

**Does the World Trade Organization Promote Trade? An Empirical  
Assessment of Agricultural and Non-Agricultural Trade Flows**

Jason H. Grant<sup>a,\*</sup> , Kathryn A. Boys<sup>b</sup>

<sup>a</sup> *Dept. of Agricultural & Applied Economics, Virginia Polytechnic  
Institute & State University, Blacksburg, VA*

<sup>a</sup> *Dept. of Agricultural & Applied Economics,  
Clemson University, Clemson, SC*

***Preliminary Draft. Comments Welcome. Please Do Not Quote.***

**Abstract**

In this paper we ask whether the GATT/WTO has actually failed to increase members' agricultural trade. Surprisingly, there is very little empirical econometric support to shed light on this question despite the fact that agricultural trade is often at the forefront of multilateral negotiations. We address this issue by considering GATT/WTO effects across agricultural and non-agricultural sectors. Despite much 'hoopla and hype' that the GATT/WTO has done nothing to boost members' agricultural trade, our results suggest that the multilateral institution has delivered significant positive effects on agricultural trade over the period 1980-2004. Moreover, in many cases the trade flow effect of membership in the GATT/WTO exceeds that of non-agriculture, merchandise trade. The results have important policy implications when one considers the growing body of literature that often presumes that the GATT/WTO has done nothing to stimulate members' agricultural trade.

*Selected Paper prepared for presentation at the Agricultural & Applied Economics  
Association's 2009 AAEA & ACCI Joint Annual Meeting, Milwaukee, WI, July 26-28, 2009.*

---

\* Tel.: +1 540 231 7559; fax: +1 540 231 7417.  
E-mail address: [jhgrant@vt.edu](mailto:jhgrant@vt.edu)

## 1. Introduction

*“Almost nobody doubts that the WTO and its predecessor, the General Agreement on Tariffs and Trade (GATT), have helped to boost global trade, by encouraging countries to lower their tariff barriers in successive rounds of trade negotiations.” (The Economist, 2002)*

The World Trade Organization (WTO) and its predecessor the General Agreement on Tariffs and Trade (GATT) is often heralded as one of the most successful multilateral institutions in the post-war era. Indeed, the WTO celebrated its 60<sup>th</sup> anniversary on January 1, 2008 claiming that:

*“The global trading system has been a source of prosperity, stability and predictability for six decades. It has underpinned an unprecedented period of economic growth and has provided an environment in which many countries have been able to raise development levels and reduce poverty”* (available at: [http://www.wto.org/english/news\\_e/pres07\\_e/pr502\\_e.htm](http://www.wto.org/english/news_e/pres07_e/pr502_e.htm))

Moreover, the World Trade Report 2007 titled “Six decades of multilateral cooperation: What have we learnt?” notes that since 1950 world trade has grown more than twenty-seven fold in volume terms and this expansion is more than three times as large as the growth in world output which expanded eight-fold during the same period (WTO 2007, pg. 243).

That international trade has grown courtesy of the GATT/WTO seems like an axiomatic truth since one of the founding principles of the GATT/WTO is to ensure that trade flows as freely and predictably as possible on a Most Favored Nation (MFN) basis. However, in one of the first empirical analysis, Andrew Rose (2004) found very little compelling evidence that GATT/WTO Members traded more than their nonmember counterparts. Rose’s findings are seemingly against much conventional wisdom and have led some to seriously call into question the usefulness of the organization.<sup>1</sup> Why would the leaders of the global economy (both

---

<sup>1</sup> In one of several media items sizing up the WTO since Rose’s 2004 publication, The Economist (2004) titled one of its articles (appropriately or inappropriately): “Is there any point to the WTO?”

developed and developing) promote membership into an organization that failed to deliver on the promise of increased trade? Indeed, Rose (2004) notes himself that this result is “... an interesting mystery” (pg. 112).

Naturally, Rose’s result – that GATT/WTO Members do not trade anymore than outsiders - has subsequently spawned a growing body of literature (Subramanian and Wei 2007; Tomz, Goldstein, and Rivers 2006; Felbermayr and Kohler 2006; Herz and Wagner 2006; Chang and Lee 2007; Liu 2007; Engelbrecht and Pearce 2007). A few insights are worth noting. First, Subramanian and Wei (2007) found a positive and significant WTO effect but only for developed countries. Subramanian and Wei (2007) contend that we should ignore developing and least-developed countries since these countries undertook smaller trade liberalization commitments; often benefitted from a number of *Special and Differential Treatment* provisions; and did not participate fully in the trade negotiating rounds of the GATT/WTO. In other words, developing and least-developed countries were members in name but not in spirit.

Second, Rose’s non-WTO result can be overturned if we alter the control group by which WTO membership is judged. Tomz, Goldstein, and Rivers (2006) argued that Rose’s results were misleading because a number of informal members (particularly low-income economies) were part of the GATT/WTO as colonies, *de facto*, or as provisional members for many years even though they were not on the GATT/WTO roster. When these countries are re-coded as GATT/WTO members, thereby altering treatment and control groups, Tomz, Goldstein, and Rivers show that membership increased trade by 72 percent. Other studies have produced positive WTO effects using more elaborate econometric techniques regarding sample selection

(Chang and Lee 2007), zero trade flow values (Liu 2007), or by focusing on the extensive margin of trade (Felbermayr and Kohler 2004).

