Trade Diversion and Declining Tariffs: Evidence From MERCOSUR

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ABSTRACT: This paper empirically examines the alternative posed by Richardson (1993) to the traditional view that trade integration may exacerbate inefficiencies. Richardson's hypothesis boldly predicts that trade diversion (and trade creation) may actually cause tariffs to decline! The hypothesis is fundamentally attributable to the presence of a political component in the governments' objective functions. A cross-sectionally rich data set on trade and tariffs from the Mercosur-pact countries, primarily Argentina, is used. The evidence yields surprising conclusions about the validity of endogenous tariff determination in models of trade integration.

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1. Introduction

The objective of this paper is to test hypotheses from the emerging literature on endogenous tariff determination in models of free trade agreements (FTAs). Introducing political economy into the traditional analysis of trade agreements has enriched such models by imparting a real world flavor. This paper examines a model of endogenous tariffs due to Richardson (1993) that challenges the classical view that trade integration generally isolates the trade bloc from the rest of the world. The idea behind the theory is simple. If the level of tariff protection in an industry is due in part to the political power wielded by the industry, then as the political power of the industry diminishes with trade integration so will the level of protection afforded the industry.

While Richardson's model is specific to industries which experience trade diversion, even industries in which there is trade creation are candidates for endogenous tariff diminution. In the case of trade diversion, supply from the (less inefficient) FTA-partner country replaces imports that previously originated in the (most efficient) rest of the world. Hence, such industries experience a reduction in their political power as tariff-free imports from a possibly large FTA-partner country shrink their domestic output. In the case of trade creation, supply from the (less inefficient) FTA-partner country replaces output that previously originated in the (most inefficient) home country. These industries are therefore likely to see a reduction in tariffs on their imports from the rest of the world, as their political power is reduced. Eventually, these industries may experience true free trade as their external tariffs go to zero. Formation of the trade bloc thus promotes broader free trade.

In the area of trade integration there has been little empirical work on the relevance of models of endogenous tariff. Olarreaga and Soloaga's (1998) examination of the Grossman-Helpman (1995) model of the formations of FTAs, is a notable exception. Since political economy is increasingly featured in the trade integration literature (e.g. Grossman and Helpman 1995, Krishna 1998, Maggi and Rodriguez-Clare 1999) a detailed empirical examination of the

validity of this class of models is warranted. To this end, this paper investigates the counter-intuitive prediction from Richardson (1993) about trade diversion and declining tariffs under a free-trade agreement. The paper proceeds with an investigation of the hypothesis in the presence of no specific alternative, in the spirit of first-generation empirical work on the political economy of trade integration. The ambitious task of comparing political economy models with their more traditional counterparts is left to second-generation studies.

A detailed cross-industry data set on intra-union and extra-union trade and tariffs from Mercosur over the period 1991-1996 is used in this study. The Mercosur free trade pact formed in 1991 among Argentina, Brazil, Paraguay and Uruguay is well suited for the purpose of examining Richardson's hypothesis. This study employs data on Argentinian tariffs before and after the trade agreement. Being the smaller of the two leading Mercosur countries (Brazil being the other), many of its industries faced the possibility of decline due to free trade with Brazil, a country twice its size in total output. This setting is apt for an examination of whether industries that declined due to the free trade agreement, experienced increased or lowered protection.

The paper proceeds as follows. Section 2 provides specific information pertaining to the nature of trade liberalization in the Mercosur partner countries before and after the formation of the trade agreement. In Section 3, two hypotheses from Richardson's model are derived, and the method of testing them is developed. In Section 4 the data are described and empirical results are analyzed in light of the theory. Section 5 makes concluding observations.

2. Mercosur: Internal and external tariff liberalization

Mercosur was built on previous treaties which Argentina and Brazil had signed since 1986. In that year, they signed the "Argentina-Brazil Integration Act" which established protocols on the scope of liberalization and cooperation for each sector. The number of protocols that were approved increased with every new treaty the two countries signed. The 1988 Treaty of Integration, Cooperation and Development explicitly set, for the first time, the objective of reaching a Common Market. In July 1990 the Presidents of Argentina and Brazil, signed the

Buenos Aires Act to complete the Free Trade Area by 1994. This Act was the foundation for the Mercosur agreement of March 1991, which also included Uruguay and Paraguay. While previous agreements were important in shaping the integration agenda, no major regional tariff liberalizations occurred until the end of 1990[1].

However, during this period, Argentina had taken significant steps at unilaterally reducing its external (MFN) tariffs. The 1988 "Canitrot Reform" (Cristini, 1991) reduced the nominal tariffs from an average level of 45% to 29% by the end of 1988. Further, import licenses (authorizations) for approximately 3000 tariff-line items were eliminated. The new administration that took office in 1989 continued the liberalization process. By January 1991 the average nominal tariff stood at 14% (Berlinsky 1999).

Mercosur was broad in its integration goals. The first article of the Treaty stated that the initiative aimed to achieve "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 merchandises and of any other equivalent measure". It also established the adoption of a Common External Tariff (CET) and of a common commercial policy with relationship to third countries or groups of countries[2]. Mercosur institutions were solidified when in December 1994 the "Protocol of Ouro Preto" legislation set up dispute settlement mechanisms and established guidelines for a Customs Union (see e.g. Laird 1997).

2.1 Internal tariff liberalization

After an initial drop of 47% in 1991 in the rates applied by each country to internal Mercosur imports, successive reductions took place every six months in order to achieve a zero tariff by the end of 1994 on most goods. However, transitorily and for a limited number of

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[1] Porta (1990) indicates that in capital goods where the most ambitious liberalizations took place, of 600 items little more than one-third (236) were included in the free trade agreement.

[2] Deeper integration objectives included coordination of policies in agriculture, industry, public taxes and expenditures, monetary rules, exchange rates, capital market, services, transports and communications. An aim of coordinating policies was to assure competitive conditions in the broadened economic space.

products, countries could maintain tariffs on internal Mercosur imports. By the end of 1994 these products were included in an "Adaptation Regime" to begin lowering their tariffs, with the aim of completely eliminating them by January 1, 1999.[3] In addition to those exceptions, the sugar and automotive sectors were excluded from the trade agreement due to the sensitive political nature and the divergence in policies towards the two sectors in Argentina and Brazil. An ad-hoc group for sugar and a technical committee for autos were created to bring about convergence in national policies. In the interim, Argentina maintained tariffs and quotas on sugar imports from its Mercosur partners, in order to countervail generous subsidies enjoyed by Brazilian producers. In autos, a managed trade arrangement was put in place, featuring local content, concessional entry of parts, and a bilateral trade balance requirement.

2.2 External Tariffs

In 1995 the Mercosur countries agreed to put in place a common external tariff (CET). Four types of exceptions to the CET were allowed. The first was a general exceptions category in which each country listed around 300 tariff-line items for which tariffs would converge to the CET only by 2001 (2006 in the case of Paraguay)[4]. The second group of exceptions included products in the adaptation list. Since internal tariffs were higher than the negotiated CET for many items, in order to avoid a negative "tariff preference" margin (i.e. the difference between the internal and external tariff) countries were allowed to set a higher external tariff for those items. The convergence of the external tariff to the CET was then linked to the reduction of internal tariff within the adaptation list. Argentina had 155 items in this list. Capital goods, comprising approximately 1136 tariff-line positions were the third group to which CET

[3] Argentina had 223 tariff line items on this list. 57% of the items were steel products, 19% were textiles, 11% were paper and 6% footwear. Brazil had only 29 such items, including wool products peaches in can, rubber factories and wines. The average tariff in Argentina for these products was 21.9% in 1995 and of 17.1% in 1996 (Crespo and Constanzó 1998).

[4] In the case of Argentina, out of these 300 items approximately 200 converged to the CET from above while 100 from below. (Crespo and Constanzó 1998).

exceptions extended. In these goods, Argentina and Brazil were to converge to a CET of 14% by 2001 and Uruguay and Paraguay by 2006. Interestingly, for most of these items Argentina had external tariffs *below* the CET. By 1996, they were increased to 10% and then to 14% in 1998. Finally, computers and telecommunication equipment also enjoyed temporary exceptions. The CET in this sector varied between zero and 16%, to which all countries were to converge by 2006. As in the case of capital goods, in 1995 Argentina had an external tariff below the CET.

