How do free trade agreements reduce tariff rates and non-tariff barriers?

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How Do Free Trade Agreements Reduce Tariff Rates and Non-tariff Barriers?

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Abstract

This paper empirically investigates how far free trade agreements (FTAs) successfully lower tariff rates and non-tariff barriers (NTBs) for manufacturing industries by employing the bilateral tariff and NTB data in a time series for countries around the world. We find that FTAs under GATT Article XXIV and the Enabling Clause contribute to reducing tariff rates by 2.1% points and 1.5% points, respectively. In the case of NTBs, their respective impacts are 6.6% points and 5.7% points. Membership in the World Trade Organization (WTO) does not contribute greatly to reducing tariff rates but does play a significant role in reducing NTBs. These results provide important implications for the literature on numerical assessments of FTAs.

Keywords: Tariff rates; non-tariff barriers; free trade agreement
JEL classification: F10; F13; F15

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How Do Free Trade Agreements Reduce Tariff Rates and Non-tariff Barriers?

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Abstract: This paper empirically investigates how far free trade agreements (FTAs) successfully lower tariff rates and non-tariff barriers (NTBs) for manufacturing industries by employing the bilateral tariff and NTB data in a time series for countries around the world. We find that FTAs under GATT Article XXIV and the Enabling Clause contribute to reducing tariff rates by 2.1% points and 1.5% points, respectively. In the case of NTBs, their respective impacts are 6.6% points and 5.7% points. Membership in the World Trade Organization (WTO) does not contribute greatly to reducing tariff rates but does play a significant role in reducing NTBs. These results provide important implications for the literature on numerical assessments of FTAs.

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1. Introduction

Trade liberalization through free trade agreements (FTAs) has recently played a central role in enhancing trade in the world. By May 2012, around 500 FTAs, counting goods and services notifications separately, had been notified to the WTO. From the viewpoint of tariff elimination, FTA member countries can enjoy the use of preferential tariff rates, which are lower than general tariff rates such as most favoured nation rates (MFN rates) in trading among FTA members. Also, FTAs contribute to reducing non-tariff barriers (NTBs). The scope of recent FTAs has significantly been

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broadened. Although the elimination of tariffs continues to be one of the major purposes, new FTAs tend to include provisions for various policy modes such as the mobility of persons, government procurement, competition policy, intellectual property rights protection, E-commerce, dispute settlement, labor standards, environmental policy, technical cooperation, institutional mechanisms, and so on. Some of these provisions will play a role in reducing NTBs among FTA members. As a result, such reduction of tariff rates and non-tariff barriers has led to a recent remarkable increase in world trade.

In the academic literature, a vast number of scholars have evaluated the trade creation effects of FTAs. In the ex-ante evaluation, a computable general equilibrium (CGE) model simulation is often conducted, which is the most widely utilized method to assess economic impacts of possible FTAs. In particular, many studies based on CGE models use variations of the GTAP (Global Trade Analysis Project) model. Such studies include those reviewed by Baldwin and Venables (1995), Park (2006), and Plummer and Wignaraja (2006). The recent CGE studies try to take care of not only tariff elimination but also the elimination of NTBs in possible scenarios of FTAs (e.g., Ando, 2009; Winchester, 2009; Petri et al., 2011). Those studies concluded that gains from FTAs would be much larger when both tariffs and NTBs are eliminated than when only tariffs are removed.

On the other hand, the ex-post evaluation often focuses on the existence of trade creation effects, namely positive impacts of FTAs on international trade. Such effects have been quantified by applying international trade data to the well-known gravity equation, which includes FTA dummy variables taking unity if trading partners belong to the same FTA and zero otherwise (e.g., Baier and Bergstrand, 2007; Caporale et al., 2009; Medvedev, 2010; Roy, 2010; and Vicard, 2009). In this sort of analysis, the coefficient for the FTA dummy represents total trade creation effects of FTAs, which are often proved to be significantly positive. In other words, these studies capture the sum of the impacts of tariff elimination and NTB reduction. Some other findings in these studies are also of interest. First, Baier and Bergstrand (2007) find that about half of the trade enhancing effect occurs during the first half of the typical 10-year interim period. Second, while Roy (2010) claims that the trade creation effect is larger in customs unions than in free trade agreements, Vicard (2009) finds that the magnitude of trade creation effects is not significantly different no matter what the type of FTAs is, including preferential arrangements, free trade agreements, and customs unions.

This paper is believed to be the first one that investigates the direct relation of tariff rates and NTBs with FTAs. Specifically, we examine how much FTAs have

succeeded in reducing tariff rates and NTBs separately. It is important to know the actual amount of reduction particularly for the more precise ex-ante investigation of FTA impacts. For example, Ando (2009) assumes in an ad hoc manner that trade facilitation measures lead to the enhancement of efficiency by 10%. Winchester (2009) assumes in his CGE simulation that FTA members' NTBs are completely eliminated. Petri et al. (2011) determine the magnitude of NTB reduction by scoring *subjectively* the coverage of 24 issues (e.g., dispute settlement) in the agreement and assume around 30%-60% reduction of NTBs. However, we do not know how far FTAs could *actually* reduce member countries' NTBs. It is unlikely that FTAs completely eliminate NTBs among the member countries. Our estimates on the reduction of NTBs by FTAs will provide a magnitude of reference when simulating the impacts of NTB reduction.

Our estimates on the reduction in tariff rates and NTBs through FTAs will also be useful to comprehend the above-mentioned findings in the ex-post studies. For example, our estimates may provide a clue to whether trade creation effects are due to tariff elimination or NTB reduction. Furthermore, examining the pattern of reductions in tariff rates and NTBs by different FTA types will contribute to uncovering differences in FTA impacts. Our estimates also yield information on FTAs' phase-in effects by examining reductions in tariff rates and NTBs during the years after the FTAs' entry into force. Our analysis thus makes the interpretation of gravity findings richer.

