

# DOES WTO PROMOTE TRADE?:

## Further Evidences

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### ABSTRACT

In a recent notable paper, Andrew Rose (2004a) finds no evidence that membership in the WTO increases trade. However, Denzau and Kim (2006) argue that appropriate analysis of this issue requires focusing on trade sectors that are actually under the WTO's purview. Denzau and Kim find that when the WTO-exempt oil sector is excluded, the WTO is found to significantly promote trade among its members. This paper extends the previous analysis by also excluding the agriculture and textile sectors; as a result, the WTO's beneficial effect is even more pronounced, promoting trade by approximately 30 percent for its member countries.

**Keywords:** Agriculture; Textile; Gravity Model; GATT; WTO; Trade Promotion; Trade Liberalization

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## 1. Introduction

The World Trade Organization (WTO) contends with international trade concerns and international economic relations previously not dealt with by the General Agreement on Tariffs and Trade (GATT), including trade in services and protection of intellectual property rights. Further, the Uruguay Round (UR) introduced and reinforced more comprehensive rules to the agreements which contained loopholes. For instance, GATT permitted member countries to utilize some non-tariff barriers such as import quotas, and to subsidize the agricultural sector. UR, however, constructed the first multilateral agreement dedicated to agricultural trade. In addition, UR took over the area in textiles and clothing trade which was previously governed by the Multifibre Arrangement (MFA).

It is widely believed that the international trade organization, WTO, enhances trading systems and promotes trade. The WTO states that: “The WTO is the only international organization dealing with the global rules of trade between nations.” Further, it states that its “...overriding objective is to help trade flow smoothly, freely, fairly and predictably.”<sup>1</sup> However, in one of the first empirical analyses of this belief, Rose (2004a) shows that there is no evidence that the WTO promotes trade.<sup>2</sup>

In this paper, we re-examine the conclusion of Rose’s (2004a) analysis in which he proposes that “...membership in the GATT/WTO is *not* associated with enhanced trade...” In other words, “...the GATT/WTO does not promote trade.” However, an accurate evaluation of the GATT/WTO’s role in promoting global trade would require

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<sup>1</sup> Taken from [http://www.wto.org/english/thewto\\_e/whatis\\_e/inbrief\\_e/inbr00\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/inbrief_e/inbr00_e.htm).

<sup>2</sup> Subramanian and Wei (2003) dispute this conclusion.

focusing on trade commodities and sectors that are actually under the GATT/WTO's purview. In doing so, we employ Rose's (2004a) gravity model but with data from a different source<sup>3</sup> that allows us to exclude agriculture,<sup>4</sup> and textiles and clothing<sup>5</sup> trade. Rose (2004a) suggests that a sectoral analysis would be illuminating, as the multilateral trade system has been less successful at liberalizing agriculture and textiles trade.

Many governments support and protect their agricultural sector even though this distorts agricultural trade. The textiles sector has been governed by special regimes: the Short Term Cotton Arrangement (STA), the Long Term Cotton Arrangement (LTA), and the Multifibre Arrangement (MFA), now expired. Hence, we exclude the value of agriculture and textiles trade from the value of total trade and proceed with the research to examine GATT/WTO's influence on trade.

In the first empirical analysis of the effectiveness of the WTO on world trade, Rose (2004a) argues that there is no evidence that the WTO has increased world trade. However, we may have thought that the results would be different if we take account of the sectoral asymmetry in trade liberalization (e.g., oil, agricultural and textiles, etc...).

Furthermore, Denzau and Kim (2006) argue that when the oil sector is omitted, because the GATT/WTO does not deal with it, the magnitude of the estimated parameters changes considerably, and the results are that GATT/WTO promotes trade for about 23 percent for the member countries and about 13 percent for the non-member countries.

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<sup>3</sup> The data source is UN COMTRADE which is obtained from <http://unstats.un.org/unsd/comtrade/>.

<sup>4</sup> The agricultural sector includes food and live animals; beverages and tobacco; and animal and vegetable oils and fats. Hereafter, "Agriculture." Appendix 2 for a more detailed description of the agricultural products.

<sup>5</sup> The textiles and clothing sector includes textile fibers, textile yarn, fabrics, made up articles, clothing and footwear. Hereafter, "Textiles." Appendix 2 for a more detailed description of the textiles and clothing products.

Thus, oil trade is a seriously influential commodity that affects whether or not GATT/WTO promotes trade.

It turns out that membership in the GATT/WTO does not promote total non-agricultural and non-textile trade,<sup>6</sup> even when agricultural and textiles sectors are omitted. In contrast to the results for total trade, in separate tests for exports and imports, joining the GATT/WTO promotes trade among the member countries since GATT/WTO dummies for exports and imports (except non-agricultural exports) are positive and significant. Further, according to Subramanian and Wei (2003), it is better to use import values alone, rather than the average of bilateral exports and imports, since GATT/WTO relate to imports and there is no theoretical reason exports should also increase by the same proportion. These results, however, show that Lerner (1936) symmetry seems to hold not only at the level of a country's aggregate but also for bilateral trade.

The remainder of the paper is organized as follows: Section 2 describes the background of these two sectors, agriculture and textiles. Section 3 presents the estimation methodology (model specification), and describes data and sources. Empirical results and some sensitivity analysis with discussion are addressed in Section 4, and finally Section 5 concludes the paper.

