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Alliances, market power, and postwar trade: explaining the GATT/WTO

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Abstract: This paper argues that testing the empirical implications of existing theories about institutions yields rich insights into the postwar trade regime. Market-failure theory predicts that the GATT/WTO will exert its strongest impact on trade between its largest member states. A theory based on security externalities implies that a sizeable expansion of trade will also occur between a subset of the contracting parties that alliance ties link. An analysis of the data shows that the evidence is consistent with both theories, making clear the value added of taking explicitly into account the economics and politics that motivated the establishment of the postwar regime and that governed its subsequent operation.

The abundant literature about institutions regards the postwar trade regime as its 'beau ideal' (Goldstein *et al.*, 2007b: 38). Yet, it was only six years ago that Andrew Rose published the first systematic empirical analysis of its effects. Contravening conventional wisdom, he found that the General Agreement on Tariffs and Trade (GATT) and its successor, the World Trade Organization (WTO), did not exert any significant impact on trade (2004).

Several empirical studies of the regime quickly followed. Joanne Gowa and Soo Yeon Kim (2005) report that the GATT exerted a positive and significant impact on trade only between its largest industrial-country members. Arvind Subramanian and Shang-Jin Wei (2007) find that the regime increased the imports of its industrial-country members more generally. Judith Goldstein, Douglas Rivers, and Michael Tomz (2007a, 2007b), expanding Rose's membership roster, show that the GATT/WTO boosts trade between states that acceded to it irrespective of their level of development.

Neither these nor other related papers, however, examine whether the evidence is consistent with the empirical implications of existing theories about international trade institutions.[1] These theories predict that the impact of a regime is likely to vary

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1 See, e.g., Herz and Wagner (2007), Eicher and Henn (2008), Felbermayr and Kohler (2009).

across different subsets of its members. They attribute this variation to the political ties and economic attributes that distinguish states, affecting their ability to exploit the benefits regime membership offers. They do not attribute it, however, to the different ways states acceded to the regime, as in Goldstein *et al.* (2007a, 2007b).

Market-failure theory predicts that trade expansion will be skewed toward the largest member countries, as a regime helps them realize a welfare-improving equilibrium outcome of the Prisoners' Dilemma (PD) game that engages them. A theory based on the politics that an anarchic international system induces implies that the regime will also promote trade between its allied members if at least one of them is a developing country. Alliances encourage trade because they endow their members with a stake in each other's welfare, deterring attempts to shift the terms of trade between them. If an ally is a developing country and its firms must sink costs into dedicated assets in order to export, however increasing intra-alliance trade also requires insurance against the risk of reneging that can accompany waning political–military ties. When a regime supplies this insurance, joint membership in it and in an alliance will increase trade independent of the impact of either alone. For reasons I explain below, industrial countries can self insure against the risk that alliance dissolution creates.

The findings in this paper are consistent with these predictions. The GATT/WTO does indeed exert its strongest impact on trade between its largest member states. As market-failure theory implies, trade also expands to a smaller but still sizeable extent between these states and others with relatively similar factor endowments, consistent with the most-favored nation (MFN) treatment the postwar regime required. Finally, the evidence also conforms to the hypothesis that the regime increases trade when its developing-country members are also members of a political–military alliance. The results here do not, however, support the idea that different routes to membership influence the extent to which the regime affects trade.

Immediately below, I describe briefly the findings of existing studies. Next, I explain the predictions that theories about institutions generate. Finally, I report the results of testing these predictions.

Recent literature

Although no theory predicts that the GATT/WTO will exert uniform effects on its member states, the benchmark analysis in Rose (2004) includes them all in one 'treatment' group. He codes states as members if they either joined the organization at its inception or did so thereafter in accord with the accession protocol in effect when they joined. He uses a gravity model, the industry standard, to estimate the effect of regime membership on bilateral trade flows between 1950 and 1999. Including a series of potentially confounding covariates, he finds that membership in the postwar trade regime 'is *not* associated with enhanced trade' (2004: 98,

emphasis original). A wide-ranging series of robustness tests, including some that disaggregate member states, does not persuade him to change his conclusion.

