

Accession to the World Trade Organization: Sector Level Impacts on the Extensive and Intensive Margins of Trade

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Abstract: Using panel data from 1964-2014 for bilateral trade pairs at the one-digit SITC Revision 2 level, I use a gravity model of international trade to estimate the impact of the World Trade Organization on different economic sectors. I use a two-part model in order to examine both the extensive and intensive margins of trade. To examine the extensive trade margin, I use a probit model, finding that GATT/WTO accession of the exporter is associated with an increase in the probability of trade for both primary and secondary sectors, with a larger effect in secondary sectors. Similarly, using an OLS gravity model to examine the intensive trade margin, I find that GATT/WTO accession of the exporting country is associated with an increase in trade and that this impact is greater for secondary sectors than for primary sectors. These findings are robust to changes in model specifications.

Introduction and Motivation

The World Trade Organization (WTO), founded in 1995, and its predecessor, the General Agreement on Tariffs and Trade (GATT), founded in 1947, were designed to increase world trade through the liberalization of trade policies, to provide an enforceable dispute settlement process, and to provide a fair negotiation platform.¹ However, recent empirical economic analyses have called into question the extent to which GATT/WTO accession actually increases a country's trade. Much of the recent analysis is based off of the seminal work of Rose (2004), which fails to find that the GATT/WTO significantly increases trade. Since the publication of Rose (2004), a large body of literature has corrected Rose's shortcomings and expanded on his initial findings. Most of this literature finds that the GATT/WTO does have a significant positive impact on trade but only under certain circumstances. Of central importance to this paper is Balding (2010), which uses Rose's database and incorporates many of the widely held critiques of Rose.

One lingering question is how the effect of GATT/WTO accession varies across industries. Often, the GATT/WTO is critiqued for having power asymmetries within the dispute settlement process and inequality in negotiations as a whole. For example, some argue that although developing countries were able to gain concessions on agriculture in the Uruguay Round, they lost more in other negotiation areas than they gained in agriculture due to a negotiation system that favors developed countries.² Similarly, recent negotiations have stalled due to the unhappiness of developing countries with their small gains from the Uruguay Round (the most recently completed negotiation round), the desire of developed countries to maintain a position of power, and insufficient political motivation for change.³

This paper's analysis follows the methodology of Balding (2010), expanded to the sector level in order to analyze sector level asymmetries in how the GATT/WTO impacts trade. To examine the extensive margin of trade, defined as the creation or loss of trade in a sector between two countries already trading in a different sector, this paper uses a

¹ Kent Jones, *The Doha Blues: Institutional Crisis and Reform in the WTO* (Oxford: Oxford University Press, 2010), 1-4.

² Amrita Narlikar, *The World Trade Organization: a very short introduction* (Oxford: Oxford University Press, 2005), 95, 54.

³ Kent Jones, *The Doha Blues*, 1-4.

probit model. Although previous studies have used probit models to examine aggregate bilateral trade flows, this has not previously been explored at the sector level or with data more recent than 2005. Additionally, to examine the intensive margin of trade, defined as the increase or decrease in trade in a sector in which two countries are already trading, this paper uses an OLS gravity model, studying more sectors and years than have previously been examined.

My aggregate results are consistent with those of Baldwin (2010), despite differences in data sources, establishing a baseline from which I explore sector level results. The sector level results suggest that the impact of GATT/WTO accession on exports is greater in secondary sectors than in primary sectors. These results are robust to different methodologies, including a two-part model estimating the extensive and intensive margin and a tobit model censoring observations with zero trade flows. These findings suggest that GATT/WTO accession is more beneficial for countries sufficiently developed to export in secondary sectors rather than those that export in primary sectors. However, the model cannot rule out reverse causality associated with GATT/WTO entry, an issue that is under explored in the trade literature.

Literature Review

Much of the current debate on the effectiveness of the GATT/WTO at increasing international trade stems from Rose's (2004) paper "Do We Really Know that the WTO Increases Trade?" which fails to find a significant result that gaining or having GATT/WTO membership enhances trade. Rose uses a gravity model with a panel dataset for 175 countries from 1948-1999. Regressing on the average value of real bilateral trade between two countries in a specific year, Rose includes established gravity variables such as distance, as well as additional variables that could effect trade such as culture, proxied by language, and history between the countries, proxied by variables such as whether one country colonized the other. Rose's dataset is frequently used in more recent papers, which critique and expand upon Rose's initial findings. Although Rose fails to find a significant result that GATT/WTO membership increases trade, nearly all subsequent studies find that GATT/WTO membership does have a significant increase in trade, but only under certain circumstances.

In the recent body of literature, Rose has been criticized for his failure to include country fixed effects within the majority of his regressions. Among others, such criticism comes from Subramanian and Wei (2007), Tomz et al. (2007), and Anderson and van Wincoop (2003). Fixed effects are also used in the regressions of Balding (2010), Felbermayr and Kohler (2009), and Rose (2005). Without importer and exporter fixed effects, there is an endogeneity issue. This issue is discussed by Subramanian and Wei (2007), who argue that without fixed effects, the model may be misspecified because it does not account for multilateral resistance or remoteness between trade partners. However, importer and exporter fixed effects are able to account for differences between countries and therefore correct for this misspecification. Rose has also been criticized, such as in the work of Balding (2010) and Subramanian and Wei (2007), for regressing on the average of imports and exports between a country pair rather than only on imports. The criticism is due to fewer observations when looking at the average of imports and exports. When export data is used rather than the average of imports and exports, the number of observations increases. Therefore, this study's use of export data rather than the average of import and export data allows for an increase in the number of observations. Since data is more likely to be missing for less developed countries, results from the use of export data are likely to be more accurate. Balding (2010), one of the most recent papers modeled after Rose (2004), includes all of the main criticisms of Rose's model. Therefore, I use Balding (2010) as a baseline from which to explore the impact of GATT/WTO accession on sector level trade.

Using variations of the Rose (2004) model to examine aggregate trade, Balding (2010) finds that GATT/WTO accession only increases both exports and imports for high-income countries. He also finds that middle and low-income countries do not see, as a result of GATT/WTO membership, increases in trade independent of high-income countries. Subramanian and Wei (2007) find that GATT/WTO accession increases imports significantly in developed countries but only slightly in developing countries. Tomz et al. (2007) find that the GATT did increase trade for both formal members and nonmember participants, such as colonies de facto members, and provisional members, relative to countries that did not participate in the agreement.

The gravity model has long been used in international trade and its use is backed by theoretical justification such as that described in Anderson (1979), Bergstrand (1989), and Anderson and van Wincoop (2003). The gravity model of bilateral trade explains most of the natural variation in international trade. Therefore, when using a gravity model, the measured impact of the GATT/WTO on trade is not likely to be biased by other causes of trade. Gravity models most often regress the natural log of bilateral trade flows on an established set of variables including GDP, population, and distance and accounting for cultural and historical ties. These variables are statistically significant and reasonably consistent across studies and are included in the regressions of Rose (2004) and Balding (2010). Therefore, these variables are included in my regressions as well.

Subramanian and Wei (2007) begin to look at sector level data. However, they only use data for the years 1990, 1995, and 2000 and only use an OLS gravity model. Additionally, their analysis covers only a limited number of sectors, as they exclusively look at manufacturing, clothing, footwear, and food. My analysis fills a gap in the trade literature by examining in depth the impact of GATT/WTO accession on each sector as well as by comparing the impact of GATT/WTO accession on primary and secondary sectors. Additionally, I cover more recent years than have previously been examined and measure the impact of GATT/WTO accession on both the extensive and intensive margins of trade.

