

Do We Really Know That the WTO Increases Trade? Comment

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In a recent article in the *American Economic Review*, Andrew K. Rose (2004) finds that countries belonging to the General Agreement on Tariffs and Trade (GATT) and its successor, the World Trade Organization (WTO), did not trade more than countries that abstained from membership. A vast literature on the GATT and the WTO presupposes that these organizations were important, but, until Rose, there were few systematic efforts to test the assumption that membership increased trade. Rose's contribution is striking because he assembles a large dataset, performs a myriad of analyses, and uncovers scant evidence that the GATT and the WTO had any impact. Rose describes his negative findings as an "interesting mystery" (112).

The solution to this mystery lies in understanding who actually participated in the GATT.¹ We show that Rose has overlooked a large proportion of countries to which the agreement applied and mistakenly classified them as nonparticipants, when in fact they had rights and obligations under the agreement. This causes a downward bias in his estimates of the GATT's effect on trade, because his gravity regressions

compare the trade levels of formal members to the trade levels of a group that includes many participants. The purpose of this paper is to identify the full set of GATT participants and, once this institutional detail is understood, to show that the GATT did indeed contribute to the substantial growth in postwar trade.

The paper has three sections. First, we describe the institutional reach of the GATT. Drawing on published and archival material, we document that the GATT gave rights and obligations not only to formal members but also to three categories of *nonmember participants*: colonies, de facto members, and provisional members. Second, we demonstrate that previous work has missed the role of most nonmember participants by grouping them with countries that had no rights and obligations under the GATT.² Using the same data and methods as Rose, we show that the GATT substantially increased the trade of *both* formal members and nonmember participants, compared with countries outside the agreement. In fact, nearly every conclusion that Rose reaches is reversed once GATT participants are correctly classified. Finally, we perform a series of sensitivity analyses, similar to those reported by Rose, which show that the estimated effects of the GATT are positive across time and geographic regions and robust to changes in method of estimation.

I. GATT Membership and Participation

The GATT was established "to remove or diminish barriers which impede the flow of international trade and to encourage by all available means the expansion of commerce" (GATT 1961, 1; see also Douglas A. Irwin 1995). In pursuit of these objectives, the organization defined rules to govern trade policy and sponsored eight rounds of trade negotiations that led to reciprocal reductions in tariffs and nontariff

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¹ From this point forward, we use the acronym GATT to refer to both the General Agreement on Tariffs and Trade and the World Trade Organization, unless otherwise specified.

² This critique applies not only to Rose (2004) but also to Arvind Subramanian and Shang-Jin Wei (2007), who reanalyze Rose's data in many interesting ways but use the same measure of GATT membership as Rose.

barriers (NTBs).³ Succinctly summarized by Kyle Bagwell and Robert W. Staiger (2002b, 11), the rules oblige parties “to concentrate national protective measures into the form of tariffs, to apply them on a nondiscriminatory basis, and to honor any tariff bindings made in a GATT/WTO negotiation.” These obligations give rise to correlative rights: participants are entitled to be treated according to the same code they must uphold themselves.

The rules of the GATT and other international agreements foster trade in a variety of ways. For example, they help governments solve the prisoner’s dilemma that occurs when each country sets policy unilaterally according to a terms-of-trade logic (Bagwell and Staiger 1999, 2002a). International agreements can also alleviate time-inconsistency problems that arise from the temptation to reestablish barriers, whether for purely economic reasons or in response to political pressure by protectionist lobbies (e.g., Staiger and Guido Tabellini 1987, 1999; Giovanni Maggi and Andrés Rodríguez-Clare 1998). These benefits could flow from agreements involving as few as two countries, but *multilateral* pacts such as the GATT have additional ways to promote trade (Maggi 1999). Under the GATT, concessions between any two participants automatically get passed to others according to the most-favored-nation (MFN)

principle: a party that accords “any advantage, favour, privilege or immunity...to any product originating in or destined for any other country” must extend the same benefit “to the like product originating in or destined for the territories of all other contracting parties.”⁴ In this way, the GATT multiplies the rights and obligations that would emerge from purely bilateral negotiation.

To estimate the effect of the GATT on international trade, one must first determine which countries and territories were actually bound by the agreement. A close examination of public documents and archival records reveals that GATT rules applied not only to formal members but also to three categories of *nonmember participants*. Certain colonies, newly independent states, and provisional members had GATT rights and obligations, even though their names did not appear on the formal membership roster. By overlooking most of these nonmember participants, previous work has greatly understated the reach of the organization.

Like other international agreements, the GATT created rights and obligations for formal members. In October 1947, 23 nations signed the General Agreement at the Palais des Nations in Geneva. These founders pledged that in relations with other GATT parties they would extend MFN treatment and respect the tariff concessions they had made. In return, they were entitled to similar treatment from other participants. The founders, as formal members, were required to pay dues and notify the organization of changes in trade policy. They could participate in multilateral trade negotiations and annual meetings, and they had voting rights. When other countries acceded to the organization, they acquired the same duties and privileges as the founders.

In addition, the GATT gave rights and obligations to three other types of countries and territories, none of which could be called formal members. Colonies and overseas territories make up the first group of nonmember participants. According to Article XXVI:5(a) of the GATT, “Each government accepting this Agreement does so in respect of its metropolitan

³ With each negotiating round, GATT members made thousands of reciprocal concessions covering billions of dollars in trade. As the GATT reduced tariffs, some participants increased NTBs as a substitute form of protection. Nevertheless, we know of no evidence that NTBs have fully compensated for tariff cuts and other liberalization measures under the GATT. It is difficult to analyze the substitution effect directly, because trade policies are notoriously difficult to measure. Governments use many instruments to affect trade and apply them differentially across products and trading partners. There is no obvious way to average over instruments, products, and partners to obtain a single index for analysis. Researchers have proposed various measures, but Lant Pritchett (1996) found that the measures were “completely uncorrelated” with each other, and H. Lane David (2007) reached the same conclusion with an even wider set of indicators. David Dollar and Art Kraay (2003, 150) add that available measures correlate poorly with observed trade volumes. They conclude that “existing measures of trade policy are unlikely to be very informative about actual policy changes.” We find, below, that the GATT has stimulated trade, which could be taken as indirect evidence that the GATT has led to net reductions in trade barriers.

