PREFERENTIAL TRADE AGREEMENTS: BUILDING BLOCKS OR STUMBLING BLOCKS - CASE STUDY OF THE US IMPORTS

by

ADITI BOTHRA

PGDCM, Symbiosis Institute of Media and Communication, 2007
B.COM, Maharani College, Rajasthan University, 2005

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Approved by:

Major Professor
Dr. Peri da Silva

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Abstract

Preferential Trade Agreements (PTAs) are known to facilitate liberalization with respect to only a few trading partners and thus they have been a topic of debate for the past two decades especially because their effect on most favored nation (MFN) tariffs is known to be ambiguous. We provide insights for analyzing whether the PTAs indeed hamper or support multilateral liberalization. Using product level official and actual tariffs we provide evidence from the United States (US) import data that the stumbling block effect on the US MFN bound tariffs is present only for goods that receive full preference in books or in actual. However, my dataset does not statistically support the stumbling block hypothesis in the case of Applied tariffs.

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Chapter 1 - Introduction

Preferential Trade Agreements (PTAs) have become an integral part of the world economy landscape especially since past two decades. PTAs can be bilateral or unilateral in nature. Free trade agreements (FTAs) and Customs Unions (CUs) represent bilateral agreements since member countries exchange preferential access. On the other hand, unilateral agreements usually refer to a developed country offering developing countries unilateral preferential access to its market. The increasing importance of PTAs is undeniable according to the world trade statistics. According to WTO, the number of PTA notifications amounted to 124 in the period 1948-1994. This number increased to over 300 in the time period 1995 -2011[1]. As Limão (2006) shows, "PTAs can affect multilateral trade liberalization (MTL) through various channels. They can divert the scarce negotiation resources, alter the number of negotiating parties and their bargaining power and affect the countries optimal multilateral tariffs in all or subset of goods." There has been a lot of discussion on whether these PTAs either represent an obstacle to freer trade policies sponsored by the WTO or a stepping-stone towards freer trade. But no consensus has still been reached on the effects of PTAs on MTL[2].

In this paper we take a step forward towards analyzing the effect of PTAs on the US (United States) multilateral liberalization. We use product level data on the US imports from different sources as described below (Chapter-2) and create various sub groups of products imported in the US market. Limão (2006) has shown that US PTAs caused smaller reduction in multilateral tariffs of the goods it imported from its PTAs relative to similar non-PTA goods. Their results show a significantly larger stumbling block effect from the subset of goods that are

[1] Tobias *et al*.(2012), footnote 1

[2] Frankel *et al.* (1996) show that PTA's can raise welfare for rich countries, provided the margin of prefrence is not set too high. They assume that the first best solution of worldwide free trade is not attainable for political reasons. Thus the choice –betweeen a status quo of non discriminatory MFN tariffs and a move to PTAs is an exercise in theory of the second best. Generalising beyond pure FTA's to PTA's they found that a small margin of preferences for continental neighbours is always beneficial in their framework.
Krugman (1991) has shown in his model (without any transportation cost) that the economic welfare is diminished by a move from a system where a large number of individual countries post MFN tariffs, to a system of FTAs.
Krishna (1998) , within the framewrok of his paper found, 'PTAs that divert trade away from the rest of the world are more likely to be supported politically and will reduce the multilateral liberalization . In some cases this reduction in incentives coud be critical: multilateral liberalization that is initially feasible could be rendered infeasible by preferential arrangements.".
Levy (1997), shows that bileteral free-trade agreements can never increase political support for multilateral free trade.

exported to the US under every PTA. They even found a direct stumbling block effect for agreements with small countries. Notice, that the unilateral agreements are exactly the ones that should cause a stumbling block effect, as they are an exchange of preferential access for accomplishing non-economic objectives. Bilateral agreements would not necessarily cause stumbling block effect, as there is an exchange of preferential access is both ways. Using Limão (2006) strategy, we check if the stumbling block effect as found in his paper is present for all different groups of products in the US imports. We revisit a few results reached in Limão (2006) and present our findings in this paper. Our definition and choice of the groups of products from the US imports that we intend to analyze in this work was inspired from the various key papers mentioned below.

Karacaovali & Limão (2008), supports the stumbling block effect -"Using products level tariffs negotiated by the European Union (EU) in the last two multilateral trade rounds we find that several of its PTAs have clashed with its MTL". The model described in this paper shows that only products that receive full preferential access to the importing market (i.e., preferential tariff is zero) should have a stumbling block effect. This is important because Limão (2006) does not control for the type of preference (full/partial). On the empirical side, Karacaovali and Limão (2008) investigate whether preferential agreements involving the members of the European Union have led to a stumbling or building block effect on the EU's multilateral trade liberalization efforts during the Uruguay round of negotiations. Interestingly, the authors consider unilateral and bilateral agreements involving the EU and show that unilateral agreements have generated a stumbling block effect on the EU's multilateral policy. The same applies to the case of Free Trade areas but this does not apply to the customs unions. This shows once again that the type of PTAs involved is an important issue in the investigation of the effects of PTA formation.

There have been a lot of researches that have shown concerns on the projected ill effects of PTAs. Some researchers have shown concern on the overall effect and the economic importance of preferential access granted by the PTAs. They have questioned how effective are these preferences in the light of the pervasive presence of other non-trade barriers (NTB). Anson *et al.* (2005) argue that "in the predominantly North-South recent wave of PTAs, rules of origin (ROO) have been set up in a complex and non uniform manner, so that in practice these PTAs

provide little market access. As a result, compliance costs have largely eroded the preferential access afforded by the PTA, leading us to suggest that southern partners are effectively left on their participation constraint." They found that for NAFTA, ROO largely undid preferential tariff access, suggesting that North-South PTAs may well offer little market access to the southern partners. Among other things, their findings suggest that we should be careful in using official tariffs in measuring preferential access. For this reason, we construct actual measures of preferential access as suggested below (Chapter-2).

Ozden & Reinhardt (2005) have shown that countries removed from GSP adopt more liberal policies than those remaining eligible. Therefore, they suggest that the developing countries may be best served by full integration into reciprocity- based world trade regime rather than the continued GSP-style preferences. These findings in this paper are based on unilateral agreements that are full of hidden barriers and sudden changes in the grant of preferences. Since, we also intend to analyze the unilateral agreements (ATPA, CBI and GSP) in our work, we consider it is important to measure preferential access using official and actual tariffs as proposed by this work.

Estevadeordal *et al.* (2008) examined the effect of regionalism on unilateral trade liberalization using industry level data on most favored nation (MFN) Applied tariffs and bilateral preferences for ten Latin American countries from 1990 to 2001. They found that a preferential tariff reduction in a given sector leads to a reduction in the external (MFN) tariff in that sector. They also found, that the external liberalization is greater if preferences are granted to important suppliers. In their study, these effects were absent for customs unions and only present for free trade agreements. Overall, they find that preferential treatment generates a building block to multilateral free trade. Their paper shows that it is important to consider the effects of preferential access on Applied MFN tariffs, since multilateral agreements only focus on tariff bindings but, they allow countries to apply tariffs that may be set below their tariff bindings. We take this key issue into account in this work.

Ketterer *et al.* (2012) explored the determinants of Canada's tariff cuts at HTS-8, and found that the Canadian-US free trade agreement (CUSFTA) acted as an additional driver of Canadian multilateral tariff reductions during the Uruguay round. In other words, CUSFTA served as a building block for the Canadian multilateral trade policy. They show that since a

FTA is characterized by the exchange of market access with a large and competitive trading partner, the agreement can cause leakage of protectionist benefits to domestic industry from lobbying against external tariff cuts. This rent destruction effect of an FTA can cause policy makers to be more aggressive in cutting multilateral tariffs. This once again makes the type of PTA, a key issue to investigate.

Notice that the results of all these above-mentioned studies do not concur on the ill or positive effects of a country's PTAs on its multilateral trade liberalization. All these findings are derived from different dataset consisting of countries that are very different from the US and hence the findings from any one sample may or may not hold true in case of the US. Therefore, we decided to start our investigation by first creating a dataset that would enable us to distinguish products according to the degree of preferential access using the actual and official preferential rates. We then enriched our dataset by pooling in the data from other researchers (Romali's dataset and dataset from Limão (2006), which we discuss in detail in the next section. Using this unique dataset we test whether the insights in the literature are also relevant in case of the US. We investigate partial and full preferences, the degree of importance of particular products (large imports) and margin of preferences, applied versus bound tariffs and effects of different PTAs (unilateral versus bilateral).

Not all of our findings support the results from the literature discussed above. Like Karacaovali & Limão (2008), we found that the stumbling block effect on MFN tariff bounds is only generated from the products that get full preferences in books or actual. Unlike Limão (2006), we did not find any larger stumbling block effect from the products that get full preference (in books) under all PTAs as compared to the products that get full preference (in books) only under some PTAs but not all. We found that the products with full preferences but smaller margins (both in books and in actual) have a stronger stumbling block effect than the products with full preferences but large margins in books or in actual. We also found, that the stumbling block effect from products that receive full preferences under any PTA in books and have either small margin or small export volume, is identical to the products that get full preferences in any PTA in the books but with big margin and large export volume (this result is same in case of actual tariffs too). Furthermore, we found that on an average, FTAs have a smaller stumbling block effect on the US MFN bounds than the unilateral trade agreements.

Most importantly, we did not find any significant evidence of the stumbling block effect from PTAs in case of the US Applied tariffs.

In the next chapter, we present data description that allows us to discuss how we define different groups of products in the US imports. This dataset created by us, facilitated our investigation on the impact of PTAs on the US multilateral tariffs and the nature of different PTAs involving the US until the mid-1990s.

Chapter 2 - Data Description

In this section, we describe the compilation of the dataset that enables us to re-examine some of the conclusions reached in Limão (2006). This requires, the identification of products that receive full preferential access to the US market, under the different preferential trade agreements (PTAs) sponsored by the US and that were included in Limão's (2006) work. We, measure full (duty free) preferential access, both in terms of the official tariff set on different products imported by the US through its PTAs, as well as in terms of the duties collected at US customs. Moreover, we collected data on Applied MFN (most-favored-nation) tariffs for different years to ascertain whether the formation of these PTAs has acted as a stumbling block to the US multilateral trade policy. This is important; as the Applied MFN tariffs are the appropriate policy tool to measure the degree of market access as well as the protectionist degree of US trade policy relative to the rest of the world. These are the main reasons that drive the organization of this work's dataset. We organize the dataset at the product level using the Harmonized Tariff Schedule of the US at eight digits (HTS-8)[3]. The HTS 8 comprises a hierarchical structure, subdivided into eight digit rate lines unique to the US for describing all goods in trade for duty, quota, and statistical purposes.

2.1 Data on imports and duties collected

The United States International Trade commission's (USITC) website provides detailed data on imports and duty collected for the US economy. In particular, it allows us to distinguish imports by the program used to sell foreign goods in the US, as well as the duties collected under the different programs. We collect information at HTS-8 on trade for the different preferential programs under investigation. The five preferential trade programs under consideration and the beneficiary countries in each program for the year 1994 are following:

(i) Andean Trade Preference Act (ATPA) –Bolivia, Colombia, Ecuador and Peru.

(ii) Caribbean Basin Initiative (CBI) – List in Appendix A

(iii) Generalized System of Preferences (GSP) --- List in Appendix A

(iv) ISRAEL Free Trade Agreement (ISRAEL) --- Israel

(v) North American Free Trade Agreement (NAFTA) -- Mexico and Canada

[3] (http://www.ustr.gov/trade-topics/industry-manufacturing/industrial-tariffs/tariff-schedules).

The data collected from USITC contains the value of imports and duties paid at the US customs, for each group of countries that benefit from one of the five PTAs described above. Notice, that not all products exported from the countries listed above are eligible for preferential access in the US market. Moreover, some products are exported through a preferential program as well as through the MFN regime, possibly because of the presence of tariffs or hidden barriers to trade (export ceilings, rules of origin, administrative costs). Thus, imports from these countries can enter the US market through the MFN regime, where they pay the same duties as applied to the rest of the world, the GSP program and through the PTA program in question.

We then proceeded by downloading for each PTA_j (j = ATPA, CBI, GSP, ISRAEL and NAFTA), information about imports through the MFN regime, imports through the GSP, and imports through the PTA in question for the years of 1989 to 2011. Duties paid under the different alternative programs were also downloaded. This dataset enables us to understand and cross verify the value of US imports from these five groups of countries, by checking whether or not the total value of imports equals the summation of imports through the MFN, GSP and through the PTA program in question.

Some key observations from this data for the year of 1994 are summarized in Table 2.1 below. Column 1 lists the five PTA programs; Column 2 gives the value of total imports in million dollars to the US from the member countries of the respective PTA programs; Column 3 lists the different import programs that these member countries can use to import to the US; Column 4 shows the percentage of total US imports by import program. As mentioned previously, not all products exported by the member countries of a PTA received preferential access to the US market. Furthermore, only a fraction of products that were officially granted preferential access were exported through a preferential regime. Column 5 gives the percentage of products that in spite of having a preferential access enter the US economy also via the MFN regime.

