HAS THE WORLD TRADE ORGANIZATION PROMOTED SUCCESSFUL REGIONAL TRADE AGREEMENTS?

PRELIMINARY DRAFT, COMMENTS WELCOME

Jason H. Grant[a,*] , Christopher F. Parmeter[a]

[a] *Dept. of Agricultural & Applied Economics, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA*

Abstract

This study uses econometric gravity equations to test whether the WTO has promoted successful regional trade agreements (RTA). Two important findings emerge. First, we find that two countries that are members of the GATT/WTO and enter into a regional trade agreement stimulate trade. However, the effect on trade is not nearly as large as that between two RTA members that *belong* to the GATT/WTO. Contrary to the findings in Rose (2004), this result tends to support the fact that the GATT/WTO has liberalized multilateral trade, outside of RTAs. In other words, the effect of an RTA on countries' trade who are not party to the GATT/WTO should generate a large RTA trade response due to relatively large pre-existing trade distortions. Second, we show that the GATT/WTO has not promoted successful RTAs using explicit RTA variables that controls for the notification status (to the GATT/WTO) of an RTA. Interestingly, *non-notified* RTAs trade significantly more than their *notified* counterparts.

Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Orlando, FL, July 27-29, 2008.

* Tel.: +1 540 231 7559; fax: +1 540 231 7417.
E-mail address: jhgrant@vt.edu

Introduction

Regional trading arrangements are now a ubiquitous feature of global trade. In July of 2007, the Committee on Regional Trade Agreements (CRTA) recognized 380 RTAs as having been notified to theWorld Trade Organization (WTO), with 205 agreements in force. These figures are up from 250 notified RTAs in 2003, where almost 180 agreements were in force. Since the advent of the WTO in 1995, the CRTA has received an average of 11 notifications per year - almost one per month - and most WTO Members are participating in an average of five agreements (Crawford and Fiorentino 2005).

However, a careful review of the empirical literature estimating the trade flow effects of RTAs reveals that trade increases among members can hardly be taken for granted. An important policy question then is not whether RTAs have created or diverted trade categorically (i.e., the EU, NAFTA, ASEAN, etc.), but whether we can identify factors that ensure successful RTAs? A natural starting point for evaluating a successful RTA is the WTO. In practice, rules governing the formation and implementation of RTAs fall under Article XXIV of the General Agreement on Tariffs and Trade (GATT), whereas the task of verifying WTO compliance and assessing the effectiveness of notified RTAs is entrusted to the CRTA. As recent evidence suggests however, the WTO has been unable to effectively ensure RTA compliance. Clem Boonekamp (WTO 2007), Director of the Trade Policies Review Division of the WTO notes that: "... keeping track of the number, type, scope and more importantly, the effectiveness and compliance of each RTA remains an elusive task."

RTAs are receiving an unprecedented amount of attention from trade economists. In the last 10 years alone, the question of whether RTAs are "trade creating" or "trade diverting" has motivated an explosion in the number of ex post econometric analyses using the gravity equation. Conflicting reports abound as evinced in recent studies by Baier and Bergstrand (2007) and Ghosh and Yamarik (2004). Baier and Bergstrand (2007) highlighted the European Union (EU) integration as a case and point: some studies have found positive and significant effects (Tinbergen 1962; Aitken 1973; Brada and Mendez 1985), while others have found insignificant and, in some cases, negative trade flow effects (Frankel, Stein and Wei 1995, 1996; Frankel 1997; Krueger 2000).

Rose's (2004) finding that the WTO does not promote trade across a variety of gravity models came as somewhat of a surprise given that nearly all economists agree that free trade is welfare improving. The fact that Rose (2004) found an insignificant (or even negative) impact on trade by belonging to the WTO is a puzzling result. Why would the leaders of the world promote membership into an organization that failed to deliver on the promise of free trade? Indeed, Rose (2004, page 112) notes himself that this result is "... an interesting mystery." While Rose's (2004) finding is interesting in its own right, perhaps a better question is: has the WTO promoted trade in other ways?

Keep in mind that the WTO is not a trade agreement much the way that RTAs are. The WTO is a body that oversees trade between its members and attempts to promote open, fair and undistorted competition. So, as a negotiating forum, one would not expect membership in the WTO to have its privileges until a member had a dispute resolved in its favor or the provisions of the WTO resulted in more liberal trade policy. The key is that a dispute must be brought to the WTO's attention or the member country must

comply with WTO provisions in order for freer trade to exist. Thus, trading partners may exploit the benefits of WTO membership directly (as in Rose, 2004) or indirectly, through RTAs that are notified under Article XXIV.

Here we motivate another potential avenue where the WTO may promote trade, be monitoring RTAs and ensuring compliance with the provisions of Article XXIV. The purpose of this study is to provide an empirical test of whether the provisions of Article XXIV of the GATT and CRTA compliance standards have promoted successful RTAs, through increased trade among members, relative to non-notified RTAs. This is made possible by the development of a comprehensive dataset on RTAs, incorporating over 260 agreements along with an expanded set of trading countries involving 243 partner countries and 178 reporting countries spanning the years, 1976-2004. This is a significant improvement over previous econometric studies, which typically consider only a small subset of RTAs in existence. A remarkable feature of our data reveals that almost 40 percent of all agreements are neither notified, nor accounted for in the RTA database published by the WTO.