⁴ GATT Article I:1. The GATT allows exceptions to MFN for colonial systems, regional trading arrangements, and the Generalized System of Preferences (GSP).

territory and of the other territories for which it has international responsibility, except such separate customs territories as it shall notify to the Executive Secretary to the Contracting Parties at the time of its own acceptance.” With much of the world under colonial rule in the late 1940s, this clause greatly expanded the potential scope of the GATT. When sponsored by their metropole, colonies could receive and give the benefits of membership, even though they were not formal members.

Some contracting parties applied the GATT to all their colonies without exception. The Netherlands, for example, accepted the agreement on behalf of Aruba, Indonesia, the Netherlands Antilles, and Surinam.⁵ Belgium, Portugal, Spain, and the United States likewise applied the GATT to each of their possessions.⁶ As the United States elaborated (in response to an inquiry from Cuba), “The signature of the United States . . . was intended to apply to all territories for which the United States has international responsibility,” including not only its primary customs zone (the mainland, Alaska, Hawaii, and Puerto Rico), but also American Samoa, Guam, the Kingman Reef, Midway Islands, the Panama Canal Zone, the Pacific Trust Territory, the Virgin Islands, and Wake Island. “Consequently the United States considers that the General Agreement has applied between these territories and Cuba since January 1, 1948.”⁷

Other contracting parties were slightly more selective. France applied the agreement to all its overseas territories except Morocco, and the United Kingdom adopted the GATT for its entire empire except Jamaica.⁸ When British authorities finally included Jamaica shortly before its independence in 1962, GATT members “were

required to accord to the trade of Jamaica all the advantages provided for in the Agreement.”⁹ A similar transformation occurred with respect to the Faroe Islands. After exempting the islands for two years, Denmark announced in 1952 that henceforth “the Annex Protocol, the Torquay Protocol, as well as supplementary protocols and amendments thereto, should apply also to the Faroe Islands.”¹⁰ In sum, the GATT gave benefits and obligations to many colonies and dependent territories around the world.

A second mode of informal participation emerged in response to decolonization. Having accepted the GATT in respect of their overseas territories, contracting parties needed guidelines for treating territories that gained independence. The GATT envisioned two ways that newly independent territories could become formal members. Most simply, they could invoke Article XXVI:5(c) to become a contracting party “on the terms and conditions previously accepted by the metropolitan government on behalf of the territory in question.”¹¹ Alternatively, ex-territories could negotiate new terms and attempt to enter via Article XXXIII. If neither option seemed attractive, the newly independent state could terminate its participation in the GATT.

Before making such a decision, many new states wanted time to plan their future commercial policy. The contracting parties “considered it desirable that, in the period between the acquisition of autonomy and the final decision on the relations with the General Agreement, the trade relations between the newly independent countries and the contracting parties continue to be governed by the General Agreement.”¹² Consequently, they resolved to apply the GATT de facto in relations with the new territory, provided the territory continued to apply the GATT de facto in relations with them. Put another way,

⁵ GATT/CP.4/11 (23 February 1950); GATT/CP.4/SR.3 (24 February 1950). In this footnote and subsequent ones, legal documents and memoranda of GATT and the WTO are referenced by unique identification numbers assigned by the organizations.

⁶ For the United States, see GATT/CP.3/SR.5 (20 April 1949): 4-5. Belgium is discussed in GATT/CP.2/11 (3 August 1948) and GATT/CP/108/Add.2 (11 September 1951): 1. For Portugal, see *Basic Instruments and Selected Documents* (BISD) 11S/, paragraph 11. For Spain, see L/1994 (7 May 1963), paragraph 2.

⁷ GATT/CP/33 (13 September 1949): 2.

⁸ On France, see GATT/CP/22 (25 May 1949). The United Kingdom is discussed in GATT/CP.3/SR.5 (20 April 1949): 5 and L/1809 (6 July 1962).

⁹ E. Wyndham White (GATT Executive Secretary) to G. Arthur Brown (Government of Jamaica), 29 August 1962.

¹⁰ G/10 (21 May 1952): 1. Only two contracting parties—Australia and New Zealand—exempted several overseas customs territories from the GATT. Australia applied the GATT to Tasmania but not Papua New Guinea, Nauru, and the Norfolk Islands. New Zealand applied the GATT to the Cook Islands but not Western Samoa and the Tokelau Islands. See GATT/CP.3/SR.5 (20 April 1949): 5 and GATT/CP/108/Add.2 (11 September 1951): 3.

¹¹ BISD 10S/73.

¹² C/130 (28 June 1984): 1-2.

the contracting parties allowed newly independent states “to benefit from, and to apply on a reciprocal basis, the provisions of the GATT, and, in particular, the rules for most-favoured-nation treatment,” even though they were not formal members.¹³ Participation during this de facto period is a second important form of non-member involvement.

De facto participants were “expected to observe the substantive provisions of the General Agreement.”¹⁴ They were required to give MFN and national treatment, were invited to participate in multilateral trade negotiations, and could observe the annual GATT sessions. The main differences between de facto participants and formal members were procedural: de facto members did not pay dues or vote. These procedural differences were of limited importance because the organization typically did not make decisions by voting, and because the economic benefits of the GATT stemmed from lower trade barriers and MFN treatment, not from votes within the organization.¹⁵ Aside from these procedural differences, de facto participants gave and received the core rights of the GATT.