Clearly the GATT/WTO can deliver positive effects on trade. However, many of these studies have had to rely on various sub-sets of the data based on development status, alternative membership definition, or differing econometric assumptions. In a reply to various authors challenging his work, Rose (2006) succinctly notes that “...the GATT/WTO has worked well if you ignore its failures” (p.9). Furthermore, in a reply to Subramanian and Wei (2006), Rose (2006) asks: “by conditioning on its successes, do we get an accurate view of the [trade flow] effects of the GATT/WTO membership” (p.5). Probably not. Moreover, these follow-up studies challenging Rose’s (2004) work rest on conflicting premises. While Subramanian and Wei (2007) contend that developing countries should be ignored altogether because of their limited participation in trade liberalization efforts, Tomz, Goldstein, and Rivers (2006) argue that more developing countries – those that were colonies and provisional members - should be included.

In this article, we focus attention on one of the GATT/WTO’s seemingly apparent failures: agricultural trade. That is, do we really know that the GATT/WTO has failed to promote agricultural trade? While most commentators would be inclined to say that the answer to this question is a resounding yes, surprisingly however, we have very little *ex post* econometric evidence to support this belief. Yet since the Corn Laws were revoked in 1846 one cannot forget that agricultural interests have always been at the frontline of trade disputes and multilateral negotiations such as the Uruguay and Doha Rounds of trade liberalization. Thus, investigating whether the GATT/WTO has stimulated trade among its membership may be long overdue.

This study adopts the framework of Rose (2004) to answer this important policy question with two innovations over previous work. First, we consider separately agricultural and non-agricultural trade flows in the empirical analysis. A notable feature common to Rose (2004) and the large body of literature that has followed is the use of aggregate (merchandise) trade data. Second, we evaluate where the GATT/WTO has worked well and where it has not by allowing the average treatment effect of membership to vary over development status and subsets of countries that have been identified as “fragile” in the agricultural draft modalities texts (i.e. least-develop countries, small vulnerable economies (SVEs) and recently acceded members (RAMs)).

## 2. Gravity Econometrics

The gravity equation has been remarkably successful in predicting bilateral trade flows between country pairs. For this reason, it has become the workhorse model for empirical econometric studies of trade flows (Eichengreen and Irwin 1998). Developed by Tinbergen (1962), the gravity model is akin to Newton’s law of universal gravitation, whereby larger and closer countries trade more with one another than smaller and more distant countries. In its basic panel-data form, the model predicts that trade flows from country  $i$  to country  $j$  in year  $t$  are proportional to the multiplicative interaction (in levels) of each country’s size, often measured by GDP, and inversely proportional to the distance between them. Denoting import flows from  $i$  to  $j$  in year  $t$  as  $T_{ijt}$ , GDP of country  $i$  ( $j$ ) as  $Y_{it}$  ( $Y_{jt}$ ) and the distance between country  $i$  and  $j$  as  $D_{ij}$ , the gravity model of trade is:

$$(1) \quad T_{ijt} = \beta_0 Y_{it}^{\beta_1} Y_{jt}^{\beta_2} D_{ij}^{\beta_3}$$

where,  $\beta_0$ ,  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  are unknown parameters.

To operationalize the model, a multiplicative, stochastic error term,  $\varepsilon_{ijt}$ , is appended to equation (1) yielding:

$$(2) \quad T_{ijt} = \beta_0 Y_{it}^{\beta_1} Y_{jt}^{\beta_2} D_{ij}^{\beta_3} \varepsilon_{ijt}$$

Traditional econometric studies of trade flows assume that the expectation of the random noise, conditional on the explanatory variables is equal to one. Thus, taking logs of both sides yields a traditional, linear in parameters, panel-level gravity equation that can be easily estimated:<sup>2</sup>

$$(3) \quad \ln(T_{ijt}) = \alpha_0 + \beta_1 \ln(Y_{it}) + \beta_2 \ln(Y_{jt}) + \beta_3 \ln(D_{ij}) + \gamma Z_{ij(t)} + \varepsilon_{ijt},$$

where,  $Z_{ij(t)}$  is a vector of additional, potentially time-varying controls of interest to the researcher. Common variables include whether the countries share a common language, a common currency, or if both countries are members of a particular trade agreement. Conditional on these factors influencing bilateral trade, researchers then look for positive (or negative) deviations in trade caused by regional trade agreements (Grant and Lambert, 2008), currency unions (Rose and Glick, 2002), or more importantly, multilateral GATT/WTO effects (Rose 2004, Subramanian and Wei 2007). More precisely, our benchmark empirical estimating strategy is as follows:

$$(4) \quad \ln(T_{ijt}) = \alpha_0 + \alpha_t + \beta_1 \ln(Y_{it}) + \beta_2 \ln(Y_{jt}) + \beta_3 \ln(D_{ij}) + \gamma Z_{ij(t)} \\ + \delta RTA_{ijt} + \phi CU_{ijt} + \lambda_1 Bothin + \lambda_2 Onein + \varepsilon_{ijt}$$

---

<sup>2</sup> This of course assumes that zero trade flows do not exist, which is typically not the case. It is common for researchers to either drop zero trade flow observations, add one to all zero trade flows so the logarithmic function is well defined, or to estimate a Poisson or threshold-Tobit model (Santos Silva and Tenreyro 2006; Pham and Martin 2008). The issue of zero trade flows is not addressed in this version of the paper.

where,  $\alpha_t$  denotes time fixed effects and  $Z_{ij(t)}$  includes the following nine additional controls which are essentially the same variables included in the Rose (2004) specification. These are as follows:

- A dummy variable for country pairs that share a common border (*contig<sub>ij</sub>*);
- A dummy variable for country pairs that speak the same language (*lang<sub>ij</sub>*);
- Three additional dummy variables indicating whether *i* and *j* were colonized by the same country (*comcol<sub>ij</sub>*); whether *i* and *j* have ever had a colony link (*colony<sub>ij</sub>*); whether *i* and *j* have had a colonial relationship after 1945 (*colony\_1945<sub>ij</sub>*); and whether *i* and *j* are currently in a colonial relationship (*curcol<sub>ij</sub>*);
- A dummy variable indicating whether countries *i* and *j* were ever the same country (*smctry<sub>ij</sub>*);
- The natural logarithm of the product of country *i* and *j*'s land area ( $\ln[area_i * area_j]$ );
- A count variable denoting the number of landlocked countries in the country-pair (*landlocked<sub>ij</sub>*);
- A count variable indicating the number of island countries in the country pair (*island<sub>ij</sub>*).