3. Theory

The concepts of trade creation and trade diversion developed by Viner (1950) have been central to much of the work in trade integration. Viner analyzed the second-best situation of a three-country one-good case, where the highest price (least efficient) producer of a good, country *A*, has the opportunity to form a union with either the second highest price producer *B*, or the most efficient producer *C*. 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 on *C* will be "trade diverting". *A* will now import from *B* at a higher than pre-union price. Of course, if both *A* and *B* were inefficiently producing the good before the union, their union would be trade creating as the less inefficient producer will capture the union market, or at least shrink production of the least efficient producer. Notably, in both cases, the country with the highest cost experiences an increase of imports from the FTA-partner, and a decline in its domestic output.

Viner's analysis pointed out the possibility of welfare losses from forming customs unions at a time when it was generally accepted that unions not only increased world welfare, but were stepping stones to free trade. Indeed, many empirical analyses of that day (see e.g. Lipsey, 1960) were finding in favor of customs unions primarily in Europe (e.g. Benelux and ECM). We note that Viner's observation was not a positive one about whether customs unions would increase or decrease welfare, only that the relative strengths of trade creating and diverting forces should be considered while making such a prediction.

How the recent models of endogenous protection (in the trade integration context) extend, modify or contradict some of the above conclusions are exemplified in the Richardson hypothesis. Richardson's is not an ad hoc proposition but one that emerges formally from a general equilibrium model.

3.1 Richardson (1993): Trade Diversion and FTA tariffs

Richardson (1993) considers a 3-country case where two small open economies, Home and a partner country, form a free trade area, excluding the third large country (rest of the world). Home produces *n* goods, each using labor and sector-specific capital, plus a numeraire good that uses only labor. All goods are produced with constant returns to scale technology. Home's government chooses tariffs to maximize a Stigler-Peltzman objective function that is a weighted sum of the welfare of labor and capital owners. Since their welfare is augmented by the redistribution of the tariff revenue to labor and capital owners (in some predetermined proportion), tariffs are endogenously determined in equilibrium. Richardson's insight, and the basis for the testable implication from his model, is this. Suppose the FTA leads to a sudden decrease in Home's tariff revenue as the FTA partner country captures Home's market. Then, Home's government will lower protection on imports from the rest of the world just enough to resume importing from the rest of the world and gain back some tariff revenue.

In Figure 1 the small Home country, labeled country A, forms a free trade agreement with country B. D^A is total demand in A (Home), S^A is the supply curve of A's domestic producers, P^B is the perfectly elastic supply curve of country B (FTA partner), and P^C is perfectly elastic supply of the outside country C (ROW). The rest of the world with perfectly elastic supply at price P^C is the most efficient producer, while the FTA-partner country with perfectly elastic supply at the higher price P^B is less efficient than ROW but more efficient than country A.

In Viner's analysis, an FTA can have welfare reducing effects through trade diversion if, after an FTA is formed, the FTA-partner's price becomes lower than the pre-FTA tariff-ridden world price. In contrast, in Richardson's model, trade diversion is endogenously eliminated. In

Figure 1, t^0 is the pre-FTA nondiscriminatory specific tariff. When A enters into an FTA with B, it maintains the tariff on its external trade with C. B now fully supplies A along P^B. Compared with the pre-FTA equilibrium, the net welfare loss is area 4 (tariff revenue) minus area 2+5 (gain in consumer welfare). But the loss in area 4 can be avoided by simply switching to importing from C by lowering the tariff on C from t^0 to a level that brings $P^C + t$ to a level just below P^B, the partner-FTA price. The diversion eliminated, Home now imports from the rest of the world and enjoys additional tariff revenue.

Thus, maximizing the Stigler-Peltzman objective function leads Home to eliminate the trade diversion. Richardson's model thus yields the following testable prediction:[5]

Hypothesis 1: External Tariffs and Trade Diversion

External tariffs of a country joining a FTA should fall in industries in which imports have been diverted from the rest of the world to the FTA partner, that is, those industries in which imports from the partner country initially increase at the expense of imports from the rest of the world.

A more general consequence of Richardson's model, one which subsumes the trade diversion case and therefore is tested first, is the following.

Hypothesis 2: External Tariffs and Declining Industries

External tariffs of a country joining a FTA should fall in declining industries, that is, those industries in which imports from the partner country initially increase.

Hypothesis 2, unlike Hypothesis 1, does not distinguish between trade-creating industries and trade diverting industries. In either case, domestic value added declines. The textbook case with trade creation is one where the FTA partner B and the rest of the world C are equally

[5] A second, equally important prediction from Richardson's model, that tariffs in FTA-countries should experience a larger decline than the common external tariffs in countries that form a customs union, all else equal, is best tested using a cross-bloc data. It is thus left as an open research issue.

efficient at producing the good (they both have the same horizontal supply curve), but high (prohibitive) pre-FTA tariffs reduce (preclude) exports into A. With an FTA, trade creation occurs and domestic output declines. A no longer has any incentive to maintain its tariff against C and so its external tariff drops.[6] This case is in fact an extreme version of the trade diversion case, one in which B and C are equally efficient.[7] We now turn to implementing empirical tests of these two hypotheses.

4. Methodology, Data and Econometric Issues

4.1 Methodology

Of Mercosur's output in the year of the pact, Brazil accounted for 65%, Argentina accounted for 30%, and Uruguay and Paraguay the remainder. These smaller partners had trade-to-GDP ratios of over 0.35 in 1990, while Brazil and Argentina were relatively closed, with ratios of .11 (Brazil) and .15 (Argentina). Argentina, Uruguay and Paraguay fit the situation described by Richardson. They are examples of countries in which free trade agreements could lead to the decline of industries in which imports from bigger partners replaced domestic output. In this paper we bring data from Argentina to bear on the theory, leaving open the extension of this work to Uruguay and Paraguay.

The more general hypothesis, Hypothesis 2, is analyzed first using the regression model:

$$\text{ExternalTariff}_{i,t} = \beta(\text{Internal Imports/Value Added})_{i,t-1} + \alpha\ \text{InternalTariff}_{i,t} + \delta_i + \delta_t + \epsilon_{it}, \quad t=92, 93, 96. \qquad (1)$$

[6] B has an incentive to block, but Richardson's model does not examine such incentive compatibility issues in the context of trade diversion or trade creation.

[7] The distinction between trade creation and trade diversion can be subtle. For example, in the case of trade diversion, if the gain from increased trade with the FTA partner (area 2+5 in Figure 1) outweighs the loss of tariff revenue (area 4) then the FTA is welfare improving and hence considered to be trade creating. Here trade creation involves switching of imports from C to B. In the textbook example with a prohibitive tariff, trade creation does not result in import switching from C to B, only increased imports from B and a decline in domestic output. It is thus misleading to distinguish trade creation from trade diversion simply on the basis of whether there was switching of imports or not. Section 4 describes how we empirically distinguish trade creation from trade diversion.

In (1) $\text{ExternalTariff}_{i,t}$ is the external tariff imposed by Argentina on imports of good *i* from non-Mercosur partners at time *t*, and $(\text{Internal Imports/Value Added})_{i,t-1}$ is the Argentinian internal-imports-to-value added ratio of good *i* at time $t-1$, where internal imports refer to imports from Mercosur partners. δ_i measures fixed effects across the cross sections *I* (they absorb the constant term) while δ_t measures time-fixed effects. Given the fixed effects and other regressors, ϵ_{it} is a classically distributed error term. As indicated in Section 2, the Mercosur agreement featured "exclusions" that exempted some goods from the FTA. Nondiscriminatory tariffs were maintained on intra-Mercosur trade in these goods. A possible identification problem arises if exceptions are not adequately controlled for (as detailed in the next section). The variable $\text{InternalTariff}_{i,t}$, measuring the internal tariff imposed by Argentina on intra-Mercosur imports of good *I* at time *t*, controls for exclusions. For industries included in the FTA, $\text{InternalTariff}_{i,t}$ equals zero, but is positive for excluded industries. Due to the unavailability of internal tariff data for 1992 and 1993, the 1996 internal tariffs were used in their place. As indicated in Section 2, exempted products from internal tariff liberalization between 1991-94 were included in an adaptation list, and their internal tariffs were to be eliminated only by 1999. The 1996 internal tariffs are therefore highly correlated with internal tariffs in earlier years, since few changes occurred until then.