The difficulty of this study lies obviously in the data availability. However, recently, there have been some efforts toward the construction of databases of tariff rates and NTBs. We draw data on tariff rates from the World Integrated Trade Solution (WITS)[1] database developed by the World Bank, UNCTAD, International Trade Center (ITC), United Nations Statistical Division (UNSD), and World Trade Organization (WTO). This database includes detailed data on tariff rates in more than 200 countries from the year 1988. Basically, the bilateral tariff data on all available schemes (for example, not only MFN and FTAs but also the generalised system of preferences (GSP)) are ready to use. On the other hand, the data on NTBs are obtained from the ESCAP-World Bank Trade Cost Database, which includes country-pair specific NTBs for 158 countries during 1995-2010. These NTBs are estimated by employing the method proposed by Novy (2013). These data on tariff rates and NTBs are useful for examining the direct relation with FTAs.

In addition to FTAs, we also examine reductions in tariff rates and NTBs through WTO participation. The WTO has played a central role in enhancing trade

[1] http://wits.worldbank.org/WITS/.

around the world. After Rose (2004a), several studies were conducted on the trade creation effects of the WTO; see Chang and Lee (2007), Rose (2004b, 2005a, 2005b), Engelbrecht and Pearce (2007), Subramanian and Wei (2007), and Tomz, Goldstein, and Rivers (2007). Most of the studies employ the gravity equation to quantify the impacts of WTO membership on trade. Empirical evidence remains mixed.[2] Some studies find significantly positive impacts of WTO membership on trade, while others do not. Also in the case of WTO impacts, the main sources of trade creation effects should be coming from the reduction in both tariff rates and NTBs. Our study is the one that directly examines the existence of such sources of trade creation effects by the WTO.

The rest of this paper is organized as follows. The next section introduces our data sources and databases on tariff rates and NTBs. Section 3 reports the main empirical results on how much FTAs lower tariff rates and NTBs. Some more interesting findings in the extension of empirical studies are presented in Section 4. Last, Section 5 concludes the paper.

2. Databases on Tariffs and NTBs

2.1. Tariff Database

We draw all tariff data from TRAINS raw data provided by the WITS. As mentioned in the introductory section, the data include tariff rates in all available tariff schemes in more than 200 countries from the year 1988. In order to identify exactly all tariff schemes available for each country pair, we collect the information of the WTO, FTA member countries, and GSP beneficiaries, which is obtained from the WTO website, the Regional Trade Agreements Information System (RTAIS),[3] and several documents from the UNCTAD website[4] and official documents on websites of each country's national customs agency, respectively. Then, at a tariff-line level, we select

[2] Several studies by Andrew Rose cannot find robust positive impacts of WTO membership. Engelbrecht and Pearce (2007) and Subramanian and Wei (2007) analyze the impacts of the WTO membership on agricultural trade and find negatively significant impacts. Tomz, Goldstein, and Rivers (2007) conduct a careful gravity analysis by including zero trade and controlling for multilateral resistance but do not find robust positive impacts of WTO membership. On the other hand, Chang and Lee (2007) employ the propensity score matching method to tackle endogeneity and specification error in gravity exercises. As a result, they find robust positive impacts of WTO membership on trade.

[3] http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx.

[4] http://www.unctad.org/Templates/Page.asp?intItemID=1418&lang=1.

the lowest tariff rates among all schemes available for each country pair.[5] We aggregate all tariff-line level data at the six-digit level of the Harmonized System (HS) 1992 by using the converter tables in HS1992, HS1996, HS2002, and HS2007.[6] We take a simple average in aggregation. For missing data, we insert the most recent historical rates available.

There are some notes on data construction. First, for simplicity, we treat non-*ad valorem* tariff rates as missing. Also, we use *ad valorem* tariff rates in the case of mixed tariffs. Second, in our tariff database, only GSP beneficiaries identifiable in these documents are taken into account. Although lists of beneficiary countries are available for a specific year for each country, changes may occur—i.e., countries may graduate from being GSP beneficiaries. Therefore, the possibility of under-counting or over-counting GSP beneficiaries exists. Due to the same reason, we do not take fully into account country-product graduation from GSP schemes. Third, some countries do not necessarily report all tariff schemes. For example, countries that conclude an FTA might not report FTA preferential rates, particularly in the year when it enters into force. In this case, we may overestimate the lowest tariff rates.

In this paper, we focus on tariff rates in manufacturing industries. Specifically, our tariff rates at the six-digit level of HS1992 are converted to those at the two-digit level of ISIC Revision 3 (ISIC Revision 3, 15-36).[7] We take a simple average for this aggregation. Our focus on the manufacturing industries obviously decreases the magnitude of the above-mentioned underestimation in our treatment in non-*ad valorem* tariff rates because non-*ad valorem* tariff rates and mix tariff rates are mostly set for non-manufacturing industries, particularly agricultural goods. In order to have an enough number of sample importing countries in each year, we focus on the tariff rates during 1997-2010. As a result, our tariff data are not balanced-panel and consist of 178 countries (see Appendix).[8]

2.2. NTBs Database

[5] Namely, we assume that exporters always use the schemes with the lowest tariff rates though, in the real world, some exporters may be forced to use higher general tariff rates, such as MFN rates, because some fixed costs are incurred in using preferential tariff schemes (Demidova and Krishna, 2008).

[6] http://unstats.un.org/unsd/trade/conversions/HS%20Correlation%20and%20Conversion%20tables.htm.

[7] The conversion table is available at http://unstats.un.org/unsd/cr/registry/regdnld.asp?Lg=1.

[8] For more details on the construction of the tariff database, see Hayakawa (2013).