## **2. Background**

### **2.1. Agriculture**

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<sup>6</sup> More precisely they are average value of real total, non-agricultural and non-textile trade. Hereafter "total trade", "agricultural trade", "non-agricultural trade", "textile trade", "non-textile trade." In addition, "non-agricultural trade" means the average value of real total minus the average value of real agricultural trade.

Historically, GATT has given exceptional treatment to agricultural trade. GATT prohibited non-tariff barriers for non-agricultural goods and yet permitted quantitative restrictions for agricultural goods under certain circumstances. Such circumstances were broadened until quotas, levies and other protective measures were allowed in almost every country. Tariff protection was also present, with only 55 percent of agricultural goods bound (i.e., committed not to go beyond a specific tariff level) for developed countries and only 18 percent for developing countries (Hathaway and Ingco, 1996; Binswanger and Lutz, 2000).

For many reasons, governments usually support and protect their agricultural sector even though this distorts agricultural trade. In addition, to quote the WTO:<sup>7</sup>

*“The original GATT did apply to agricultural trade, but it contained loopholes. For example, it allowed countries to use some non-tariff measures such as imports quotas, and to subsidize. Agricultural trade became highly distorted, especially with the use of exports subsidies which would not normally have been allowed for industrial products. The Uruguay Round produced the first multilateral agreement dedicated to the sector. It was a significant first step towards order, fair competition and a less distorted sector.”*

The Uruguay Round (UR) introduced the requirement for minimum market access, whereby all countries are to ensure that imports make up at least 5 percent of a good's

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<sup>7</sup> Obtained from [http://www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/agrm3\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm3_e.htm).

consumption by the end of the transition period. “Tariff quotas”<sup>8</sup> provide minimum access which was, however, undermined by State trading agencies with monopoly power and exclusive rights (Ingco and Ng, 1998; Binswanger and Lutz, 2000).

## **2.2. Textiles and Clothing**

From the early 1960s, textiles and clothing trade were treated as an exceptional case in the GATT and were subject to specially negotiated rules, i.e., quantitative restrictions that resulted from GATT’s recognition of industrial countries’ difficulties due to competition from low-cost imports. This was a significant departure from the GATT principle of free entry of imports.

For more than 30 years, this sector was governed by special regimes: the Short Term Cotton Arrangement (STA; 1961), the Long Term Cotton Arrangement (LTA; 1962 - 1973) and the Multifibre Arrangement (MFA; 1974 - 1994). The MFA defines rules for the imposition of quotas by using either bilateral agreements or unilateral actions when surges of imports cause market disruption or threaten the importing countries. The MFA, intended only to be a temporary arrangement,<sup>9</sup> has been extended for twenty-one years. It received four extensions; 1977, 1981, 1986 and 1994<sup>10</sup> (Francois and Spinanger, 2004). On January 1 1995, WTO replaced the MFA with the Agreement on Textiles and Clothing (ATC). To quote the WTO:<sup>11</sup>

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<sup>8</sup> To be more precise, it is “Tariff Rate Quotas (TRQ)”. “It is two-level tariffs which were adopted during the Uruguay Round as a method for providing greater access to markets with high tariffs. A limited volume of imports is allowed at the lower tariff, and all subsequent imports are charged the higher tariff. If the demand for imports at the low tariff is greater than the volume allowed by the TRQ, then imports must be rationed” (Obtained from <http://www.useu.be/agri/tarreduc.html>).

<sup>9</sup> Initially for four years, but repeatedly extended until 1994, with more and more restrictions added on through expansion of product coverage.

<sup>10</sup> ATC: A short history ([http://www.wto.org/english/thewto\\_e/whatis\\_e/eol/e/wto02/wto2\\_28.htm](http://www.wto.org/english/thewto_e/whatis_e/eol/e/wto02/wto2_28.htm).)

<sup>11</sup> Obtained from [http://www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/agrm5\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm5_e.htm).

*“Textiles, like agriculture, is one of the hardest-fought issues in the WTO, as it was in the former GATT system. It is now going through fundamental change under a 10-year schedule agreed in the Uruguay Round. The system of imports quotas that has dominated the trade since the early 1960s is being phased out.”*

As agriculture is a fundamental part of many countries’ culture, “non-trade concerns (NTCs)” such as food security and traditional heritage have been considered in the WTO.<sup>12</sup> Agriculture, therefore, cannot be treated in the same way as non-agricultural sectors. As for the textiles sector, quotas on textiles and clothing imports from developing countries have long been in place in major developed countries. This restriction goes against the fundamental GATT principle that prohibits quantitative restrictions.

Because of these reasons, agricultural and textiles trade are not influenced by GATT/WTO. Hence we proceed with the research to examine GATT/WTO’s influence on trade by looking at total trade both with and without agriculture and textiles trade. Once these asymmetries are taken into account by subtracting these two sectors from total trade, we want to analyze whether WTO membership has a different effect for countries belonging to the GATT/WTO as compared to those countries that do not participate.

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<sup>12</sup> Article 20 of the Agreement on Agriculture states that negotiations have to take non-trade concerns into account in the continuation of the multilateral agricultural reform process. Agriculture may be defined as multifunctional when it has several roles or functions in addition to its primary role of producing food (Simpson and Schoenbaum, 2003).