Data and Methodology

I. Gravity Model Estimation

In order to establish a baseline from which to expand on the existing literature, I begin by replicating the results of Balding (2010), which uses OLS gravity regressions with importer and exporter specific fixed effects. Since Balding's estimations do not include data past the year 1999, I estimate this model through 1999 as well as through 2014. Since these regressions include importer and exporter fixed effects, I exclude the landlocked, island, and land area variables due to collinearity and because the inclusion or exclusion of these variables has very little impact on the other coefficients in the regressions. Additionally, since some observations are missing for these variables, their

exclusion increases the number of observations in my regressions. Balding's model is as follows:

$$\text{Model 1: } \ln(T_{ijt}) = \beta_1 XWTO_{jt} + \beta_2 MWTO_{it} + \beta_3 X + \{\psi_j\} + \{\gamma_i\} + \{\phi_t\} + \varepsilon_{ijt}$$

In this model, the subscript i denotes importer, j denotes exporter, and t denotes time. All linear regressions include $\{\psi_j\}$, a set of exporter fixed effects, $\{\gamma_i\}$, a set of importer fixed effects, and $\{\phi_t\}$, a set of time fixed effects. ε_{ijt} represents a well-behaved error.

The dependent variable, $\ln(T_{ijt})$, represents the quantity of real exports from one country to another, measured in USD. For cases in which there is no trade, it is recorded as a missing observation. The data is gathered from the UN Comtrade database for the years 2001 through 2014. Data for 1964-2000 comes from the work of Feenstra (2005). Since the data was gathered at the sector level, when regressing on aggregate trade, the trade values for each sector are summed for each year and country pair. Nominal trade values are converted into real values using the US CPI, available from the World Bank's Economic Development Indicators database. For consistency with the existing literature and to ensure a normal distribution, I use the natural log form of this variable.

The main variables of interest are $XWTO$ and $MWTO$. These variables are dummy variables for whether the exporter ($XWTO$) or importer ($MTWO$) country in a trade pair is a member of the GATT/WTO. These variables were created using information about formal WTO members and accession dates that is available on the WTO website.

All other variables in the model, denoted with (X) , are part of the gravity model and are included in order to control for natural causes of trade between two countries. All gravity variables are observed for trade pairs. Therefore, they are still estimated even with the inclusion of a set of importer fixed effects and a set of exporter fixed effects. The inclusion of these variables is consistent with the work of Rose (2004) and Balding (2010). I gather this data from the World Bank, De Sousa (2012), CEPPII, and Rose (2004). A description of each of these variables is available in Table 2 of the appendix.

Summary statistics for all variables are available in Tables 3-8B of the appendix. Notably, Table 3 shows that, across all observations and all years, 81 percent of exporters and 77 percent of importers are GATT/WTO members. Additionally, Table 6 shows that trade exists in 80 percent of my primary sector observations and 86 percent of my secondary sector observations.

II. Extensive and Intensive Margins of Trade Across Sectors

After performing aggregate regressions, I examine the impact of GATT/WTO membership at the sector level. For these regressions, I use data at the 1-digit SITC Revision 2 level. For data collected directly from UN Comtrade, I gathered data at the 1-digit sector level for exports. Since the Feenstra (2005) database contains 4-digit data, I sum the subsectors to get 1-digit data. The primary sectors I consider are Food and Live Animals, Beverages and Tobacco, and Crude Materials, inedible, except Fuels (ex. cork wood, crude rubber, and pulp and waste paper). The secondary sectors I consider are Chemicals and Related Products (ex. medicinal and pharmaceutical products, fertilizers, and plastics), Manufactured Goods Classified Chiefly by Material (ex. leather manufactures, tires, paper, and nails), Machinery and Transport Equipment (ex. boilers, engines, office machines, and motor vehicles), and Miscellaneous Manufactured Articles (ex. plumbing and heating fixtures, furniture, and apparel).

Although the OLS gravity model is widely used, results are likely to be biased when country pairs experience zero trade flows because the dependent variable in gravity equations is most often the natural log of bilateral trade and the natural log of zero is undefined. Therefore, in an OLS gravity model, pairs with zero trade are treated as missing observations. This is especially problematic at the sector level because trade pairs most often only trade in a limited number of sectors, resulting in a large number of zeros. Thus, an OLS gravity model may not be able to fully capture the extent to which GATT/WTO accession increases trade because it does not consider impacts on the extensive trade margin. At the aggregate trade level, a variety of models have been used to address this issue.

Felbermayr and Kohler (2006) argue that the traditional exclusion of zero trade values in the gravity model results in biased estimates of the total effect of GATT/WTO

accession because it does not consider the extensive trade margin. Therefore, after using OLS gravity model to account for the intensive trade margin, Felbermayr and Kohler (2006) use a probit model to account for the extensive margin. They also estimate a tobit model by first adding one to trade flows and then taking the natural log to account for the combined impact of GATT/WTO membership.

Helpman, Melitz and Rubinstein (2008) suggest the Heckman 2-stage selection procedure as a way to account for zero trade flows across country pairs. This model consists of a probit regression in the first stage, which is then used as part of a linear gravity regression in the second stage. They argue that this corrects for sample selection bias as well as omitted variable biases. However, this procedure requires the inclusion of a variable that affects whether two countries trade but not the quantity of trade between two countries. Helpman et al (2008) use common religion as this variable. However, as discussed in Liu (2009), this instrument has little justification. In my study, I choose not to use the Heckman 2-stage model due to the difficulty of finding a good instrument for the model, especially one that could justify why a country pair would trade in one sector but not another.

Santos Silva and Tenreyro (2006) and Felbermayr (2009) suggest the use of Poisson Pseudo Maximum Likelihood Estimators (PPML) to account for zero trade observations between countries due to its consistency in the presence of heteroskedasticity. However, Martin and Pham (2015) argue that in the presence of a large quantity of zeros, the PPML model is misspecified. Considering that the sector level data I use in my analysis contains even more zeros than would be present in aggregate trade regressions, I choose not to use the PPML model.

To examine the sector level impacts of GATT/WTO accession, I turn to a two-part model to estimate the effects of GATT/WTO on the extensive and intensive trade margins at the sector level. Part one uses a probit model to examine the extensive margin of trade and part two uses an OLS gravity model to examine the intensive margin of trade. I chose the two-part model due to its feasibility with sector level data and later run robustness checks to ensure my findings are not solely due to model specifications.

Part one uses a probit model, estimating the probability that trade exists in order to examine the extensive trade margin. Helpman et al (2008) provides a detailed

theoretical explanation of the probit model. A probit model is also used in the work of Felbermayr and Kohler (2006) and Martin and Pham (2015). Following the methodology of Felbermayr and Kohler (2006), I treat missing observations of trade as zero trade values. Although this may involve a measurement problem, there are no available databases that explicitly include zero trade values. However, unlike Felbermayr and Kohler (2006), I only add zeros for the years in which countries are already trading but for which trade does not exist in a specific sector rather than adding zeros for all country pairs in all years. I chose not to include zero trade values when countries do not trade at all because a complete lack of trade is likely due to issues such as political differences or a history of conflict.

The dependent variable in the regressions is a dummy variable that takes a value of one if trade exists and zero if trade does not exist. Following the work of Felbermayr and Kohler (2006), it is assumed that there is a value \bar{T}_{ijts} that denotes the threshold trade value for which actual trade (T) will happen at its full potential if it exceeds \bar{T}_{ijts} . If trade does not exceed the threshold, bilateral trade will be zero. With the probit model, I do not include fixed effects due to the model's failure to converge when fixed effects are included. I use a gravity model similar to model 1, adding shared border, landlocked, and island back into the regression due to the exclusion of fixed effects. To account for time-varying nature of panel data, I include random effects.

