there are many non-tariff barriers, such as product standards, labor regulations, and the environmental restrictions, which can be negotiated to different extents. Third, there are exceptions in most agreements. Finally, many agreements, especially those involving low income countries are achieved under the enabling clause, which does not require free trade. Thus, if we think of t as the tariff equivalent of all the barriers in country i —a free trade area will not necessarily reduce t to zero.

Incentive constraint

A free trade agreement will only be approved if welfare of both countries is improved. That is it must be the case that welfare after the bilateral tariff reduction exceeds welfare with ex ante tariffs. Using the welfare function above and substituting quantities in from Equation (2) and solving yields the incentive constraint for an agreement with a tariff cut of v from MFN rate t^x in country X and a tariff cut of w from MFN rate t^y in country Y . Specifically the constraint is:

$$(4) \quad ((-6v(1-c)+20 t^x v-21v^2)/(32a^x))+((6w(1-c)-12wt^y +9w^2)/(16a^y))>0.$$

Equation (4) implies that an agreement is more likely to be welfare improving when a^x is large and a^y is small—i.e. the small country is likely to gain more from the agreement. It is also likely to be welfare improving when t^x and v are small, the tariff and the cut in the

home country are small, and the t^y and w are large, the tariff and the cut in the foreign country are large. Hence, the incentive constraint is more likely to be satisfied for both countries, when countries are similar in size, trade policy, and the extent of the tariff reduction—as would be the case in a North-North or a South-South agreement. Alternatively, the incentive constraint may be satisfied for both parties if the smaller country offers greater trade concessions.

Sustainability

We use a repeated game framework to evaluate the extent to which a trade agreement between two countries is self-enforcing.⁵ In order for a bilateral agreement to be sustainable, the welfare gain from cheating on the agreement and then returning to the MFN tariff equilibrium forever must not exceed the welfare level from committing to the agreement. We consider cheating and punishment to consist of failing to install the preferences (i.e. maintaining status quo tariff) and returning to the ex ante tariff level forever. Alternatively, we could use the Nash tariff level but this is somewhat less realistic. The results are qualitatively unchanged if we use the Nash tariff as a punishment—except in that case somewhat more tariff reduction is achievable.

Specifically,

$$(4) \quad W_{deviate} + \frac{\delta}{1-\delta} W_{punishment} \leq \frac{\delta}{1-\delta} W_{bilateral}.$$

Where δ is the discount rate. We can solve this equation for maximum size of the tariff cut that is achievable between any two partners.

⁵ See Freund (2000) for more details on the repeated game analysis in this type of model.

Using the welfare function above and substituting quantities in from Equation (2)

and solving yields the cutoff discount rate ($\bar{\delta}$) such that a free trade agreement— involving a tariff cut of v in country X and a tariff cut of w in country Y —is feasible.

$$(5) \quad \bar{\delta} \geq \frac{6(1-c) - 20t^x + 21v}{6(1-c) - 12t^y + 9w} \cdot \frac{a^y v}{2a^x w}.$$

Equation (5) implies that the cutoff discount rate that X needs to achieve an agreement with Y is lower, i.e. commitment is easier, if Y 's market is relatively large (a^y/a^x is small) and the preferential treatment Y offers is relatively large (v/w is small). The intuition is that if the foreign market is large and/or the foreign preferential treatment granted is extensive then preferential market access is worth more and countries have less incentive to cheat on the agreement.

The model also points to a credibility-reciprocity tradeoff with respect to trade policy and participation in free trade agreements. Countries have an easier time committing to free trade agreements when the preferential access offered is small, but countries can extract greater market access abroad by offering more preferential treatment in return. This provides an intuition for why some agreements may never be implemented. Countries offer more to get more, but their concessions are simply not credible in equilibrium.

IV. Empirical Analysis

In order to use the model as a guide for the empirical analysis, it is worth rewriting equation (5) in terms of the maximum feasible tariff reduction (v) that country X can offer country Y .

$$(6) \quad v \leq \frac{6(1-c) - 12t^y + 9w}{6(1-c) - 20t^x + 21v} \cdot \bar{\delta} \frac{2a^x w}{a^y}$$

Provided tariffs are low, the first term will be close to one and we can rewrite equation (6) as

$$(7) \quad v \leq \bar{\delta} \frac{2a^x w}{a^y}.$$

Equation (7) says that the maximum tariff reduction offered is nearly proportional to the tariff reduction received, the relative size of the two countries, and the discount rate.

