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Exclusions for Sale: Evidence on the Grossman-Helpman Model of Free Trade Agreements

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1. Introduction

Introducing political economy features into the analysis of trade agreements has not only enriched the economic literature on integration by imparting a real world flavor, but it has introduced new hypotheses that have remained outside the realm of the traditional treatment of the subject. An important new hypothesis in the literature on trade integration, advanced by Grossman and Helpman (1995, henceforth also cited as GH95), makes predictions about industries that are prime candidates for exclusions from an otherwise free-trade agreement (FTA). Without such industry exclusions, many successfully concluded free trade agreements may not have even come into existence.[1] The exclusion of politically sensitive industries was a key feature of the Mercosur pact, a trade agreement concluded in 1992 among the four South American countries of Argentina, Brazil, Paraguay, and Uruguay. In this paper, cross sectional data from its two leading countries, Argentina and Brazil, are used to empirically examine the Grossman-Helpman hypothesis.

Though nascent, empirical evidence affirming the validity of the new political economy models of trade policy is accumulating (Goldberg and Maggi 1999, Gawande and Bandyopadhyay 2000, Gawande, Krishna, and Robbins 2000, McCalman 2000, and Mitra, Thomakos, and Ulubasolglu 2000). This paper takes perhaps the first step in the direction of theory-based empirical examination of whether the political economy construct is valid in the trade agreement setting. The increasing use of political economy as a central feature in the analysis of trade integration (for example, Ethier 1998, Krishna 1998, and Maggi and Rodriguez-Clare 1999) warrants such an examination.[2]

The only other empirical study of political economy models of trade agreements of which we are aware is Olarreaga and Soloaga (1998), also in the Mercosur context. We employ a different specification than theirs, one that we believe is tightly connected with the GH model and designed to produce more direct inferences. A central feature of this paper is the analysis of nontariff barriers (NTBs) to internal trade even after the Mercosur agreement. These were maintained in addition to tariffs on intra-Mercosur imports, which are examined by Olarreaga and Soloaga. Industries that maintained NTBs to internal trade are, naturally, exclusions to the FTA. They were pervasive among the Mercosur pact

[1] For example, the NAFTA agreement excluded certain primary goods. The EEC chose transfers over direct industry exclusions, notably the Common Agricultural Policy, but with similar effect. Almost all other agreements have featured long phase-in periods for tariffs, if not outright exclusions, especially in politically powerful industries. Such phase-ins are included in our definition of exclusions.

[2] Some examples of political economy models that produce conclusions different from conventionally held views are: (a) Richardson's (1993) hypothesis that trade integration may reduce trade diversion by hastening the decline of less efficient sectors in the face of competition from the FTA partner, (b) Panagariya and Findlay's (1996) political economy extension of the traditional Meade model to examine trade diversion and creation, and (c) models by Richardson (1994) and Panagariya and Findlay (1996) of the external tariffs in free-trade blocs vis-a-vis the common external tariffs in customs-union blocs.

countries, and, as we detail below, little progress has been achieved in eliminating them.

The paper takes a step that, we feel, sets it apart from first-generation studies of the political economy of trade policy. Those studies are best viewed as using regression analysis to provide useful data summaries. Here, a tight link between the theory's prediction and its empirical implementation is developed. It is hoped that this sets a standard for future empirical studies in this area. The evidence presented in this paper is striking.

Section 2 begins with a background on the formation of Mercosur, and what it has achieved by way of freeing trade. The GH95 model is analytically described in Section 3 and its predictions motivated. In section 4 the Mercosur data and the empirical methodology for examining the GH95 hypothesis are detailed. Graphical data analysis and discussion of the formal econometric estimates are the subject of Section 5. Finally, concluding observations are offered in Section 6.

2. The Political Economy of Mercosur

Mercosur as a regional integration scheme was notified to the GATT in February of 1992. GATT/WTO normatives govern the relationships of the bloc with third countries. The Treaty of Asuncion of 1992 laid the constitutional basis for the South Common Market (Mercosur) consisting of Argentina, Brazil, Paraguay and Uruguay. The first article of the Treaty stated the ambitious scope of the agreement as "...the free circulation of goods, services and productive factors among the member countries, through the elimination of the tariff and non tariff restrictions to the circulation of merchandise." Eventually, by 2001, Mercosur was to become a customs union via the adoption of a common external tariff and a common commercial policy vis-a-vis the non-Mercosur countries.

The scope of the Treaty went beyond trade policy, into the coordination of sectoral policies in agriculture and industry, harmonizing public taxes and expenditures, coordination of monetary rules and exchange rates, liberalization of capital markets, and the opening up of communications. It signified a watershed separating a brighter future from the economically and politically unstable past. The free trade agreement was the centerpiece of this "deeper integration".[3]

The bodies charged with achieving the Treaty's objectives were formed via the Ouro Preto Protocol, signed in December 1994. They are the Council of the Common Market, the Common Market Group, and the Mercosur Trade Commission.[4] The legislative bodies of the four countries ratified this structure,

[3] Neither is Mercosur the first attempt at a free trade agreement. The Treaty of Montevideo created the ALADI agreement signed in 1980, preceded Mercosur, but was not nearly as successful.

[4] The Council of the Common Market is in charge of politically facilitating the integration

making Mercosur an institution of international law.

The Mercosur bodies are not supra national, so the decisions, resolutions and directives put out by them have no legal force per se. For the common Mercosur normatives to possess legal force they must be written into the national laws and regulations of the Mercosur countries. The internalization of the common rules has to be done via costly legislative approval, where lobbying has played an important role in shaping the eventual policies in place. Political action by industry lobbies and other pressure groups are in evidence in the slow internalization of Mercosur norms and decisions. For example, 25% of the Common Market Council decisions and 30% of the Common Market Group resolutions failed to be internalized by at least one Mercosur country. On the trade front, the directives of the Mercosur Trade Commission were being implemented with even greater delay. 50% of the directives it had released by 1997 failed to be internalized by at least one Mercosur country.

Exceptions to the Free Trade Agreement

Tariffs

The implementation of the Mercosur agreement in January 1995 implied the complete elimination of import tariffs on trade among member countries. The process of tariff elimination was intended, through progressive linear and automatic reductions, to reach a zero-tariff state by the end of 1994. After an initial drop in 1991 of 47% in the rates applied by each country to intra-Mercosur imports, reductions took place every six months in order to achieve zero tariffs at the beginning of 1995.

However, for a limited number of products, each country could maintain transitory tariffs on imports from Mercosur partners. Argentina had 223 tariff line items on this list of exclusions from free trade, of which 57% were steel products, 19% textiles, 11% paper and 6% footwear. Brazil had only 29 such tariff-line exclusions, including wool products, canned peaches, rubber products and wines. Paraguay had 272 tariff-line exclusions, with the majority in textiles, and others in agricultural products, wood and steel. Finally, Uruguay had

process and for taking decisions to assure the execution of the objectives set in the Mercosur treaty. It is comprised of ministers of Foreign Relations and of Economy of the four member countries. Its presidency is held for a duration of six months, and is rotated in alphabetical order. The Common Market Group is the executive body of the Mercosur. It comprises representatives from the Ministries of Foreign Relations, of Economy and of the Central Banks of the four countries, and is assisted by a number of working sub-groups, specialized meetings and ad hoc groups. The Mercosur Trade Commission (MTC) is an intergovernmental body in charge of advising the Common Market Group on trade matters, to oversee the evolution of common trade policies in the treaty. GATT/WTO normatives govern the relationships of the bloc with third countries. Within Mercosur, the sources of law are (in decreasing order of importance): Treaty of Asunción, Protocol of Ouro Preto, decisions by Council of the Common Market, resolutions of Common Market Group, and directives of the Mercosur Trade Commission. These Mercosur bodies have been active. Since their inception, the Council has issued 122 decisions, the Market Group has released 594 resolutions, and the Trade Commission has written 95 directives.

an extensive list of 1018 tariff-line exclusions, including textiles (22%), chemical products and pharmaceuticals (16%), and steel and electric machinery (8%). By the end of 1994 the tariff-line exclusions became part of an "adaptation regime" with the aim of lowering their tariffs until their complete elimination by 1999 in the case of Argentina and Brazil, and by 2000 for Paraguay and Uruguay. Some products included in the adaptation regime, such as steel, were also subject to tariff quotas. Trade in these products were relatively free of tariffs, but only up to a quota, beyond which trade among the partners was tariff-ridden.

Outright exclusions, in addition to the exceptions in the adaptation regime, applied to the sugar and automotive sectors. They were not part of the trade liberalization, because they were the most politically sensitive sectors within each country. Brazil and Argentina had widely diverging policies with regard to these industries. While an ad-hoc group for sugar and a technical committee for autos were created to plan the convergence in their national policies for those industries, the exchange of these products continued to be subject to a complicated set of rules and restrictions. Argentina maintained quotas and prohibitions on sugar imports from its Mercosur partners. The Argentine position was that this was necessary due to the generous subsidies enjoyed by Brazilian producers from their government. For autos, a managed trade arrangement was put in place, which favored local content, concessional entry of parts, and a bilateral export balance requirement.

Non-Tariff Barriers

The Treaty of Asuncion explicitly states that commercial liberalization should embrace the elimination of non-tariff barriers (NTBs). As a first step towards this politically difficult objective, the Mercosur countries have established a distinction among those NTBs that will be eliminated and those that will be subject to a process of "harmonization" and/or "justification". Harmonization of a given national norm refers to the adoption by all member countries of a unified version of a national norm that was previously in contradiction of the Treaty of Asuncion. A harmonized regulation becomes a Mercosur normative. Justification of a national norm refers to its acceptance by the remaining members, whereupon the non-tariff measure or norm continues to be maintained. If it is neither possible to harmonize a national non-tariff norm, nor justify it via its acceptance by the other member states, the norm is to be eliminated.

The Mercosur Trade Commission, the body responsible for implementing the NTB policy, has used the standards set by the WTO on the nature of permissible common regulations, as they are documented in the various WTO agreements on technical obstacles to trade. As of 1996, the results were mixed. Of a total of 342 national norms that were identified, decisions on over half of these measures (180) were concluded. Of these concluded measures, 37 were eliminated, 76 were harmonized, 60 were justified, while 7 received "regional treatment", that is they were applicable only on extra-Mercosur imports. Of the measures that remain to be completed (162), 39 were to be eliminated (5 with regional treatment), and 102 were to be harmonized. The small number of regional treatments implies that Mercosur's dealings on non-tariff restrictions has a distinctively nondiscriminatory character, as would befit a free-trade agreement.

The contentious issue of lowering NTBs lies ahead. It has been recognized that internalization of NTB liberalization via changes in national laws and regulations will, at best, take time to put into practice, and, at worst, undermine the integration process in the face of mounting political action by interest groups in favor of the status quo. It is possible that what had been achieved by 1996 was as close to the politically possible lower limit on NTBs that is likely to be achievable. We take the position that without the existence of NTBs the Mercosur agreement may not have been politically feasible. Retaining the right to employ NTBs in a discretionary manner against imports from Brazil was important to Argentinian interests, and has played out in the imposition of antidumping duties on imports from Brazil on a number of occasions in products such as textiles, apparel, autos, and footwear (Notisur, various issues in 1998; Mercosur, 2000).[5] NTBs are thus treated as significant exclusions to the FTA.

3. Theory: The Grossman-Helpman (1995) Model of FTAs

It is apt to begin discussion of the theory with Viner's (1950) analysis of FTAs. Viner analyzed the second-best situation of a three-country one-good case, where the highest price producer (least efficient) of a good, country A, has the opportunity to form a union with either the less inefficient producer B, or the most efficient producer C. If A's tariff is prohibitive so that it produces the good in the pre-FTA regime, the union will increase welfare by enabling imports at a lower price. If A's tariff is nondiscriminatory but not prohibitive before the union, so that it is importing from the least cost source C, then a free trade union with B, where both A and B shut out C using a common external tariff, will be "trade diverting". A will now import from B at a higher than pre-union price. But if both A and B were inefficiently producing the good before the

[5] Cases of the internal use of NTBs in excepted sectors are abundant. In steel products, though the internal tariff was eliminated, as scheduled, at the end of 1999, domestic producers in Argentina filed an antidumping investigation against Brazilian importers (CNCE Annual report 2000). The case ended with a private price agreement which, in practice, seriously limited Brazilian penetration into the Argentinean market. Other than antidumping, safeguards and quantitative NTBs have been used to limit internal trade liberalization. As internal tariffs disappeared on certain types of textiles, Argentinian producers filed a safeguard action against all imports (including those of Brazil) in 1997 based on the GATT agreement for the liberalization of textiles and apparel products (Mercosur, 2000). Brazilian exporters successfully complained to a Mercosur panel that the safeguard action was against Mercosur principles, which prohibited safeguards within the region. A similar situation developed in 1998 when Brazilian import-competing producers pressured their government for the establishment of a non-automatic import license for certain food manufactures. Upon petition by Argentinian exporters a Mercosur panel determined that the Brazilian government had to eliminate that NTB (Mercosur 2000). The surge of various NTBs affecting trade within Mercosur, as the ones just mentioned, were sometimes also motivated by depressed macroeconomic conditions in both economies as well as a Brazilian devaluation that threatened Argentinian producers in the years following 1997.

union, their union would be trade creating as the less inefficient producer will capture the union market. Since empirical analyses of the day (e.g. Lipsey, 1960) were finding in favor of customs unions primarily in Europe (for example Benelux and ECM), Viner's analysis emphasized the relative strengths of trade creating and diverting forces while making normative judgements about trade agreements.

While Viner's analysis is ex post to the formation of a trade agreement, Grossman and Helpman (1995) provide insight into how trade agreements may come into existence, recognizing that the net gains from trade diversion and trade creation will be the driving forces behind the decision by the two countries A and B to enter into an FTA.[6]

3.1 Domestic Politics

$$G = \sum_{i=1} C_i() + aW(), \tag{1}$$

where C_i is the political contribution made by industry i's lobby, which may be zero if industry i is not politically organized or if its optimal contribution is zero. In (1) W is aggregate gross-of-contributions welfare of all voters, given as

$$W() = l + \sum_{i=1} \pi(p_i) + N[r() + s()], \tag{2}$$

where l is total labor income determined exogenously by the wage. In (2), $\pi(p_i)$ is the aggregate reward to owners of specific factor i, or lobby i's "profits", as a function of own producer price p_i. N is the size of the voting population, $r()$ is the per capita amount of redistributed tariff revenue, and $s()$ is per capita consumer surplus. In (1) the parameter a is the weight the government places on W relative to contributions.[7] C_i and W are functions of the domestic price

[6] Viner also made the positive observation that welfare losses were more likely when countries were complementary in the range of commodities protected by tariffs. Great overlap between two union countries in the range of protected products would lead the more efficient of the two to capture the union market, reallocating resource efficiently. Less overlap would result in the protected industry in one country capturing the union market, thus reallocating resources inefficiently. Grossman and Helpman (1995) show that, where exclusions are not permitted so that either all industries must be party to the FTA or none at all, the formation of the FTA is actually more likely when there is less overlap, that is when trade diversion is the driving force. Since our focus is on industry exclusions as the primary force behind an FTA we do not examine this possibly interesting connection of GH95 with Viner's analysis.