*RTA<sub>ijt</sub>* is a dummy variable equal to one when countries *i* and *j* are part of the same regional trade agreement in year *t* and zero otherwise; *CU<sub>ijt</sub>* is a dummy variable equal to one if *i* and *j* are part of a currency union in year *t* and zero otherwise; and *Bothin<sub>ijt</sub>* (*Onein<sub>ijt</sub>*) is a dummy variable equal to one if both (one) countries (country) are (is) party to the GATT/WTO in year *t* and zero otherwise.

The coefficient of interest is  $\lambda_1$ ; measuring the positive or negative influence on trade when both countries are members of the GATT/WTO. However,  $\lambda_1$  measures the “average”

treatment effect of GATT/WTO membership but says very little about whether the multilateral institution has benefitted developed, developing or least-developed countries (DC, DingC, and LDC henceforth). Because the gravity equation is a bilateral relationship, we follow (loosely) Subramanian and Wei (2007) in this respect and allow for separate GATT/WTO effects depending on whether the importer/exporter country pair comprises the following combinations:

- i) Importer is a DC in the GATT/WTO and exporter is any other country
- ii) Importer is a DC in the GATT/WTO; exporter is any GATT/WTO member and exporter is any non-GATT/WTO member
- iii) Importer is a DC in the GATT/WTO; exporter is also a DC in the GATT and exporter is a DC not in the GATT/WTO
- iv) Importer is a DC in the GATT/WTO; exporter is a DingC in the GATT and exporter is a DingC not in the GATT/WTO
- v) Importer is a DC in the GATT/WTO; exporter is also a LDC in the GATT and exporter is a LDC not in the GATT/WTO.

Moreover, we perform additional regressions based on equation (4) that separate agricultural from non-agricultural trade flows. Developing countries have always had a strong interest in accessing developed country markets for the export of their agricultural products. Given the relative importance of agriculture within low-income economies, a finding that developing nations have benefited from membership in the GATT/WTO would be particularly useful to shore up support for multilateral agreements as an effective means to support developing economies and to promote membership in the organization.



### 3. Data

The dataset used is somewhat different than conventional studies following Rose (2004) and employing aggregate merchandise trade from the Direction of Trade Statistics of the International Monetary Fund (IMF). Because our interest lies in testing whether the GATT/WTO has increased members agricultural trade and comparing this with non-agricultural trade flows, we use the 1976-2004 Trade, Production and Protection (TPP) dataset developed by Nicita and Olarreaga (2006)<sup>3</sup>. The TPP dataset merges disaggregated trade flows, production and protection data available from different sources into a common classification: the 3-digit International Standard Industrial Classification (ISIC, Revision 2). The data is disaggregated into 28 ISIC manufacturing sectors, one of which includes all food and agricultural commodities.

One of the benefits of the TPP dataset is that it contains an expanded number of importer-exporter country pairs because it employs mirrored trade flows. Since bilateral trade flow data often contain numerous missing values, mirrored trade flows allow the use of partner country exports if the reporting country's imports are recorded as missing but the partner country reports export flows to the reporting country.<sup>4</sup> Using mirrored trade flows to fill in missing reporter statistics, the TPP bilateral trade flow matrix covers 226 reporting countries and 235 partner countries and represents a significant improvement over previous studies using the IMF-DOTS dataset covering roughly 175 countries.

Although production values by ISIC industry is available in the TPP dataset, we prefer to use Gross Domestic Product (GDP) data (in US dollars) obtained from the World Bank (WB)

---

<sup>3</sup> The dataset can be obtained from:  
<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21085384~pagePK:64214825~piPK:64214943~theSitePK:469382.00.html>

<sup>4</sup> Feenstra et al. (2005) also employs mirrored trade flows when trade flow statistics of the reporting country a recorded as missing.

Development Indicators and the United Nations (UN) National Accounts data because the industry-level production data is incomplete. GDP data from the International Monetary Fund's (IMF) *Financial Statistics Yearbook* and the Penn World Tables are used to supplement WB and UN data when it is incomplete or missing (IMF 2005).<sup>5</sup>

Distance, contiguity, common language, colonial ties, same countries, country area as well as indicators for landlocked and island countries are taken from the *Centre d'Etudes Prospectives et d'Informations Internationales* (CEPII) geo-distance datasets (Mayer and Zignago 2006).<sup>6</sup> CEPII uses the great circle formula to calculate the geographic distance between countries, referenced by latitudes and longitudes of the largest urban agglomerations in terms of population. Currency unions are taken from Rose and Glick (2002). Regional trade agreements (RTAs) include all agreements notified to the WTO.<sup>7</sup>

GATT/WTO membership is coded based on the official membership status of the country. These accession dates can be accessed on the WTO website. Our definition of GATT/WTO membership is akin to Rose (2004).<sup>8</sup> In the current paper, we do not control for *de facto* or provisional membership as in Tomz, Goldstein, and Rivers (2007).