Gowa and Kim (2005) focus on the principal-supplier rule that governed postwar tariff bargaining. This rule allowed only the state that is the principal supplier of a good to another's market to ask the importing state to cut its tariff on that product. They attribute the adoption of the rule to congressional insistence that only product-by-product tariff cuts would ensure reciprocity and protect import-competing industries. Together with the elimination of agricultural products from the regime's domain, the rule effectively concentrated tariff bargaining on the GATT's largest industrial-country members. Using data through 1994, Gowa and Kim find that the evidence is consistent with their argument: GATT membership expanded trade only between Britain, Canada, France, Germany, and the United States.

Subramanian and Wei focus on four asymmetries that they believe inhered in the regime: (1) only developed countries 'engaged actively in reciprocal' tariff cuts, (2) only members participated in tariff bargaining, (3) tariff cuts privileged industrial-country products, and (4) developing countries that acceded to the WTO rather than to its predecessor were more likely to liberalize their trade (2007: 153–156). Their empirical results are consistent with their priors: imports of developed-country member states increase significantly more than do the imports of either developing countries or states in the excluded group; member-country trade exceeds that of nonmembers; trade in manufactures expands; and more recent accession leads to higher developing-country trade.

Goldstein *et al.* use a data set that includes much more information about the colonial status of states and about preferential trade agreements (PTAs) than Rose uses in his analysis. Their trade data begin in 1946 rather than in 1950 and end in 2004 rather than in 1999. Their most original and important addition, however, is the membership roster they construct. Based on research in the GATT archives, Goldstein *et al.* conclude that Rose codes as nonmembers many states that actually had standing in the organization. These 'nonmember participants' (NMPs) joined the regime in one of three ways: (1) their imperial powers signed them on at the inception of the GATT; (2) they remained in the organization as '*de facto*' members after gaining independence;[2] or (3) they acquired 'provisional' member status once they began but before they completed the accession process (2007b: 40–43).[3]

Using the expanded membership roster, Goldstein *et al.* find that regime members trade about 43 % more with each other than do states in the excluded group (2007b: 55). They also report that the impact of membership varies across three

2 More precisely, Article XXVI: 5(c) sanctions automatic accession for newly independent states, permitting them to join 'on the terms and conditions previously accepted by the metropolitan government on behalf of the territory in question' (Goldstein *et al.*, 2007b: 41).

3 NMPs disappear with the advent of the WTO, as it required states to accede formally. The ten provisional members, excepting Tunisia, remained as such for five years on average.

types of country pairs: (1) formal-member dyads – i.e., country pairs composed of states that signed the 1948 Havana Charter or that later completed a standard accession protocol; (2) NMP dyads – i.e., those that include two states that acceded to the regime in other ways; and (3) 'mixed' dyads – i.e., those that include one formal member and one NMP.[4] Formal members trade about 41% more with each other than do base-group states. The corresponding statistics for mixed-dyad and NMP trade are about 46% and 56%, respectively (2007b: 55).[5] The authors themselves regard these differences as puzzling, given that all groups 'had essentially the same rights and obligations' (2007a: 2011).

I return to this issue below. Next, I explain the hypotheses that two salient theories about institutions generate.

Theory

Market-failure theory

The canonical representation of the free-trade problem in the existing literature is based on the PD game (e.g., Bagwell and Staiger, 2002). In standard trade theory, tariff bargaining conforms to a PD game when it engages 'large' states – that is, countries that wield sufficient market power to affect their terms of trade. The dominant strategy of a large state is an 'optimal' tariff, an import tax that maximizes the real income gains that accrue as a consequence of the improved terms of trade it generates net of the costs it inflicts as trade volume drops.[6] If all large countries impose tariffs, however, prices will not change but trade will drop, making each worse off than if they had all adhered to free trade.[7] As such, states are better off opening their markets to each other's products than imposing trade barriers, as long as they expect their interactions to continue indefinitely, value future relative to present payoffs 'sufficiently', and are able to monitor each other's compliance.