The validity of Hypothesis 2 implies that $\beta<0$. In words, an industry's decline due to increased imports from an FTA partner is associated with a decline in its *external* tariffs. The increase in the internal-imports-to-value-added ratio variable captures the decline in industry due to the FTA.[8] In the theory, as an industry declines due to increased internal imports, either as a result of trade creation or trade diversion, external tariffs that protect the industry are reduced just enough to make the rest of the world competitive at the tariff-ridden price. This enables the home country to recapture part of the lost tariff revenue. Estimates from Model (1) provide

[8] While the theory is in terms of one-way trade, in the data an increase in imports does not imply a decline of the industry. Quite the opposite may occur, if, for example, intermediate goods are imported for domestic assembly. Hence, the ratio of internal imports to value added provides the appropriate measure of industry decline.

evidence of any such decline in external tariffs.

Hypothesis 1 requires identifying industries that decline specifically due to trade diversion. Industries with trade diversion cannot be distinguished from industries with trade creation simply by observing whether or not there was import switching from the rest of the world to the FTA partner (see fn. 7). The trade diversion measure constructed here is motivated by Balassa's (1967) method of distinguishing between trade creation and diversion using ex post imports and output data. Ex post to the FTA, Balassa (1967) measures the income (GDP) elasticity of imports of (I) internal imports, (ii) rest of the world (external) imports, and (iii) total (internal plus external) imports. If the income elasticity of internal imports rises above its pre-FTA level while income elasticity of external imports falls below its pre-FTA level, it implies a move away from world (and domestic) production thus indicating trade diversion. If the income elasticity of *total* imports rises from its pre-FTA level, then it implies a move away from domestic production towards world production generally and indicates trade creation.

The trade diversion measure used here captures essential elements of Balassa's method. Define the trade diversion dummy, DIV_i, to equal one if in industry *I* internal imports from the FTA partner increased (decreased) *more* (*less*) than did imports from the rest of the world between 1992 and 1995, and zero otherwise. As in Balassa's method, this indicator of trade diversion allows for both external as well as internal imports to increase as home's GDP grows, so long as external imports grow "commensurately" less than internal imports. Hence, the indicator incorporates changes on the demand side, since growth is usually accompanied by an increase in import demand. The definition of trade diversion also allows both internal and external imports to fall in the event of a negative shock to GDP. So long as there are imports from the rest of the world at the margin, the measure DIV is consistent with trade diversion.[9]

Empirical analysis of Hypothesis 1 is based on the econometric model:

[9] If there are imports at the tariff-ridden price from the rest of the world at the margin, then it must be the case that any increase in domestic imports from the partner country is due to trade diversion.

$$\text{ExternalTariff}_{i,t} = \beta_1(\text{Internal Imports/Value Added})_{i,t-1} + \beta_2(\text{DIV})_i * (\text{InternalImports/ValueAdded})_{i,t-1} + \alpha\ \text{InternalTariff}_{i,96} + \delta_i + \delta_t + \epsilon_{it}, \quad t=93, 96. \tag{2}$$

Industry decline due to the FTA is measured by the variable (Internal Imports/Value Added), while the variable DIV identifies industries with trade diversion. Thus, in (2) β_1 is the effect of a change in (Internal Imports/Value Added) on external tariff in any industry, while β_2 is the *additional* impact of a change in (Internal Imports/Value Added) on external tariff in the industry that specifically experiences trade diversion. Validation of Richardson's hypothesis about trade diversion and declining tariffs (Hypothesis 1) requires a negative coefficient on the interaction term, $\beta_2<0$. In sum, $\beta_1<0$ is effect on the external tariff in an industry that declined due to reasons other than trade diversion (for example, trade creation), while $\beta_1+\beta_2<0$ is the total effect on the external tariff in an industry that declined *and* experienced trade diversion.

We note that since the definition of DIV does not preclude imports and industry size growing together, DIV by itself does not inform the theory and is included as a control variable.

4.2 Data

The cross-sectional component of the data are organized at the 6-digit Harmonized System (HS) tariff-line level of disaggregation. This level of detail was chosen over a more aggregate system of classification such as the 4-digit level ISIC, because decisions about tariff rates are made at the HS level. Mixing heterogeneous micro-level information into aggregate data masks, even overwhelms, information that may be relevant at the micro-level. For example, a tariff of, say, 10% may impact imports of a HS 6-digit commodity, while imports of the ISIC industry which includes that plus other HS 6-digit goods may not be as strongly affected. The reason is that aggregation of goods with heterogeneous import elasticities mixes the elasticity information.

Argentina's tariffs at the HS 6-digit level for 1992, 1993 and 1996 were kindly provided

by Marcelo Olarreaga. They are the basis for the results in Olarreaga, Soloaga and Winters (1999). The HS 6-digit cross-sections are pooled across 1993 and 1996 (a few preliminary models are also estimated using pooled data across all three years). The most detailed level at which output data are available is the ISIC (rev. 3) classification of 127 industries. The internal-imports-to-value-added ratio was thus computed at the ISIC (rev. 3) level, and then mapped into the HS 6-digit level using a standard conversion system. For each ISIC industry the ratio is computed as imports of Argentina from Brazil (imports from Brazil comprise over 90% of Argentina's total Mercosur imports) divided by value added. The ISIC level imports and output data were obtained from the Argentine Trade Commission (CNCE).

Of the full set of 5824 HS 6-digit goods, only manufactured products are considered. Additionally, industries with very low imports (lower than $1000) are dropped. Our personal communication with the CNCE led to this decision after we found out that industries with low or zero imports are prone to data entry errors. Also, when the imports are low, products are being bought primarily as samples, not necessarily for consumption. Taking into account restrictions imposed by data availability, the effective sample for the study is approximately 5660 for the two years combined, or an average of 2830 HS 6-digit observations per year.

Table A.1 contains descriptions and descriptive statistics on all variables used in the analysis, including the control variables L/Profit, %Employment, Concentration, $(\text{Extra-Mercosur Net Imports/ Output})_{1993}$, %IntermediateOutput, and DIV. The control variables, other than DIV, are from Olarreaga, Soloaga, and Winters (1999). They were originally constructed from variables defined at the 80-industry ISIC (revision 2) 4-digit level data, and concorded into HS 6-digit goods. L/Profit, %Employment, and Concentration were constructed from extrapolations of variables in the 1985 Argentine industrial census, %IntermediateOutput was constructed from the GTAP database, and $(\text{Extra-Mercosur Net Imports/Output})_{1993}$ from the COMTRADE database. The mean for DIV indicates that 40.2% of the sample experienced trade diversion as we have defined it.

4.3 Econometric Issues

When applying theory to the data, issues pertaining to the identification of the Richardson effect arise. The ideal "experiment" for testing the hypothesis is one that yields informative data on the response of external tariff in a sector to an increase in internal imports in that sector, all else held constant. In the Mercosur data, two identification issues must be solved. The first is the possible simultaneity between changes in the external tariff and internal imports for any good. An increase in Home's external tariff on a good should increase imports of the good from the FTA partner country, certainly if the partner is the more efficient producer of the good among the two union countries, but also if domestic production is unable to satisfy domestic demand. This reverse causality from the external tariff to internal imports therefore imparts a possibly strong bias in a direction opposite to that predicted by Richardson. Lagging the variable Internal Imports/Value Added by one year as in (1) and (2) provides one solution to this problem. Since lagging does not necessarily solve the endogeneity problem, perhaps more important are results using instrumental variables that are described in the next section.

The second confounding effect is the presence of exceptioned sectors. If exceptioned sectors are not controlled for, an identification problem exists. In exceptioned sectors, each nondiscriminatory tariffs were applied to all imports including those from FTA partners. In such sectors, any increase in (external) tariffs would lower internal imports. The result would be a negative correlation between external tariffs and internal imports, just as predicted by Richardson, but due to an entirely different mechanism. The variable Internal Tariff (from 1996) is included in order to control for exceptioned sectors.