To look for evidence of reciprocity we need to measure actual trade preferences that countries grant one another. We do this in three ways. First, using detailed trade and tariff data, we calculate ex ante trade-weighted average bilateral tariffs. Second, we use tariff data and exports before the agreement to estimate lost tariff revenue. The second measure also captures the transfer of tariff revenue from the importing country to producer surplus in the exporting country. Third, we create an index of the change in market share from the agreement. This measures the extent to which the regional agreement led to increased bilateral trade in each country. More specific descriptions of each measure follow.

The most basic measure of preferences is the trade-weighted tariff.

$$(7) \quad tariff_{ij} = \sum_k (MFN_j^k * \frac{exports_{ij}^k}{exports_{ij}}),$$

where MFN_j^k is the tariff in county j on industry k , $exports_{ij}^k$ are exports from i to j in industry k , and $exports_{ij}$ are total exports. Bilateral tariffs are available from the TRAINS database and total bilateral exports are from the IMF International Financial Statistics. One problem with the simple trade-weighted tariff is that it does not capture

the relative importance of an export market. For example, the U.S. and Canadian trade-weighted tariffs on Mexican imports could be very similar, but since the United States is a much larger market for Mexican goods, U.S. preferences are worth more to Mexico. Including GDP in the equation will control for this to the extent that it is only market size that matters. But, it could also be tastes, proximity, and endowments.

The second measure controls for this market relevance effect. It is a measure of gain in producer surplus in the exporting country, or the forgone tariff revenue in the importing country. It is the bilateral tariff in a six-digit sector multiplied by the trade in that sector, summed across all sectors. It is calculated as follows:

$$(8) \quad \text{producer surplus}_{ij} = \text{tariff}_{ij} * \text{exports}_{ij} ,$$

It is thus the amount of tariff revenue that the importing country will forgo collecting as a result of the trade agreement, assuming that all tariffs are removed.⁶ To the extent that prices remain roughly unchanged, it also represents a gain in producer surplus to the exporting country. Hence, the measure will be increasing in exports and also in tariffs, provided the elasticity of trade to tariffs does not exceed one in absolute value.

While these measures provide a good proxy for the extent to which firms gain from liberalization in the other country, and hence how balanced the agreement is, there are some problems with both measures. First, as previously noted, not all tariffs are necessarily removed when the agreement is signed, so they might overstate the gains in some cases and perhaps fail to show reciprocity, even though reciprocity is actually

⁶ More specifically, it is calculated as the average trade-weighted tariff in the year before the agreement, or if that is not available the closest year to that year. We also attempt to match as closely as possible the year of the tariff data in the partner countries. The trade weighted tariff is then multiplied by average trade in the four-year period before the agreement was concluded in order to control for possible anomalies in trade flows in a particular year.

present. Second, tariffs are not the only trade barriers. Third, the data required to calculate this measure are only available for 48 agreements concluded after 1989. Still, if agreements are approximately true free trade agreements and tariffs are the primary barriers that are negotiated, then only agreements that offer similar return should be signed. In this case, this measure should roughly capture the extent of reciprocity.

The third measure focuses on increases in trade to capture the extent to which concessions are actually made. It attempts to estimate the magnitude of all barriers, not just tariffs, that are lowered. It uses data on bilateral trade among members of 79 regional agreements negotiated between 1980 and 1999 to estimate changes in market share, where market share is estimated using the so-called “export intensity index”, I_{ij} .

$$(6) \quad I_{ij} = \frac{X_{ij}}{X_{ROW,j}}.$$

The numerator in Equation (6) is j 's share of i 's exports, and the denominator is j 's share of the rest-of-the-world's exports.⁷ The export intensity index describes how much i exports to j relative to how much the rest of the world exports to j . An export intensity index of unity implies that j 's share of i 's exports is identical to j 's share of rest-of-the-world exports. The important feature of this index is that, with constant income elasticity of trade across countries, it will not increase as a result of regional income growth in the importing country. This is because j 's share of i 's exports (the numerator of the index) increases in exactly the same proportion as j 's of world exports (the denominator of the index). This measure of market access is defined as the average intensity in the four-year period following the agreement less the average intensity in the four-year period

⁷ See Anderson and Norheim (1993) for a detailed description of trade intensity indices.

preceding the agreement and denoted it as ΔI_{ij} . Trade intensity indices are constructed from the f.o.b. bilateral trade data recorded in the IMF Direction of Trade Statistics.