The maximum allowable duration of de facto status changed over time. The first countries to enter de facto status were Laos and Cambodia, which gained independence in 1949 and 1953, respectively. By late 1957 neither had decided whether to formalize its participation, prompting the contracting parties to set deadlines. In two cases (Laos and Guinea) deadlines passed and de facto status expired, but in other cases the new states enlisted as formal members or secured extensions to their de facto status. Eventually the contracting parties stopped imposing deadlines and allowed de facto participation to continue indefinitely.¹⁶ The practice ended only with the creation of the WTO, which eliminated the possibility of de facto participation by requiring countries to accede or lose benefits.

A third type of nonmember participation emerged when the contracting parties allowed

some states to accede *provisionally*, as a way to include them while negotiations for full accession were still taking place. When Japan proposed this kind of arrangement in 1953, the contracting parties decided that, “pending the conclusion of tariff negotiations with Japan...the commercial relations between the participating contracting parties and Japan shall be based upon the General Agreement.”¹⁷ The *travaux préparatoires* make clear that “during such period Japan shall be subject to all the obligations and shall receive all the benefits of the General Agreement.”¹⁸ The contracting parties made similar arrangements for Israel (1959), Switzerland (1960), Tunisia (1960), Argentina (1962), Egypt (1963), Yugoslavia (1963), Iceland (1964), the Philippines (1973), and Colombia (1976).¹⁹

Provisional accession affected relations among most but not all GATT participants. When a country acceded provisionally, it acquired GATT rights and obligations only with respect to contracting parties that signed the declaration on provisional accession, not with respect to all contracting parties. The Swiss experience illustrates this phenomenon. During its provisional period, which lasted until 1966, Switzerland could have entered into GATT relationships with as many as 69 contracting parties. In fact, only 61 contracting parties formally accepted the Swiss protocol of provisional accession and put it into force. The other eight contracting parties did not have obligations or rights with respect to Switzerland until it acceded completely in 1966.²⁰

In two other ways, provisional members differed from contracting parties. First, they could not vote at GATT meetings. By all estimates, this limitation “was not very important as the contracting parties did not usually proceed to

¹³ L/2757 (8 March 1967): 2.

¹⁴ C/130 (28 June 1984): 3.

¹⁵ SR.14/10 (10 June 1959): 120. De facto participants also had no right to assistance in resolving disputes between themselves and contracting parties regarding the interpretation of the agreement.

¹⁶ BISD 15S/64; L/3457 (9 November 1970):1.

¹⁷ BISD 2S/31.

¹⁸ L/107 (20 August 1953): 2.

¹⁹ The years given in the text (and used in the data analyses) refer to the date each country’s provisional agreement went into force, though in some cases the agreement was made earlier: Switzerland (1958), Tunisia (1959), Yugoslavia (1959), Argentina (1960), Egypt (1962), and Colombia (1975).

²⁰ Australia, Burundi, Cameroon, the Dominican Republic, Myanmar, New Zealand, and Rwanda did not accept the Swiss protocol. Portugal accepted the protocol but did not put it into force.

a formal vote in reaching decisions; generally, the Chairman took the sense of the meeting,” and each provisional member had “the same opportunity as contracting parties to express its opinion.”²¹ Second, provisional members—not having completed their own negotiations for accession—did not possess negotiating rights in respect to tariff concessions by others. Thus, provisional members were not entitled to compensation if a contracting party withdrew or modified the tariff concessions it had made in previous negotiating rounds. Aside from these minor differences, provisional members had the same obligations and rights as full members.

II. Did Participation in the GATT Increase Trade?

Having identified the countries and territories to which the GATT applied, we can now solve Rose’s mystery: why do insiders appear to trade at no higher levels than outsiders? The answer, we argue, is that treating nonmember participants as outsiders leads to a systematic downward bias in the estimated effect of the GATT. For the most part, Rose treats colonies, de facto members, and provisional members as being outside the organization, grouping them with countries that had no rights and obligations. As a consequence, his estimates of the GATT effect are based on a comparison of formal members with an amalgam of nonmember participants and nonparticipants. If nonmember participants benefited from the GATT (as was indeed the case), analyses that overlook them will underestimate the impact of the agreement by misallocating some treatment recipients to the “control group.”

By taking full account of nonmember participants, we correct the downward bias in previous estimates. Insofar as possible, we use the same data and methods as Rose. The primary difference between our analysis and his involves the treatment of provisional members, de facto members, and colonies. Recognizing that all three had rights and obligations, we move them from the control group into a new treatment category. After making this change, it becomes clear that the GATT substantially increased the trade of *both* formal members and nonmember

participants, relative to countries outside the agreement.

Rose’s GATT membership indicator is, as a practical matter, nearly equivalent to formal membership. He treats all 10 provisional members and 56 de facto members as if they were outsiders. One de facto member, Comoros, is classified as belonging to the GATT, but apparently not for reasons related to its de facto status. In Rose’s dataset, Comoros resembles a founding member with rights and obligations dating to 1948. In truth, Comoros has never been a formal member, much less a founder, though it did participate in the GATT as a French colony between 1949 and 1975 and subsequently as a de facto member. Thus, Comoros was part of the GATT, but purely as a nonmember participant.