Market-failure theory, the most prominent explanation of international institutions, contends that a regime helps large states trapped in a PD game to improve their welfare in at least three ways (Keohane, 1994). First, it reduces the marginal costs states incur when they engage in repeated rounds of bargaining, because it allows them to coordinate relatively cheaply on when, where, and how they will negotiate. Second, its secretariat maintains a record of the tariff cuts its contracting parties agreed upon. Given the dominance of bilateral negotiations in successive

4 About 1% of GATT dyads include two NMPs; about 14% are mixed dyads.

5 In their (2007b) article, the authors report that the p-value of the test for whether the coefficients are equal for formal members and NMPs is 0.09 (p. 54, n. 39). All pair-wise differences are significant in their earlier paper (2007a: 2013).

6 Empirical evidence shows that states do set tariffs in ways that are consistent with their market power (Broda *et al.*, 2008; Bagwell and Staiger, 2006).

7 This is so whether a relative price change or protection is the objective sought (Bagwell and Staiger, 2002: 3).

tariff rounds, states themselves had few incentives to publicize their cuts. Finally, its dispute-resolution mechanism (DRM) can limit the retaliation that might otherwise ensue in the event a defection occurs.

In contrast, small states do not play a role in market-failure theory. By definition, a small state cannot affect its terms of trade: the effects of any tariff it imposes 'move through the local prices within the country and thus reside entirely within national boundaries' (Bagwell, 2007: 4). As a result, a small country's tariff reduces its aggregate welfare, making free trade its dominant strategy. Thus, large countries have no incentive to engage small states in tariff bargaining, and small states have no reason to bargain with each other.

As in Gowa and Kim (2005) then, but for different reasons, market-failure theory predicts that a regime will exert its strongest impact on its largest member states, because it helps them to reach a Pareto-improving equilibrium outcome of the PD game that engages them.[8] It also implies that the tariff cuts these states make will privilege the goods they produce and exchange, as each has an interest in reducing tariffs only on its own exports (Bagwell *et al.*, 2002: 57). In this view, a principal-supplier rule is endogenous to the policy preferences standard trade theory assigns to states.[9]

When an MFN clause governs tariff bargaining, market-failure theory also predicts an increase in trade involving smaller states if their relative factor endowments are similar to those of the largest regime members. Although the latter will seek to internalize the benefits of their tariff cuts, they are unlikely to succeed completely.[10] As a result, states with similar production profiles can free ride on the tariff concessions their larger counterparts negotiate.

Historical accounts of the GATT/WTO are consistent with market-failure theory in several important ways. In 1946, the contracting parties themselves noted that MFN treatment meant that 'importing country A will be interested in granting to exporting country B concessions on products of which B is the main supplier, because … country A will [then] secure the highest concessions from B on other goods which A exports to country B' (cited in Irwin *et al.*, 2008: 116, n64). The principal-supplier rule, which requires item-by-item exchanges of concessions, also explains why bilateral talks were a staple of postwar bargaining. This was so despite agreement on a linear approach at the Kennedy Round and the assumption by the European Union (EU) at that round of the role that individual

8 The dominance of large countries is also consistent with the hypothesis that it is their political power that mattered. However, this framework does not explain why cutting tariffs on each other's products makes them better off.

9 As Ludema and Mayda (2009: 138) show, the rule is an optimal response to the free-rider problem if an MFN clause exists, because it reduces uncompensated externalities.