For the purposes of computing all three indices, for the members of a new union (eg MERCOSUR), we examine all bilateral pairs; for countries acceding to a well-established union (eg. Austria to the EU) we consider only exports from the new member to the union and vice versa, not each pair of countries. The intuition is that negotiations for a new union take place at a country-to-country level, but negotiations between a country and a union take place at a country-to-union level. Table 1 in the appendix lists all of the agreements used for each measure.

In the first stage, we look at partial correlations between t_{ij} and t_{ji} , PS_{ij} and PS_{ji} and ΔI_{ij} and ΔI_{ji} . In addition to measures of preferences, theory suggests that preferences granted should be a function of country size. In the case of both tariffs and the market access measure we would expect relative size to matter—exactly as the model predicts. Bigger countries should get a relatively greater increase in market access abroad since the value of their tariff reduction to other countries is worth relatively more. In the case of producer surplus, this would also be true if all countries had one firm—as in the model. The increase in profits that an exporting firm from i gets because the tariff in j is removed will be increasing in the size of the j . However, if i is larger it likely has more firms and its total exports will be larger, implying that the profits from tariff removal are also greater. Thus, both foreign and domestic GDP could positively impact producer surplus gains. The regression equation that we estimate, for each measure, is:

$$(7) \quad preference_{ij} = \alpha + \beta_1 preference_{ji} + \beta_2 gdp_i + \beta_3 gdp_j + \varepsilon_{ij},$$

where preference is one of the three measures ($\ln(\text{tariff})$, $\ln(\text{producer surplus})$, or the change in the intensity index), and small letters denote the natural log of the variables. Theory predicts that β_1 should be positive; an increase in preferences granted should lead to an increase in preference received. Indeed, with perfect reciprocity the coefficient should be unity. The null hypothesis is that β_1 is zero—representing the case where the gains to one country are uncorrelated with the gains to the other country. This would be the case if, for example, countries have varying bilateral trade barriers, join trade agreements at random, and give full trade concessions. In this case, countries would get greater concessions from an agreement with a high-tariff country and less from an agreement with a low-tariff country. Since agreements are chosen randomly there is no reason to think that the preferences measures should be correlated—country-fixed effects should account for most of the variation in the measure of preferences.

One econometric problem with this regression is that errors are likely to be correlated across bilateral pairs. Each agreement enters as two observations, for example, CUSFTA enters once with the US preferences in Canada as a dependent variable and once with Canadian preferences in the US as a dependent variable. We correct the errors for pairwise correlation as well as heteroskedasticity using Rogers (1993) and White (1980), respectively.

The results are reported in the columns (1), (4), and (7) of Table 1. All of the signs are as predicted, but only the coefficient on the preference variable is significant in all of the specifications at standard confidence levels. In particular, the coefficient of .6 on the tariff variable implies that a 10 percent bilateral tariff cut in one country leads to about a 6 percent cut in the other country's tariff. The coefficient of .5 on the producer

surplus variable implies that a ten percent increase in tariff revenue lost leads to a 5 percent increase in producer surplus gained. The coefficient of .3 on the share variable implies that a 10 percent increase in i 's access to j 's market is associated with about a 3 percent increase in j 's access to i 's market. The coefficient on GDP_i and GDP_j in the tariff and intensity indices regressions are positive and negative, respectively, as predicted, implying that the market access that a country receives for a given level of preferences granted is increasing in its relative size, but the coefficients are not significant.⁸

Columns (2), (5) and (7) of Table 1 augment the basic specification to include importer and exporter country-fixed effects, instead of GDP. Country-fixed effects will capture the extent to which certain countries always give/receive the same access. While these turn out to be important determinants of preferences, they do not appear to be correlated with reciprocity since the coefficients on $preference_{ji}$ remains almost unchanged in each of the three cases.⁹

This simple regression implies that the null hypothesis—there is no correlation between preferences granted and preferences received—can be eliminated. But, there are still some econometric issues that need to be addressed. If the model is correct, the estimated coefficient on preferences is biased because preferences are jointly determined and because of measurement error. Specifically, since preferences in i are an increasing

⁸ We also test joint significance and in most cases the coefficients are not jointly significant at standard levels.