5. Evidence

As a prelude to the formal econometric analysis, features of the Argentine tariff data are described. As indicated in Section 2, in the immediate years preceding the Mercosur trade agreement, Argentina had completed a wide-reaching liberalization, including tariff liberalization. By 1992 Argentina was already a low-tariff country in many industries relative to

Brazil. Figure 2 depicts the distribution of its external tariffs in 1996, aggregated at the 4-digit ISIC (rev. 2) level. At this aggregation, the distribution is not so different from the one in 1992, when the trade agreement went into effect. The maximum tariff rate applied in 1996 (and in 1992) was 30%. When the Mercosur countries agreed to the vector of common external tariffs to which all countries were to converge by 2000, in many industries Argentina would *raise* tariffs in order to converge to the CET. In contrast, its biggest trading partner Brazil would have to cut most of its tariffs in order to converge to the CET.

The message from Figure 2 is that, with tariffs already at their lowest level in two decades by 1992, further decreases in the tariff would be politically costly for the government to achieve. The 1992-96 data therefore present a challenging testing grounds for a theory about tariff decreases. Given the already low tariff rates in 1992, industries that experienced further reductions in their tariffs likely did so as the endogenous result of their declining political power. Evidence of the association of tariff decreases during the 1992-96 period with trade diversion to Brazil would therefore provide strong support for Richardson's hypothesis.

Hypothesis 2: Declining industries and external tariffs

First, the more encompassing hypothesis, Hypothesis 2, is tested using econometric models based on (1). Parameter estimates for those models are reported in Table 1. Cross sectional data at the HS 6-digit level for the external tariff data (ExternalTariff) are pooled across 1992, 1993, and 1996. For each cross section, the issue variable Internal Imports/Value Added is lagged by a year. For example, in the 1992 cross section, Internal Imports/Value Added is from 1991. Three linear specifications labeled A1-A3 are first explored in order to choose the most preferred model. Extensions of the preferred model are presented in the columns labeled B1-B4.

Model A1 is the base model just as it appears in (1). It is estimated with data pooled across 1992, 1993, and 1996 using approximately 2830 observations per cross section. If external tariffs are sticky then it is appropriate to include initial tariffs as a control variable.

Model A2 thus includes tariffs in 1992 as a regressor.[10] It is estimated with the 1993 and 1996 cross-sections. Model A3, the final base model explored, contains full two-way effects (the 6-digit HS cross section plus time dummies). It uses pooled data across all three years.[11]

Three features of the results from the three models are notable. First, the control variables serve their purpose well. The precisely measured positive estimate on Internal Tariff indicates that it adequately controls for exceptions to the otherwise free trade agreement. Similarly, in A2 the large and precisely measured estimate on Tariff_{1992} suggests that Argentina's 1993 and 1996 tariffs had a similar cross-sectional pattern as the 1992 tariffs. Second, the inclusion of Tariff_{1992} substantially increases the fit on model A2 over A1. A3 with its 2801 regressors merely produces the same adjusted R^2 as A2, and is less preferred on the basis of any information criteria that penalizes excessive parameterization. Thus, A2 is chosen as the preferred model upon which to build extensions.[12]

Third, and most significantly for Hypothesis 2, the coefficient on the issue variable Internal Imports/Value Added is precisely measured with a negative sign, and is robust across the three models. The estimates on Internal Imports/Value Added are noteworthy, especially for those goods which experienced a large increase in their internal-imports-to-value-added ratio. The estimate of −9.295 from model A2 indicates that Argentina's external tariff on imports from non-Mercosur partners decreased by 0.930 percentage points for every 0.10 increase in the ratio Internal Imports/Value Added. Given the already low levels of tariffs prevailing in Argentina in 1992, the tariff decrease is of economically significant magnitude. It should be noted that a change of 0.10 in Internal Imports/Value Added, while not a trivial, is easily achieved for goods in which imports from Brazil were low or zero before Mercosur, but increased thereafter.[13]

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[10] Tariff data from an even earlier period were not available to us.

[11] A balanced panel was used for this model.

[12] Information criteria (not reported here) such as the Akaike or Bayes information criteria favor A2.

[13] Detailed inspection of the raw 6-digit level Harmonized System imports data indicated that in 1991, of the 5824 possible HS 6-digit lines only 15.8% or 920 goods were imported from Brazil. In 1992, the year the Mercosur agreement took effect, 45% or 2632 of the HS 6-digit goods were imported from Brazil, as imports from Brazil doubled in value from $1.5 bn. To $3.3 bn. However, there also seems to have been

(continued...)

Galiani and Sanguinetti (2003) show that the change in the ratio of manufacturing imports on output has indeed been substantial. For example, in Argentine manufacturing industries this ratio rose from 0.05 in 1994 to 0.12 in 1999, a four-fold increase. The ratio varied substantially across industries, with a standard deviation of 0.12 in 1999. The largest increase was in the Office Accounting and Computing Equipment industry in which the ratio rose from 0.08 to 0.57 between 1994 and 1999.

Models B1-B4 investigate robustness of the model A2 results to pivotal economic and econometric issues. Model B1 addresses the mapping of data from a more aggregate system (ISIC) to a more detailed one (HS), by using a clustering procedure to estimate the standard errors.[14] While the estimates are the same as model A2, the *t*-values are robust to clustering effects. Model B2 is motivated by the concern that other political economic influences, which are discussed below, may be driving the results that we attribute to Richardson's model.

If the issue variable Internal Imports/Value Added is endogenous, lagging it does not

[13](...continued)
a regime change in the system of data keeping/classification during 1992, to which may be attributed at least part of the switch from zero to positive imports between 1991 and 1992 in many of the HS 6-digit categories (this change in the data-keeping regime may be inferred from the fact that there is a similar switch in the number of HS 6-digit lines for which imports from the world increased from 1439 lines (24.7% of all 6-digit lines) to 3902 (67%) between 1991 and 1992). Since more detailed information about the nature of such a change is not available to us, it is difficult to make a precise statement about the extent to which the zero-to-positive switches were due to the data-keeping regime change. Nevertheless, there seem to have been a significant number of goods in which the imports from Brazil did change from zero to positive, and sometimes increased dramatically. This data-keeping regime change was also a factor in how we defined the sample, excluding observations with zero or low imports.

[14] The method assumes that observations are independent across ISIC groups (clusters) but not within the clusters. A White-type heteroskedasticity-consistent covariance matrix, given knowledge about the clusters, is computed as follows: Let C denote the number of clusters in the HS 6-digit data (here C=127, the number of ISIC 4-digit industries), and Ω_j denote the set of HS 6-digit observations that belong to cluster j. Let $u_j = \sum_{i \in \Omega_j} e_i x_i$, where e_i is the scalar error on the ith observation and x_i is the row vector of regressors on the ith observation. Then the covariance matrix used to compute standard errors is

$$V = (X'X)^{-1}\left[\sum_{j=1}^{C} u_j' u_j\right](X'X)^{-1} \quad .$$

resolve the inconsistency of the estimator, especially if it is markedly autoregressive. In model B3 Internal Imports/Value Added is instrumented using those political economy variables from model B2 that may be considered exogenous. Finally, Model B4 uses first-differenced data. It emphasizes the temporal change in the data, and thus addresses the concern that the models in levels is influenced mainly by the cross-sectional information in the data.