Part two uses an OLS gravity model which is identical to that estimated at the aggregate trade level except for the use of sector level data as dependent variables. Since the recent literature is widely in agreement that importer and exporter fixed effects should be used in linear gravity regressions, I exclusively show results for regressions including importer and exporter fixed effects.

Results

In examining regression results, I focus primarily on the relationship between GATT/WTO exporter accession and trade because increases in exports are the most direct benefit of increased trade. Increased exports provide opportunities for expansion of existing domestic industries as well as for the creation new industries for which there may not be sufficient domestic demand. Therefore, if the GATT/WTO is a beneficial

organization for its members, the coefficients on GATT/WTO exporter membership should be positive. The implications of the GATT/WTO importer membership coefficients are less clear. Although increases in imports can be beneficial for domestic consumers and, long term, can help to ensure domestic industries are efficient, large increases in imports also have the potential to stifle infant industries. Thus, it is less clear whether a positive or negative coefficient on GATT/WTO importer membership is preferable for GATT/WTO members.

I. Aggregate Regressions

All of the OLS results exclusively focus on the intensive margin of trade. Table 9, regression 1 shows the results of Balding (2010). Regression 2 shows my results under similar specifications. Thus, I compare regressions 1 and 2. The main focus of these regressions, the coefficient on GATT/WTO exporter membership, is relatively consistent across estimations and always has a positive and significant value. In Balding's regression, GATT/WTO exporter membership increases exports in a trade pair by 21 percent and I find that it increases exports by 13.4 percent. Additionally, Balding finds that GATT/WTO importer membership increases imports in a trade pair by 22 percent and I find that it increases imports by 23.5 percent. In addition, most other variables take the same sign in each case. This indicates that my database is similar to the Rose (2004) database that is used by Balding (2010) and thus establishes a baseline from which examine sector level impacts of GATT/WTO membership. Variation between Balding's results and my results is likely due to my inclusion of the years 1964-1969, the fact that I used a different trade database so that I could obtain sector level data, and that most variables come from different sources so that I could obtain data for 2000-2014. Therefore, while my control variables are similar to the control variables used in Balding (2010), they are often measured differently. Thus, although some control variables have different coefficients in Balding's regression and my regression, I do not focus on these differences because my study does not aim to interpret these coefficients. When the time period is extended through 2014, the coefficients on both WTO importer and WTO exporter are larger, providing evidence that the WTO's impact on trade has grown over the past 15 years. When the time period is extended through 2014, the impact of

GATT/WTO exporter membership changes from increasing trade by 13.4 percent to increasing trade by 16.7 percent. Similarly, when the time period is expanded, GATT/WTO importer membership changes from increasing trade by 23.5 percent to increasing trade by 42.4 percent.

II. Sector Level Regressions

A. Extensive Margin

To examine the extensive trade margin, I run probit regressions at the sector level. For ease of interpreting coefficients, the values presented in Table 10 represent the marginal effect of the coefficient at the mean. At the mean, GATT/WTO exporter membership increases the probability that trade exists between two potential trade partners by 25.1 percent in primary sectors and 38.8 percent in secondary sectors. These values provide evidence that, on the extensive margin, GATT/WTO exporter membership is associated with a larger increase in the probability that there are exports to a potential trade partner in secondary sectors than in primary sectors. I find a similar relationship when looking at the impact of GATT/WTO importer membership on the probability of trade. I find that for primary sectors, GATT/WTO importer membership increases the probability of trade by 23.1 percent. However, this number rises to 27.7 percent for the secondary sector.

GATT/WTO importer and exporter membership has a positive impact on the probability of trade across all sectors. However, there is a large amount of variation between the sectors. Looking at the impact of GATT/WTO exporter membership, I find that membership is associated with the smallest increase in the probability of trade in the Crude Materials, Inedible, Except Fuels sector. I find the largest increase in the probability of trade in the Miscellaneous Manufactured Articles sector. These findings are as expected, since the greatest increases are in secondary sectors.

In order to test the robustness of the differences between the primary and secondary sectors, I also run logit and linear probability regressions, both of which yield similar results to the probit model. Although I exclude fixed effects in the logit and probit models due to their non-linear nature and difficulties getting the models to converge, I include fixed effects in the linear probability models.

B. Intensive Margin

To examine the intensive trade margin, I use OLS fixed effects regressions. The results, as shown in Table 10, indicate that GATT/WTO exporter membership is associated with a larger increase in trade in secondary than in primary sectors. There is a large difference between the sectors, with membership increasing exports by 46.1 percent in secondary sectors but only 17.0 percent in primary sectors. However, I find the opposite effect when looking at imports. Although membership has a positive impact on imports in both primary and secondary sectors, the effect is larger in primary sectors, at a 42.7 percent increase, than in secondary sectors, at a 27.7 percent increase. Overall, these findings indicate that GATT/WTO membership is more beneficial for countries exporting or preparing to export in secondary sectors than in primary sectors. For importers, it is less clear who benefits most. While it may be beneficial for consumers to purchase cheaper primary sector goods from abroad, if a country has not sufficiently established more advanced domestic industries, such competition could hurt the domestic economy, particularly if the foreign goods are subsidized.

At the individual sector level, GATT/WTO exporter membership does not have a significant impact on trade in beverages and tobacco or crude materials, inedible, except fuel. Instead, the positive impact on the primary sector as a whole is driven by the positive and significant coefficient on food and live animals. These findings suggest that joining the GATT/WTO may not be beneficial at all for countries wishing to export in beverages and tobacco or crude materials because while countries are unlikely to see increases in their own exports in these sectors, they are likely to face increased competition in their domestic markets as evidenced by the positive coefficient on GATT/WTO importer membership.

Although there were some reductions in protectionism in agricultural sectors in the most recent round of WTO negotiations, there is still rampant protectionism by developed countries and developed countries protect agriculture much more than manufacturing. Additionally, a study by Hertel and Martin (2000) finds that farm policies in developed countries cause developing countries to lose US\$40 billion in welfare per

year.⁴ Developed countries frequently exhibit the most power in WTO negotiations and therefore it is unsurprising that trade policies favor developed countries, who are most likely to be exporting goods in the secondary sector rather than the primary sector. Therefore, my findings, that on the extensive and intensive trade margins GATT/WTO accession is associated with a larger increase in exports in the secondary sector than the primary sector, are consistent with WTO theory.

C. Developing Country Exporters

After regressing on sector trade for all countries in the sample, I regress exclusively on trade pairs for which the exporting country is a developing country to ensure that differences between the primary and secondary sector are not exclusively driven by differences in trade between developing and developed countries. Due to the difficulty of obtaining time-varying data on developing and developed country status, I categorize a country as developed if it is categorized as developed in the statistical annex of the United Nations' 2012 version of the "World Economic Situation and Prospects". The exporters excluded from these regressions are indicated in Table 1 and the regression results are shown in Table 10C. When developed exporters are excluded from the regression, on the extensive trade margin, GATT/WTO exporter membership continues to increase the probability of trade more in secondary sectors than in primary sectors. Additionally, on the intensive trade margin, GATT/WTO exporter membership continues to increase the quantity of trade more in secondary sectors than primary sectors. However, on both the intensive and extensive trade margins, when developed country exporters are excluded, there is a decrease in the magnitude of the impact of GATT/WTO exporter membership on trade. This finding provides evidence that GATT/WTO membership is more beneficial for developed than developing countries.