⁹ One additional concern is that the results could be generated by the type of trade agreement; for instance, some agreements are deeper than others, and as a result might produce greater changes in trade. To some extent this would be evidence of reciprocity, since countries choose how far to go, but it would be a different kind of reciprocity—at the bloc level instead of the country level. To test for this, we augment the analysis to include bloc fixed effects. Again, the results remain robust (not reported), suggesting that bilateral reciprocity plays an important role in trade agreements.

function of preferences in j , and vice versa, the coefficient estimate is likely to be overstated. On the other hand, since we are using tariffs and outcomes to proxy for true preferential policy, both the dependent and independent variables are likely to be measured with error. Assuming the measurement error in the dependent and independent variables are normally distributed and uncorrelated with each other, the error in the explanatory variable would tend to bias the coefficient on preferences towards zero.

To deal with these problems we use instrumental variables technique.¹⁰ We instrument for preferences with importer and exporter country fixed effects. Country fixed effects make ideal instruments because they are exogenous and are highly correlated with preferences. Moreover, they should also be uncorrelated with the measurement error in preferences. The results are reported in Columns (3), (6) and (9) of Table 1. In each case, the coefficient on the preference variable is almost unchanged, suggesting that the two effects roughly offset each other in the OLS regressions.

North-South Agreements: Are Some Agreements Less Equal than Others?

Staiger (1998) notes that the notion of reciprocity as intended in the GATT may not carry over to North-South regional agreements, since even in multilateral negotiations small countries have not been required to offer reciprocal concessions to large countries. That is, developed countries may have other motivations for signing free trade agreements with developing countries. Additional evidence that such agreements may be different comes from the number of programs designed to give preferences to developing countries, such as Europe's Everything-But-Arms initiative and the Africa Growth and Opportunity Act in the United States. On the other hand, there has also been a recent

¹⁰ The parameter in question is not identified in a simultaneous equations approach.

emergence of agreements that are less one-sided. The Cotonou Agreement, for example, rescinds the one-way preferences that Europe gave countries in Africa and the Caribbean and replaces them with free trade agreements. An alternative to Staiger's argument may be that precisely because small countries have not been required to make reciprocal concessions in multilateral negotiations, large countries have used regional agreements to extract concessions.

In this section, we examine whether North-South agreements are different. South countries are defined as those with per-capita income below \$10,000 in 1995. Table 2 reports the results from running the regressions separately on North-South country pairs. For both the tariff and the producer surplus measures there is no evidence of reciprocity in North-South agreements. However, market share changes are correlated in the OLS regressions, though this result is not robust for North-South country pairs in the instrumental variables regression. This could suggest that country fixed effects are not good predictors of preferences in North-South agreements. However, results from a regression of preferences on country fixed effects in North-South agreements have an R-square of 0.41. This suggests that to the extent that there is reciprocity in North-South trade agreements, it is related only to concessions that go beyond the standard concessions that a particular country gives.

To examine in this question in more detail we split each sample according to the size of the market, and use seemingly unrelated regressions techniques. Specifically, in one sample the dependent variable is the increased market access the smaller country (the South) gives to the larger country (North) and the other sample has the opposite. This specification allows big countries and small countries to have different coefficients on the

preference variable. For example, if the North has most of the bargaining power then for a given change in access to its market, the North should be able to extract relatively more, i.e. the coefficient on North access offered should be greater than the coefficient on South access offered. The results are reported in Table 3. For both the tariff and the market access measure they suggest that South countries have relatively lower bargaining power than north countries. For example, for a 10 percent increase in the South's access to the North, the North extracts 15 percent increase in access to the South. In contrast, for a 10 percent increase in access to the South, the South extracts only about a 5 percent increase in access to the North. It is worth noting that doing a similar exercise on other agreements produces somewhat different results. Columns 5 and 6 of Table 3 report the results for these other agreements.

Conclusion

- Reciprocity is important in free trade agreements.
- Results suggest that a one percent increase in preferences offered leads to more than a ½ percent increase in preferences received.
- There is little evidence of reciprocity in North-South agreements.
- Size matters: A one percent increase in preferences offered by the big (small) country leads to more (less) than a one percent increase in preferences received.
- Incentives to maintain protection to extract more concessions in a trade agreement is a concern.
- The marginal value of a developing-country tariff reduction in terms of its effect on reciprocal reduction is very small. This implies that developing countries should not maintain barriers to extract more from large countries.