Rose (2004) correctly observes that some colonies “were covered because of their relationship with a founding member” (101), but his empirical analyses reflect this fact to a very limited degree. He classifies most colonies—all but Bermuda, Comoros, and Reunion—as belonging to the GATT only when trading with their metropolitan power, not when trading with anyone else. To take an example, preindependence Uganda is viewed as a GATT member only when paired with the United Kingdom. There are, of course, many pairings of colonies with countries other than their colonizer, so colonies are treated as insiders in only a minute share of the observations. The dataset contains two additional errors involving colonies. It misses the participation of colonial Zaire, Lesotho, and Namibia, placing them outside the GATT even in relations with their metropolitan power. At the same time, it presents colonial Jamaica, Morocco, Papua New Guinea, and Vanuatu as belonging to the GATT, when in fact metropolitan powers did not apply the agreement to these territories.²²

In contrast, the coverage of formal members in Rose (2004) is nearly comprehensive, with three exceptions. First, the paper does not recognize Benin as a member until 1996, when in fact the country acceded via Article XXVI:5 in

²¹ SR.14/10 (10 June 1959): 120.

²² The United Kingdom did apply GATT to Jamaica, but only for the week immediately preceding Jamaican independence in 1962. Similarly, Australia applied GATT to Papua New Guinea for two weeks prior to independence in 1975.

1963. Second, the Kyrgyz Republic is treated as never having belonged, even though it joined the WTO in 1998. Third, Rose claims that Cuba and Czechoslovakia “left the GATT when their governments were overthrown” (101). In truth, Cuba has been a formal member continuously since 1948 and Czechoslovakia was a formal member from the founding of the GATT until 1993, when the country split into the Czech Republic and Slovakia. This third error does not affect the statistical analysis, because neither Cuba nor Czechoslovakia is included in Rose’s regressions.

To what degree does ignoring nonmember participation understate trading relationships governed by the GATT? Nonmember participation was not rare. By our count, 80 of the 178 countries in Rose’s dataset were at one time nonmember participants. Consequently, a high proportion of dyad-years have been misclassified. As shown in Table 1, over half (54 percent) of the 21,037 dyad-years that Rose codes as “none in” involved at least one GATT participant, and more than a third (36 percent) of the cases in Rose’s “one in” category actually involved two participants. Likewise, Rose’s “both in” classification misses over a quarter of the 152,986 dyad-years in which both countries had rights and obligations in GATT.²³ These misclassifications cause substantial bias, because Rose estimates the effect of GATT by comparing “both in” and “one in” versus “none in,” when in reality the GATT applied to a majority of Rose’s “none in” cases. Once we correct these misclassifications, the effect of the GATT becomes apparent.

Rose uses a gravity model to estimate the impact of GATT membership on trade between pairs of countries. We adopt the same approach in Table 2 but augment his specification with measures of nonmember participation. Following Rose, the dependent variable is the logarithm of average imports and exports in a given year for each dyad. In addition to indicators for whether one or both countries in the dyad participated in the GATT, the independent variables include the

logarithm of the products of GDP and GDP per capita, the logarithm of the distance between the countries, indicators of colonial relationships, common languages, geographic characteristics, and other controls. To correct for common shocks and trends, including declining transportation and communication costs, all specifications include fixed effects (FE) for years. Details are given in Rose (2004), the source for all variables except GATT participation.

There are some limitations in Rose’s methodology that we do not attempt to deal with here. Subramanian and Wei (2007) criticize Rose for averaging imports and exports, though some effects (GSP, for instance) should differ according to whether the importer or the exporter was the recipient of the preference. This does not have much impact on Rose’s estimates because all the explanatory variables in Rose’s models other than GSP are symmetric for importers and exporters. They also argue that, in the early years, terms of accession were less stringent for developing countries and, after joining, developing countries tended to be less active participants in negotiating rounds. Both Rose and we estimate models separately by round and, while some of the changes noted by Subramanian and Wei are evident, the general conclusions remain: Rose finds small and negative effects for GATT/WTO membership, whereas we find consistently positive and usually substantial effects.

The first equation in Table 2 reproduces the “benchmark default” specification from Rose (2004, Table 1). These and similar estimates lead Rose to conclude that GATT membership did not increase trade. In fact, the estimated coefficients for GATT membership are slightly negative in this and many other of Rose’s numerous regressions. When he uses country or dyadic FE estimators, Rose sometimes finds positive GATT effects, though he judges them “small compared to other effects” and “economically insignificant” (104).

In the second column of Table 2, we replace Rose’s membership measure with one that includes only formal members, thereby reclassifying countries that Rose counted as belonging, even though they had not acceded and become full contracting parties. This change does nothing to solve the mysterious nonassociation between GATT membership and higher trade. The estimated effects of formal GATT

²³ The right panel of Table 1 also shows a small number of cases in which Rose overstated the role of the GATT. The cases involve the following countries, which were treated as belonging to the GATT for selected years in which they did not actually participate: Comoros, Jamaica, Morocco, Papua New Guinea, and Vanuatu.

TABLE 1—RELATIONSHIP BETWEEN PARTICIPATION AND FORMAL MEMBERSHIP

Participation	Formal membership			Rose			
	Both in	One in	None in	Both in	One in	None in	Total
Both in	112,520	37,237	3,229	114,151	35,903	2,932	152,986
One in	0	63,161	8,747	599	62,862	8,447	71,908
None in	0	0	9,703	0	45	9,658	9,703
Total	112,520	100,398	21,679	114,750	98,810	21,037	234,597

Notes: The columns labeled “formal membership” summarize our determination of which dyad-years actually involved formal members. The columns labeled “Rose” are the codings in Rose’s dataset.

membership in equation (2) are even more negative and statistically significant than what Rose reported.²⁴

The solution to the mystery lies in correctly classifying nonmember participants, who were bound by the agreement. Equation (3) adds indicators for whether the countries in each dyad were nonmember participants. We now find significantly higher trade when both countries had GATT rights and obligations, either as formal members or as nonmember participants, compared with dyads in which neither country belonged to the agreement. The effects are uneven in size but statistically significant.