We totally rely on the ESCAP-World Bank Trade Cost Database to obtain the data on NTBs.[9] This database includes "comprehensive trade costs," τ_{ij}, which are calculated based on the formula derived in Novy (2013);

$$\tau_{ij} = \sqrt{\frac{t_{ij}t_{ji}}{t_{ii}t_{jj}}} - 1 = \left(\frac{x_{ii}x_{jj}}{x_{ij}x_{ji}}\right)^{\frac{1}{2(\sigma-1)}} - 1,$$

where τ_{ij} is geometric average comprehensive trade costs between countries i and j. t_{ij} and x_{ij} are trade costs from countries i to j and country i's consumption of products from country j. σ denotes elasticity of substitution. The database also includes the geometric average of tariff rates, TR_{ij};

$$TR_{ij} = \sqrt{\left(1 + \text{Tariff}_{ij}\right) \cdot \left(1 + \text{Tariff}_{ji}\right)},$$

where Tariff_{ij} denotes the simple average effective tariff rates in country i against products from country j.

NTBs are then calculated at a tariff-equivalent basis (%) as follows:

$$NTB_{ij} = 100 \cdot \left(\frac{1 + \left(\tau_{ij}/100\right)}{TR_{ij}} - 1\right).$$

This measure of NTBs includes *all additional costs other than tariff costs involved in trading goods bilaterally rather than domestically*. In order to maximize sample countries, we use the data of NTBs in which missing observations are filled in by employing the linear interpolation method (also obtainable from the ESCAP-World Bank Trade Cost Database). Finally, as mentioned in the introductory section, this NTBs database includes country-pair specific NTBs for 158 countries during 1995-2010. For the analysis presented below, we use NTBs for the manufacturing industry, in which the elasticity is set to eight in the database.

3. Empirical Analysis

This section first takes a casual look at the average of tariff rates and NTBs according to FTA status. Then, we conduct some regression analyses.

3.1. The First Look

[9] For more details, see "Note for Users," which is available on the following website: http://www.unescap.org/tid/artnet/db/usernote-2012.pdf.
Also, for other measures on NTBs, see Anderson and van Wincoop (2004).

Table 1 reports the simple average of tariff rates and NTBs according to the FTA status one year after its entry into force. Specifically, we consider two kinds of FTAs separately: FTAs under GATT Article XXIV and FTAs based on the Enabling Clause. From this table, we can see that both tariff rates and NTBs between FTA member countries in general, i.e., GATT24 ($t-1$) / Enabling Clause ($t-1$), are lower than those between countries not linked with any FTAs. The tariff rates are 9% between FTA members and 10% between countries not linked with any FTAs, while the NTBs are 155% between FTA members and 231% between countries not linked with any FTAs. Although the difference in tariff rates is small, the lower tariff rates and NTBs between FTA member countries are consistent with our expectation.

=== Table 1 ===

The table also shows that both tariff rates and NTBs are much lower between members of FTAs under GATT Article XXIV, at 4% and 121%, respectively. Thus, those members clearly have low tariff rates and NTBs. On the other hand, while NTBs are clearly lower between members of FTAs based on the Enabling Clause, tariff rates are higher between those members than between countries not linked with any FTAs. After all, these higher tariff rates are obviously due to selection effects of FTAs based on the Enabling Clause. Those FTAs are mainly for developing countries, which originally have much higher tariff rates. Thus, even after the conclusion of FTAs, such developing countries still have high tariff rates on average. This result suggests to us the necessity of controlling for the selection effects of FTAs in evaluating the reduction of tariff rates (and NTBs) through FTAs.

3.2. Regression Analysis

Simple analysis of the average of tariff rates and NTBs in the previous subsection suggests the necessity of controlling for the selection effects of FTAs. Indeed, it is well known in the gravity literature that the FTA dummy variable is not an exogenous variable so that its coefficient suffers from endogeneity biases. Baier and Bergstrand (2007) closely examine this issue. One possible way of addressing the endogeneity is the use of instruments. Baier and Bergstrand (2007) tried a wide array of economic and political instrument variables. However, they conclude that the instrument variable method is not a reliable method because of the lack of suitable instruments. Most of the variables that are correlated in cross-section with the probability of having an FTA are also correlated in cross-section with trade flows. As a

result, they demonstrate that the most plausible estimates of the FTA impacts on international trade are obtained from a gravity estimation using panel data with bilateral fixed effects. This estimation enables us to isolate the FTA impacts on bilateral international trade from any time-invariant country-pair-specific elements, some of which are related with the decision on the conclusion of the FTA and bilateral international trade as demonstrated by Baier and Bergstrand (2004).

A similar story applies to our context. For example, elements having influence on tariff rates, e.g., historical ties, may affect the decision on the FTA conclusion. If so, the simple regression of tariff rates on FTA dummy variables yields biased estimates. As is done in the gravity literature, we account for this issue by including country pair dummy variables. The regression of tariff rates (and NTBs) on FTA dummy variables with controlling time-invariant country-pair specific elements will tackle this selection issue. Also, in order to control for unobservable time-specific effects, we introduce year dummies.

The estimation results for tariff rates and NTBs are reported in Table 2. As shown in columns (I) and (IV), FTAs in general reduce tariff rates by 1.9% points and NTBs by 6.4% points. Column (II) shows that FTAs under GATT Article XXIV and the Enabling Clause contribute to reducing tariff rates by 2.1% points and 1.5% points, respectively. It is interesting that FTAs under GATT Article XXIV have a larger effect than those based on the Enabling Clause, maybe because the former FTAs require member countries to achieve a high degree of liberalization (discussed later). Column (V) shows that FTAs under GATT Article XXIV and the Enabling Clause contribute to reducing NTBs by 6.6% points and 5.7% points, respectively. Again, we find a larger reduction of NTBs by FTAs under GATT Article XXIV than by FTAs based on the Enabling Clause.

=== Table 2 ===

4. Further Analyses

This section presents some more results of our estimation. We first examine the reduction due to the WTO in addition to that due to FTAs. Second, we conduct some robustness checks. Third, we examine the reduction of tariff rates through FTAs by industry. Last, the time-series pattern of the reduction of tariff rates and NTBs through FTAs is investigated.