In the empirics we distinguish GATT/WTO effects between developed, developing and least-developed countries. The IMF definition of high income economies is used to define developed countries. The definition of least-developed nations is akin to the WTO's list

---

<sup>5</sup> WB Development Indicators Data can be accessed (with subscription) at: <http://ddp-ext.worldbank.org/ext/DDPQQ/member.do?method=getMembers&userid=1&queryId=135>, and UN GDP data can be retrieved at: <http://unstats.un.org/unsd/snaama/dnllist.asp>. Penn World Tables can be accessed at the Center for International Comparisons at the University of Pennsylvania's website: <http://pwt.econ.upenn.edu/>

<sup>6</sup> CEPII is an independent European research institute on the international economy stationed in Paris, France. CEPII's research program and datasets can be accessed at [www.cepii.com](http://www.cepii.com).

<sup>7</sup> A list of all RTAs notified to the WTO can be found at: [www.wto.org/english/tratop\\_e/region\\_e/region\\_e.htm](http://www.wto.org/english/tratop_e/region_e/region_e.htm)

<sup>8</sup> A list of GATT/WTO members prior to and after the creation of the WTO in 1995 can be found at: [http://www.wto.org/English/thewto\\_e/gattmem\\_e.htm](http://www.wto.org/English/thewto_e/gattmem_e.htm) and [http://www.wto.org/English/thewto\\_e/gattmem\\_e.htm](http://www.wto.org/English/thewto_e/gattmem_e.htm)

(available at: [http://www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/org7\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/tif_e/org7_e.htm)). Finally, developing economies are all other countries not in the developed or least-developed set.

The completed panel dataset spans 1980-2004 (the end of the UR of trade commitments for developing countries) and potentially contains 388,650 observations for the aggregate trade dataset. The agricultural and non-agricultural datasets contain 249,178 and 361,777 observations, respectively.

#### **4. Results**

The results are organized as follows. Section one estimates equation (4) using aggregate trade flow data (i.e., trade flows summed across all 28 ISIC 3-digit industries). Section two disaggregates agricultural trade flows from non-agricultural trade flows. Here, we allow for the possibility that the trade flow effect of membership in the GATT/WTO will differ between agricultural and non-agricultural trade. Based on conventional wisdom, our null hypothesis is that the GATT/WTO has done very little to stimulate agricultural trade relative to non-agricultural trade.

##### *4.1 GATT/WTO Effects Using Aggregate Trade, 1980-2004*

Table 1 presents the econometric results. Asymptotic p-values are reported in parenthesis and all standard errors are robust to clustering on country-pairs. Seven regression scenarios are reported. With the exception of our benchmark specification in column one, all regressions include year fixed effects. Columns one and two are akin to Rose (2004) with and without time fixed effects, respectively, and using generic *Bothin* and *Onein* coefficients. In the remaining columns (3 through 7), the GATT/WTO coefficient is delineated based on the development status of the importer and exporter in the trading pair.

As expected the gravity model performed well. Country size coefficients as measured by GDP of the importing and exporting country are consistently positive and highly significant. Distance is consistently negative and significant and implies that doubling the distance between countries more than halves trade on average in all specifications. Sharing a border (contig), speaking a common language and sharing some colonial relationship stimulates trade. The log product of country area appears to reduce trade as does being landlocked, whereas island nations trade more. The trade flow effect of free trade agreements is consistently positive and in line with previous estimates in the literature (Baier and Bergstrand 2007; Grant and Lambert 2008). For example, using our benchmark specification in column two with year fixed effects, free trade agreements increased members' trade by 90 percent  $((\exp(0.64)-1)*100)$ . Currency unions have an even larger effect on international trade. The trade flow effect of country pairs in a currency union was to increase trade by a remarkable 169 percent  $((\exp(0.99)-1)*100)$ .

Does the GATT/WTO promote members' trade? The short answer is: no. Column one (without year fixed effects) suggests that membership in the GATT/WTO is associated with an 11 percent  $((\exp(0.10)-1)*100)$  decrease in trade. With year fixed effects (column two) the effect is negative but insignificant. These results are consistent with the findings in Rose (2004).

Column 3 recodes the *Bothin* dummy variable to equal one if the importer is a DC and the exporter is any other country (WTO and non-WTO members). The coefficient is -0.06 and significant, implying a six percent decrease in trade. Column four considers two GATT/WTO effects - one for importers that are DC's and any exporter that is also a GATT/WTO member; and one where the importer is a DC and the exporter is any non-GATT/WTO member. Exporter members trading with a DC GATT/WTO member is associated with 15 percent  $((\exp(0.14)-$

1)\*100) higher trade. However, DC members' imported 60 percent less from nonmember exporters. Moreover, the difference in the trade flow effect of exporting GATT/WTO members versus non-member exporters is highly significant (table 1).

Similar to Subramanian and Wei (2007), our results suggest that DC members traded 116 percent more on average with other DC exporters who are also GATT/WTO members (column five). This GATT/WTO effect for DC's is impressive especially since it is larger than the effect of being in a free trade agreement (FTA) which implies a 49 percent increase  $((\exp(0.40-1)*100)$  in trade. In other words, the increase in trade between DC members in the GATT/WTO was 67 percentage points higher than two countries party to an FTA. Moreover, a simple test of the equality of the trade flow effect between DC-DC membership in the GATT/WTO versus the general effect of countries belonging to an FTA is easily rejected at conventional levels. DC members' imports from other nonmember DC's is not significant.

