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The Determinants of Non-Tariff Barriers: The Role of WTO Membership

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ABSTRACT

With the formation of the WTO/GATT, a substantial reduction of tariff barriers (TBs) was achieved, but many countries then tried to use more non-tariff barriers (NTBs) to achieve new trade protection. To date, about two-thirds of the countries in the world are members of WTO. This study aims to find the determinants of NTBs and ascertain whether the accession as a member of WTO can actually reduce the use of NTBs. The results indicate that WTO membership, tariff and unemployment exert a strong influence on the incidence of NTBs, while the exchange rate, political institution and economic size are not significant factors. In addition, tariffs and NTBs are complementary. The finding also reveals that WTO member use NTBs to a lesser degree than do non-members of the WTO. Hence, we can conclude that accession to membership in the WTO reduces the use of NTBs.

Key words: Economic size, exchange rate, non-tariff barriers, Political institution, Tariff, Trade protection, Unemployment, WTO

INTRODUCTION

The establishment of General Agreement on Tariffs and Trade (GATT) in 1947 and its successor the World Trade Organization (WTO) in 1995 was to encourage free trade between member states by regulating and reducing tariff barriers, quantitative

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restrictions and subsidies on traded goods and by providing a common mechanism for resolving trade disputes. The GATT conducted eight rounds of multilateral negotiations between 1947 and 1993. Up to the Kennedy round (1967), negotiators were essentially pre-occupied with the reduction of tariff barriers. Starting in the mid-1960s, recurring negotiating rounds expanded the scope of the GATT to cover NTBs, such as antidumping measures, quantitative restrictions and product standards. An agreement on Technical Barriers to Trade (TBT) was negotiated in the Tokyo round (1979), followed by agreements on sanitary and phytosanitary (SPS) measures, intellectual property rights and measures affecting trade in services in the Uruguay round (1993)1.

Crowley (2003) reported tariffs on manufactured products fell from a trade-weighted average of roughly 35 percent before the creation of GATT in 1947 to about 6.4 percent at the start of the Uruguay Round in 1986. Despite this success, GATT faced certain problems, including liberalization of trade in agricultural products, handling the issues of intellectual property, and dealing with the issue of anti-dumping. These problems brought about the formation of the World Trade Organization (WTO) through the Uruguay Round that took place from September 1986 to January 1995. The new GATT treaty provided for an entirely new and different dispute resolution mechanism to eliminate the gridlock of the old system. Furthermore, the Uruguay Round expanded GATT's authority to new areas—agreements regarding trade in textiles, agriculture, services, and intellectual property were major achievements. Finally, new sets of rules regarding administered protection came into effect with the creation of the WTO in 1995.

Before the implementation of the WTO system, different trading partners would charge different tariffs and impose different regulations. The same product from different countries would often substantially differ in its selling price. However, with implementation of the WTO system, a country would have to charge the same tariff rate to all its trading partners. According to the World Bank, after the formation of the WTO in 1995, world import value increased sharply from USD 6.3 trillion in 1995 to USD 12.9 trillion and USD 18.4 trillion in 2005 and 2010, respectively.

However, while WTO succeeded in reducing and eliminating tariffs around the world, non-tariff barriers for examples technical barriers to trade (TBT) and sanitary and phytosanitary (SPS) measures became a major concern. World Trade Organization (2012), Bacchetta and Beverelli (2012), Staiger (2012) and Evenett (2012) reported the use of NTBs had been on the rise. Evenett (2012) reported that in 2009, about 60 percent of protectionism was implemented by G20 governments

[1] Refer to Hoekman (2013) for more detail.

and in 2012 that percentage has risen to 79 percent. From year to year, the developed countries designed new types of non-tariff barriers (NTBs). For example, technical barriers which stipulate mandatory technical regulations and voluntary standards that a producer or exporter needed to abide to for a product, such as its size, shape, design, labelling and packaging became common in the European Union. Studies like Haveman and Shatz (2004), Iacovone (2005), and Daly and Kuwahara (1999) point out that tariff barriers (TBs) have fallen dramatically in Europe; however, NTBs still remain significant. As pointed out by Ching, *et al*. (2004) and Chemingui and Dessus (2008), NTBs are still prominent in the Asia Pacific and the Middle East countries. Similarly, Kapuya (2015), Gebrehiwet *et al*. (2007) and Otsuki *et al*. (2001) observed that the utilization of NTBs do affect African country exports. According to Amani (2007), agricultural products mainly exported by developing countries are the worst affected with particular commodities facing restraints such as import and export bans, quota restrictions, variable SPS and TBT restrictions, licensing requirements and seasonal restrictions. General manufactured goods which mainly produced by developed countries face few restrictions and when they do exist they tend to be the need to meet national standards or rules of origin requirements. A report on NTBs by the United Nations Conference on Trade and Development (UNCTAD) in 2005 noted that many developing countries have failed to export their agricultural and manufactured products to developed countries due to their inability to satisfy stringent environmental and safety standards.