4.1. WTO and GSP

We examine the reduction of tariff rates and NTBs through not only FTAs but also joining the WTO. To do this, we introduce a WTO dummy variable, which takes one if both the exporter and the importer are WTO members and zero otherwise. In the case of tariff rates, we also introduce a GSP dummy variable, which takes one if the exporter is a beneficiary of the importer's GSP and zero otherwise, because the GSP program is also one of the important preferential tariff schemes. The results are reported in column (III) in Tables 2 and 3. The coefficients for FTAs under GATT Article XXIV and the Enabling Clause are not quantitatively and qualitatively changed much. While WTO membership reduces tariff rates by 0.5% points and has smaller impacts than FTAs, the reduction of tariff rates though the GSP is 3.4% points and is much larger than that through FTAs. On the other hand, NTBs are reduced through joining the WTO by 15.6% points, which is a much larger reduction than in the case of FTAs. These results can be summarized as follow. The WTO does not contribute greatly to reducing tariff rates but does play a significant role in reducing NTBs. The introduction of WTO rules such as GATT Article XIII (Non-discriminatory Administration of Quantitative Restrictions) or Article XVII (State Trading Enterprises) will account for such significant reduction of NTBs through joining the WTO. In addition, the GSP program seems to succeed in granting good market access to developing countries.

4.2. Robustness

In this subsection, we conduct some robustness checks. First, we take a log of tariff rates and NTBs because of two kinds of concern. One is that some countries, particularly developed countries, already have low tariff rates and NTBs and thus do not have much room to reduce those. Therefore, estimates of reduction through FTAs might not be precise in the case of those countries. The other is that, as is well known, FTAs under GATT Article XXIV require member countries to eliminate tariffs in "substantially" all the trade between member countries. In order to tackle these kinds of concern, we focus on percentage changes rather than percent point changes by employing the log-version of dependent variables. The results in the case of the log-version are reported in Table 3 and are not qualitatively changed. FTAs under GATT Article XXIV reduce tariff rates and NTBs more than FTAs under the Enabling Clause. The reduction in tariff rates is largest in the case of the GSP. The effect of WTO membership is trivial in the case of tariff rates but large in the case of NTBs.

=== Table 3 ===

Second, in order to tackle the above two kinds of concern more directly, we restrict sample countries only to developing countries. This restriction also contributes to accounting for another problem, the way of calculating NTBs. The NTBs are calculated by employing the geometric average trade costs and the geometric average of tariff rates. Thus, in the case between developed and developing countries, where many asymmetric tariff rates are likely to exist, NTBs may not be precisely computed. As a result, we estimate our models only for developing countries, specifically non-OECD countries.[10] We do not take logs of tariff rates and NTBs. The results are reported in Table 4 and show larger impacts than those in Table 2. Specifically, FTAs in general reduce tariff rates and NTBs by 2.3% points and 8.5% points, respectively. FTAs under GATT Article XXIV and the Enabling Clause contribute to reducing tariff rates by 2.5% points and 2.1% points, respectively. In the case of NTBs, their respective impacts are 8.1% points and 9.0% points.

=== Table 4 ===

4.3. Impacts on Tariff Rates by Industry

We examine the reduction of tariff rates by industry (two-digit level of ISIC Revision 3).[11] We estimate our model as in column (III) in Table 2, by industry. The results are reported in Table 5. Four major points should be noted. First, the GSP makes the largest contribution to reducing tariff rates in all industries. Second, there are some insignificant coefficients. FTAs based on the Enabling Clause do not have an influence on tariff rates in the office machinery industry, and WTO membership does not reduce tariff rates on rubber and plastic products and electrical machinery products. Third, the magnitude relation in reducing tariff rates between FTAs under GATT Article XXIV and those based on the Enabling Clause differs by industry. Last, the impacts of FTAs on tariff rates are large in food products and tobacco products but are small in machinery industries including general machinery, electric machinery, transport equipment, and precision machinery products.

[10] OECD countries include Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States.

[11] The data on NTBs are not available by industry.

=== Table 5 ===

4.4. Time-series Changes

Last, we explore time-series changes of the reduction in tariff rates and NTBs through FTAs. Specifically, we estimate our model as in columns (III) and (VI) in Table 2 by including not only one-year lagged FTA dummy variables but also up to fifteen-year lagged variables simultaneously. The coefficients for those lagged dummy variables in addition to the 95% confidence interval are depicted in Figures 1-4. For example, the coefficients for one-year-lagged and two-year-lagged GATT24 variables in the equation for tariff rates are estimated to be −1.0 and −1.1, respectively. This means that the cumulative effects of GATT Article XXIV on tariff rates up to two years after their entry into force are −2.1 (−1.0 plus −1.1).

=== Figures 1-4 ===

Our findings from these figures are as follow. Through FTAs under GATT Article XXIV, tariff rates are greatly reduced one or two years after their entry into force. We can see the lagged and further reduction six to eight years after their entry into force. Also, tariff rates are greatly reduced through FTAs under the Enabling Clause four years after their entry into force. A relatively large further reduction can be found six years after their entry into force. These “twin-peak” shapes in the case of tariff rates may be because, in most FTAs, the timing of the start of tariff reduction and the speed of tariff reduction differ for products listed in normal track lists and sensitive lists. On the other hand, the small reduction in NTBs through FTAs under GATT Article XXIV can be found every year after their entry into force, while the reduction of NTBs through FTAs under the Enabling Clause is detected two, three, and seven years after their entry into force.

5. Concluding Remarks

This paper empirically investigates the degree to which FTAs succeed in lowering bilateral tariff rates and NTBs in manufacturing industries on average. Our findings are summarized as follow. FTAs under GATT Article XXIV and the Enabling Clause contribute to reducing tariff rates by 2.1% points and 1.5% points, respectively. In the case of NTBs, on the other hand, their respective impacts are 6.6% points and 5.7% points. Also, WTO membership does not contribute greatly to reducing tariff

rates but does play a significant role in reducing NTBs. These results provide some implications for the literature of ex-ante and ex-post analyses of FTAs. First, our estimates on the reduction particularly of NTBs through FTAs contribute to serving as a reference magnitude when simulating the impacts of FTAs. Second, if we assume that a one percent reduction in tariff rates and NTBs increases trade by the same proportion, our results showing a larger reduction in NTBs implies that the main source of FTAs' trade creation effects is the reduction of NTBs rather than reduction of tariff rates.