Where our results differ relative to Subramanian and Wei (2007) is in the trade flow effect between DC and DingC members. The general conclusion of Subramanian and Wei (2007) was the GATT/WTO is a club for industrial countries with little trade flow impacts for developing nations. While Subramanian and Wei (2007) did not consider explicitly DingC access to DC markets, our results suggest that DingC members have benefitted greatly from participation in the GATT/WTO in terms of accessing DC markets. Column six reports these results which imply that DC imports from DingC members were 51 percent  $((\exp(0.41)-1)*100)$  higher. Moreover, DC imports from nonmember DingC's is associated with a 36 percent  $((\exp(0.31)-1)*100)$  decrease in trade.

Finally, in column seven we consider LDCs who have largely been exempt from any trade liberalization commitments in the GATT/WTO. In this case, access to DC markets in terms of LDC member exports were some 108 percent lower, whereas access to DC markets by nonmember LDCs was not significant.

#### 4.2 *GATT/WTO Effects for Agricultural and Non-Agricultural Trade, 1980-2004*

In this scenario, we estimate equation (4) again with year fixed effects, but we estimate separate models for agricultural and non-agricultural (AGR and NAGR, henceforth) trade flows. Table 2 contains the results. The standard gravity equation coefficient estimates generally have the expected signs and will not be discussed to save on space.

The first thing to note from the GATT/WTO effects reported in table 2 is the comparison between the trade flow effects of GATT/WTO membership on AGR and NAGR trade. If the GATT/WTO has done such a poor job at promoting AGR trade then we would expect this to show up in the data. Or, at the very least, we would expect an insignificant or negative result similar to what Rose (2004) found for aggregate trade and what we found in the previous scenario. However, a casual glance at the GATT/WTO effects across all specifications in table 2 reveals that the trade flow effect of membership in the institution is larger in AGR compared to NAGR in every specification with the exception of trade between DC members.

In column one using the generic *Bothin* dummy variable estimated with year fixed effects, the result implies that members traded an additional 36 percent  $((\exp(0.31)-1)*100)$  more AGR trade relative to the average trade flow between nonmember countries. This compares to a trade flow decrease of 22 percent for NAGR among members. DC importers traded 70 percent  $((\exp(0.53)-1)*100)$  more AGR trade with partners that are members

(column 3). Moreover, the results suggest that the membership status of the exporting partner is important. DC traded an astonishing 136 percent  $((\exp(0.86)-1)*100)$  less with exporters who are not GATT/WTO members.

DingC members benefit through greater AGR access to DC markets compared to nonmember DingC's nonmembers. However, the AGR trade flow effect of DC imports from DingC members is much less than DC-DC member trade in AGR (columns 4 and 5). And, consistent with the previous scenario, DC's traded was much lower with LDC's regardless of the LDC's membership status.

## **5. Conclusions**

This paper asked whether the GATT/WTO has increased members' AGR trade? Based on our initial empirical results, the answer to this question is a resounding: yes! Countries, particularly developing countries, can reap large market access benefits to DC markets if they are also GATT/WTO members. This result is robust in both AGR and NAGR sectors. While the results may seem questionable given much of the criticism surrounding the treatment of AGR trade in the GATT/WTO, there may be several reasons why membership "has its privileges" (Tomz, Goldstein, and Rivers 2006).

First, although trade liberalization commitments with respect to AGR trade have been lenient, the UR Agreement on Agriculture (URAA) was a major stepping stone in the reform of agricultural trade because it put in place a set of rules to make non-tariff border measures more transparent and it improved the framework to settle trade disputes. If pre-UR protection in agriculture was significantly larger than NAGR, then even small multilateral trade cost

reductions from a relatively large base could generate a sizeable AGR trade response among WTO Members.

Second, the GATT/WTO establishes an element of predictability among WTO members that may not be the case when members trade with nonmembers. Such rules can reduce uncertainty in international transactions and provide a legal means to circumvent discriminatory actions. Moreover, multilateral protection rates (those outside the provisions of FTAs) such as tariffs are consistently documented by the GATT/WTO and are capped so exporting countries know *a priori* that the maximum tariff rate that can be levied is the importing country's most favored nation rate. Thus the GATT/WTO framework provides an incentive for countries to invest in trading relationships with other GATT/WTO members. This incentive structure may not exist when trade occurs between GATT/WTO members and outsiders.