Table 2.1: US imports by PTA

PTAs	Total Imports'94 (Millions of $)	Import Programs	Custom Value of Imports in %	% of products that receive preference under a PTA but also export through MFN'94
ATPA	5,879	MFN	82.6	25.58
		GSP	5.8	
		ATPA	11.6	
CBI	11,023	MFN	78.7	26.1
		GSP	3.4	
		CBI	17.9	
GSP	91,142	MFN	81.1	69.25
		GSP	18.9	
		----	----	
ISRAEL	5,159	MFN	54.5	16.3
		GSP	8.2	
		ISRAEL	37.3	
NAFTA	142,462	MFN	44.6	66.41
		GSP	0	
		NAFTA	55.4	

Source: author using data provided by the USITC.gov

Column 2 of Table 2.1 shows, that the total imports to the US in the year 1994 from NAFTA member countries were the highest, at $142,462 million, followed by imports from the GSP, CBI, ATPA and ISRAEL member countries. Notice, that Israel and NAFTA are bilateral free trade agreements (created under article XXIV of General Agreement on Tariffs and Trade) that entails elimination of almost all internal trade barriers within the partners. Israel was the first FTA signed by the US and it came into force in the year of 1985, while NAFTA came into force in the year of 1994. We observe that NAFTA is an important free trade agreement for the US considering the sheer size of custom value of imports from Canada and Mexico. On the other hand, GSP that has over 127 member countries (list in Appendix A) comes at a distant second in terms of custom value of imports entering the US. PTAs like CBI, ATPA and GSP are unilateral agreements supported by the enabling clause in GATT- 'contracting parties may accord differential and more favorable treatment to developing countries, without according such

treatment to other contracting parties[4]. For example: ATPA is a unilateral trade agreement which was created to help four Andean countries (Bolivia, Colombia, Ecuador, and Peru) in their fight against drug production and trafficking by expanding their economic alternatives through enhanced access to the US market[5].

Of the total imports from NAFTA members in the year 1994, over 55 % (column 4) entered the US via NAFTA. On the other hand, over 82 % of the total imports from ATPA members entered the US market, through the MFN regime and only less than 12 % were through the ATPA preference regime. Since, ATPA is a unilateral preference granted by the US, it is rather selective in granting preference (number of products qualifying for preferential access is small). The enabling clause discussed above, grants developed countries the ability to select the range of products that are eligible for preferences as well as the degree of access to the its market (the US in our case). Also, it has additional guidelines relating to the rules of origin and stricter terms relating to the fulfillment of non-trade objectives, resulting in hidden barriers to trade (increased administrative costs) attached to the trade through ATPA.

We found, that over one fourth (column 5) of the total products that had preferential access via ATPA also entered the US via MFN. This is also true for CBI where over 26 % of goods that qualified for preferential access entered the US also via MFN. Over 69 % of the total products that qualified for GSP access, did not completely avail this preference and were also imported via the MFN regime. For NAFTA, this figure was even more astounding where over 66 % of total goods that had preferential access, also used the MFN regime. Sometimes, policy changes take time to generate their expected effects. NAFTA was implemented in 1994 and should lead to duty free access for the vast majority of products among member countries since it corresponds to a free trade area. So, we calculated and found that in 1996 about 52 % of goods that received preferential access under NAFTA also entered the US via the MFN regime.

As said above, we would like to identify products that receive full (duty free) preferential access in the US market. One of the ways, in which we identify these cases, is by selecting products that officially should receive preferential access and that can enter into the US market without paying duties as suggested by the US customs data. We create a term called "actual preferential tariffs" to assist us in identifying these products.

[4] (http://www.fas.org/sgp/crs/misc/RS22183.pdf)
[5] (http://www.ustr.gov/trade-topics/trade-development/preference-programs/andean-trade-preference-act-atpa)

Actual preferential tariffs (t^{pref}_{actual}) defined as follows:

$$(t^{pref}_{actual})_{ijt} = \frac{duties\ paid_{ijt}}{custom\ value_{ijt}} \quad (1)$$

where, *i* = product code at HTS-8; *j*=ATPA, CBI, GSP, ISRAEL, NAFTA; *t* = 1994, 1996

2.2 Data on MFN Applied tariffs and on official preferential tariffs (Romali's dataset)

As discussed earlier, we need to collect information about the actual (equation 1) and official preferential tariffs levied on goods imported by the US from countries that receive preferences under the different PTAs mentioned above. As discussed in the introduction, as well as in the section describing the empirical strategy, only the goods receiving duty free access should generate a stumbling block effect on US multilateral policy. Data on preferential tariffs actually paid by exporters to sell to the US market (t^{pref}_{actual}) was sourced from USITC as described in the previous section. Data on official preferential tariffs ($t^{pref}_{official}$) is sourced from Romali's dataset and is described in detail in this section. This dataset also provides information about the US's Applied MFN tariffs ($t^{mfn}_{applied}$) for different years, which will be important to test whether preferential access has a meaningful effect in the US multilateral policy beyond its effects on the US MFN tariff bounds (t^{mfn}_{bounds}).

Importantly, Romali's dataset contains information that indicates the products that are eligible for tariff preferences under each PTA discussed above. Moreover, this dataset provides details of the official preferential tariffs ($t^{pref}_{official}$) under all the five PTAs of interest. In the case of NAFTA, his dataset provides information about products originating in Mexico and Canada that should benefit from preferential access in the US market over the years. Though Romali's dataset is essentially sourced from USITC website, it has been compiled and organized so as to provide information on applicable tariffs even where no trade is observed. This information is of great interest to us because it provides us information about US Applied MFN tariffs and the official preferential tariffs under the different PTAs. Notice that throughout this thesis we use the expression 'official tariffs' or 'tariffs in the books' interchangeably.

In Table 2.2, we use information obtained from Romali's dataset about the products that should benefit from preferential access to the US market. Notice, that this information corresponds to an indicator (binary) variable that provides no guarantee about the degree of market access or whether or not explicit or hidden barriers to trade apply to a particular product exported to the US from a particular region. Again, column 1 of Table 2.2, describes the different PTAs; column 2 gives the percentage of goods that are eligible to receive preferential treatment in the US market, according to US official statistics.

Table 2.2: Percentage of goods receiving Preference

PTA	% of goods eligible to receive preference in books-'94
ATPA'94	72
CBI'94	73.1
GSP'94	49.8
ISRAEL'94	84.8
NAFTA-CANADA'94	85.5
NAFTA-MEXICO'94	99.4

Source: author using data provided by Romali's dataset

Table 2.2 shows that bilateral trade programs like NAFTA and ISRAEL are more comprehensive (especially in terms of number of products that are eligible for preferential access to the US market) as compared to the unilateral trade programs like ATPA, CBI and GSP. We find that in the year of 1994 over 72 % of goods that could be imported to the US from the ATPA members qualified for preferential tariff under ATPA. About 85 % of goods from Israel officially qualified for preferential access to the US market under ISRAEL. For Canada and Mexico this figure was over 85 % and 99.4 % respectively under NAFTA.

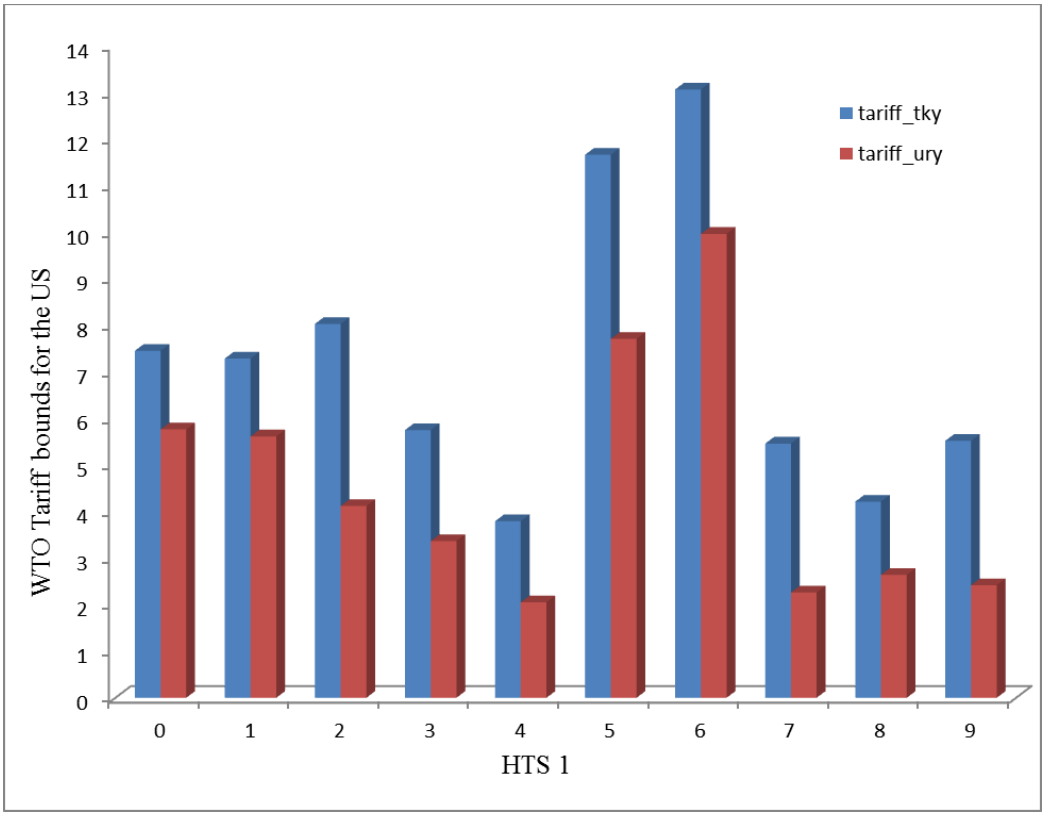
2.3 Data on the US Bound Tariffs and the US Applied Tariffs

The World Trade Organization's (WTO) website provides detailed data on the MFN tariff bounds (t^{mfn}_{bounds}) set by each country on its imports. These MFN tariff bounds are negotiated amongst the member countries during each WTO round and are on an average expected to fall in order to achieve WTO's aim of promoting freer trade among its member countries. We collect HTS 8 wise data on tariff bounds set by the US during both Tokyo round

and Uruguay round. In order to understand the trend and measure the tariff cuts by the US we calculated the absolute change in tariff bounds by taking the difference between Uruguay and Tokyo round tariffs. We then aggregated the data from the 8 digit level tariff lines to the 1 digit level and averaged out the difference in the US MFN tariff bounds between the two WTO rounds $[(Uruguay\_t^{mfn}_{bounds}) - (Tokyo\_t^{mfn}_{bounds})]$ at the one-digit industry levels. Notice, that Limão (2006) calculated this measure as 'log (1+ $Uruguay\_t^{mfn}_{bounds}$) −log (1+ $Tokyo\_t^{mfn}_{bounds}$)'.

Graph 1, gives us the one digit industry levels (HTS 1) on 'X' axis. On 'Y' axis we have the MFN tariff bounds in percentage points.

Graph 1: MFN Bound Tariffs set during WTO rounds



Source: author using data provided by the WTO

Graph 1, shows the histogram for the US MFN tariff bounds aggregated at the one digit of the HTS level. The blue bars are the MFN tariff bounds set during Tokyo round and red bars are the MFN tariff bounds set during the Uruguay round. The data described in graph 1, suggests that the greatest drop in the US MFN bound tariffs between the two rounds of multilateral negotiation took place in industry 7 (stone, glass, metals and minerals) of one digit of the HTS

level corresponding to a total of approximately 58 %. This is followed closely by industry '9' (medical or surgical instruments & accessories, arms and ammunitions, miscellaneous manufactured articles and services.) with a drop of 56 %. On an average there was a decrease of 39 % in the US MFN tariff bounds negotiated between the two WTO rounds mentioned above.

According to Etevadeordal *et al.* (2008), developing countries have high Applied tariffs and even higher MFN tariff bounds that creates a tariff overhang (difference between MFN tariff bound and the Applied tariffs). Therefore, it gives the developing countries a lot of freedom to adjust (increase or decrease) their Applied tariffs while staying well within their tariff bounds and following the WTO rules. The data of MFN bounds is easily available but does not usually change between the two WTO rounds. We believe that using Applied tariffs (which can be changed between the WTO rounds) though constraint by the MFN tariff bounds should still show a more crisp picture of how the PTAs affect the US tariffs. As mentioned previously, we sourced our data of Applied MFN tariffs from Romali's dataset. Unfortunately, data back from early 1980 was not available. So, to draw a parallel between the MFN bounds between the two WTO rounds and the Applied tariff for the same years was not possible. The earliest year for which such data is available is 1989. Therefore, we use the same, and show the comparison in the table below.

Column 1 of Table 2.3 shows the HTS 1 digit level. Column 2 shows the average difference in the US tariff bounds set between the Uruguay round and the Tokyo round. Column 3 shows the average difference in the Applied tariffs between the years '89 and '94. Since NAFTA was created in the same year and we know that the policy changes take time to come into effect, therefore, in column 4 we also present the average difference in the US Applied tariffs for year 89 and 96. Applied tariffs can also take time to adjust after the changes in bounds; this is an additional reason that makes this information crucial. We found that on an average the US Applied tariffs decreased between '89 and '96, a length of time that covers the formation of two of the most important PTAs in our dataset, NAFTA and ATPA.

