Negotiating Preferential Market Access:
The Case of NAFTA

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NEGOTIATING PREFERENTIAL MARKET ACCESS:

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Antoni Estevadeordal[*]

There is a growing interest related to the theoretical analysis of Free Trade Agreements (FTAs). Nevertheless, there has been as yet very little empirical research on the topic, in particular, on the negotiating dynamics of these types of agreements. This paper attempts to make a contribution in this direction examining the relationship between the two most important market access instruments in the case of NAFTA negotiations: the preferential tariff phase-outs and the accompanying rules of origin (RoO). The traditional literature has viewed market access negotiations solely in terms of tariff (and non-tariff) negotiations. From an analytical point of view, the role of RoO, that is the rules that are designed to determine the origin of products in international trade, has usually been restricted to a "secondary" or "supportive" function. As such, RoO were seen to assist in the application or implementation of other "primary" instruments. In the case of preferential RoO, they help to determine when a particular good will be granted preferential tariff treatment. Using a newly constructed data set this paper estimates a simultaneous equation model where the endogenous variables are the preferential tariff phase-outs between Mexico and the United States and the RoO under the NAFTA agreement. The empirical findings of this paper support the view that in accordance with recent literature, the NAFTA RoO were used as an independent commercial policy instrument with a "primary" market access function as it is the case with the traditional preferential tariffs.

I. INTRODUCTION

In recent times there has been a large amount of literature related to the theoretical analysis of free trade agreements (FTAs).[1] Nevertheless, there has been as yet very little empirical research on the dynamics of how these agreements have been negotiated and implemented, their impact on the pattern of trade and investment flows, their positive or negative externalities with respect to the multilateral system, their effects on the productive and investment decisions in each of the parties involved, and more generally issues regarding the political economy process behind the negotiating process. This paper attempts to make a contribution with respect to the first question, that is, the dynamics of negotiating preferential market access in FTAs. In particular, the paper offers a detailed analysis of one of the most important preferential agreements

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[1] See for example Bhagwati and Panagariya [1996].

negotiated in the Americas in recent times, that is, the North American Free Trade Agreement (NAFTA) among the United States, Canada and Mexico. It also provides a new analytical framework for exploring the interdependence among various policy instruments used in preferential market access negotiations. The focus of this paper is on the role of two key instruments: the preferential tariff phase-out program and the accompanying rules of origin (RoO) negotiated under the NAFTA agreement. This issue has been clearly stated by Mayer [1999]: "Why this NAFTA? Why its long phase outs of protection for some products and immediate elimination for others, its exemptions, its rules of origin? "(p. 111) and "The [NAFTA] negotiators faced essentially two categories of [market access] problems: How fast should the tariffs come down? And what counted as a "North American" good?" (p. 117). This paper tries to document some of the links between those questions.

Economists have tended to view market access negotiations solely in terms of tariff (and non-tariffs) negotiations. From an analytical point of view, the role of RoO, that is the rules that are designed to determine the origin of products in international trade, has usually been restricted to a "secondary" or "supportive" function. As such, RoO were seen to assist in the application or implementation of other "primary" instruments. In the case of preferential RoO, they help to determine when a particular good will be granted preferential tariff treatment. In the case of non-preferential RoO, they help to determine the application of a specific non-preferential policy, such as whether a particular good would be subject to antidumping duties following an antidumping investigation. In this paper we emphasize the role of RoO in preferential trade agreements as an independent commercial policy instrument. In fact, the empirical results support the view that, in the case of NAFTA, RoO were used as an additional and distinctive commercial policy instrument with respect to the preferential tariff phase out built-in the agreement.

This paper is divided into six additional chapters. Chapter II discusses some general issues regarding the structure and timing of the NAFTA negotiations in the context of other agreements in the Americas. Chapter III analyzes the key policy instruments used in market access negotiations and their use in the NAFTA agreement. Chapter IV introduces an empirical specification to analyze the interdependence among these policy instruments used. Chapter V describes the construction of the data set to carry out the econometric exercise. The empirical results are discussed in Chapter VI. A final chapter concludes.

II. NEGOTIATING PREFERENTIAL MARKET ACCESS IN THE AMERICAS: THE TIMING OF THE NAFTA NEGOTIATIONS

Although this paper focuses on the NAFTA negotiations between the United States and Mexico, it raises issues that can easily be extended to the analysis of other FTAs, in particular, those agreements in the Americas which have been modeled after NAFTA. The most immediate precedent of NAFTA was the United States-Canada FTA that was negotiated during the second half of the 1980s and entered into force in 1989. A year later, in August 1990, President Carlos Salinas of Mexico proposed to President Bush the negotiation of a free trade agreement between the United States and Mexico. In September 1990, Canada agreed to join the negotiations. The three party negotiations were formally launched at a Ministerial meeting in June 1991. The agreement was signed a year later, in December 1992, and entered into force on January 1, 1994.[2] In this paper any analysis of the Canadian involvement in the NAFTA negotiations is explicitly excluded since most of the market access issues were not new but rather extensions of the previous agreement with the US.

Since the mid-1980s there has been a growing interest in regional approaches to trade liberalization. Ethier [1998] has used the NAFTA agreement, and in particular the US-Mexico negotiations, as the best example of this "New Regionalism" characterized by the following stylized facts:

- The agreement typically involves a small country linking up with a large country
- The smaller country has made significant unilateral reforms
- The degree of liberalization in the agreement is typically modest
- The liberalization achieved is primarily by the small country
- The agreement often involves "deep" or comprehensive objectives
- The agreement is regional in a geographical sense

In the Americas this "new" regionalism has been an important additional component to broad packages of trade reforms in the region. During this period most countries moved toward substantial market-oriented economic reforms that included, almost without exception, a profound unilateral trade liberalization. In addition, all of this has happened in the context of multilateral trade liberalization commitments around the world, which culminated in the Uruguay Round Agreements in 1994 and the creation of the World Trade Organization in 1995.

It is important to emphasize the timing of the NAFTA negotiations in order to understand its impact on subsequent agreements in the region. The agreement was implemented just a few months short of the signature of the Final Act of the Uruguay Round in Marrakech. Moreover, during the same year, important advances were being made in the Southern Cone in preparation for the creation of MERCOSUR among Argentina, Brazil, Paraguay and Uruguay to be launched on January 1, 1995. Later in the year, in December 1994, the most ambitious initiative for

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[2]   See Mayer [1999] for a political economy analysis of the NAFTA negotiations and Tornell and Esquivel [1995] for a Mexican perspective into the NAFTA negotiations.

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economic integration in the Americas was launched at the Miami Summit of the Americas under the name of the Free Trade Area of the Americas (FTAA). In addition, during the same time period, two key countries in the hemisphere were in the process of consolidating their positions as strategic trade hubs in the region. In the same year as NAFTA was implemented, Mexico was able to secure three important agreements based on the "NAFTA" model: with Costa Rica in April, with Colombia and Venezuela (known as the G-3 Agreement) in June and with Bolivia in September. All three agreements were implemented at the beginning of 1995. For Chile, 1994 marked an acceleration of its efforts to reach a series of bilateral agreements in the hemisphere. This started with Mexico (1991), Venezuela (1992), Colombia (1993), and Ecuador (1994). What followed during this and subsequent years was the initiation of free trade talks with MERCOSUR countries and Canada and the beginning of a second round of negotiations to deepen its agreements with Mexico and Peru. These strategically important agreements would be signed in subsequent years (1996,1997 and 1998, respectively). Although with important differences, the agreements signed by Chile have also progressively become more similar to the NAFTA model.

III.   NEGOTIATING PREFERENTIAL MARKET ACCESS IN NAFTA

There are two basic instruments when approaching market access negotiations under a free trade agreement. The first instrument is the preferential tariff program vis-à-vis the tariff structure applied to other non-member parties on a MFN basis. The second instrument is the system of RoO governing the determination of whether or not a product is originating from the partner country so it can fully benefit from the preferential treatment. To date, we do not have detailed empirical studies analyzing the interdependence that exists between these two key commercial policy instruments when negotiating FTAs.

Preferential Tariffs

Market access in traditional preferential agreements, in particular among Latin American countries, used to be negotiated by means of a fixed preferential tariff below the MFN rates and, in many cases, only for a selected group of products or sectors. Unilateral and multilateral tariff reductions had the effect of progressively eroding preference margins initially agreed upon. To maintain those margins over time countries needed to constantly renegotiate the agreements. Later on, preferential agreements were based on constant relative margins of preference by negotiating preferential tariff reductions as a percentage of the MFN currently applied rates. Most of the "new" FTAs have followed the NAFTA model in many respects, moving towards tariff phase-out programs that are relatively quick, automatic, and nearly universal. The tariff elimination process follows pre-specified timetables ranging from immediate elimination up to generally a 10 year period phase-outs, with special phase-out periods for those products regarded as "sensitive". The negotiations usually start with an agreement on a base rate or base level from which phase out schedules will be applied. Those base rates usually coincide with the MFN applied rates to third parties at the time of negotiations. This was the case, for instance, in NAFTA after initial proposals to use GATT bound rates were rejected. In other cases, it has been necessary to take into account previous preferences negotiated under other agreements in order to establish the initial base rate. These rates can also be subject to negotiations with the aim of beginning the phase-out schedules from lower rates. In a second stage, parties must agree on specific tariff elimination programs or phase-out schedules to bring the initial base rates to zero in a defined time period.