### 3. Methodology – Model Specification

#### 3.1. Non-Agricultural, and Non-Textiles and Clothing Trade Model

In order to examine the effects of agricultural and textiles trade on the role of the WTO on world trade, we adopt the extended gravity model used by Rose (2004a). The equation for bilateral non-agricultural and non-textiles trade is as follow:<sup>13</sup>

$$\begin{aligned} \ln(NAT, NTT_{ijt}) = & \beta_0 + \beta_1 \ln D_{ij} + \beta_2 \ln(Y_i Y_j)_t + \beta_3 \ln(Y_i Y_j / Pop_i Pop_j)_t \\ & + \beta_4 Lang_{ij} + \beta_5 Cont_{ij} + \beta_6 Landl_{ij} + \beta_7 Island_{ij} \\ & + \beta_8 \ln(Area_i Area_j) + \beta_9 ComCol_{ij} + \beta_{10} CurCol_{ijt} \quad (1) \\ & + \beta_{11} Colony_{ij} + \beta_{12} ComNat_{ij} + \beta_{13} CU_{ijt} + \beta_{14} FTA_{ijt} \\ & + \sum \Phi T_t + \gamma_1 Bothin_{ijt} + \gamma_2 Onein_{ijt} + \gamma_3 GSP_{ijt} + \varepsilon_{ijt}, \end{aligned}$$

where:

- $NAT, NTT_{ijt}$  denotes the average/exports/imports value of real non-agricultural and non-textiles bilateral trade between  $i$  and  $j$  at time  $t$ ,
- $Y$  is real GDP,
- $Pop$  is population,
- $D$  is the distance,
- $Lang$  is a binary dummy variable which is unity if  $i$  and  $j$  have a common language and zero otherwise,
- $Cont$  is a binary variable which is unity if  $i$  and  $j$  share a land border,
- $Landl$  is the number of landlocked countries in the country-pair (0, 1, or 2),

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<sup>13</sup> The model is the same as Rose (2004a), except for the source of the dependent variable.

- *Island* is the number of island nations in the pair (0, 1, or 2),
- *Area* is the area of the country (in square kilometers),
- *ComCol* is a binary variable which is unity if *i* and *j* were ever colonies after 1945 with the same colonizer,
- *CurCol* is a binary variable which is unity if *i* and *j* are colonies at time *t*,
- *Colony* is a binary variable which is unity if *i* ever colonized *j* or vice versa,
- *ComNat* is a binary variable which is unity if *i* and *j* remained part of the same nation during the sample (e.g., France and Guadeloupe),
- *CU* is a binary variable that is unity if *i* and *j* use the same currency at time *t*,
- *FTA* is a binary variable that is unity if *i* and *j* both belong to the same regional trade agreement,
- $\{T_t\}$  is a comprehensive set of time fixed effects,
- $\beta$  and  $\Phi$  are vectors of nuisance coefficients,
- $Bothin_{ijt}$  is a binary variable which is unity if both *i* and *j* are GATT/WTO members at *t*,
- $Onein_{ijt}$  is a binary variable which is unity if either *i* or *j* is a GATT/WTO member at *t*,
- $GSP_{ijt}$  is a binary variable which is unity if *i* was a GSP beneficiary of *j* or vice versa at *t*, and
- $\varepsilon_t$  represents the omitted other influences on bilateral trade, assume to be well behaved.

The  $\gamma_1$  and  $\gamma_2$  are the parameters of interest in this test (same as Rose, 2004a).

The hypotheses<sup>14</sup> tested are:

- 1) *if trade is created when both countries are in the GATT/WTO,  $\gamma_1$  should be positive, ( $\Rightarrow$  if both countries are in the GATT/WTO, bilateral trade among the member countries is increased), and*
- 2) *if trade is diverted from a non-member, then  $\gamma_2$  may be negative, ( $\Rightarrow$  if one country is in the GATT/WTO, bilateral trade between member and non-member countries is decreased).*

The first coefficient,  $\gamma_1$ , measures the effect of the GATT/WTO membership on the non-agricultural and non-textiles trade when both countries are in the GATT/WTO, while the second coefficient,  $\gamma_2$ , measures the effect of the GATT/WTO membership on the non-agricultural and non-textiles trade when one country is in the GATT/WTO. If membership in the GATT/WTO is associated with enhanced trade, then  $\gamma_1$  should be positive and bigger than  $\gamma_2$ , since membership would be associated with increased trade and would result in a higher coefficient than the coefficient of trade with non-member countries.

We estimate the above model using the simple ordinary least squares (OLS) method on the pooled data set.<sup>15</sup> However, this estimation technique has been criticized by Subramanian and Wei (2003), and Anderson and van Wincoop (2003) since it does

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<sup>14</sup> The hypotheses are the same throughout this paper.

<sup>15</sup> We estimate the model using the OLS absorbing by year and clustering by pairid. The same technique was used by Rose (2004a).

not take into account fixed country-specific effects. Yet, in this study, we use country-pair-specific (dyadic) fixed effects rather than country-specific effects as a sensitivity check.<sup>16</sup> The differences between these two estimation techniques are whether the technique takes into account trade resistance and other unobservable features of individual countries, or the relationship between each pair of countries (Rose, 2004b).