Table 2.3: Average decline in MFN bounds and Applied Tariffs

HTS 1	Average tariff bound difference	Average Applied tariff difference ('94-'89)	Average Applied tariff difference ('96-'89)
0	-1.7	-0.1	-0.7
1	-1.7	0.0	-0.8
2	-3.9	-0.7	-1.0
3	-2.4	0.0	-0.6
4	-1.7	0.0	-0.6
5	-4.0	0.0	-0.7
6	-3.1	0.0	-0.7
7	-3.2	0.0	-0.8
8	-1.6	0.0	-0.6
9	-3.1	-0.1	-1.3

Source: author using data provided by Romali's dataset

2.4 Creating binary variables:

As discussed in sub-section 2.1, not all goods imported from the PTA members qualify for preferential access to the US market. Using the information provided in Romali's data we first identify the goods that receive preferential access (PTA indicator- 'I') under a PTA (Table 2.2, column 2). Limão identifies the products that are exported to the US under a PTA as products that receive preference (Limão, AER-2006). Therefore, we also create a binary variable 'Limao_{ijt}', as an equivalent to Limão's (2006) binary variable that accounts for imports to the US under a PTA[6].

$$\text{Limao}_{ijt} = 1 \; if \; I_{ijt} > 0 \; \& CV_{ijt} > 0 \; otherwise \; 0 \qquad (2)$$

(where, CV = customs (imported) value, i = product code at HTS-8; j=ATPA, CBI, GSP, ISRAEL, NAFTA; t = 1994, 1996)

Following Karacaovali & Limão (2008), only the products receiving full preferential access to the US market should create the stumbling block effect on the US multilateral tariff policy. When the US offers duty free access in a subset of products imported from certain developing countries, then these developing countries benefit by facing lower tariffs than their

[6] Limao_i that we create is equal to 'G_i' of Limao (2006), (see section II of Limao (2006))

competitors. Also, when the PTA is signed, the member countries value it at given multilateral tariffs. Therefore, if the US decreases or eliminates its multilateral tariffs on the same subset of goods then it would effectively diminish the preference (Margin) it valued before. We define 'Margin' as follows:

$$Official\ Margin_{ijt} = t^{mfn}_{applied_{it}} - t^{pref}_{official_{ijt}} \quad (3)$$

$$Actual\ Margin_{ijt} = t^{mfn}_{applied_{it}} - t^{pref}_{actual_{ijt}} \quad (4)$$

(where, i = product code at HTS-8; j = ATPA, CBI, GSP, ISRAEL, NAFTA; t = 1994, 1996)

Alternatively, if there exists a positive official preferential tariff ($t^{pref}_{official}$) then there is scope of reducing the same in conjunction with the Applied MFN tariffs ($t^{mfn}_{applied}$) without actually eroding the preference margins of the PTA members and hence avoiding any resistance (stumbling block effect) from them if the US decides to lower its MFN tariffs, (Karacaovali & Limão-2008). In addition, there has to be a positive Applied MFN tariff ($t^{mfn}_{applied}$) on products imported from PTA members, because if the Applied MFN tariff is zero then there is essentially no preference granted. Furthermore, we should have positive imports (CV>0) for that product to cause any effect on multilateral trade policies of the US on the whole.

As discussed previously only the products getting full preferential access to the US should create a 'stumbling block effect'. But this difference between full preferential access and partial preferential access is unaccounted for in Limão's (2006) calculations. From our data set we wanted to identify only the products that were imported in the US from the PTA members and enjoyed full preference in books. We use official preferences and preferences in books interchangeably in our description. Thus, as compared to Limão's binary variable (Limao_{ijt}), we created a more specific and relevant binary variable (B_{ijt}) that would account for all these above-mentioned conditions.

$$B_{ijt} = 1\ if\ t^{mfn}_{applied_{it}} > 0\ \&\ I_{ijt} > 0\ \&\ t^{pref}_{official\ ijt} = 0\ \&\ CV_{ijt} > 0;\ \ otherwise\ 0 \quad (5)$$

(where, i = product code at HTS-8; j=ATPA, CBI, GSP, ISRAEL, NAFTA; t = 1994, 1996)

As mentioned previously (sub-section 2.1) the presence of tariffs or hidden barriers to trade (export ceilings, rules of origin, administrative costs) may create discrepancy between the official and actual preferences granted to the beneficiary countries. Anson *et al.* (2005) show that 'the rules of origin virtually limit the market access that PTA's confer to southern partners. In case of NAFTA, the average compliance cost is around 6 % of ad valorem undoing the Tariff preference (4 % on average) for a large number of tariff lines. Administrative costs amount to 47 % of the preference margin.'

So, to address this issue we generated a binary variable that captures the products with large margin (BL_{ijt}) that would identify the products that have meaningful margins (greater than 3 %) in their preferential tariffs. Moreover, these are products with economically important margin, as shown by Etevadeordal *et al.* (2008). The potential effect of significant preferential margins is ambiguous. On one hand, Estevadeordal *et al.* (2008) show that products with important margins and significant exports tend to generate a building block effect on the multilateral trade policy of Latin American countries. On the other, it is possible that products with significant margins may represent exactly the cases of meaningful preferential access where the stumbling block effect is most pervasive. We describe products with significant official preferential margins as follows,

$$BL_{ijt} = 1 \; if \; t^{mfn}_{applied_{it}} > 0 \;\&\; I_{ijt} > 0 \;\&\; t^{pref}_{official_{ijt}} = 0 \;\&\; CV_{ijt} > 0 \;\&\; t^{mfn}_{applied_{it}} - t^{pref}_{official_{ijt}} > 0.03 \; ; otherwise \; 0 \quad (6)$$

(where, *i* = product code at HTS-8; *j*=ATPA, CBI, GSP, ISRAEL, NAFTA; *t* = 1994, 1996)

Since, official preferential tariffs (in the books) are often different form actual preferential tariffs, we created the following two binary variables (A_{it} *and* AL_{it}) similar as equation (5) and (6) but using Actual preferential tariffs (t^{pref}_{actual}) instead of official preferential tariffs ($t^{pref}_{official}$). Equation (1) shows how we compute the Actual preferential tariffs using the data described in sub-section 2.1. Actual preferential tariffs show a picture of preferential tariffs that is closer to reality since it is essentially the outcome of the preference granted under the PTAs discussed above along with the hidden barriers to trade that diminishes the benefit to the member countries (administrative costs, Rules of origin etc.). We also control for noise in the data and capture the products with actual preferential tariffs less than or equal to 0.001.

$$A_{ijt} = 1 \; if \; t^{mfn}_{applied_{it}} > 0 \;\&\; I_{ijt} > 0 \;\&\; 0 \leq t^{pref}_{actual_{ijt}} \leq 0.001 \;\&\; CV_{ijt} > 0; \;\; otherwise \; 0 \qquad (7)$$

(where *i* = product code at HTS-8; *j*=ATPA, CBI, GSP, ISRAEL, NAFTA; *t* = 1994, 1996)

$$AL_{ijt} = 1 \; if \; t^{mfn}_{applied_{it}} > 0 \;\&\; I_{ijt} > 0 \;\&\; 0 \leq t^{pref}_{actual_{ijt}} \leq 0.001 \;\&\; CV_{ijt} > 0 \;\&$$
$$t^{mfn}_{applied_{it}} - t^{pref}_{actual_{ijt}} > 0.03 \; ; otherwise \; 0 \qquad (8)$$

(where, *i* = product code at HTS-8; *j*=ATPA, CBI, GSP, ISRAEL, NAFTA; *t* = 1994, 1996)

The results from these binary variables($B_{ijt}, BL_{ijt} A_{ijt} \; and \; AL_{ijt}$) are shown in Table 2.4 below. For the year 1994, we have information on over 8,600 products in our dataset, which we use to compute these binary variables. Column one gives the name of the PTAs. Column two (B_{ijt}) gives us the percentage of products that face a positive MFN tariff ($t^{mfn}_{applied} > 0$) in the US market, are officially qualified to receive preferences under a specific PTA program for importing to the US ($I_{jt} > 0$), the preference granted in books is full i.e. ($t^{pref}_{official} = 0$) and there were some imports (Custom Value of imports > 0) in this category of products (HTS 8) in the year 1994. We found that the fraction of products that receive full preferences in the books (B_{ijt}) was smallest for ATPA'94 at less than 13 % and largest for NAFTA'94 at over 50 % Column three (BL_{ijt}) gives us a subset of column two and contains the products that fulfill an additional condition that the official margin of preference is greater than three percentage points ($t^{mfn}_{applied} - t^{pref}_{official} > 0.03$). We found that the fraction of products that receive full preferences in the books and have a meaningful margin (BL_{ijt}), was smallest for ATPA'94 at 10 % and again largest for NAFTA'94 at a little less than 39 %.

Column four describes the average value for the binary variable 'A_{ijt}' by PTA sponsored by the US. It shows the percentage of products that have a positive MFN tariff ($t^{mfn}_{applied} > 0$), are officially qualified to receive preference under a specific PTA program for importing to the US ($I_{it} > 0$), after controlling for noise, the actual preference granted is full i.e. ($0 \leq \left(t^{pref}_{actual}\right) \leq 0.001$) and there were some imports (Custom Value of imports >0) in this category in the year 1994. We found that fraction of products that receive full actual preferences (A_{ijt}), was the smallest for ATPA'94 at 9 % and largest for ISRAEL'94 at 17.6 %. Column five (AL_{ijt}) gives us a subset of column four and gives us the percentage of products that also fulfills an additional

condition that the actual margin of preference is large ($t^{mfn}_{applied} - t^{pref}_{actual}) > 0.03$). We found that the fraction of products that get full actual preference with meaningful margins (AL_{ijt}) was the smallest for GSP'94 at 6.5 % and the largest for Israel'94 at 14.7 %.

Table 2.4: Percentage of products that receive preferences in Books and in Actual

Binary Variable/ PTA'94	% of products with full preference				Limao_{ijt}
	B_{ijt}	BL_{ijt}	A_{ijt}	AL_{ijt}	
ATPA'94	12.7	10.0	9	6.9	13.1
CBI'94	17.2	13.6	11.7	9.1	17.6
GSP'94	39.1	30.3	9.9	6.5	39.1
ISRAEL'94	21.0	17.6	17.6	14.7	23.4
NAFTA'94	50.3	38.8	16.6	11.1	78.8

Source: author using data provided by Romali's dataset and USIT website

The table above gives us some important insights on the significance and coverage of the PTA programs under discussion. We found that for ATPA'94, slightly less than 13 % of products from over 8,600 products that the member countries export to the US officially enjoy full preference. But only 10 % of the total products officially get meaningful (greater than at least 3 %) preferential margins. As discussed before the trade barriers (like rules of origin and administrative costs) are high for imports via a PTA, therefore importing via a PTA is beneficial only if there is a substantial margin ($t^{mfn}_{applied-} - t^{pref}_{official}$). About 9 % of goods imported via ATPA'94 actually get full preferential access to the US market. We found that only about 6.9 % of the products actually earn a meaningful actual preferential margin ($t^{mfn}_{applied-} - t^{pref}_{actual}) > 0.03$).

Column six shows the percentage of products that get preference (full preference or partial preference) according to the definition used in Limão (2006). Notice that he considers all the products that are exported to the US (Custom Value of imports >0) under a PTA ($I_{ijt} > 0$). According to Limão (2006) 78.8 % of products imported in the US from the NAFTA member countries receive preferential access. A little over 13 % of products imported from the ATPA countries receive preferential access to the US market. As discussed above, these are not

necessarily full preferences since there is no control for the same in his definition of the binary variable (Limao_{ijt})

We calculated the same binary variables for the year 1996 and found that AL_{it} decreased for all the programs, except for NAFTA where we observed a marginal increase. Please see Appendix B, Table B-1 for percentage of goods that fulfill the conditions for the above-mentioned binary variables ($B_{ijt}, BL_{ijt}A_{ijt}\ and\ AL_{ijt}$) for the year 1996. The increase in NAFTA could be attributed to the fact that NAFTA came into force in 1994 and therefore with the passage of time more products qualified for full preferential access with meaningful margins in the US market. The decrease in (AL_{ijt}) for the rest of the PTAs could be because of the hidden barriers to trade that eroded the meaningful (greater than 3 %) preferential margins.

Furthermore, we created several variables to compare the stumbling block effect between different set of products and to see their individual effect on an average. In Limão (2006), the stumbling block effect is calculated for the group of products that receive any type of preference (full or partial) under a PTA. Also, the stumbling block effect is found to be comparatively stronger if the product receives full or partial preference under all the PTAs. Limão (2006) found 60 % larger effect in the group of products that receive preference in all PTAs as compared to the group of products that receive preferences under some but not all PTA. Karacaovali and Limão (2008), found that the tariff reduction from the goods that get partial preference (positive preferential tariff) is identical to non PTA goods. Following the intuition from these papers we decided to study if only the products that get full preference in the US market cause the stumbling block effect. Also, whether the effect is different for the products that get full preferences in some PTA as against all PTAs. Therefore, we first created the union of individual PTA variables to estimate the average stumbling block effect.

a). "ANYPTABook": $B_{it} = 1\ if\ B_{ijt} = 1\ for\ any\ j;\ otherwise\ 0$ (9)

In simple words "ANYPTABook" is a binary variable that takes the value of 1 only if a product gets full preference in books under one or more PTA. In our dataset, 61.4 % of the products receive full preferential access according to official tariffs in the US market through at least one of the described PTAs. We generated the intersection of individual PTAs,

"EVERPTABook", which is a binary variable that takes the value of one, if a product gets full preference in books under all PTAs. It accounts for 3.86 % of the total goods in our dataset.

b). "EVERYPTABook": $EVB_{it} = 1\ if\ B_{ijt} = 1\ for\ all\ j;\ otherwise\ 0$ (10)

We revisit Karacaovali and Limão (2008) results using our data on US imports. Therefore, we created "ParANYPTABook" which is 1 for the group of products that get partial preferences under any PTA.[7] In my dataset, less than 18 % of the products receive partial preferential access according to official tariffs in the US market through at least one of the described PTAs. This variable will help us gauge the stumbling block effect caused by goods that get partial preference in books.

c). "ParANYPTABook": $PB_{it} = 1\ if\ \text{Limao}_{ijt} = 1\ \&\ B_{ijt} = 0\ for\ any\ j;\ otherwise\ 0$ (11)

Estevadeordal *et al.* (2008) found that 'for goods with a meaningful margin, higher preference shares lead to deeper MFN tariff reductions.' Their study based on the data from 10 Latin American countries reflected a clear tariff complementarity (an increase in the preference margin leads to future reduction in Applied MFN tariffs) effect in FTAs but not for CU. In their analysis if preferences are greater that 2.5 %, then it was considered as meaningful preference margin. They also found that tariffs on goods with meaningful preference margins tend to fall faster for FTAs. With an intention to explore our data for US imports on the same lines we created binary variables: "ANYPTABooklarge" and "LargeExportsandMarginBook".