In these extended models, the finding from the exploratory models that declining industries are associated with declining external tariffs is maintained, and in some cases strengthened, in the new models. The robust-to-clustering *t*-values in model B1 indicate that the inference about Hypothesis 2 from model A2 continues to hold. Model B2 includes new control variables. The labor-profitability (L/Profit) ratio is a proxy for the labor-capital (L/K) ratio if a constant multiple of profits is reinvested into capital formation. If a lower a L/K ratio leads to lower comparative costs, then L/Profit measures comparative cost disadvantage (Baldwin, 1985). The fraction of all workers employed in an industry (%Employment) measures the electoral strength of workers (Caves, 1976). It is also a measure of government's conservative status quo motives behind protecting labor's income (Corden, 1974). Industry concentration, measured by the inverse of the number of firms, captures the effectiveness of lobbying organizations (Olson, 1965; Stigler, 1971). The ratio of external net imports to value added from 1993 is inversely related to the stakes from protection in politically organized industries (Grossman and Helpman, 1994), and percent of output used as intermediate inputs by downstream industries measures counter-lobbying against protection (Gawande and Bandyopadhyay, 2000). All the variables in model B2 are estimated with their expected signs.[15] Controlling for these other political-economic motives changes the estimated coefficient on the

[15] The negative coefficient on L/Profit shows that labor-intensive industries (those with high L/K ratios) experienced declining external tariffs. This complements Richardson's hypothesis since L/K may proxy trade diversion: since Brazil possessed comparative advantage in these industries, it was able to divert trade in the FTA. Argentina thus dropped its external tariffs on the rest of the world to make up the lost revenue. The positive coefficient on %Employment verifies Corden's hypothesis about protecting labor incomes, as well as Caves' hypothesis about protection according to the electoral strength of an industry. The Grossman-Helpman variable Net Extra-Mercosur Imports/Value Added is not statistically significant, but counter lobbying by downstream users was a significant influence in lowering the external tariffs.

issue variable to −7.664. The fit on model B2 is a significant improvement over model A2.

Model B3 addresses endogeneity of the issue variable, using four variables as instruments: L/Profit, Concentration, %Employment, and %IntermediateOutput. The trade literature offers strong justification for why these may be correlated with imports, and therefore also with the issue variable Internal Imports/Value Added. L/Profit and %Employment, being proxies for factors of production, are natural instruments for imports and output, while concentration and intermediate output have been used to explain intra-industry trade. Their exogeneity offers a strong justification for use as instruments. They are considered exogenous because their cross-industry pattern has remained fairly stable and unchanged in the face of shocks to external tariffs (that is, they are not correlated with the error term in (1)). The 2SLS estimate for the coefficient on the issue variable is −28.97, the highest absolute estimate among all models. Evidently, endogeneity imparted a strong bias in a direction opposite that predicted by Richardson, so that the coefficient on Internal Imports/Value Added in earlier regressions was grossly understated in absolute terms.

In Model B4 the dependent variable is the first-difference of the external tariffs. The statistically significant coefficient of −7.656 on Internal Imports/Value Added is consistent with Richardson's hypothesis even in the context of temporal changes in each commodity's tariff: the greater the industry decline, the larger is the temporal decrease in the external tariff. This is a somewhat stronger statement than what is permitted by the regressions in levels.

In sum, the results in Table 1 present strong evidence in favor of a general version of Richardson's hypothesis. Argentine industries that declined with the onset of the free trade agreement (either as a result of trade being diverted to Brazil or trade being created by increased production in the low-cost producing partner country) found their political power diminished. As the political power that had kept tariffs high in the pre-Mercosur regime waned, those external tariffs dropped. But was trade *diversion* a cause? To answer this more specific question, trade diversion is identified as described in (2). Those results are now presented.

Hypothesis 1: Trade diversion and external tariffs

To keep the discussion of evidence on this important hypothesis succinct, we focus on results beyond what was reported in Table 1. Tests of Hypothesis 1 focus on the interaction of the trade diversion dummy DIV with Internal Imports/Value Added. As discussed in Section 4.1, it's coefficient provides direct evidence about Richardson's hypothesis. In Table 2 the column labeled A2′ contains estimates from the baseline model. The coefficient on the issue variable is −3.018, conditional on trade creation (measured by Internal Imports/Value Added), exceptions (measured by Internal Tariff), and stickiness in the cross sectional structure of tariff (measured by Tariff_{1992}). It's statistical significance affirms Hypothesis 1 about the association of trade *diversion* with a drop in external tariffs.

It indicates that in sectors experiencing trade diversion, the additional impact of an increase of 0.10 in the ratio Internal Imports/Value Added was associated with a decrease of 0.302 percentage points in the external tariff. Though the impact may appear to be small, this result is quite significant for two reasons. First, this is in *addition* to the larger decline of 0.797 percentage points in the external tariff from a 0.10 increase in Internal Imports/Value Added not associated with trade diversion (implied by the estimate of −7.979 on Internal Imports/Value Added). Second, Argentine tariffs present a formidable testing ground for this theory due to the general tendency of Argentine tariffs to increase (to Brazilian levels) once the pre-1992 tariff reforms ended and Mercosur came into being.[16] Interestingly, Chang and Winters (2002, Table 1) show that even in Brazil the average external tariff began to increase after 1995, from an average of 13% in 1995 to 13.5% in 1996. Our evidence against this rising tide is in itself an economically significant finding. The negative coefficient indicates that the Richardson effect

[16] The table below from the Argentine Ministry of Economics shows how Argentine external tariffs have evolved. Statistics are at the tariff line level.

Argentina's External tariff (%)

	mean	max	min	sd		mean	max	min	sd
1996	11.77	30.00	0.00	7.30	**1999**	16.06	35.00	0.00	7.15
1997	11.79	30.00	0.00	6.99	**2000**	16.73	35.00	0.00	6.53
1998	14.00	33.00	0.00	6.83	**2001**	18.15	35.00	0.00	9.91

was strong enough in industries experiencing trade diversion to overcome the general upward pressure on tariffs.

The column labeled B1′ corrects the standard errors on the estimates from model A2′ for clustering of observations, using a variant of the White heteroskedasticity-consistent correction (see fn 14). The correction leads to a statistically less precise estimate, but that is still statistically significant at the one-tailed 10% level.

In model B2' control variables are included to ensure that the interaction term is not picking up effects that should be attributed to other influences. Thus the variables L/Profit, %Employment, Concentration, %IntermediateOutput and Extra-Mercosur Net Imports/Output are included in order to control for political and economic influences outside Richardson's model. We note that DIV is included as a control variable, since its definition (in Section 4.1) does not imply that industries for which DIV equals 1 necessarily experience an increase in their Internal Imports-to-Value Added ratios. Its positive coefficient indicates that industries for which DIV equaled 1 had external tariffs which were higher by 0.701 percentage points over industries for which DIV equaled zero, all else held constant. The main result from model B2' is the estimate of −3.569 on the interaction term. It shows that even after controlling for these other influences, the size and sign on the estimated coefficient on the issue variable remains relatively unchanged. It is also measured with greater precision than in the baseline model.

Whether the association between the interaction term and external tariffs is causal is made clear in the estimates from model B3'. In model B3', the variable Internal Imports/Value Added is first instrumented for possible endogeneity using the exogenous variables, including cross sectional and time series dummies, from model B2' before interacting with the diversion dummy DIV. The first stage regression is presented in Table A.2. A rule of thumb for a single endogenous regressor is that a value of less than 10 for the model's *F*-statistic is cause for concern (Staiger and Stock, 1997) about weak instruments imparting bias to the 2SLS estimate.

Clearly, our instruments do not suffer from the weak instruments problem.[17]

The estimates on the interaction term from models B2' and B3' indicate that trade diversion indeed causes a drop in the external tariff (which is in addition to the drop in tariffs due to industry decline not associated with trade diversion). This is the most direct affirmation about the Richardson hypothesis among all the models estimated thus far. The estimates are statistically and economically significant. For example, the estimate of −5.856 from model B3' indicates that an increase of 0.10 in the ratio Internal Imports/Value Added[18] leads to a decrease in the external tariff of 0.06 percentage points. For reasons elucidated above, we reiterate that this is a significant finding in favor of Hypothesis 1.

Finally, estimates from the model of first-differenced data are presented in the last column. This is a very different model from the other models in Table 2. It explains cross-sectional variation in the temporal change in the external tariff in the, while other models explained the cross-sectional variation in the level of the external tariff. The statistically estimate of −4.999 indicates that in industries experiencing trade diversion, the temporal decline in the external tariff was significantly determined by the internal imports-to-value added ratio. Notably, this estimate is quantitatively close to estimate of −5.443 on the variable Internal Imports/value Added, indicating that trade diversion had as much of an impact on the temporal change in the external tariff in declining industries as did trade creation in declining industries.