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Appendix. Sample Countries

Country	Tariff	NTBs	Country	Tariff	NTBs
Afghanistan	YES	YES	Dominica	YES	YES
Angola	YES	NO	Denmark	YES	YES
Albania	YES	YES	Dominican Republic	YES	YES
United Arab Emirates	YES	YES	Algeria	YES	YES
Argentina	YES	YES	Ecuador	YES	YES
Armenia	YES	YES	Egypt	YES	YES
Antigua and Barbuda	YES	YES	Eritrea	YES	YES
Australia	YES	YES	Spain	YES	YES
Austria	YES	YES	Estonia	YES	YES
Azerbaijan	YES	YES	Ethiopia	YES	NO
Burundi	YES	YES	Finland	YES	YES
Belgium and Luxembourg	YES	YES	Fiji	YES	YES
Benin	YES	YES	France	YES	YES
Burkina Faso	YES	YES	Gabon	YES	YES
Bangladesh	YES	YES	United Kingdom	YES	YES
Bulgaria	YES	YES	Georgia	YES	YES
Bahrain	YES	YES	Ghana	YES	YES
Bahamas	NO	YES	Guinea	YES	YES
Bosnia and Herzegovina	YES	YES	Gambia	YES	YES
Belarus	YES	YES	Guinea-Bissau	YES	NO
Belize	YES	YES	Equatorial Guinea	YES	NO
Bermuda	YES	NO	Greece	YES	YES
Bolivia	YES	YES	Grenada	YES	YES
Brazil	YES	YES	Guatemala	YES	YES
Barbados	YES	YES	Guyana	YES	YES
Brunei Darussalam	YES	YES	Hong Kong	YES	YES
Bhutan	YES	YES	Honduras	YES	YES
Botswana	YES	YES	Croatia	YES	YES
Central African Republic	YES	YES	Haiti	YES	NO
Canada	YES	YES	Hungary	YES	YES
Switzerland	YES	YES	Indonesia	YES	YES
Chile	YES	YES	India	YES	YES
China	YES	YES	Ireland	YES	YES
C d'Ivoire	YES	YES	Iran	YES	YES
Cameroon	YES	YES	Iceland	YES	YES
Congo	YES	NO	Israel	YES	YES
Colombia	YES	YES	Italy	YES	YES
Comoros	YES	NO	Jamaica	YES	YES
Cape Verde	YES	YES	Jordan	YES	YES
Costa Rica	YES	YES	Japan	YES	YES
Cuba	YES	YES	Kazakstan	YES	YES
Cyprus	YES	YES	Kenya	YES	YES
Czech Republic	YES	YES	Kyrgyzstan	YES	YES
Germany	YES	YES	Cambodia	YES	YES
Djibouti	YES	NO	Saint Kitts and Nevis	YES	YES

(continue)

Country	Tariff	NTBs	Country	Tariff	NTBs
Korea	YES	YES	Paraguay	YES	YES
Kuwait	YES	YES	French Polynesia	YES	NO
Lao PDR	YES	NO	Qatar	YES	YES
Lebanon	YES	YES	Romania	YES	YES
Libyan Arab Jamahiriya	YES	NO	Russian Federation	YES	YES
Saint Lucia	YES	YES	Rwanda	YES	YES
Sri Lanka	YES	YES	Saudi Arabia	YES	YES
Lesotho	YES	YES	Sudan	YES	YES
Lithuania	YES	YES	Senegal	YES	YES
Luxembourg	YES	YES	Singapore	YES	YES
Latvia	YES	YES	Solomon Islands	YES	NO
Macau (Aomen)	YES	YES	El Salvador	YES	YES
Morocco	YES	YES	Suriname	YES	YES
Moldova, Rep.of	YES	YES	Slovakia	YES	YES
Madagascar	YES	YES	Slovenia	YES	YES
Maldives	YES	YES	Sweden	YES	YES
Mexico	YES	YES	Swaziland	YES	YES
Macedonia	YES	YES	Seychelles	YES	YES
Mali	YES	YES	Syrian Arab Republic	YES	YES
Malta	YES	YES	Chad	YES	NO
Burma	YES	NO	Togo	YES	YES
Mongolia	YES	YES	Thailand	YES	YES
Mozambique	YES	YES	Tajikistan	YES	NO
Mauritania	YES	YES	Turkmenistan	YES	YES
Montserrat	YES	NO	Tonga	YES	YES
Mauritius	YES	YES	Trinidad and Tobago	YES	YES
Malawi	YES	YES	Tunisia	YES	YES
Malaysia	YES	YES	Turkey	YES	YES
Namibia	YES	YES	Taiwan	YES	NO
Niger	YES	YES	Tanzania, United Rep. of	YES	YES
Nigeria	YES	YES	Uganda	YES	YES
Nicaragua	YES	YES	Ukraine	YES	YES
Netherlands	YES	YES	Uruguay	YES	YES
Norway	YES	YES	United States of America	YES	YES
Nepal	YES	YES	Uzbekistan	YES	NO
New Zealand	YES	YES	Saint Vincent and the Grenadines	YES	YES
Oman	YES	YES	Venezuela	YES	YES
Pakistan	YES	YES	Viet Nam	YES	YES
Panama	YES	YES	Vanuatu	YES	YES
Peru	YES	YES	Yemen	YES	YES
Philippines	YES	YES	South Africa	YES	YES
Palau	YES	NO	Congo	YES	NO
Papua New Guinea	YES	YES	Zambia	YES	YES
Poland	YES	YES	Zimbabwe	YES	YES
Portugal	YES	YES			

Table 1. Average Rates (%)

	Tariff Rates	NTBs
GATT24 ($t-1$) / Enabling Clause ($t-1$)	9	155
GATT24 ($t-1$)	4	121
Enabling Clause ($t-1$)	12	199
No FTAs ($t-1$)	10	231

Note: We calculate the simple average of tariff rates and NTBs according to FTA status one year after its entry into force.