We consider preference margins greater than 3 % as meaningful margins large enough to qualify for "ANYPTABooklarge".[8] We basically, created a union of individual PTA variable with meaningful margins (greater than 3 %) to estimate the average stumbling block effect from the products that receive large margins under all PTAs. It accounts for 48.05 % of products in our dataset.

d). "ANYPTABooklarge"- $BL_{it} = 1\ if\ BL_{ijt} = 1\ for\ any\ j;\ otherwise\ 0$ (12)

[7] On the same lines we created the following binary variables to measure the stumbling block effect from goods getting partial preferences in every PTA in books. In my dataset less than 0.5 % of the products receive partial preferential access according to official tariffs in the US market through all of the PTAs under consideration (See Appendix B, Table-B-3).

[8] To control for endogeniety of BL_{it} we constructed a new IV: $BL78_{ij}$(see appendix B, Table B-3 for details).

"LargeExportsandMarginBook" consists of products that receive full preferences in any PTA in the books with meaningful margins (greater than 3 %) and have large export volume, (HI_EX =1 if export value of good 'i' from each given PTA exceeds the mean export value of that PTA to the US in all goods).[9] It accounts for 6.81 % of the total products in our dataset.

e). "LargeExportsandMarginBook": $LEMB_{it}$= 1 if $BL_{it} = 1$ and HI_EX=1 (13)

On the same lines we also created an intersection of individual PTA variable with meaningful margins (greater than 3 %) to estimate the average stumbling block effect from the products that receive large margins under all PTAs. In our dataset, 3.17 % of the products receive preferential access to the US market with meaningful margins under all of the above-mentioned PTAs.

f). "EVERYPTABookLarge": $EVBL_{it} = 1\ if\ BL_{ijt} = 1\ for\ all\ j;\ otherwise\ 0$ (14)

MFN tariff bounds and MFN Applied tariff are not the same. Estevadeordal *et al.* (2008) use MFN Applied tariffs in their analysis of PTAs affect trade liberalization in case of Latin American countries. Like them, we also intend to analyze the effect of full preferences in books in the presence of tariff bounds that constrain the Applied tariffs in case of the US. Therefore, for the year 1994, we first created bind_{94_i}. Then we created an interaction variable, for the group of products that get full preferences in books and are also bound by MFN tariff bounds

g). bind_94_i =1 if tar_ury_i <= AppliedT_MFN94_i+.05 (15)

(where i = product code at HTS-8)

h). ANYPTABookbind: $Bbind94_i = B_i$*bind_94_i (16)

(where i = product code at HTS-8)

As mentioned previously in our discussion, the actual tariffs may not be the same as the official tariffs. We believe the difference between the two is important and further analysis should provide some new insights. Therefore, we went ahead and created parallel binary variables for all of the above-mentioned variables using actual tariffs, instead of official tariffs.

[9] We borrow HI_EX from Limão (2006).

(Appendix B, Table B-2 contains the explanation of all the binary variables created using Actual tariffs).

Chapter 3 - Econometric Model

In this chapter, we describe the econometric model for analyzing the effects of PTAs on the US multilateral tariff policies. Since our motivation for this study came from Limão (2006), we begin by first describing his model. Then, we proceed by describing our econometric model and discussing the difference between the two approaches. Our benchmark model is Limão (2006), and though our basic framework is similar, we describe several variables differently than him. This means that we use several controls on our variables that our data suggest are important and could give a biased result if ignored.

3.1 Limão's Strategy

Linear approximation of Limão's (2006) empirical model is given as follows:

$$\tau_{it} = \emptyset G_i Z_T + \emptyset_2 Z_T + \emptyset_3 G_i + \alpha_t + \alpha_i + \alpha_{It} + \beta\left(b_t - b_t^k\right) + \left(-\rho * ma_t^k\right)1_i^k + \varepsilon_{it} \qquad (17)$$

where i=1… N and t=1, 2

Where, τ_{it} is a measure of the US MFN-bound ad valorem tariff rate negotiated in period t on product i. The indicator G_i denotes whether i is exported to the US under a PTA and Z_T is equal to one after the PTA and zero before it. A positive $\emptyset$ means an increase in the US MFN tariff on PTA goods relative to non-PTA goods. Limão controls for several factors to ensure, that the MFN tariffs of non-PTA goods provide a reasonable counterfactual for the MFN tariffs of PTA goods. He controls for all unobserved product characteristics through a full set of product dummies: α_i. Furthermore, α_{It} in his model controls for all time-varying unobserved characteristics (e.g., import penetration, labor intensity, and lobbying strength of domestic industries versus their foreign counterparts) of the group of goods i in each industry I during period t. The last two variables ($\beta\left(b_t - b_t^k\right)1_i^k$ & $\left(-\rho * ma_t^k\right)1_i^k$) respectively control for bargaining and reciprocity effects related to multilateral trade negotiations, which vary over time and products.

In the next step, Limão (2006) relaxes the symmetry assumption of the theoretical model and allows for multiple non-PTA countries to negotiate multilaterally with the US. He controls for any indirect effects on the US MTL that arises from other countries changing their MTL. In

the equation above, 1_i^k indicates whether country *k* exports good- *i* to the US and therefore, the last two variables in his model exhibit product variation (since each country *k* exports different sets of goods). These variables measure two important determinants of tariff changes during multilateral negotiations: the US bargaining power relative to country *k* and product tariff reciprocity. He initially assumes that the US is negotiating with a single country, *k*, and then generalizes this to multiple countries below. He takes the difference across the last two multilateral rounds to describe bargaining and reciprocity in his model. This eliminates the unobserved product characteristics (α_i) that we assume, remain constant over time and also account for market access concession.

$$\Delta\tau_{it} = \emptyset G_i + \emptyset_2 + \Delta\,\alpha_t + \Delta\alpha_{It} + \beta\Delta\left(b_t - b_t^k\right)1_i^k + \left(-\rho * \Delta ma_t^k\right)1_i^k + \varepsilon_{it} \qquad (18)$$

where *i*=1… N and *t*=1, 2

Limão uses relative GDP changes as a broad proxy for changes in bargaining power of an economy across rounds. He proposes that, relative economic size is crucial and conditional on the other variables. The idea is that a particular country *k* exporting good *i* is expected to obtain a relatively larger cut in the US tariff if, when comparing across the two trade rounds, either of the following holds: (a) country *k* is relatively better prepared for the negotiation, perhaps because it has more resources to dedicate to it; (b) *k* imports more of the US goods such that it has relatively high market power. His prediction is that an increase in k' s bargaining power relative to the US, as proxied by a fall in the log difference of GDP in the US and country *k*, $\left(b_t - b_t^k\right)$, causes the US to lower its tariff in the goods exported by *k*, i.e., $\beta > 0$.

He takes into account a potentially important determinant of differential liberalization across products, i.e. reciprocity-the extent to which the US reduces its tariffs by more when its partners offer larger tariff reductions. Reciprocity in multilateral negotiations is typically sought in first-differences (Bhagwati, 1991), i.e., negotiators focus on changes in protection as opposed to their level; these are often called market access concessions. If product reciprocity is followed, then the larger the aggregate market access concession *k* offers to the US, i.e., the larger Δma_t^k in

(18) is, the larger the US tariff reduction, -$\Delta\tau_{it}$, is on the products exported by *k.* Thus, if reciprocity is an important element in multilateral negotiation, we expect that, $\rho > 0$. [10]

Limão expresses the aggregate change in *k*'s market access as $\Delta ma_t^k = \Sigma_j(-\Delta\tau_{jt}^k)w_{jT}^k$, where $-\Delta\tau_{jt}^k$ is the percentage tariff reduction by *k* in each imported good *j.* For a given weight, larger reductions by *k* increase market access for the US and so, if negotiators reciprocate, then it leads to a lower US tariff in each good *i* that *k* exports to the US.

Limão addresses the issue of multiple exporters for any good *i* to the US as follows. According to the principal supplier rule in the GATT, countries negotiate only with the top exporters; so he aggregates the observations for each good *i* in (18) over its principal suppliers to the US using their individual export value as a share of their total value exported to the US, s_{iT}^k. Using this and the derived market access expression above, he wrote (18) in terms of estimable coefficients as

$$\Delta\tau_{it} = \emptyset G_i + a + a_I + \beta\Sigma_k s_{iT}^k \Delta\left(b_t - b_t^k\right) + \rho\Sigma_k s_{iT}^k(\Sigma_j \Delta\tau_{jt}^k w_{jT}^k) + u_i \qquad (19)$$

where, *i*=1… N and *t*=1, 2

Where a denotes an intercept that estimates the average MFN tariff change for the excluded industry (miscellaneous manufacturing); and a_I, represents the set of included industry dummies. He estimates (19) and tests if $\emptyset$ is positive. Moreover, if bargaining power and reciprocity are important determinants of multilateral tariff settings, then he expects β and ρ to be positive.

3.2 Proposed model

With Limão (2006) as our benchmark model we proceed by redefining some of his key variables and then incorporate the newly defined variables in his model. As discussed previously (Subsection 2.4, equation 2), Limão (2006) identifies products that get preference and are exported to the US under a PTA (Limao$_{ijt}$). The indicator G_i in equation 17 denotes whether product - i is exported to the US under a PTA. Essentially, Limao$_i$ (*i*=1…N) that we calculated is same as G_i (i=1…N) of Limão (2006). In the same section, we reason and introduce the binary variable B_{ijt}(equation 9) that is equal to 1 for the products that receive full preferential access in

[10] We may expect to find product reciprocity because, in the UR, negotiators used a product-by-product approach rather than agreeing to reduce tariffs across the board according to a formula (Bernard M. Hoekman and Michel M. Kostecki, 2001, p. 133).

books under a PTA, have positive MFN tariff and are exported to the US, otherwise zero. We borrow Limão's (2006) econometric model and replace his binary variable that identifies goods that get preference (G_i) with a more relevant and stringent binary variable B_i. Hence, our equivalent linear approximation of Limão (2006) model is:

$$\tau_{it} = \emptyset B_i Z_T + \emptyset_2 Z_T + \emptyset_3 B_i + \alpha_t + \alpha_i + \alpha_{It} + \beta\left(b_t - b_t^k\right) + \left(-\rho * ma_t^k\right)1_i^k + \varepsilon_{it} \qquad (20)$$

where, *i*=1… N and *t*=1, 2

Where, τ_{it} is a measure of the US MFN-bound ad valorem tariff rate negotiated in period *t* on product i. The indicator B_i denotes whether *i* is exported to the US under a PTA, receives full preference in the books and the MFN tariff on this product is positive. Z_T is equal to one after the PTA and zero before it. A positive $\emptyset$ means an increase in the US MFN tariff on PTA goods relative to 'non-PTA goods'[11]. Like Limão, we also control for several factors to ensure that the MFN tariffs of non-PTA goods provide a reasonable counterfactual for the MFN tariffs of PTA goods. We use Limão's (2006) control for all unobserved product characteristics through a full set of product dummies: α_i. Furthermore, α_{It} in the model controls for all time-varying unobserved characteristics (e.g., import penetration, labor intensity, and lobbying strength of domestic industries versus their foreign counterparts) of the group of goods i in each industry *I* during period: *t*. The last two variables ($\beta\left(b_t - b_t^k\right)1_i^k$ & $\left(-\rho * ma_t^k\right)1_i^k$) respectively control for bargaining and reciprocity effects related to multilateral trade negotiations, which vary over time and products.

We follow his steps and take difference across the last two multilateral rounds to describe bargaining and reciprocity in the model. This eliminates the unobserved product characteristics (α_i) that we assume, remain constant over time and also account for market access concession.

$$\Delta\tau_{it} = \emptyset B_i + \emptyset_2 + \Delta\,\alpha_t + \Delta\alpha_{It} + \beta\Delta\left(b_t - b_t^k\right)1_i^k + \left(-\rho * \Delta ma_t^k\right)1_i^k + \varepsilon_{it} \qquad (21)$$

where, *i*=1… N and *t*=1, 2

We borrow Limão's expression for the aggregate change in *k*'s market access as $\Delta ma_t^k = \Sigma_j(-\Delta\tau_{jt}^k)\, w_{jT}^k$, where $-\Delta\tau_{jt}^k$ is the percentage tariff reduction by *k* in each imported good

[11] In reference to our model 'non-PTA goods' represent the goods that do not receive full preferential access to the US market. (i.e. goods that do not receive any preference plus the goods that receive only partial preferences).

j. For a given weight, larger reductions by *k* increase market access for the US and so, if negotiators reciprocate, then it leads to a lower US tariff in each good *i* that k exports to the US.

To address the issue of multiple exporters for any good *i* to the US we use Limão's (2006) approach described in the previous section. Using Limão's s_{iT}^{k} and his derived market access expression above, we write (12) in terms of estimable coefficients as

$$\Delta\tau_{it} = \emptyset B_i + a + a_I + \beta\Sigma_k s_{iT}^{k}\Delta\left(b_t - b_t^{k}\right) + \rho\Sigma_k s_{iT}^{k}(\Sigma_j \Delta\tau_{jt}^{k} w_{jT}^{k}) + u_i \qquad (22)$$

where, *i*=1… N and *t*=1, 2

Where a denotes an intercept that estimates the average MFN tariff change for the excluded industry (miscellaneous manufacturing); and a_I, represents the set of included industry dummies. We estimate (22) and test if $\emptyset$ is positive. Also, if bargaining power and reciprocity are important determinants of multilateral tariff settings, then he expects β and ρ to be positive.