Evidence shows that the traditional forms of protectionism – tariff decreases, however the non-traditional forms of protection is on the rise. Why governments use NTBs? Theoretically, the rationale for protectionism should protect domestic employment, infant industries, sources of government revenue, industry diversification, elimination of trade deficits, and protection from unsafe product. This focus is supported by the studies of Cheh (1976), Takacs (1981), Mansfield and Busch (1995), Goldberg and Maggi (1999), and Kono (2009) who found that the level of employment does affect the level of protectionism. In addition, studies like that of Mansfield and Busch (1995) demonstrate that NTBs are governed by economic size, domestic institutions, and the interaction between these two factors. Saksena and Anderson (2008) agree, saying that economic size and political institutions also matter with regard to NTBs. There are also arguments that countries used NTBs to replace tariffs that took effect after joining WTO. Before joining WTO, a country is free to use tariffs as a form of trade protection. Government can raise import tariffs and other forms of trade protection during the crisis era. After became a member of WTO, the country is abided to reduce tariffs, government no longer able to rasie tariffs to counter recession. Government may

under pressure to use NTBs to restrict imports to protect local business during periods of macroeconomic weakness[2]. Mansfield and Busch (1995) pointed out that the recent proliferation of NTBs has done much to offset the gains in liberalization made by GATT and WTO. A fuller understanding therefore needed of the factors that account for variations in NTBs across states. Hence, this study aims to find the determinants of NTBs, and ascertain whether accession as a member of WTO affects the level of NTBs.

This study is important since WTO members comprising about two-thirds of the countries in the world and covering approximately 97 percent of world trade[3]. As part of their liberalization agenda, WTO had been actively reduce tariffs and NTBs such as import quotas that restrict quantities selectively as well as established guidelines for TBT and SPS (WTO, 2012). Since the present tariffs rate are relatively low and there is an up trend in the use of NTBs, it is important to examine how successful the WTO has been in reducing the NTBs among its members. To our knowledge, no study to date has studied this issue. Therefore, the dual objectives of this study are to find the determinants of NTBs and ascertain whether accession as a member of WTO reduces the use of NTBs.

A LITERATURE REVIEW ON THE DETERMINANTS OF NON-TARIFF BARRIERS (NTBS)

Theoretical Review

Much research on the determinants of trade policy has been focused on the efficacy of societal and statist approaches. According to Mansfield and Busch (1995), societal theories typically attribute patterns of protection to variations in demands made by pressure groups, whereas statist theories emphasize the effects of the national interest and domestic institutions in determining the level of protection. Societal explanations consider trade policy to be the product of competition among pressure groups and non-state actors that are affected by commerce. Societal approaches attribute little importance to policymakers and political institutions for the purposes of explaining trade policy. As Ikenberry *et al.* (1988) point out, societal theories view the state as "essentially passive; it acts as a disinterested referee for competing groups, and supplies policies to satisfy the demands of the successful domestic

[2] Ohlin (1969) found that success with tariff reductions may generate pressures on governments to impose new forms of NTBs.

[3] To date, the membership in WTO has grown to 161 countries (WTO, n.d.). The trade percentage is drawn from Crowley (2003).

players"[4]. Studies of societal approaches infer the demands for protection based on macroeconomic or sectoral fluctuations.

Societal approaches have been criticized for systematically underestimate the effects of two factors that regulate the provision of protection: state interests with respect to trade policy and domestic institutions. On the contrary, statist theories emphasize the effects of the national interest and domestic institutions in determining the level of protection. Analyses that emphasize state interests generally focus on the roles of politicians and policymakers in the formation of trade policy, holding constant societal pressures (Ikenberry *et al*., 1988). Many statists conclude that the ability of policymakers to advance the national interest depends in large measure on the extent to which domestic political institutions render them susceptible to demands by pressure groups and other non-state actors. Thus, one hypothesize scholars normally tested is that institutional factors that foster the insulation and autonomy of public officials bolster the ability of states to pursue trade policy consistent with the national interest (Mansfield and Busch, 1995).