[7] If the government welfare function in (1) were rewritten with weights of a_1 on aggregate campaign contributions and a_2 on aggregate welfare net of contributions (see Grossman and Helpman, 1994, fn. 5), then a in (1) equals $a_2/(a_1 + a_2)$. Note that low values of a, say, $a < 2$, substantially differentiate between the relative weight on aggregate welfare net of contributions vis-a-vis aggregate contributions. If $a > 4$, then $a_2 > 0.8a_1$ and so high values of a yield similar weights.

vector () which may be different from the free-trade price vector (*).

The same industry structure and politically motivated welfare function is used in Grossman and Helpman (1994) (henceforth GH94) to model equilibrium tariffs resulting from domestic politics within a single country. We derive the structure of protection equation from that model here, because the econometric model used to investigate the GH95 model will exploit the close connection between the two. The GH95 model may usefully be viewed as the second stage of the FTA game where, in the first stage, the equilibrium nondiscriminatory (pre-FTA) tariffs are determined independently in each country according to the GH94 model.

The GH94 model is itself a two-stage game of lobbying and tariff setting. In the first stage each industry lobby presents a menu of contribution offers to their government, that is, the menu of "prices" the lobby is willing to pay the government for every possible n-vector of tariffs, where positive tariffs imply protection to import-competing sectors, while negative tariffs imply subsidies to exporters. They do this knowing that the government will choose the vector of tariffs that maximizes its political welfare in (1). In the second stage the government, faced with these bids and the knowledge of welfare losses associated with any set of tariffs, sets its welfare-maximizing tariffs according to (1), and collects the bids associated with its choice.

Bernheim and Whinston (1984) characterize the equilibrium of the menu auction as one that maximizes the joint welfare of the principals (lobbies) and agent (government). In the GH94 context, this is equivalent to the choice by lobbies of contribution schedules $C_i^o(), i = 1, \ldots, n$, and the choice by the government of tariffs. Equivalently, the government chooses a tariff-ridden price vector $(^o)$ to maximize, individually with respect to every politically organized lobby j, their joint welfare:

$$\begin{aligned} V_j + G &= W_j(^o) - C_j^o(^o) + \sum_{i=1} C_i^o(^o) + aW(^o) \\ &= W_j(^o) - C_j^o(^o) + \sum_{i \in L} C_i^o(^o) + aW(^o). \qquad (3) \end{aligned}$$

In (3) $V_j = W_j(^o) - C_j^o(^o)$ is the welfare of members of lobby i net of contributions,[8] and $G = \sum_{i \in L} C_i^o(^o) + aW(^o)$ is the government's welfare as in (1),

[8]Specifically, $W_j() = l_j + \pi_j(pj) + \alpha_j N[r() + s()]$, where l_j is labor income of members of lobby j, $\pi_j(p_j)$ is the aggregate rents or profits from their ownership of factor i, α_j is the proportion of the voting population comprising lobby j, N is population, and $r()$ and $s()$ is as defined for (2). If α_j is negligible, then lobby j's welfare is well approximated by their profits $\pi_j(p_j)$. Note that the gross-of-contributions welfare component of the government's objective function is $W = \sum_{j \in L} W_j + (1-\alpha_L)[l + N[r() + s()]]$, where L is the set of industries with politically organized lobbies, $(1 - \alpha_L)$ is the proportion of the voting population that is

rewritten to emphasize the role of the set of lobbies that are politically organized, denoted L. The maximization by lobbies and the government of the joint surplus (3) is in addition to the maximization of the social welfare function in (1) by the government.

Maximizing (3), given that the government maximizes (1), implies the first order conditions (Grossman and Helpman, 1994, pp. 841):

$$\sum_{i \in L} \frac{\partial W_i}{\partial p_j} + a \frac{\partial W}{\partial p_j} = 0, \qquad j = 1, \ldots, n. \tag{4}$$

The solution to these equations is the Grossman-Helpman structure-of-protection equations:[9]

$$\frac{t_i}{1+t_i} = \frac{I_i - \alpha_L}{a + \alpha_L} \left(\frac{z_i}{e_i} \right), \qquad i = 1, \ldots, n. \tag{5}$$

In (5) $t_i = (p_i - p_i^*)/p_i^*$ is the ad valorem tariff (positive) or export subsidy (negative) for good i, where p_i is the domestic price for good i and p_i^* its world price. In the first term on the right hand side of (5) I_i is an indicator variable that equals one if sector i is organized into a lobby. The parameter α_L is the fraction of the population organized into lobbies (industries in the set L), and $a > 0$ is as defined for (1). $z_i = y_i/m_i$ is the equilibrium ratio of domestic output to imports (exports if m_i is negative) and $e_i = m_i' p_i/m_i$ is the elasticity of import demand (positive) or export supply (negative). If industry i is an import-competing producer and it is organized ($I_i > 0$) then it is able to "buy" protection ($t_i > 0$) but obtains an import subsidy ($t_i < 0$) if it is not organized ($I_i < 0$). If industry i is an exporter and is organized, it is able to "buy" an export subsidy ($t_i > 0$), but if it unorganized its exports are taxed.

A case worth considering is one where the number of members of lobby i is negligibly small relative to the population, so that their share of the economy's consumer surplus and the rebated tariff revenue is negligible. Only their own producer price matters to the political calculus of lobby i, not their welfare loss due to protection/subsidization of other industries. In that case, only $i = j$ need be considered in (4) to obtain the structure-of-protection equation (5). Then in fn. 8, W_i is approximately given as $W_i = \pi_i(p_i)$. From the results in fn. 9, now

unorganized, and l is total labor income. Hence, W is the sum of the welfare of individuals who belong to lobbies and individuals who are unorganized.

[9] From the previous fn., $\sum_{i \in L} \partial W_i/\partial p_j = (I_j - \alpha_L) y_j + \alpha_L (p_j - p_j^*) m_j'$, where I_j is a binary variable indicating whether industry j is politically organized, $\alpha_L = \sum_{i \in L} \alpha_i$ is the proportion of the voting population that belongs to any lobby, y_j is the output of industry j, and m_j is the import demand (export supply) function with $m_j' < 0$ (> 0). The dependence of y_j and m_j on p_j is suppressed in the expressions for the partials. Also from the previous fn., $\partial W/\partial p_j = (p_j - p_j^*) m_j'$. Substituting these partials into (4) and solving yields (5).

$\partial W_i/\partial p_i = I_i y_i$ and $\partial W_i/\partial p_i = (p_i - p_i^*)m_i'$. Substituting into (4) and solving yields:

$$\frac{t_i}{1+t_i} = \frac{I_i}{a}\left(\frac{z_i}{e_i}\right), \qquad i = 1, \ldots, n. \tag{6}$$

Industry i is protected (or subsidized if it exports) only if it is organized, but not otherwise. In order to focus on the key domestic elements and interactions between governments, Grossman and Helpman focus attention on this case, where lobbies are negligible in size relative to the population. Then the structure of pre-FTA nondiscriminatory tariffs (subsidies) is determined according to (6).

The empirical examination of the GH95 hypothesis about FTAs requires identification of the politically most sensitive industries in terms of measurable variables. The structure in (6) will provide the basis for this identification. The politically most sensitive industries are defined as being those which bring the greatest benefit to the specific factor owners and politicians taken together. These are precisely those industries for which the change in the joint surplus given by (3) is the greatest. We examine this connection in greater detail in Section 4 after discussion of the GH95 model predictions.

3.2 Enhanced and Reduced Protection: The Losers and Gainers

At the heart of the decision of whether to form an FTA are political pressures for and against the FTA by the potential losers and gainers due to trade creation and trade diversion. GH95 use the term enhanced protection to describe trade diversion and reduced protection to describe trade creation (relative to the tariff-ridden pre-FTA situation). In the GH95 general equilibrium model, goods are produced independently of each other so that there are no cross-effects in production, and utility functions are additively separable so there are no cross-effects in consumption. So an industry may conveniently be analyzed in a partial equilibrium setting. Figure 1, replicated from Grossman and Helpman (1995, pp. 671), depicts the effect of an FTA between countries A and B on country A's import-competing producers of good i, country B's exporters of good i, and consumers in both countries.

Suppose good i is defined in terms of units that make its world price equal to 1. Let the pre-FTA nondiscriminatory tariff-ridden prices in industry i in countries A and B be, respectively, τ_i^A and τ_i^B, with $\tau_i^A > \tau_i^B$. If after the FTA the producer price increases, it raises profits of producers who become a source of support for the FTA. If the consumer price decreases, it increases consumer welfare, which is a motivating factor in a welfare-minded government's decision to enter an FTA. On the other hand, a reduction in producer price lowers profits, and such producers will be a source of opposition to the FTA. All these factors play out in the decision to form an FTA. There are three cases to consider, depicted in Figure 1.

Case 1 (Enhanced Protection): If output of industry i in B is small in the sense that it is unable to fully satisfy A's import demand so that its total supply curve is $X_i^B[TD]$ (TD for trade diversion) in Figure 1, then producers in B experience enhanced protection as they divert their entire output to A's market, due to its higher price of τ_i^A relative to its home price of τ_i^B. Domestic demand in B is satisfied by imports from the rest of the world at the price of τ_i^B. Import-competing producers in A continue to enjoy the same level of protection as before and do not oppose the FTA. Welfare loss relative to the pre-FTA situation in A occurs because of the loss in tariff revenue as imports from the rest of the world, on which the tariff can be imposed, are replaced by imports from FTA partner B.[10]

Case 2 (Reduced Protection): If B's output in industry i is large enough that its total supply curve is $X_i^B[TC]$ (TC for trade creation), then it is able to more than satisfy A's import demand at the lower of the two domestic prices. Then B's exporters satisfy A's import demand at the price τ_i^B, and produce the rest for their domestic market. Since they receive no extra gain from the FTA (they get no more than their pre-FTA price), exporters in industry i neither support nor oppose the FTA. However, import-competing producers in A suffer reduced protection and are likely to organize opposition to the FTA. Consumers in A gain relative to the pre-FTA situation. In this case, import-competing producers are likely to lobby for exclusions, if exclusions are permitted.[11]

Case 3 (Enhanced protection for A's producers, Reduced protection for B's producers): If B's supply curve for i is at $X_i^B[TD, TC]$, then it is able to satisfy A's import demand at a price higher than its domestic price of τ_i^B, but lower than A's pre-FTA price of τ_i^A. Then B's exporters receive enhanced protection and support the FTA, while A's producers suffer reduced protection

[10]Note the following sources of gains in country B and losses in country A. The change in profits to B's exporters is $\Delta\pi_i^B = \pi_i^B(\tau_i^A) - \pi_i^B(\tau_i^B) > 0$, and the change in welfare is $\Delta W_i^B = \Delta\pi_i^B + (\tau_i^B - 1)X_i^B(\tau_i^B)$, where $(\tau_i^B - 1)X_i^B(\tau_i^B)$ is the gain in tariff revenue as its entire domestic demand, previously produced at home ($= X_i^B$, at price τ_i^B) is satisfied by importing from the rest of the world. In country A there is no change in profits as producer price in industry i remains unchanged. The only source of change in welfare is due to the loss in tariff revenue. Hence $\Delta W_i^A = -(\tau_i^A - 1)X_i^A(\tau_i^A)$, where imports from the FTA partner is the entire output of the partner, equal to $X_i^A(\tau_i^A)$.

[11]Note the following sources of losses in country A and gains in country B. Import-competing producers in country A experience a possibly large decline in profits, $\Delta\pi_i^A = \pi_i^A(\tau_i^B) - \pi_i^A(\tau_i^A) < 0$. However, the increase in consumer surplus due to the price decline softens the impact on welfare, $\Delta W_i^A = \Delta\pi_i^A - (\tau_i^A - 1)M_i^A(\tau_i^A) + s_i^A(\tau_i^B) - s_i^A(\tau_i^A)$, where $(\tau_i^A - 1)M_i^A(\tau_i^A)$ is the loss in tariff revenue since $M_i^A(\tau_i^A)$ was imported from the rest of the world at the tariff-ridden price before the FTA, and $s_i^A(\tau_i^B) - s_i^A(\tau_i^A)$ is the increase in consumer surplus. In country B here is no change in profits as the producer price remains unchanged. The only source of change is the gain in tariff revenue. Hence, $\Delta W_i^B = (\tau_i^B - 1)M_i^A(\tau_i^B)$, where exports of $M_i^A(\tau_i^B)$ to A at price τ_i^B are made up from the rest of the world.

and oppose the FTA. Consumers in A gain relative to the pre-FTA situation, while consumers in B remain indifferent. Some welfare loss in A occurs due to loss in tariff revenue. If exclusions are possible, the issue of which industries to exclude pits the interests of A's producers against those of B's exporters.