In the case of NAFTA, each country's base rate was based on pre-NAFTA MFN applied tariff rates. Hence, the base tariff rates contained in each party's schedules are different. The average base rate for Mexico was 10 % while the average US rate was about 4%. The second component of the tariff negotiations are the staging categories that identify the time frame over which parties agreed to phase out their respective tariffs. As each party negotiated the time frame over which it would reduce its duties, the agreement includes different staging categories or phase-out programs for the same product in each party's respective schedule. Early in the negotiations the parties agreed to put goods into several categories depending on their sensitivity to import competition, reflecting the magnitude of liberalization effect as well as the political weight of each sector. The four main NAFTA staging categories specifying the number of equal-sized annual cuts until full liberalization were: A (immediate); B (five stages); C (ten stages); C+

(fifteen stages).[3] Additionally, the NAFTA schedules include other categories: D (continued to be duty free) plus some special categories, such as, B+ (seven stages); B6 and B1 (five stages with initial small reductions vis-à-vis large initial reductions); C10 (nine stages). At the time of implementation (January 1, 1994), tariffs for about half of all import categories were eliminated immediately. Most of the remaining tariffs were set to disappear within a period of 5 years. The few exceptions would be eliminated during periods of up to 15 years. Tables 1 to 4 summarize the average tariff cuts by sector effective in 1994, 1997, 2000 and 2003 between Mexico and the United States and Mexico and Canada. The most drastic phase-out was carried out by Mexico with initial cuts above 50 percent on average. The United States, which had started with low tariffs, implemented an almost immediate full tariff liberalization with the exception of specific sensitive sectors, such as food products and textiles, apparel and footwear manufactures.

Rules of Origin

Because of its discriminatory nature, a preferential agreement must distinguish "non-member originating" from "member originating" products in order for a product to be granted preferential access. The growth of international trade in goods that are not manufactured in a single country has made the issue of the rules for determining the "origin" (RoO) of goods traded into one of the most important and complex areas of preferential market access negotiations. Although this has been an area well known to trade lawyers and customs specialists (see for example Vermulst et alt. [1994]) it has just recently caught the attention of economists. The economic analysis of RoO has been relatively limited, both in terms of formal modeling as well as empirical testing. It has been argued, from an analytical point of view, that the way in which RoO are defined and applied within modern preferential agreements plays an important role in determining the degree of protection they confer and the level of distortionary trade effects which they produce (see Hoekman [1993]).

One of the most convincing treatments of the potential "hidden" protectionism of RoO has been elaborated by Krishna and Krueger [1995] who argued that RoO can induce a switch in the sourcing of low cost non-regional to high-cost regional inputs in order for producers to take advantage of the preferential rates. Since the tariff applies to the transaction value of final goods whenever preferences are deep and RoO are restrictive there is an incentive for regional producers to buy intermediate goods from regional sources. So by displacing low-cost intermediate goods from the rest of the world, restrictive rules of origin provide additional protection to regional producers of intermediate goods to the apparent detriment of downstream or final goods producers. This apparent conflict could be explained because of the specific production relations that exist between component producers and users. If the linkages between the different parts of the production chain are very tight, it may be difficult for a foreign final good producer to locate components within the region and remain competitive. In this way, RoO "export protection" both for the intermediate and final goods producers. Moreover, outside producers of intermediate goods hurt by restrictive RoO may have an incentive to move production facilities into the lower-cost country within the region, even though it is not the low

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cost producer worldwide. This situation could potentially distort efficient investment decisions and hinder the liberalizing effects of a FTA.

Conceptually, there are two basic criteria to determine origin. The criterion of "wholly obtained or produced", where only one country enters into consideration in attributing origin, and the criterion of "substantial transformation", where two or more countries have taken part in the production process. The first criteria applies mainly to commodities and related products which have been entirely grown, extracted from the soil or harvested within the country, or manufactured there from any of these products. Such products acquire origin by virtue of the total absence of the use of any second country components or materials. Even a minimal content of imported components will imply losing its qualification of "wholly produced". Most countries have adopted the precise definition contained in the Kyoto convention (Annex D.2) for this criteria.

The "substantial transformation" criteria is the second concept recognized by the Kyoto Convention as a basis on which origin of goods may be determined. The Kyoto Convention does not offer a single approach for defining substantial transformation. One of the goals underlying the NAFTA negotiations on RoO was to develop specific criteria to give more precision to this concept. There are at least three methods in the NAFTA agreement:

- A change in tariff classification, requiring the product to change its tariff heading, CTH, (section, CC; heading, CH; sub-heading, CS; or item, CI) under the Harmonized Commodity Description System (Harmonized System) in the originating country.

- A domestic content rule or regional value content, RVC, requiring a minimum percentage of local value added in the originating country (or setting the maximum percentage of value originating in non-member countries).

- A technical requirement, TECH, prescribing that the product must undergo specific manufacturing processing operations in the originating country.

These methods have been used with different degrees of precision under different FTAs. In the case of agreements negotiated in the Americas, we find at one extreme of this "continuum" traditional agreements where a general rule is being used across the board for all tariff items (e.g., under the traditional LAIA agreements the general RoO that applies across-the-board is based on a Change in Tariff Classification at the heading level or, alternatively, a regional value added of at least 50 percent of the FOB export value). At the other extreme we encounter the type of RoO negotiated under NAFTA which incorporates a general rule plus additional specific rules negotiated at the product level (6 digit HS), combining in many different ways the three methods described above. An immediate precedent with a lower degree of specificity can be found in the FTA agreement between the United States and Canada. RoO negotiated for the G3 agreement, the Mexican bilateral with Costa Rica and Bolivia and the recent Chilean bilateral with Mexico and Canada are also close to the NAFTA model. Meanwhile, rules introduced under the MERCOSUR and MERCOSUR bilateral with Chile and Bolivia, as well as the Central America Common Market RoO, can be considered intermediate models between the two extreme cases (see Garay and Estevadeordal [1996]).

The NAFTA RoO negotiations introduced a highly disaggregated methodology. Aside from the definition of a general rule that applies to all goods based on the concept of "wholly produced or obtained rule" (Art. 401, this rules applies mainly to natural goods, such as minerals, raw

foodstuffs and animals), NAFTA adopted specific rules at the product level (generally using a 6 - Digit HS level of disaggregation). Those specific rules were adopted to close loopholes that might allow third country-producers to obtain NAFTA duties by performing assembly, processing or minimal production operations in the territory of one of the parties. Those rules are extremely comprehensive and detailed and are described in a 150 page Annex using the product definition of the Harmonized System. The criteria used to define origin are based on changes of tariff classification (at the section, heading, subheading or item level with the possibility of including exceptions), regional value content, technical tests or a combination of these criteria.

During the negotiations, "(…) using the NAFTA rules of origin as a means of securing foreign investment was not a primary goal [of the United States]. Instead, the objectives were primarily aimed at preventing third-country participation in the NAFTA preferential tariff benefits, and in providing a system of enforcement. (…). The main concern was that the rules not resulted in a flood of low cost imports into the US market. (…). Like the United States, Mexico was concerned about the effect that the NAFTA would have on its domestic industries. This concern was heightened by the fact that, with the exception of a few industrial giants, e.g., VITRO and CEMEX, Mexican companies had little experience in trading abroad. More importantly, because of restrictions on sales in the Mexican market, Mexican companies had yet to experience competition in the Mexican market by foreign firms. Thus, Mexico was particularly concerned that a reduction of duties would result in a flow of foreign low-cost goods, a circumstance it resolved to prevent through strict rules of origin. Indeed, immediately upon entry into force of the NAFTA, Mexico experienced a huge surge in imports of Chinese products, which Mexico addressed by, among other things, instituting the largest (in terms of tariff items covered) antidumping investigation ever filed and by establishing new certificates of origin requirements for imports of non-preferential merchandise." (Reyna [1995] p. 36-37, 41) .