Table 2. Results for All Manufacturing

	Tariff Rates			NTBs		
	(I)	(II)	(III)	(IV)	(V)	(VI)
GATT24 ($t-1$) / Enabling Clause ($t-1$)	-1.884***			-6.430***		
	[0.136]			[1.952]		
GATT24 ($t-1$)		-2.084***	-1.941***		-6.612***	-6.067***
		[0.124]	[0.122]		[1.861]	[1.844]
Enabling Clause ($t-1$)		-1.502***	-1.582***		-5.679*	-5.104*
		[0.189]	[0.182]		[3.029]	[3.039]
WTO			-0.481***			-15.639***
			[0.087]			[1.849]
GSP			-3.393***			
			[0.076]			
Pair Dummy	YES	YES	YES	YES	YES	YES
Year Dummy	YES	YES	YES	YES	YES	YES
Observaitons	340,725	340,725	340,725	68,456	68,456	68,456

Notes: ***, **, and * indicate, respectively, the 1%, 5%, and 10% levels of statistical significance. Robust standard errors are in parentheses.

Table 3. Results for All Manufacturing: A Log Version

	Tariff Rates			NTBs		
	(I)	(II)	(III)	(IV)	(V)	(VI)
GATT24 ($t-1$) / Enabling Clause ($t-1$)	-0.018***			-0.022***		
	[0.001]			[0.005]		
GATT24 ($t-1$)		-0.020***	-0.019***		-0.021***	-0.019***
		[0.001]	[0.001]		[0.005]	[0.005]
Enabling Clause ($t-1$)		-0.015***	-0.015***		-0.024***	-0.022***
		[0.002]	[0.002]		[0.008]	[0.008]
WTO			-0.005***			-0.051***
			[0.001]			[0.005]
GSP			-0.033***			
			[0.001]			
Pair Dummy	YES	YES	YES	YES	YES	YES
Year Dummy	YES	YES	YES	YES	YES	YES
Observaitons	340,725	340,725	340,725	68,456	68,456	68,456

Notes: ***, **, and * indicate, respectively, the 1%, 5%, and 10% levels of statistical significance. Robust standard errors are in parentheses.

Table 4. Results for Non-OECD Countries

	Tariff Rates		NTBs	
	(I)	(II)	(III)	(IV)
GATT24 ($t-1$) / Enabling Clause ($t-1$)	-2.315***		-8.454**	
	[0.271]		[4.051]	
GATT24 ($t-1$)		-2.542***		-8.117**
		[0.243}		[3.738]
Enabling Clause ($t-1$)		-2.083***		-8.977*
		[0.360]		[5.401]
Pair Dummy	YES	YES	YES	YES
Year Dummy	YES	YES	YES	YES
Observaitons	210,353	210,353	26,238	26,238

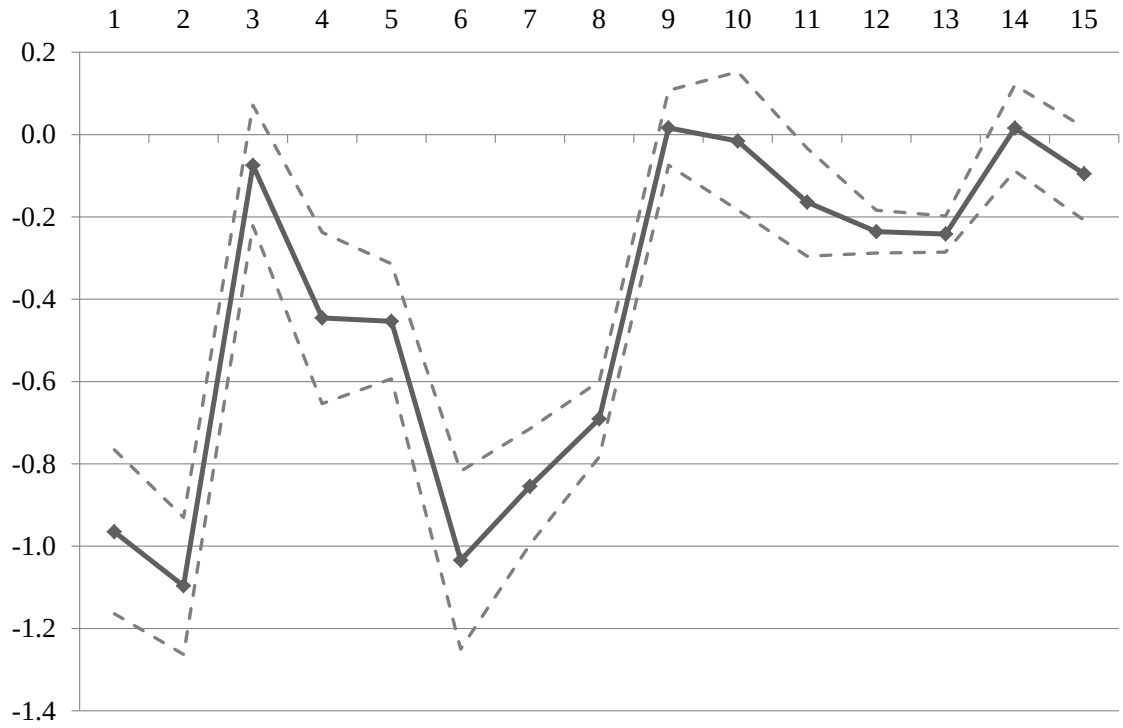
Notes: ***, **, and * indicate, respectively, the 1%, 5%, and 10% levels of statistical significance. Robust standard errors are in parentheses.