## References

- [1] Anderson, J.E., and E. van Wincoop. 2003. "Gravity with Gravititas: A Solution to the Border Puzzle." *American Economic Review* 93(1): 170-92.
- [2] Baier, S.L., and J.H. Bergstrand. 2007. "Do Free Trade Agreements Actually Increase Members' International Trade?" *Journal of International Economics* 71(1): 72-95.
- [3] Economist, 2002. "Weighing up the WTO," The Economist Newspaper and The Economist Group, August 4, 2005.
- [4] Economist, 2004. "Is there any point to the WTO?" The Economist Newspaper and The Economist Group, November 21, 2004.
- [5] Eichengreen, B., and D. Irwin. 1998. "The Role of History in Bilateral Trade Flows," In *The Regionalization of the World Economy*, edited by Jeffrey A. Frankel. Chicago: University of Chicago Press, pp. 33-57.
- [6] Engelbrecht and Pearce 2007. "The GATT/WTO has Promoted Trade, but Only in Capital-Intensive Commodities," *Applied Economics*, 39(12): 1573-1581.
- [7] Feenstra, R. 2004. *Advanced International Trade: Theory and Evidence*. Princeton, NJ: Princeton University Press.
- [8] Feenstra, R., R.E. Lipsey, H. Deng, A.C. Ma, and H. Mo. 2005. "World Trade Flows: 1962-2000". NBER Working Paper No. 11040.
- [9] Felbermayr, G.J., and W. Kohler. 2006. "Exploring the Intensive and Extensive Margins of World Trade," *Review of World Economics*, 142(4):642-674.
- [10] Grant, J.H. and D.M. Lambert. 2008. "Do Regional Trade Agreements Increase Members' Agricultural Trade?" *American Journal of Agricultural Economics*, 90(3): 765-782
- [11] Herz, B., and M. Wagner. 2006. "Do the World Trade Organization and the Generalized System of Preferences Foster Bilateral Trade?" Department of Economics Working Paper 12-2006, Bayreuth University, Germany.
- [12] International Monetary Fund. 2002. *International Financial Statistics Yearbook*. Washington, D.C., various issues.
- [13] Liu, X. *Forthcoming*. "GATT/WTO Promotes Trade Strongly: Sample Selection and Model Specification," *Review of International Economics*.

- [14] Mayer, T. and S. Zignago. 2006. "Notes on CEPII's Distance Measures," unpublished manuscript, Paris France, May.
- [15] Martin, W.J. and C.S. Pham. 2008. "Estimating the Gravity Equation when Zero Trade Flows are Frequent", Paper provided by University Library of Munich, Germany, MPRA Paper number: 9453
- [16] Rose, A., and R. Glick. 2002. "Does a Currency Union Affect Trade? Time-series Evidence", *European Economic Review*, 46(6): 1125-1151.
- [17] Rose, A. 2004. "Do We Really Know That the WTO Increases Trade?" *American Economic Review* 94(1): 8-114.
- [18] Rose, A. 2006. "The Effect of Membership in the GATT/WTO on Trade: Where do we Stand?" Unpublished manuscript, available at: <http://faculty.haas.berkeley.edu/aroze>.
- [19] Santos Silva, J.M.C., and S. Tenreyro. 2006. "The Log of Gravity," *The Review of Economics and Statistics*, 88(4): 641-658
- [20] Subramanian A., and S.J. Wei. 2007. The WTO Promotes Trade Strongly but Unevenly," *Journal of International Economics*, 72(1): 151-175.
- [21] Tinbergen, J. 1962. *Shaping the World Economy*. New York: The Twentieth Century Fund.
- [22] Tomz, M., J.L. Goldstein, and D. Rivers. 2007. "Do We Really Know that the WTO Increases Trade? Comment," *American Economic Review*, 97(5): 2005-2018.
- [23] WTO. 2007. *World Trade Report 2007. Six Decades of Multilateral Trade Cooperation: What have we Learnt?* WTO Document WT/REG/E/37, March 2007.

**Table 1. GATT/WTO Effects using Aggregate Trade, 1980-2004**

	-----Regression Scenarios-----						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>InGDP<sub>it</sub></b>	1.19** (0.00)	1.20** (0.00)	1.21** (0.00)	1.20** (0.00)	1.19** (0.00)	1.19** (0.00)	1.20** (0.00)
<b>InGDP<sub>jt</sub></b>	0.85** (0.00)	0.86** (0.00)	0.87** (0.00)	0.87** (0.00)	0.84** (0.00)	0.88** (0.00)	0.87** (0.00)
<b>InDIST<sub>ij</sub></b>	-1.13** (0.00)	-1.13** (0.00)	-1.13** (0.00)	-1.13** (0.00)	-1.11** (0.00)	-1.14** (0.00)	-1.12** (0.00)
<b>Border<sub>ij</sub></b>	0.75** (0.00)	0.74** (0.00)	0.74** (0.00)	0.74** (0.00)	0.76** (0.00)	0.75** (0.00)	0.74** (0.00)
<b>Lang<sub>ij</sub></b>	0.47** (0.00)	0.46** (0.00)	0.48** (0.00)	0.46** (0.00)	0.47** (0.00)	0.47** (0.00)	0.49** (0.00)
<b>Colony<sub>ij</sub></b>	0.59** (0.00)	0.54** (0.00)	0.53** (0.00)	0.53** (0.00)	0.48** (0.00)	0.53** (0.00)	0.51** (0.00)
<b>ComCol<sub>ij</sub></b>	0.49** (0.00)	0.51** (0.00)	0.54** (0.00)	0.51** (0.00)	0.54** (0.00)	0.52** (0.00)	0.54** (0.00)
<b>CurCol<sub>ij</sub></b>	-0.28 (0.41)	-0.25 (0.46)	-0.36 (0.28)	-0.23 (0.50)	-0.37 (0.27)	-0.32 (0.35)	-0.43 (0.19)
<b>Colony_1945<sub>ij</sub></b>	1.21** (0.00)	1.20** (0.00)	1.21** (0.00)	1.24** (0.00)	1.28** (0.00)	1.22** (0.00)	1.27** (0.00)
<b>Same Country<sub>ij</sub></b>	0.83** (0.00)	0.85** (0.00)	0.86** (0.00)	0.87** (0.00)	0.93** (0.00)	0.82** (0.00)	0.86** (0.00)
<b>In[Areai*Areaj]</b>	-0.11** (0.00)	-0.12** (0.00)	-0.12** (0.00)	-0.12** (0.00)	-0.11** (0.00)	-0.12** (0.00)	-0.12** (0.00)
<b>Number Landlocked<sub>ij</sub></b>	-0.41** (0.00)	-0.34** (0.00)	-0.34** (0.00)	-0.34** (0.00)	-0.36** (0.00)	-0.33** (0.00)	-0.33** (0.00)
<b>Number Island<sub>ij</sub></b>	0.26** (0.00)	0.26** (0.00)	0.25** (0.00)	0.25** (0.00)	0.22** (0.00)	0.25** (0.00)	0.24** (0.00)
<b>Free Trade Agreement<sub>ijt</sub></b>	0.61** (0.00)	0.64** (0.00)	0.71** (0.00)	0.61** (0.00)	0.40** (0.00)	0.76** (0.00)	0.69** (0.00)
<b>Currency Union<sub>ijt</sub></b>	1.00** (0.00)	0.99** (0.00)	1.03** (0.00)	1.05** (0.00)	0.99** (0.00)	0.99** (0.00)	1.01** (0.00)
<b>Bothin WTO<sub>ijt</sub></b>	-0.10** (0.03)	-0.02 (0.75)	---- ----	---- ----	---- ----	---- ----	---- ----
<b>Onein WTO<sub>ijt</sub></b>	-0.31** (0.00)	-0.28** (0.00)	---- ----	---- ----	---- ----	---- ----	---- ----
<b>DC Importer in WTO<sub>jt</sub></b>	---- ----	---- ----	-0.06* (0.07)	---- ----	---- ----	---- ----	---- ----
<b>DC Importer in WTO; Exporter also in WTO<sub>ijt</sub></b>	---- ----	---- ----	---- ----	0.14** (0.00)	---- ----	---- ----	---- ----
<b>DC Importer in WTO; Exporter not in WTO<sub>ijt</sub></b>	---- ----	---- ----	---- ----	-0.47**	----	----	----