The remainder of the paper is laid out as follows. Section 2 reviews the theoretical gravity model and discusses the econometric model to be estimated. Section 3 discuss the data to be used in the paper while Section 4 reviews the results and provides intuition for our findings. Our conclusions and suggestions for further research appear in Section 5.

Gravity Econometrics

In the empirical trade literature the workhorse model is undoubtedly the gravity equation. Developed by Tinbergen (1962), this model is akin to Newton's law of

universal gravitation. This model predicts that larger and closer countries will trade (exert more gravity on) more with one another than smaller and more distant countries.

In its most simple form, the gravity model for trade states that trade flow from country i to country j is proportional to the multiplicative interaction of each country's size, measured by GDP, and inversely proportional to the distance between them. Denoting trade flow from *i* to *j* as *Tij* , GDP of country *i* as *Yi* and the distance between country *i* and *j* as *Dij*, the gravity model for trade is formalized as:

(1) $$T_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3}$$

where, β_0, β_1, β_2, and β_3 are unknown parameters.

While the theory assumes a physical relationship for trade between countries, economic forces may prohibit a universal set of coefficients for which the relationship will hold. To operationalize the model, a multiplicative, stochastic error term, ε_{ij}, is appended to equation (1) to yield:

(2) $$T_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3} \varepsilon_{ij}$$

Traditional econometric studies of trade flows assume that the conditional expectation of the random noise, conditional on the explanatory variables is one. Thus, taking logs of both sides yields a traditional, linear in parameters, regression model that can easily be estimated.[1]

Formally, we have a log-linearized, empirical gravity model as:

(3) $$\ln(T_{ij}) = \alpha_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(D_{ij}) + \gamma Z_{ij} + \varepsilon_{ij},$$

[1] This of course assumes that zero trade does not exist, which is not the case. It is common for researchers to either drop the observations that exhibit zero trade, or to add one to all zero trade flows, making the logarithm of said observation zero.

where, where Z_{ij} is a vector of additional controls of interest to the researcher. Common variables in empirical gravity models include whether the countries have a common language, a common currency, if both are members of a particular trade agreement, and whether countries share a common border. The traditional gravity equation in (3) can also be estimated across time (in a panel setting), in which case the Z_{ij} vector may contain a set of country-pair fixed effects.

In 2003, James Anderson and Eric van Wincoop developed a theoretically consistent version of the gravity model that accounts for multilateral resistance. The idea is that trade depends not only on the bilateral barriers separating countries *i* and *j*, but also on the multilateral resistance they face with their partners in the rest of the world. The theoretically consistent model that appears in Anderson and van Wincoop (2003) suggests estimating a modified gravity equation subject to unobserved multilateral price resistance (Baier and Bergstrand 2007):

$$\ln\left[\frac{T_{ij}}{Y_i Y_j}\right] = \beta_0 + \beta_3 \ln D_{ij} + \gamma Z_{ij} - \ln P_i^{1-\sigma} - \ln P_j^{1-\sigma} + \varepsilon_{ij} \tag{4}$$

subject to $i = 1 \ldots N$ equilibrium conditions:

$$P_i^{1-\sigma} = \sum_{i=1}^{N} P_i^{\sigma-1}\left(\frac{Y_i}{Y_W}\right) \cdot e^{\beta_3 \ln D_{ij} + \gamma Z_{ij}} \tag{5}$$

where, Y_W denotes world GDP (constant across countries); $P_i^{1-\sigma}$ and $P_j^{1-\sigma}$ are exporter and importer price indices (i.e., the multilateral resistance terms), respectively; and σ is the elasticity of substitution between varieties (i.e., countries).

The general equilibrium structure of Anderson and van Wincoop's (2003) model is different from the traditional gravity equation in (4) due to the explicit role of the multilateral price terms ($P_i^{1-\sigma}$ and $P_j^{1-\sigma}$) and the restriction of the income coefficients to unity. Because the multilateral price terms are largely unobservable, the authors use a nonlinear least squares procedure to recover unbiased estimates of model's parameters. However, a computationally easier method to control for the multilateral resistance terms in the cross-section is to estimate equation (4) using exporter (*i*) and importer (*j*) fixed effects (Anderson and van Wincoop 2003; Feenstra 2004). With importer and exporter fixed effects in the cross-section, only those variables that vary across country pairs are included. In other words, GDPs for the importer and exporter drop out since they are perfectly collinear with the corresponding fixed effects.

Baier and Bergstrand (2007) adapted the general equilibrium structure of Anderson and van Wincoop's (2003) model in equation (4) with one important extension. They show how this model can be applied in a panel setting using country-by-time (*it*, *jt*) fixed effects to account for potentially time-varying multilateral resistance terms as well as country-pair fixed effects to account for all time invariant factors that promote/impede trade. This is the approach applied here. For a more formal discussion see Grant and Lambert (2008).