### **3.2. Data and Sources**

Most data from Rose (2004a) are posted on his website.<sup>17</sup> The paper (Rose, 2004a) describes the data set in detail. Therefore, we will only comment on a few data issues here. Whereas Rose acquired his trade data from the Direction of Trade Statistics (DOT), we use the Commodity Trade Statistics Database (COMTRADE) developed by the United Nations (UN).<sup>18</sup> In addition, DOT does not have trade records for intermediate commodities, whereas COMTRADE contains all detailed merchandise trade records.

The time period of Rose's data is longer (1948-1999). However, the values are in millions of US\$ and it is thus possible that small amounts of trade (less than US\$500,000) between small nations can be overlooked or treated as zero. COMTRADE data period is 1962 to 1999, shorter than Rose's, but the units are in US\$. Regardless of how small the amount of trade might be, it is not treated as insignificant. Also, using Rose's data, it is impossible to discern the influence of oil trade. The first reason is that

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<sup>16</sup> Rose (2004b) states that he has no clear ranking between country-specific and country pair-specific effects, and which one is more appropriate.

<sup>17</sup> Rose data can be obtained from his website "<http://faculty.haas.berkeley.edu/arose/RecRes.htm>."

<sup>18</sup> UN data can be obtained from UN COMTRADE website <http://unstats.un.org/unsd/comtrade/>. DOT covers 178 countries and COMTRADE covers 173 countries for a sample period of 1962-1999. South Africa, Botswana, Lesotho, Namibia and Swaziland are not covered by COMTRADE since their data are only available from 2000. We check the correlation between DOT and COMTRADE data sets. The correlation of the two data sets is 0.999 before taking a natural log and 0.966 after taking natural logs. For identical nation-years, these data are very similar, yet not identical.

Rose's data do not disaggregate the items that are in total trade. COMTRADE data not only indicate the total trade amount, as well as individual trade commodities. Second, one could subtract the COMTRADE agricultural and textile trade amount from the DOT total trade data, but this often results in negative non-agricultural and non-textile trade amounts.<sup>19</sup> We, therefore, use only COMTRADE for our analysis of non-agricultural and non-textile trade, but first look at total trade to compare with Rose.<sup>20</sup>

Bilateral exports and imports are reported by the exporting and importing countries.<sup>21</sup> We deflate nominal export and import values by the American consumer price index (CPI) for all urban consumers<sup>22</sup> to obtain the real values. An average value of bilateral trade between a pair of countries is created by averaging all of the (four possible) measures potentially available (exports from  $i$  to  $j$ , imports into  $j$  from  $i$ , and so forth).<sup>23</sup> Agricultural and textiles data also have been obtained from the UN COMTRADE database and, in order to calculate the average value of agricultural and textiles trade between a pair of countries, the same method is applied.

#### 4. Empirical Results

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<sup>19</sup> e.g. Suppose an average total trade between country  $A$  and  $B$  is \$1,000 (\$500 for agricultural trade and \$500 for non-agricultural trade) at time  $t$ . In this example, DOT data records it as \$0 since the value is in millions, and COMTRADE records it as \$1,000 for total trade and \$500 for agricultural trade. If we subtract agricultural trade from DOT's total trade, the non-agricultural trade values between two countries is -\$500.

<sup>20</sup> We check the correlation between DOT and COMTRADE data sets. The correlation of the two data sets is 0.999 before taking a natural log and 0.966 after taking natural logs. For identical nation-years, these data are very similar, yet not identical.

<sup>21</sup> They are recorded in American dollars.

<sup>22</sup> 1982-1984=100; taken from the website of the U.S. Bureau of Labor Statistics, <http://www.bls.gov/>.

<sup>23</sup> This method is used by Rose (2004a) and we followed the exact same way which he did except the source of the American CPI (American CPIs data should be the same even if the sources are different.).

The gravity equation (1) was first estimated with ordinary least squares (OLS) for all observations of total trade, non-agricultural, non-textiles, and non-agricultural and textiles trade, respectively.<sup>24</sup> Observation differences among categories occur because there is no trade between two countries without agriculture or textiles. For instance, the total trade has 188,442 observations and non-agricultural trade has 183,040 observations. The amount of agricultural trade is the same as total trade for the 5,402 (188,442-183,040=5,402) observations. In this case, non-agricultural trade is \$0 and it is not possible to regress those observations, since the dependent variable is log real trade value.

The resulting coefficients on the distance and income (both GDP and GDP per capita) variables are correctly signed and large, indicating that they each have sizable effects on bilateral trade. In other words, it is the case that countries that are farther apart trade less and economically large countries trade more. GDP has a positive effect on trade. Countries belonging to the same region and currency union trade more. Sharing a language or land border also has a positive effect on trade. Finally, a formal colonial relationship encourages trade. However, landlocked countries and physically larger countries trade less.

With regard to the parameters of interest, i.e., membership in the GATT/WTO, the sign and magnitude for total trade are the same as Rose's (2004a). This indicates that membership in the GATT/WTO had no significant effect on total trade, since both ( $\gamma_1$ )

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<sup>24</sup> In addition, we also examine the results by changing the dependent variable of the regression. Therefore, two separate equations (imports and exports as the dependent variables) are thus also used in this paper to examine explicitly the effects of the selected variables on exports and imports.

and one ( $\gamma_2$ ) of the countries being GATT/WTO member have small positive numbers and neither are statistically different from zero at conventional significance levels.<sup>25</sup>

We expected positive  $\gamma_1$ s of both the non-agricultural and non-textiles trade, but they are small numbers and neither is statistically significant (Column 2 and 3 of Table 1). Since agricultural and textiles sectors were not covered by early GATT and not covered until the Uruguay Round, it is reasonable to assume that GATT/WTO would have positive effects on trade when those sectors are excluded from the total trade. Furthermore, the coefficient of the  $\gamma_1$  of non-agricultural and textiles trade is negative and significant (Column 4 of Table 1).