The structure of the NAFTA RoO is presented in Table 5. The table illustrates the degree of specificity used in the making of the RoO in NAFTA, in particular, for the most sensitive sectors such as autos, electronics and textiles. For these important sectors, the challenge of establishing RoO that restricted the preferential benefits of the agreement to the NAFTA parties without cutting off foreign investment and the availability of foreign materials and components was extraordinary. In the end, the negotiators had to adopt very special rules tailored to the problems of each specific sector. For example, in the case of the textile and apparel sector roughly two thirds of the products require a rule based on a change of section or heading, excluding specific headings (CC/E or CH/E). In fact, for most products the rules do not permit a change in tariff classification from a heading that includes coarse or fine wool, cotton, hair, and natural or man made fibers, the so-called "yarn forward rule" by which in order to qualify as originating, a textile or apparel good must be produced entirely from the yarn spinning stage forward in a NAFTA territory. For another third of products NAFTA rules require a change in tariff classification and that the goods be "both cut, sewn or otherwise assembled in North America" (CH/E/OR). In the case of the automotive sector, the main challenge was the need to establish a regional value content requirement (RVC) acceptable to the three parties and to improve the methods for calculating and verifying the RVC rule.[4] Table 5 shows that almost 50 percent of the products under the category "Fabricated Metal Products, Machinery and equipment" incorporate

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[4]   See Mayer [1999] for a political economy analysis of the NAFTA RoO negotiations in the automotive sector.

a RVC requirement. Similarly, electronic products were also subject to complex RoO negotiations. Generally, those products were subject to three type of rules: (1) a change of tariff classification; (2) a change in tariff classification combined with a regional value content (RVC) requirement; and (3) a rule that either requires or prohibits the incorporation of specific parts, assemblies, or subassemblies.

To conclude this chapter, the interdependence of the two instruments under consideration will be intuitively explored before attempting a more formal approach. Table 6 looks at the NAFTA tariff phase out program from the point of view of the speed of the tariff liberalization process, that is, the number of years that it takes for each party to undertake the full elimination of its tariffs on a bilateral basis with other FTA partners. For example, on average Mexico eliminates its tariffs applied to the United States in about five years, while the United States takes around one year and a half to complete full tariff liberalization vis-à-vis Mexico. Table 7 looks at a simple relationship between the NAFTA phase-out program and the most relevant structural patterns of RoO in the agreement. If RoO is ordered by an "ad hoc" level of restrictiveness (see below for a full discussion on that) we find some degree of correlation between the two instruments. Slow liberalization is associated with higher restrictiveness in terms of origin requirements. From a "narrow" interpretation of the role of RoO as "supporting" instruments in the application of a particular policy (in a general sense, this could apply to either preferential or non-preferential policies) this correlation would suggest that high levels of protection (slow liberalization) are associated with stringent rules to ensure the application of these policies. However, when RoO are viewed as distinctive policy instruments to target the input composition of final products their interaction with the tariff instrument could have a positive or negative correlation. The correlation in Table 7 would suggest a complementarity function, but a more formal statistical approach, like the one introduced in the next chapter, would be needed to establish this relationship. Tables 8 and 9 look further into this relationship by way of disaggregating the same variables by sectors. Although this table attempts to look again at the interplay between the two instruments under consideration, the results are more difficult to interpret. Again, only a formal econometric model can produce a clear answer.

IV.   AN EMPIRICAL SPECIFICATION

In this chapter, I explore the degree of interdependence between the two key instruments in preferential market access negotiations, that is, the preferential tariff phase-out and the RoO, using an ad-hoc econometric model. There are several difficulties with this approach. First, the suggested specification of the model structure is identified "from the ground up," based on insights on how preferential market access negotiations take place in the real world rather than formalizing a theoretical model based on behavioral assumptions of the economic parties involved in those type of negotiations.[5] Second, one of the endogenous variables cannot be observed directly, that is, the real level of restrictiveness implied by the RoO is not "observable". Third, the NAFTA negotiations were a "game" played by three parties in which they agreed to negotiate one of the instruments (preferential tariffs) bilaterally, and the other instrument (RoO) jointly, thereby complicating any interaction analysis. From this perspective, a full model of the negotiating dynamics would have to consider the point of view of all parties simultaneously. In this paper, I restrict my analysis to the interactions between Mexico and the United States negotiations. The non-inclusion of the Canadian strategy can be justified on several grounds. Most importantly, Canada joint the NAFTA negotiations in order to preserve some of the gains achieved under the US-Canada FTA. While maintaining the bilateral preferential tariff structure with the United States negotiated under the previous FTA, Canada negotiated new RoO with the other two NAFTA partners. The preferential structure with Mexico is summarized in Tables 3 and 4.

In this chapter I introduce an econometric specification where one of the endogenous variables is an *ordered categorical variable* (an index of restrictiveness of RoO) and the other is a regular *continuous variable* (the "speed" of preferential liberalization or the number of years to full intra-area liberalization).[6] A number of trade related variables will be used as independent (and instrumental) variables, i.e., the levels of intra-industry trade, the import and export ratios, the MFN tariff differentials to third parties, the initial preferential margin and, finally, other party's offers of tariff liberalization.

To carry out this exercise, I use a non-traditional simultaneous structure where, in the first equation, the *latent values* (that is, the real unobserved values) of the <u>endogenous categorical variable</u> – <u>RoO</u> - depends on some exogenous variables. Remember that this is the variable that is determined jointly by the parties participating in the negotiations. Therefore, the explanatory variables to be included must represent structural factors that determine how the parties jointly agree on a common set of RoO under the agreement. In turn, in the second equation, the <u>continuous endogenous variable</u> - <u>Preferential Tariff Phase-Outs</u> - is assumed to be a function not of the actual observed values of the categorical variable (RoO) but rather of their real or *latent* intensity indices, as well as an additional set of other explanatory factors. Since this variable is country specific we estimate equations for each of the parties participating in the negotiations

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[5]   It would be possible to justify an econometric specification such as the one used in this paper based on contributions from some recent theory literature modeling negotiation dynamics.

[6]   The approach taken in this paper follows a tradition of empirical research on explaining tariff negotiations. A good survey of the literature and a close empirical application to the NAFTA tariff negotiations is Kowalczyk and Davis [1998]. Although their interest is on testing for reciprocity in tariff negotiations using standard regression methods, their empirical approach is similar to the one taken in this paper.

(Mexico and the United States). The proposed modeling feature is appropriate in this case since the categories associated with the data for the endogenous categorical variable are an artifact of the way the codification of the RoO was conducted (see below -Chapter V- for a detailed description on how RoO data was constructed). The model can be represented with the following equations (alternative specifications are discussed in the Appendix):

$$y_1^* = \beta_1' X_1 + \upsilon_1 \qquad\qquad [1.1]$$

$$y_{2i}^* = \gamma_{2i} y_1^* + \beta_{2i}' X_{2i} + \upsilon_{2i} \qquad\qquad [1.2]$$

Where the latent variable y_1^* is the *latent* level of restrictiveness of RoO, y_2^* is a continuous variable measuring the number of years to liberalization and X_1 and X_2 are vectors of the explanatory variables independently distributed from the error terms υ_1 and υ_2. These υ_1 and υ_2 are supposed to be jointly normally distributed with mean zero and a positive definite variance matrix $\Sigma = [\sigma]$. The sub-index i is included as a reference to the separate country specific equations to be estimated.[7]

In this model the influence on the depth or speed of preferential tariff liberalization is attributed to the real or *latent* indices of restrictiveness imposed by the RoO rather than the observed level of restrictiveness of the RoO. The codification of the RoO data (Chapter V) simply acts as a constraint on the information available to the analyst. Remember that most RoO are designed on the basis of some very specific sector analysis (generally this information will be provided directly by the private sector) of their effects in the medium to long run since such rules are not generally phased-out over time in these types of agreements. Then, independent of the degree of liberalization negotiated for a product, the rule will still be operative after the market has been fully open to all FTA members. Therefore, it has to be designed, to a certain degree, independently of the preferential liberalization program granted to each specific product. However, information on the degree of restrictiveness of the RoO will usually be part of the "information set" used by the tariff negotiator. The presence of a very restrictive RoO could be used as an additional protective measure to a slow liberalization program or a compensatory mechanism to a faster liberalization schedule. Under this specification, the underlying reduced form can be easily derived explicitly in terms of the *latent* variable and the estimation admits a two-stage procedure as in Amemiya [1978, 1979] and Nelson and Olsen [1978].

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[7]   Note that the full model will require a simultaneous estimation of (i +1) equations. The first equation is a RoO equation to explain the joint negotiation of a common RoO regime on the basis of several structural variables. Second, i-country specific equations, where each preferential tariff phase-out of country i to j is explained in terms of some country specific factors, as well as the common RoO variable. Because of the econometric complexities of the estimation procedure of (i +1) equations, where one of the endogenous variable is a categorical variable, this estimation approach will be attempted in future work.

V. DATA

This chapter briefly describes issues regarding data construction. Our data set focuses on information regarding the NAFTA negotiations between Mexico and the United States. The database is constructed at the 6-Digit level of the Harmonized System. At this level of product disaggregation the following variables were constructed.

First, the degree or speed of preferential tariff liberalization is being measured by the number of years to achieve zero intra-agreement tariffs. This variable is given by the phase-out schedule of the NAFTA agreement. According to the structure of the liberalization program, each product line at 8 digit HS (or in some cases at 10-digit) is associated with a specific phase-out program. When this data is averaged out at the 6-digit level we get a continuous variable for the number of years to liberalization.