Data

The dependent variable s is the natural log of bilateral import flows from country *i* (the exporter) to country *j* (the importer). The database used in this article is from Nicita and Olarreaga's (2007) bilateral trade flow matrix (T_{ijt}) in U.S. dollars from 1976-2004 and the extended version made available by the *Centre d'Etudes Prospectives et*

d'Informations Internationales (CEPII).[2] The dataset is unique in that bilateral trade flows can be reconciled based on mirror trade flows reported by partner countries. Because of this, bilateral trade flows exist for 178 reporting countries and 243 partner countries, which is a significant improvement over conventional trade data from the International Monetary Fund's Direction of Trade Statistics or the National Bureau of Economic Research (NBER) World Trade Flow database made available by Feenstra and Lipsey (2005). Moreover, the expanded country coverage makes it possible to control for almost 170 regional trade agreements in existence. This type of coverage is essential to exploit variation in notified and non-notified regional trading agreements and their interaction with GATT/WTO membership.

Bilateral trade flows are derived from the United Nations Commodity Trade Statistics Database (COMTRADE). Real GDP data (in US dollars) are obtained from two primary sources: the World Bank (WB) Development Indicators database; and the United Nations (UN) National Accounts database. GDP data from the International Monetary Fund's (IMF) *Financial Statistics Yearbook* are used to supplement WB and UN data when it is incomplete or missing (World Bank 2005; IMF 2005; and http://unstats.un.org/unsd/snaama/dnllist.asp).

Trade flow (T_{ijt}) data in ($1000) U.S. dollars are converted to real dollars by deflating bilateral trade flows by the American Consumer Price Index (CPI) available from the Bureau of Labor Statistics.[3] Distance, contiguity and common language indicators are taken from CEPII's geo-distance dataset (Mayer and Zignago 2006). CEPII uses the great circle formula to calculate the geographic distance between

[2] 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.
[3] http://data.bls.gov/cgi-bin/surveymost?cu

countries, referenced by latitudes and longitudes of the largest urban agglomerations in terms of population. The completed panel dataset spans 1976-2004 in annual intervals and contains 190,700 obeservations.

With this type of coverage we are able to incorporate 286 bilateral and regional trading agreements that were signed and entered into force up to 2004. This is a critical feature of this study because it allows us to make a distinction between those RTAs that are notified to the WTO (*notified*) and those that have never been notified (*non-notified*). Furthermore, most previous studies have accounted for only a handful of (*notified*) RTAs taken from the WTO website.[4] For each agreement, we record three important statistics that will enable us to test the effectiveness of the WTO in promoting successful regional trade agreements: (i) the type of agreement; (ii) the number of members; and (iii) whether the agreement has been notified to the WTO. In addition, we also document whether one, both or none of the RTA members are current WTO members. Our definition of GATT/WTO membership is akin to Rose (2004).[5]

Three sources of data are used to construct the RTA database: the Preferential Trade Agreements Database (PTAD) published by McGill University's Faculty of Law; the WTO list of RTAs published by the CRTA; and a recent survey of RTAs published

[4] Baier and Bergstrand (2007) provide a definitive analysis of the effects of RTAs on members' international trade using the gravity equation. However, that study incorporated only 53 RTAs, all of which were notified to the WTO. Similarly, Grant and Lambert (2008) investigated the effects of 60 RTAs. Rose (2004) included only ten regional trade agreements in his study of the effects of the GATT/WTO on trade. For a list of RTAs notified to the WTO see: www.wto.org/english/tratop_e/region_e/region_e.htm

[5] In the current paper, we do not control for *de facto* or *de jure* membership. A list of GATT members prior to the Uruguay Round of 1995 ca be found at: http://www.wto.org/English/thewto_e/gattmem_e.htm. A list of WTO members since the start of the Uruguay Round can be found at: http://www.wto.org/English/thewto_e/gattmem_e.htm

by the World Bank (see Mevedev 2006).[6] The WTO publishes a list of RTAs that are notified to the CRTA and indicates the date the agreement entered into force. However, not every agreement is notified to the WTO as evidenced by the McGill PTAD and the recent survey by Medvedev (2006). Moreover, some agreements overlap creating Baghwati's "spaghetti bowl" phenomenon. This is particularly true of the African agreements. While this will not affect the results if both of the overlapping agreements are either notified or non-notified, it does create a problem if one agreement to which two members belong is notified and the other agreement to which the same two members belong is not notified (non-notified). While these occasions are rare, in instances where they do occur, we incorporate the longest standing RTA and record information for that agreement.

Results

The results are organized in four sections. In section one (*Generic RTA Effects*) we estimate the effects of RTAs on trade using a generic RTA dummy representing 167 RTAs in existence up to 2004 using cross-section and panel data methods and a theoretically consistent gravity equation. This scenario serves as our benchmark to ensure that we can replicate recent findings in the literature (see Baier and Bergstrand 2007 and grant and Lambert 2008).

In section two (*GATT/WTO Membership*) we begin testing the effectiveness of the WTO in promoting successful regional trade agreements by allowing for separate RTA effects with respect to: (i) both countries are GATT/WTO members (*both-in*); (ii) one

[6] The McGill and WTO databases are freely available at: http://ptas.mcgill.ca/; and http://www.wto.org/english/tratop_e/region_e/region_e.htm

trading partner is a GATT/WTO member (*one-in*); and (iii) neither country is a GATT/WTO member (*none-in*).