In contrast, in Table 2, the  $\gamma_1$ s of the exports and imports separate tests are positive and significant (except non-agricultural exports). This means that membership in the GATT/WTO has strong positive effects on exports and imports. However,  $\gamma_1$  of non-agricultural exports and most of the  $\gamma_2$ s are not significant. The rest of the results of the exports and imports separate test show a similar pattern. For instance, countries that are farther apart trade less and economically large countries trade more. The Generalized System of Preferences (GSP) has a positive effect on trade. Countries in the same region and in a currency union trade more. Sharing a language or land border also has a positive effect on trade. Finally, a formal colonial relationship encourages trade. However, landlocked countries and physically larger countries trade less.

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<sup>25</sup> These results are the same as Rose (2004a). In addition, we may think year and country selection bias, because COMTRADE trade data set does not fully match DOT trade data set. Therefore, we select exactly the same DOT country pairs data set which are available in the COMTRADE data set and the comparisons are shown in Appendix 1.

We include country-pair-specific fixed effects as robustness checks because the data is a panel data.<sup>26</sup> The results are presented in Table 3. In contrast to OLS with year effects, the results of the country-pair-specific fixed effects show that all the coefficient,  $\gamma_1$  and  $\gamma_2$ , are positive and significant. Further, the magnitudes of the  $\gamma_1$ s are always higher than  $\gamma_2$ s.

Denzau and Kim (2006) show that GATT/WTO membership does promote trade among the member countries, aside from oil trade. However, when we subtract agricultural and textiles trade, this does not change the sign of the  $\gamma_1$ . Agriculture and textiles trade display different behavioral patterns, and therefore it is of interest to study their static and dynamic patterns, as well as factors leading to such behavior. Therefore, in this section we consider some potential explanations as to why GATT/WTO dummies (when both countries in GATT/WTO) for the non-agricultural trade and non-textiles trade do not have positive coefficients.

Even though the original GATT 1947 did apply to agricultural trade and became highly distorted, trade of agricultural products among GATT/WTO member countries has increased (e.g., trade increased by about 49 percent since  $\exp(0.400)-1 = 0.49$ , Column 1 of Table 4). Additional evidence suggests that agricultural trade has increased even if it has been seriously distorted.

Denzau and Kim (2006) argue that oil is also the variable which GATT/WTO does not deal with, and with exclusion of the oil sector, it is found that GATT/WTO promotes trade. Therefore, we examine the agricultural and textiles sectors with oil sector. Table 5 reports the results from the combined subtracted dependent variables tests: non-

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<sup>26</sup> The Hausman test indicates that the hypothesis of no systematic differences between fixed and random coefficients is rejected for our model.

oil & agricultural, non-oil & textiles, non-agricultural & textiles and non-oil & agricultural & textiles trade, respectively.<sup>27</sup>

The non-oil & agricultural, non-oil & textiles and non-oil & agricultural & textiles trade have positive  $\gamma_1$  and  $\gamma_2$ , and the magnitude of the  $\gamma_1$ s are higher than  $\gamma_2$ . Column 4 of Table 5 shows that GATT/WTO membership increases trade about 30 percent (since  $\exp(0.260)-1 = 0.30$ ) among member countries. In addition, trade with non GATT/WTO member countries increases about 22 percent (since  $\exp(0.201)-1 = 0.22$ ). In this case, even though  $\gamma_2$  is positive number, it is smaller than  $\gamma_1$ . On the other hand, non-agricultural & textiles trade's  $\gamma_1$  is a small negative number and not significant.

Thus, we conclude that whenever oil products are subtracted with other products, the WTO dummy,  $\gamma_1$ , is positive and significant. Based on these results, it seems like the strong positive non-oil trade affects other combined dependent variables tests (e.g. non-oil & agricultural and non-oil & textiles) since only non-agricultural & textiles trade has a small negative number and is insignificant (Column 3 of Table 5), and non-agricultural trade and non-textiles trade are not significant (Column 2 and 3 of Table 1).

## 5. Conclusion

In this paper, we follow a recent study on the role of the GATT/WTO membership on trade. With this aim, we apply an extended gravity model to annual bilateral total, non-agricultural and non-textiles trade. Since agricultural and textiles

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<sup>27</sup> Non-oil & agricultural & textiles means total trade excludes oil, agricultural and textiles trade (total trade – (oil trade + agricultural trade + textiles trade)). The same rule applies to the other use of &.

sectors have had a long history of exceptional treatment in GATT, we expect that the exclusion of those sectors will help to examine the role of the GATT/WTO.

When only the agricultural and textiles sectors are excluded (either together or individually), GATT/WTO membership is found to have no significant effect on trade promotion. When oil sector is excluded along with the agricultural and/or textiles sectors, GATT/WTO membership has an even stronger effect on trade promotion than when only oil sector is excluded. This suggests that the effect of the oil sector overpowers the effects of the agricultural and textiles sectors combined. By eliminating the obscuring influence of the oil sector, we are able to more effectively account for other key determinants of trade, and correctly identify the true relationship between the GATT/WTO membership and trade promotion.