To check for the stumbling block effect from the group of products that receive partial preferences under any PTA in the US market we follow the approach of Karacaovali & Limão (2008). We estimate equation 22 with slight modification. We use 'G_i' (same as in Limão (2006)) instead of 'B_i'and an additional explanatory variable ' PB_i'. The variable 'G_i' takes the value of one if *i* is exported to the US under a PTA (includes both full and partial preferences). Whereas, PB_i is one for the subset of goods exported to the US with only partial preferential tariff (equation 11). We also conduct a formal test of summation in which the sum of these coefficients measures the total effect of goods with partial preferential tariff.

Since, we also want to investigate the stumbling block effect for actual tariffs, we also introduce the binary variable A_{ijt} (equation 7) which takes the value 1 for the products that actually receive full preferential access under a PTA, have positive MFN tariff and is exported to the US. For all other products A_{ijt} is zero. Therefore, we also estimate:

$$\Delta\tau_{it} = \emptyset A_i + a + a_I + \beta\Sigma_k s_{iT}^{k}\Delta\left(b_t - b_t^{k}\right) + \rho\Sigma_k s_{iT}^{k}(\Sigma_j \Delta\tau_{jt}^{k} w_{jT}^{k}) + u_i \qquad (23)$$

where, *i*=1… N and *t* = 1, 2

Till now we were measuring the stumbling block effect from various group of products on the US MFN bounds. As discussed previously there is a difference between the MFN bound

tariffs and the Applied Tariffs. We check for the stumbling block effect from the group of products that receive full preferences in books or in actual under any PTA on the US Applied tariffs. For this we estimate equation 22, but with '$\Delta A\tau_{it}$' as the explained variable instead of $\Delta\tau_{it}$ (difference in the US MFN tariff bounds). Where, '$\Delta A\tau_{it}$' represents the difference in the US Applied tariffs (year 1996-year 1989). The explanatory and variables remain the same[12] for book and actual respectively.

[12] We drop the reciprocity variable from the regression while estimating the effect of PTAs on the US Applied tariffs.

Chapter 4 – Estimates

We present the econometric results in 6 different tables. Tables 4.1, 4.2, 4.3 and 4.4 present the changes in the US MFN tariff bounds while Tables 4.5 and 4.6 present the changes in the US MFN Applied tariffs. The mean reduction in the US tariff (Bounds and Applied) is presented in Appendix B, Table B-5. Results in Tables 4.1, 4.3 and 4.5 are based on official tariffs while results in Tables 4.2, 4.4 and 4.6 are based on actual tariffs. First, we consider the effects of products with full preferential access on the change in MFN tariff bounds both in absolute terms and relative to products with partial preferential access in Tables 4.1 and 4.2. In Tables 4.3 and 4.4, we consider the effects of products with large margin and large export participation as well as the effects of full preferential access across different preferential programs. Finally, in Tables 4.5 and 4.6, we focus on the effects of full preferential access on Applied MFN tariffs.

4.1 Book: Preferences under all PTAs versus preferences under some but not all PTAs and full preference versus partial preferences

In column 1 and 2 of Table 4.1, we estimate equation-22 using ordinary least square (OLS) and an instrumental variable approach respectively. While, columns 3 and 4 consider whether products with full official preferences in all PTAs differ from products with full preferential access in some PTAs only. Columns 5 and 6 consider the effects of full preferences relative to partial preferential access in books. The OLS results are shown in columns 1, 3 and 5 of Table 4.1. Columns 2, 4 and 6 of Table 4.1 have different specifications where we use GMM estimator and instrument for endogenous variables. All specifications include the same two digits of the harmonized standard industry dummies used in Limão (2006).

In column 1, the coefficient of B_i (ANYPTABook), is 1.084. We find that products receiving full preferential access to the US markets have a statistically significant stumbling block effect. The OLS estimation in column 1 may be biased due to presence of endogeniety. Thus, we also present and discuss the IV regression of column 1 in column 2. The estimate for the coefficient on B_i, $\emptyset$ in column two is 1.812; it is positive and statistically significant. Therefore, we find that products receiving full preferential access in books to the US markets have a statistically significant stumbling block effect on MFN tariff bounds.

In column 3, we check if the magnitude of the stumbling block effect varies over different goods depending on whether all PTA partners under consideration, as against some but not all PTA partners, export it to the US with full preferential access[13]. In column 3, the coefficient of the variable B_i suggests that products that receive full preferential access in some PTAs have a stumbling block effect. The coefficient of EVB_i (EVRPTAbook94) is not statistically significant. From the test of the sum of the coefficients for $B_i \; and \; EVB_i$, we reject the null hypothesis. These results imply that, the products that receive full preferential access in books under all PTAs have a stumbling block effect that is identical to the stumbling block effect of products that receive full preferential access in books under some PTAs but not all.

Following the same logic that due to endogeniety we might have a bias in the OLS regression in column 3, so we present IV approach for the same in column 4. We found that the coefficient of B_i suggests a stumbling block effect for goods that receive full preferential access to US market under some PTAs. Coefficient of EVB_i is 0.470 and statistically not significant. From the test of summation test of $B_i \; and \; EVB_i$, we reject the null hypothesis. We found that the stumbling block effect from products that get full preferences in books under all PTAs is identical to the stumbling block effect from products that get full preferences in books under some but not all PTAs.

Columns 5 and 6 investigate whether goods that receive partial rather than full preferential access cause any effect on multilateral tariff changes. The intuition from Karacaovali and Limão (2008) suggests that only products receiving full preferences should generate a stumbling block effect.[14] We use the same variable as Limão (2006) uses for representing the group of products that receive full or partial preferences under any PTA (anypta94[15]). In column 5, we use an OLS approach while in column 6 we use an IV-GMM approach. The coefficient of "anypta94" maintains a stumbling block effect and is significant. The sign of coefficient of PB_i(partialprefanybook) is negative and it is significant. From the summation test of

[13] The econometric model used in columns 3 and 4 is similar to the model used by Karacaovali and Limão (2008) for the case of European Union (EU). See column 2 of Table 2 of their paper. Limão (2006) follows similar modelling strategy but does not distinguish between full or partial prefrences. See Table 2 , columns 2 and 4 of their paper.

[14] The choice of variables to investigate this issue follows the paper by Karacaovali and Limão (2008) about the effects of preferential treatment in the EU's multilateral policy. See column 2 of Table 3 in their paper. In Table 4.2 we consider actual full preferences , something not considered in Karacaovali and Limão (2008).

[15] 'anypta94' is same as 'ANYPTA' in Limao(2006), (see Table 1A, Data Discription of Limao(2006))

"anypta94" and PB_i we reject the null hypothesis. Moreover, the coefficient of the sum is positive. This means that both goods with full preferences in books under any PTA and with partial preferences in books under any PTA have a stumbling block effect but the effect of the former is greater than the effect of the latter (1.388-0.818).

In column 6 we found that coefficient of "anypta94" is positive and significant. The sign of coefficient of PB_i is negative and significant. From the formal test we fail to reject the null hypothesis and conclude that on an average only products with full preferences under any PTA seem to cause a stumbling block effect using the official tariffs (book). This is in line with Karacaovali and Limão (2008) that conclude that partial preferences do not generate a stumbling block effect on MFN tariff bounds.

In our analysis[16] we found that products that get full preferences in books under any PTA show stumbling block effect. Our results in columns 1 and 2 of Table 4.1 are in line with Limão's (2006) results. The coefficient of B_i from column 2 (1.812) means that on an average the drop in US MFN tariff bounds on the products that receive full preferences in books is 1.8 percentage points less as compared to non PTA goods (good that do not receive full preferences). On the other hand, our estimates for B_i and EVB_i do not support the theory, that if a product receives full preferences in books under all of the above mentioned PTAs, then the stumbling block effect should be stronger, as compared to the products that receive full preferences under some PTAs but not all. In fact, columns 3 and 4 of table 4.1 show that we found no difference in the stumbling block effect generated from these two set of products. Our estimates from the OLS regression in column 5 contradict the results of Karacaovali and Limão (2008) and we found that the products receiving partial preferences in books under any PTA also have a stumbling block effect, though this effect is smaller than the products that get full preferences in books under any PTA. However, the IV regression in column 6 supports the results of Karacaovali and Limão (2008). We found that on average only products with full preferences in books cause a stumbling block effect on the MFN bound tariffs. Our instruments also pass IV tests (Hansen J and K-P) making these results reliable.

[16] We borrow our IVs from Limão (2006). We report only a few instruments like BARPOW, NTB, DS etc here (See Table 1A, Limao (2006) for details).
We also constructed new IVs to control for the endogeniety that could be caused by the variables we created (See Appendix B, Table B-3).

Table 4.1: Estimates of Stumbling Block and Multilateral Negotiation Effects: Preferences in book-full, Partial, any PTA and every PTA

Dependent variable: Tariff diff (Δτ)	OLS	IV-GMM	OLS	IV-GMM	OLS	IV-GMM
	(1)	(2)	(3)	(4)	(5)	(6)
B_i (∅)	1.084	1.812	1.085	1.791		
	(0.140)	(0.469)	(0.140)	(0.464)		
anypta94					1.388	2.174
					(0.229)	(0.390)
PB_i					-0.818	-2.846
					(0.171)	(0.875)
EVB_i			-0.011	0.470		
			(0.151)	(0.290)		
BARPOW (β)	0.009	0.009	0.009	0.009	0.009	0.008
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
TOTLIB (ρ)	-0.003	0.018	-0.003	0.017	-0.003	0.016
	(0.005)	(0.007)	(0.005)	(0.007)	(0.005)	(0.007)
TOT*NTB	-0.014	-0.080	-0.014	-0.078	-0.015	-0.077
	(0.009)	(0.013)	(0.009)	(0.013)	(0.009)	(0.013)
NTB	-0.895	-4.193	-0.895	-4.106	-1.009	-3.833
	(0.538)	(0.747)	(0.538)	(0.738)	(0.548)	(0.791)
DS	-0.573	-0.573	-0.572	-0.596	-0.591	-0.516
	(0.173)	(0.176)	(0.173)	(0.177)	(0.173)	(0.179)
Constant (a)	-3.046	-2.698	-3.045	-2.770	-3.340	-3.108
	(0.409)	(0.594)	(0.410)	(0.579)	(0.435)	(0.541)
Observations	5079	5079	5079	5079	5079	5079
K-P F statistics		217.65		111.75		7.748
Hansen's Jp		0.7255		0.7465		0.5869
$B_i + EVB_i$=0; p-val			(Reject)	(Reject)		
anypta94 + PB_i= 0; p-val					(Reject)	(Fail to reject)
No. of parameters	98	98	99	99	99	99
RED: 5 % significance; BLUE: 10 % significance						

4.2 Actual: Preferences under all PTAs versus preferences under some but not all PTAs and full preference versus partial preferences

As discussed previously, the official tariffs and the actual tariffs are often not the same. Therefore, Table 4.2 investigates the same issues discussed for Table 4.1, but in this case we use actual instead of official tariff measures. In particular, we estimate equation-23, using ordinary least square (OLS) and an instrumental variable approach, to find the stumbling block effect

caused by actual preferential tariffs on the US MFN tariff bounds. The results are described in columns 1 and 2. In terms of econometric model, the OLS results are shown in columns 1, 3 and 5 of Table 4.2. Columns 2, 4 and 6 of Table 4.2 have different specifications where we use GMM estimator and instrument for endogenous variables. All specifications include the same two digits of the harmonized standard industry dummies used in Limão 2006.

In column 1, the coefficient of A_i(ANYPTAactual), is 0.383. We find that products receiving actual full preferential access to the US markets have a statistically significant stumbling block effect on the MFN tariff bounds. The OLS estimation in column 1 may be biased due to endogeniety. Therefore, we also present and discuss the IV regression of column 1 in column 2. The estimate for the coefficient on A_i, $\emptyset$ in column two is 2.415, and is statistically significant. Therefore, we find that products receiving actual full preferential access to the US markets have a statistically significant stumbling block effect on the MFN tariff bounds.

In column 3 we check if the magnitude of the stumbling block effect varies over different goods depending on whether it receives full actual preferential access in the US by all its PTA partners as against some but not all PTA partners. In column 3, the coefficient of the variable A_i, $\emptyset$ suggests that products that receive actual full preferential access in some PTAs have a stumbling block effect on the MFN tariff bounds. The coefficient of EVA_i (EVERYPTAactual) is not statistically significant. From the test of the sum of the coefficients for A_i and EVA_i we fail to reject the null hypothesis. Meaning, we did not find any stumbling block effect on the MFN tariff bounds from goods that get actual full preferences under all PTAs.

Following the same logic from column 2, that due to endogeniety we might have a bias in the OLS regression in column 3, so we present IV approach to account for the same in column 4. We found that the coefficient of A_i, suggests a stumbling block effect for goods that receive actual full preferential access to US market under some PTAs. Coefficient of $EVA_i$is negative and statistically not significant. From the test of summation of coefficients of A_i and EVA_i we fail to reject the null hypothesis. Therefore, we found no stumbling block effect on the MFN tariff bounds from the products that receive actual full preference under all PTAs.

Columns 5 and 6 investigate whether goods that receive actual partial preference rather than actual full preferential access to the US market also have an effect on multilateral tariff changes. From the OLS estimation in column 5, we found that coefficient of 'anypta94' is

positive and statistically significant. The coefficient of PA_i (ParANYPTAactual) is negative and significant at 10 % level. From the summation test: anypta94 and PA_i we reject the null hypothesis. Therefore we found that both, the products that get actual full preference and the products that get actual partial preferences cause stumbling block effect on the MFN tariff bounds, but the stumbling block effect form the former is greater than the latter.