Second, I construct an index of the level of restrictiveness of the NAFTA rules of origin to be used as the observability rule for the ordered categorical variable in the first equation of the model. Rules of origin in the NAFTA agreement were negotiated at the product level (mostly at the 6-Digit tariff line level) and were defined using the three methods described in Chapter III, that is, a Change of Tariff Heading (CTH), a Regional Value Content (RVC), or a Technical Requirement (TECH). The first criteria can be specified requiring a change at the section level (2-Digit HS), heading level (4-Digit HS), sub-heading level (6-Digit HS), or item level (higher than 6-Digit HS), with the possibility of including specific exceptions. The three methods could also be combined under the same RoO, for example, a change of subheading plus a specific regional value content. Moreover, there are many cases where the agreement defines alternative RoO for the same product. To obtain this restrictiveness index we first codify each rule or set of rules according to those different criteria.[8] Then, a qualitatively ordered index is constructed under the following assumptions. First, a change of tariff classification at the section level tends to be more stringent than at the heading level, a change at the heading level more than at the subheading level, and so on. Second, a regional content requirement adds more restrictiveness to a given rule, as does the technical requirement. For each pair (or sometimes trio) of alternative rules being applied to the same product, we selected the one with the higher restrictiveness index. Finally, I construct the categorical variable RoO (y_1^*) assigning to each 6-Digit HS product category an ordered numerical value according to the following observation rule:[9]

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[8] This methodology was developed in Garay and Estevadeordal [1996]. Due to the heterogeneous ways in which RoO are administratively expressed it is empirically difficult to construct a restrictiveness index. Cordoba [1996] expresses NAFTA RoOs in a homogeneous form computing the equivalent regional content requirement as a percentage of the transaction value of a given exported good using direct consultations with the private sector. A similar approach using census information on the relative participation of the cost of non-regional inputs, in the case of RoO based on change of tariff classification has been used for Colombia under the G-3 Agreement in Garay and Quintero [1998]. Estevadeordal and Miller [1999] construct a "revealed" restrictiveness index for Canada under NAFTA RoO based on NAFTA Preferential Utilization rates. Whenever those indexes are made available they can easily be used in the econometric specification of this paper.

[9] The benchmark levels of restrictiveness (1 to 7) were chosen on the basis of the most frequent combinations of the RoO in the NAFTA agreement.

y = 1	if $y^* \leq$ CTH (Item)
y = 2	if CTH (Item) $< y^* \leq$ CTH (Sub-heading)
y = 3	if CTH (Sub-heading) $< y^* \leq$ CTH (Sub-heading) & RVC
y = 4	if CTH (Sub-heading) & RVC $< y^* \leq$ CTH (Heading)
y = 5	if CTH (Heading) $< y^* \leq$ CTH (Heading) & RVC
y = 6	if CTH (Heading) & RVC $< y^* \leq$ CTH (Section)
y = 7	if CTH (Section) $< y^* \leq$ CTH (Section) & TECH

Third, I consider several explanatory (and instrumental) variables. To measure the depth of tariff liberalization I construct a measure of the initial preferential margin between parties *ij* as the relative margin between the respective MFN applied rate to third countries vis-à-vis the initial preferential rate applied to the FTA partner. I report the average values of this measure at the sector level in table 10. The variable is defined as follows:

$$PRE\text{-}MAR_{ij} = [\{(1 + MFN_i \, Tariffs) \, / \, (1 + PREFERENTIAL_{ij} \, Tariffs \, in \, 1^{st} \, year)\}\text{-}1] \; x \; 100$$

To account for trade deflection effects, I compute a measure of the absolute value of the spread between each party's MFN rates and third country rates as follows:

$$MFN\text{-}DIF_{ij} = \left| \, [\{(1 + MFN_i) \, / \, (1 + MFN_j)\}\text{-}1] \; x \; 100 \, \right|$$

To illustrate the MFN differential, Table 11 reports several statistics on the simple difference between Mexican and United States rates as well as the average values of the MFN-DIF variable. Finally, I compute several trade-based measures (using average data for the pre-NAFTA period 1990 – 1992) to be included as additional independent factors in our econometric estimation. In particular, I compute Grubel-Lloyd intra-industry indices as well as import and export ratios. The average intra-industry indices constructed at 3-Digit levels of disaggregation are reported by sector in Table 12.

VI. EMPIRICAL RESULTS

The proposed structural specification of equation [1.1] and [1.2] can be estimated using the following variables:

$ROO\text{-}RI = f_1\ (MFN\text{-}DIF,\ IIT\text{-}ME\text{-}US,\ IIT\text{-}ME\text{-}RoW,\ IIT\text{-}US\text{-}RoW)$ [1.1]

$YE\text{-}ME\text{-}US = f_2\ (ROO\text{-}RI,\ YE\text{-}US\text{-}ME,\ PRE\text{-}MAR\text{-}ME,\ IMP\text{-}RAT\text{-}ME,\ EXP\text{-}RAT\text{-}ME)$ [1.2A]

$YE\text{-}US\text{-}ME = f_3\ (ROO\text{-}RI,\ YE\text{-}ME\text{-}US,\ PRE\text{-}MAR\text{-}US,\ IMP\text{-}RAT\text{-}US,\ EXP\text{-}RAT\text{-}US)$ [1.2B]

Where:

ROO-RI = Rules of Origin (RoO) Restrictiveness Index

MFN-DIF = Most Favored Nation Tariffs Differential between Mexico and United Sates

IIT-ME-US = Intra-Industry Trade between Mexico and United States (1990-92)

IIT-ME-RoW = Intra-Industry Trade between Mexico and Rest of the World (1990-92)

IIT-US-RoW = Intra-Industry Trade between United States and Rest of the World (1990-92)

YE-ME-US = Years to liberalization of Mexico to United States under NAFTA

YE-US-ME = Years to liberalization of United States to Mexico under NAFTA

PRE-MAR-ME = Initial Preferential Margin of Mexico vis-à-vis United Sates

PRE-MAR-US = Initial Preferential Margin of United States vis-à-vis Mexico

IMP-RAT-ME = Mexican Imports from United States relative to total Mexico's trade (1990-92)

EXP-RAT-ME = Mexican Exports to United States relative to total Mexico's trade (1990-92)

IMP-RAT-US = United States Imports from Mexico relative to total U.S. trade (1990-92)

EXP-RAT-US = United States Exports to Mexico relative to total U.S. trade (1990-92)

Following the methodological discussion outlined in Chapter IV, the estimation proceeds in two stages. First, I estimate equation [1.1] using an ordered probit regression of the categorical variable "Rules of Origin (RoO) Restrictiveness Index (ROO-RI)" using instrumental variables. This dependent variable is constructed under a specific "observability rule" described in the previous chapter. This estimation allows me to obtain the predicted values for the index of restrictiveness of RoO as a continuous indicator, which will in turn be used to estimate sequentially equation [1.2A] and [1.2B] using standard OLS procedures.[10] The results can be found in Tables 13 and 14.

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[10] See Footnote 7 on the econometric approach of this paper. I do not attempt to estimate simultaneously equation [1.2A] and [1.2B] jointly with [1.1]. The reason being that in order to use the two-stage estimation procedure as in Amemiya [1978, 1979] and Nelson and Olsen [1978], it is preferable to consider two separate models: the Mexican model represented by equation [1.1] and [1.2A] and the U.S. model represented by equations [1.1] and [1.2B].

In Table 13, I report the results of the ordered probit estimation of the RoO equation [1.1]. The overall results confirm that the structure of trade barriers to members and non-members as well as other structural trade related variables are important factors in explaining the level of restrictiveness built-in the common RoO regime. First, I obtain very significant results in favor of the hypothesis about the role of RoO in preventing "trade deflection". The higher the absolute spread between Mexican and U.S. tariffs to third parties (MFN-DIF), the higher is the restrictiveness built-in the RoO. Since Mexican MFN tariffs were higher than U.S. MFN tariffs for most products, the positive and significant coefficient of MFN-DIF may reflect the fact that some Mexican and U.S. producers tried to avoid cheap competing imports of inputs from third parties to be shipped through the U.S. into Mexico. Those products could then be used as intermediate inputs in the production of final goods in Mexico to be reexported to the U.S. An additional interpretation, not mutually exclusive, is that high levels of RoO restrictiveness are associated with high initial protection rates. Since the U.S. rates are, for the most part, low and relatively uniform, the MFN-DIF acts as a proxy for the initial Mexican base rates, which we do not introduce independently in our equation to avoid a multicolinearity problem.[11] The intra-industry variables are introduced as proxies for the degree of intra-industry linkages between the two economies. I introduce three potential measures of the linkages between them: intra-area linkages and individual party linkage vis-à-vis the rest of the world (IIT-ME-US, IIT-ME-RoE and IIT-US-RoW).[12] All the variables are statistically significant. In the first case, that is, the intra-industry trade variable between Mexico and the United States, the coefficient is positive. This can be interpreted as the incentive to preserve existing intra-industry complementarity between Mexico and the U.S. through higher levels of restrictiveness based on origin determination for those sectors. At the same time, the data shows a positive and strong correlation between RoO and the IIT-ME-RoW. Sectors with higher levels of intra-industry trade between Mexico and the rest of the world may indicate a higher potential for outsourcing by Mexican producers that can hinder regional interests in becoming the primary source for inputs in those industries. In the case of the index of the intra industry trade between the U.S. and the rest of the world the coefficient is significant and negative. As is the case with the previous indicator, many different forces may be at work behind these correlations, and the net effect will depend upon the relative strength of such forces. In this case, a plausible explanation may be the fact that US sectors with higher intra industry linkages with other non-NAFTA members may want to preserve their sources of foreign outsourcing while at the same time keeping their presence in a larger preferential market. Also, in the case of the U.S., sectors with high levels of intra-industry trade with the rest of the world may indicate the presence of a competitive sector that would eventually lobby for fast access to FTA partner markets. These are not, in any way, the only single explanations, but rather signal to potential mechanisms in the complex operation of this commercial instrument that targets primarily intermediate and input goods trade. A more disaggregated analysis is needed to capture some sector specific explanations. Nevertheless, the first key finding of this paper is clear: the structure of the RoO is highly correlated with the MFN tariff differential as well as different measures of industry linkages existing between FTA members and non-member countries.