3.3 Equilibrium Without Industry Exclusions

Suppose no exclusions (or side-payments between governments) are permitted, so that either all the industries in both countries are to be included in the FTA, or the status quo prevails and the FTA fails to materialize. Then an FTA occurs only if *both* countries *unilaterally* favor the FTA. Consider the unilateral domestic stance in a country. Lobby i presents the government with a contribution schedule consisting of two bids, C_{iF} and C_{iN}, which are its promised contributions in the event the government chooses the FTA (F) or the status quo (N), respectively. The unilateral stance is defined as a domestic equilibrium in political contributions by each of the n lobbies, where (i) the contributions induce the government to take a pro-FTA position, and (ii) the set of contribution schedules is a Nash equilibrium, that is, given the contribution schedules of the other lobbies and the anticipated optimization by the government, each lobby's contribution maximizes its own welfare. We consider only a pressured stance where the position taken by the government is influenced by contributions.[12]

The first result (GH95, Result 2) is one about existence of a pressured stance in favor of the FTA. If a pressured stance exists in favor of an FTA, then:

$$\sum_i \pi_{iF} + aW_F \geq \sum_i \pi_{iN} + aW_N. \tag{7}$$

That is, if the FTA-regime is supported in a country, it maximizes the *joint* welfare of its lobbies [net of contributions, lobby i's welfare is equal to $\sum_i (\pi_i - C_i)$], and the government [whose welfare equals $\sum_i C_i + aW$). It is quite possible that the inequality in (7) fails to hold in either of the two countries, making the FTA impossible to achieve. This would happen in a country if, for example, tariffs do not cause a substantial welfare loss and/or the government values contributions more than welfare (so that the difference between a_{WN} and a_{WF} is small), and the stakes from protection are high (so that $\sum_i \pi_{iN}$ is high rela-

[12] In the unpressured stance, the government prefers the FTA regime rather than the status quo, on the basis of public welfare (the aW component of its welfare function), without recourse to any lobbying. A pressured stance occurs when, in order for the government to prefer the FTA, positive contributions by supporters of the FTA (exporters) are needed in order to outbid the sum of the maximum willingness to pay by lobbies that oppose the FTA (importers subject to reduced protection). A pressured stance and an unpressured stance may both exist. If they choose the same policy, then in equilibrium there is no lobbying. The more interesting case is when they do not choose the same policy outcome. In that case policy is chosen according to the pressured stance since it is coalition proof (GH95, pp 675). Intuitively, while no single lobby may stand to lose as much as the (weighted) loss in public welfare, a collection of lobbies may stand to lose more. They will collectively be able to sway the government's policy decision by contributing more than the loss in public welfare.

tive to $\sum_i \pi_{iF}$). Then import-competing interests may easily be able overcome pro-FTA lobbying by potential exporters who would benefit from access to the other country's markets. Grossman and Helpman (1995) present the following hypothesis about the viability of an FTA when no exclusions are possible:

Viability of an FTA without industry exclusions
An FTA among countries is most likely when trade between them is sufficiently "balanced".

In their 2-country n good model, GH define balanced trade in terms of the fraction of industries s_x that are potential export industries in each country. A more precise statement of Hypothesis 1 is that the political viability of an FTA requires s_x to be close to half. The intuition behind Hypothesis 1 is that with unbalanced trade, some industries stand to lose a lot from the FTA and will be able to successfully lobby their governments to change their unilateral stance from one that favors the FTA to one that rejects it. With balanced trade, there are a sufficient number of exporters who gain from trade diversion and hence lobby for the agreement. Also, with balanced trade, welfare gains in many sectors from reduced protection may offset welfare losses in other sectors due to trade diversion.

We examine this prediction graphically below. The intuition behind balancedness carries over to the understanding of how trade agreements may take place even between countries that are not symmetric in their trade with each other. The idea, which is investigated in the following section, is that by excluding some goods from the FTA, sufficient balancedness in trade in the remaining goods may be brought about, making it possible to negotiate an FTA with exclusions.

3.3 The Industry Exclusions Hypothesis

The GH model is insightful about why the successful conclusion of an FTA is most often accompanied by a list of industries that are not part of the agreement. Often, their exclusion is a precondition for the FTA, without which it would not be possible to bring about the FTA. Consider the unilateral stance in the GH95 model with industry exclusions. Lobby i now presents a contribution schedule with three bids, C_{iN}, C_{iE}, and C_{iF}, corresponding to the three possible decisions by its government: stay with the status quo, proceed with the FTA but with i excluded, proceed with the FTA with i included.

Suppose there is a constraint on the number of industries T that may be excluded from the FTA. [13] Denote the set of politically optimal exclusions as

[13] The GH95 model accommodates other measure of exclusion that can be written as $\sum_i T_i \leq T$. For example, T_i may denote the fraction of bilateral trade accounted by industry i, and T the maximum fraction of bilateral trade that can be excluded from the FTA. The fraction of output, fraction of employment, or fraction of total trade are some other measures on which exclusions may be based. We consider exclusions based on the number of

$\mathcal{E}(T)$. If there were no constraint on the number of industries that may be excluded from the FTA, all industries for which the joint welfare of the industry lobby and the government is higher in the status quo than under the FTA are in the set $\mathcal{E}(T)$. More formally, the change in the joint welfare of lobby i and politicians, from including industry i in the FTA, is the sum of the change in industry i's profits net of contributions (denoted $\Delta\pi_i = \pi_{iF} - \pi_{iN}$) and the change in government's welfare (denoted $\Delta W_i = W_{iF} - W_{iN}$).[14] Denote this change in joint welfare as $g_i = \Delta\pi_i + a\Delta W_i$. Then the set $\mathcal{E}(T)$ consists of all industries for which $g_i < 0$ *if* there is no constraint on the number of industries excluded or if the constraint on the number of exclusions is not binding. If the constraint is binding, then the T industries with the most negative values of g_i are listed for exclusions.

An important result is one about unilateral stances: A unilateral stance exists if and only if

$$\sum_{i\in\mathcal{E}(T)} (\pi_{iN} + aW_{iN}) + \sum_{i\notin\mathcal{E}(T)} (\pi_{iF} + aW_{iF}) \geq \sum_{i} (\pi_{iN} + aW_{iN}) \qquad (8)$$

It is possible that where (7) fails (8) is satisfied. In words, where a unilateral stance in favor of the FTA would have been impossible in the absence of such exclusions, such a stance becomes possible when the most politically sensitive industries may be excluded. (7) may be rewritten as $\sum_i(\Delta\pi_i + a\Delta W_i) \geq 0$, and (8) as $\sum_{i\notin\mathcal{E}(T)}(\Delta\pi_i + a\Delta W_i) \geq 0$ or, alternatively, as $\sum_i g_i \geq 0$, and $\sum_{i\notin\mathcal{E}(T)} g_i \geq 0$, respectively. Since $\sum_{i\notin\mathcal{E}(T)} g_i$ excludes industries with the most negative g_i's, that is, lobbies with the greatest loss in their joint welfare with government from being included in the FTA, $\sum_{i\notin\mathcal{E}(T)} g_i \geq \sum_i g_i$. That is, it is easier to satisfy (8) than (7) by excluding those industries for which the joint welfare gains are negative, presuming that such industries exist.

In the unilateral stance, the prime candidates for exclusion are import-competing industries that are the most "politically sensitive", in the sense that their inclusion imposes the greatest cost to the joint welfare of the specific factor owners (lobbies) and politicians. Import-competing industries who experience reduced protection (see Figure 1 and fn. 11 for the exact expressions for g_i) impose the biggest political costs. Industries with high stakes from being included in the FTA, on the other hand, are potential exporters who enjoy enhanced protection.

Suppose the unilateral stance with (a mutually agreed constraint on) exclusions favor the FTA in both countries. The final decision that puts the FTA in

industries in order to keep the analysis and notation simple.

[14] Fns. 10 and 11 give exact expressions for $\Delta\pi_i$ and ΔW_i under reduced and enhanced protection, respectively.

place is about which industries to exclude from the FTA. When the two governments discuss the FTA, they bring their lists of potential exclusions to the bargaining table. The industries that are excluded from the FTA are decided in a bargaining equilibrium. GH95 consider the simple and intuitive Nash bargaining solution to the bargaining game. Here, the two governments decide which industries to exclude from the FTA in order to maximize a geometric weighted average of the "net gains"or "surpluses". Define an indicator variable α_i, which takes the value 1 if industry i is excluded from the FTA and the value 0 if it is included in the FTA. Denoting the two countries as A (for Argentina) and B (for Brazil), the bargaining solution solves for the exclusions as the solution to:

$$Max_{\{\alpha_i\}} \; \sum_{j=A,B} \left[G^A(i) - \overline{G^A}\right]^{\eta^A} \left[G^B(i) - \overline{G^B}\right]^{\eta^B} , \; s.t. \sum_i \alpha_i \leq T. \quad (9)$$

In (9), $G^A(i) = \sum_i [\alpha_i (C^A_{iE} + aW^A_{iN}) + (1-\alpha_i)(C^A_{iF} + aW^A_{iF})] = \sum_{i \in \mathcal{E}(T)} (C^A_{iE} + aW^A_{iN}) + \sum_{i \notin \mathcal{E}(T)} (C^A_{iF} + aW^A_{iF})$ is the welfare of government A if industries $i \in \mathcal{E}(T)$ are excluded. $\overline{G^A} = \sum_i (C^A_{iN} + aW^A_{iN})$ denotes the "threat point" of government A, that is, its welfare in the status quo.[15] Similar definitions extend to $G^B(i)$ and $\overline{G^B}$. η^A and η^B are the Nash weights denoting, respectively, the bargaining strengths of governments A and B. The government with the higher threat point will succeed in getting those industries excluded that its domestic politics favor. The same holds for the government with the greater bargaining strength. For example, if $\eta^A = 1$ and $\eta^B = 0$ then only government A's list of exclusions is considered in the bargaining game, subject, of course, to the limitations on the number of exclusions. And if $\overline{G^B}$ is small in comparison with $\overline{G^A}$, then, all else equal, the bargaining equilibrium favors A's list of exclusions. This example is not as extreme as may appear, as we will see in the context of Mercosur countries.

The difference between the threat points of the two countries reflect differences in their underlying political economic structure, for example their profit functions, the set of organized industries in the two countries, and the weights their governments put on a dollar of contributions relative to a dollar of welfare. The difference in their bargaining strengths are due to factors outside the

[15] In going from (8) to (9) the main difference is that the π_i's have been replaced by C_i's. This is because the coalition-proof stance in (8) can, by the results in Bernheim and Whinston (1986), be supported by offers in which (i) lobbies bidding for exclusions bid the same amount as they would for a rejection of the FTA, i.e. $C_{iE} = C_{iN}$, (ii) industries that are not in the excluded, that is $j \notin \mathcal{E}$, bid for an exclusion (C_{iE}) exactly what they would lose by being included in the FTA (this is zero for exporters, but may be positive for an import-competing industry which is not excluded due to the constraint on the number of exclusions), and (iii) any industry that is excluded, i.e. $i \in \mathcal{E}$, never bids more than what it stands to lose by being included in the FTA, but probably bids less, for it needs to bid just enough to ensure that the joint welfare gain from its exclusion ($-g_i$) exceeds the joint welfare gain from excluding the marginally included industry (i.e. the largest $-g_j$). Substituting these contributions into the government's political welfare function (1), we get the expressions for $G_A(i)$ and $G_B(i)$.

model.[16] The first order conditions for solving (9) lead to the following testable implications about industry exclusions.[17]

Industry Exclusions

Exclusions are granted to industries for which a weighted sum of the political benefits of market access to the exporting country and the political cost of greater import competition in the importing country, is most negative. (The weights are functions of the Nash weights and aggregate surpluses of the two countries.)

Consider arranging industries in ascending order according to the weighted sum

$$\omega^A \times [(C^A_{iF} + aW^A_{iF}) - (C^A_{iE} + aW^A_{iN})] \quad + \quad \omega^B \times [(C^B_{iF} + aW^B_{iF}) - (C^B_{iE} + aW^B_{iN})]$$

or

$$\omega^A \times [(\Delta C^A_i + a\Delta W^A_i)] \quad + \quad \omega^B \times [(\Delta C^B_i + a\Delta W^B_i)] \qquad (10)$$

where $\omega^J = \eta^J/(G^J(i) - \overline{G^J})$ weights country J's gains from including industry i in the FTA. Then industries with a value of $\omega^A \times [(\Delta C^A_i + a\Delta W^A_i)] + \omega^B \times [(\Delta C^B_i + a\Delta W^B_i)]$ lower than a cutoff are excluded from the FTA. The cutoff (see fn. 17) is equal the negative of the Lagrange multiplier of the constraint on number of exclusions. Hypothesis 2 states that industries for whom the weighted sum of political benefits of market access to the exporting country and the political cost of greater import competition in the importing country is most negative, are excluded from the FTA.

4. Empirical Implementation and Data

4.1 Empirical Implementation

In order to empirically examine the validity of the GH95 hypothesis about industry exclusions, industries must be ranked according to (10). This requires measurement of the change in the joint welfare of each industry lobby and its government due to the inclusion of the industry in the FTA, for both countries. In order to find measurable variables that are as close to the theory as possible, and which facilitate the ranking of industries according to (10), we draw on

[16] In the case of Mercosur the FTA was part of a "deeper integration" and harmonization of policies other than trade policy. Argentina was the stronger bargainer on issues other than trade because it led the way on aspects of the deeper integration pertaining to fiscal, monetary, and stabilization policies. If Argentina's bargaining strength extended to trade issues, then it is reflected in a higher η^A than η^B.

[17] The objective function in (9) may be written in logs, after substituting for the G's, as:

$$\eta^A log[\alpha_i(C^A_{iE} + aW^A_{iN}) + (1-\alpha_i)(C^A_{iF} + aW^A_{iF}) - (C^A_{iN} + aW^A_{iN}) +$$
$$\eta^B log[\alpha_i(C^B_{iE} + aW^B_{iN}) + (1-\alpha_i)(C^B_{iF} + aW^B_{iF}) - (C^B_{iN} + aW^B_{iN})$$

results from Grossman and Helpman (1994) that were described in Section 3.1. This is done in two steps. First, the nature of the gains and losses from the FTAs is revisited in greater detail. Second, the connection between these gains and losses to measurable variables is made clear.

Consider each term in the weighted sum in (10). Since the theory concerns one-way trade (Krishna 1998, develops the analysis of the formation of FTAs with imperfectly competitive markets), we can analyze each industry independently. Let us consider industry i and revisit Figure 1. Whenever trade diversion in any industry produces gains for exporters in B (i.e. producer price in industry i is greater than τ_i^B in Figure 1), it also produce a nonnegative gain in tariff revenue for their governments without any additional welfare loss compared with the pre-FTA situation. Industries in B that would be potential exporters to their FTA partner will therefore be at the bottom of the list of exclusions in B's unilateral stance. On the other hand, trade diversion is accompanied by a loss in tariff revenue to government A, since what the FTA-partner now supplies, free of the tariff, was earlier imported at the world price plus the nondiscriminatory tariff. While this is the only source of opposition to the FTA when there is pure trade diversion (that is, when producer price remains at τ_i^A), a possibly powerful source of opposition occurs if producers in A experience a decline in their producer price, or when there is reduced protection. In any industry, the opposition from import-competing producers to the FTA increases with the size of the price decline due to trade creation, and is most fierce when there is pure trade creation under the FTA (that is, when producer price declines to τ_i^B). Once again, consider the three cases in Figure 1.