Column 6 takes the IV approach for column 5 to account for endogeniety. The coefficient of 'anypta94' suggests a significant stumbling block effect. The coefficient of PA_i is negative and significant. From the summation test: anypta94 + PA_i we fail to reject the null hypothesis. Therefore, we found that only the products with actual full preferences seem to cause (on average) a stumbling block effect on the MFN tariff bounds.

In our analysis we found that products that get full preferences in actual under any PTA show a stumbling block effect. The coefficient of A_i from column 2 (2.415) above means, that on an average the drop in the US MFN tariff bounds on the products that receive actual full preferences is 2.4 percentage points less as compared to non PTA goods. Our results in columns 1 and 2 of Table 4.2 are in line with Limão (2006) results. On the other hand, our estimates for A_i and EVA_i do not support the theory that if a product receives full preferences in actual under all of the above mentioned PTAs then the stumbling block effect should be stronger for these products as compared to the products that receive full preferences under some PTAs but not all. In fact, columns 3 and 4 of table 4.2 shows that we did not find any stumbling block effect from the group of products that get actual full preferences under all PTAs.[17] Our estimates from the OLS regression in column 5 contradict the results of Karacaovali and Limão (2008) and we found that the products receiving partial preferences in actual under any PTA also have a stumbling block effect, though this effect is smaller than the products that get full preferences in actual under any PTA. However, the IV regression in column 6 supports the results of Karacaovali and Limão (2008). We found that on average only products with actual full preferences cause a stumbling block effect.

[17] Notice that our results also differ from Karacaovali and Limão (2008), where they use official full preferences in case for EU.

Table 4.2: Estimates of Stumbling Block and Multilateral Negotiation Effects: Actual preferences-full, Partial, any PTA and every PTA

Dependent variable: Tariff diff (Δτ)	OLS	IV GMMS	OLS	IV GMMS	OLS	IV GMM
	(1)	(2)	(3)	(4)	(5)	(6)
A_i (∅)	0.383	2.415	0.382	2.159		
	(0.095)	(0.653)	(0.095)	(0.494)		
anypta94					1.235	2.289
					(0.232)	(0.398)
PA_i					-0.163	-1.648
					(0.099)	(0.467)
EVA_i			0.725	-12.035		
			(1.722)	(39.379)		
BARPOW (β)	0.011	0.006	0.011	0.007	0.010	0.008
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
TOTLIB (ρ)	-0.003	0.025	-0.003	0.024	-0.003	0.023
	(0.005)	(0.007)	(0.005)	(0.007)	(0.005)	(0.007)
TOT*NTB	-0.015	-0.085	-0.015	-0.084	-0.016	-0.085
	(0.009)	(0.014)	(0.009)	(0.014)	(0.009)	(0.013)
NTB	-1.121	-4.531	-1.121	-4.465	-1.228	-4.655
	(0.544)	(0.784)	(0.544)	(0.769)	(0.544)	(0.766)
DS	-0.628	-0.653	-0.627	-0.685	-0.637	-0.674
	(0.179)	(0.190)	(0.179)	(0.194)	(0.178)	(0.181)
Constant (a)	-2.213	-2.280	-2.214	-2.140	-3.125	-2.443
	(0.402)	(0.568)	(0.402)	(0.513)	(0.438)	(0.537)
Observations	5079	5079	5079	5079	5079	5079
K-P F statistics		109.44		0.128		16.401
Hansen's *Jp*		0.6104		0.6465		0.7851
$A_i + EVA_i$=0; p-val			(Fail to reject)	(Fail to reject)		
anypta94 + PA_i =0; p-val					(Reject)	(Fail to reject)
No. of parameters	98	98	99	99	99	99

RED: 5 % significance; BLUE: 10 % significance

4.3 Book: Full preferences by PTA

According to Anson *et al.* (2005), "The costs involved in complying with the rules of origin (ROOs) can be greater than the gains stemming from the preferential treatment if the margin of preference is too small. As a result, small enough preference margins can be for practice purpose equivalent to no preferences." Furthermore, Estevadeordal *et al.* (2008)

suggests possible building block effects of large preferential margins " In particular, because sectors with higher preferential trade shares generate larger terms of trade losses vis-à-vis RTA partners for the preferential and MFN tariff, governments would benefit more by shifting sources to non members in those industries rather than in industries with lower preferential trading shares." They also show that 'higher preferential import shares are associated with reductions of MFN tariffs when meaningful preference margins are present'. We address these issues in our analysis below. Limão (2006) does not account for difference in size of preference. As discussed previously, we created several variables that differentiate the products with meaningful margins from the products that get preferences but these preferences are below 3 %. In this section we present our results for the same.

Table 4.3, Column 1 shows the OLS estimate of the effect from products with full official preferences and with large margins, on the US MFN tariff bounds. The coefficient of B_i is postitive and statistically significant suggesting a stumbling block effect (on tariff bounds) from the products that receive full preferences in the books. The coefficient of BL_i (ANYPTABooklarge94) is negative and statistically significant. From the summation test: $B_i + BL_i$, we reject the null. Hence, we found that the group of products that get full preferences with small margin in books under any PTA create a stumbling block effect on the MFN tariff bounds. Group of products that get full preferences with large margin in books under any PTA also create a stumbling block effect but this effect is smaller than the former group. On an average, the drop in the US MFN tariff bounds of the products that receive full preferences with large margin in books is 1-percentage points less.

Column 2 shows the IV GMM estimates for column 1. We created an additional IV ($BL78_{ij}$) to control for endogeniety of the variables identifying products with economic meaningful margins in the books (see Appendix B, Table B-3). The coefficient of B_i is postitive and statistically significant suggesting a stumbling block effect. The coefficient of BL_i is negative and statistically significant. From the summation test: $B_i + BL_i$, we reject the null. Therefore, we found that the group of products that get full preferences with small margin in books under any PTA create a stumbling block effect. Group of products that get full preferences with large margin in books under any PTA also create a stumbling block effect but this effect is smaller than the former group. Meaning, on an average, the drop in the US MFN tariff bounds of

the products that receive full preferences with large margin in books is 1.7 percentage points less as compared to non-PTA goods.

In column 3, the OLS estimation shows the effect from the goods with official full preferences, large margins and large exports. The coefficient of B_i is positive and statistically significant. The coefficient of $LEMB_{it}$ (LargeExportsandMarginBook) is positive but statistically not significant. From the summation test: $B_i + LEMB_{it}$ we reject the null hypothesis. Hence we found that the stumbling block effect from products that receive full preferences in any PTA in books but have either small margin or small export volume, is identical to the products that get full preferences in any PTA in the books but with big margin and large export volume. Therefore, our results do not completely support Estevadeordal *et al*. (2008) theory that 'higher preferential import shares are associated with reductions of MFN tariffs when meaningful preference margins are present'.

Column 4 shows the IV GMM estimates for the column 3. The coefficient of B_i is positive and statistically significant. The coefficient of $LEMB_i$ is positive and statistically not significant. From the summation test: $B_i + LEMB_i$ we reject the null hypothesis. Hence, we found that the stumbling block effect from products that receive full preferences in any PTA in books but have either small margin or small export volume, is identical to the products that get full preferences in any PTA in the books but with big margin and large export volume.

In columns 5 and 6, we investigate the effect of full preferential access in each PTA on US MFN tariff bounds. This is similar to the strategy employed in Limão (2006) and in Karacaovali & Limão (2008). Most importantly, it allows us to test whether the effects of full preferences vary between unilateral and bilateral preferential agreements. The coefficients of ATPA and CBI are statistically not significant. The coefficient of GSP (unilateral agreement) is positive and significant only at 10 % suggesting a stumbling block effect. The coefficients of Israel (FTA) and NAFTA (FTA) are significant at 5 % and also suggest a stumbling block effect. From the summation test (ATPA+ CBI+ GSP - ISRAEL- NAFTA), the coefficient of summation is positive and we reject the null. This suggests that unilateral agreements have a greater stumbling block effect than bilateral agreements in the case of the US.

Column 6 shows the IV GMM for column 5. The coefficients of ATPA, CBI and GSP are positive and statistically significant, suggesting a stumbling block effect from the goods that get

full preferential access to the US market under these above mentioned unilateral PTAs. The coefficient of Israel (FTA) is statistically not significant. The coefficient of NAFTA (FTA) is positive and statistically significant, suggesting a stumbling block effect from goods that get full preferential access to the US market in books under NAFTA (FTA). From the summation test: ATPA+CBI+GSP-ISRAEL-NAFTA=0, we reject the null hypothesis. The coefficient of summation test is positive. Therefore we found that the products imported from the FTAs like NAFTA and Israel have a smaller stumbling block effect as compared to products imported under unilateral preference like ATPA, CBI and GSP.

In our analysis we found a stronger stumbling block effect from the group of products that get full preferences in books but have small margins as compared to the group of products that have full preferences in the books but with large margins (column 1 & 2). Limão (2006) does not distinguish between small and large margins. Limão (2006) found a 48 % higher stumbling block effect from important exports (export value of good *i* from each given PTA exceeds the mean export value of that PTA to the US in all goods). We modified the definition of 'important exports', and as discussed previously created $LEMB_i$ to measure the effects of full preferences in books for products with significant exports and large margins. Also, shown in column 3 and 4 of Table 4.3, we found that the stumbling block effect on MFN tariff bounds, from products that receive full preferences in any PTA in books, but have either small margin or small export volume, is identical to the products that get full preferences in any PTA in the books, but with big margin and large export volume. As compared to Limão (2006) our result is more relevant if we consider the intuition from Estevadeordal *et al*. (2008): 'sectors with higher preferential trade shares generate larger terms-of-trade losses vis-à-vis RTA partners for given preferential and MFN tariffs, governments would benefit more by shifting sources to non members in those industries, rather than in industries with lower preferential trading shares.' We also found (columns 5 and 6) that the products getting full preference in books and imported via a unilateral PTA (ATPA, CBI and GSP) have a larger stumbling block than products getting full preferences in the books and imported via FTAs (NAFTA and ISRAEL). Our instruments also pass the IV tests making these results reliable.

Table 4.3: Estimates of Stumbling Block and Multilateral Negotiation Effects: Preferences in book by PTA and margins

Dependent variable: Tariff diff (Δτ)	OLS	IV-GMM	OLS	IV-GMM	OLS	IV-GMM
	(1)	(2)	(3)	(4)	(5)	(6)
B_i (∅)	1.708	5.398	1.083	1.792		
	(0.176)	(0.951)	(0.141)	(0.502)		
BL_i	-0.717	-3.689				
	(0.120)	(0.643)				
$LEMB_i$			0.010	0.747		
			(0.106)	(0.590)		
NAFTA					0.766	0.556
					(0.127)	(0.139)
ATPA					-0.120	0.501
					(0.119)	(0.171)
CBI					0.042	0.477
					(0.111)	(0.154)
GSP					0.227	0.839
					(0.116)	(0.266)
ISR					0.365	0.060
					(0.100)	(0.125)
BARPOW (β)	0.009	0.007	0.009	0.007	0.010	0.010
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
TOTLIB (ρ)	-0.003	0.015	-0.003	0.019	-0.002	0.021
	(0.005)	(0.007)	(0.005)	(0.007)	(0.005)	(0.007)
TOT*NTB	-0.014	-0.077	-0.014	-0.080	-0.015	-0.082
	(0.009)	(0.013)	(0.009)	(0.013)	(0.009)	(0.013)
NTB	-0.917	-4.066	-0.896	-4.232	-0.976	-4.256
	(0.536)	(0.741)	(0.537)	(0.752)	(0.542)	(0.760)
DS	-0.561	-0.461	-0.574	-0.643	-0.649	-0.731
	(0.172)	(0.184)	(0.173)	(0.190)	(0.175)	(0.180)
Constant (a)	-3.111	-3.509	-3.047	-2.775	-2.846	-2.332
	(0.407)	(0.610)	(0.409)	(0.600)	(0.410)	(0.461)
Observations	5079	5079	5079	5079	5079	5079
K-P F statistics		30.531		13.137		101.844
Hansen's Jp		0.3426		0.6837		12.939
$B_i + BL_i = 0$; p-val	(Reject)	(Reject)				
$B_i + LEMB_i = 0$; p-val			(Reject)	(Reject)		
ATPA+CBI+GSP-ISR-NAFTA=0; p-val					(Reject)	(Reject)
No. of parameters	99	99	99	99	102	102
RED: 5 % significance; BLUE: 10 % significance						

4.4 Actual: Full preferences by PTA

We then repeated the same exercise with Actual Tariffs and the results are presented in Table 4.4. Column 1 shows the OLS estimate of the effect from products with full actual preferences and with large margins, on the US MFN tariff bounds. The coefficient of A_i is positive and statistically significant. Meaning, on an average, the drop in the US MFN tariff bounds of the products that receive full actual preferences is 0.8 percentage points less as compared to non-PTA goods. While the coefficient of AL_i(ANYPTAactuallarge) is negative and statistically significant. From the summation test: $A_i + AL_i$ we reject the null hypothesis. Thus we found that the set of products that get actual full preferences with small margin under any PTA create a stumbling block effect. Group of products that get actual full preferences with large margin under any PTA also create a stumbling block effect but this effect is smaller than the prior: (0.882 - 0.598)

Column 2 gives the IV GMM estimates for column 1. We created an additional IV ($AL78_{ij}$) to control for endogeniety of the variables identifying products with economic meaningful margins in actual (see Appendix B, Table B-3). The coefficient of A_i suggests a significant stumbling block effect. The coefficient of AL_i is negative and statistically significant and from the test of the two we reject the null hypothesis. Therefore our IV results are in concurrence with our OLS results. Both create stumbling block effect but the effect from the group of products that get actual full preferences with small margin under any PTA have a stronger effect than the group of products that get actual full preferences with large margin under any PTA: 9.045-8.009

The OLS estimate in column 3 shows that the coefficient of A_i is 0.4 and statistically significant. The coefficient of $LEMA_i$ (LargeExportsandMarginActual) is statistically not significant. From the test of summation of the two variables we reject the null hypothesis. The stumbling block effect of products that receive full preferences in any PTA in actual but have either small margin or small export volume, is the same as for the group of products that get full preferences in any PTA in actual but with big margin and large export volume.