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[11] This correlation appears in the data when a measure of national tariff rates are introduced in the equation. This relationship between RoO and protection through tariffs will also appear when estimating the second equation of the model.

[12] The correlation among intra-industry indices is very low: 0.17 between IIT-ME-US and IIT-ME-RoW; -0.03 between IIT-ME-US and IIT-US-RoW; and 0.08 between IIT-ME-RoW and IIT-US-RoW.

Equation [1.2] is estimated separately for each country using standard OLS techniques. Table 14 reports the results for Mexico's preferential liberalization program towards the US and viceversa. The results can be summarized as follows. First, the degree of restrictiveness of the RoO (ROO-RI) is an important factor in explaining the policy formation of the central instrument in preferential tariff negotiations, that is, the depth or speed of tariff liberalization among FTA members. These estimates show that the degree of reciprocal liberalization between Mexico and the United States (YE-ME-US and YE-US-ME) are positively and significantly correlated with the RoO restrictiveness index (ROO-RI). This is the second key result of the paper: origin matters when determining the preferential liberalization scheme. RoO, when considered across all tariff universe, act as an additional instrument to the preferential tariff liberalization. Products that are under a slow liberalization program carry more restrictive rules of origin. This is a strong result that views RoO as an independent endogenous instrument in FTA tariff negotiations with a "complementary" role in the design of a discriminatory tariff policy. A more sophisticated interpretation of this result is the existence of a "substitution" post-liberalization effect. Once tariffs have been completely phased out, the origin requirements will still remain, thereby implying that the degree of "protection" attached to the rules will remain in place: products that are relatively more protected (slow liberalization, high initial tariffs) will still be subject to more restrictive rules. The other key explanatory variables in these equations are the initial level of the preferential margins. Both variables enter into the equation with negative and significant signs. For example, consider the case of the Mexico equation. One would expect that higher margins of preference for Mexico vis-à-vis the United States are good proxies for sectors with higher protectionist interests, that is, sectors seeking slow liberalization programs. However, higher margins of preference may well indicate sectors that are already relatively open to the US vis-à-vis a third party, and therefore further degrees of liberalization may be expected. In addition, lower margins of preference, given the higher tariffs of Mexico, indicate sectors protected from outside parties as well as from the U.S. One could then expect that efforts will be made to keep barriers high for those sectors (slow liberalization). Finally, the import and export ratios both have a positive and significant impact on the degree of liberalization, except in the case of the U.S. import ratio where the coefficient is not significant. The import ratio effect may capture some well-known empirical results of the endogenous protection literature. In response to increased import competition, domestic interests will intensify its lobbying activity for protection; that is, higher import ratios will lead to demands for slow liberalization[13]. However, some models à la Grossman and Helpman [1994] predict a negative relation, arguing that the higher the import demand the higher the cost for the government to introduce a tariff distortion in that sector. Maggi and Rodriguez [1998] develop a model in which the government uses trade distortionary instruments (quotas, VERs) other than tariffs, predicting that the protection level increases with import penetration in sectors that are protected with tariffs and in sectors that are protected with quantitative restrictions. An interesting line of research would be to try to extend this type of result in a model à la Ju and Khrisna [1998] with RoO. The results in this chapter are still preliminary, waiting for a more disaggregated sector analysis to capture different negotiating dynamics when specific sectors are analyzed.

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[13]   Note that our variable is a proxy for import penetration instead of a imports/domestic consumption measure.

VII. CONCLUSIONS

In this paper I use a non-traditional simultaneous econometric specification and a newly constructed data set to explain the interaction between two key market access instruments when negotiating FTAs. In particular, I examine the policy design of the Preferential Tariff Phase-Outs and the Rules of Origin (RoO) during the NAFTA negotiations between Mexico and the United States. Under the preferred model, the first result of the paper is that RoO are instruments against trade deflection. The greater the difference between Mexican and US MFN tariffs, the higher the incentives for trade deflection and, therefore, the higher the degree of restrictiveness imposed by RoO. Moreover, proxy variables for industry linkages between the two economies play an important and significant role as fundamental explanatory factors of the structure of RoO. The simultaneous structure of the model also shows that the degree of preferential tariff liberalization between the NAFTA partners is highly and significantly correlated with the degree of restrictiveness of RoO. Sectors with higher RoO are also the ones with longer phase out periods for tariff liberalization. In other words, borrowing the language of the endogenous protection literature, one could conclude that the same forces that push for tariff protection also push for more restrictive RoO. I interpret this result as evidence that in FTA negotiations, RoO and preferential tariffs are both primary policy instruments for market access negotiations.

APPENDIX

Since I have not started with a fully developed theoretical model and my main interest is to conduct a thorough data analysis it is important to be explicit about other alternative approaches to the particular econometric specification used in this paper. First, let's consider the following alternative model:

MODEL A

$$y_1{}^* = \beta_1' \, X_1 + \upsilon_l \qquad\qquad\qquad [1.1\ a]$$

$$y_{2i}{}^* = \gamma_{2i} \, y_1 + \beta_{2i}' \, X_{2i} + \upsilon_{2i} \qquad\qquad [1.2\ a]$$

This specification would implicitly assume that the observability rule used to construct the RoO variable (see Chapter V) also acts as a constraint on the tariff negotiator's choice set as well as to the analyst. That is, the model would imply that the tariff negotiator would only be using the "simple" codification of RoO in her negotiating strategy for preferential tariff liberalization. This may be true in some cases. However, the original model is preferable for several reasons. First, the actual information made available to the negotiators, mostly through private sector inputs in this type of negotiations on RoO, is much more sophisticated and complete than the simplified codes used here for computational purposes. Second, this alternative specification would have some non-trivial estimation problems (see Blundell and Smith [1994]).

There is another alternative specification when considering that the continuous endogenous variable (Preferential Tariff Phase-Out programs negotiated by each party) enters as an explanatory variable in the RoO equation. From a game-theoretical point of view, this is a plausible alternative to modeling a negotiating process where years of liberalization and rules of origin are negotiation outcomes that are jointly determined. The model could be written as follows:

MODEL B

$$y_1{}^* = \gamma_1' \, Y_{2i}{}^* + \beta_1' \, X_1 + \upsilon_l \qquad\qquad [1.1\ b]$$

$$y_{2i}{}^* = \gamma_{2i}' \, y_1{}^* + \beta_{2i}' \, X_{2i} + \upsilon_{2i} \qquad\qquad [1.2\ b]$$

Where $Y_{2i}{}^*$ is the vector of years to liberalization for each country. However, as argued earlier this is a somewhat less appealing model on economic grounds. Moreover, from an econometric point of view, while the system represented by equation [1.1b] and [1.2b] could in principle be estimated by standard maximum likelihood methods, the resulting likelihood function is extremely non-linear and thus difficult to maximize using standard methods. This joint estimation feature will be explored in future research.