The first case is that of pure trade diversion which occurs when the producer price in industry i remains at τ_i^A. Then the only opposition B's exporters face is due to the loss in tariff revenue experienced by the government of A. If the loss in tariff revenue is not large (no side-payments between governments are permitted), then the industry is also likely to be low on the list of exclusions in the unilateral stance of country A. Since B's government wants industry i to be included in the FTA, and neither the industry's lobby in A nor A's government opposes its inclusion, this industry will be included in the FTA. However, if the loss in revenue is large, the outcome will hinge on the bargaining power of the two countries. This, in turn, depends on their Nash weights (the larger the η^J the greater is J's bargaining power) as well as the difference between their welfare in the Nash equilibrium and at their threat points (the lower is $G^J(i) - \overline{G^J}$ the greater is J's bargaining power).

In order to empirically assess which industries are likely to be included in the FTA, suppose that the two countries are symmetric in their aggregate bargaining power. Then their domestic politics determines which industries are to be included. In Section 3.1 we showed that the GH94 model led to the prediction that the problem of joint welfare maximization of each industry lobby and the government led to the simple and intuitive structure of protection equation in (6):

$$\frac{t_i}{1+t_i} = \frac{I_i}{a}\left(\frac{z_i}{e_i}\right), \qquad i = 1, \ldots, n. \tag{11}$$

In the context of politically organized export interests, (11) implies that in the export-subsidy game of GH94, politically organized industries ($I = 1$) with a high output-to-export ratio (z) and low absolute export supply elasticity (e_i) get the largest export subsidies. This is due to three reasons. First, the marginal cost of "buying" export subsidies for such an industry is lower than in industries with higher export elasticities, since a unit of the subsidy imposes greater deadweight costs as e_i increases. Hence it has to compensate the government less than industries with higher export elasticities for the same amount of the subsidy, all else equal. Second, since the size of profits is determined by the size of output, the higher is output the greater the stakes from protection. Third, the lower are exports, the lower is the loss in consumer surplus.

At the margin, for each politically organized industry, the lobbying contributions are just enough to compensate for the loss in government's welfare as in (4). However, the *total* contribution to the joint welfare of an industry and the government is highest for industries that succeed in securing the highest export subsidies. Hence, industries that lobby hardest for an export subsidy are precisely the ones lobbying for *inclusion* of the industry in the FTA. The political calculus behind lobbying for access to a market with a higher producer price is similar to the political calculus behind lobbying for an export subsidy. The subsidy has the same ultimate effect as an FTA: an increase in the producer price.

In order to evaluate which industries actively support inclusion into the FTA, (11) can be applied as follows. Define the index $I^J_{Xi} \times (z/e)^J_{Xi}$, where I^J_{Xi} takes the value 1 if industry i in country J is politically organized as an export industry, and 0 if it is not so organized, and $(z/e)^J_{Xi}$ is industry i's output-to-export ratio divided by its absolute export supply elasticity. In computing this index the output-to-export ratio requires the use of potential *exports to the FTA partner country* (whereas in (6) it is defined using total exports). The reason can be most clearly seen in the case of an industry which competes with imports from rest of the world in the pre-FTA regime, but becomes an exporter in the FTA-regime, being the lower cost FTA-producer.

The index $I^J_{Xi} \times (z/e)^J_{Xi}$ varies positively with the change in joint welfare of industry i in country J and its government from being included in the FTA. Consider applying this index to the bargaining game in the pure trade diversion case. If the tariff loss experienced by, say, B's government is small, then industries in A experiencing gains from trade diversion should unambiguously be included in the FTA. If the tariff loss experienced by B's government is large, then the outcome depends on its bargaining power, and whether the weighted sum in (10) is lower than the cutoff.

The second case is one of pure trade creation or reduced protection which occurs when the price to import-competing producers of good i in country A is lowered to country B's domestic price τ_i^B in Figure 1. These producers are opposed to being part of the FTA, due to the possibly large decline in their profits ($\Delta\pi_i^A = \pi_i^A(\tau_i^B) - \pi_i^A(\tau_i^A) < 0$). The government of country A experiences a change in welfare that is, both, lowered due to the decline in industry profits and the decline in tariff revenue, and raised due to the increase in consumer welfare following the price decline [$\Delta W_i^A = \Delta\pi_i^A - (\tau_i^A - 1)M_i^A(\tau_i^A) + s_i^A(\tau_i^B) - s_i^A(\tau_i^A)$, see fn. 11]. In the unilateral stance of country A, therefore, industries that experience pure reduced protection are the source of the biggest losses in the joint welfare of the industries and government. For industry i this loss is given by $\Delta\pi_i^A + a\Delta W_i^A$. Any industry for which $\Delta\pi_i^A + a\Delta W_i^A < 0$ is a candidate for exclusion, for excluding it raises the industry's profits (and therefore its contributions) as well as produces tariff revenue, which more than makes up for the decrease in consumer surplus. The more negative is $\Delta\pi_i^A + a\Delta W_i^A$, the higher is industry i on the list of potential exclusions.

The unilateral stance of country B regarding industries which experience reduced protection in A depends on its tariff revenue gain as part of its domestic supply which is diverted to satisfy demand in A must be imported from abroad (since producer and consumer prices stay the same in B, there is no other source of support for the FTA among producers and consumers in B). If the gain in tariff revenue is small, B's government is indifferent to the exclusion of these industries from the FTA. Then, in the bargaining equilibrium it is likely that A's unilateral stance regarding exclusions will dominate decisions on which industries to exclude from the FTA, subject to the constraint on their number.

In order to empirically evaluate which industries impose the biggest losses on the joint welfare of the industry and government when there is pure trade diversion, we apply equation (11) to this case. Industries that lobby hardest for import protection are the same industries who would also lobby for *exclusion* of the industry from an FTA. The political calculus behind lobbying by an industry to prevent foreign access to their market at a lower producer price is similar to the political calculus behind lobbying for a tariff (which holds up its producer price). In (11) the industries that are highly protected are politically organized industries ($I_i = 1$) with a high output-to-import ratio (z_i) and low absolute import demand elasticity (e_i) for the same reasons as in the previous case of the export subsidy: (i) a price distortion in an industry with low elasticity inflicts a lower deadweight loss than one in an industry with a high import elasticity, and (ii) the higher the output-to-import ratio, the greater the stakes from protection and lower the welfare loss inflicted on consumers. Define the index $I_{Mi}^J \times (z/e)_{Mi}^J$, where I_{Mi}^J takes the value 1 if industry i in country J

is politically organized as an import-competing industry, and 0 otherwise, and $(z/e)^J_{Mi}$ is industry i's output-to-import ratio divided by its absolute import supply elasticity. The definition of z is now based on *imports from the FTA partner country*, (while in (6) it is defined using total imports). The index $I^J_{Mi} \times (z/e)^J_{Mi}$, varies positively with change in joint welfare of industry i in country J and its government from being *excluded* from the FTA.

Consider applying this index to the bargaining game in the pure trade creation case. If import-competing producers in A experience reduced protection, and the tariff gain experienced by the government of B is small, then industries in country A experiencing losses should be candidates for exclusion from the FTA. Similarly, if import-competing producers in B experience reduced protection, and tariff gains to A's government are small, then these industries in B will be candidates for exclusion from the FTA. Which industries will actually be excluded in the bargaining equilibrium depends on the constraint on exclusions, and the relative bargaining strengths of the two countries.

The third case is the intermediate case where both enhanced and reduced protection occur. In Figure 1, this occurs in industry i when the producer price seThen import-competing producers of good i in country A experience a decline in profits $(\Delta\pi^A_i < 0)$. ttles at a level below τ^A_i but above τ^B_i. Though the decline is smaller than in the pure enhanced protection case, it may still be substantial, leading producers in A to organize opposition to being part of the FTA. In country B, potential exporters gain from trade diversion as their producer price rises above τ^B_i. The interests of government B are aligned with the interests of lobby i, since tariff revenue is gained without any loss in consumer welfare from including industry i in the FTA. But A's government may or may not be aligned with its producer interests due to the gain in consumer welfare as price declines. In industries which experience both trade diversion and trade creation, the unilateral stances of each country come into conflict on the issue of which industries to exclude from the FTA. The solution to the bargaining game achieves an equlibrium between export interests in B who desire inclusion and import-competing producers in A who desire exclusion.

As before, we apply equation (11) to measure which industries are the beneficiaries from enhanced protection and which industries lose from reduced protection in each country. The index $I^J_{Xi} \times (z/e)^J_{Xi}$ measures the joint gain to exporters in industry i in country J and J's government due to the inclusion of i in the FTA. The higher is this index, the greater is the gain. The index $I^J_{Mi} \times (z/e)^J_{Mi}$ measures the joint gain to import-competing producers in industry i and its government, by excluding i from the FTA. It is possible to have a high value of $I^J_{Xi} \times (z/e)^J_{Xi}$ in one country, and a high value for $I^J_{Mi} \times (z/e)^J_{Mi}$ in the other, in the intermediate case of enhanced as well as reduced protection.. The bargaining strengths of the two countries play a critical role in deciding which, if any, of these industries to exclude from the FTA.

To summarize the discussion in this section, consider the hypothetical setting where both countries are symmetric. They are mirror images of each other, so that exactly half of their industries export to their FTA partner, and the other half import from the FTA partner. To begin with, suppose there is no constraint on the number of industries that may be excluded. Then all industries that experience pure trade diversion in the two countries are excluded from the agreement, under the assumption that the loss of tariff revenue in the partner country is not big enough that considerations of bargaining strength begin to matter. They impose the biggest loss on the joint industry-government welfare in each country from being included in the FTA. The next biggest loss is imposed by industries that experience both enhanced and reduced protection, but where there is more reduced than enhanced protection. In the symmetric case, this occurs when the FTA price in any industry settles close to the low-tariff country's price (τ^B in the case of Figure 1). Then there is great opposition to the FTA by importer-competing producers, without a counter-balancing effort by export interests in the other country. These industries, where the losses from reduced protection in one country outweigh the gains from enhanced protection in the other, are also excluded from the FTA. At the margin are those industries where the losses from reduced protection in one country exactly balance the gains from enhanced protection in the other. The remaining industries are included in the agreement. If there *is* a constraint on the number of industry exclusions then it is possible that some politically sensitive industries, those experiencing pure reduced protection, may not be excluded.

Having motivated the connection between measurable variables and theoretical gains and losses from exclusion/inclusion in the FTA, we are ready to propose an econometric specification for investigating the theory. Define the four indices $(I \times z/e)^J_{Mi}$, $J = A, B$ and and $(I \times z/e)^J_{Xi}$, $J = A, B$ as: $(I \times z/e)^J_{Mi} = I^J_{Mi} \times (z/e)^J_{Mi}$, and $(I \times z/e)^J_{Xi} = I^J_{Xi} \times (z/e)^J_{Xi}$, where I^J_{Mi} equals 1 if industry i in country J is a politically organized import-competing producer, $(z/e)^J_{Mi}$ is the output-to-imports (from the FTA partner) ratio divided by the absolute import elasticity of industry i in country J, I^J_{Xi} equals 1 if industry i in country J is a politically organized exporter and 0 otherwise, and $(z/e)^J_{Xi}$ is the output-to-exports (to the FTA partner) ratio divided by the absolute export elasticity of industry i in country J. We use the following econometric model to examine the GH95 exclusions hypothesis:

$$y_i = \beta_0 + \beta_1 (I \times z/e)^A_{Mi} + \beta_2 (I \times z/e)^A_{Xi} + \beta_3 (I \times z/e)^B_{Mi} + \beta_4 (I \times z/e)^B_{Xi} + \epsilon_i, \qquad (12)$$

where y_i is an indicator variable measuring whether industry i is excluded ($y_i = 1$) or included ($y_i = 0$) in the FTA. We measure two types of industry exclusions. The first measures the incidence of internal tariffs, which is also used by Olarreaga and Soloaga (1998). The second measures the incidence of nontariff barriers (NTBs).

In the symmetric situation discussed above, Hypothesis 2 predicts that import variables will have non-negative coefficients: $\beta_1 \geq 0$, $\beta_3 \geq 0$ while the export variables will have non-positive coefficients: $\beta_2 \leq 0$, $\beta_4 \leq 0$. When there is asymmetry between the two countries in their bargaining strengths or threat points, the coefficients in (12) may reveal the nature of such asymmetries. For example, if exclusions and inclusions are determined by A but not B, then we should see $\beta_1 > 0$, $\beta_2 > 0$, and $\beta_3 = 0$, $\beta_4 = 0$.

With asymmetries either in trade patterns or bargaining strength, the theory is quite consistent with other permutations on the signs of the coefficients. We view this as a useful feature of the theory because, given its validity, the theory explains what a specific permutation of coefficient signs implies about trade politics. For example, suppose the coefficients are inferred to have the following permutation of signs: $\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 < 0$, $\beta_4 > 0$. Then, according to the theory, country A's organized import-competing industries entirely determined the exclusions and its organized exporting industries entirely determined the inclusions. Not only were country B's organized interests ineffectual in determining exclusions, but the industries they most wanted to exclude were included ($\beta_3 < 0$) and the industries they most wanted to include were excluded ($\beta_4 > 0$). The theory traces the reason for this to the fact that most industries probably fell into the intermediate case of both enhanced and reduced protection, where import-competing interest groups in A were pitted against exporting interests in B, and A's export interests were pitted against import-competing interests in B. The estimates reveal that A's import-competing interests and exporting interests won in the bargaining game, at the expense of their competitors in B. This example demonstrates the value of the GH95 model as a theoretical device for empirically summarizing and understanding the factors determining the formation of FTAs. We will use (12), both, in order to infer about the validity of the GH95 model, and to understand the relative bargaining strengths of the two largest Mercosur partners.

4.2 Data

Mercosur is typical of regional trade agreements among countries that are geographically close, share a common history vis-a-vis the rest of the world, and are at relatively similar stages of development. This is not to say that there are few differences among them. Mercosur partner countries are quite disparate in market size and composition of output. Brazil, the largest country, accounted for 60

The data for the empirical analysis are organized at the 6-digit Harmonized System (HS) level of disaggregation of almost 4500 goods produced by manufacturing industries. That level of detail was chosen over a more aggregate system of classification such as the 80-industry ISIC (rev. 2) 4-digit level for two reasons. First, actual decisions about tariff rates are made a the HS level. The incidences of tariffs and NTBs vary widely at this level of detail, which is masked by a higher level of aggregation. Second, in order to make full use of the information in internal tariffs and non-tariff barriers (NTBs) which were available to us at the HS level, it is econometrically desirable to estimate the model with such micro-level data. Since the theory requires no more than binary measures of the data, the HS level is the appropriate level of analysis. The internal tariffs of Argentina and Brazil are for the year 1996, and were kindly provided by Marcelo Olarreaga. The NTB data are also for the year 1996, and was provided to us by the Argentinian International Trade Commission (CNCE, 2000). The appendix provides more detail on development of the NTB data.