In section three (*Notified and Non-Notified RTAs*), we allow for separate effects of *notified* and *non-notified* regional trade agreements, the latter of which represents RTAs that have never been notified to the WTO's CRTA and therefore is not subject to the provisions of *Article XXIV* and RTA compliance reviews by the CRTA. This scenario is designed to test whether the GATT/WTO has ensured successful RTAs notified to the WTO.

In the final section (*GATT/WTO Membership & RTA Notification Status*) we provide a robustness check by combining GATT/WTO membership with *notified* and *non-notified* RTAs. In this scenario, we test to see whether the effects of WTO membership may be affecting the coefficient estimates obtained when we estimated the differential effect of *notified* and *non-notified* RTAs in scenario three.

Generic RTA Effects

Table 1 presents the results after estimating a cross-sectional (at five-year intervals) and panel gravity equation using a common RTA coefficient (including all notified and non-notified RTAs). The gravity model performed quite well as expected. Geographic distance, language similarity, and adjacency variables are highly significant and have typical magnitudes found in the literature (see for example Rose 2004). Countries that share a common border and speak a common language trade more with each other as expected, whereas doubling the economic distance between countries more than halves trade. When we allow economic size to be different than unity (column 7),

GDP coefficients are significantly positive and elastic and suggest that larger countries trade more.

The effects of RTAs on members' international trade in the cross-section are consistent with recent findings by Baier and Bergstrand (2007) and Ghosh and Yamarik (2004). RTAs seem to promote trade significantly in some years (2000 and 2004), while in other years the effect on trade is small and in some cases even negative (1980 and 1985). Baier and Bergstrand (2007) addressed this issue and found that countries likely select endogenously into RTAs. The authors found that panel data methods applied to a theoretically consistent gravity equation that includes country-by-time fixed effects to account for the potentially time-varying multilateral resistance terms, and country pair fixed effects, tends to eliminate the endogeneity bias of the RTA coefficient. In the final column of table 1 we estimate this model. The results suggest that RTAs increase members' trade by 75 percent ((exp(0.56)-1)*100), which is consistent with Baier and Bergsrtand (2007) who found that RTAs approximately doubled members trade.

GATT/WTO Membership

Rose (2004) found that membership in the GATT/WTO was not associated with increased trade after controlling for a host of natural factors that may promote or impede trade. Contrary to Rose (2004), we are interested in identifying one area where the WTO *might have been* successful: regional trade agreements. If the GATT/WTO has been successful at liberalizing trade among its membership then the effect on trade of an RTA between two countries that are both members of the GATT/WTO may not stimulate trade as much as between two countries that are not members of the GATT/WTO due to relatively large pre-existing trade distortions in the latter. In this second scenario we

allow for the effect of RTAs on trade to differ depending on whether one, both, or none of the countries that enter into an RTA are GATT/WTO members.

The results are reported in Table 2. Again we estimate the effect of GATT/WTO membership using both cross-sectional and panel data methods applied to a theoretically consistent gravity equation. The variable *RTA* is the benchmark which measures the effect of of RTAs on trade when neither country in the RTA is a GATT/WTO member (*none-in*). The counterfactuals are when both members of an RTA are party to the GATT/WTO (*both-in*) and when one member (either *i* or *j*) is party to the GATT/WTO (*one-in*). What is noteworthy about the results in table 2 is that non-GATT/WTO members' RTA agreements significantly outperformed their one-in or both-in counterparts. In other words, the GATT/WTO may in fact be successful: RTAs that are formed by outsiders (i.e., *none-in*) effectively increased RTA member trade by a remarkable 183 percent ((exp(1.04)-1)*100). When one member of the RTA is party to the GATT/WTO, the RTA effectively doubles members' trade ((exp(1.04-0.35)-1)*100). However, this effect is 83 percentage points less than when two non-GATT/WTO members enter into an RTA. Finally, when both countries are party to the GATT/WTO (*both-in*), the effect of the RTA is to increase members' trade by 86 percent ((exp(1.04-0.42)-1)*100).

Our results have important policy implications regarding the effectiveness of the GATT/WTO. If the GATT/WTO has been successful in liberalizing trade for its signatories such that pre-RTA barriers to trade were relatively low, then we might expect to obtain a relatively smaller RTA effect between countries that are both GATT/WTO members or even those where one member is in the GATT/WTO. Our results from the

previous estimation support this hypothesis using panel data. When one or both countries are GATT/WTO signatories, the effect of an RTA on trade between the two countries is very similar to the average effect for all countries in the sample (table 1, column 8).

Notified and Non-Notified RTAs

While the results from the previous section are encouraging, an important question remains and that is whether the GATT/WTO has promoted successful RTAs. The GATT/WTO has come under increasing scrutiny of late due to an influential paper by Rose (2004) that found the membership in the GATT/WTO was not associated with higher trade flows among members.[7] In this section we do not ask whether the WTO has increased trade among its members. Rather, we seek to identify one area where the WTO may in fact be quite successful – cultivating successful RTAs. There are at least three reasons why the GATT/WTO can potentially foster effective RTAs. First, if the agreement is notified to the WTO, it is subject to stricter rules than than whatmight be the case otherwise. The WTO produces periodic Trade Policy Reviews (TPRs) to ensure RTAs are compliant with the rules enshrined in Article XXIV of the GATT. Second, Article XXIV commits WTO members that enter into an RTA (i.e., notified RTAs) to reduce trade barriers on "substantially" all trade within the agreement over a specified period of time. Beyond eliminating formal tariff barriers, RTAs may provide for deeper integration by removing non-tariff barriers and harmonizing domestic regulations, areas where the multilateral process of the WTO has made very little progress. Finally, the

[7] Subsequent studies have managed to reverse this result but have had to rely on subsets of countries (i.e. level of development) or relaxing the formal membership that Rose (2004) strictly imposed. However, Rose's (2004) general result still holds in a multilateral context and is still considered a puzzling result by many.