Empirical Review

Many studies have examined the trend or pattern of NTBs faced by various countries or regions. However, only a few studies have researched the determinants of NTBs. Ray (1981a, 1981b) developed and tested a simple model for the determination of tariff and NTBs to trade across different industries within the United States. NTBs are assumed to be functions of predetermined tariffs, current imports, specific industry characteristics, and current foreign non-tariff trade restrictions. Both papers found that non-tariff trade restrictions supplemented tariff protection in the United States and both tariff and non-tariff trade restrictions are biased toward industries where the United States has an apparent comparative disadvantage in world trade. The studies also produced substantial evidence that tariff and non-tariff trade restrictions predominate in industries that have very different market characteristics.

Grossman and Helpman (1994) derived a model that relates an industry's protection to the state of its political organization, the ratio of domestic output in the industry to net trade, and the elasticity of import demand or export supply. Goldberg and Maggi (1999) further extended Grossman and Helpman (1994) model by introducing employment conditions of that industry and its growth, concentration indices, and changes in import penetration ratio to the model. However, none of the alternative specifications was found to significantly improve the fit of the model.

[4] The quotation is drawn from pp.7-8 of Ikenberry *et al*. (1988). See also Frieden (1988) and Mansfield and Busch (1995).

They found that the pattern of protectionism in the United States as of 1983 was broadly consistent with the predictions of the model.

Takacs (1981) investigated how the level of economic activity and unemployment rate affects pressures for instilling protectionism in the United States. Employing the Ordinary Least Square, she found that the level of economic activity and the unemployment rate offered correct signs for protectionism and were statistically significant. Salvatore (1987) extended Takacs's (1981) model by introducing one more equation to relate import penetration to protectionism. By employing the two-stage least-squares method and data from 1948 to 1985, he found that the level of economic activity strongly influences the pressures for protectionism.

Knettera and Prusa (2003) examined the relationship between anti-dumping filings and the macroeconomic factors in Australia, Canada, European Union, and the United States during 1980–1998. They found that real appreciation of the domestic currency and a fall in domestic real GDP will increase the number of anti-dumping filings. Oatley (2010) then investigated anti-dumping due to changes in the exchange rate. Using data from six industrialized countries between 1979 and 2004, he found that anti-dumping increases when the real exchange rate is strong and decreases when the real exchange rate is weak.

Mansfield and Busch (1995) and Saksena and Anderson (2008) then combined political and macroeconomic factors to model the incidence of NTB. Using a cross sectional analysis, Mansfield and Busch (1995) modelled the incidence of NTB by combining the societal and statist approaches. Their findings lent support to the societal argument that macroeconomic fluctuations contribute to the demand for protection. Consistent with the societal theories, high levels of unemployment and appreciated currencies strongly relate to a high incidence of NTBs. Those factors that are highlighted by statist approaches also strongly relate to cross-national patterns of NTBs. As statist analyses do indeed predict, economic size strongly relates to the incidence of NTBs. Large states have a greater incentive to impose protection than do their smaller counterparts.

Mansfield and Busch (1995) also discovered considerable evidence indicating that domestic institutions help shape differences in NTBs. In addition, they added interaction terms for these factors. Their results yield substantial evidence that tariffs and NTBs are substitutes. In other words, NTBs are used to protect industries that have lost tariff protection. According to these authors, large states that use proportional representation (PR) and have a small number of (large) electoral districts have an institutional environment in which politicians are insulated from societal pressures. Such states are characterized by high levels of NTBs. However, Saksena and Anderson (2008) presented a critical reevaluation of this argument

and hypothesized (in contrast to the work of Mansfield and Busch in 1995) that PR-based systems are associated with lower rather than higher levels of NTBs.

The key finding of Saksena and Anderson (2008) indicates the majoritarian democracy variable is positive and also statistically significant. This finding indicates that the more majoritarian the political institutions of a state are, the higher their level of NTBs. Since the key elements of a majoritarian system all derive from an underlying single-member district/plurality electoral system, their result supports their primary hypothesis and cuts against the findings of Mansfield and Busch (1995). Apparently, PR-based systems are associated with lower, rather than higher levels of NTBs. Saksena and Anderson (2008) also found that the larger the economy of a state, the more dependent it will be on international trade, and thus the higher will be its level of NTBs. The unemployment and ideology variables had no statistical significance.