The binary exclusions variables are measured by taking the union of binary exclusions for the two countries. Table 1 indicates that in 3.5% of the sample of HS 6-digit lines Argentina imposed tariffs to internal Mercosur trade (I^A_{TARIFF}=.035), while Brazil imposed internal tariffs on only 0.3% ($I^B_{\mathsf{TARIFF}} = .003$). The measure of tariff exclusions used in the probit analysis is the union of these tariff exclusions. Since they are in separate tariff lines, their union is approximately their sum ($I_{\mathsf{TARIFF}} = .037$).

NTB exclusions are similarly constructed for three types of NTBs: Prohibitions which prohibit imports but allow imports via a government agency, Import Authorizations which require the prior authorization of the government before any import transaction may take place, and Core NTBs which include Prohibitions (but not Authorizations), as well Import Licensing and Quotas. As described in the Appendix, the Mercosur countries did not consider the more conventionally used antidumping (AD) and countervailing duties (CVDs) and safeguard actions as non tariff barriers. Data for AD/CVD actions are incomplete and uneven across the two partners, since they were not required to report them to the Mercosur Common Market Group, the body responsible for keeping trade and protection data. Our analysis thus restricts attention to Prohibitions, Authorizations and Core NTBs.[18] Table 1 reports descriptive statistics on the incidence of these NTBs by Argentina and Brazil, and also the union of the two. Since there is an overlap in the HS lines on which NTBs in the two countries were imposed, the means for the union of the measures in the two countries (I_{PROH}, I_{AUTH}, and I_{CORE}) are less than the sum of corresponding Argentina and Brazil means. The reason for the overlap is that in a number of industries the nondiscriminatory NTBs, used to protect from rest of the world imports, have been maintained in the Mercosur regime as well. That is, the two countries have kept their options open as to the internal use of NTBs. The summary statistics in Table 1 show that progress on the elimination of NTBs has certainly

[18]AD and CVDs are in use in Mercosur countries, but since they were not recognized as such, the Mercosur NTB database we obtained does not include details on those NTBs for both Argentina and Brazil equally. An independently compiled summary in the WTO semi-annual reports on AD and CVDs indicated, as we would suspect, that Argentina applied far more of these actions against Brazil than did Brazil against Argentina. The WTO report shows that 25% of the 90 Argentinian AD actions (34% in import terms) in force, as of 1998, were directed against Brazil (the largest recipient of AD actions, followed by China). Brazil, in turn, imposed no AD or CVD actions on imports from Argentina, though it had 82 AD/CVD actions in force as of 1998. 30% of these were directed against China and the U.S.

not kept pace with tariff elimination.

The construction of regressors in (12) required data on output, trade, and elasticities for Argentina and Brazil at a consistent level of classification. The ISIC (rev. 2) 4-digit level was the most detailed level at which value added data and other data required to estimate import elasticities were available. The output-to-imports (z_{iM}) and output-to-exports (z_{iX}) variables are therefore computed at the ISIC level. Bilateral imports and exports are used for the purpose of computing z_{iM} and z_{iX}. Import elasticities are estimated for each 4-digit ISIC industry, as described below. The imports, exports and output data are averaged over the four years 1993-1996, before constructing the output-to-imports and output-to-exports ratios. This reduces concerns about their endogeneity, since the tariff and NTB data are for the year 1996. The regressors so computed are then mapped into the HS 6-digit level using a standard conversion system.

Import elasticities are estimated using quarterly data for Argentina between 1992-99. Due to a change in the data-keeping system in 1992, there is great discord between pre- and post-1992 data. We chose to use post-1992 data to estimate elasticities. For each of the ISIC industries the import elasticities were estimated using the following model, motivated by Senhadji (1998):

$$M_t = a_0 + a_1 P_t + a_2 D_t + a_3 M_{t-1} + e_t, \quad t = 1992:1, \dots, 1999:4,$$

where M=ln(imports from the world), P=ln(price of imports), D=ln(value added-exports to the world), and e is a classical error term. Since the lagged dependent variable is included, the assumption on the error term yields consistent estimates. The import elasticities are measured as the estimated values of a_1.[19]

Table A.1 lists the elasticity estimates and other features of the model used to estimate them. The elasticities were estimated with the correct signs for a majority of the 4-digit industries. In the case where the estimated values were nonpositive, they were set equal to their closest 4-digit neighbor. The same elasticities are used for Brazil, because quarterly price and quantity data were unavailable for Brazil. Importantly, the elasticities are "generated" variables and must be corrected for an error-in-variables problem before being used to construct regressors in (12). To do this we use the method of Gawande (1997), which is described in some detail in the appendix.

[19] The models are estimated by assessing the presence of stationarity and cointegration in the data. For each industry, the Dickey-Fuller test for stationarity is performed on each of the three series (M, P, and D). The results show that these series contain unit root (i.e., integrated of order 1, I(1)). Since the estimates of elasticities are meaningful only if the I(1) variables are cointegrated, a test of cointegration is also performed on these series. The null of noncointegration is rejected for most series.

To our knowledge, there are no estimates of export supply elasticities reported in the substantial literature on trade elasticity measurement. We proceeded by presuming that export elasticities are equal to unity (or some constant) in all industries.[20] Hence, the explanatory variables in (12) employ the estimated elasticities in the definition of $(z/e)^A_{Mi}$ and $(z/e)^B_{Mi}$, but elasticities are presumed equal to unity in $(z/e)^A_{Xi}$ and $(z/e)^B_{Xi}$.

A key consideration in investigating the Grossman-Helpman model is the proper measurement of lobbying organization, that is, the indicator variables I^A_M, I^B_M, I^A_X, and I^B_X. If cross-sectional data on lobbying in Argentina and Brazil were available, it would be possible to measure them either by the method in Gawande and Bandyopadhyay (2000) or by simply using a cutoff rule as in Goldberg and Maggi (1998). Unfortunately, lobbying data for the Mercosur countries are not available to us. The primary reason is that while lobbying activity is pervasive, there are no legal reporting requirements for such expenditures as there are in the U.S. Indirect measures, for example, the number of industry professionals that belong to politically well-connected organizations may also be used to measure political organization. But our search for measures of such networks did not yield systematic data. Further, we are specifically interested in lobbying organizations set up for the purpose of influencing trade policy and not some other policy. Those data are difficult to obtain for even highly developed countries.

We chose to construct simple measures of export and import lobbying organization in Argentina and Brazil using cutoffs based on available data on trade and output-per-firm. The first set of formal results we present presumes that industries in the ISIC 4-digit sample in which total imports (from the world) exceed the sample mean are politically organized into protectionist lobbies. Applying this definition to industries in Argentina and Brazil, respectively, provides measures of I^A_M and I^B_M. A similar cutoff above the sample mean for total exports is used to define I^A_X and I^B_X, that is, indicators for politically organized lobbies seeking to promote their exports. The descriptive statistics for the number of organized industries in both countries, and the regressors in (12) constructed using this mean threshold are given in Table 1.

Given the simplicity of our construct, it is imperative to demonstrate robustness of our results to different measures of political organization. For this purpose, results from four other measures of the set of vectors { I^A_M, I^B_M, I^A_X, I^B_X }, using a variety of different cutoffs, are presented. Their performance is

[20] Olarrreaga, Soloaga, and Winters (1999) argue for the use of import shares in the partner country as a proxy for export supply elasticity of the exporting country. For example, if the importer has an infinitely small share of the exports, then it has no ability to influence price, and thus faces an infinitely elastic export supply curve. But if the importer has a large market share and is a price-maker, then the export supply curve it faces is inelastic. The results from using partner's imports share data as proxies for export elasticities yielded results that are, for the most part, qualitatively similar to those reported in the paper. There are some quantitative differencs, though.

compared with the baseline model via large-sample non-nested tests.

5. Political Economy of Trade Agreements: Evidence

5.1 Graphical Analysis

Had there been no industry exceptions, would trade between Argentina and Brazil under Mercosur be "balanced" enough that the agreement would have been possible without exceptions? A negative answer to this question seems requisite for any analysis of the exceptions hypothesis to be meaningful. Otherwise, why should exceptions even be discussed among potential FTA partners?

Hypothesis 1 clarified that without sufficient "balancedness" in trade between two countries, the viability of a free trade agreement *without industry exclusions* is seriously in doubt. Balancedness in trade in a cross-section of manufacturing industry requires that there should be a sufficient number of industries in both countries that stand to gain from trade diversion. Balancedness creates the best opportunity for exporting interests to overcome opposition to the FTA from import-competing producers and thus establish unilateral stances in favor of the FTA in both countries. Also, with balanced trade, welfare gains in many sectors from reduced protection may offset welfare losses in other sectors due to trade diversion.

If there were no industry exclusions, the gains from the Mercosur trade agreement would have been lopsidedly in favor of the larger country Brazil. This is evident in Figure 2, which depicts the distribution of total production in 1996 between the two partner countries across eighty 4-digit ISIC (rev 2) industries. The bars are sorted in ascending order of Argentina's share. Since the 1996 data are ex post to the Mercosur agreement (with industry exceptions), they are approximations to the hypothetical distribution that would have prevailed in the absence of exceptions. Nevertheless, it is the best approximation available in order to provide a satisfactory answer to the question posed at the beginning of this section. If trade between the two countries were balanced in the Grossman-Helpman sense, then the industry with equal output shares between the two countries (0.50, or the mid-point of the horizontal axis in Figure 2) would approximately be the median industry in the sample (the mid-point of the vertical axis). This is clearly not true in the figure, for the industry with equal shares (labeled DRUG) is the 13th industry from the top in Figure 2, which puts it at the 85th percentile in the set of 4-digit ISIC industries. If the cutoff for balancedness were relaxed to a 0.45 share, then the threshold industry (MFGTXT) is ranked 60th or is at the third quartile in the set of 4-digit ISIC industries.

In theory, if the larger of the two industries were the exporting industry and the smaller of the two the import-competing producer, then the distribution of output in Figure 2 implies that under (fully) free trade, Argentina would import in approximately 75% (and perhaps more) of the 4-digit ISIC industries, and export in only 25% (or less) of them. While this distribution may have induced a unilateral stance in favor of an FTA without exceptions in Brazil, a similar stance in Argentina would probably have been defeated by politically organized import-competing producers.

The intuition behind industry exclusions is transparent in Figure 2. For the moment, suppose that a third of all the 4-digit ISIC industries, all from among industries ranked below MFGTXT (rank=60), were excluded from the FTA. Then MFGTXT would be the median industry among the included industries. This would provide the best opportunity for unilateral stances in favor of the FTA on both sides. Of course, many other permutations of industry exclusions may be found, featuring exclusions for import-competing producers in Argentina and Brazil, that support unilateral stances on both sides. But in all of these permutations, the distribution of output in Figure 2 implies that, according to the Grossman-Helpman theory of exclusions, Argentina would require many more exceptions than Brazil in order to make the FTA viable. Or, given the successful conclusion of the FTA, we should find that Argentina was accorded the lion's share of exceptions.

Figures 3, 4.1, and 4.2 reveal the previous prediction to be approximately true. Figure 3 indicates which industries were excluded from the zero tariff requirement of the Mercosur agreement. While the exceptions and the subsequent tariffs imposed on their bilateral imports by Brazil and Argentina were decided at the HS tariff line level of detail, Figure 3 depicts the import-weighted average tariffs at the 4-digit ISIC level. While Argentina was permitted tariff exclusions in fifteen of the 4-digit industries, Brazil obtained tariff exclusions in only three. Argentina also obtained "hard" exclusions on autos and sugar, without which Argentinian production in these sectors would have contracted following the FTA. Most of the Argentinian tariff exceptions occurred in industries that appear in the bottom two-thirds of Figure 2. They are marked with the label "AT" (for Argentina Tariff exceptions).

NTBs are potentially more restrictive instruments than tariffs. For a number of NTBs it is difficult to accurately quantify or stringently define their use. As a result, there are no precisely written codes of conduct regarding their use, as there are for tariffs in the WTO rules. Considerable discretion may therefore be exercised in just how restrictively they are used. Figures 4.1 and 4.2 depict, respectively for Argentina and Brazil, the distribution across the eighty 4-digit ISIC industries of NTBs in 1996. At the ISIC level of aggregation they are measured as the proportion of the bilateral imports covered by NTBs. Coverages of three types of NTBs are displayed: Prohibitions, Import Authorizations, and Core NTBs. A comparison of Figure 4.1 with Figure 4.2 confirms the prediction that NTBs are far more frequently imposed by Argentina than by Brazil. Figure A.1 in the appendix affirms that as a percentage of total manufacturing imports, Argentina's NTB coverage of imports from Brazil is far greater than Brazilian NTB coverage of imports from Argentina. A comparison of NTB coverages on imports from the Mercosur partner with NTB coverages on imports from the world in Figure A.1 shows that their multilateral character.

We hypothesize that if it were easier to negotiate NTB exclusions, then they would follow the pattern predicted: many exclusions in the bottom two-thirds of the industries in Figure 2 in order to gain the support of import-competing producers in Argentina, and a handful at the top of the distribution to satisfy import-competing producers in Brazil. Even with the present NTBs, this pattern is in evidence. In Figure 2 the labels "AN" and BN" indicate industries subject to Prohibitions in Argentina and Brazil, respectively. A majority of the industries protected in Argentina via Prohibitions are in the bottom two-thirds of the distribution where Brazil is the potential supplier in the FTA, and those protected in Brazil via Prohibitions are in the top of the distribution where Argentina is the potential supplier in the FTA. To be sure, there are counter-intuitive incidences of NTBs: Argentina protected some industries at the top of the distribution in which it had a larger share of joint output (e.g. 80. Containers, 77. Engines, and 75. Industrial Machinery), while Brazil protected industries in which it had a greater share of joint output (e.g. 19. Industrial Chemicals, 34. Canned Vegetables, and 36. Other Chemicals). But these instances are probably due to the fact that the NTB data do not distinguish between protecting against rest of the world imports and protecting against FTA partner imports.