WTO provides a forum to settle trade disputes that often arise between formal RTA members.

In this third scenario we construct two separate RTA dummy variables. The first dummy variable that we call *notified RTAs* is equal to one if the RTA has been notified to the WTO, and zero otherwise. The second dummy variable which we call *non-notified RTAs* equals one if the agreement has never been notified to the WTO during the sample period. As noted in the previous section, our comprehensive database covering virtually all RATs in existence reveals that 40 percent of these agreements have never been notified to the WTO.

Table 3 presents the results from this estimation. The cross-section results (columns 1-6, table 3) again suggest that the effects of notified and non-notified RTAs on members' trade is high unstable across years. For example, in the year 2000, the results suggest that the WTO has promoted successful RTAs. Two RTA members that *notified* their agreement to the WTO traded an additional 169 percent ((exp(0.99)-1)*100) compared to just 26 percent ((exp(0.23)-1)*100) for *non-notified* RTAs. A simple F-test that the effect of notified RTAs is equal to that of non-notified RTAs is strongly rejected at the one percent level. However, this result changes dramatically just four years later. In 2004, the effect of *notified* RTAs increased members' trade by 116 percent – a 53 percentage point drop compared to four years earlier. On the other hand, the effect for *non-notified* RTAs increases to 108 percent – an 82 percentage point increase – and we can not reject the hypothesis that *notified* and *non-notified* RTAs have the same effect on members' trade flows at any conventional levels of significance.

The cross-sectional results are not particularly illuminating and are likely plagued by the endogeneity concerns mentioned in Baier and Bergstrand (2007). To be more confident that the GATT/WTO has promoted successful RTAs, we rely on panel data methods (columns 7 and 8). The results are striking. *Non-notified* RTAs have facilitated more trade among member countries compared to *notified* RTAs by a significant margin. This surprising result is robust regardless of whether we estimate a traditional panel data gravity equation with only time and country-pair fixed effects or whether we estimate the theoretically consistent gravity equation with country-by-time and bilateral pair fixed effects as suggested by Baier and Bergstrand (2007). Using our preferred specification (column 8), *non-notified* RTAs increased members trade by a remarkable 118 percent ((exp(0.78)-1)*100) compared to just 68 percent ((exp(0.52)-1)*100) for notified RTAs. This is a difference of 50 percentage points!

GATT/WTO Membership & RTA Notification Status

To be absolutely sure that non-notified RTAs have facilitated more trade than notified RTAs and the results are not driven by any relationship to membership in the GATT/WTO, we conduct one final sensitivity robustness check. Here, we estimate similar gravity equations as in the previous scenario, only this time, we allow notified and non-notified RTAs to have separate effects if at least one member of the RTA (notified or non-notified) is party the GATT/WTO. This final scenario is important because not only can we estimate the differential effect between notified and non-notified RTAs, but we can also determine whether this effect is driven by membership status in the GATT/WTO. Again, the benchmark comparison for notified and non-notified RTAs is a non-GATT/WTO member compared to at least one member in the GATT/WTO.

Table 4 presents the results for four selected cross sectional years and two panel estimations.[8] The results appear to be robust to the GATT/WTO membership status of the RTA members. Two non-notified RTA members that are not party to the GATT/WTO traded a remarkable 216 percent ((exp(1.15)-1)*100) more within the RTA compared to 166 percent ((exp(0.98)-1)*100) more for notified non-GATT/WTO member RTAs. This result is more pronounced when we consider notified and non-notified RTAs that include at least one GATT/WTO member. For non-notified RTAs, two RTA members that include at least one GATT/WTO member traded an additional 141 percent ((exp(1.15-0.27)-1)*100) more with each other compared to just 80 percent for notified RTAs that include at least one GATT/WTO member. This is a difference of 61 percentage points – 11 percentage points more than the previous scenario when we considered notified and non-notified RTAs but did not distinguish GATT/WTO membership.

Conclusions

RTAs are receiving an unprecedented amount of attention from international trade economists and are demanding a growing amount of political resources. There are now more RTAs in existence than there are WTO members. In 2004, Andrew Rose published a puzzling result. After an extensive empirical search, Rose found no difference in trade patterns between GATT/WTO members and nonmembers. From a policy perspective this feature is not nearly as important as it appears. What is more illuminating is whether the GATT/WTO promotes successful RTAs Our empirical results suggest that the

[8] In the early years of our sample (1980 and 1985) there are very few RTAs where non-notified RTAs contained at least one GATT/WTO member. For these two years we were not able to uniquely identify separate effect of the variable *Non-Notified & At Least One in WTO* form that of *non-notified* in table 4.

WTO has not been as effective as one might have expected, given the recent proliferation of RTAs in the last decade alone.