Table 5. Results by Industry (Two-digit Level of ISIC Revision 3): Impacts on Tariff Rates

	GATT24 ($t-1$)		Enabling Clause ($t-1$)		WTO		GSP	
	Coef.	S.D.	Coef.	S.D.	Coef.	S.D.	Coef.	S.D.
Food products and beverages	-3.972***	[0.489]	-5.726***	[0.637]	-0.676***	[0.165]	-11.656***	[0.277]
Tobacco products	-7.518***	[0.852]	-10.010***	[0.837]	4.134***	[0.394]	-22.082***	[1.053]
Textiles	-3.091***	[0.187]	-2.470***	[0.276]	-1.495***	[0.144]	-3.422***	[0.115]
Wearing apparel	-3.637***	[0.233]	-3.054***	[0.349]	-1.433***	[0.163]	-4.652***	[0.121]
Tanning and dressing of leather	-2.655***	[0.162]	-2.334***	[0.238]	-0.667***	[0.112]	-3.085***	[0.088]
Wood and wood products	-1.975***	[0.155]	-1.640***	[0.211]	-0.884***	[0.106]	-2.437***	[0.077]
Paper and paper products	-2.034***	[0.145]	-1.579***	[0.186]	-0.680***	[0.104]	-3.036***	[0.091]
Publishing and printing	-1.434***	[0.109]	-0.941***	[0.137]	-0.804***	[0.068]	-1.861***	[0.052]
Coke, refined petroleum products and nuclear fuel	-0.768***	[0.092]	-0.246**	[0.100]	0.118*	[0.063]	-1.027***	[0.041]
Chemicals and chemical products	-1.476***	[0.109]	-0.803***	[0.140]	-0.332***	[0.080]	-1.963***	[0.064]
Rubber and plastics products	-2.306***	[0.152]	-1.631***	[0.201]	-0.078	[0.099]	-2.927***	[0.089]
Other non-metallic mineral products	-2.191***	[0.144]	-1.917***	[0.200]	-0.471***	[0.098]	-3.280***	[0.071]
Basic metals	-1.264***	[0.112]	-0.680***	[0.131]	-0.218***	[0.070]	-1.820***	[0.063]
Fabricated metal products	-1.868***	[0.136]	-1.299***	[0.181]	-0.262***	[0.093]	-2.759***	[0.080]
Machinery and equipment n.e.c.	-1.117***	[0.096]	-0.503***	[0.130]	-0.180**	[0.072]	-2.385***	[0.068]
Office, accounting and computing machinery	-0.679***	[0.109]	-0.137	[0.143]	-0.868***	[0.091]	-1.064***	[0.050]
Electrical machinery and apparatus n.e.c.	-1.727***	[0.131]	-1.146***	[0.170]	0.021	[0.093]	-2.502***	[0.072]
Radio, television and communication equipment	-1.373***	[0.137]	-0.829***	[0.183]	-0.779***	[0.101]	-1.583***	[0.066]
Precision machinery products	-1.202***	[0.110]	-0.503***	[0.142]	-0.292***	[0.078]	-2.178***	[0.064]
Motor vehicles, trailers and semi-trailers	-1.935***	[0.153]	-1.231***	[0.217]	-0.896***	[0.094]	-3.021***	[0.103]
Other transport equipment	-1.736***	[0.131]	-1.140***	[0.185]	-0.314***	[0.082]	-3.212***	[0.088]
Furniture and manufacturing n.e.c.	-1.867***	[0.160]	-1.517***	[0.237]	-1.174***	[0.121]	-3.331***	[0.083]

Notes: ***, **, and * indicate, respectively, the 1%, 5%, and 10% levels of statistical significance. Robust standard errors are in parentheses.

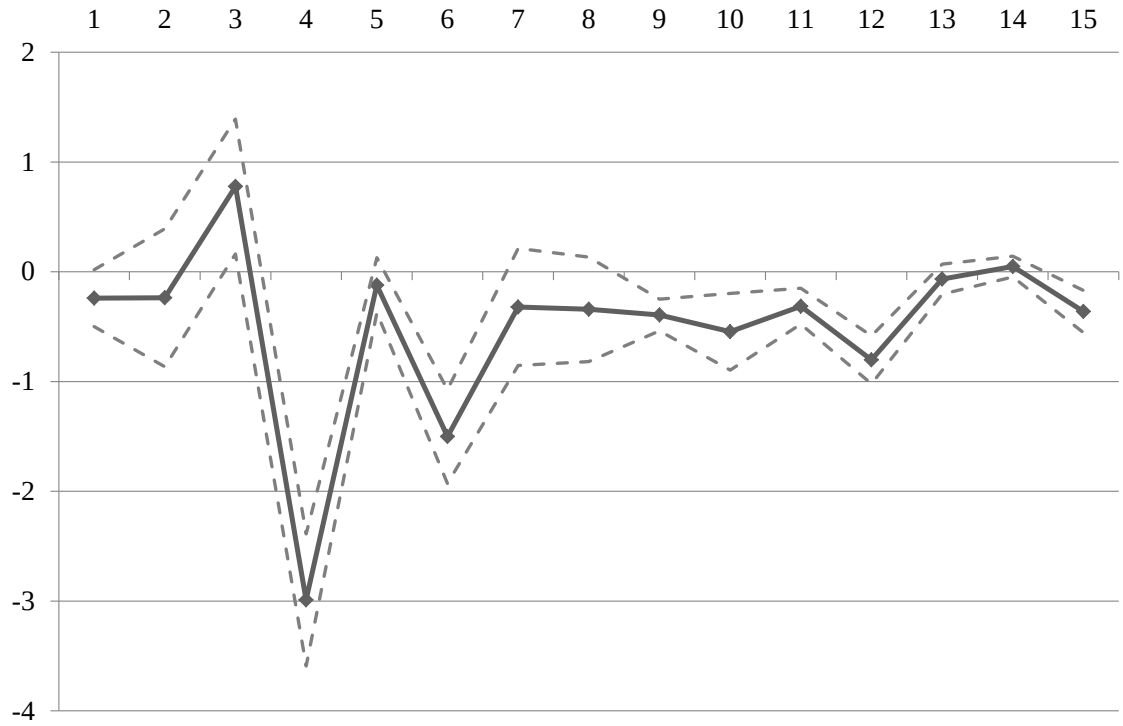
Figure 1. Coefficients in Lagged GATT24 Dummy Variables in Tariff Rates



Source: Authors' estimation

Notes: Solid and dashed lines show point estimates and 95% confidential estimates, respectively.