Whether or not oil, agricultural and textiles trade should fall under the purview of the GATT/WTO has been subject to vigorous debate for decades. Like these sectors, trade in services and intellectual property are also contentious topics, however measurement of the extent of trade in these sectors is not yet feasible since they have not been categorized as trade commodities in the Standard International Trade Classification (SITC) or Harmonized System (HS). As measurement improves, however, the analysis in this paper can be extended to address these sectors as well.

**Table 1: Core Regressions**

	total trade	non- agricultural trade	non- textiles trade	non- agricultural & textiles trade
Both in GATT/WTO	0.003 (0.058)	-0.053 (0.066)	0.045 (0.061)	<b>-0.013</b> (0.070)
One in GATT/WTO	0.019 (0.056)	0.009 (0.063)	0.060 (0.058)	<b>0.061</b> (0.067)
GSP	<b>0.761</b> (0.032)	<b>0.648</b> (0.035)	<b>0.826</b> (0.033)	<b>0.724</b> (0.036)
Log Distance	<b>-1.080</b> (0.022)	<b>-1.181</b> (0.024)	<b>-1.131</b> (0.023)	<b>-1.249</b> (0.025)
Log Product real GDP	<b>0.913</b> (0.009)	<b>0.991</b> (0.010)	<b>0.875</b> (0.010)	<b>0.949</b> (0.011)
Log Product real GDP p/c	<b>0.283</b> (0.014)	<b>0.307</b> (0.015)	<b>0.355</b> (0.015)	<b>0.408</b> (0.016)
Regional FTA	<b>1.207</b> (0.102)	<b>1.147</b> (0.116)	<b>1.162</b> (0.102)	<b>1.099</b> (0.119)
Currency Union	<b>1.109</b> (0.123)	<b>1.179</b> (0.132)	<b>1.124</b> (0.126)	<b>1.213</b> (0.136)
Common language	<b>0.332</b> (0.041)	<b>0.327</b> (0.044)	<b>0.322</b> (0.042)	<b>0.292</b> (0.046)
Land border	<b>0.614</b> (0.104)	<b>0.541</b> (0.112)	<b>0.625</b> (0.107)	<b>0.558</b> (0.117)
Number landlocked	<b>-0.300</b> (0.031)	<b>-0.216</b> (0.033)	<b>-0.336</b> (0.033)	<b>-0.245</b> (0.035)
Number islands	-0.006 (0.037)	<b>-0.095</b> (0.041)	0.030 (0.037)	-0.067 (0.041)
Log product land area	<b>-0.108</b> (0.008)	<b>-0.147</b> (0.009)	<b>-0.082</b> (0.008)	<b>-0.118</b> (0.009)
Common colonizer	<b>0.584</b> (0.066)	<b>0.654</b> (0.067)	<b>0.567</b> (0.069)	<b>0.645</b> (0.072)
Currently colonized	<b>1.233</b> (0.358)	<b>1.320</b> (0.366)	<b>1.202</b> (0.357)	<b>1.299</b> (0.361)
Ever colony	<b>1.299</b> (0.110)	<b>1.337</b> (0.116)	<b>1.362</b> (0.112)	<b>1.431</b> (0.120)
Common country	-0.346 (1.114)	-0.412 (1.069)	-0.312 (1.150)	-0.391 (1.109)
Observation	188,442	183,040	186,635	177,949
R <sup>2</sup>	0.686	0.678	0.673	0.667
RMSE	1.740	1.850	1.801	1.917

*Notes:* Values significant at the 5 percent level are marked in bold. All regressands are in log real values. OLS with year effects (intercepts not reported). Robust standard errors (clustering by country-pairs) are in parentheses.

**Table 2: Results of separate test (Exports and Imports)**

	total	non- agricultural	non- textiles	non- agricultural & textiles
<b>Exports</b>				
Both in GATT/WTO	<b>0.142</b> (0.067)	0.064 (0.071)	<b>0.188</b> (0.069)	0.096 (0.074)
One in GATT/WTO	0.101 (0.065)	0.028 (0.069)	<b>0.148</b> (0.067)	0.065 (0.072)
Observation	265,408	254,640	260,856	248,188
R <sup>2</sup>	0.594	0.590	0.581	0.573
RMSE	2.112	2.182	2.158	2.250
<b>Imports</b>				
Both in GATT/WTO	<b>0.220</b> (0.065)	<b>0.133</b> (0.069)	<b>0.237</b> (0.067)	0.116 (0.072)
One in GATT/WTO	0.096 (0.063)	0.046 (0.067)	0.118 (0.064)	0.064 (0.070)
Observation	278,048	265,514	273,570	258,392
R <sup>2</sup>	0.621	0.618	0.608	0.602
RMSE	2.106	2.184	2.157	2.258

*Notes:* Values significant at the 5 percent level are marked in bold. All regressands are in log real values. Regressors not recorded: regional FTA; currency union; log product real GDP; log product real GDP p/c; and currently colonized. OLS with year effects (intercepts not reported). Robust standard errors (clustering by country-pairs) are in parentheses.