III. Alternative Methodologies

A. Tobit Model

To test the robustness of my earlier findings, I run tobit models, which account for both the intensive and extensive trade margins. The use of a tobit model is consistent with

⁴ Narlikar, *World Trade Organization*, 70.

the work of Eaton and Tamura (1994), Felbermayr and Kohler (2006), and Martin and Pham (2015). In creating the tobit model, I follow the method of Felbermayr and Kohler (2006), which provides an explanation for the details of the tobit model, and account for zero trade values by transforming the dependent variable to $\ln(1+T)$ so that zero trade values will be listed as $\ln(1)=0$ rather than as $\ln(0)=\text{undefined}$. I use the tobit model as a robustness check rather than as one of my main models due to its arbitrary nature. There is no direct interpretation of $\ln(1+T)$ and little theoretical justification for why I choose $1+T$ rather than some other value. As with the probit model and following the work of Felbermayr and Kohler (2006), I treat missing observations as zero trade values. I censor the log values at zero in order to account for the fact that values listed as equal to zero may not actually equal zero due to the lower bound.

The tobit model includes the same variables as the probit model including random effects. As shown in Table 11, this model indicates that GATT/WTO accession is associated with a greater increase in exports in secondary sectors than in primary sectors. This finding is in line with my findings from the linear fixed effects and probit models. Consistent with my findings for the intensive trade margin, the tobit model shows that GATT/WTO importer membership is associated with a larger increase in trade in primary sectors than secondary sectors.

B. Reverse Causality Test

Although much of the trade literature does not address reverse causality, I examine this issue by running fixed effects regressions that include leads and lags for exporter and importer WTO membership. Other than the inclusion of leads and lags, these models are identical to the OLS gravity models estimated previously. If there is a significant coefficient on the lead variables, this indicates that reverse causality issues may exist because it suggests that when a country will soon join the GATT/WTO it experiences an increase in trade. This could indicate that countries choose to join the GATT/WTO because they are trading more. However, such a finding could also be the result of countries implementing policies necessary for GATT/WTO accession.

Table 12 shows that for both GATT/WTO exporter and importer accession, the leads are sometimes significant, depending on the model and the sector evaluated.

Exporter leads are only significant in the secondary sector and importer leads are only significant in the primary sector. However, these findings are not robust to variation in the number of leads and lags included. Lags are sometimes significant for both exporters and importers in primary and secondary sectors. This provides evidence that the impact of GATT/WTO membership continues past the year of accession. However, these findings are not robust to changes in the number of leads and lags included.

This table shows that I cannot rule out reverse causality in this study. However, gaining membership into the GATT/WTO requires political, social, and economic liberalization in order to have the necessary legal and regulatory systems to be accepted into the organization.⁵ These reforms are part of a 20-step process that all new members must complete. For the GATT, the average time to complete the necessary protocols was 62 months. When the process was made more difficult with the creation of the WTO, accession time for the first 25 new members averaged 101 months and has increased since that time.⁶ It makes sense that there would be increases in trade as a result of the liberalization process that occurs in the years prior to accession in addition to the gains to trade from actual accession. Since in some cases, the accession process takes over 8 years, I am unable to fully account for this impact.

Conclusion

This study adds to the existing literature by expanding the Rose (2004) database to include an additional 15 years of data (2000-2014) and providing an in depth analysis at the sector level. I find that on the intensive and extensive margins of trade, GATT/WTO membership is more beneficial for exporters in secondary sectors than in primary sectors. This finding supports arguments that the GATT/WTO provide unequal benefits to members. Although this study provides an entry point into the examination of sector level data with a bilateral trade model similar to that used by Rose (2004) and Balding (2010), additional research should be completed at the sector level that accounts for both formal and factual GATT/WTO members as well as for examination of the

⁵ Jones, *Doha Blues*, 58.

⁶ Jones, *Doha Blues*, 64.

impact of different negotiation rounds. Such analysis would allow for further insight into who benefits from the GATT/WTO.

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Appendix

Table 1: Trading Entities in Sample

Date of GATT/WTO Accession for Countries Entering Before 2015 in Parentheses, Developed Countries Indicated with ⁺

Albania (2000)	Djibouti (1994)	Lao People's Dem. Rep. (2013)	Sao Tome & Principe
Algeria	Dominica (1993)	Latvia ⁺ (1999)	Saudi Arabia (2005)
Angola (1994)	Dominican Rep. (1950)	Lebanon	Senegal (1963)
Antigua and Barbuda (1987)	Ecuador (1996)	Lesotho (1988)	Seychelles
Argentina (1967)	Egypt (1970)	Liberia	Sierra Leone (1961)
Armenia (2003)	El Salvador (1991)	Libya	Singapore (1973)
Australia ⁺ (1948)	Equatorial Guinea	Lithuania ⁺ (2001)	Slovak Republic ⁺ (1993)
Austria ⁺ (1951)	Estonia ⁺ (1999)	Luxembourg ⁺ (1948)	Slovenia ⁺ (1994)
Azerbaijan	Ethiopia	Macedonia, TFYR of (2003)	Solomon Islands (1994)
Bahamas	Fiji (1993)	Madagascar (1963)	Somalia
Bahrain (1993)	Finland ⁺ (1950)	Malawi (1964)	South Africa (1948)
Bangladesh (1972)	France ⁺ (1948)	Malaysia (1957)	Spain ⁺ (1963)
Barbados (1967)	Gabon (1963)	Maldives (1983)	Sri Lanka (1948)
Belarus	Gambia (1965)	Mali (1993)	St. Kitts & Nevis (1994)
Belgium ⁺ (1948)	Georgia (2000)	Malta ⁺ (1964)	St. Lucia (1993)
Belize (1983)	Germany ⁺ (1951)	Mauritania (1963)	St. Vincent & Gren. (1993)
Benin (1963)	Ghana (1957)	Mauritius (1970)	Sudan
Bermuda	Greece ⁺ (1950)	Mexico (1986)	Surinam (1978)
Bhutan	Grenada (1994)	Moldova, Republic of (2001)	Swaziland (1993)
Bolivia (1990)	Guatemala (1991)	Mongolia (1997)	Sweden ⁺ (1950)
Botswana (1987)	Guinea (1994)	Morocco (1987)	Switzerland ⁺ (1966)
Brazil (1948)	Guinea-Bissau (1994)	Mozambique (1992)	Syria
Bulgaria ⁺ (1996)	Guyana (1966)	Namibia (1992)	Tajikistan (2013)
Burkina Faso (1963)	Haiti (1950)	Nepal (2004)	Tanzania, United Rep of (1961)
Burma (1948)	Honduras (1994)	Netherlands ⁺ (1948)	Thailand (1982)
Burundi (1965)	Hong Kong (1986)	New Zealand ⁺ (1948)	Togo (1964)
Cambodia (2004)	Hungary ⁺ (1973)	Nicaragua (1950)	Trinidad and Tobago (1962)
Cameroon (1963)	Iceland ⁺ (1968)	Niger (1963)	Tunisia (1990)
Canada ⁺ (1948)	India (1948)	Nigeria (1960)	Turkey (1951)
Cape Verde (2008)	Indonesia (1950)	Norway ⁺ (1948)	Turkmenistan
Central African Republic (1963)	Iran	Oman (2000)	Uganda (1962)
Chad (1963)	Iraq	Pakistan (1948)	Ukraine (2008)
Chile (1949)	Ireland ⁺ (1967)	Panama (1997)	United Arab Emirates (1994)
China (2001)	Israel (1962)	Papua N. Guinea (1994)	United Kingdom ⁺ (1948)
Columbia (1981)	Italy ⁺ (1950)	Paraguay (1994)	United States ⁺ (1948)
Comoros	Jamaica (1963)	Peru (1951)	Uruguay (1953)
Congo, Dem. Rep. of (1997)	Japan ⁺ (1955)	Philippines (1979)	Uzbekistan
Congo, Rep. (1963)	Jordan (2000)	Poland ⁺ (1967)	Vanuatu (2012)