In examining trade protectionism, Calder (1988), Cowhey (1993) and Kono (2009) relate protectionism to electoral institutions. Kono (2009) applied the level of a particularism- based vote, ballot and pool. A high particularism level suggests a small constituency size. Kono found that the smaller the constituency size, the higher were the NTB's because the smaller constituency size increases the number of pressure groups. Calder (1988) argues that Japan's system of medium size electoral districts led to Japanese policymakers being less autonomous and less insulated from interest groups. Hence, Japanese legislators tend to be highly sensitive to constituency pressure, especially from relatively well organized groups, such as those in agriculture and small business. Similar finding were presented by Cowhey (1993).

Observers have worried about the role of NTBs in trade as a substitute for or in addition to actual tariffs. Mansfield and Busch (1995) found empirical support that tariffs and NTBs are actually substitutes. In contrast, Ray (1981a, 1981b) and Ray and Marvel (1984) claim the relationship between tariffs and NTBs are supplementary.

Table 1 summarizes the variables commonly used in the literature and the direction of their impact on NTBs. We see that, many factors have emerged as possible reasons for NTBs. A large number of empirical studies on this topic infer there are demands for protection based on macroeconomic fluctuations and institutional factors. Among the macroeconomic variables emphasized by these studies are economic growth, unemployment and the real exchange rate. Institutional factors that foster both insulation and autonomy, such as relative economic size, trade dependency, and specific political institution, have been used by several researchers to relate these institutional or political factors to the incidence of NTBs. Furthermore, some economists also argue that pre-existing tariff levels may

Table 1 Selected literature review on the variables used to explain NTBs

Dependent variable	NTB	NTB	NTB	NTB	NTB	AD	AD	Tariff+NTB
Explanatory variable	Saksena & Anderson (2008)	Mansfield & Busch (1995)	Ray & Marvel (1984)	Ray (1981a)	Ray (1981b)	Knettera & Prusa (2003)	Oatley (2010)	Cheh (1976)
Macroeconomic								
unemployment	+NS	+						
real effective exchange rate		+				+	+	
Growth								
GDP growth						+	-	
world GDP growth						+		
import growth					-NS		-NS	
Relative size								
GDP	+							
GDP/world GDP		+						
import/GDP	+							
import/world import		+						
Political institution								
majoritarian democracy	+							
corporatism	+							
leaf seats	+NS							
parliamentary constituencies		+						
proportional representation		+						

Table 1 (Cont.)

Trade protection						
domestic tariff	-	+/-NS	+	+		
Δ domestic tariff		+				
Foreign NTB			+/-			
Industry specific						
R&D intensity		+/-		+		
consumer goods ratio		+				
agriculture dummy		+/-NS				
industry concentration			+NS/-	-		
Δ industry concentration				+NS		
product heterogeneity			-	-		
skill intensity			-	-		
capital intensity			+	+		
labour intensity				-		+NS
unskill labour						+NS
scale economies				-		

Notes: NTB, non-tariff barrier; AD, Antidumping; GDP, gross domestic product; GNP, gross national product; Δ, change; R&D, research and development; the + sign, a positive and significant coefficient; the - sign, a negative and significant coefficient; +NS, a positive but non-significant coefficient; -NS, a negative but non-significant coefficient.

influence both the strength of the societal demands for NTBs and the willingness of government to meet those demands. Market characteristics such as market concentration, labour or skill intensity often been included by those studied NTBs based on industry level.

Despite the growing importance of NTBs, there is still limited understanding on the determinants of NTBs. This is mainly due to the complex nature of the measures and the difficulties of collecting and analyzing data. Analyses of the determinants of NTBs have been largely limited to the study of the influence of macroeconomic fluctuations on NTBs (for example Ray, 1981a, 1981b and Takacs, 1981), except for Mansfield and Busch (1995) and Saksena and Anderson (2008) who had considered both macroeconomic and political factors. Our study agreed with Mansfield and Busch (1995) and Saksena and Anderson (2008) that it is more fruitful to include both macroeconomic and political factors in the analysis. Our study is different from Mansfield and Busch (1995) and Saksena and Anderson (2008) in that our study also consider the role of WTO in explaining the variation in cross-national patterns of NTBs. To our best knowledge, scholars have conducted little cross-national research on NTBs and virtually none with a focus on the role of WTO.