5.2 Probit Analysis

Data Graphs

As a prelude to the formal econometric analysis, Figures 5.1-5.4 provide a summary of the 6-digit HS data indicating how tariff and NTB exclusions may vary with the regressors $(I \times z/e)^A_M$, $(I \times z/e)^A_X$, $(I \times z/e)^B_M$, and $(I \times z/e)^B_X$. Recall that the regressors were constructed at the 4-digit ISIC level of eighty industries, and then concorded into the 6-digit HS level comprising 4490 tariff line items, in order to make full use of the exclusions data available at the tariff line level. The concordance replicates the 4-digit data at the 6-digit HS level. The bars in Figures 5.1 depict frequency distributions, representing the occurrence of tariff and NTB exclusions for sets of values of the regressor $(I \times z/e)^A_M$. For example, the left-most bar in Figure 5.1 shows that, of the 6-digit HS lines for which $(I \times z/e)^A_M$ is around zero (whenever I^A_{Mi} equals 0 so does $(I \times z/e)^A_M$), tariff exclusions had a low rate of incidence. However, over 30% of these lines had incidences of Core NTBs. The number at the top of the bar indicates that of the sample of 4490 6-digit HS observations, 1589 had a value of zero for $(I \times z/e)^A_M$. The bars are for intervals of values of $(I \times z/e)^A_M$ which round off to the indicated number. The left-most bar thus accommodates values of $(I \times z/e)^A_M$ in the interval [0, .005), and the bar to its right is for the interval [.005, .015).

If the bivariate data for tariff exclusions and $(I \times z/e)^A_M$ were in accord with the theory unconditionally with respect to the influence of other issue and control variables, then we would expect to see a pattern with high frequency of tariff exclusions associated with greater values of $(I \times z/e)^A_M$, and low frequency of tariff exclusions associated with smaller values of $(I \times z/e)^A_M$. The data on tariff exclusions is bi-modal; a high frequency of tariff exclusions occurs when $(I \times z/e)^A_M$ is around 0.02, and also when it is around 0.19. For NTB exclusions, the pattern is not clear unconditionally. It seems that Authorizations do not vary as predicted vis-a-vis $(I \times z/e)^A_M$: they have a low frequency of occurrence at high values of the regressor, but occur with high frequency at low values of the regressor. Prohibitions do not appear to unconditionally support the theory, but since they occur with high frequencies at high values of $(I \times z/e)^A_M$, but with appropriate control variables their incidence could be driven by $(I \times z/e)^A_M$ in the manner predicted by the GH95 theory. The probit analysis below is directed at precisely questions of this kind.

Figure 5.2 indicates, sharply enough, that Prohibitions data may be in accord with its prediction vis-a-vis $(I \times z/e)^A_X$: the rate of occurrence of Prohibitions diminishes as $(I \times z/e)^A_X$ increases. That is, organized exporters in Argentina with high stakes from access to Brazil's market are able to include their industries in the FTA.

How the exclusions data vary with the Brazil regressors $(I \times z/e)^B_M$ and $(I \times z/e)^B_X$ are depicted in Figures 5.3 and 5.4. There do not appear to be unconditional associations of the regressors with the exclusions data, though there may be strong associations conditional on the inclusion of other regressors, particularly for NTBs. High values of $(I \times z/e)^B_M$ do have high incidences of NTBs, and low values of $(I \times z/e)^B_M$ do have high incidences of NTBs. But while these associations are in line with the theory, they are accompanied by incidences of NTBs not entirely consistent with the theory, at least as they appear unconditionally in the Figures. The probit analysis is designed to shed light on this issue.

Probit Model Estimates

The probit model (12) is now used to formally examine the GH95 exclusions hypothesis. Marginal effects (i.e. slopes) from probit models of tariff and NTB exclusions are reported in Table 2. t-statistics are reported in parentheses below the marginal effects. In addition to the four regressors in (12), all models include a constant and eight 1-digit HS dummies. The inclusion of the dummies is strongly favored by any information criteria that penalizes additional regressors (such as the Akaike of Schwartz information criteria). The t-values appear in parentheses below the estimates, and asterisks indicate precisely estimated coefficients. Shaded cells indicate where estimates may be at odds with the theory, as explained in the discussion of the results below.

Consider first the estimates in the four columns of Table 2 labeled "All Org.". They are from models which assume that all industries are organized in both countries, that is, $I^A_{Mi} = I^A_{Xi} = I^B_{Mi} = I^B_{Xi} = 1$ for all i. In the face of mounting evidence in favor of the GH94 model cited earlier, this is clearly a doubtful assumption. In part, estimates from this doubtful model are reported to show just how poorly this model performs in the context of trade integration relative to models which measure the extent of political organization. The estimates in Table 2 show that while a case for this model may be weakly made for *tariff* exclusions, the same models for *NTB* exclusions show little, if anything, of significance for Prohibitions and Core NTBs, and have contrary signs on all four coefficients with Authorizations data.

In columns labeled "I1" are presented estimates from models that presume that some but not all industries are politically organized. Specifically, in the models estimated in Table 2, the political organization indicators are constructed according to the "sample mean" criterion, as described above in Section 4.2. For example $I^A_{Mi} = 1$ if total imports from the world of (4-digit ISIC) industry i in Argentina exceeds the (4-digit ISIC) sample mean of total imports. The variables $I^A_{Xi}, I^B_{Mi}, I^B_{Xi}$ are similarly constructed using the mean threshold for total exports and imports in the relevant countries. Formal non-nested tests (not reported here), following the method of Davidson and MacKinnon (1993) specifically designed for probit models, strongly rejected the models labeled "All Org." in favor of their counterparts labeled "I1", in all four cases. An inspection of the simple log-odds ratios also indicates that the "I2" models are far more likely than their "All Org." counterparts.

Inferences from the "I1" models, specifically from the NTB exclusions data, are striking. But first, consider tariff exclusions. The estimates from the "I1" models of tariff exclusions indicate that politically organized Argentinian importers were successful in obtaining tariff exclusions. The estimated coefficient on $(I \times z/e)^A_M$ indicates that the greater their stakes from preventing free trade with Brazil in their industry, the higher the probability that organized import-competing industries were able to be excluded from the FTA. For an increase of one standard deviation, or 0.10 (see Table 1), in $(I \times z/e)^A_M$, the probability of exclusion increased by 0.56%. Although precisely measured, it is not an economically large probability response, considering the significant magnitude of change in the regressor. The likely reason for why the marginal effect is small is because only 3.7% of the sample of the 6-digit HS sample were allowed tariff exclusions (see Table 1), and tariff exclusions incidences are approximately bimodally distributed at, both, high and low values of $(I \times z/e)^A_M$ (Figure 5.1). The net result is a statistically significant, but economically weak, affirmation of the GH95 hypothesis for tariff exclusions.

The negative coefficient on $(I \times z/e)^A_X$ indicates that organized Argentinian exporters were unable to lower the probability of excluding industries in which they may have gained from enhanced protection in the Brazilian market. Again, the probability response is not of an economically significant magnitude. Not surprisingly, neither Brazil's importer-competing interests nor exporters exerted any significant influence on the probability of tariff exclusions. It should be noted that even though their coefficients are economically small, the combination of a positive coefficient on $(I \times z/e)^A_X$ (i.e. $\beta_2 > 0$) and a negative coefficient on $(I \times z/e)^B_X$ (i.e. $\beta_3 < 0$) is at odds with the theory. Suppose that industries determining these coefficients fall into the intermediate case (the third case discussed in Section 4.1) with both enhanced and reduced protection. Then $\beta_2 > 0$ implies that organized Argentinian exporters (and their government) failed to include the industries they most wanted to, because Brazilian import-competing interests (and their government) prevented their inclusion. But $\beta_3 > 0$ implies that Brazilian import-competing interests not only failed to prevent their inclusion, but also the inclusion of industries that hurt them (and their government) the most.

Models with NTB exclusions provide (i) strong, and credible inferences about the validity of the Grossman-Helpman hypotheses, and (ii) a realistic and sensible description of the politics that lay behind the formation of Mercosur. Consider the estimates from the model labeled "I1" with Prohibitions data. The positive estimates on β_1 indicate that Argentinian import-competing lobbies were successful in (increasing the probability of) maintaining Prohibitions on those goods whose inclusion into the FTA would have hurt them and their government the most. Further, as the positive estimate on β_4 reveals, this came at the expense of export lobbies in Brazil who desired the inclusion of those goods in the agreement. In the bargaining game over exclusions by Prohibitions, Argentinian import-competing producers were the winners over Brazilian exporters. The estimate on β_1 is precisely measured, but more importantly, it is economically significant in magnitude. According to its estimate, a one standard deviation increase in $(I \times z/e)^A_M$, or 0.10, increased the probability of exclusions by Prohibitions by 10.91%.

The bargaining strength of Argentinian export interests is revealed by the statistically and economically significant estimate on β_2. The marginal effect indicates that a one standard deviation increase in $(I \times z/e)^A_X$, or 0.10 (see Table 1), increased the probability of including an industry in the FTA, that is, exempted it from Prohibitions in Brazil, by 34.12%. This did not necessarily come at the expense of Brazilian import-competing producers, who were successful in (increasing the probability of) obtaining exclusions from the FTA by maintaining Prohibitions on internal trade in industries they most desired to exclude. This is indicated by statistically precise estimate on β_3. According to the estimate, a one standard deviation increase in $(I \times z/e)^B_M$, or 0.31, increased the probability of exclusions via Prohibitions by 4.65%. These exclusions may have taken place in industries where Brazilian import-competing producers would experience pure reduced protection. Such exclusions would then encounter no resistance from Argentinian export interests.

Towards the bottom of Table 2 are reported estimates for "Importer Strength" and "Exporter Strength", measured by Wald statistics for $\beta_1 - \beta_3$ and $\beta_2 - \beta_4$, respectively. If $\beta_1 - \beta_3 > 0$ then the data fail to reject the hypothesis that Argentinian import-competing industries had greater bargaining strength in obtaining exclusions relative to their Brazilian counterparts. If $\beta_2 - \beta_4 < 0$ then the data fail to reject the hypothesis that Argentinian exporting industries had greater say in which industries to include in the FTA, relative to their Brazilian counterparts. As we would expect from the descriptive analysis of the data, the Wald statistics show that Argentinian export and import-competing interests dominated decision-making over which industries to exempt from Prohibitions and which industries were allowed to protect themselves using Prohibitions.

The probability of exclusions to the FTA via the use of Import Authorizations was largely determined by Brazilian import-competing interests, while Argentinian export interests were also effective in limiting the (probability of) use of Authorizations. The estimate of 0.274 for β_3 from the "I1" model of Authorizations indicate that for every standard deviation increase in $(I \times z/e)_M^B$ (by 0.31), the probability of Authorizations increased 8.50%. The estimates for β_2 indicate that for every 0.10 increase in $(I \times z/e)_X^A$, the probability of Authorizations decreased by 2.43%. While not economically large, it does indicate that pressure exerted by export interests in Argentina was to some extent able to keep the use of Authorizations by Brazil in check. It appears that at the top of Brazil's list of *exclusions* from Authorization were industries experiencing pure reduced protection, and at the top of Argentina's list of *inclusions*, were industries experiencing pure trade diversion. This is probably why Brazilian import-competing interests and Argentinian export interests succeeded to some extent in getting their wishes. Brazilian exporters were, however, unable to check the (probability of the) use of Authorizations by Argentina, as evinced by the precisely measured positive coefficient on β_4. While the statistically insignificant estimate on β_1 shows that Argentinian import-competing interests were unsuccessful in (increasing the probability of) exempting the industries they most wanted to exempt from Authorizations by Brazil, they were at least able to prevent Brazilian export-interests from removing Authorizations on industries in which they desired free trade with Argentina.

Core NTBs have a similar pattern of estimates on the four issue coefficients as Prohibitions, which is to be expected from the data graphs, since Core NTBs were largely composed of Prohibitions.

Sensitivity Analysis

The estimates presented above were based on a specific method of measuring political organization in the two countries: industries with world imports (exports) that exceeded the sample mean of world imports (exports) were considered organized as import-competing (exporting) producers. The measurement of political organization is crucial to the proper empirical implementation of the Grossman-Helpman framework. Given the absence of any unanimous criterion to measure political organization in the trade arena due to limitations on available data, we undertake to examine the sensitivity of the results in Table 1 under three different measures on political organization. Estimates from those models, labeled "I2", "I3", and "I4", are presented in Table 3. In these models we still use cutoffs based on sample statistics from the ISIC 4-digit sample to define political organization. In the models labeled "I2", industries in which total imports from the world averaged over 1993-96 exceed the 85th percentile in the sample are considered politically organized import-competing industries, and a similar cutoff defines organized exporting industries. Applying this to manufacturing industries in Argentina and Brazil provides measures of $I^A_{Mi}, I^A_{Xi}, I^B_{Mi}, I^B_{Xi}$. In the models labeled "I3", a 90th percentile cutoff is used to similarly define political organization. In the models labeled "I4", a combination of a mean cutoff on imports and exports (as in Model "I1") *and* a 25th percentile cutoff on output per firm (as a proxy for concentration) is used to define political organization. This last definition is motivated by the finding in previous studies (Gawande and Bandyopadhyay, 2000; Gawande, 1997b) that firm concentration is an important determinant of lobbying organization in the U.S.

In order to summarize the results in Table 3 in a compact and systematic manner, non-nested model comparisons have been performed using the test developed specifically for probit models by Davidson and MacKinnon (1993). The Davidson-MacKinnon (DM) statistics are reported in the last row of Table 3. A statistically significant value for the DM statistic implies rejection of model I1 reported in Table 2 relative to its counterpart in Table 3, while a statistically insignificant value cannot reject the model I1. For example, the DM statistics for tariff exclusions data do not indicate a preference by the data for the models in Table 3 over Model I1. Nevertheless, it may be noted that the inferences from tariff exclusions data are qualitatively similar to those from Model I1 in Table 2 (with the possible exception of model I4).

The DM statistics for incidences of Prohibitions similarly indicate that the data on Prohibitions do not necessarily prefer the models in Table 3 over Model I1. Nevertheless, the inference that is robust across all four models is about the strong influence of Argentinian export-competing interests. In industries experiencing both, enhanced and reduced protection, this implied that they were able to limit the number of exclusions on Prohibitions permitted Brazilian import-competing producers. In industries experiencing pure enhanced protection, this implied that Argentinian export interests were able to profit from trade diversion.

The models for Import Authorizations in Table 3 are all preferred over Model I1 in Table 2 according to the DM statistic. The models here imply that *both* Argentinian and Brazilian import-competing interests were able to influence the number of exclusions to the FTA in terms of the ability to impose this NTB on internal trade. A one standard deviation change in $(I \times z/e)^A_M$ led to an increase in the probability of exclusions desired by Argentina's import-competing producers by between 3.5% and 6.2% across the three models, while a similar change in $(I \times z/e)^B_M$ led to an increase in the probability of exclusions desired by Brazil's import-competing producers by between 2.3% and 8.1% . But for an absolute unit change in the two regressors, Argentinian importers were able to obtain exclusions with a higher probability. This is indicated by the Wald statistics for "Importer Strength" for the Authorization models. Since this finding about the bargaining strength of Argentinian import-competing interests is in contrast to Table 2, we use the models in Table 3, on the basis of the DM statistic, to make inferences from data on the incidence of Authorizations. The estimates on β_1 together with β_4 from these models indicate that import-competing interests were not only able to obtain a higher probability of exclusions on goods that may have experienced reduced protection, but were also able to lower the probability of allowing export interests in Brazil to benefit from access to their markets (in industries falling in the intermediate case of enhanced and reduced protection).