Costa Rica (1990)
Côte D'ivoire (1963)
Croatia (2000)
Cyprus⁺ (1963)
Czech Republic⁺ (1993)
Denmark⁺ (1950)

Kazakhstan
Kenya (1964)
Kiribati
Korea, South (1967)
Kuwait (1963)
Kyrgyz Republic (1998)

Portugal⁺ (1962)
Qatar (1994)
Romania⁺ (1971)
Russia (2012)
Rwanda (1966)
Samoa (2012)

Venezuela (1990)
Vietnam (2007)
Yemen, Republic of (2014)
Zambia (1982)
Zimbabwe (1948)

Table 2: Variable Descriptions

<i>Trade from Country i to Country j</i> (T)	The quantity of real exports from one country to another. For cases in which there is no trade, it is recorded as a missing observation. The data is gathered from the UN Comtrade database for the years 2001 through 2014. Data for 1964-2000 comes from the work of Feenstra (2005). I use data at the 1-digit SITC Revision 2 level. For data collected directly from UN Comtrade, I gathered data at the 1-digit sector level for exports. Since the Feenstra (2005) database contains 4-digit data, I sum the subsectors to get 1-digit data. When regressing on aggregate trade rather than sector level trade, the trade values for each sector are summed for each year and country pair. The primary sectors I consider are Food and Live Animals, Beverages and Tobacco, and Crude Materials, inedible, except Fuels (ex. cork wood, crude rubber, and pulp and waste paper). The secondary sectors I consider are Chemicals and Related Products (ex. medicinal and pharmaceutical products, fertilizers, and plastics), Manufactured Goods Classified Chiefly by Material (ex. leather manufactures, tires, paper, and nails), Machinery and Transport Equipment (ex. boilers, engines, office machines, and motor vehicles), and Miscellaneous Manufactured Articles (ex. plumbing and heating fixtures, furniture, and apparel). Nominal trade values are converted into real values using the US CPI, available from the World Bank's Economic Development Indicators database. For consistency with the existing literature and to ensure a normal distribution, I use the natural log form of this variable.
<i>WTO Exporter</i> (XWTO)	A dummy variable for whether the exporter country in a trade pair is a member of GATT/WTO. This variable was also created using information about formal WTO members and accession dates that is available on the WTO website.
<i>WTO Importer</i> (MWTO)	A dummy variable for whether the importer country in a trade pair is a member of GATT/WTO. This variable was created using information about formal WTO members and accession dates that is available on the WTO website.
<i>Regional Free Trade Agreements</i> (RTA)	A dummy variable for whether the countries in a trade pair are members of the same regional trade agreement. The data comes from a database compiled by José de Sousa, Professor of Economics at Paris-Sud University.
<i>Common Currency Union</i> (CU)	A dummy variable for whether the countries in a trade pair have the same currency. The data comes from a database compiled by José de Sousa, Professor of Economics at Paris-Sud University.
<i>Distance</i> (D)	The distance between the most populated cities of the countries in a trade pair, measured in km. The data comes from the CEPII. For consistency with the existing literature and to ensure a normal distribution, I use the natural log form of this variable.
<i>GDP</i> (YY)	The GDP of the exporter country multiplied by the GDP of the importer country, measured in constant 2005 US dollars. This data is gathered from the World Bank database of world development indicators. For consistency with the existing literature and to ensure a normal distribution, I use the natural log form of this variable.
<i>GDP per Capita</i> ((YY)/(PopPop))	The GDP of the exporter country multiplied by the GDP of the importer country (as defined in vii) divided by product of the population size of the exporter country and the population size of the importer country. The population data includes all residents regardless of legal status or citizenship. This data is gathered from the World Bank's Economic Development Indicators database. For consistency with the existing literature and to ensure a normal distribution, I use the natural log form of this variable.
<i>Common Language</i> (Lang)	A dummy variable for whether a common language is spoken by at least 9 percent of the population of both countries in a trade pair. This data comes from the CEPII.
<i>Shared Border</i> (Cont)	A dummy variable for whether the countries in a trade pair share a border. This data comes from the CEPII.

<i>Landlocked</i> (Landl)	A variable for the number of landlocked countries in the trade pair (0, 1, 2). This data comes from Rose (2004).
<i>Island</i> (Island)	A variable for the number of islands in the trade pair (0, 1, 2). This data comes from Rose (2004).
<i>Area</i> (AreaArea)	The area of the exporter country in the trade pair multiplied by the importer country area. It is measured in square kilometers. This data comes from Rose (2004). For consistency with the existing literature and to ensure a normal distribution, I use the natural log form of this variable.
<i>Common Colonizer</i> (ComCol)	A dummy variable for whether the countries in a trade pair were colonies of the same colonizer after 1945. This data comes from the CEPII.
<i>Current Colony</i> (CurCol)	A dummy variable for whether one of the countries in a trade pair is currently a colony of the other. This data comes from the CEPII.
<i>Ever Colony</i> (Colony)	A dummy variable for whether one of the countries in a trade pair ever colonized the other. This data comes from the CEPII.
<i>Common Nationality</i> (ComNat)	A dummy variable for whether the countries in a trade pair were ever part of the same country. This data comes from the CEPII.

Table 3: Descriptive Statistics: Dummy Variables

Variable	N	Mean	s.d.
GATT/WTO Exporter Membership	565,261	0.81	0.39
GATT/WTO Importer Membership	565,261	0.77	0.42
RTA	545,518	0.10	0.30
Common Currency	551,725	0.02	0.13
Common Language	565,261	0.18	0.38
Shared Border	565,261	0.03	0.16
Landlocked	551,545	0.28	0.49
Island	551,545	0.30	0.51
Common Colonizer	565,261	0.08	0.27
Current Colony	565,261	0.00	0.03
Colony Post-1945	565,261	0.02	0.15
Common Country	565,261	0.01	0.10

Table 4: Descriptive Statistics: Numerical Variables.

Variable	N	Mean	s.d.	Min.	Quantiles			
					.25	Median	.75	Max
Distance	565,261	7,188.32	4,363.54	10.48	3,694.01	6,732.05	9,943.47	19,812.04
GDPGDP	490,614	1.2e+31	1.5e+31	1.1e+18	2.6e+30	6.9e+30	1.5e+31	1.0e+32
GDPGDP/PopPop	490,284	4.6e+18	1.1e+20	5.1e+05	7.6e+15	7e+16	2.9e+17	1.2e+22
AreaArea	551,545	9.1e+11	5.3e+12	15,346.80	5.6e+09	4.5e+10	2.7e+11	1.7e+14

Table 5: Descriptive Statistics: Sector Level Trade in millions USD. Does not include zero trade values.