METHODOLOGY

Theoretical Framework

Our basic approach is that NTBs to trade are the result of both economic and political factors. The best-known work on the subject is Mansfield and Busch (1995). Using a cross sectional analysis, Mansfield and Busch (1995) modelled the incidence of NTB by combining the societal and statist approaches. According to Mansfield and Busch (1995), NTBs is subjects to a country's economic size, unemployment rate, real exchange rate, existing tariff rate, and domestic political institutions. Mansfield and Busch (1995) argue that relatively large economies are likely to impose NTBs with little fear of retaliation from smaller states, a strong currency and a higher unemployment rate will influence the government to impose NTBs to protect domestic product. In addition, Mansfield and Busch (1995) viewed that tariffs and NTBs are substitutes for each other because groups that are already well protected by tariffs may bring less pressure to bear for new NTBs and also face more government resistance to their demands than the less well protected groups. In addition, Mansfield and Busch (1995) argued that NTBs is positively related to domestic political institutions.

Model Specification

This study modifies the basic model used by Mansfield and Busch (1995) by adding a WTO dummy variable to capture any difference in the behaviour of members versus non-members of the WTO with respect to the implementation of NTBs. The basic cross-sectional regression thus becomes the following:

$$NTB_{t+1} = C + SIZE_t + UNEM_t + TARIFF_t + POLITIC_t + REER_t + WTO_t + e_t \quad (1)$$

where NTB is non-tariff barriers; UNEM is the unemployment rate; TARIFF is a weighted mean-applied tariff; POLITIC is number of parliamentary seats (proxy for political institutions); REER is the real effective exchange rate; SIZE is the economic size. Four proxies, namely, national GDP, ratio of national GDP to global GDP, ratio of national imports to total global imports and imports as a percentage of GDP are used to measure relative size. Thus, we estimate equation (1) using these four variables one at a time. In addition, WTO is the dummy variable that takes the value of 1 for non-WTO members and 0 otherwise and *e* is the error term. Following Mansfield and Busch (1995), the dependent variable, NTB_{t+1}, was used to indicate NTB was implemented one year after a country experienced macroeconomic fluctuations at time t.

Dependent Variable

Following Mansfield and Busch (1995), the dependent variable, NTB_{t+1}, was used. This is because normally the implementation of NTBs was after a country experienced recession or macroeconomic fluctuations such as high level of unemployment and appreciation of currency. This study assumed NTBs will be implemented if a country experienced macroeconomic fluctuations in previous year.

Independent Variables

WTO membership

As discussed earlier, one of the objectives of this study is to ascertain whether accession to membership in the WTO reduces the use of NTBs. Since the goal of the WTO is to promote fairer and freer trade, it is expected that the possibility of imposing NTBs is lower for members of the WTO compared to countries that are non-members of WTO. This study thus uses a dummy variable for WTO to

capture any difference in the behaviour of members compared to non-members with respect to the implementation of NTBs. This dummy variable will take the value of 1 for a non-member of WTO and 0 for a member of WTO**.** The dummy is expected to carry a positive sign because non-members of WTO are comparatively more likely to impose NTBs.

Unemployment rate

Theoretically, one of the reasons for protectionism is to protect domestic employment. Cheh (1976) found that government increases NTB to protect labor. Goldberg and Maggi (1999) and Kono (2009) showed that the unemployment rate has a positive relationship to trade protection. A higher unemployment rate will force government to implement trade barriers. Therefore, it is expected that there exists a positive relationship between the unemployment rate and NTBs. A previous study by Mansfield and Busch (1995) showed that the unemployment rate is significant and has a positive relationship with NTBs. However, Saksena and Anderson (2008) showed that the unemployment rate is not significant in terms of explaining the variation in the use of NTBs.

Relative Size

Studies like those by Mansfield and Busch (1995) and Saksena and Anderson (2008) have shown that NTBs are governed by economic size. Intuitively, relatively large economies are likely to possess greater market power. Large states can exercise their power through the use of TBs or NTBs with little fear of retaliation from smaller states. In contrast, smaller states depend more on the international economy and trade, and therefore, are less likely to employ NTBs. Hence, it is expected that the relationship between economic size and NTBs is a positive one. Mansfield and Busch (1995) used the ratio of a country's GDP to the world GDP as one of the indicators to determine the size of an economy, while Saksena and Anderson (2008) argued that the GDP of a country alone is also a good measure of its economic size.