The results about Core NTBs from the models in Table 3 yield somewhat different inferences from the results about Core NTBs from Model I1 in Table 2. Since the DM statistics exhibit a preference by the data for the models in Table 3, we use them to make inferences. The robust result is about the strength of Argentinian export interests in influencing the probability of which industries would be able to engage in trade free of Core NTBs after the FTA.

Three other types of sensitivity analyses were also conducted. The first was sensitivity to heteroskedasticity, where heteroskedasticity was modeled as a linear function of a set of four two-digit ISIC-level dummies. The results for all models I1-I4 presented here are quite insensitive to the heteroskedasticity specification. Notably, the heteroskedastic specification was preferred on the basis of likelihood ratio (LR) test statistics to the specifications reported in Tables 2 and 3.

The second sensitivity analysis was motivated by the question of whether the results from the full sample of 4490 lines would hold up if only observations with positive trade (over 1993-96) between the two countries were considered. Eliminating lines in which there was no trade between Argentina and Brazil dropped the sample to 2422 lines, yet the results remained surprisingly robust to their exclusions.

Mercosur was due to become a customs union by the year 2001. To this end the member countries had agreed to a preliminary vector of common external tariffs (CETs) by 1995 in order to facilitate convergence to the CET. The third sensitivity analysis checks whether any early convergence of the external tariffs of the two countries to the common external tariff affects the results. Since the GH95 model is one about FTAs, not customs unions, we formed a "true FTA" sample by excluding those lines in which the external tariff of either Argentina or Brazil was equal to the CET. This dropped the sample to 3659 observations. The results from this sub-sample are qualitatively close to the estimates presented in Tables 2 and 3.

In sum, the results are seen to be quite robust to a variety of sensitivity analyses, which, in this context, appear to be important in order to make sturdy inferences.

6. Conclusion

The results of this paper may be viewed in two ways. The first is that they allow credible inferences to be made about an important economic model of the politics behind free trade agreements put forth by Grossman and Helpman (1995). Their exclusions hypothesis makes clear predictions about which industries are most likely to be excluded from a free-trade agreement (FTA) in order for the FTA to come into existence. The tight connection of the empirical specification to the theory enables us to make inferences about the validity of the Grossman-Helpman exclusions hypothesis. The results in the paper yield striking new evidence in favor of the GH95 model. While the affirmation of the model is weak with tariff exclusions data, it is strong with NTB data. The results with NTB data are robust to a variety of perturbations in model specifications, to different measurement of regressors, and to the estimates using sub-samples motivated by issues specific to the Mercosur agreement.

A graphical analysis, based on Grossman and Helpman's proposition about what it might take to successfully conclude an FTA *without* exclusions, suggests that due to the asymmetries in their size and consequently in their potential bilateral trade patterns after an FTA, an FTA without exclusions would not have been possible between Argentina and Brazil. Further, in order to reach an agreement, Argentina's export interests or import-competing interests, or both, would be decisive on the issue of which industries to include and which to exclude from the FTA. This would be especially true in industries with both enhanced and reduced protection, where interests in Argentina and Brazil were pitted against each other. It was possible for Brazil's import-competing lobbies to also obtain exclusions, but only in those industries in which it met no resistance from Argentinian export lobbies. This restricted Brazilian exclusions to industries in which it's producers could potentially experience pure reduced protection in the FTA .

This intuition is confirmed by the more formal econometric analysis of tariff and NTB exclusions. Argentina's import-competing interests largely determined the probability of exclusions from zero internal tariffs, and exclusions from zero internal Import Authorizations, which could be used to protect them in the FTA regime. Argentina's export interests largely determined the probability of limiting which Brazilian industries could be exempted from zero internal Prohibitions and Core NTBs (mostly composed of Prohibitions). In the bargaining over exclusions, gains by Argentina's import-competing interests came at the expense of Brazil's export interests. Brazil's import-competing interests were also effective in increasing the probability of exclusions from zero internal Import Authorizations to protect them in the FTA regime. These gains seem to have come in industries featuring pure reduced protection in the FTA regime, thus meeting no opposition from Argentine export interests.

The theory makes it abundantly clear that unless the two partners are symmetric, we should not expect quantitatively symmetric effects. The results *should* show that the country in which import-competing interests felt greatly threatened by the FTA, would win the exclusions game, precisely because exclusions would be designed to achieve symmetry in the goods that are freely traded in the FTA regime. Hence, the evidence that Brazil's organized importers were only weakly successful in obtaining NTB exclusions to the free trade agreement, while Brazil's organized exporters were not effective in gaining access to Argentina's markets in goods with the greatest potential to profit through enhanced protection, accords well with the GH95 theory.

The second view of the Grossman-Helpman model is that it provides a sophisticated and powerful lens through which to examine the politics behind an FTA. Given the validity of the theory, empirical work based on the theoretical framework should provide answers to these three questions: (i) Which country was most crucial to the successful negotiation of the Mercosur trade agreement? (ii) In which country did import-competing producers or exporters have greater influence over the characteristics of the eventual agreement? (iii) Are the lesson learned applicable to other nascent agreements? The answers our analysis providesa are (i) Argentina. (ii) Both, import-competing producers and exporters in Argentina in industries with both enhanced and reduced protection; import-competing producers in Brazil but only in industries with pure reduced protection, that is, no gains of access for Argentinian exporters. (iii) Certainly, especially for FTAs among unequal partners which may be impossible to achieve without exclusions.

So far, we have made no normative judgements about whether FTAs are desirable relative to the status quo. That is an issue under considerable debate, since an FTA among a set of countries likely worsens the rest of the world's welfare. Within a political economy construct, Richardson (1993) demonstrates an endogenous mechanism by which external tariffs decline over time in the FTA regime, so that they are welfare improving in the long run. If so, then the validity of the GH95 model of the politics behind FTAs should motivate its use as a blueprint for how to achieve FTAs.

References

˘**Bernheim, B. Douglas and Whinston, Michael D.,** "Menu auctions, resource allocation, and economic influence", *Quarterly Journal of Economics*, 1986,101, pp. 1-31.

Bond, Eric W., Syropoulos, Costas , and L. Alan Winters, "Deepening of Regional Integration and Multilateral Trade Agreements," 1999. Manuscript.

Cadot, Oliver, de Melo, Jaime and Olarreaga, Marcelo, "Regional Integration and Lobbying for Tariffs Against Non-Members", *International Economic Review*, 1999, 40, pp. 635-657.

Clarida, Richard, "Consumption, Import Prices, and the Demand for Imported Consumer Durables: A Structural Econometric Investigation", *Review of Economics and Statistics*, 1996, 78, pp. 369-374.

CNCE Annual Report, 2000 (Comicion Nacional de Comercio Internacional Informe Anual, Buenos Aires, Argentina, 2000)

Davidson R. and J. MacKinnon, *Estimation and Inference in Econometrics.* New York: Oxford University Press, 1993.

De Melo, Jaime and Panagariya, Arvind, eds. *New Dimensions in Regional Integration.* Cambridge: Cambridge University Press, 1993.

Ethier, Wilfred J., "Regionalism in a Multilateral World." *Journal of Political Economy*, 1998, 106, pp. 1214-1245.

Fuller, Wayne, *Measurement Error Models.* New York, Wiley, 1987.

Gawande, Kishore, Krishna, Pravin, and Robbins, Michael, "Foreign Lobbies and U.S. Trade Policy." Manuscript. 2000.

Gawande, Kishore, and Bandyopadhyay, Usree, "Is Protection for Sale? A Test of the Grossman-Helpman Theory of Endogenous Protection." *Review of Economics and Statistics*, 89, 2000, 139-152.

Gawande, Kishore, "U.S. Nontariff Barriers as Privately Provided Public Goods", *Journal of Public Economics*, 64, 1997a, 61-81.

Gawande, Kishore, "Generated Regressors in Linear and Nonlinear Models", *Economics Letters*, 54 1997b, 119-126.

Goldberg, Penelopi and Maggi, Giovanni, "Protection for Sale: An Empirical Investigation", *American Economic Review*, December 1999, 89, pp. 1135-1155.

Grossman, Gene M. and Helpman, Elhanan, "The Politics of Free-Trade Agreements." *American Economic Review*, September 1995, 85(4), pp. 667-690.

Grossman, Gene M. and Helpman, Elhanan, "Protection for Sale." *American Economic Review*, September 1994, 84(4), pp. 833-850.

Krishna, Pravin, "Regionalism and Multilateralism: A Political Economy Approach." *Quarterly Journal of Economics*, 1998, 113, pp. 227-251.

Levy, Philip I., "A Political-Economic Analysis of Free-Trade Agreements." *American Economic Review*, September 1997, 87(4), pp. 506-519.

Lipsey, Richard, "The Theory of Customs Unions: A General Survey." *Economic Journal*, 1960, pp. 496-513.

Maggi, Giovanni and Rodriguez-Clare A., "The Value of Trade Agreements in the Presence of Political Pressure." *Journal of Political Economy*, 1998,1 06, pp. 574-601.

McCalman, Phillip, "Protection for Sale and Trade Liberalization: An Empirical Investigation." *Review of International Economics*. Forthcoming. 2000.

Mercosur arbitration panel report Mercosur Secretariat, 2000.

Mitra, Devashish, Thomakos, Dimitrios D., and Ulubasoglu, Mehmet, A. " "Protection For Sale" in a Developing Country: Democracy Versus Dictatorship." Manuscript. 2000.

Nogues, J. J., and Quintanilla, R. "Latin America's Integration and the Multilateral Trading System." In J. De Melo and A. Panagariya, eds. *New Dimensions in Regional Integration*. Cambridge: Cambridge University Press, 1993.

NOTISUR, Several issues during 1998-2000

Olarreaga, Marcelo and Soloaga,Isisdro, "Endogenous Tariff Formation:

The Case of Mercosur." *World Bank Economic Review* 1998, 12, pp. 297-320.

Olarreaga, Marcelo, Soloaga,Isisdro, and Winters, L. Alan, "What's Behind Mercosur's CET?" Manuscript. 1999.

Panagariya, Arvind, "Preferential Trade Liberalization: The Traditional Theory and New Developments." *Journal of Economic Literature*, June 2000, 38, pp. 287-331.

Panagariya, Arvind, and Ronald Findlay, "A Political-Economy Analysis of Free-Trade Areas and Customs Unions." In R. C. Feenstra, G. M. Grossman, and D. A. Irwin (eds.), *The Political Economy of Trade Policy: Papers in Honor of Jagdish Bhagwati.* Cambridge, MA: MIT Press, 1996.

Richardson, Martin, "Endogenous Protection and Trade Diversion." *Journal of International Economics*, May 1993, 34(3-4), pp. 309-324.

Senhadji, Abdelhak, "Structural import demand equations" *IMF Staff Papers*, June 1998.

Viner, Jacob, *The Customs Union Issue.* New York: Carnegie Endowment for International Peace, 1950.

Appendix

I. DATA

1. NTBs: The 1996 NTB database at the 8-digit HS level was obtained from the Mercosur Secretariat, and constructed by Technical Sub Group No. 8 (of the Common Market Group of Mercosur, see fn. 4) from information provided by the individual Mercosur countries. The NTBs are classified in a manner that is quite different from the the UNCTAD system, so we use the classifications used in the SG No. 8 database. The main NTBs, comprising what we call Core NTBs are Prohibitions (goods cannot be imported by private sector firm, but via a government agency), Import Authorizations (prior authorization is required before any import transaction), Import Licenses (a license must be purchased from the government permitting a specified quantity of imports), and Import Quotas. The more conventional (according to frequency of international use) NTBs such as antidumping duties, countervailing duties, and safeguards were not considered to be NTBs by the Mercosur countries, and hence not recorded in the SG No. 8 database. In the case of the Mercosur countries, it appears that the most widely used NTBs are Prohibitions and Import Authorizations. Figure A.1 indicates that in 1996 they covered, respectively, 7% and 2% of Brazil's total manufacturing imports from Argentina, and 32% and 40% of Argentina's manufacturing imports from Brazil. The analysis in the paper is restricted to those two NTB-types plus a more encompassing type called Core NTBs (which, in addition to Prohibitions and Authorizations, also includes Licenses and Quotas). The NTB data used in the probit analysis are 0/1 indicators of the three types of NTBs. The 0/1 indicators are constructed by taking the union of the exclusions in the two countries. Thus if for a 6-digit HS line item, either Argentina or Brazil (or both) imposed a Core NTB on internal trade, then the Core NTB exclusion variable takes the value 1. Otherwise it takes the value 0.

2. Tariffs: Tariff data are the 6-digit HS data used by Olarreaga and Soloaga (1998) to construct their more aggregate ISIC level tariff data for their analysis.

3. Other Variables: The variables z_M =output/imports, z_X ==output/exports, and import elasticities e are measured at the 4-digit ISIC (rev. 2) level of aggregation. The export, import, and output data are from the Argentina and Brazil censuses, and are averaged over the four years 1993-96 before computing the variables z_M and z_X. In order to construct the z/e ratios consistently, the z variables and the elasticity measures must be available at the same level of aggregations. The 4-digit ISIC level is the most detailed level at which they are available. The z/e ratios were concorded into the 6-digit HS level using a standard concordance available from UNCTAD. Indicators for politically organized import (I_M) and export lobbies (I_X) are constructed at the 4-digit ISIC level from data on world imports and exports, together with output-per-firm (as proxies for concentration ratios). No directly measures of lobbying are available either for Argentina or Brazil. A variety of criteria were used to construct many sets of I_M and I_X vectors for Argentina and Brazil. Results based on those sets are used to demonstrate the robustness of the econometric results.