Sector	N	Mean	s.d.	Min.	.25	Median	.75	Max
Food and Live Animals	378,065	50.52	327.92	0.00	0.24	1.99	14.52	18,592.12
Beverages and Tobacco	209,324	12.11	76.91	0.00	0.04	0.39	2.74	3,689.14
Crude Materials, Inedible, Except Fuels	333,767	37.76	364.39	0.00	0.11	1.06	8.32	52,239.05
Chemicals and Related Products, n.e.s.	333,516	77.45	579.41	0.00	0.16	1.45	12.63	30,777.54
Manufactured Goods Classified Chiefly by Material	399,872	98.00	702.62	0.00	0.18	1.92	18.56	48,965.68
Machinery and Transport Equipment	371,411	252.03	2,552.38	0.00	0.16	1.87	24.03	2.1e+05
Miscellaneous Manufactured Articles	372,743	81.94	841.56	0.00	0.06	0.68	7.58	1.0e+05
Sum of Primary Sector	454,389	75.35	564.72	0.00	0.29	2.63	19.49	54,716.49
Sum of Secondary Sector	488,733	387.06	3,730.25	0.00	0.27	3.70	41.66	3.2e+05

Table 6: Descriptive Statistics: Trade Dummies for Whether Trade Exists

Sector	N	Mean	s.d.
Food and Live Animals	565,261	0.67	0.47
Beverages and Tobacco	565,261	0.37	0.48
Crude Materials, Inedible, Except Fuels	565,261	0.59	0.49
Chemicals and Related Products, n.e.s.	565,261	0.59	0.49
Manufactured Goods Classified Chiefly by Material	565,261	0.71	0.45
Machinery and Transport Equipment	565,261	0.66	0.47
Miscellaneous Manufactured Articles	565,261	0.66	0.47
Sum of Primary Sector	565,261	0.80	0.40
Sum of Secondary Sector	565,261	0.86	0.34

Table 7A: Descriptive Statistics: Sector Trade if Exporter is a GATT/WTO Member measured in million USD. Does not include zero trade values.

Sector	N	Mean	s.d.	Min.	Max
Food and Live Animals	317,052	56.19	352.79	0.00	18,592.12
Beverages and Tobacco	187,308	13.14	80.83	0.00	3,689.14
Crude Materials, Inedible, Except Fuels	278,421	42.05	396.75	0.00	52,239.05
Chemicals and Related Products, n.e.s.	288,479	87.16	621.62	0.00	30,777.54
Manufactured Goods Classified Chiefly by Material	338,128	109.88	754.64	0.00	48,965.68
Machinery and Transport Equipment	321,799	286.49	2,733.20	0.00	2.1e+05
Miscellaneous Manufactured Articles	319,236	88.84	833.65	0.00	1.0e+05
Sum of Primary Sector	374,334	85.44	616.44	0.00	54,716.49
Sum of Secondary Sector	405,148	451.32	4,050.56	0.00	3.2e+05

Table 7B: Descriptive Statistics: Sector Trade if Exporter is not a GATT/WTO Member measured in million USD. Does not include zero trade values.

Sector	N	Mean	s.d.	Min.	Max
Food and Live Animals	61,013	21.03	136.11	0.00	6,512.78
Beverages and Tobacco	22,016	3.31	23.92	0.00	1,046.22
Crude Materials, Inedible, Except Fuels	55,346	16.23	91.14	0.00	5,500.38
Chemicals and Related Products, n.e.s.	45,037	15.24	80.87	0.00	3,003.01
Manufactured Goods Classified Chiefly by Material	61,744	32.91	271.13	0.00	13,956.13
Machinery and Transport Equipment	49,612	28.53	507.53	0.00	41,580.11
Miscellaneous Manufactured Articles	53,507	40.82	886.14	0.00	60,780.68
Sum of Primary Sector	80,055	28.16	174.84	0.00	8,489.30
Sum of Secondary Sector	83,585	75.59	1,310.41	0.00	1.2e+05

Table 8A: Descriptive Statistics: Trade Dummies for Whether Trade Exists if Exporter is a GATT/WTO Member.

Sector	N	Mean	s.d.	Min.	Max
Food and Live Animals	457,239	.69	.46	0	1
Beverages and Tobacco	457,239	.41	.49	0	1
Crude Materials, Inedible, Except Fuels	457,239	.61	.49	0	1
Chemicals and Related Products, n.e.s.	457,239	.63	.48	0	1
Manufactured Goods Classified Chiefly by Material	457,239	.74	.44	0	1
Machinery and Transport Equipment	457,239	.70	.46	0	1
Miscellaneous Manufactured Articles	457,239	.70	.46	0	1
Sum of Primary Sector	457,239	.82	.39	0	1
Sum of Secondary Sector	457,239	.89	.32	0	1

Table 8B: Descriptive Statistics: Trade Dummies for Whether Trade Exists if Exporter is not a GATT/WTO Member.

Sector	N	Mean	s.d.	Min.	Max
Food and Live Animals	108,022	.56	.50	0	1
Beverages and Tobacco	108,022	.20	.40	0	1
Crude Materials, Inedible, Except Fuels	108,022	.51	.50	0	1
Chemicals and Related Products, n.e.s.	108,022	.42	.49	0	1
Manufactured Goods Classified Chiefly by Material	108,022	.57	.49	0	1
Machinery and Transport Equipment	108,022	.46	.50	0	1
Miscellaneous Manufactured Articles	108,022	.50	.50	0	1
Sum of Primary Sector	108,022	.74	.44	0	1
Sum of Secondary Sector	108,022	.77	.42	0	1

Table 9: Results for Aggregate Trade

Model	Balding (2010)	Years: 1964-1999	Years: 1964-2014
	Years: 1970-1999		
	(1)	(2)	(3)
WTO Exporter	0.21* (0.04)	0.134*** (0.0364)	0.167*** (0.0337)
WTO Importer	0.22* (0.04)	0.235*** (0.0352)	0.424*** (0.0300)
RTA	0.372* (0.232)	-0.00911 (0.0569)	0.504*** (0.0321)
Common Currency	1.68* (0.383)	0.743*** (0.132)	0.304*** (0.0825)
Ln Distance	-1.80* (0.036)	-1.128*** (0.0228)	-1.294*** (0.0188)
Ln Real GDP	0.993* (0.086)	0.909*** (0.0608)	0.238*** (0.0405)
Ln Real GDP per Capita	-0.483* (0.081)	-0.910*** (0.0609)	-0.238*** (0.0404)
Common Language	0.66* (0.063)	0.377*** (0.0420)	0.474*** (0.0349)
Shared Border	-0.146 (0.216)	0.376*** (0.102)	0.382*** (0.0960)
Island	-0.681 (333.2)		
Ln Land Area	0.372* (0.058)		
Common Colonizer	0.746* (0.09)	0.544*** (0.0653)	0.692*** (0.0477)
Current Colony	0.954* (0.812)	-0.815 (0.872)	-1.330 (1.058)
Colony Post-1945	1.65* (0.167)	1.305*** (0.0810)	1.258*** (0.0813)
Common Country	0.261* (1.18)	0.940*** (0.184)	0.839*** (0.148)
Year FE	Yes	Yes	Yes
Importer and Exporter FE	Yes	Yes	Yes
N		236,410	477,503

Regression 1: Robust coefficients, * indicates significant

Regressions 2-5: Standard errors in parentheses, clustered by exporter importer country pairs