First, RTAs involving country pairs that are not party to the GATT/WTO (*none-in*) have been remarkably successful compared to RTAs that include one or both countries in the GATT/WTO. This initial finding suggests that the GATT/WTO has been successful in liberalizing members' trade policy, contrary to the findings in Rose (2004). Countries not belonging to the GATT/WTO presumably have more restrictive trade policies prior to the formation of an RTA. Thus, successful liberalization of large pre-RTA trade barriers that exist between non-GATT/WTO members may generate a larger trade response compared to GAT/WTO members that enter into RTAs. Indeed, two non-GATT/WTO members traded 183 percent more with each other in an RTA compared to just 86 percent when both RTA members were party to the GATT/WTO (*both-in*, table 2).

Second, while the previous results are intriguing, they do not imply that the WTO has promoted successful RTAs. Interestingly, we find that the GATT/WTO *has not* promoted successful RTAs. Using our preferred panel specification in table 3 (column 8), we find that the increase in RTA member trade for notified RTAs (i.e., notified to the WTO) underperformed their non-notified RTA counterparts by 50 percentage points.

How confident are we in this result? In other words, if non-GATT/WTO member RTAs outperform RTAs that include members of the GATT/WTO (the results in table 2), are notified RTAs significantly underperforming non-notified RTAs? To answer this question, we estimate one more specification that identifies GATT/WTO and non-GATT/WTO members under notified and non-notified RTAs as a final robustness check

on the results. The results appear to be robust. Non-notified RTAs that include at least one GATT/WTO member traded 141 percent more with each other compared to just 80 percent more trade under notified RTAs that include at least one GATT/WTO member. Moreover, two non-GATT/WTO members of a non-notified RTA traded 216 more with each other compared to 166 percent between two non-GATT/WTO members in a notified RTA.

This study has moved us closer to an understanding of what types of regional trade agreements the WTO has successfully promoted. There are long-standing controversies about the interpretation of WTO provisions against which RTAs are assessed, and from discrepancies between existing WTO rules and those contained in several types of RTAs notified to the WTO. Our results suggest that there is considerable scope for strengthening GATT/WTO rules that govern RTAs or developing more effective CRTA compliance mechanisms to ensure that future RTAs are in fact successful.

References

Aitken, N.D. 1973. "The Effect of the EEC and EFTA on European Trade: A Temporal Cross-Section Analysis." *American Economic Review* 63(5): 881-892.

Anderson, J.E., and E. van Wincoop. 2003. "Gravity with Gravitas: A Solution to the Border Puzzle." *American Economic Review* 93(1): 170-92.

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.

Brada, J.C., and J.A. Mendez. 1985. "Economic Integration among Developed, Developing and Centrally Planned Economies: A Comparative Analysis." *Review of Economics and Statistics* 67(4): 549-56.

Crawford, J., and R. Fiorentino. 2005. "The Changing Landscape of Regional Trade Agreements," WTO Discussion Paper No.8, World Trade Organization, Geneva.

DeRosa, D.A. 1998. "Regional Integration Arrangements: Static Economic Theory, Quantitative Findings and Policy Guidelines." World Bank Policy Research Working Paper No. 2007, World Bank, Washington D.C.

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.

Feenstra, R. 2004. *Advanced International Trade: Theory and Evidence*. Princeton, NJ: Princeton University Press.

Feenstra, R., R.E. Lipsey, D. Haiyan, A.C. Ma, and H. Mo. 2005. "World Trade Flows: 1962-2000," NBER Working Paper No. 11040, National Bureau of Economic Research, Cambridge MA.

Frankel, J.A. 1997. *Regional Trading Blocs in the World Economic System*. Washington, DC: Institute for International Economics.

Frankel, J.A., E. Stein, and S.J. Wei. 1995. "Trading Blocs and the Americas: The Natural, the Unnatural, and the Super-Natural." *Journal of Development Economics* 47(1): 61-95.

Frankel, J.A., E. Stein, and S.J. Wei. 1996. "Regional Trading Arrangements: Natural or Supernatural?" *American Economic Review* 86(2): 52-56.

Ghosh, S, and S. Yamarik. 2004. "Are Regional Trading Arrangements Trade Creating? An Application of Extreme Bounds Analysis." *Journal of International Economics* 63(2): 369-95.

Grant, J.H. and D.M. Lambert. 2008. "Do Regional Trade Agreements Increase members' Agricultural Trade?" American Journal of Agricultural Economics, (*forthcoming*)

International Monetary Fund. 2002. International Financial Statistics Yearbook. Washington, D.C., various issues.

Krueger, A.O. 2000. "Trade Creation and Trade Diversion under NAFTA." NBER Working Paper No. 7429, National Bureau of Economic Research, Cambridge, MA.

T. Mayer, and S. Zignago. 2006. "Notes on CEPII's Distance Measures," unpublished manuscript, Paris france, May, 2006.

Rose, A. 2004. "Do We Really Know That the WTO Increases Trade?" *American Economic Review* 94(1): 8-114.

Soloaga, I. and A.L. Winters. 1999. "How has regionalism in the 1990s Affected Trade?" World Bank Policy Research Working Paper No. 2156, Washington, D.C.

Tinbergen, J. 1962. *Shaping the World Economy*. New York: The Twentieth Century Fund.