Robustness

A broad set of models were estimated to check the robustness of the results presented in Tables 1 and 2. They include (I) the use of tariff preference margins as dependent variable,

[17] They also provide clues to why the instrumented results in Table 2 are significantly different. Consider the effect of the exogenous variable L/Profit, for example. It's coefficient indicates that the partial correlation of the fitted value of the instrumented variable Internal Imports/Value Added with L/Profit is negative. The partial correlation of L/Profit with the dependent variable External Tariff is also negative (see model B2′). If this variable is an influential component of the instrumented variable, then we should expect the coefficient on the instrumented variable to be positive, as model B3′ indicates it is.

[18] As indicated in the previous section, a change of 0.10 in the variable Internal Imports/Value Added occurred in a significant number of industries, and a few industries experienced even greater increases.

defined in Chang and Winters (2002, Table 1) as the difference between external and internal tariffs, (ii) estimation from subsamples that exclude goods on which tariffs had transitioned to the CET by 1996, i.e. estimates that are free of the "CET bias", (iii) models with (Internal Imports/Value Added) measured in 1991 to investigate robustness of the results to adjustment dynamics implied by the lagged structure in (1) and (2), and (iv) log models.

Table 3 shows estimates from the first two types of sensitivity analyses. The first two columns present the preference margin regressions corresponding to, respectively, A2 in Table 1 and A2′ in Table 2. They reinforce the finding about Hypotheses 2 and 1 from the earlier regressions in levels and differences. We estimated the full set of models in Table 2 with preference margins, and while they are not reported in Table 3, the results affirm the Richardson hypothesis.

The transitioning of external tariffs to the common external tariff (CET) as early as 1995-96 for some goods, as noted in Section 2, also pose an identification problem. Even though partner countries were allowed to unilaterally impose external tariffs on all goods during most of the period of the analysis, this policy coexisted with the understanding that by 2001 their external tariffs would converge to the common external tariffs (CETs). To the extent that some countries started their adjustment to the CET early, it would introduce biases into measuring the Richardson effect. For example, if a sector's CET had been set at a level higher than Home's nondiscriminatory tariff, and Home decided to impose this higher tariff immediately on rest of the world imports, then the Richardson mechanism would be prematurely stopped short by the CET. Including those industries would, by causing high external tariffs to move positively with increased internal imports, impart a bias in a direction opposite to the Richardson effect.[19] If the two hypotheses are validated in a sample that includes the transitioning industries, then the Richardson mechanism appears to have been strong enough to overcome these opposing influences. To confirm that this intuition is correct, the last two columns in Table 3 present

[19] If Home moved its external tariff in the direction of the CET at a *lower* than the pre-FTA tariff, in the data this would be reflected in lower external tariffs leading to trade diversion, again biasing the effect in the opposite direction to what is postulated by Richardson's hypothesis:

estimates from models A2 and A2′, but with the sample restricted to the "pure FTA" sample, dropping observations with external tariffs equal to the CET. Since the CET was agreed upon in 1995, the sample is restricted to 1996 data. In line with our intuition, the issue coefficients are larger in absolute value relative to estimates from corresponding models in tables 1 and 2.

Not reported in Table 3 in the interest of brevity, are (I) models with the issue variable Internal Imports/Value added from 1991 rather than lagged by one year in order to investigate different adjustment dynamics of tariffs to trade diversion, and (ii) models in logs. Their estimates also validate both hypotheses. Finally, we re-estimated all models without dropping observations with low or zero imports. The effective sample then is approximately 3688 HS 6-digit observations per year. In some models, notably the model in first differences, support for Hypothesis 2 is somewhat weaker than reported in Tables 1 and 2. But by and large the results based on this more inclusive sample strongly support the reported findings on both hypotheses.

6. Conclusion

Political economy models in trade and other areas of economics are motivated by the notion that in the real world governments maximize something other than public welfare. Their purported aim of explaining real-world outcomes better than models based on pure welfare maximization makes them natural candidates for empirical testing. In this paper the political economy model of trade integration in Richardson (1993) is subject to empirical examination. The main feature of this model is its counter-intuitive prediction that the diversion of trade from the rest of the world to the less efficient FTA-partner, which initially occurs as trade barriers are removed on trade between FTA partners but maintained on the rest of the world, will endogenously be lowered. If true, then the model makes the case for free trade agreements, an issue that is quite controversial among policymakers and academics.

This prediction is empirically investigated using trade and tariff data from Argentina, the second biggest partner (to Brazil) in the Mercosur trade agreement. A data set assembled at the 6-digit Harmonized System level of detail over the period 1991-96 is used to examine whether

the increasing penetration of imports from Brazil and the resulting "decline" of industries in Argentina led, via the Richardson mechanism, to the lowering of external tariffs in these industries. The results provide an affirmation of the Richardson hypothesis.

Econometric models of the external tariff in levels as well as in first differences indicate that an increase in the ratio of internal imports-to-value added was significantly, both statistically and economically, associated with a decline in the external tariff. A refinement of the model to specifically study this effect in industries that experienced trade diversion also validates Richardson's prediction. This is in spite of the well-documented fact that Argentine external tariffs showed a general tendency to increase in the 1990s after the formation of Mercosur to the higher Brazilian external tariffs. A wide variety of models is estimated to take account of political economy influences outside Richardson's model, the exogeneity of issue variables, preference margins as the dependent variables, and the use of different sub-samples ro separate the effect of the convergence of Argentine tariffs to a CET from the mechanism proposed by Richardson. In all these models, without exception, Richardson's proposition is empirically validated. The robustness of the result is indeed surprising and newsworthy.

The paper has taken a first step towards the larger goal of *testing* political economy models of trade integration. There are theories that make predictions similar to Richardson's but via different mechanisms. They therefore compete with the Richardson model in explaining the same phenomenon. For example, the model of Bond, Riezman, and Syropoulos (2002) uses an imperfectly competitive market structure to obtain the prediction that the external tariff will decline. Since their modeling assumptions are quite different from the political economy model of Richardson, a formal comparison of the two models appears to be necessary in order to distinguish between the relative importance of political economy influences and market structure considerations in lowering the external tariffs. A more subtle competing hypothesis emerges from Levy's (1999) political economy model with imperfectly competitive market structure. Levy's model predicts that pressure by import competing lobbies to raise inter-bloc tariffs increases with less elastic supply of the import good and with greater elasticity of foreign

demand for the good. This is a generalization of the effect postulated by Richardson, and is worth testing to discover whether elasticities matter.

With imperfect competition, other price effects could play an important role. Chang and Winters (2002) show that the terms of trade moved against producers in non-partner countries as they reduced prices of export goods to Mercosur markets so that their tariff-ridden prices were competitive with partner country prices. Contrary to other imperfectly competitive models this has the more pernicious effect of reducing welfare of exporting countries, providing little incentive to move to freer world trade. Our results show that if indeed that is the case then the Richardson effect, by lowering tariffs, might mitigate the welfare loss of exporting countries by mitigating the price reduction required on the part of exporters.

Since Richardson's theory undermines the traditional emphasis on trade diversion, it competes with any model which predicts that free trade agreements will tend to isolate blocs of countries from each other as inter-bloc tariffs increase. The political economy model of Panagariya and Findlay (1996) demonstrates how lobbying becomes cheaper under an FTA, with the result that inter-bloc tariffs will rise. Cadot, de Melo and Olarreaga (1996) argue that while an FTA could deter lobbies from using contributions to affect trade policy, a customs union may allow lobbies to obtain increased protection. Discriminating among these and other political economy models that arrive at opposite conclusions serves the larger purpose of indicating directions in which newer theories or refinement of existing ones should be developed. For that reason, further empirical work on comparing models of RTAs is recommended.