*p<0.05, **p<0.01, ***p<0.001

Table 10A: Primary Sector

Model	Food and Live Animals		Beverages and Tobacco		Crude Materials, Inedible, Except Fuels		Sum of Primary Sector	
	Probit	Ln (Trade)	Probit	Ln (Trade)	Probit	Ln (Trade)	Probit	Ln (Trade)
WTO Exporter	0.394*** (0.0244)	0.258*** (0.0395)	0.522*** (0.0292)	-0.0938 (0.0650)	0.191*** (0.0238)	0.0616 (0.0429)	0.251*** (0.0233)	0.170*** (0.0345)
WTO Importer	0.254*** (0.0232)	0.320*** (0.0366)	0.360*** (0.0271)	0.336*** (0.0534)	0.377*** (0.0219)	0.541*** (0.0422)	0.231*** (0.0220)	0.427*** (0.0333)
RTA	0.546*** (0.0297)	0.656*** (0.0346)	0.786*** (0.0292)	0.802*** (0.0458)	0.577*** (0.0271)	0.503*** (0.0383)	0.497*** (0.0313)	0.592*** (0.0338)
Common Currency	0.786*** (0.122)	0.477*** (0.0821)	0.484*** (0.0873)	0.730*** (0.103)	0.346*** (0.0843)	0.00328 (0.0946)	0.624*** (0.115)	0.255** (0.0809)
Ln Distance	-0.675*** (0.0175)	-1.021*** (0.0210)	-0.699*** (0.0185)	-0.874*** (0.0264)	-0.667*** (0.0155)	-1.100*** (0.0222)	-0.563*** (0.0159)	-1.104*** (0.0195)
Ln Real GDP	0.321*** (0.00922)	0.419*** (0.0475)	0.410*** (0.0120)	-0.184** (0.0688)	0.395*** (0.00846)	0.248*** (0.0511)	0.277*** (0.00779)	0.414*** (0.0438)
Ln Real GDP per Capita	-0.338*** (0.00899)	-0.414** (0.0475)	-0.429*** (0.0119)	0.185*** (0.0687)	-0.411*** (0.00821)	-0.254*** (0.0510)	-0.296*** (0.00746)	-0.417*** (0.0438)
Common Language	0.157*** (0.0345)	0.467*** (0.0405)	0.315*** (0.0369)	0.360*** (0.0543)	0.249*** (0.0301)	0.304*** (0.0418)	0.104*** (0.0309)	0.424*** (0.0368)
Shared Border	0.618*** (0.105)	0.700*** (0.0871)	0.453*** (0.0954)	0.600*** (0.0939)	0.422*** (0.0971)	0.532*** (0.0887)	0.560*** (0.113)	0.617*** (0.0877)
Landlocked	-0.728*** (0.0217)		-0.393*** (0.0237)		-0.487*** (0.0190)		0.546*** (0.0194)	
Island	0.363*** (0.0281)		0.353*** (0.0301)		0.150*** (0.0251)		0.216*** (0.0249)	
Ln Land Area	-0.0565*** (0.00651)		-0.151*** (0.00786)		-0.0444*** (0.00584)		-0.0365*** (0.00548)	
Common Colonizer	-0.403*** (0.0431)	0.669*** (0.0591)	-0.469*** (0.0472)	1.045*** (0.0830)	-0.192*** (0.0378)	0.612*** (0.0610)	-0.238*** (0.0385)	0.711*** (0.0534)
Current Colony	-2.659*** (0.769)	-0.729 (0.667)	-1.601* (0.737)	-0.641** (0.225)	-1.514 (0.922)	0.0967 (0.553)	-2.170** (0.688)	-1.076 (0.813)
Colony Post-1945	1.945*** (0.112)	1.261*** (0.0801)	1.837*** (0.111)	1.049*** (0.0889)	1.588*** (0.0936)	1.017*** (0.0747)	1.892*** (0.134)	1.204*** (0.0761)
Common Country	0.335* (0.137)	0.444*** (0.136)	0.273* (0.130)	0.715*** (0.147)	0.118 (0.127)	0.230 (0.139)	0.224 (0.135)	0.482*** (0.134)
Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Importer and Exporter FE	No	Yes	No	Yes	No	Yes	No	Yes
N	464,212	323,735	464,212	184,520	464,212	288,734	464,212	387,318

Standard errors in parentheses, clustered by exporter importer country pairs

*p<0.05, **p<0.01, ***p<0.001

Note: Probit coefficients listed as marginal effects at the mean and probit models include random effects

Table 10B: Secondary Sector

Model:	Chemicals and Related Products, n.e.s.		Manufactured Goods Classified Chiefly by Material		Machinery and Transport Equipment		Miscellaneous Manufactured Articles		Sum of Secondary Sector	
	Probit	Ln (Trade)	Probit	Ln (Trade)	Probit	Ln (Trade)	Probit	Ln (Trade)	Probit	Ln (Trade)
WTO Exporter	0.426*** (0.0257)	0.213*** (0.0469)	0.358*** (0.0215)	0.552*** (0.0425)	0.488*** (0.0230)	0.657*** (0.0498)	0.546*** (0.0218)	0.453*** (0.0428)	0.388*** (0.0228)	0.461*** (0.0371)
WTO Importer	0.351*** (0.0253)	0.188*** (0.0374)	0.347*** (0.0220)	0.303*** (0.0371)	0.330*** (0.0230)	0.145*** (0.0366)	0.362*** (0.0219)	0.125*** (0.0364)	0.277*** (0.0234)	0.277*** (0.0322)
RTA	0.752*** (0.0314)	0.698*** (0.0352)	0.601*** (0.0296)	0.783*** (0.0347)	0.758*** (0.0318)	0.635*** (0.0339)	0.815*** (0.0298)	0.653*** (0.0348)	0.576*** (0.0385)	0.616*** (0.0326)
Common Currency	0.626*** (0.0910)	0.763*** (0.0932)	0.431*** (0.0914)	0.380*** (0.0889)	0.364*** (0.0879)	0.390*** (0.0910)	0.246** (0.0799)	0.545*** (0.0935)	0.210* (0.0993)	0.584*** (0.0953)
Ln Distance	-0.885*** (0.0202)	-1.394*** (0.0218)	-0.725*** (0.0169)	-1.424*** (0.0213)	-0.707*** (0.0184)	-1.273*** (0.0197)	-0.645*** (0.0168)	-1.369*** (0.0209)	-0.601*** (0.0182)	-1.392*** (0.0194)
Ln Real GDP	0.648*** (0.0118)	0.556*** (0.0510)	0.482*** (0.00870)	0.388*** (0.0473)	0.619*** (0.0107)	0.201*** (0.0497)	0.522*** (0.00895)	0.0148 (0.0468)	0.465*** (0.00919)	0.339*** (0.0429)
Ln Real GDP per Capita	-0.662*** (0.0117)	-0.552*** (0.0509)	-0.497*** (0.00847)	-0.390*** (0.0471)	-0.633*** (0.0105)	-0.195*** (0.0496)	-0.534*** (0.00871)	-0.0116 (0.0468)	-0.473*** (0.00886)	-0.338*** (0.0428)
Common Language	0.334*** (0.0401)	0.405*** (0.0412)	0.182*** (0.0325)	0.520*** (0.0399)	0.292*** (0.0358)	0.545*** (0.0374)	0.367*** (0.0327)	0.677*** (0.0397)	0.274*** (0.0344)	0.589*** (0.0356)
Shared Border	0.479*** (0.118)	0.306*** (0.0910)	0.468*** (0.112)	0.338*** (0.0973)	0.364** (0.112)	0.524*** (0.0902)	0.257* (0.102)	0.404*** (0.104)	0.352** (0.123)	0.346*** (0.0997)
Landlocked	-0.571*** (0.0264)		-0.437*** (0.0210)		-0.232*** (0.0235)		-0.220*** (0.0203)		-0.190*** (0.0227)	
Island	0.356*** (0.0324)		0.250*** (0.0267)		0.371*** (0.0297)		0.360*** (0.0263)		0.236*** (0.0275)	
Ln Land Area	-0.233*** (0.00779)		-0.159*** (0.00616)		-0.264*** (0.00725)		-0.225*** (0.00630)		-0.212*** (0.00640)	
Common Colonizer	-0.521*** (0.0494)	0.942*** (0.0603)	-0.368*** (0.0399)	0.872*** (0.0560)	-0.639*** (0.0438)	0.776*** (0.0549)	-0.453*** (0.0400)	0.705*** (0.0556)	-0.404*** (0.0418)	0.753*** (0.0489)
Current Colony	-1.985 (1.105)	-0.688 (1.063)	-1.814* (0.835)	-0.594 (0.971)	-2.014* (0.991)	-0.0968 (1.044)	-1.689* (0.793)	-0.767 (1.164)	-2.153** (0.693)	-1.128 (1.185)
Colony Post-1945	1.468*** (0.119)	1.087*** (0.0791)	1.369*** (0.112)	1.039*** (0.0835)	1.392*** (0.111)	1.086*** (0.0794)	1.387*** (0.110)	1.194*** (0.0810)	1.120*** (0.131)	1.118*** (0.0811)
Common Country	0.345* (0.157)	0.582*** (0.160)	0.399** (0.144)	0.616*** (0.167)	0.533*** (0.137)	0.579*** (0.142)	0.439*** (0.136)	0.795*** (0.164)	0.497** (0.162)	0.848*** (0.168)
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Importer and Exporter FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	464,212	289,188	464,212	344,332	464,212	323,657	464,212	322,817	464,212	417,120