Column 4 presents the IV-GMM estimation for column 3. These results are in concurrence with the OLS estimation and we found that the stumbling block effect from the products that receive full preferences in any PTA in actual but have either small margin or small

export volume, is the same as from the group of products that get full preferences in any PTA in the actual but with big margin and large export volume.

Column 5 gives us the OLS estimates of stumbling block effect from individual PTAs. The coefficients of ATPA, CBI and GSP are positive but statistically not significant. The coefficient of Israel (FTA) is positive and significant at 5 %. The coefficient of NAFTA (FTA) is positive but statistically insignificant. The summation test shows that on average there is no distinction between FTAs and unilateral preferential programs.

Column 6 shows the IV GMM for column 5. The coefficients of ATPA, CBI and GSP are positive and significant suggesting a stumbling block effect on the US MFN tariff bounds. The coefficient of ISRAEL is positive and statistically significant at 10 %, also suggesting a stumbling block effect. The coefficient of NAFTA is negative and statistically not significant. From the summation test, we reject the null (ATPA+CBI+GSP-ISRAEL-NAFTA=0). Hence, we concur that on an average the unilateral programs cause a greater stumbling block effect on the US MFN tariff bounds than FTAs.

In our analysis we found a stronger stumbling block effect from the group of products that get full preferences in actual but have small margins as compared to the group of products that have full preferences in actual but with large margins (column 1 & 2). As mentioned above, Limão -2006 does not distinguish between small and large margins. As shown in column 3 and 4 of Table 4.4, we found that the stumbling block effect from products that receive full actual preferences in any PTA but have either small margin or small export volume, is identical to the products that get full actual preferences in any PTA but with big margin and large export volume. We also found (columns 6) that the products getting full actual preference and imported via a unilateral PTA (ATPA, CBI and GSP) have a larger stumbling block than products getting full preferences in the books and imported via FTAs (NAFTA and ISRAEL). Our instruments pass the IV tests of over-identification and under-identification suggesting that our instruments are strong.

Table 4.4: Estimates of Stumbling Block and Multilateral Negotiation Effects: Actual preferences by PTA and margins

Dependent variable: Tariff diff (Δτ)	OLS	IV GMM	OLS	IV GMM	OLS	IV GMM
	(1)	(2)	(3)	(4)	(5)	(6)
A_i (Ø)	0.882	9.045	0.411	2.573		
	(0.148)	(1.798)	(0.098)	(0.668)		
AL_i	-0.598	-8.009				
	(0.137)	(1.575)				
$LEMA_i$			-0.167	-1.176		
			(0.137)	(1.284)		
NAFTA					0.082	-0.018
					(0.124)	(0.135)
ATPA					0.052	0.923
					(0.127)	(0.237)
CBI					0.146	0.994
					(0.120)	(0.226)
GSP					0.090	2.245
					(0.119)	(0.743)
ISR					0.443	0.289
					(0.096)	(0.148)
BARPOW (β)	0.010	0.005	0.011	0.008	0.011	0.010
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
TOTLIB (ρ)	-0.003	0.019	-0.003	0.022	-0.003	0.021
	(0.005)	(0.008)	(0.005)	(0.007)	(0.005)	(0.007)
TOT*NTB	-0.014	-0.077	-0.015	-0.083	-0.014	-0.082
	(0.009)	(0.014)	(0.009)	(0.013)	(0.009)	(0.013)
NTB	-1.122	-4.438	-1.106	-4.372	-1.119	-4.469
	(0.543)	(0.839)	(0.543)	(0.791)	(0.544)	(0.777)
DS	-0.604	-0.308	-0.621	-0.614	-0.675	-0.799
	(0.178)	(0.235)	(0.179)	(0.201)	(0.179)	(0.195)
Constant (a)	-2.244	-2.786	-2.215	-2.319	-2.144	-1.336
	(0.401)	(0.660)	(0.402)	(0.564)	(0.401)	(0.457)
Observations	5079	5079	5079	5079	5079	5079
K-P F statistics		12.985		9.034		23.796
Hansen's *Jp*		0.6205		0.7004		15.993
$A_i + AL_i$=0; p-val	(Reject)	(Reject)				
$A_i + LEMA_i$ =0; p-val			(Reject)	(Reject)		
ATPA+CBI+GSP-ISR -NAFTA=0; p-val					(Fail to reject)	(Reject)
No. of parameters	99	99	99	99	102	102
RED: 5 % significance; BLUE: 10 % significance						

4.5 Book: Applied Tariffs

Estevadeordal *et al.* (2008) use Applied tariffs in their study on Latin American countries. As discussed before, applied tariffs often change between the two WTO rounds. Therefore, we check how the US MFN Applied tariffs change in relation to the PTAs in Table 4.5. Meaning, we investigate the stumbling block effect on the US Applied MFN tariffs caused by products receiving full preferential tariffs in books. The OLS results are showed in columns 1, 3 and 5 of Table 4.5. Columns 2,4 and 6 of Table 4.5 have different specifications where we use GMM estimator and instrument for endogenous variables. All specifications include the same two digits of the harmonized standard industry dummies used in Limão 2006.

Column 1 shows the OLS estimation but with $\Delta A\tau_{it}$ (see Appendix B, Table B-3) as the explained variable. The coefficient of B_i, in column one is 0.053. The direction of the effect is in line with the results found in column 1 of Table 4.1, but the coefficient is not statistically significant. Therefore, we did not find any statistically significant stumbling block effect on the Applied tariffs from the group of products receiving full preferential access in the books to the US markets. The OLS estimation in column 1 may be biased due to presence of endogeniety. Hence, we also present and discuss the IV regression for column 1 in column 2. The estimate for the coefficient on B_i, in column two is 0.182 and it is statistically not significant. Therefore, we find that products receiving full preferential access in books to the US markets do not have any statistically significant stumbling block effect on the US Applied MFN tariffs.

In column 3 and 4, we investigate the effect of full official preferences in the presence of tariff bounds that restrict the Applied tariffs. For this purpose we created two new variables ($Bbind94_i$ *and* $bind\_94_i$)[18] that we have discussed above in section 2.4. In the OLS estimation shown in column 3, the coefficient of B_i is -0.281 and statistically significant at 10 % level. Meaning, on an average, the drop in the US MFN Applied tariff of the products that receive full official preferences is 0.281 percentage points more as compared to non-PTA goods that are also not bound by the MFN tariff bounds. The coefficient $bind\_94_i$ suggesting that on an average, the drop in the Applied tariffs for the goods constraint by tariff bindings is 0.38 percentage points less as compared to the non-PTA goods that are also not constraint by tariff bindings. We

[18] To control for endogeniety that could be caused by the new variables, we also constructed a new IV-barpowerbind94 (see appendix B, Table B-3).

found a similar effect for goods that received full preferences in books and were restricted by tariff bindings ($Bbind94_i$). From the summation test: ANYPTAbook94 + .68*ANYPTAbookbind94 = 0, we fail to reject the null hypothesis.[19] Therefore, we did not find any stumbling block effect on the US Applied tariffs from the products that get full preference in books under any PTA and are constraint by the US MFN bound tariffs.

Column 4, gives the IV GMM estimates for column 3. The coefficient of B_i is negative and statistically not significant. The coefficient of $bind\_94_i$ is more in line with the intuition that the Applied tariffs restricted by MFN tariff bounds tend to fall more in order to comply with WTO regulations. The coefficient of $Bbind94_i$ is positive and statistically not significant. From the summation test of the variables we fail to reject the null hypothesis. Therefore, we did not find any statistically significant effect from the group of products that get full preferences in the books under any PTA and are constraint by the MFN tariff bounds on the US Applied tariffs.

Column 5 gives us the OLS estimates of stumbling block effect from the individual PTAs. It is basically equivalent to Table 4.3, column 5 but the explained variable is '$\Delta A\tau_{it}$' in this case. The coefficient of NAFTA is positive and statistically significant, suggesting a stumbling block effect on the US Applied MFN tariff from the products receiving full preferential access in books, to the US market under NAFTA. The coefficient of GSP is negative and statistically significant. The coefficients of other PTAs are not significant. From the summation test: ATPA + NAFTA=0 we reject the null hypothesis. Since the coefficient of the summation test is positive, we found that full preferences in the book for the two regimes (NAFTA and ATPA) on average have a stumbling block effect on the US MFN Applied tariffs. Column 6 shows the IV GMM for the above column. The coefficients of all the PTAs are statistically not significant. Additionally, we failed to reject the summation test (ATPA + NAFTA=0). Therefore, we did not find any significant effect from goods that get full preferences in books under the FTAs (NAFTA & Israel) or the unilateral trade agreements (ATPA, CBI & GSP). We are aware of the limitation of these results, as the instruments seem to be weak but the F-statistics shows a p-value equal to zero, i.e., the summation of coefficients (including the binary variables) is different from zero.

[19] Notice that the effect of the products receving full preferences in books, on the US Applied tariffs is the summation of the coefficients of ANYPTAbook94 and ANYPTAbookbind94 multiplied by 0.68 (the mean value of $bind\_94_i$).

Table 4.5: Estimates of Stumbling Block and Multilateral Negotiation Effects: Applied tariffs and preferences in books

Dependent variable: Tariff diff (ΔAτ)	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
B_i (Ø)	0.053	0.182	-0.281	-0.574		
	(0.062)	(0.145)	(0.152)	(0.917)		
$Bbind94_i$			0.377	1.083		
			(0.166)	(1.140)		
$bind\_94_i$			0.379	-5.559		
			(0.192)	(0.833)		
NAFTA					0.215	1.016
					(0.067)	(1.041)
ATPA					-0.003	0.071
					(0.059)	(0.111)
CBI					-0.078	0.024
					(0.060)	(0.120)
GSP					-0.163	-0.120
					(0.068)	(0.217)
ISR					0.053	-0.063
					(0.047)	(0.128)
BARPOW (β)	0.003	0.002	0.006	0.087	0.004	0.001
	(0.001)	(0.001)	(0.003)	(0.015)	(0.001)	(0.002)
barrowpowerbind94			-0.004	-0.112		
			(0.004)	(0.019)		
NTB	0.311	0.087	0.330	0.113	0.293	0.314
	(0.111)	(0.073)	(0.116)	(0.144)	(0.108)	(0.240)
DS	-0.048	0.014	0.087	-0.132	-0.036	0.051
	(0.080)	(0.075)	(0.360)	(0.705)	(0.080)	(0.146)
Constant (a)	-0.634	-0.744	-0.776	3.423	-0.598	-1.385
	(0.192)	(0.232)	(0.241)	(0.722)	(0.200)	(0.748)
Observations	4546	4546	4336	4336	4546	4546
K-P F statistics		253		11		2.37
Hansen's *Jp*		0		0.04		0.09
ANYPTAbook94 + 0.68*ANYPTAbookbind94			(Fail to reject)	(Fail to reject)		
NAFTA +ATPA=0					(Reject)	(Fail to reject)
No. of parameters	94	94	96	96	98	98

RED: 5 % significance; BLUE: 10 % significance

4.6 Actual: Applied Tariffs

In Table 4.6, we estimate the stumbling block effect on the US Applied MFN tariffs caused by the actual preferential tariffs. The OLS results are showed in columns 1, 3 and 5 of Table 4.6. Columns 2,4 and 6 of Table 4.6 have different specifications where we use GMM estimator and instrument for endogenous variables. All specifications include the same two digits of the harmonized standard industry dummies used in Limão 2006.

In column 1, the coefficient on A_i, in column one is 0.074. The direction of the effect is in line with the results found on column 1 of Table 4.2 but the coefficient is not statistically significant. Therefore, no stumbling block effect was found on the Applied tariffs from the group of products that that products receiving full actual preferential access to the US markets. The OLS estimation in column 1 may be biased due to endogeniety. Thus, we also present and discuss the IV regression of column 1 in column 2. The estimate for the coefficient on A_i, in column 2 is 0.339, and it is statistically significant at 10 % level. Therefore, we find that products receiving full actual preferential access to the US markets do create a stumbling block effect. Meaning, on an average, the drop in the US MFN Applied tariff of the products that receive full preferences in actual is 0.34 percentage points less as compared to non-PTA goods.

In column 3, we investigate the effect of full actual preferences in the presence of tariff bounds that constrain the Applied tariffs. The OLS estimates of the coefficients of A_i and $Abind94_i$ are statistically not significant. From the summation test: A_i + .68*$Abind94_i$=0, we fail to reject the null hypothesis. Therefore, we did not find any stumbling block effect on the US Applied tariffs from the products that get full actual preferences under any PTA and are constraint by the US MFN bound tariffs. Column 4 gives the IV GMM estimates for column 3. The coefficients of A_i and $Abind94_i$ are statistically not significant. The coefficient of $bind94_i$ is more in line with the intuition, that on an average the Applied tariffs constraint by the tariff bounds should drop more in order to comply with the WTO regulations. From the summation test of the variables we fail to reject the null hypothesis. Therefore we did not find any statistically significant effect on the US Applied tariffs from the group of products that get full actual preferences under any PTA and are constraint by MFN bound tariffs.