The next two equations in Table 2 add FE for countries and dyads, respectively, while maintaining the year effects that were present in previous specifications.²⁵ We focus on equation (5), which has the largest set of fixed effects, though the estimates in equation (4) are similar. According to equation (5), trade between two formal members is about 62 percent higher (calculated using $e^{0.48} - 1 \approx 0.62$) than trade between pairs of nonparticipants. When one country is a formal member and the other is a nonmember participant, trade is estimated to increase by about 75 percent, compared to commerce between outsiders. The effect when both countries are nonmember participants is hardest to estimate and has the largest standard error. In equation (5), trade between two nonmember participants is estimated to be 141 percent higher than trade between countries without GATT rights and obligations. It is difficult to explain why the effect should be larger for nonmember

participants than formal members, given that both had essentially the same rights and obligations.²⁶ When we impose a restriction of equality in equation (6), we obtain an estimate that is plausible and not qualitatively different from any of the subgroup estimates.

Which estimates should one believe, OLS or FE? Rose focused on his OLS estimates, which were close to zero or negative, and downplayed his positive FE estimates as “small.” In our case, *both* OLS and FE produce positive and significant GATT effects, so the issue is less critical than in Rose, where the two sometimes conflict. We find positive and significant GATT effects with OLS not only in Table 2, but also in Tables 3 and 5, discussed below. Nonetheless, the choice of estimator is consequential. The primary advantage of FE estimates is robustness to certain forms of misspecification and endogeneity. Their main disadvantage is inefficiency, since they do not exploit cross-sectional variation between dyads. Given the large size of this dataset, inefficiency is not too serious a problem. Unless the proportion of variance between units is very large (which it is not), there is sufficient within-dyad variation to obtain good estimates using FE. Furthermore, discrepancies between OLS and FE suggest unobservable dyadic differences that bias the OLS estimator (see Jerry A. Hausman and William E. Taylor 1981) and would, in large samples such as ours, tilt any mean square error comparison in favor of FE.

There are also theoretical reasons to prefer FE over OLS (Robert C. Feenstra 2004, 161–63). James E. Anderson and Eric van Wincoop (2003) derive a gravity-type specification from

²⁴ In all remaining equations, “formal membership” refers to our measure, not Rose’s.

²⁵ To accommodate dyadic effects, we delete variables that remain constant over time for pairs of countries.

²⁶ With so many observations, we can reject the hypothesis of equality at conventional significance levels.

TABLE 2—EFFECT OF GATT ON BILATERAL TRADE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Both participate in GATT							
<i>Both formal members</i>	−0.04 (0.05)	−0.17 (0.03)	0.17 (0.07)	0.54 (0.06)	0.48 (0.06)	}	0.54 (0.06)
<i>Formal member and nonmember participant</i>			0.80 (0.14)	0.86 (0.12)	0.88 (0.09)		
<i>Both nonmember participants</i>			0.41 (0.07)	0.64 (0.06)	0.56 (0.06)		
Only one participates in GATT							
<i>Formal member</i>	−0.06 (0.05)	−0.27 (0.04)	0.06 (0.07)	0.24 (0.06)	0.23 (0.06)	}	0.27 (0.05)
<i>Nonmember participant</i>			0.33 (0.09)	0.40 (0.08)	0.34 (0.07)		
Both invoke Article XXXV							−1.88 (0.62)
Only one invokes Article XXXV							−0.25 (0.14)
GSP	0.86 (0.03)	0.86 (0.03)	0.85 (0.03)	0.70 (0.03)	0.18 (0.03)	0.19 (0.03)	0.19 (0.03)
Log product real GDP	0.92 (0.01)	0.92 (0.01)	0.93 (0.01)	0.18 (0.05)	0.47 (0.05)	0.45 (0.05)	0.45 (0.05)
Log product real GDP per capita	0.32 (0.01)	0.32 (0.01)	0.31 (0.01)	0.52 (0.05)	0.21 (0.04)	0.22 (0.04)	0.22 (0.04)
Regional FTA	1.20 (0.11)	1.20 (0.11)	1.19 (0.11)	0.94 (0.13)	0.76 (0.07)	0.77 (0.07)	0.77 (0.07)
Currency union	1.12 (0.12)	1.15 (0.12)	1.11 (0.12)	1.17 (0.12)	0.61 (0.11)	0.61 (0.11)	0.61 (0.11)
Currently colonized	1.08 (0.23)	0.98 (0.23)	0.94 (0.23)	0.73 (0.26)	0.28 (0.16)	0.31 (0.15)	0.31 (0.15)
Log distance	−1.12 (0.02)	−1.12 (0.02)	−1.13 (0.02)	−1.31 (0.02)			
Common language	0.31 (0.04)	0.30 (0.04)	0.31 (0.04)	0.27 (0.04)			
Land border	0.53 (0.11)	0.51 (0.11)	0.52 (0.11)	0.28 (0.11)			
Number landlocked	−0.27 (0.03)	−0.27 (0.03)	−0.27 (0.03)	−1.53 (0.32)			
Number of islands	0.04 (0.04)	0.03 (0.04)	0.02 (0.04)	−1.03 (0.19)			
Log product land area	−0.10 (0.01)	−0.10 (0.01)	−0.09 (0.01)	0.37 (0.03)			
Common colonizer	0.58 (0.07)	0.56 (0.07)	0.52 (0.07)	0.60 (0.06)			
Ever in a colonial relationship	1.16 (0.12)	1.16 (0.12)	1.15 (0.12)	1.28 (0.11)			
Common country	−0.02 (1.08)	−0.03 (1.07)	−0.02 (1.07)	0.32 (0.58)			
Fixed effects	years	years	years	countries & years	dyads & years	dyads & years	dyads & years
Standard error of the regression	1.980	1.978	1.976	1.817	1.313	1.313	1.313
R^2	0.648	0.649	0.649	0.704	0.853	0.853	0.853

Notes: Number of observations is 234,597. Robust standard errors, clustered by dyad, are in parentheses.

a model with each country producing a single differentiated good, CES utilities, and market clearing. Their model implies the presence of a “multilateral resistance” term that can be approximated using country and time fixed effects.²⁷ Moreover, Scott L. Baier and Jeffrey H. Bergstrand (2007) conclude that, for research on trade agreements, the best approach to dealing with endogenous unit effects is either fixed effects or differencing. In a recent paper, Rose (2005, 10) takes the same position, writing, “I follow the profession in placing most confidence in the fixed effects estimators.” We, too, prefer FE estimates over OLS on both theoretical and statistical grounds, but the interpretations and conclusions would be similar regardless of which estimator is chosen.