	----	----	----	(0.00)	----	----	----
DC Importer in WTO; Exporter is DC in WTO <sub>ijt</sub>	----	----	----	----	0.77**	----	----
	----	----	----	----	(0.00)	----	----
DC Importer in WTO; Exporter is DC not in WTO <sub>ijt</sub>	----	----	----	----	0.04	----	----
	----	----	----	----	(0.26)	----	----
DC Importer in WTO; Exporter is DingC WTO Member <sub>ijt</sub>	----	----	----	----	----	0.41**	----
	----	----	----	----	----	(0.00)	----
DC Importer in WTO; Exporter is non-WTO DingC <sub>ijt</sub>	----	----	----	----	----	-0.31**	----
	----	----	----	----	----	(0.00)	----
DC Importer in WTO; Exporter is LDC WTO Member <sub>ijt</sub>	----	----	----	----	----	----	-0.73**
	----	----	----	----	----	----	(0.00)
DC Importer in WTO; Exporter is non-WTO LDC <sub>ijt</sub>	----	----	----	----	----	----	0.02
	----	----	----	----	----	----	(0.58)

---

<i>H<sub>0</sub>: Exporter in WTO = Exporter not in WTO</i>	----	----	----	152.75**	86.4**	154.9**	74.3**
	----	----	----	(0.00)	(0.00)	(0.00)	(0.00)

---

<b>Observations</b>	388,650	388,650	388,650	388,650	388,650	388,650	388,650
<b>R-squared</b>	0.63	0.64	0.63	0.63	0.63	0.63	0.63
<b>Root mean square error</b>	2.25	2.23	2.23	2.23	2.23	2.23	2.23

---

Notes: The regressand is the log of nominal imports. P-values are reported below coefficient estimates. Asterisks \* and \*\* denote significance that ten and five percent levels, respectively. Acronyms DC, DingC, and LDC denote develop countries, developing countries, and least-developed countries, respectively. Developed countries are classified based on the IMF's list of high income economies and LDCs are classified based on the WTO's list: ([www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/org7\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/tif_e/org7_e.htm)).