TABLE 1
PREFERENTIAL TARIFF LIBERALIZATION IN NAFTA BY ISIC REV.3 SECTORS: MEXICO TO UNITED STATES

	Base Rate (MFN)	1994	1997	2000	2003
(01) Agriculture	11.52	2.39	1.19	.48	.00
(02) Forestry	10.98	1.84	.67	.27	.00
(05) Fishing	18.54	4.68	1.46	.59	.00
(10) Coal	10.00	.00	.00	.00	.00
(11) Petroleum	7.50	6.00	3.75	1.50	.00
(12) Uranium	10.00	.00	.00	.00	.00
(13) Metal Ores	8.93	.86	.00	.00	.00
(14) Other Mining	9.95	.79	.39	.16	.00
(15) Food Products	15.77	7.77	4.12	1.66	.01
(16) Tobacco	36.67	22.92	22.50	9.17	.00
(17) Textiles	15.60	9.71	2.99	.37	.00
(18) Apparel	19.63	10.52	3.39	.51	.00
(19) Leather and Footwear	15.80	6.07	3.23	1.29	.00
(20) Wood	16.70	8.03	2.33	.93	.00
(21) Paper	9.39	3.82	1.68	.66	.00
(22) Publishing and Printing	10.18	1.91	.94	.38	.00
(23) Coke and Petroleum	8.32	4.65	2.16	.86	.00
(24) Chemicals	10.79	4.07	2.16	.84	.00
(25) Rubber	15.31	9.72	4.64	1.82	.00
(26) Other Non-Metallic	15.59	5.77	1.99	.79	.00
(27) Basic Metals	10.08	5.88	3.14	1.26	.00
(28) Fabricated Metals	10.64	8.14	3.49	1.40	.00
(29) Machinery and Equipment	10.26	4.05	1.29	.51	.00
(30) Office and Computing	10.75	1.48	.00	.00	.00
(31) Electrical Machinery	10.40	7.80	3.92	1.57	.00
(32) Radio, TV, Communications	11.03	1.53	.25	.10	.00
(33) Medical, Precision Instr.	10.51	1.73	.56	.22	.00
(34) Motor Vehicles	10.36	6.49	2.30	.92	.00
(35) Other Transport Equip.	10.01	3.09	1.28	.51	.00
(36) Furniture	12.40	5.29	1.46	.55	.00

Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 2
PREFERENTIAL TARIFF LIBERALIZATION IN NAFTA BY ISIC REV. 3 SECTORS: UNITED STATES TO MEXICO

	Base Rate (MFN)	1994	1997	2000	2003
(01) Agriculture	1.32	.93	.63	.43	.24
(02) Forestry	.93	.25	.06	.00	.00
(05) Fishing	.25	.00	.00	.00	.00
(10) Coal	.00	.00	.00	.00	.00
(11) Petroleum	.00	.00	.00	.00	.00
(12) Uranium	.00	.00	.00	.00	.00
(13) Metal Ores	.00	.00	.00	.00	.00
(14) Other Mining	1.17	.00	.00	.00	.00
(15) Food Products	2.43	2.54	1.57	.78	.07
(16) Tobacco	.00	.00	.00	.00	.00
(17) Textiles	9.21	7.12	3.05	.20	.00
(18) Apparel	8.82	5.18	2.39	.40	.00
(19) Leather and Footwear	7.22	4.53	3.21	1.92	.71
(20) Wood	2.01	.19	.12	.06	.00
(21) Paper	1.76	.03	.01	.00	.00
(22) Publishing and Printing	1.40	.00	.00	.00	.00
(23) Coke and Petroleum	.71	.09	.03	.01	.00
(24) Chemicals	3.32	.59	.32	.12	.00
(25) Rubber	3.08	.30	.17	.07	.00
(26) Other Non-Metallic	4.66	1.00	.74	.50	.26
(27) Basic Metals	4.03	2.09	1.37	.68	.00
(28) Fabricated Metals	3.52	.19	.12	.06	.00
(29) Machinery and Equipment	2.86	.14	.08	.04	.00
(30) Office and Computing	2.40	.00	.00	.00	.00
(31) Electrical Machinery	3.24	.05	.02	.00	.00
(32) Radio, TV, Communications	3.97	.30	.16	.07	.00
(33) Medical, Precision Instr.	3.46	.04	.01	.00	.00
(34) Motor Vehicles	2.24	1.72	.97	.43	.00
(35) Other Transport Equip.	4.25	.33	.22	.11	.00
(36) Furniture	4.20	.13	.05	.01	.00

Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 3

PREFERENTIAL TARIFF LIBERALIZATION IN NAFTA BY ISIC REV.3 SECTORS:

MEXICO TO CANADA

	Base Rate (MFN)	1994	1997	2000	2003
(01) Agriculture	11.52	2.05	1.04	.41	.00
(02) Forestry	10.98	1.84	.67	.27	.00
(05) Fishing	18.54	4.68	1.46	.59	.00
(10) Coal	10.00	.00	.00	.00	.00
(11) Petroleum	7.50	6.00	3.75	1.50	.00
(12) Uranium	10.00	.00	.00	.00	.00
(13) Metal Ores	8.93	.86	.00	.00	.00
(14) Other Mining	9.95	.79	.39	.16	.00
(15) Food Products	15.77	6.70	3.47	1.40	.01
(16) Tobacco	36.67	22.92	2.50	9.17	.00
(17) Textiles	15.60	11.56	7.06	.18	.00
(18) Apparel	19.63	14.64	9.01	3.61	.00
(19) Leather and Footwear	15.80	6.82	3.73	1.45	.00
(20) Wood	16.70	8.09	2.49	1.00	.00
(21) Paper	9.39	3.82	1.71	.66	.00
(22) Publishing and Printing	10.18	1.91	.94	.38	.00
(23) Coke and Petroleum	8.32	4.65	2.16	.86	.00
(24) Chemicals	10.79	4.06	2.24	.82	.00
(25) Rubber	15.31	9.71	4.76	1.82	.00
(26) Other Non-Metallic	15.59	5.29	1.41	.56	.00
(27) Basic Metals	10.08	5.88	3.14	1.26	.00
(28) Fabricated Metals	10.64	8.22	3.54	1.42	.00
(29) Machinery and Equipment	10.26	4.05	1.30	.52	.00
(30) Office and Computing	10.75	1.48	.00	.00	.00
(31) Electrical Machinery	10.40	7.80	3.93	1.57	.00
(32) Radio, TV, Communications	11.03	1.53	.25	.10	.00
(33) Medical, Precision Instr.	10.51	1.73	.56	.22	.00
(34) Motor Vehicles	10.36	6.49	2.30	.92	.00
(35) Other Transport Equip.	10.01	3.09	1.28	.51	.00
(36) Furniture	12.40	5.50	1.73	.63	.00

Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 4

PREFERENTIAL TARIFF LIBERALIZATION IN NAFTA BY ISIC REV. 3 SECTORS:

CANADA TO MEXICO

	Base Rate (MFN)	1994	1997	2000	2003
(01) Agriculture	1.46	.36	.10	.01	.00
(02) Forestry	.25	.10	.02	.00	.00
(05) Fishing	.65	.18	.12	.06	.00
(10) Coal	1.46	.00	.00	.00	.00
(11) Petroleum	5.67	1.46	.98	.49	.00
(12) Uranium	.00	.00	.00	.00	.00
(13) Metal Ores	.00	.00	.00	.00	.00
(14) Other Mining	2.53	.01	.00	.00	.00
(15) Food Products	7.10	1.99	.70	.17	.02
(16) Tobacco	15.10	8.05	3.02	.00	.00
(17) Textiles	17.15	13.12	9.65	4.75	.00
(18) Apparel	22.96	19.78	13.05	6.48	.00
(19) Leather and Footwear	14.82	9.39	6.13	3.01	.00
(20) Wood	5.31	2.09	.92	.31	.00
(21) Paper	6.85	1.96	.98	.39	.00
(22) Publishing and Printing	5.34	1.23	.59	.23	.00
(23) Coke and Petroleum	3.57	1.58	.87	.38	.00
(24) Chemicals	8.17	1.69	.88	.37	.00
(25) Rubber	12.29	6.55	3.40	1.41	.00
(26) Other Non-Metallic	7.72	1.58	.48	.07	.00
(27) Basic Metals	7.20	4.09	2.56	1.23	.00
(28) Fabricated Metals	9.55	3.88	1.69	.57	.00
(29) Machinery and Equipment	6.33	.84	.31	.08	.00
(30) Office and Computing	2.88	.00	.00	.00	.00
(31) Electrical Machinery	9.36	3.57	1.24	.27	.00
(32) Radio, TV, Communications	6.68	.38	.10	.00	.00
(33) Medical, Precision Instr.	6.21	1.11	.32	.03	.00
(34) Motor Vehicles	7.90	3.79	2.12	.93	.00
(35) Other Transport Equip.	10.54	3.92	2.29	1.04	.00
(36) Furniture	10.11	3.51	1.75	.68	.00

Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 5
STRUCTURE OF RULES OF ORIGIN IN NAFTA (ALL PRODUCTS AND MANUFACTURING SECTORS)
(Percentage of Tariff Items in Each Category)