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Table 1: Determinants of Trade Preferences

	t_{ij} (1)	t_{ij} (2)	t_{ij} (3)	ps_{ij} (4)	ps_{ij} (5)	ps_{ij} (6)	ΔI_{ij} (7)	ΔI_{ij} (8)	ΔI_{ij} (9)
t_{ji}	0.59** (4.23)	0.62** (3.34)	0.58** (5.98)						
ps_{ji}				0.52** (11.66)	0.41** (4.09)	0.60** (9.12)			
ΔI_{ji}							.34** (3.85)	0.33* (2.48)	0.38** (3.08)
gdp_i	0.09 (1.53)		0.09 (1.53)	0.50** (2.93)		0.43 (2.40)	0.02 (0.74)		0.02 (0.77)
gdp_j	-0.04 (-0.82)		-0.04 (-0.80)	0.38** (5.62)		0.31 (4.42)	-0.02 (0.93)		-0.02 (-0.94)
Country fixed effects	No	Yes	No	No	Yes	No	No	Yes	No
Method	OLS	OLS	IV	OLS	OLS	IV	OLS	OLS	IV
NOB	82	82	82	82	82	82	158	158	158
R-Square	0.37	0.86	0.37	0.69	0.86	0.68	0.12	.43	0.12

ΔI_{ij} is the percentage change in i 's export intensity to j . Errors corrected for heteroskedasticity and pairwise correlation. All regressions include a constant term, values for the constant not reported. **Significant at the 1 percent level.*Significant at the 5 percent level. In columns (3) and (4) country fixed effects are used as instruments for ΔI_{ij} .

Table 2: Reciprocity in North-South Agreements

	t_{ij}		PS_{ij}		ΔI_{ij}			
	North-South (1)	Other (2)	North-South (3)	Other (4)	North-South (5)	Other (6)	North-South (7)	Other (8)
t_{ji}	-0.05 (-0.45)	0.68** (6.23)						
PS_{ji}			-0.12 (-0.36)	0.63** (5.96)				
ΔI_{ji}					.39** (3.02)	0.30* (2.62)	-0.11 (-0.54)	0.52** (5.43)
$\ln(GDP_i)$	0.29 (1.42)	0.11 (1.35)	1.66** 3.09	0.22* (1.92)	0.03 (0.72)	0.02 (0.49)	0.04 (0.63)	0.03 (0.71)
$\ln(GDP_j)$	0.23 (1.69)	-0.06 (-1.07)	1.63** (3.38)	0.42** (4.54)	0.00 (0.11)	-0.04 (-1.47)	0.02 (0.39)	-0.04 (-1.43)
Method	OLS	OLS	OLS	OLS	OLS	OLS	IV	IV
NOB	22	60	22	58	58	100	58	100
R-Square	0.21	0.49	0.88	0.87	0.16	.10	0.00	.05

A constant is included in all regressions, value not reported. Errors corrected for heteroskedasticity and pairwise correlation. *Significant at the 5% level. ** Significant at the 1% level.

Table 3: Determinants of Large and Small Country Preferences

	Total		North-South		Other	
	Large Access to Small (1)	Small Access to Large (2)	Large Access to Small (3)	Small Access to Large (4)	Large Access to Small (5)	Small Access to Large (6)
t_{ji}	1.51** (10.12)	0.58** (10.12)	3.31** (3.12)	0.17** (3.12)	1.44** (9.81)	0.64** (9.81)
ps_{ji}	2.34** (11.78)	.40** (11.78)	1.00 (1.05)	0.95 (1.05)	2.52** (10.83)	0.37** (10.83)
ΔI_{ji}	.70** (6.17)	.55** (6.17)	1.59** (5.89)	.43** (5.89)	0.47** (4.27)	0.64** (4.27)

All regressions run with a constant and gdp_i and gdp_j using SUR. Only the coefficients on preference variables from each regression are reported. Columns (1), (3), and (5) report the results when the small country's preferences granted is the dependent variable. Columns (2), (4), and (6) report the results when the large country's preferences granted is the dependent variable.