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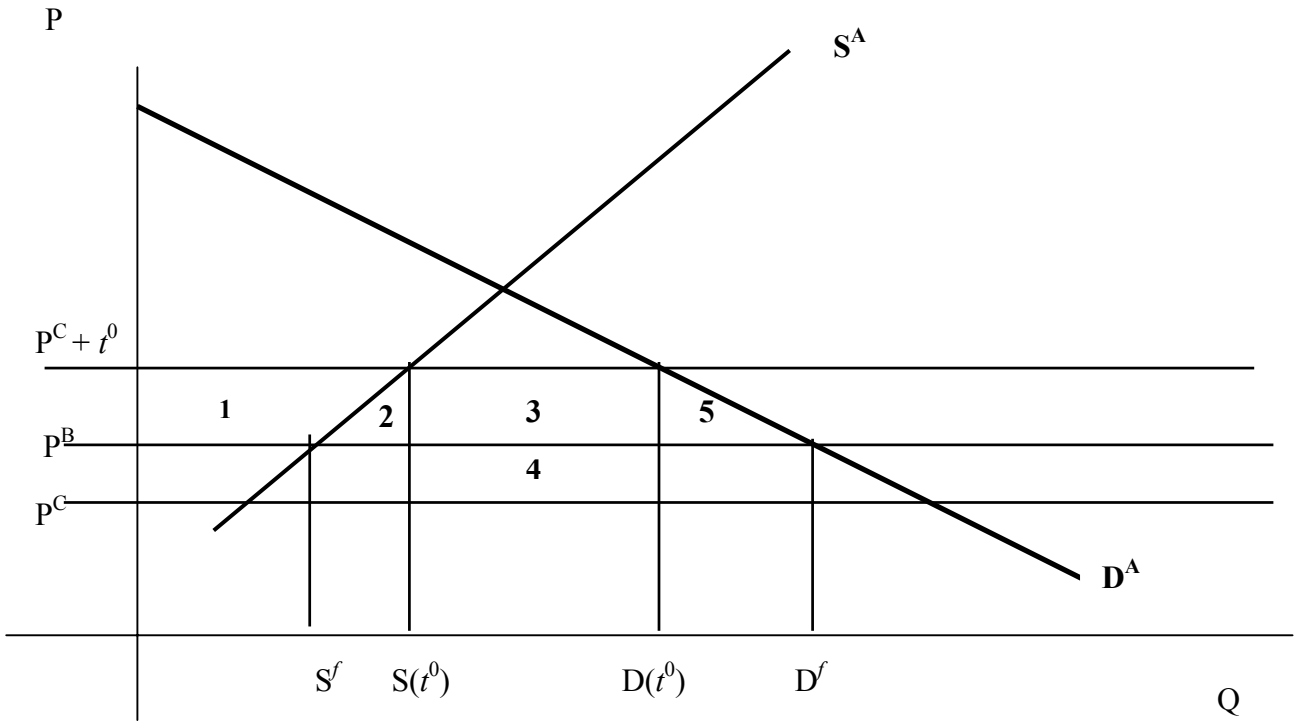

Figure 1: Trade diversion endogenously disappears.

D^A is total demand in A (Home), P^B is perfectly elastic supply of country B (FTA partner), and P^C is perfectly elastic supply of the outside country C (ROW). t^0 is the pre-FTA nondiscriminatory specific tariff. With an FTA, A maintains the tariff in a discriminatory manner against C. B now fully supplies A along P^B. With diversion imports are switched from C to B and domestic production shrinks. Since the import price is lower, domestic output shrinks from $S(t^0)$ to S^f, and imports increase.

Compared with the pre-FTA equilibrium, the net welfare loss for A is area 4 (tariff revenue) minus area 2+5 (gain in consumer welfare due to the lower consumer price). But the loss in area 4 can be avoided by simply switching to importing from C by lowering the tariff on C from t^0 to a level that brings $P^C + t$ to a level just below P^B. In maximizing the Stigler-Peltzman objective function, Home's government is induced to do so, eliminating trade diversion. The new equilibrium is still tariff ridden, but ceases to be if there is no domestic production of the good.

Figure 2: Argentina's External Tariffs (%) in 1996
ISIC (rev. 2) 4-digit industries

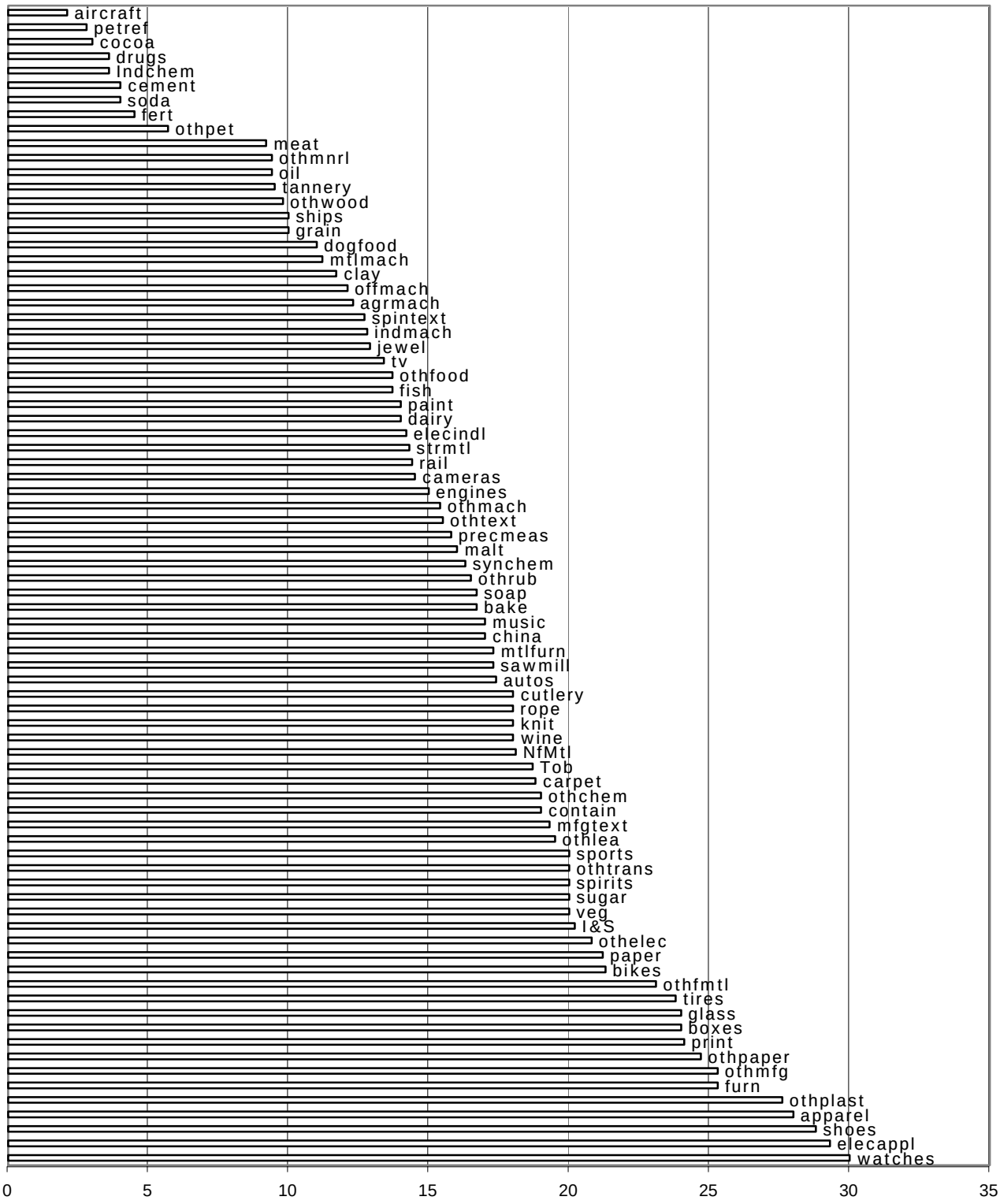

Table 1: HYPOTHESIS 2: Declining Industries and Tariffs in Argentina. Post-Mercosur.
Cross-section at HS 6-digits, pooled across 1992, 1993, 1996 [a]
External Tariff$_{i,t}$ = β_0 + β_1(Internal Imports/Value Added)$_{i,t-1}$ + β_2 Internal Tariff$_{i,96}$ + **X**β + 2-Way Fixed Effects