In equation (6), we reduce the number of GATT parameters by imposing the restriction that formal membership has the same effect as nonmember participation. This simplifies the presentation and facilitates comparison with Rose, without changing our conclusions in any important way. Compared to relations between outsiders, we estimate that trade is approximately 72 percent higher when both sides of the dyad participate in the GATT. We regard equation (6) as our own benchmark specification and conclude that the GATT had an economically and statistically significant effect on trade.

One might think the GATT would cause trade diversion, as has been claimed of regional trade agreements (RTAs). The GATT, like most RTAs, grants preferences to its members that are, at least in principle, discriminatory to nonmembers. If trade were being diverted by the GATT, we would expect higher trade not only among participant pairs but also among non-participant pairs, while trade would be lowest between participants and nonparticipants. On the contrary, equation (6) shows that, *ceteris paribus*, trade is lowest among nonparticipants, is 31 percent higher when one country participates in the GATT and the other does not, and is an additional 31 percent higher when both countries participate in the organization. This could

be explained by a tendency of GATT participants to liberalize trade generally. Tariff reductions negotiated under the GATT are sometimes extended to nonparticipants, even though the GATT requires only that MFN treatment be given to participants.

The final column of Table 2 considers the effect of Article XXXV, a clause signatories sometimes used to limit their obligations with respect to another signatory. Article XXXV states that the GATT “shall not apply as between any contracting party and any other contracting party if: (a) the two contracting parties have not entered into tariff negotiations with each other, and (b) either of the contracting parties, at the time either becomes a contracting party, does not consent to such application.” To date, more than 60 countries have resorted to Article XXXV or the equivalent provision of the WTO agreement,²⁸ but they have been highly selective. In total, invocations affect only 989 of the 234,597 observations in the dataset.

Equation (7) shows that the invocation of Article XXXV reduces the benefits of the GATT. When neither party invokes Article XXXV, the GATT increases trade by more than 70 percent. The use of Article XXXV by one trading partner cuts the benefits in half, lowering the gain to 34 percent ($e^{0.54-0.25} - 1 \approx 0.34$), and invocation by both parties wipes out the effect of the GATT altogether.²⁹ Nevertheless, the occasional use of Article XXXV does not weaken our main conclusion that the GATT led to a statistically and economically significant increase in trade.³⁰

²⁸ Article XIII of the WTO agreement resembles Article XXXV of the GATT.

²⁹ In fact, two countries that invoke Article XXXV against each other trade less than two complete outsiders. This does not imply that the GATT reduces trade. On the contrary, it reveals what happens when, at the time of accession, two countries have such hostile relations that they choose not to apply the GATT to each other, even though they recognize the agreement as binding in relations with other trading partners.

³⁰ We also looked more closely at the trade patterns of provisional members. As expected, the surge in trade was smaller (45 percent instead of more than 70 percent) when the partner did not sign the declaration on provisional accession.

²⁷ Anderson and van Wincoop suggest an alternative estimation procedure involving cross-equation nonlinear constraints. This approach is computationally intractable for the number of countries and time periods in Rose’s data.

III. Sensitivity Analyses

Rose performs a large number of sensitivity analyses, varying the sample, model specification, and method of estimation. Following a similar procedure, we find that the estimated effects of GATT participation are positive for nearly all subsamples of countries and time periods, and are relatively insensitive to estimation techniques. That is, when countries are classified correctly according to their rights and obligations, the estimated effects of the GATT are almost always positive and usually economically and statistically significant.

Table 3 reestimates our baseline model but allows the effect of the GATT to vary over time from one negotiating round to the next. The equation on the left side of the table includes fixed effects for years only, while the equation on the right (our preferred specification) incorporates a full set of controls for dyads and years. In both equations, the estimated effect of GATT participation is positive and economically substantial in every round except the last. The negative coefficient for the final period should be discounted. By that time, participation was nearly ubiquitous, and the remaining nonparticipants were composed almost entirely of ex-Communist and Middle Eastern countries, micro states, and China. Using the model with fixed effects for dyads and years, the stimulus to trade when both countries participate ranges between 57 and 125 percent between 1948 and 1994. Except for the periods before the Annecy Round (where we had only a single year of data) and after the Uruguay Round, the estimates are statistically significant at the 0.05 level or better, with or without dyadic fixed effects.³¹

The effect of the GATT holds up across regions, as well. Table 4 reports the estimated

coefficients on GATT participation for various subsets of countries, selected according to their degree of industrialization, level of income, or geographic region.³² All estimates come from models that include a large set of control variables, including fixed effects for dyads and years. Except in the North African/Middle East subsample, the GATT has an economically significant effect on trade ranging from 48 percent to 97 percent when both countries participate in the agreement. Thus, the benefits of the GATT are not unique to a particular region or to countries at a certain level of development.