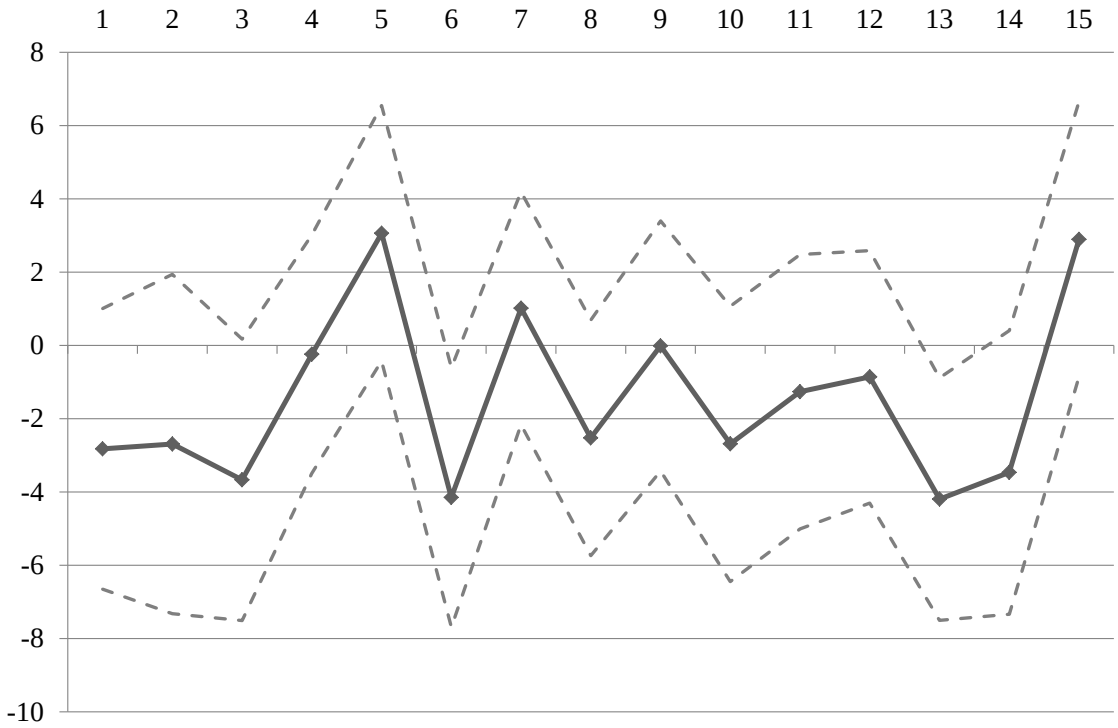
Figure 2. Coefficients in Lagged Enabling Clause Dummy Variables in Tariff Rates



Source: Authors' estimation

Notes: Solid and dashed lines show point estimates and 95% confidential estimates, respectively.

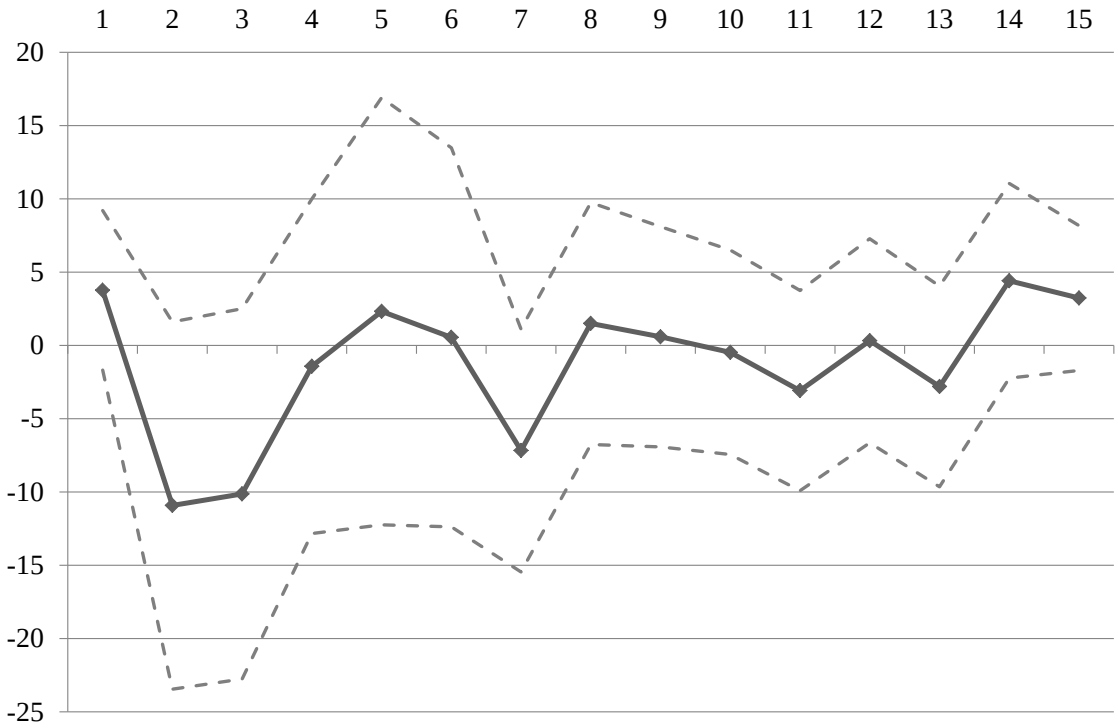
Figure 3. Coefficients in Lagged GATT24 Dummy Variables in NTBs



Source: Authors' estimation

Notes: Solid and dashed lines show point estimates and 95% confidential estimates, respectively.

Figure 4. Coefficients in Lagged Enabling Clause Dummy Variables in NTBs



Source: Authors' estimation

Notes: Solid and dashed lines show point estimates and 95% confidential estimates, respectively.