**Table 2. Comparing GATT/WTO Effects for Agricultural and Non-Agricultural Trade, 1980-2004**

	-----Regression Scenarios-----											
	1		2		3		4		5		6	
	AGR	NAGR	AGR	NAGR	AGR	NAGR	AGR	NAGR	AGR	NAGR	AGR	NAGR
<b>InGDP<sub>it</sub></b>	0.77**	1.24**	0.77**	1.24**	0.76**	1.23**	0.75**	1.21**	0.76**	1.23**	0.77**	1.22**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>InGDP<sub>jt</sub></b>	0.55**	0.85**	0.52**	0.85**	0.56**	0.89**	0.54**	0.82**	0.58**	0.89**	0.57**	0.87**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>InDIST<sub>ij</sub></b>	-0.90**	-1.19**	-0.89**	-1.19**	-0.90**	-1.19**	-0.87**	-1.17**	-0.90**	-1.19**	-0.88**	-1.18**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>Border<sub>ij</sub></b>	0.69**	0.79**	0.71**	0.80**	0.67**	0.77**	0.69**	0.81**	0.66**	0.77**	0.68**	0.77**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>Lang<sub>ij</sub></b>	0.54**	0.40**	0.55**	0.42**	0.54**	0.40**	0.56**	0.41**	0.54**	0.40**	0.57**	0.43**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>Colony<sub>ij</sub></b>	0.82**	0.59**	0.77**	0.57**	0.81**	0.61**	0.78**	0.53**	0.83**	0.61**	0.80**	0.56**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>ComCol<sub>ij</sub></b>	0.34**	0.50**	0.38**	0.53**	0.34**	0.49**	0.37**	0.53**	0.33**	0.48**	0.37**	0.51**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>CurCol<sub>ij</sub></b>	0.31	-0.32	0.30	-0.41	0.41	-0.30	0.20	-0.38	0.44	-0.23	0.12	-0.56*
	(0.39)	(0.32)	(0.40)	(0.21)	(0.25)	(0.36)	(0.58)	(0.23)	(0.21)	(0.48)	(0.75)	(0.08)
<b>Colony_1945<sub>ij</sub></b>	0.74**	1.06**	0.75**	1.08**	0.77**	1.10**	0.78**	1.13**	0.75**	1.09**	0.79**	1.19**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>Same Country<sub>ij</sub></b>	0.46**	0.70**	0.51**	0.72**	0.50**	0.70**	0.55**	0.79**	0.46**	0.71**	0.48**	0.71**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>In[Area<sub>i</sub>*Area<sub>j</sub>]</b>	0.00	-0.12**	0.01	-0.12**	0.00	-0.13**	0.01	-0.11**	-0.01	-0.13**	-0.01	-0.12**
	(0.78)	(0.00)	(0.18)	(0.00)	(0.96)	(0.00)	(0.33)	(0.00)	(0.23)	(0.00)	(0.39)	(0.00)
<b>Number Landlocked<sub>ij</sub></b>	-0.44**	-0.21**	-0.45**	-0.21**	-0.44**	-0.19**	-0.45**	-0.22**	-0.43**	-0.20**	-0.43**	-0.18**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>Number Island<sub>ij</sub></b>	0.27**	0.33**	0.24**	0.32**	0.26**	0.34**	0.22**	0.27**	0.26**	0.33**	0.25**	0.31**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>Free Trade Agreement<sub>ijt</sub></b>	1.46**	0.64**	1.38**	0.67**	1.37**	0.66**	1.29**	0.35**	1.48**	0.59**	1.54**	0.67**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>Currency Union<sub>ijt</sub></b>	0.35**	0.89**	0.39**	0.90**	0.44**	0.95**	0.38**	0.86**	0.46**	0.96**	0.40**	0.88**
	(0.04)	(0.00)	(0.02)	(0.00)	(0.01)	(0.00)	(0.03)	(0.00)	(0.01)	(0.00)	(0.02)	(0.00)
<b>Bothin WTO<sub>ijt</sub></b>	0.31**	-0.20**	----	----	----	----	----	----	----	----	----	----
	(0.00)	(0.00)	----	----	----	----	----	----	----	----	----	----

Onein WTO <sub>ijt</sub>	0.01 (0.81)	-0.42** (0.00)	----	----	----	----	----	----	----	----	----	----
DC Importer in WTO <sub>ijt</sub>	----	----	0.53** (0.00)	0.04 (0.23)	----	----	----	----	----	----	----	----
DC Importer in WTO; Exporter also in WTO <sub>ijt</sub>	----	----	----	----	0.53** (0.00)	0.05 (0.23)	----	----	----	----	----	----
DC Importer in WTO; Exporter not in WTO <sub>ijt</sub>	----	----	----	----	-0.86** (0.00)	-0.61** (0.00)	----	----	----	----	----	----
DC Importer in WTO; Exporter is DC in WTO <sub>ijt</sub>	----	----	----	----	----	----	0.69** (0.00)	0.94** (0.00)	----	----	----	----
DC Importer in WTO; Exporter is DingC WTO Member <sub>ijt</sub>	----	----	----	----	----	----	----	----	0.29** (0.00)	-0.16** (0.00)	----	----
DC Importer in WTO; Exporter is non-WTO DingC <sub>ijt</sub>	----	----	----	----	----	----	----	----	-0.87** (0.00)	-0.80** (0.00)	----	----
DC Importer in WTO; Exporter is LDC WTO Member <sub>ijt</sub>	----	----	----	----	----	----	----	----	----	----	-0.55** (0.00)	-1.24** (0.00)
DC Importer in WTO; Exporter is non-WTO LDC <sub>ijt</sub>	----	----	----	----	----	----	----	----	----	----	-0.69** (0.00)	-0.80** (0.00)
<hr/>												
<i>Ho: Exporter in WTO = Exporter not in WTO<sup>a</sup></i>	----	----	----	----	274.7** (0.00)	91.4** (0.00)	----	----	289.2** (0.00)	124.3** (0.00)	0.44 (0.51)	14.8** (0.00)
<hr/>												
<b>Observations</b>	249,178	361,777	249,178	361,777	249,178	361,777	249,178	361,777	249,178	361,777	249,178	361,777
<b>R-squared</b>	0.43	0.62	0.43	0.62	0.44	0.63	0.43	0.63	0.44	0.63	0.43	0.63
<b>Root mean square error</b>	2.33	2.27	2.33	2.27	2.32	2.27	2.33	2.26	2.32	2.27	2.34	2.27

Notes: The regressand is the log of nominal imports. P-values are reported below coefficient estimates. Asterisks \* and \*\* denote significance that ten and five percent levels, respectively. AGR (NAGR) denotes regressions based on agricultural (non-agricultural ) trade flows. Acronyms DC, DingC, and LDC denote develop countries, developing countries, and least-developed countries, respectively. Developed countries are classified based on the IMF's list of high income economies and LDCs are classified based on the WTO's list: ([www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/org7\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/tif_e/org7_e.htm)).

<sup>a</sup> Due to the very limited number of non- WTO developed countries (DC), the coefficient for "DC Importer in WTO; Exporter is non-WTO DC<sub>ijt</sub>" that appeared in table 1 could not be estimated with any precision in the AGR and NAGR regressions.