Standard errors in parentheses, clustered by exporter importer country pairs

*p<0.05, **p<0.01, ***p<0.001

Note: Probit coefficients listed as marginal effects at the mean and probit models include random effects

Table 10C: Primary and Secondary Sector

Model	Sum of Primary Sector – Full Sample		Sum of Secondary Sector – Full Sample		Sum of Primary Sector – Developing Exporters Only		Sum of Secondary Sector – Developing Exporters Only	
	Probit	Ln (Trade)	Probit	Ln (Trade)	Probit	Ln (Trade)	Probit	Ln (Trade)
GATT/WTO Exporter	0.251*** (0.0233)	0.170*** (0.0345)	0.388*** (0.0228)	0.461*** (0.0371)	0.199*** (0.0235)	0.238*** (0.0375)	0.258*** (0.0220)	0.324*** (0.0408)
GATT/WTO Importer	0.231*** (0.0220)	0.427*** (0.0333)	0.277*** (0.0234)	0.277*** (0.0322)	0.244*** (0.0259)	0.554*** (0.0459)	0.322*** (0.0260)	0.385*** (0.0477)
Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Importer and Exporter FE	No	Yes	No	Yes	No	Yes	No	Yes
N	464,212	387,318	464,212	417,120	304,394	251,081	304,394	260,663

Standard errors in parentheses, clustered by exporter importer country pairs

*p<0.05, **p<0.01, ***p<0.001

Note: Regressions contain same control variables as probit and ln(trade) models in 10A and 10B. Probit coefficients are listed as marginal effects at the mean and probit models include random effects.

Table 11A: Robustness Check: Tobit Model

	Food and Live Animals	Beverages and Tobacco	Crude Materials, Inedible, Except Fuels	Chemicals and Related Products, n.e.s.	Manufactured Goods Classified Chiefly by Material	Machinery and Transport Equipment	Miscellaneous Manufactured Articles	Sum of Primary Sector	Sum of Secondary Sector
WTO Exporter	1.692*** (0.0414)	3.377*** (0.0706)	0.721*** (0.0453)	2.145*** (0.0449)	1.584*** (0.0369)	2.617*** (0.0414)	2.368*** (0.0398)	0.778*** (0.0315)	1.170*** (0.0256)
WTO Importer	1.155*** (0.0398)	2.064*** (0.0640)	1.856*** (0.0441)	0.980*** (0.0417)	1.106*** (0.0353)	0.958*** (0.0387)	1.260*** (0.0378)	0.884*** (0.0304)	0.702*** (0.0247)
N	464,212	464,212	464,212	464,212	464,212	464,212	464,212	464,212	464,212

Standard errors in parentheses
*p<0.05, **p<0.01, ***p<0.001

Table 11B: Robustness Check: Logit Model - Marginal Effects Evaluated at the Mean

	Food and Live Animals	Beverages and Tobacco	Crude Materials, Inedible, Except Fuels	Chemicals and Related Products, n.e.s.	Manufactured Goods Classified Chiefly by Material	Machinery and Transport Equipment	Miscellaneous Manufactured Articles	Sum of Primary Sector	Sum of Secondary Sector
WTO Exporter	0.692*** (0.0443)	0.951*** (0.0552)	0.329*** (0.0433)	0.748*** (0.0471)	0.615*** (0.0390)	0.857*** (0.0421)	0.959*** (0.0396)	0.442*** (0.0433)	0.675*** (0.0426)
WTO Importer	0.442*** (0.0421)	0.645*** (0.0494)	0.668*** (0.0399)	0.628*** (0.0464)	0.624*** (0.0403)	0.607*** (0.0422)	0.644*** (0.0399)	0.401*** (0.0410)	0.496*** (0.0444)
N	464,212	464,212	464,212	464,212	464,212	464,212	464,212	464,212	464,212

Standard errors in parentheses, clustered by exporter importer country pairs
*p<0.05, **p<0.01, ***p<0.001

Note: The regressions in Tables 11A and 11B also contain control variables. These are RTA, Common Currency, Ln Distance, Ln Real GDP, Ln Real GDP per Capita, Common Language, Shared Border, Landlocked, Island, Ln Land Area, Common Colonizer, Current Colony, Colony Post-1945, and Common Country. I do not include fixed effects but do include random effects.

Table 12: Model with Leads and Lags to Examine Reverse Causality

Model:	Primary Sector			Secondary Sector		
	1 lead and lag	2 leads and lags	5 Year leads and lags	1 lead and lag	2 leads and lags	5 Year Leads and Lags
WTO Exporter: 5 Year Lag			-0.0818* (0.0350)			0.142*** (0.0373)
WTO Exporter: 2 Year Lag		-0.0539 (0.0391)			0.168*** (0.0396)	
WTO Exporter: 1 Year Lag	0.0457 (0.0386)	0.107*** (0.0324)		0.159*** (0.0395)	0.00730 (0.0296)	
WTO Exporter	0.118*** (0.0341)	0.107** (0.0360)	0.127*** (0.0316)	0.123*** (0.0302)	0.134*** (0.0307)	0.0831* (0.0336)
WTO Exporter: 1 Year Lead	0.0141 (0.0417)	-0.0322 (0.0373)		0.244*** (0.0418)	-0.0322 (0.0314)	
WTO Exporter: 2 Year Lead		0.0455 (0.0425)			0.309*** (0.0425)	
WTO Exporter: 5 Year Lead			0.0775 (0.0401)			0.353*** (0.0443)
WTO Importer: 5 Year Lag			0.117*** (0.0324)			0.211*** (0.0317)
WTO Importer: 2 Year Lag		0.174*** (0.0354)			0.189*** (0.0332)	
WTO Importer: 1 Year Lag	0.278*** (0.0367)	0.0973** (0.0310)		0.220*** (0.0334)	0.0725** (0.0273)	
WTO Importer	-0.0158 (0.0311)	0.00658 (0.0322)	0.155*** (0.0292)	0.0442 (0.0270)	0.0144 (0.0278)	0.0814** (0.0263)
WTO Importer: 1 Year Lead	0.188*** (0.0363)	0.0283 (0.0341)		0.0270 (0.0344)	0.0258 (0.0279)	
WTO Importer: 2 Year Lead		0.149*** (0.0392)			-0.0104 (0.0360)	
WTO Importer: 5 Year Lead			0.190*** (0.0370)			-0.0599 (0.0363)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Importer and Exporter FE	Yes	Yes	Yes	Yes	Yes	Yes
N	334,424	296,998	233,298	354,250	312,386	243,632

Standard errors in parentheses, clustered by exporter importer country pairs

*p<0.05, **p<0.01, ***p<0.001

Note: Models also contain control variables. These are RTA, Common Currency, Ln Distance, Ln Real GDP, Ln Real GDP per Capita, Common Language, Shared Border, Common Colonizer, Current Colony, Colony Post-1945, and Common Country variables.