These findings speak to a growing literature about the effect of the GATT on developing countries. In a recent article, Subramanian and Wei (2007, 151) conclude that the GATT promotes trade “strongly but unevenly”: it increases trade among industrial countries but is less consequential for the developing world. Their analysis, like Rose’s, understates the effect of the GATT by misclassifying many developing countries as outsiders. After correcting this misclassification, we find that the GATT substantially raises the trade of developing countries.

How has the GATT achieved this outcome and led so many developing countries to seek membership in the organization? First, the GATT requires developing countries to extend minimum tariffs to other participants, many of whom were previously subject to higher rates. Through the simple application of the MFN principle, then, the GATT broadens the geographic coverage of free trade: it widens the set of countries to which minimum tariff rates apply. Second, the organization has required many developing countries to lower and bind their tariffs. In some cases, this occurred

³¹ One weakness of this type of analysis is its limited attention to dynamics. There is high autocorrelation in the residuals, due mostly to omitted dynamics. When lags of the dependent and independent variables are included in the baseline model, the implied long-run multiplier for the effect of the GATT on trade is 0.55 when both members of the dyad participate and 0.26 when one member of the dyad participates. These estimates are similar to our benchmark specification (Table 2, equation (6)), in which the indicator for both countries participating has an estimated coefficient of 0.54 and the indicator for one country participating has an estimated coefficient of 0.27.

³² We follow Rose (2004, 104) in classifying countries as industrial if their IMF country code is less than 200. We use Rose’s indicators of income and geography after correcting a few errors. First, we reclassified Gabon as a middle-income country and Guinea-Bissau as a low-income country, according to the instructions at <http://faculty.haas.berkeley.edu/arose/ERRORWTO.htm>. Second, we added the Bahamas and Bermuda to Latin America; added Gabon and Reunion to sub-Saharan Africa; added Israel, Kuwait, Qatar, the United Arab Emirates, Cyprus, and Turkey to the Middle East; and added Japan, Hong Kong, and Singapore to East Asia. In the Rose dataset, these countries were not assigned to a geographic region.

TABLE 3—EFFECTS BY GATT ROUND

	Fixed effects for years		Fixed effects for dyads and years	
	Both participate in GATT/WTO	One participates in GATT/WTO	Both participate in GATT/WTO	One participates in GATT/WTO
Before Annecy Round (1949)	1.17 (0.62)	0.43 (0.56)	0.81 (0.46)	0.07 (0.45)
Annecy to Torquay Round (1951)	0.59 (0.11)	0.29 (0.10)	0.76 (0.10)	0.41 (0.10)
Torquay to Geneva Round (1956)	0.65 (0.11)	0.40 (0.11)	0.77 (0.10)	0.38 (0.10)
Geneva to Dillon Round (1961)	0.61 (0.10)	0.42 (0.10)	0.68 (0.09)	0.35 (0.09)
Dillon to Kennedy Round (1967)	0.38 (0.09)	0.22 (0.09)	0.53 (0.08)	0.20 (0.08)
Kennedy to Tokyo Round (1979)	0.43 (0.10)	0.27 (0.10)	0.48 (0.08)	0.21 (0.08)
Tokyo to Uruguay Round (1994)	0.33 (0.12)	0.10 (0.12)	0.45 (0.09)	0.17 (0.09)
After the Uruguay Round	-0.86 (0.13)	-0.77 (0.13)	-0.01 (0.14)	-0.16 (0.14)
Standard error of regression		1.98		1.31
R^2		0.65		0.85

Notes: Dependent variable is log of real trade, measured by dyad-year. Both models control for GSP, regional FTA, currency union, currently colonized, log product real GDP, and log product real GDP per capita. The first model, which does not include dyadic fixed effects, controls for log distance, common language, land border, number landlocked, number islands, log product land area, common colonizer, ever colony, and common country. Robust standard errors, clustered by dyad, are in parentheses.

because developed countries negotiated on behalf of their colonies, and those tariff levels got locked in when the colonies gained independence and became de facto or formal members of the GATT; in other cases, developing countries participated directly in GATT rounds. Third, even when developing countries did not lower their tariffs through GATT negotiations, the agreement required that any unilateral liberalization (for whatever reason) be extended to all GATT participants. Finally, the GATT gives developing countries access to markets of other GATT participants, including ones that have liberalized considerably. For these reasons, the GATT is not simply a rich country club.

Although the GATT contributed significantly to the trade of LDCs, our estimates do not imply that “the relevance of the GATT can be rescued *only* by including developing countries.”³³ On the contrary, the GATT has a marked effect even when the sample contains no developing

countries. In Table 4, the coefficient for “only industrial countries” is substantively large (implying a 48 percent increase in trade) and statistically significant ($p < 0.05$ with a two-tailed test). The problem is not that the GATT has no effect on developed countries, but that misclassifying some industrialized countries (such as Japan, Switzerland, Yugoslavia, and Iceland) and a large number of developing countries as nonparticipants biases the pooled estimates downward.

Following Rose, we also conducted a series of cross-sectional analyses at five-year intervals beginning in 1950. Each regression in Table 5 controls for the standard set of gravity variables but involves data for only one year, and therefore omits fixed effects for dyads and years. Again, in every case except the last, participation in the GATT increases trade by 25 to 120 percent when both sides of the dyad belong to the agreement. There is no apparent trend in the cross-sectional estimates, with large effects at both the beginning and the end of the series.

Finally, we disaggregated participation into five categories: colonial, de facto, provisional,

³³ Rose (forthcoming, 9).