World Bank. *World Development Indicators*, CD-ROM. Washington, DC: World Bank, 2001.

Table 1: Benchmark RTA Effects on Trade

	----------Cross Section Regressions----------						*-------Panel Regressions-------*	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***
	1980	***1985***	***1990***	***1995***	***2000***	***2004***	***Time and Bilateral Pair FE***	***Country-by-time and Bilateral pair FE***
GDPi	1.00	1.00	1.00	1.00	1.00	1.00	1.73	1.00
	----	----	----	----	----	----	(23.74)	----
GDPj	1.00	1.00	1.00	1.00	1.00	1.00	1.38	1.00
	----	----	----	----	----	----	(24.22)	----
Distance	-1.44	-1.48	-1.54	-1.61	-1.64	-1.55	----	----
	(-27.84)	(-30.72)	(-35.49)	(-45.13)	(-49.1)	(-41.43)	----	----
Contiguity	0.10	-0.19	0.18	0.55	0.74	0.77	----	----
	(0.47)	(-0.95)	(1.08)	(4.16)	(6.14)	(5.79)	----	----
Language	1.30	1.13	1.08	1.33	1.14	1.09	----	----
	(12.43)	(11.6)	(12.32)	(17.89)	(16.53)	(15.06)	----	----
RTA	-0.29	-0.06	0.22	0.41	0.86	0.76	0.20	0.56
	(-1.71)	(-0.41)	(1.92)	(4.52)	(11.7)	(10.69)	(6.24)	(23.11)
Constant	-24.93	-28.38	-27.69	-26.53	-26.05	-25.63	-68.53	0.00
	(-12)	(-19.5)	(-18.64)	(-12.9)	(-12.55)	(-23.39)	(-30.28)	(-0.03)
R^2	0.54	0.55	0.52	0.53	0.53	0.54	0.86	0.69
N	3,798	4,098	5,318	8,284	10,213	9,774	181,920	181,957
F-Statistic	28.44	32.23	38.02	49.13	54.46	59.31	328.23	533.96

Note: the dependent variable is the natural logarithm of bilateral trade (imports) scaled by the product of importer and exporter GDP (except in column 7). Cross-section regressions include country-fixed effects (omitted for brevity). Panel regressions in column (8) include country-by-time and bilateral pair fixed effects to account for the potentially time varying multilateral resistance terms in a panel scenario. T-statistics are in parentheses. Standard errors are robust to clustering on country pairs.

Table 2. Effect of WTO Membership and RTAs on Trade

	----------Cross Section Regressions----------						*-------Panel Regressions-------*	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***
	1980	***1985***	***1990***	***1995***	***2000***	***2004***	***Time and Bilateral Pair FE***	***Country-by-time and Bilateral pair FE***
GDPi	1.00	1.00	1.00	1.00	1.00	1.00	1.73	1.00
	----	----	----	----	----	----	(55.21)	----
GDPj	1.00	1.00	1.00	1.00	1.00	1.00	1.37	1.00
	----	----	----	----	----	----	(61.7)	----
Distance	-1.46	-1.49	-1.56	-1.62	-1.67	-1.60	----	----
	(-27.98)	(-30.95)	(-36.4)	(-45.8)	(-49.73)	(-42.52)	----	----
Contiguity	0.10	-0.24	0.09	0.48	0.67	0.64	----	----
	(0.47)	(-1.24)	(0.52)	(3.61)	(5.48)	(4.81)	----	----
Language	1.38	1.20	1.09	1.33	1.11	1.08	----	----
	(13.27)	(12.31)	(12.5)	(17.93)	(16.12)	(14.99)	----	----
RTA	1.63	0.06	1.48	3.42	2.76	3.41	-0.20	1.04
	(1.02)	(0.1)	(3.96)	(9.16)	(11.76)	(9.17)	(-2.46)	(11.84)
RTA & Both-in WTO	-2.16	-0.37	-1.72	-3.28	-2.07	-2.85	0.45	-0.42
	(-1.35)	(-0.6)	(-4.39)	(-8.52)	(-8.41)	(-7.52)	(5.62)	(-4.68)
RTA & One-in WTO	-1.41	0.41	-0.50	-2.73	-1.96	-2.23	0.24	-0.35
	(-0.88)	(0.66)	(-1.27)	(-6.87)	(-7.59)	(-5.99)	(2.97)	(-4.06)
Constant	13.44	17.08	16.16	17.67	17.61	18.14	-68.81	0.00
	(6.41)	(11.65)	(13.16)	(8.65)	(8.5)	(16.53)	(-74.92)	(0)
R^2	0.72	0.73	0.73	0.73	0.73	0.75	0.86	0.71
N	3,882	4,193	5,497	8,322	10,277	9,862	181,920	181,957
F-Statistic	60.41	67.59	73.09	85.84	98.77	113.22	1545.25	222.6

Note: the dependent variable is the natural logarithm of bilateral trade (imports) scaled by the product of importer and exporter GDP (except in column 7). Cross-section regressions include country-fixed effects (omitted for brevity). Panel regressions in column (8) include country-by-time and bilateral pair fixed effects to account for the potentially time varying multilateral resistance terms in a panel scenario. Both-in and One-in denote membership in the GATT/WTO. T-statistics are in parentheses. Standard errors are robust to clustering on country pairs.