In addition, both studies also included imports ratio in their model. Because imports ratio further determines the dependence of an economy on international trade. As mentioned earlier, countries that are more dependent on international trade are less likely to employ NTBs than are those countries that are more self-reliant. Hence, the coefficient for the import ratio is a negative one. Mansfield and Busch (1995) use the ratio of an individual country's imports to world imports,

while Saksena and Anderson (2008) use the ratio of a country's imports to its GDP. Since economic size and imports ratio maybe highly correlated, we will follow the approach of Mansfield and Busch (1995) to use these variables separately[5]. To examine the sensitivity of the results to alternative indicator of relative size, this study repeats the same estimations by employing four common used relative size indicators one at a time. The relative size indicators are GDP, GDP/World GDP, Import/World Import and Import/GDP.

Tariffs

In addition, we examine the effects of pre-existing tariff levels on NTBs. There are two current views on the relationship between tariffs and NTBs. According to Mansfield and Busch (1995), pre-existing tariff levels may influence both the strength of the societal demand for NTBs and the willingness of a government to meet those demands. Groups that are already well protected by tariffs may bring less pressure to bear for new NTBs and also face more government resistance to their demands than the less well protected groups. This relationship suggests that tariffs and NTBs are substitutes for each other, which is consistent with the view that NTBs are often used to protect industries that have lost tariff protection in successive rounds of the GATT.

However, some economists argue that tariffs and NTBs are complementary. NTBs are often used to protect those industries that are also beneficiaries of high tariffs. For example, NTBs are used to counter new foreign challenges to important economic sectors that are already the beneficiaries of tariff protection. Similarly, Ray and Marvel (1984) found that U.S. NTBs were concentrated in those industries least affected by the Kennedy Round of GATT. Ray (1981a, 1981b) also found that NTBs have been used to supplement tariff protection in the United States. Therefore, the coefficient of a tariff can be either positive or negative. Positive means the tariff and NTBS are complementary, while negative means they substitute for each other.

Various tariff rates have been employed in previous studies. Mansfield and Busch (1995) used the average national post-Tokyo Round offer rate for each national state; Ray (1981a, 1981b) used simple average U.S. tariff; and Ray and Marvel (1984) applied Post-Kennedy Round U.S. nominal tariff. This study, however, uses the weighted mean applied tariff calculated by the World Bank based

[5] Saksena and Anderson (2008) used both the GDP of a country and imports as a percentage of GDP as the indicators to determine the size of an economy. While Mansfield and Busch (1995) used the ratio of a country's GDP to the world GDP and ratio of national imports to total global imports alternately.

on the UNCTAD database because this tariff is the average of effectively applied rates weighted by product import shares that correspond to each partner country[6].

The Real Effective Exchange Rate

Previous studies, including those of Knettera and Prusa (2003), Oatley (2010) and Mansfield and Busch (1995), show that the exchange rate can influence protectionism. An appreciated currency increases the price of domestically produced goods and thus threatens to undermine both the export and import-competing sectors of that economy. This phenomenon occurs because when currency is strong, then imported goods become cheaper. To protect a domestic product, the demand for protection will thus increase. In another words, a strong currency will influence the government to impose NTBs. This study uses the Real Effective Exchange Rate (REER) because it is a measure of the value of a currency against a weighted average of several foreign currencies and divided by a price deflator or index of costs. REER is more suitable than other exchange rate measures because it relates to major currencies and is adjusted for inflationary effect. Since the higher the index of REER, the stronger the currency will be, REER is expected to have a positive relationship to the incidence of NTBs.

Political Institution

A political institution is one of the factors that determine the implementation of NTBs. Mansfield and Busch (1995) used proportional representation and size of constituency to explain the influence of political factor on NTBs. They hypothesized that proportional representation and the number of parliamentary constituencies is positively related to the level of NTBs. In contrast, Saksena and Anderson (2008) used left seats and majoritarian to represent political influence. They assumed that left-wing parties have a major concern about the labor demand for protection, while right-wing parties are committed to capitalism and a free market. In addition, the more majoritarian the political institutions of a country, the higher the level of NTBs will be.

[6] Data are classified using the Harmonized System of trade at the six- or eight-digit level. Tariff line data were matched to Standard International Trade Classification (SITC) Revision 3 codes to define commodity groups and import weights. To the extent possible, specific rates have been converted to their ad valorem equivalent rates and have been included in the calculation of weighted mean tariffs. Import weights were calculated using the United Nations Statistics Division's Commodity Trade (Comtrade) database. Effectively applied tariff rates at the six- and eight-digit product level were averaged for products in each commodity group (World Bank, n.d.).

Due to data limitations, we do not measure the size of the constituency in each district. Instead we use the number of parliamentary seats in a country to gauge the effect of political influence. We hypothesize that the larger the number of parliamentary seats in a country, the greater will be insulation and autonomy because individuals or small groups of politicians find it harder to gain the enough power to design trade policies that precisely reflect their economic preferences. Hence, it is expected that the number of parliamentary seats and NTBs have an inverse relationship.