Column 5 gives us the OLS estimates of stumbling block effect from the individual PTAs. The coefficient of NAFTA is positive and statistically significant, suggesting a stumbling

block effect. The coefficients of other PTAs are not statistically significant. From the summation test: ATPA + NAFTA=0 we fail to reject the null hypothesis. Therefore, we found that full preferences in the book for the two regimes (NAFTA and ATPA) on average do not have any stumbling block effect on Applied MFN Applied tariffs. Column 6 shows the IV GMM for column 5. The coefficients of all the PTAs are statistically not significant. Therefore, we did not find any significant effect from goods that get full actual preferences under the FTAs (NAFTA & Israel) or the unilateral trade agreements (ATPA, CBI & GSP). From the summation test also, we fail to reject the null hypothesis. Therefore, we did not find any stumbling block effect in total. We are aware of the limitation of these results, as the instruments seem to be weak but the F-statistics shows a p-value equal to zero, i.e., the summation of coefficients (including the binary variables) is different from zero.

Table 4.6: Estimates of Stumbling Block and Multilateral Negotiation Effects: Applied tariffs and Actual preferences

Dependent variable: Tariff diff ($\Delta A\tau$)	OLS	IV	OLS	IV GMMS	OLS	IV GMM
	(1)	(2)	(3)	(4)	(5)	(6)
A_i (∅)	0.074	0.339	-0.028	-0.265		
	(0.054)	(0.200)	(0.142)	(1.241)		
$Abind94_i$			0.096	0.876		
			(0.147)	(1.567)		
bind_94$_i$			0.625	-5.424		
			(0.176)	(0.889)		
NAFTA					0.172	0.492
					(0.070)	(1.226)
ATPA					0.004	0.125
					(0.068)	(0.146)
CBI					-0.065	0.128
					(0.069)	(0.152)
GSP					-0.094	-0.156
					(0.066)	(0.513)
ISR					0.056	0.058
					(0.045)	(0.116)
BARPOW (β)	0.003	0.002	0.006	0.090	0.003	0.001
	(0.001)	(0.001)	(0.003)	(0.014)	(0.001)	(0.002)
barpowerbind94			-0.004	-0.117		
			(0.004)	(0.017)		
NTB	0.309	0.092	0.346	0.141	0.297	0.115
	(0.109)	(0.070)	(0.112)	(0.140)	(0.107)	(0.118)
DS	-0.052	-0.001	0.081	-0.122	-0.039	-0.004
	(0.080)	(0.075)	(0.368)	(0.705)	(0.080)	(0.156)
Constant (a)	-0.634	-0.808	-1.000	3.263	-0.620	-0.800
	(0.185)	(0.235)	(0.237)	(0.774)	(0.185)	(0.441)
Observations	4546	4546	4336	4336	4546	4546
K-P F statistics		123.8		11.521		1.329
Hansen's *Jp*		0		0.0346		0.0411
A_i + 0.68*$Abind94_i$=0			(Fail to reject)	(Fail to reject)		
NAFTA +ATPA=0					(Fail to reject)	(Fail to Reject)
No. of parameters	94	94	96	96	98	98
RED: 5 % significance; BLUE: 10 % significance						

Chapter 5 - Conclusion

We analyze the effect of PTAs on US multilateral liberalization. The effects of the formation of PTAs on multilateral tariffs policies have been an important topic of discussion in the literature for the last two decades and this is particularly true for the case of the US economy. Our modeling strategy borrows a great deal from Limão (2006). We modify it to present some new insights on the impact of the PTAs on US MTL. Using the detailed data from USITC, WTO on the US MFN bound & Applied tariffs and data used by Limão (2006) for other specifications we create subgroups of the US imports and present the effect on US MTL from these groups.

We found that the only the group of products that get full preferences under any PTA either in books or in actual generate a stumbling block effect on the US MFN tariff bounds. Unlike Limão (2006), we found no additional stumbling block effect from the group of products that received full preferences in books under all PTAs. Furthermore, in case of actual tariffs we did not find any stumbling block effect from the group of products that received full preferences in actual under all PTAs. Our results were in line with Karacaovali & Limão (2008), as we also found that on average the group of products that receive partial preferences in books or in actual under any PTA did not create any stumbling block effect.

We found that the group of products that get full preference with large margins in books or in actual have a smaller stumbling block effect as compared to the group of products that receive full preferences but in books or in actual but with small margins. Possibly, though the small margins are barely any preferences for practical purposes, owing to rules of origins and other NTBs, but are still considered worth holding on to by the PTA parties. The other reason for such a result could be large volume of exports that can make even the small margin beneficial to the exporting partners, we check for the same. We found that the stumbling block effect from products that receive full preferences in any PTA in books or in actual but have either small margin or small export volume, is identical to the products that get full preferences in any PTA in books or in actual but with big margin and large export volume.

One more important result from our analysis was that we found that the FTAs (NAFTA and ISRAEL) have a smaller stumbling block effect as compared to the unilateral trade agreements (ATPA, CBI and GSP). The obvious reason is the nature of the agreements. A

bilateral agreement like FTA (more focused on the exchange of preferential access) is entirely focused on trade issues while the unilateral agreements are a way of extending economic support to the beneficiary countries on non trade issues (helping them fight drugs, following labor laws, fighting terrorism etc.).

In our analysis, we did not find any statistically significant stumbling block effect on the US MFN Applied tariffs, form the group of products that receive full preferences in books under any PTA. But we did find the stumbling block effect on the US MFN Applied tariffs, form the group of products that receive full preferences in actual under any PTA. Our IV results concur with the intuition that on an average the Applied tariffs should fall more if constraint by MFN tariff bounds. We did not find any statistically significant stumbling block effect on the US Applied tariffs, from the group of products that get full preferences officially or in actual under any PTA, and are constraint by the US MFN bound tariffs. Most importantly, on an average we did not find any statistically significant stumbling block effect on the US MFN Applied tariffs from the two regimes (ATPA and NAFTA) that were created within the time frame (1989 -1996) that we consider for the US Applied tariffs in our analysis.

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Appendix A

Table A1: List of PTA partners in 1994

PTA	NAME	PTA	NAME	PTA	NAME	PTA	NAME
ISRAEL	Israel	GSP	Cayman Islands	GSP	Malta	GSP	Wallis, Futuna
NAFTA	Canada	GSP	Central African Rep.	GSP	Mauritius	GSP	Western Sahara
NAFTA	Mexico	GSP	Chad	GSP	Morocco	GSP	Western Samoa
ATPA	Bolivia	GSP	Chile	GSP	Mozambique	GSP	Yemen Ar. Rep
ATPA	Colombia	GSP	Christmas Island (Austr.)	GSP	Namibia	GSP	Zaire
ATPA	Ecuador	GSP	Cocos (Keeling)	GSP	Nepal	GSP	Zambia
ATPA	Peru	GSP	Comoros	GSP	New Caledonia	GSP	Zimbabwe
CBI	Anguilla	GSP	Congo	GSP	Nicaragua		
CBI	Antigua and Barbuda	GSP	Cook Islands	GSP	Niger		
CBI	Aruba	GSP	Cote d'Ivoire	GSP	Niue		
CBI	Bahamas, The	GSP	CROATIA	GSP	Norfolk Island		
CBI	Barbados	GSP	Cyprus	GSP	Oman		
CBI	Belize	GSP	Czech Republic	GSP	Pakistan		
CBI	Costa Rica	GSP	Djibouti	GSP	Palau		
CBI	Dominica	GSP	Egypt	GSP	Papua New Guinea		
CBI	Dominican Republic	GSP	Equatorial Guinea	GSP	Paraguay		
CBI	El Salvador	GSP	Estonia	GSP	Philippines		
CBI	Grenada	GSP	Ethiopia	GSP	Pitcairn Islands		
CBI	Guatemala	GSP	Falkland Islands	GSP	Poland		
CBI	Guyana	GSP	Fiji	GSP	Romania		
CBI	Haiti	GSP	French Polynesia	GSP	Russia		
CBI	Honduras	GSP	Gambia, The	GSP	Rwanda		
CBI	Jamaica	GSP	Ghana	GSP	Saint Helena		
CBI	Montserrat	GSP	Gibraltar	GSP	Sao Tome Principe		
CBI	Netherlands Antilles	GSP	Greenland	GSP	Senegal		
CBI	Panama	GSP	Guinea	GSP	Seychelles		
CBI	Saint Lucia	GSP	Guinea Bissau	GSP	Sierra Leone		
CBI	St Vincent and Grenadines	GSP	Heard, McDonald Isl.	GSP	Slovakia		
CBI	St. Kitts and Nevis	GSP	Hong Kong	GSP	Slovenia		

CBI	Trinidad and Tobago	GSP	Hungary	GSP	Solomon Islands
CBI	Turks and Caicos Islands	GSP	India	GSP	Somalia
CBI	Virgin Islands, British	GSP	Indonesia	GSP	South Africa
GSP	Albania	GSP	Jordan	GSP	Sri Lanka
GSP	Angola	GSP	Kazakhstan	GSP	Suriname
GSP	Argentina	GSP	Kenya	GSP	Swaziland
GSP	Bahrain	GSP	Kiribati	GSP	Tanzania
GSP	Bangladesh	GSP	Kyrgyzstan	GSP	Thailand
GSP	Benin	GSP	Latvia	GSP	Togo
GSP	Bhutan	GSP	Lebanon	GSP	Tokelau
GSP	BOSNIA-H	GSP	Lesotho	GSP	Tonga
GSP	Botswana	GSP	Lithuania	GSP	Tunisia
GSP	Brazil	GSP	Macau	GSP	Turkey
GSP	British Indian Ocean Territory	GSP	Macedonia	GSP	Tuvalu
GSP	Bulgaria	GSP	Madagascar	GSP	Uganda
GSP	Burkina Faso	GSP	Malawi	GSP	Ukraine
GSP	Burundi	GSP	Malaysia	GSP	Uruguay
GSP	Cameroon	GSP	Maldives	GSP	Vanuatu
GSP	Cape Verde	GSP	Mali	GSP	Venezuela

Appendix B

Table B-1

Binary Variable/ PTA'96	% of products that qualify				
	B_{it}	BL_{it}	A_{it}	AL_{it}	$Limao_{ijt}$
ATPA'96	11.9	7.6	8.8	5.5	12.2
CBI'96	18.5	11.9	12.5	7.9	18.9
GSP'96	35.2	26.8	8.9	6.0	35.2
ISRAEL'96	24.5	17.7	19.0	13.7	24.5
NAFTA'96	50.6	32.0	20.7	11.6	66.1

Source: author using data provided by Romali's dataset and USIT website

Table B-2

BOOK	
Binary Variable	% of products
ANYPTABook: B_i	61.46
ANYPTABooklarge: BL_i	48.05
EVERYPTABook: EVB_i	3.86
EVERYPTABookLarge: $EVBL_i$	3.17

Total products: 8625

Table B-3

Variable Name	Description
Δτ	$[(Uruguay\_t_{bounds}^{mfn}) - (Tokyo\_t_{bounds}^{mfn})]$
ΔAτ	US MFN Applied tariff 1996- US MFN Applied tariff 1989
ANYPTAactual: A_i	1 $if A_{ijt} = 1\ for\ any\ j;\ otherwise$ 0
ANYPTAactualLarge: AL_i	1 $if AL_{ijt} = 1\ for\ any\ j;\ otherwise$ 0
EVERYPTAactual: EVA_i	1 $if A_{ijt} = 1\ for\ all\ j\ ;\ otherwise$ 0
EVERYPTAactualLarge: $EVAL_i$	1 $if AL_{ijt} = 1\ for\ all\ \ j\ ;\ otherwise$ 0
ParANYPTAactual: PA_i	1 if Limao$_{ijt} = 1$ & $A_{ijt} = 1\ for\ any\ j\ ;\ otherwise$ 0
ParEVERYPTABook: $PEVB_{it}$	1 if Limao$_{ijt} = 1$ & $B_{ijt} = 0\ for\ all\ j\ ; otherwise$ 0
ParEVERYPTAactual: $PEVA_i$	1 if Limao$_{ijt} = 1$ & $A_{ijt} = 1\ for\ any\ j\ ;\ otherwise$ 0
"LargeExportsandMarginActual": $LEMA_{it}$	1 if a product gets full preferences in any PTA in actual with meaningful margins (greater than 3 %) and has large export volume (export value of good 'i' from any PTA exceeds the mean export value of that PTA to the Us in all goods.)
Anyprefbookfulllarge78: $BL78_{ij}$	1 $if\ BL_{ijt} = 1\ for\ any\ j\ and\ t = 1978\ ;\ otherwise$ 0
Anyprefactualfulllarge78: $AL78_{ij}$	1 $if AL_{ijt} = 1\ for\ any\ j\ and\ t = 1978\ ; otherwise$ 0
bind_94$_i$	1 if tar_ury_i <= AppliedT_MFN94$_i$+0.05
bind_78$_i$	1 if tar_Tky_i <= AppliedT_MFN89$_i$+0.05
ANYPTAactualbind: $Abind94_{\ i}$	A_i*bind_94
Anyexp78bind94	bind_78$_i$* anyexp94 {where 'anyexp94' is same as Limão (2006)}
barpowerbind94	bind_94$_i$ * barpow {where 'barpow' is same as Limão (2006)}

Table B-4

ACTUAL	
Binary Variable	**% of products**
ANYPTAactual: A_i	42.2
ANYPTAactualLarge: AL_i	32.29
EVERYPTAactual: EVA_i	.07
EVERYPTAactualLarge: $EVAL_i$	.01

Total products: 8625

Table B-5

Mean drop in tariff	BOOK		ACTUAL	
	PTA	Non PTA	PTA	Non PTA
MFN Tariff Bounds	2.7	4.2	2.7	3.5
MFN Applied Tariff	0.9	0.5	0.9	0.7