Table 3: The Effects of Notified and Non-Notified RTAs on Trade

	----------Cross Section Regressions----------						*-------Panel Regressions-------*	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***
	1980	***1985***	***1990***	***1995***	***2000***	***2004***	***Time and Bilateral Pair FE***	***Country-by-time and Bilateral pair FE***
GDPi	1.00	1.00	1.00	1.00	1.00	1.00	1.73	1.00
	----	----	----	----	----	----	(23.76)	----
GDPj	1.00	1.00	1.00	1.00	1.00	1.00	1.38	1.00
	----	----	----	----	----	----	(24.27)	----
Distance	-1.44	-1.48	-1.55	-1.61	-1.64	-1.55	----	----
	(-27.83)	(-30.71)	(-35.51)	(-45.11)	(-49.16)	(-41.38)	----	----
Contiguity	0.10	-0.19	0.18	0.56	0.75	0.77	----	----
	(0.46)	(-0.95)	(1.03)	(4.17)	(6.22)	(5.79)	----	----
Language	1.30	1.13	1.09	1.33	1.12	1.09	----	----
	(12.42)	(11.58)	(12.34)	(17.85)	(16.23)	(15.04)	----	----
Notified RTA	-0.28	-0.05	0.18	0.44	0.98	0.77	0.17	0.52
	(-1.5)	(-0.33)	(1.49)	(4.58)	(12.67)	(10.19)	(5.2)	(20.49)
Non-Notified RTA	-0.37	-0.12	0.52	0.22	0.23	0.73	0.39	0.78
	(-0.92)	(-0.34)	(1.73)	(0.97)	(1.57)	(5.55)	(5.79)	(15.5)
Constant	-24.93	-28.38	-27.65	-26.56	-26.02	-25.64	-73.88	0.00
	(-11.99)	(-19.5)	(-18.6)	(-12.91)	(-12.56)	(-23.39)	(-32.64)	(-0.03)
R^2	0.54	0.55	0.52	0.53	0.54	0.54	0.86	0.69
N	3,798	4,098	5,318	8,284	10,213	9,774	181,920	181,957
F-Statistic	28.05	31.81	37.63	48.77	54.38	58.81	189.42	279.41

Note: the dependent variable is the natural logarithm of bilateral trade (imports) scaled by the product of importer and exporter GDP (except in column 7). Cross-section regressions include country-fixed effects (omitted for brevity). Panel regressions in column (8) include country-by-time and bilateral pair fixed effects to account for the potentially time varying multilateral resistance terms in a panel scenario. T-statistics are in parentheses. Standard errors are robust to clustering on country pairs.

Table 4: Effect of Notified and Non-Notified RTAs and WTO Membership on Trade

	----------Cross Section Regressions----------				*-------Panel Regressions-------*	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
	1990	***1995***	***2000***	***2004***	***Time and Bilateral Pair FE***	***Country-by-time and Bilateral pair FE***
GDPi	1.00	1.00	1.00	1.00	1.73	1.00
	----	----	----	----	(55.22)	----
GDPj	1.00	1.00	1.00	1.00	1.38	1.00
	----	----	----	----	(61.86)	----
Distance	-1.55	-1.62	-1.66	-1.58	----	----
	(-36.14)	(-45.67)	(-49.94)	(-42.22)	----	----
Contiguity	0.09	0.51	0.67	0.68	----	----
	(0.54)	(3.85)	(5.56)	(5.05)	----	----
Language	1.12	1.33	1.09	1.10	----	----
	(12.76)	(17.97)	(15.97)	(15.16)	----	----
Notified RTA	0.98	3.47	2.70	3.22	-0.17	0.98
	(2.34)	(9.18)	(11.32)	(8.65)	(-2.04)	(10.86)
Notified RTA & At Least One- in WTO	-0.86	-3.20	-1.88	-2.55	0.35	-0.39
	(-2.03)	(-8.29)	(-7.61)	(-6.79)	(4.28)	(-4.38)
Non-Notified RTA	2.21	-0.52	2.76	0.91	0.17	1.15
	(2.86)	(-0.25)	(2.96)	(0.43)	(0.68)	(4.31)
Non-Notified RTA & At Least One-in WTO	-1.96	0.74	-2.57	-0.18	0.23	-0.27
	(-2.43)	(0.36)	(-2.73)	(-0.08)	(0.9)	(-1.02)
Constant	16.68	17.65	17.59	18.27	-68.92	0.00
	(13.58)	(8.64)	(8.5)	(16.63)	(-75.02)	(0)
R^2	0.73	0.73	0.73	0.75	0.86	0.71
N	5,497	8,322	10,277	9,862	181,920	181,957
F-Statistic	71.71	85.09	98.37	111.95	1499.37	173.27

Note: the dependent variable is the natural logarithm of bilateral trade (imports) scaled by the product of importer and exporter GDP (except in column 5). Cross-section regressions include country-fixed effects (omitted for brevity). Panel regressions in column (8) include country-by-time and bilateral pair fixed effects to account for the potentially time varying multilateral resistance terms in a panel scenario. Both-in and One-in denote membership in the GATT/WTO. T-statistics are in parentheses. Standard errors are robust to clustering on country pairs.