Method

This study aims to find the factors that explain the cross-national patterns of NTBs. Using the Ordinary Least Square (OLS), Equation (1) will be regressed to estimate the parameters. OLS is a method to find the best regression line that minimizes the sum of the square residuals. According to Halcoussis (2005), OLS is the best procedure to estimate the linear regression model. Mansfield and Busch (1995) stated that OLS estimations may suffer heteroskedasticity and therefore inefficient. In order to get the Best Linear Unbiased Estimator (BLUE), various diagnostic tests will be used to test the robustness of the model. The diagnostic tests include the Jarque-Bera statistic tests for normality; Breusch-Godfrey Lagrange multiplier tests for serial correlation; White Test tests for heteroskedasticity in the error terms and Ramsey RESET tests for the misspecification of omitted variables, incorrect functional forms and correlation between the independent variables and the error terms.

Data

Data were obtained from a variety of sources. Data for non-tariff barriers (NTBs) were obtained from World Bank based on UNCTAD database. NTB was based on the core NTB, including quantity and price restrictions. Trade coverage ratio was provided by UNCTAD as the best estimate of NTB and the views of many experts. The NTB data was compiled for 30 countries: Algeria, Argentina, Bolivia, Brazil, Brunei, Chile, China, Colombia, Cote d' Ivory, Ecuador, Egypt, Japan, Jordan, Lao PDR, Malaysia, Mexico, Morocco, Nicaragua, Nigeria, Paraguay, Peru, Philippines, Senegal, Singapore, Sudan, Taiwan, Tanzania, Thailand, Uruguay, and Venezuela[7]. Information on WTO membership accession was extracted from the WTO website. Data for GDP, world GDP, imports (IM), world imports, Real Effective Exchange

[7] These are the countries that data of NTBs are available.

Rate (REER), unemployment rates (UNEM), and tariffs were obtained from the World Bank; data for parliamentary seats were found on the United Nations' website. All explanatory variable data were for year 2000 and NTB data was for year 2001[8].

RESULTS AND DISCUSSION

Table 2 presents the results from OLS regression. Four relative size variables are employed in the estimations. Overall, the estimated coefficients are quite consistent across four models. The coefficients for tariff and WTO are both statistically significant and carried the expected sign in Model 1, Model 2 and Model 3. Unemployment rate are statistically significant in all four models, however, it carried the wrong sign. This finding suggests that tariffs, unemployment and membership in WTO are important determinants of NTBs.

The innovation in this study is the addition of a dummy variable for WTO to capture whether there is any difference in the behaviour of WTO members or non-members with respect to the implementation of NTBs. The dummy variable took the value of 1 for non-member status and 0 otherwise. The WTO is expected to be positive because the possibility to impose NTBs is higher for a country that is non-member of the WTO. The result in Table 2 shows that this dummy variable is statistically significant and carries the expected positive sign. Hence, non-members of the WTO are most likely to impose NTBs than are members of the WTO.

According to Mansfield and Busch (1995), the coefficient of tariff can be either positive or negative. Positive means that the tariff and NTBS are complementary, while a negative coefficient means they can substitute for one another. Table 2 indicates that the coefficient of tariff is positive and statistically significant at 10 percent. The result indicates that a 1 percent increase in tariff is complemented by roughly a 1 percent increase in NTBs. This result is supported by Ray (1981a, 1981b), but is contrary to Mansfield and Busch (1995) who found that tariff is a substitute for NTBs.

Based on the theory, unemployment rate (UNEM) has a positive relationship with NTBs. Mansfield and Busch (1995) found that unemployment rate has a significant positive relationship with NTB_{t+1} which showed that when a country suffered from increased in unemployment, government will respond by increases NTB next year. Saksena and Anderson (2008) found unemployment rate has a positive relationship with NTBs, but not a significant one. However, our result

[8] NTB data were extracted from "Frequency coverage ratio of NTBs by country". Year 2001 were chosen based on the availability of NTB data. Year of data available for NTB is different for different country, ranging from 1993 to 2001. Year 2001 were chosen because this is the year that had most data that is 30 countries.

indicates that the unemployment rate is negative which is contradicts to the theory. It suggests that decline in previous year unemployment rate led to the rise of NTB in current year. The negative relationship obtained between unemployment rate and NTBs may due to only one year lag (t+1) was used in this study. It is normal for the government to take more than a year to respond to the increase in unemployment. Government will impose NTBs only if the unemployment problem is persistent.