**Table 3: Country-Pair-Specific Fixed Effects**

		average	exports	imports
Total (DOT)	Both in GATT/WTO	<b>0.199</b> (0.065)		
	One in GATT/WTO	<b>0.073</b> (0.032)		
Observation		215,354		
R <sup>2</sup>		0.854		
RMSE		1.343		
Total (UN)	Both in GATT/WTO	<b>0.280</b> (0.064)	<b>0.338</b> (0.066)	<b>0.375</b> (0.067)
	One in GATT/WTO	<b>0.149</b> (0.029)	<b>0.203</b> (0.039)	<b>0.205</b> (0.041)
Observation		188,442	265,408	278,048
R <sup>2</sup>		0.874	0.763	0.781
RMSE		1.137	1.646	1.631
Non-agricultural	Both in GATT/WTO	<b>0.334</b> (0.072)	<b>0.357</b> (0.068)	<b>0.423</b> (0.074)
	One in GATT/WTO	<b>0.180</b> (0.036)	<b>0.196</b> (0.041)	<b>0.223</b> (0.047)
Observation		183,040	254,640	265,514
R <sup>2</sup>		0.870	0.755	0.773
RMSE		1.212	1.721	1.717
Non-textiles	Both in GATT/WTO	<b>0.331</b> (0.062)	<b>0.413</b> (0.068)	<b>0.407</b> (0.068)
	One in GATT/WTO	<b>0.177</b> (0.029)	<b>0.252</b> (0.044)	<b>0.222</b> (0.042)
Observation		186,635	260,856	273,570
R <sup>2</sup>		0.868	0.755	0.775
RMSE		1.181	1.683	1.666
Non-agricultural & textiles	Both in GATT/WTO	<b>0.414</b> (0.071)	<b>0.448</b> (0.068)	<b>0.457</b> (0.076)
	One in GATT/WTO	<b>0.237</b> (0.037)	<b>0.239</b> (0.042)	<b>0.237</b> (0.049)
Observation		179,949	248,188	258,392
R <sup>2</sup>		0.867	0.7435	0.764
RMSE		1.251	1.780	1.772

*Notes:* Values significant at the 5 percent level are marked in bold. All regressands are in log real values. Regressors not recorded: regional FTA; currency union; log product real GDP; log product real GDP p/c; and currently colonized. Robust standard errors are in parentheses.

**Table 4: Agricultural, and Textiles and Clothing Trade**

	agricultural trade	textiles trade
Both in GATT/WTO	<b>0.400</b> (0.079)	-0.160 (0.089)
One in GATT/WTO	<b>0.181</b> (0.075)	<b>-0.281</b> (0.085)
Observation	155,909	145,628
R <sup>2</sup>	0.491	0.555
RMSE	2.131	2.110
Industrial Countries		
Both in GATT/WTO	0.029 (0.321)	<b>1.989</b> (0.384)
One in GATT/WTO	0.009 (0.329)	<b>1.382</b> (0.368)
Observation	10,228	10,224
Both in = 1	9,807	9,804
One in = 1	392	391
Industrial & Non-Industrial Countries		
Both in GATT/WTO	<b>0.562</b> (0.181)	-0.034 (0.176)
One in GATT/WTO	<b>0.427</b> (0.174)	-0.107 (0.167)
Observation	80,658	74,539
Both in = 1	46,819	43,188
One in = 1	33,358	30,907
Non-Industrial Countries		
Both in GATT/WTO	0.023 (0.089)	<b>-0.473</b> (0.096)
One in GATT/WTO	-0.010 (0.078)	<b>-0.298</b> (0.088)
Observation	65,023	60,865
Both in = 1	28,750	27,251
One in = 1	27,261	25,249

*Notes:* Values significant at the 5 percent level are marked in bold. All regressands are in log real values. OLS with year effects (intercepts not reported). Regressors not recorded: regional FTA; currency union; log distance; log product real GDP; log product real GDP p/c; common language; land border; number landlocked; number islands; log product land area; common colonizer; currently colonized; ever colony; and common country. Robust standard errors (clustering by country-pairs) are in parentheses.