Appendix Table 1: Regional Integration Agreements

Agreement	Date of entry into force	Type of agreement	Used in Tariff and Producer Surplus Measure
CER/ Australia-New Zealand	1-Jan-83	Free trade agreement	No
United States — Israel	19-Aug-85	Free trade agreement	No
EC accession of Portugal and Spain	1-Jan-86	Accession to customs union	No
Mercosur/ Argentina Brazil Paraguay Uruguay	29-Nov-91	Customs union	Yes
EC — Czech Republic	1-Mar-92	Free trade agreement	Yes
EC — Slovak Republic	1-Mar-92	Free trade agreement	Yes
EC — Hungary	1-Mar-92	Free trade agreement	Yes
EC — Poland	1-Mar-92	Free trade agreement	Yes
EFTA — Turkey	1-Apr-92	Free trade agreement	No
EFTA — Czech Republic	1-Jul-92	Free trade agreement	No
EFTA — Slovak Republic	1-Jul-92	Free trade agreement	No
Czech Republic — Slovak Republic	1-Jan-93	Customs union	No
EFTA — Israel	1-Jan-93	Free trade agreement	No
CEFTA/ Bulgaria Czech Republic Hungary Poland Romania Slovak Republic Slovenia	1-Mar-93	Free trade agreement	Yes/ except Bulgaria
EC — Romania	1-May-93	Free trade agreement	Yes
EFTA — Romania	1-May-93	Free trade agreement	No
EFTA — Bulgaria	1-Jul-93	Free trade agreement	No
EFTA — Hungary	1-Oct-93	Free trade agreement	No
EFTA — Poland	15-Nov-93	Free trade agreement	No
EC — Bulgaria	31-Dec-93	Free trade agreement	No

NAFTA	1-Jan-94	Free trade agreement	Yes
BAFTA/ Estonia Latvia Lithuania	1-Apr-94	Free trade agreement	No
EC — Lithuania	1-Jan-95	Free trade agreement	Yes
EC — Estonia	1-Jan-95	Free trade agreement	Yes
EC — Latvia	1-Jan-95	Free trade agreement	Yes
EC accession of Austria, Finland and Sweden	1-Jan-95	Accession to customs union	Yes
EFTA — Slovenia	1-Jul-95	Free trade agreement	No
CEFTA accession of Slovenia	1-Jan-96	Accession to free trade agreement	No
EC — Turkey	1-Jan-96	Customs union	Yes
EFTA — Estonia	1-Jun-96	Free trade agreement	No
EFTA — Latvia	1-Jun-96	Free trade agreement	No
Slovenia — Latvia	1-Aug-96	Free trade agreement	No
EFTA — Lithuania	1-Aug-96	Free trade agreement	No
Slovak Republic — Israel	1-Jan-97	Free trade agreement	Yes
Poland — Lithuania	1-Jan-97	Free trade agreement	Yes
Slovenia — Estonia	1-Jan-97	Free trade agreement	No
Canada — Israel	1-Jan-97	Free trade agreement	Yes
EC — Slovenia	1-Jan-97	Free trade agreement	No
Slovenia — Lithuania	1-Mar-97	Free trade agreement	No
Israel — Turkey	1-May-97	Free trade agreement	Yes
CEFTA accession of Romania	1-Jul-97	Accession to free trade agreement	Yes
Slovak Republic — Latvia	1-Jul-97	Free trade agreement	No
Slovak Republic — Lithuania	1-Jul-97	Free trade agreement	No
Czech Republic — Latvia	1-Jul-97	Free trade agreement	Yes

Canada — Chile	5-Jul-97	Free trade agreement	Yes
Czech Republic — Lithuania	1-Sep-97	Free trade agreement	Yes
Czech Republic — Israel	1-Dec-97	Free trade agreement	Yes
Romania — Turkey	1-Feb-98	Free trade agreement	Yes
Hungary — Israel	1-Feb-98	Free trade agreement	Yes
Czech Republic — Estonia	12-Feb-98	Free trade agreement	Yes
Slovak Republic — Estonia	12-Feb-98	Free trade agreement	No
Poland — Israel	1-Mar-98	Free trade agreement	Yes
Lithuania — Turkey	1-Mar-98	Free trade agreement	Yes
Hungary — Turkey	1-Apr-98	Free trade agreement	Yes
Estonia — Turkey	1-Jun-98	Free trade agreement	Yes
Czech Republic — Turkey	1-Sep-98	Free trade agreement	Yes
Slovak Republic — Turkey	1-Sep-98	Free trade agreement	No
Slovenia — Israel	1-Sep-98	Free trade agreement	No
Bulgaria — Turkey	1-Jan-99	Free trade agreement	No
CEFTA accession of Bulgaria	1-Jan-99	Accession to free trade agreement	No
Poland — Latvia	1-Jun-99	Free trade agreement	Yes
Chile — Mexico	1-Aug-99	Free trade agreement	Yes
EFTA — Morocco	1-Dec-99	Free trade agreement	No