	Exploratory Linear Models			**A2** Clustering	**A2** with Controls	**A2** Instru-mented	**A2** Diffe-renced
	A1	**A2**	**A3**	**B1**	**B2**	**B3**	**B4**
(Internal Imports/ Value Added)$_{t-1}$	−15.22 ** (−19.47)	−9.295** (−13.22)	−1.872* (−1.526)	−9.295** (−3.670)	−7.664** (−10.71)	−28.97** (−8.973)	−7.656** (−5.392)
Internal Tariff	0.268** (21.77)	0.286** (23.37)	[f]	0.286** (14.82)	0.265** (21.94)	0.294** (18.87)	0.216** (12.53)
Tariff $_{1992}$	-	0.266** (28.15)	[f]	0.266** (7.440)	0.244** (26.07)	0.197** (12.18)	−0.334** (25.59)
L/Profit	-	-	-	-	−0.007** (−2.578)	-	−0.004 (1.252)
%Employment	-	-	-	-	32.48** (6.445)	-	13.57** (1.890)
(Extra-Mercosur Net Imports/Output)$_{1993}$	-	-	-	-	0.0002* (1.303)	-	−0.0001* (1.404)
Concentration	-	-	-	-	−.00007 (−0.330)	-	−0.0001 (0.323)
%IntermediateOutput	-	-	-	-	−5.543** (−11.94)	-	−2.846** (4.313)
CS and TS Dummies [b]	YES	YES	-	YES	YES	YES	YES(CS)
2-Way Fixed Effects [c]	-	-	YES	-	-	-	-
N	8501	5666[d]	8400[e]	5666[d]	5662[d]	5662[d]	5666[d]
k	72	73	2801	73	78	73	77
Adjusted R^2	0.470	0.608	0.608	0.608	0.626	0.605	0.161

Notes: ** indicates one-tailed statistical significance at 5%, and * at 10%. *t*-values in parentheses. [a] External tariff data at 6-digit Harmonized System (HS) level pooled across 1992, 1993, and 1996. Only observations with total imports>$1000 are included in the sample. E.g. of the 11059 possible observations, Model A1 includes 8501 observations. [b] Sixty eight cross-section (CS) dummies at 2-digit HS level, plus two time-series (TS) dummies. [c] Fixed effects model with full set of CS and TS dummies. [d] Since 1992 Tariffs are controlled for, data pooled across 1993 and 1996 cross sections only. [e] Full set of fixed effects required balanced panel (3 TS obs. per CS group). [f] Fixed effects are collinear with the variable (variable redundant given fixed effects).

Table 2: HYPOTHESIS 1: Trade Diversion and Declining Tariffs in Argentina. Post-Mercosur. Cross-section at HS 6-digits, pooled across 1993, 1996 [a]

$$ExtTariff_{i,t} = \beta_1(\text{Internal Imports/Value Added})_{i,t-1} + \beta_2(DIV)_{i,t-1} * (\text{InternalImports/ValueAdded})_{i,t-1} + \alpha\ \text{InternalTariff}_{i,96} + \mathbf{X\beta} + \text{2-Way Fixed Effects}$$

	Baseline Model	**A2′** Clustering	**A2′** with Controls	**A2′**Instru-mented	**A2′** Diffe-renced
	A2′	**B1′**	**B2′**	**B3′**	**B4′**
(Internal Imports/ Value Added)$_{t-1}$	−7.979** (−8.799)	−7.979** (−2.654)	−6.012** (−6.570)	−30.81** (−10.14)	−5.443** (−2.945)
DIV*(Internal Imports/ Value Added)$_{t-1}$	−3.018** (−2.588)	−3.018* (−1.548)	−3.569** (−3.124)	−5.413** (−2.571)	−4.999** (−1.874)
Internal Tariff	0.285** (23.32)	0.285** (15.11)	0.265** (21.90)	0.295** (22.23)	0.216** (12.54)
DIV	0.701** (5.159)	0.701** (3.083)	0.583** (4.367)	0.789** (3.922)	0.194 (1.277)
Tariff$_{1992}$	0.263** (27.81)	0.263** (7.545)	0.242** (25.82)	0.181** (12.69)	−0.335** (−25.64)
L/Profit	-	-	−.0006** (−2.380)	-	−0.004 (−0.195)
%Employment	-	-	32.31** (6.420)	-	13.62** (1.897)
Concentration	-	-	−.000013 (−0.304)	-	−.00001 (−0.348)
%IntermediateOutput	-	-	−5.438** (−11.66)	-	−2.848** (−4.292)
(Extra-Mercosur Net Imports/Output)$_{1993}$	-	-	0.00001 (1.184)	-	−.00001* (−1.452)
CS and TS Dummies[b]	YES	YES	YES	YES	YES (CS)
N	5666	5666	5662	5662	5662
k	75	75	79	74	78
Adjusted R^2	0.610	0.610	0.627	0.608	0.162

Notes: ** indicates one-tailed statistical significance at 5%, and * at 10%. *t*-values in parentheses. [a] External tariff data at 6-digit Harmonized System (HS) level pooled across 1993, and 1996 (1992 Tariffs are controlled for). Observations with imports less than 1000 are dropped.

Table 3: Sensitivity Analysis

	Dep.var. Preference Margin [a]		Dep.var. External Tariff ExtTariff ≠ CET [b]	
	A2	**A2′**	**A2**	**A2′**
(Internal Imports/ Value Added)$_{t-1}$	−10.52** (−10.78)	−9.598** (−6.735)	−17.81** (−7.520)	−13.78** (−4.206)
DIV*(Internal Imports/ Value Added)$_{t-1}$	-	−4.121** (−2.259)	-	−7.785** (−1.828)
DIV	-	0.664** (2.722)	-	1.071* (1.5776
Tariff$_{1992}$	0.331** (22.68)	0.280** (16.36)	0.180** (5.032)	0.181** (5.061)
CS and TS Dummies[b]	YES	YES	YES	
N	3686	2833	833	833
k	71	73	38	40
Adjusted R^2	0.516	0.471	0.354	0.357

Notes:

** indicates one-tailed statistical significance at 5% and * at 10% . *t*-values in parentheses.

[a] Preference Margin = External tariff − Internal tariff. Only 1996 sample.

[b] "Pure" FTA sample: Observations with external tariff equal to common external tariff dropped. Only 1996 sample.

Table A1: Descriptive Statistics

		Table 2 Sample	
Variable	**Description**	**mean**	**sd**
External Tariff	External tariff of Argentina [%], 1996	13.66	5.82
Internal Imports/Value Added	Argentine imports from Brazil/Value Added [ratio]	.067	.073
Internal Tariff	Argentine tariffs on imports from Brazil, 1996 [%]	.930	4.13
Tariff1992	External tariff of Argentina [%], 1992	14.15	6.48
$(L/Profit)_j$	Labor-to-profitability ratio: Number of employees/(Value added − Payroll) [workers/$mn]	36.61	27.92
$Concentration_j$	Concentration proxy: Number of firms in the economy / Number of firms in industry *j*	370.4	931.8
$\%IntermediateOutput_j$	Share of output used as inputs by other domestic industries [fraction]	.611	.228
$(Extra\text{-}Mercosur\ Net\ Imports/Output)_{1993}$	(Net extra-Mercosur imports / Gross output) * 1000	188.3	375.8
$\%Employment_j$	Labor union strength proxy: Fraction of manufacturing workers employed industry *j*	.021	.017
DIV	Trade diversion dummy [see section 4, equation (2)]	.402	.490
Margin of Preference	External tariff − Internal tariff, 1996 [%]	13.33	5.94

Notes:
1. All data are for Argentinian manufacturing industry at the HS 6-digit level, except is subscripted by *j*. Those variables are constructed at the 4-digit ISIC level and mapped into HS 6-digit industries. Means are over the HS sample.
2. Data sources: ISIC 4-digit level imports and output data were obtained from the Argentine Trade Commission (CNCE). Tariff data at HS 6-digits and other industry data at ISIC 4-digits provided by Marcelo Olarreaga. Sources are UNIDO [L/Profit, Concentration, %Employment] and GTAP [%IntermediateOutput]. See Olarreaga, Soloaga and Winters (1999) .

Table A2: First Stage Regression for Models B2 and B2' (Instrumented Models)

Dependent variable: Internal Imports/Value Added

	Estimate	se
Internal Tariff	0.001**	2.701
Tariff1992	−0.003**	18.15
L/Profit	−0.001**	13.13
Concentration	0.0001*	2.537
%IntermediateOutput	0.077**	9.029
%Employment	−0.229**	2.499
TS and CS Dummies	yes	
N	5662	
k	75	
F	46.18	
R^2	0.383	