		All Products	Food Mfg.	Textiles Mfg.	Wood Mfg.	Paper Mfg.	Chemicals Mfg.	Non-Metallic Min. Prod. Mfg.	Basic Metal Industries Mfg.	Fabricated Metal Prod. & Machinery & Equipment	Other Mfg. Industries
RULES OF ORIGIN BASED ON CHANGE OF CHAPTER	CC	27.0	81.7	5.6	8.6	64.1	4.8	56.5	35.4	7.4	43.2
	CC/E	5.8	6.9	31.8	1.4		1.9				
	CC/E/OR	5.7		33.4							
	CC or CH/E/RVC	1.3					2.2		5.5	2.6	8.9
	CC or CH/E/RVC	1.1			22.9						11.2
	CC/E or CS/E/RVC	11.2					56.6				
	SUBTOTAL	52.1	88.6	70.8	32.9	64.1	65.5	56.5	40.9	10.0	63.3
RULES OF ORIGIN BASED ON CHANGE OF HEADING	CH	7.9	1.9		61.4	5.2	1.5	5.2	4.5	17.6	20.7
	CH/E	14.2	5.0	25.8	5.7	30.1	6.4	31.8	53	9.2	13.6
	CH/RVC	3.1		1.9			12.0			4.1	1.8
	CH or RVC									1.4	
	CH or CH/RVC										
	CH or CS/RVC	6.9								1.7	
	CH or CS/E/RVC		1.3				4.8			27.4	
	CH/E or CH/E/RVC	1.9								7.1	
	CH/E or CS/E/RVC						1.7				
	CH/E or CI/RVC									1.3	
	CH/E or CI/E/RVC									1.1	
	SUBTOTAL	34.0	8.2	27.7	67.1	35.3	26.4	37.0	57.5	70.9	36.1
RULES OF ORIGIN BASED ON CHANGE OF SUBHEADING	CS	1.3						1.3		4.4	
	CS/E							3.8		5.8	
	CS or CS/RVC						2.4				
	SUBTOTAL	1.3					2.4	5.1		10.2	
	TOTAL	87.4	96.8	98.5	100.0	99.4	94.3	98.6	98.4	91.1	99.4

Notes: Only percentages above 1% of the total are reported. The following abbreviations are used (see text): CC: Change of Chapter; CH: Change of Heading; CS: Change of Subheading; CI: Change of Item; E: Change of Tariff Classification including exceptions; OR: Other Technical Requirements; RVC: Regional Value Content Criteria.

Source: Author's calculations based on the official text of the NAFTA agreement.

TABLE 6

AVERAGE YEARS TO LIBERALIZATION IN NAFTA BY ISIC REV. 3 SECTORS

	Mexico to United States	United States to Mexico	Mexico to Canada	Canada to Mexico
(01) Agriculture	2.46	1.00	2.19	1.20
(02) Forestry	2.57	.55	2.57	.12
(05) Fishing	3.15	.20	3.15	.29
(10) Coal	1.00	.00	1.00	.14
(11) Petroleum	7.50	.50	7.50	4.00
(12) Uranium	1.00	.00	1.00	.00
(13) Metal Ores	1.50	.38	1.50	.00
(14) Other Mining	1.73	.40	1.73	.21
(15) Food Products	6.29	1.71	5.66	3.67
(16) Tobacco	10.00	1.75	10.00	4.17
(17) Textiles	5.35	4.71	7.51	6.84
(18) Apparel	4.92	4.09	9.34	9.42
(19) Leather and Footwear	5.16	4.96	5.67	6.63
(20) Wood	5.29	.92	5.37	3.33
(21) Paper	4.87	.56	4.88	3.27
(22) Publishing and Printing	2.44	.50	2.44	1.65
(23) Coke and Petroleum	5.53	.35	5.53	2.12
(24) Chemicals	4.37	1.36	4.40	2.68
(25) Rubber	7.16	1.35	7.20	6.86
(26) Other Non-Metallic	4.09	1.88	3.74	1.68
(27) Basic Metals	6.58	5.13	6.58	5.50
(28) Fabricated Metals	5.78	1.29	5.82	5.06
(29) Machinery and Equipment	3.36	1.00	3.36	1.66
(30) Office and Computing	1.58	.70	1.58	.16
(31) Electrical Machinery	6.43	.88	6.43	4.16
(32) Radio, TV, Communications	1.71	1.05	1.71	.80
(33) Medical, Precision Instr.	2.10	.95	2.10	1.34
(34) Motor Vehicles	4.85	2.13	4.85	6.03
(35) Other Transport Equip.	3.15	1.14	3.15	2.87
(36) Furniture	3.43	1.03	3.65	3.87

Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 7

YEARS TO LIBERALIZATION AND RULES OF ORIGIN IN NAFTA

	Mexico to United States	United States to Mexico	Mexico to Canada	Canada to Mexico
CTH (Item)	1.75	1.00	1.75	2.50
CTH (Sub-heading)	2.65	1.21	2.65	1.41
CTH (Sub-heading) & RVC	2.28	.52	2.28	1.11
CTH (Heading)	4.90	2.28	5.11	4.56
CTH (Heading) & RVC	4.71	1.68	4.79	4.36
CTH (Chapter)	4.34	1.72	4.47	6.46
CTH (Chapter) & TECH	5.23	4.40	9.61	9.44

Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 8

YEARS TO LIBERALIZATION AND RULES OF ORIGIN IN NAFTA BY ISIC REV. 3 SECTORS: MEXICO TO UNITED STATES

	CTH (Item)	CTH (Sub-Heading)	CTH (Sub-Heading) & RVC	CTH (Heading)	CTH (Heading) & RVC	CTH (Chapter)	CTH (Chapter) & TECH
(01) Agriculture						2.46	
(02) Forestry				5.74		1.16	
(05) Fishing						3.15	
(10) Coal						1.00	
(11) Petroleum				6.67		10.00	
(12) Uranium						1.00	
(13) Metal Ores						1.50	
(14) Other Mining			1.00	10.00		1.63	
(15) Food Products		10.00		6.07		6.30	
(16) Tobacco						10.00	
(17) Textiles				4.71		5.79	5.44
(18) Apparel				2.22		4.83	5.12
(19) Leather and Footwear				6.61	4.23	5.55	
(20) Wood				5.73		1.00	
(21) Paper				6.40		3.95	
(22) Publishing and Printing				3.92		1.46	
(23) Coke and Petroleum				5.97		4.20	
(24) Chemicals		5.50	2.06	6.31	4.76	4.09	
(25) Rubber		10.00		6.16	7.84	6.59	
(26) Other Non-Metallic		1.57		5.60		3.36	
(27) Basic Metals		1.97		7.97		4.96	
(28) Fabricated Metals				6.19	3.75	5.31	
(29) Machinery and Equipment		4.24	4.08	3.16	4.03	1.33	6.00
(30) Office and Computing	1.00	2.29		1.00	1.41		
(31) Electrical Machinery		2.80		6.13	8.03	7.84	
(32) Radio, TV, Communications	2.50	1.75		1.56			
(33) Medical, Precision Instr.		2.00		2.21	1.33	2.32	
(34) Motor Vehicles				5.36	4.43	5.00	
(35) Other Transport Supplies		1.22		2.48	4.27	7.44	
(36) Furniture		1.00		3.21		3.53	

Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 9

YEARS TO LIBERALIZATION AND RULES OF ORIGIN IN NAFTA BY ISIC REV. 3 SECTORS: UNITED STATES TO MEXICO

	CTH (Item)	CTH (Sub-Heading)	CTH (Sub-Heading) & RVC	CTH (Heading)	CTH (Heading) & RVC	CTH (Chapter)	CTH (Chapter) & TECH
(01) Agriculture						.99	
(02) Forestry				.00		.79	
(05) Fishing						.20	
(10) Coal						.00	
(11) Petroleum				.00		2.00	
(12) Uranium						.00	
(13) Metal Ores						.38	
(14) Other Mining			.00	.00		.41	
(15) Food Products		2.28		2.44		1.63	
(16) Tobacco						1.75	
(17) Textiles				4.57		4.84	4.61
(18) Apparel				1.31		3.43	4.32
(19) Leather and Footwear				2.17	7.05	3.95	
(20) Wood				.92		.92	
(21) Paper				.78		.42	
(22) Publishing and Printing				.74		.35	
(23) Coke and Petroleum				.29		.53	
(24) Chemicals		1.00	.30	1.35	1.03	1.43	
(25) Rubber		.33		1.36	1.37	1.25	
(26) Other Non-Metallic		.14		2.66		1.53	
(27) Basic Metals		.97		7.25		2.44	
(28) Fabricated Metals				1.53	.88	.97	
(29) Machinery and Equipment		2.35	2.15	.87	.90	.92	6.00
(30) Office and Computing	1.00	.67		.69	.71		
(31) Electrical Machinery		.50		.87	1.05	.83	
(32) Radio, TV, Communications	1.00	1.07		1.00			
(33) Medical, Precision Instr.		.67		.90	1.06	1.13	
(34) Motor Vehicles				1.06	3.03	1.75	
(35) Other Transport Equip.		.33		1.48	1.42	.06	
(36) Furniture		1.00		.83		1.10	

Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 10
PREFERENTIAL MARGIN BETWEEN MEXICO AND UNITED STATES
BY ISIC REV. 3 SECTORS