Table 2 shows that the positive coefficient of real effective exchange rate (REER) is in accordance with the theory, but not statistically significant. Similarly, political institution variable (POLITIC) carried the expected sign, but the sign was not statistically significant. As shown in Table 2, none of the relative size variable is statistically significant. Hence, there is no evidence that economic size directly relates to the incidence of NTBs.

Table 2 OLS regression results

Variables	Expected sign	Coefficient			
		Model 1	Model 2	Model 3	Model 4
C		-2.20	-2.20	-6.70	6.41
TARIFF	+/-	1.08 [c]	1.08 [c]	1.17 [c]	0.73
REER	+	0.25	0.25	0.27	0.28
UNEM	+	-0.51 [c]	-0.51 [c]	-0.48 [c]	-0.57 [b]
POLITIC	-	-0.01	-0.01	-0.01	-0.01
WTO	+	15.13 [c]	15.13 [c]	15.01 [c]	13.04
Relative Size:					
GDP	+	160.30			
GDP/world GDP	+		4.96		
IM/world IM	-			386.22	
IM/GDP	-				-0.15
Diagnostic Tests:					
JB		0.34	0.34	0.36	0.79
LM		0.95	0.95	0.74	0.79
White		1.22	1.22	1.29	1.31
RESET		0.09	0.09	0.84	0.95

Notes: JB is Jarque-Bera statistics for normality with the null hypothesis of residuals are normally distributed. LM is the Breusch-Godfrey Lagrange multiplier test for serial correlation, White is White's test for general heteroskedasticity and RESET is Ramsey RESET test for functional misspecification. The F-statistics reported for LM, White and RESET are under the relevant null hypothesis that absence of serial correlation, heteroskedasticity and functional misspecification. a, b and c denotes significance at 1%, 5% and 10% level, respectively.

In addition, this study completed a series of diagnostic tests. JB is Jarque-Bera statistics for normality with the null hypothesis of residuals normally distributed. LM is the Breusch-Godfrey Lagrange multiplier test for serial correlation, White is White's test for general heteroskedasticity, and RESET is Ramsey's RESET test for functional misspecification. The F-statistics reported for LM, White, and RESET fall under the relevant null hypothesis, namely, the absence of serial correlation, heteroskedasticity, and functional misspecification. The results in Table 2 show that all the JB and F-statistics failed to reject the null hypotheses, and hence, we can conclude that the residuals were normally distributed and there was no serial correlation, heteroskedasticity, and incorrect functional form. Overall, the estimated models reported in Table 2 are well specified.

CONCLUSION AND RECOMMENDATIONS

This study sought to find the determinants of NTBs and ascertain whether accession to membership in the WTO reduces the use of NTBs. Our result indicates that WTO membership, tariff, and unemployment rate are the main determinants of NTBs. This finding suggests that non-WTO members used NTBs to a greater degree compared to members of the WTO and suggests that the WTO successfully influenced its members to implement fairer and freer trade. Indeed the Uruguay Round took seven and half years to discuss, making the trading system freer and less discriminatory. Furthermore these results show that tariffs and NTBs are complementary, possibly due to the WTO agreement not to set the same percentage of tariff elimination for all countries. For example, developed countries have committed to bind their tariff rates on 99 percent of their product lines, whereas only 73 percent of the developing countries' product lines are bound[9]. The WTO also allows flexibility in the use of trade measures to protect infant industries. The least developed countries can charge import tariffs to protect their new industries on their early stages of development and thus not yet capable of competing against established industries. This situation can contribute to the result herein that shows that NTBs and tariff are complementary.

This study obtained an unexpected negative relationship between unemployment rate and NTBs, which may be due to only one-year lag used in this study. Future research should consider including higher lags, as a government may take more than one year to respond to any increase in unemployment. Future research should also divide the sample into developed and less developed countries. Normally, developed

[9] Bound tariff rates are the most-favored-nation tariff rates resulting from negotiations under the General Agreement on Tariffs and Trade (GATT). These maximum rates are committed in the WTO and are difficult to raise.

countries do not use NTBs as often as developing countries do. However, there is up trend in the use of NTBs among developed countries. As highlighted by others researchers, the availability of NTBs data is a problem because the classification of NTBs differs based on the country. A concrete definition, categories of NTBs, and methods of calculation, need to be standardized to help future researchers obtain the exact number of NTBs.

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