II. Estimation of import elasticities and their errors-in-variables correction: Table A.1 presents import elasticity estimates using quarterly Argentine data over 1992-99. The method is from Senhadji (1997), and entails the estimation of the model (without industry subscripts):

$$M_t = a_0 + a_1 P_t + a_2 D_t + a_3 M_{t-1} + e_t, \quad t = 1992:1, \ldots, 1999:4, \quad (13)$$

where M=ln(imports from the world), P=ln(price of imports), D=ln(value added-exports to the world), and e is a classical error term. Since the lagged dependent variable is included, the assumption on the error term yields consistent estimates. The import elasticities are measured as the estimated values of a_1. Elasticity estimates that were close to zero or positive were set equal to the (negative) elasticity estimate of the closest 4-digit ISIC industry. This was done for the five industries 3411 (set equal to 3419), 3551 (3559), 3822 (3823), 3825 (3823), 3843 (384), 3845 (3841). More details such as measures of fit on the regressions is available from the authors.

This specification is based on an import demand function derived from intertemporal optimization by Clarida (1996). Estimation of the model is done using OLS. Senhadji's study indicates that the estimates from OLS and the Phillips-Hansen Fully Modified (FM) procedure yields similar results. (The FM estimator is an optimal single-equation methods based on the use of OLS with semiparametric corrections for serial correction and potential endogeneity of the right-hand side variables.)

Denote the estimated values of a_1 as E. Direct use of the unadjusted estimates (E) will lead to erroneous results since it is a generated regressor. The errors-in-variables correction on E (see Gawande (1997b)) based on the method of Fuller (1987) is used. This enables consistent estimation whenever import elasticities are used as regressors, in linear or nonlinear models. The correction is as follows. E_i is modeled as the observed value of the true (unobserved) own price elasticity, e_i, which is measured with error:

$$E_i = e_i + u_i, \tag{14}$$

where u_i is the measurement error in E_i with mean 0 and known variance , i. This variance is equal to the square of the estimated standard errors reported in Table A.1 A simple method to correct for the EIV problem [see e.g. Fuller's (1987, Ch. 3)] is to replace (each of the variables) e_i in (12) by the prediction $\hat{E}_i$ constructed as follows. Denote the sample variance of E by $\overline{\sigma_E^2}$ and the mean of the measurement error variances by $\overline{\sigma_u^2}$ Let $\hat{\sigma}_e^2 = \overline{\sigma_u^2} - \overline{\sigma_E^2}$ and $\overline{E}$ denote the sample mean. Now construct the predictor

$$\hat{E}_i = \overline{E} :: + :: \frac{\hat{\sigma}_e^2}{\hat{\sigma}_e^2 + \sigma_{u,i}^2}(E_i - \overline{E}). \tag{15}$$

Thus, whenever E_i has measurement error variance exactly equal to $\hat{\sigma}_E^2$ (an estimate for the sample variance of e_i, had we been able to measure it exactly) it is presumed to be measured without error. Otherwise it is scaled down or scaled up according to (15).

Table 1: Descriptive Statistics

Variable	Description	Units	Mean	s.d.	Min	Max
$I^{A}{}_{TARIFF}$	Argentina: Industry exceptions to zero tariffs: 1=exceptioned, 0=free trade	Binary	0.035	0.183	0	1
$I^{A}{}_{PROH}$	Argentina: Exceptions to zero Prohibitions: 1=exceptioned, 0=free trade	Binary	0.307	0.461	0	1
$I^{A}{}_{AUTH}$	Argentina: Exceptions to zero Authorizations: 1=exceptioned, 0=free trade	Binary	0.230	0.421	0	1
$I^{A}{}_{CORE}$	Argentina: Exceptions to zero Core NTBs: 1=exceptioned, 0=free trade	Binary	0.338	0.473	0	1
$I^{B}{}_{TARIFF}$	Brazil: Industry exceptions to zero tariffs: 1=exceptioned, 0=free trade	Binary	0.003	0.052	0	1
$I^{B}{}_{PROH}$	Brazil: Exceptions to zero Prohibitions: 1=exceptioned, 0=free trade	Binary	0.057	0.232	0	1
$I^{B}{}_{AUTH}$	Brazil: Exceptions to zero Authorizations: 1=exceptioned, 0=free trade	Binary	0.122	0.327	0	1
$I^{B}{}_{CORE}$	Brazil: Exceptions to zero Core NTBs: 1=exceptioned, 0=free trade	Binary	0.110	0.313	0	1
I_{TARIFF}	Both: Industry exceptions to zero tariffs: 1=exceptioned, 0=free trade	Binary	0.037	0.189	0	1
I_{PROH}	Both: Exceptions to zero Prohibitions: 1=exceptioned, 0=free trade	Binary	0.364	0.481	0	1
I_{AUTH}	Both: Exceptions to zero Authorizations: 1=exceptioned, 0=free trade	Binary	0.330	0.470	0	1
I_{CORE}	Both: Exceptions to zero Core NTBs: 1=exceptioned, 0=free trade	Binary	0.420	0.494	0	1
$^{I}{}_{A,M}$	Argentinian industries politically organized in Import sector (see Notes)	Binary	0.646	0.478	0	1
$I_{A,X}$	Argentinian industries politically organized in Export sector (see Notes)	Binary	0.465	0.499	0	1
$I_{B,M}$	Brazilian industries politically organized in Import sector (see Notes)	Binary	0.513	0.500	0	1
$I_{B,X}$	Brazilian industries politically organized in Export sector (see Notes)	Binary	0.537	0.499	0	1
$(z/e)_{A,M}$	Argentina: z=(VA/Imports from Brazil)*0.001, e=import elasticity(see Notes)	-	0.147	0.365	0.010	6.875
$(z/e)_{A,X}$	Argentina: z=(VA/Exports to Brazil)*0.001, e=export elasticity (set equal to 1)	-	0.203	0.644	0.004	8.277
$(z/e)_{B,M}$	Brazil: z=(VA/Imports from Argentina)*0.001, e=import elasticity (see Notes)	-	0.817	1.815	0.009	30.745
$(z/e)_{B,X}$	Brazil: z=(VA/Exports to Argentina)*0.001, e=export elasticity (set equal to 1)	-	0.191	0.454	0.010	4.371
$(I \times z/e)_{A,M}$	$^{I}{}_{A,M} * (z/e)_{A,M}$	-	0.063	0.102	0	0.348
$(I \times z/e)_{A,X}$	$I_{A,X} * (z/e)_{A,X}$	-	0.038	0.098	0	1.007
$(I \times z/e)_{B,M}$	$I_{B,M} * (z/e)_{B,M}$	-	0.208	0.311	0	1.265
$(I \times z/e)_{B,X}$	$I_{B,X} * (z/e)_{B,X}$	-	0.076	0.325	0	4.371

Notes: Sample size: 4490 HS 6-digit tariff line goods. The *z/e* variables and ($I \times z/e$) variables are computed at the 4-digit ISIC (rev.2) level and then mapped into the 6-digit HS lines. Value Added, Imports, and Exports data used to compute *z* are averages over 1994-1996. See appendix for details on estimation and filtering of Import Elasticities. I_{AM}, I_{AX}, I_{BM}, I_{BX} are defined using means of *total* (world) trade as threshold. For example, I_{AM_i}=1 if *total* imports of Argentina in (ISIC 4-digit) industry *i* are greater than the (ISIC 4-digit) sample mean of *total* Argentinian imports.
Internal Tariff and NTB indicators are for 1996, available directly at the HS 6-digit level. NTBs are: PROH=soft prohibitions on imports, AUTH=prior imports authorization required, CORE=set of core NTBs including prohibitions, antidumping, and countervailing Duties.

Table 2: Marginal Effects from Probit Regression Models of the Exclusions Hypothesis
Dependent Variable: Indicators for **Internal Deviations from Free Trade**

	Tariff Exclusions		**NTB Exclusions**					
	TARIFFS		PROHIBITIONS		AUTHORIZATIONS		CORE NTBS	
	All Org.	I1	All Org.	I1	All Org.	I1	All Org.	I1
$(z/e)\ A,M$ (β_1)	0.011* (1.514)	-	0.006 (0.239)	-	-0.166** (2.943)	-	0.017 (0.562)	-
$(I\times z/e)\ A,M$ (β1)	-	0.056** (2.872)	-	1.091** (9.662)	-	-0.210 (1.461)	-	1.072** (7.204)
$(z/e)A,X$ (β_2)	0.020* (3.492)	-	0.020 (0.957)	-	0.046** (2.228)	-	0.002 (0.051)	-
$(I\times z/e)A,X$ (β_2)	-	0.075** (6.360)	-	-3.412** (8.117)	-	-0.243** (2.531)	-	-0.920** (3.987)
$(z/e)B,M$ (β_3)	-0.010* (3.231)	-	-0.00002 (0.001)	-	-0.017** (2.035)	-	0.001 (0.119)	-
$(I\times z/e)B,M$ (β_3)	-	-0.025** (2.868)	-	0.150** (5.119)	-	0.274 (9.904)	-	0.120** (3.616)
$(z/e)B,X$ (β_4)	-0.019** (1.818)	-	-0.014 (0.637)	-	0.062 (2.226)	-	0.002 (0.009)	-
$(I\times z/e)B,X$ (β_4)	-	-0.001 (0.156)	-	0.044** (1.962)	-	0.216** (5.704)	-	0.200** (4.320)
Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Importer Strength	0.533** (2.921)	2.554** (3.560)	0.019 (0.241)	3.487** (8.013)	-0.500** (2.682)	-1.671** (3.298)	0.042 (0.540)	2.567** (6.212)
Exporter Strength	1.003** (3.515)	2.389** (5.898)	0.103 (1.166)	-12.80** (8.181)	-0.054 (0.559)	-1.581** (4.463)	0.002 (0.029)	-3.023** (4.723)
N	4490	4490	4490	4490	4490	4490	4490	4490
k	12	12	12	12	12	12	12	12
LR	243.0**	286.2**	1990**	2178**	2019**	2163**	1956**	2082**

Notes: (1) Absolute *t*-values in parentheses. ** indicates statistical significance at 5% for the 1-tailed test. (2) Expected sign of coefficients below regressor name. Shaded cells indicate statistically significant coefficients at odds with theory. (3) Regressions include eight 1-digit HS dummies plus a constant. These models are highly preferred over alternative models with just the constant instead of the dummies. (4) All estimates are marginal effects (slopes) given by $\partial E(y)/\partial x_i$, where y is the binary dependent variable, and x_i is a regressor. This is identical to $\partial\Phi(x\beta)/\partial x_i$, where Φ is the standard normal cdf. (5) Importer strength is the Wald test for difference of coefficients: $\omega_M=(I\times z/e)_{A,M} - (I\times z/e)_{B,M}$. If $\omega_M > 0$ then Argentinian importers have greater bargaining strength over

Brazilian importers, and conversely. Exporter strength is the Wald test for $\omega_X=(I\times z/e)AX - (I\times z/e)BX$. If $\omega_X < 0$ then Argentinian exporters have greater bargaining strength over Brazilian exporters, and conversely.

Table 3: Robustness to Measures of Political Organization: Marginal Effects from Probit Regressions
Dependent Variable: Indicators for **Internal Deviations from Free Trade**

	TARIFFS			PROHIBITIONS			AUTHORIZATIONS			CORE NTBS		
	I2	I3	I4	I2	I3	I4	I2	I3	I4	I2	I3	I4
$(I\times z/e)_{A,M}$ (β_1)	0.302** (4.68)	0.581** (1.731)	-0.068 (0.759)	0.416 (1.200)	2.107** (2.505)	-0.229 (0.880)	2.319** (7.555)	3.112** (3.760)	1.173** (4.884)	1.638** (4.294)	1.896** (1.929)	0.001 (0.021)
$(I\times z/e)_{A,X}$ (β_2)	0.042** (5.637)	0.067** (6.183)	0.074** (6.251)	-2.216** (4.783)	-1.336** (2.345)	-2.517 (5.287)	-0.043 (0.474)	-0.079 (0.895)	-0.219** (2.366)	-0.580** (3.355)	-0.524** (3.432)	-0.782** (4.112)
$(I\times z/e)_{B,M}$ (β_3)	-0.091** (3.147)	-0.138** (1.880)	-0.024** (2.604)	0.132** (6.463)	-0.007 (0.066)	0.024 (0.659)	0.448** (10.02)	0.236** (2.199)	0.085** (2.775)	0.238** (4.258)	-0.030 (0.238)	-0.004 (0.104)
$(I\times z/e)_{B,X}$ (β_4)	0.019** (2.512)	0.025** 2.235	-0.013 (1.227)	0.034 (0.377)	-.276** (2.295)	0.025 (1.069)	0.154** (1.659)	0.254** (2.792)	0.179** (4.782)	0.090 (0.852)	-0.130 (1.122)	0.164** (3.646)
Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Importer Strength	0.393** (4.586)	0.719* (1.781)	-0.044 (0.475)	0.104 (0.288)	2.114** (2.284)	-0.253 (0.946)	1.871** (5.925)	2.876** (3.132)	1.092** (4.461)	1.400** (3.521)	1.926* (1.773)	-0.005 (0.034)
Exporter Strength	0.023** (2.110)	0.042** (2.608)	0.087** (5.297)	-2.182** (4.582)	-1.060* (1.777)	-2.542** (5.328)	-0.197 (1.527)	-0.333** (2.635)	-0.398** (3.980)	-0.670** (3.206)	-0.394** (2.036)	-0.946** (4.817)
N	4490	4490	4490	4490	4490	4490	4490	4490	4490	4490	4490	4490
k	12	12	12	12	12	12	12	12	12	12	12	12
LR	290.8**	273.1**	279.4**	2089**	2038**	2043	2207**	2114**	2073**	2027**	1984**	2003*
DM	-0.103	-0.027	0.036	0.0004	0	-4.418	-2.910**	-3.093**	-3.534**	-3.974**	-4.297**	-0.751**

Notes: Absolute *t*-values in parentheses. ** indicates statistical significance at 5% and * at 10%. Also see Notes (2)-(5) to Table **2**.
(1) Models are differentiated by how the political political organization variables IJk, J=A,B and k=M,X are constructed. They are as follows:
Model *I*1 (reported in Table **1**): IJk_i=1 of *total* imports (exports) of industry *i* in country *J* are above the mean of the ISIC sample.
Model *I*2: IJk_i=1 of *total* imports (exports) of industry *i* in country *J* are above the 85th percentile of the ISIC sample.
Model *I*3: IJk_i=1 of *total* imports (exports) of industry *i* in country *J* are above the 90th percentile of the ISIC sample.
Model *I*4: IJk_i=1 of *total* imports (exports) of industry *i* in country *J* are above the mean of the ISIC sample *and* output per firm is above the 25th percentile.

(2) DM is the Davidson-MacKinnon (1993) non-nested test-statistic for the probit model. It compares the models here with the corresponding models in Table **2**. The statistical significance of DM indicates the models here are preferred.