	Mexico to United States		United States to Mexico	
	Mean	Standard Deviation	Mean	Standard Deviation
(01) Agriculture	8.69	7.38	1.02	3.01
(02) Forestry	9.06	4.48	0.54	1.27
(05) Fishing	12.99	7.45	0.24	0.83
(10) Coal	10.00	.00	0.00	0.00
(11) Petroleum	1.39	.93	0.00	0.00
(12) Uranium	10.00	.00	0.00	0.00
(13) Metal Ores	8.30	3.04	0.00	0.00
(14) Other Mining	9.16	3.60	1.09	2.25
(15) Food Products	6.67	6.84	2.14	3.37
(16) Tobacco	3.67	7.15	0.00	0.00
(17) Textiles	5.46	4.80	2.76	3.89
(18) Apparel	8.23	6.41	4.16	5.08
(19) Leather and Footwear	7.65	6.19	3.16	2.33
(20) Wood	8.25	6.01	2.55	2.56
(21) Paper	5.39	3.52	1.84	1.85
(22) Publishing and Printing	8.63	6.86	1.33	1.89
(23) Coke and Petroleum	3.68	3.02	0.81	1.83
(24) Chemicals	6.93	4.10	2.96	3.17
(25) Rubber	5.32	4.09	3.36	1.80
(26) Other Non-Metallic	9.60	5.74	3.75	3.04
(27) Basic Metals	4.36	3.94	2.08	2.84
(28) Fabricated Metals	7.28	5.14	3.42	2.44
(29) Machinery and Equipment	9.03	4.65	2.85	1.57
(30) Office and Computing	12.93	6.58	2.61	1.53
(31) Electrical Machinery	5.54	3.41	3.48	1.74
(32) Radio, TV, Communications	10.83	4.99	4.14	2.73
(33) Medical, Precision Instr.	11.03	4.24	3.57	2.61
(34) Motor Vehicles	7.97	6.15	2.34	1.54
(35) Other Transport Equip.	9.61	5.04	3.87	4.72
(36) Furniture	11.27	6.22	3.91	3.08

Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 11
MOST FAVORED NATION TARIFF DIFFERENTIAL BETWEEN MEXICO AND UNITED STATES
BY ISIC REV.3 SECTORS

	Mean	Standard Deviation	Minimum	Maximum	Mean Of MFN-DIF [1]
(01) Agriculture	9.32	9.02	-38.27	30.00	10.66
(02) Forestry	10.11	3.16	.00	20.00	10.11
(05) Fishing	17.66	5.38	-2.91	20.00	17.80
(10) Coal	10.00	.00	10.00	10.00	10.00
(11) Petroleum	7.50	5.00	.00	10.00	7.50
(12) Uranium	10.00	.00	10.00	10.00	10.00
(13) Metal Ores	9.19	2.40	.00	10.00	9.19
(14) Other Mining	8.82	3.14	-.90	15.00	8.84
(15) Food Products	9.99	9.03	-19.23	30.00	11.76
(16) Tobacco	41.67	12.91	25.00	50.00	41.67
(17) Textiles	5.21	5.41	-7.69	20.00	6.13
(18) Apparel	9.26	6.53	-12.28	20.00	9.96
(19) Leather and Footwear	6.01	6.98	-20.29	17.65	7.94
(20) Wood	13.57	2.91	5.50	20.00	13.57
(21) Paper	7.33	2.63	-.99	15.38	7.34
(22) Publishing and Printing	9.16	6.24	-.99	20.00	9.23
(23) Coke and Petroleum	7.52	3.80	-2.91	10.00	7.81
(24) Chemicals	7.42	4.60	-11.50	20.00	7.94
(25) Rubber	11.35	3.46	3.77	20.00	11.35
(26) Other Non-Metallic	10.49	4.38	-4.24	20.00	10.58
(27) Basic Metals	6.02	4.04	-9.09	20.00	6.36
(28) Fabricated Metals	11.86	4.77	-11.50	20.00	11.97
(29) Machinery and Equipment	10.01	4.15	-1.96	20.00	10.04
(30) Office and Computing	11.60	5.82	.99	20.00	11.60
(31) Electrical Machinery	9.81	3.59	.95	18.81	9.81
(32) Radio, TV, Communications	7.77	5.63	-11.30	17.65	8.44
(33) Medical, Precision Instr.	9.02	4.97	-4.55	20.00	9.06
(34) Motor Vehicles	10.40	5.90	-5.98	17.65	11.06
(35) Other Transport Equip.	8.50	6.22	-6.78	20.00	9.65
(36) Furniture	12.38	4.69	-3.85	20.00	12.47

Note: [1] See text for details on how MFN-DIF variable was computed.
Source: Author's calculation based on the official text of the NAFTA agreement.

TABLE 12

INTRA-INDUSTRY TRADE BETWEEN MEXICO, UNITED STATES AND ROW
BY ISIC REV.3 SECTORS

(Average Grubel – Lloyd index (3 Digit) 1990 – 92)

	Mexico-United States	Mexico – Rest of the World	United States- Rest of the World
(01) Agriculture	.84	.74	.59
(02) Forestry	.99	.92	.25
(05) Fishing	.13	.79	.64
(10) Coal	.03	.03	.18
(11) Petroleum	.02	.00	.02
(12) Uranium	.00	.00	.01
(13) Metal Ores	.43	.45	.86
(14) Other Mining	.58	.92	.45
(15) Food Products	.73	.49	.81
(16) Tobacco	.89	.21	.07
(17) Textiles	.67	.68	.68
(18) Apparel	.67	.25	.18
(19) Leather and Footwear	.67	.67	.28
(20) Wood	.87	.40	.70
(21) Paper	.28	.26	.82
(22) Publishing and Printing	.64	.65	.65
(23) Coke and Petroleum	.51	.55	.65
(24) Chemicals	.54	.78	.79
(25) Rubber	.45	.33	.80
(26) Other Non-Metallic	.68	.68	.69
(27) Basic Metals	.75	.58	.62
(28) Fabricated Metals	.67	.40	.66
(29) Machinery and Equipment	.46	.17	.89
(30) Office and Computing	.87	.98	.93
(31) Electrical Machinery	.84	.38	.87
(32)Radio,TV,Communications	.70	.13	.63
(33) Medical, Precision Instr.	.76	.16	.55
(34) Motor Vehicles	.41	.38	.65
(35) Other Transport Equip.	.24	.43	.57
(36) Furniture	.89	.54	.35

Source: Author's calculation based on INTAL (Inter-American Development Bank) Database.

TABLE 13
NAFTA RULES OF ORIGIN - ORDERED PROBIT ESTIMATION

	Dependent Variable			
	Rules of Origin Restrictiveness Index (ROO-RI) Equation [1. 1]			
MFN Tariff Differential (MFN-DIF)	1.57 (5.12)	2.05 (5.83)	1.55 (5.05)	2.07 (5.90)
Intra-Industry Trade Mexico-US (IIT-ME-US)	0.17 (2.37)	0.16 (2.26)	0.18 (2.51)	0.17 (2.40)
Intra-Industry Trade Mexico-RoW (IIT-ME-RoW)	1.28 (20.72)	1.27 (20.54)	1.27 (20.59)	1.27 (20.37)
Intra-Industry Trade US-RoW (IIT-US-RoW)	-1.63 (-22.85)	-1.64 (-22.93)	-1.61 (-22.43)	-1.62 (-22.51)
Preferential Margin Mexico-US (PRE-MAR-ME-US)		-0.91 (-2.89)		-1.03 (-3.27)
Preferential Margin US-Mexico (PRE-MAR-US-ME)		0.83 (1.51)		0.84 (1.52)
Mexico Import Ratio with US (IMP-RAT-ME)			-0.21 (-4.01)	-0.22 (-4.26)
US Import Ratio with Mexico (IMP-RAT-US)			-0.40 (-1.79)	-0.40 (-1.81)
χ^2	936.55	945.50	954.65	965.80
Prob $> \chi^2$	(0.000)	(0.000)	(0.000)	(0.000)
Obs.	5005	5005	5005	5005

Notes: z – statistics in parentheses.

TABLE 14

PREFERENTIAL TARIFF LIBERALIZATION IN NAFTA - OLS ESTIMATION

	Dependent Variable			
	Years to Liberalization of Mexico to US (YE-ME-US) Equation [1.2A]		Years to Liberalization of US to Mexico (YE-US-ME) Equation [1.2B]	
Intercept	7.75	7.03	2.56	1.42
	(74.03)	(61.45)	(43.89)	(19.25)
Rules of Origin Restrictiveness Index	0.61	0.43	1.04	0.83
(ROO-RI)	(8.67)	(6.14)	(14.12)	(11.80)
Years to Liberalization to partner		0.19		0.23
(A: YE-US-ME)		(14.40)		(23.51)
(B: YE-ME-US)				
Preferential Margin	-0.45	-0.43	-0.10	-0.08
(A: PRE-MAR-ME-US)	(-7.11)	(-6.57)	(-8.65)	(-7.28)
(B: PRE-MAR-US-ME)				
Import Ratio	0.56	0.68	-0.29	-0.21
(A: IMP-RAT-ME)	(4.15)	(5.11)	(-0.58)	(-0.44)
(B: IMP-RAT-US)				
Export Ratio	0.81	0.90	1.45	0.45
(A:EXP-RAT-ME)	(4.84)	(5.43)	(3.49)	(1.15)
(B: EXP-RAT-US)				
R^2	0.51	0.53	0.10	0.15
R^2 Adj.	0.51	0.53	0.10	0.15
Obs.	5005	5005	5005	5005

Notes: t– statistics in parentheses.

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