**Table 5: Comparisons of Oil, Agriculture, and Textiles and Clothing**

	non- oil & agricultural trade	non- oil & textiles trade	non- agricultural & & textiles trade	non- oil & agricultural & textiles trade
Both in GATT/WTO	<b>0.195</b> (0.064)	<b>0.263</b> (0.060)	-0.013 (0.070)	<b>0.260</b> (0.067)
One in GATT/WTO	<b>0.137</b> (0.062)	<b>0.173</b> (0.058)	0.061 (0.067)	<b>0.201</b> (0.065)
GSP	<b>0.752</b> (0.035)	<b>0.924</b> (0.033)	<b>0.724</b> (0.036)	<b>0.839</b> (0.036)
Log Distance	<b>-1.097</b> (0.024)	<b>-1.055</b> (0.022)	<b>-1.249</b> (0.025)	<b>-1.159</b> (0.024)
Log Product real GDP	<b>1.014</b> (0.010)	<b>0.890</b> (0.010)	<b>0.949</b> (0.011)	<b>0.973</b> (0.011)
Log Product real GDP p/c	<b>0.236</b> (0.015)	<b>0.294</b> (0.015)	<b>0.408</b> (0.016)	<b>0.335</b> (0.016)
Regional FTA	<b>1.408</b> (0.116)	<b>1.406</b> (0.102)	<b>1.099</b> (0.119)	<b>1.382</b> (0.118)
Currency Union	<b>1.212</b> (0.127)	<b>1.142</b> (0.124)	<b>1.213</b> (0.136)	<b>1.245</b> (0.130)
Common language	<b>0.342</b> (0.043)	<b>0.326</b> (0.042)	<b>0.292</b> (0.046)	<b>0.311</b> (0.045)
Land border	<b>0.681</b> (0.112)	<b>0.760</b> (0.107)	<b>0.558</b> (0.117)	<b>0.702</b> (0.117)
Number landlocked	<b>-0.103</b> (0.033)	<b>-0.241</b> (0.033)	<b>-0.245</b> (0.035)	<b>-0.122</b> (0.035)
Number islands	<b>-0.156</b> (0.041)	<b>-0.013</b> (0.038)	-0.067 (0.041)	<b>-0.133</b> (0.042)
Log product land area	<b>-0.181</b> (0.009)	<b>-0.108</b> (0.008)	<b>-0.118</b> (0.009)	<b>-0.154</b> (0.009)
Common colonizer	<b>0.584</b> (0.067)	<b>0.512</b> (0.069)	<b>0.645</b> (0.072)	<b>0.564</b> (0.071)
Currently colonized	<b>1.322</b> (0.379)	<b>1.205</b> (0.366)	<b>1.299</b> (0.361)	<b>1.296</b> (0.376)
Ever colony	<b>1.384</b> (0.119)	<b>1.407</b> (0.115)	<b>1.431</b> (0.120)	<b>1.483</b> (0.122)
Common country	-0.360 (1.082)	-0.252 (1.157)	-0.391 (1.109)	-0.333 (1.126)
Observation	181,883	185,724	179,949	178,645
R <sup>2</sup>	0.685	0.675	0.667	0.676
RMSE	1.808	1.778	1.917	1.867

*Notes:* Values significant at the 5 percent level are marked in bold. All regressands are in log real values. OLS with year effects (intercepts not reported). Robust standard errors (clustering by country-pairs) are in parentheses.

**Appendix 1: Selections Problem (Year and Country between DOT and COMTRADE data)**

	DOT Data	COMTRADE data match with		
		total	non-agricultural	non-textiles
1948-1999P*				
Both in GATT/WTO	-0.042 (0.053)			
One in GATT/WTO	-0.058 (0.049)			
Observation	234,597			
1962-1999P**				
Both in GATT/WTO	-0.072 (0.060)			
One in GATT/WTO	-0.080 (0.057)			
Observation	215,354			
1962-1999P***				
Both in GATT/WTO		-0.062 (0.058)	-0.057 (0.060)	-0.058 (0.058)
One in GATT/WTO		-0.042 (0.056)	-0.032 (0.057)	-0.036 (0.056)
Observation		188,442	183,040	186,635

*Notes:* None of these are significant at 5 percent level. OLS with year effects. All regressands are in log real values of DOT data. OLS with year effects (intercepts not reported). Regressors not recorded: regional FTA; currency union; log distance; log product real GDP; log product real GDP p/c; common language; land border; number landlocked; number islands; log product land area; common colonizer; currently colonized; ever colony; and common country. Robust standard errors (clustering by country-pairs) are in parentheses. \* denotes whole data set of DOT (Rose, 2004a). \*\* denotes 1962-1999 period of DOT data set. \*\*\* denotes during the 1962-1999 period for DOT data, we also drop the observations which are not available at COMTRADE data (total, non-agricultural and non-textiles trade).

## Appendix 2: Description of Agriculture, and Textiles and Clothing Products (SITC Revision 1)

Code Description

### Agricultural Sectors

00	Name: Live animals Description: Live animals
01	Name: Meat and meat preparations Description: Meat and meat preparations
02	Name: Dairy products and eggs Description: Dairy products and eggs
03	Name: Fish and fish preparations Description: Fish and fish preparations
04	Name: Cereals and cereal preparations Description: Cereals and cereal preparations
05	Name: Fruit and vegetables Description: Fruit and vegetables
06	Name: Sugar, sugar preparations and honey Description: Sugar, sugar preparations and honey
07	Name: Coffee, tea, cocoa, spices & manufacs. Thereof Description: Coffee, tea, cocoa, spices & manufacs. Thereof
08	Name: Feed. Stuff for animals excl. Unmilled cereals Description: Feed. Stuff for animals excl. Unmilled cereals
09	Name: Miscellaneous food preparations Description: Miscellaneous food preparations
11	Name: Beverages Description: Beverages
12	Name: Tobacco and tobacco manufactures Description: Tobacco and tobacco manufactures
41	Name: Animal oils and fats Description: Animal oils and fats
42	Name: Fixed vegetable oils and fats Description: Fixed vegetable oils and fats
43	Name: Animal and vegetable oils and fats, processed Description: Animal and vegetable oils and fats, processed

### Textiles, Clothing and Footwear Sectors

26	Name: Textile fibres, not manufactured, and waste Description: Textile fibres, not manufactured, and waste
65	Name: Textile yarn, fabrics, made up articles, etc. Description: Textile yarn, fabrics, made up articles, etc.
84	Name: Clothing Description: Clothing
85	Name: Footwear Description: Footwear

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