TABLE 4—EFFECTS BY TYPE OF COUNTRY

	Both participate in GATT/WTO	One participates in GATT/WTO	Number of observations
No industrial countries	0.66 (0.08)	0.31 (0.07)	114,615
Only industrial countries	0.39 (0.20)	0.10 (0.19)	14,394
Industrial with nonindustrial country	0.49 (0.10)	0.32 (0.09)	105,588
At least one high-income country	0.46 (0.09)	0.24 (0.08)	132,559
At least one middle-income country	0.50 (0.06)	0.24 (0.06)	151,972
At least one low-income country	0.61 (0.12)	0.38 (0.11)	106,599
At least one least-developed country	0.49 (0.15)	0.28 (0.14)	69,085
At least one from Latin America	0.45 (0.09)	0.28 (0.08)	78,786
At least one from sub-Saharan Africa	0.40 (0.15)	0.09 (0.14)	88,082
At least one from North Africa or Middle East	0.13 (0.10)	0.00 (0.09)	53,728
At least one from South Asia	0.41 (1.13)	0.11 (1.13)	19,874
At least one from East Asia	0.68 (0.14)	0.25 (0.13)	49,263

Notes: Dependent variable is log of real trade, measured by dyad-year. All models include fixed effects for dyads and years and control for GSP, regional FTA, currency union, currently colonized, log product real GDP, and log product real GDP per capita. Robust standard errors, clustered by dyad, are in parentheses.

formal, and nonparticipation. We then reestimated the model for each possible combination of participation types—14 in all, excluding pairs of nonparticipants, the reference category. Thus, there were 14 different estimates of the GATT effect, not shown here to conserve space. All were positive, and 12 were statistically significant at the 0.01 level. The only insignificant estimates involved two of the five parameters for provisional membership, the least frequent mode of participation. This sensitivity analysis confirms that our main finding—the GATT increases trade—holds across all forms of participation.

IV. Conclusions

This paper solves a mystery, first identified by Rose (2004), about the effects of the GATT and the WTO on international trade. Using a large dataset and a variety of techniques, Rose found little evidence that members of the GATT and the WTO trade more than countries outside the

organization. We show that this negative finding arises from a tendency, common in work on international agreements, to overlook the role of nonmember participants. The GATT created rights and obligations not only for contracting parties but also for colonies, newly independent states, and provisional members. By treating these participants as if they were outside the organization, previous research has understated the institutional research and economic effects of the GATT.

Once we account for all GATT participants, our analyses show that participation—either as a formal member or as a nonmember participant—substantially increased trade. Over half of the observations that Rose classified as involving no GATT members actually involved countries that were bound by the agreement. Implicitly, therefore, Rose estimated the effect of GATT by comparing two groups composed mostly of insiders. By shifting the focus from formal membership to participation (actual rights and obligations), we find that the agreement

TABLE 5—CROSS-SECTIONAL ANALYSIS

	Both participate in GATT/WTO	One participates in GATT/WTO	Number of observations
1950	0.60 (0.10)	0.26 (0.09)	1,115
1955	0.79 (0.11)	0.40 (0.11)	1,468
1960	0.48 (0.10)	0.31 (0.10)	2,625
1965	0.38 (0.11)	0.26 (0.11)	3,361
1970	0.40 (0.12)	0.20 (0.13)	4,737
1975	0.22 (0.15)	0.14 (0.15)	5,354
1980	0.40 (0.16)	0.36 (0.17)	5,895
1985	0.52 (0.22)	0.25 (0.23)	6,232
1990	0.76 (0.30)	0.54 (0.30)	6,620
1995	-0.51 (0.24)	-0.67 (0.25)	7,640

Notes: Dependent variable is log of real trade, measured by dyad-year. Each model includes regional FTA, currency union, log distance, log product real GDP, log product real GDP per capita, common language, land border, number landlocked, number islands, log product land area, common colonizer, currently colonized, ever colony, common country, and an intercept. Models from 1970 control for GSP, as well. Robust standard errors are in parentheses.

benefited participants. This finding holds up for each GATT round before the WTO, for both developing and industrial countries, and when different estimation procedures are employed. With Rose's membership classification, the estimated GATT effect is sometimes negative and almost never statistically or economically significant. With the correct set of participants, our estimates are nearly always positive, statistically significant, and economically substantial.

Several areas deserve further investigation. To the extent that the GATT promotes trade by requiring MFN, it would be helpful to have a better understanding of the impact of MFN itself. As it turns out, some countries extend MFN more broadly, offering it even to those outside the GATT. At the moment, no comprehensive source of data exists on who grants MFN to whom.³⁴ The collection and analysis of

such data would represent a major contribution to our understanding of postwar trade. Such work would also shed light on trade in the age before the GATT, when countries embedded MFN clauses in bilateral commercial treaties.

Further, the analyses here and in Rose (2004) are not based on a full structural model. The gravity equations do not take into account dynamic

Hungary, Laos, Mongolia, North Korea, Poland, Romania, the Soviet Union, and Vietnam, among others. During the 1990s, the United States also deprived Afghanistan and Yugoslavia of MFN status (Vladimir N. Pregelj 2005). Moreover, in recent years the United States has offered only *conditional* and *temporary* MFN to Armenia, Azerbaijan, Belarus, Kazakhstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and Vietnam. The trade privileges of these countries must be reviewed annually by the president and the Congress (Pregelj 2004), and are therefore less permanent than the privileges of WTO members. From the fragmentary data we have reviewed for countries other than the United States, it appears that many nations do not freely extend MFN to all trading partners. We are now gathering data to establish more definitively whether, and for what periods, other countries granted MFN to countries outside the GATT.

³⁴ Currently, the United States withholds MFN from only two countries. But for much of the postwar period, several more countries were excluded: Albania, Bulgaria, Cambodia, China, Cuba, Czechoslovakia, East Germany,

adjustment processes, concessions prior to joining the GATT, or interactions between the GATT and other commercial pacts.³⁵ Identifying which countries actually participated in the GATT is just a first step toward understanding how the agreement transformed world trade.

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³⁵ For some steps in these directions, see Subramanian and Wei 2007 and Goldstein, Rivers, and Tomz 2007.