10 The internalization ratio measures the sum of all imports that originate in countries with which the importing country exchanged concessions to the sum of total imports on which it made concessions. The US ratio was about 90% in both the Dillon and Kennedy Rounds (Hoekman and Kostecki, 2001: 31). Some observers believe that it was the 'ability of judicious product selection to internalize the benefits of concessions' that explains the tariff cuts achieved under GATT auspices (e.g., Finger, 1979: 427).

representatives of its member countries had previously played.[11] Participants at the Kennedy Round, for example

> quickly found that meaningful concessions usually could be given only between the principal supplier of industrial goods and the major importers. Multilateral negotiations were useful for exchanges of information and for general discussions of structural problems of trade and production … but they did not facilitate [the] specific discussions of reciprocity … that were a necessary part of the exchange of concessions. Consequently, what was a multilateral negotiation in name became a large, complicated series of bilateral (or plurilateral) negotiations in fact. (Winham, 1986, 65)

The same was true of later negotiating rounds. During the Tokyo Round, countries typically proposed tariff cuts 'to the "principal supplier" (the largest exporter) of a particular product'. As such, large states got 'the most action', and bilateral bargaining generated the most consequential tariff cuts (Winham, 1986: 202).

To reinforce the principal-supplier rule, large states pursued tariff specialization – that is, they defined very narrowly the product to which a particular tariff cut applied (Trebilcock and Howse, 1999: 127). They also engaged in 'settling-up sessions' in which tariff cuts that had been agreed upon earlier were subject 'to threats of withdrawal or revision unless non-reciprocating countries [also] agreed to offer concessions' (Trebilcock and Howse, 1999: 117). Given the exclusion of textiles and clothing and agricultural products from the domain of the postwar regime and its emphasis on trade in manufactures, smaller industrial countries were the most logical targets of these threats.

In sum, market-failure theory implies that the impact of the postwar regime will vary not only among developed countries but also between them and developing countries. More precisely, it generates three hypotheses: (1) trade expansion will be skewed toward its largest-industrial country members; (2) smaller industrial countries will realize an increase in their trade as a result of the MFN clause; and (3) developing countries, because of their different relative factor endowments and because they were rarely the 'principal suppliers of anything', will gain little from the specialization of labor the postwar regime produced (Wilkinson and Scott, 2008: 486).

Security externalities

The extent to which politics motivated the formation of the GATT suggests that market-failure theory alone is unlikely to explain its effects. Even before World War II ended, the United States began planning a multilateral institution designed to preempt a reemergence of the interwar trade blocs. As East–West tensions increased, this institution also seemed to represent a way to stabilize the continental

11 I use the EU to denote the European Economic Community, the European Community, and the European Union.

balance of power. Absent the Cold War, it would be hard to explain US support for the creation of what is now the EU, a trade bloc that excluded it from membership and diluted its market power.

The link between trade and international politics finds expression in the theoretical literature in terms of the security externalities that trade generates – that is, the increase in potential political–military power that states realize as a result of the real income gains that trade produces. These externalities offer political–military allies stronger incentives to trade freely with each other than with either neutrals or adversaries (Gowa and Mansfield, 1993; Gowa, 1994). The long-standing US insistence on applying statutory rather than MFN rates to most communist countries reflects the logic of this argument (US Tariff Commission, 1965: 60). In 1999, the United States levied an average tariff of 30% on imports from many former Soviet-bloc countries, roughly ten times the MFN rates it applied to other countries irrespective of their GATT/WTO status (Broda *et al.*, 2008: 2061).

The security-externality argument implies that joint membership in an alliance and in a trade institution can exert a positive impact on trade involving developing countries, an effect that is independent of the impact of either alliances or regime membership alone. The regime can help to insure developing countries against the threat of reneging that may ensue in the event the alliances to which they belong break down. Large industrial states can self insure against this risk: their market power enables them to wield a credible retaliatory threat that deters reneging. Smaller industrial states, because of their similar production profiles and the existence of an MFN clause, can free ride on the insurance large states supply.

Regime-supplied insurance is important when trade between allies involves relation-specific investments. Relatively efficient firms can realize larger profits if they sell both at home and abroad, because larger production runs allow them to exploit scale economies. Producing for export, however, often requires sinking costs into dedicated assets – that is, investments that support transactions with a particular partner. These investments render both the firm and its home country vulnerable to an *ex post* demand by the destination country to renegotiate the division of the resulting surplus, creating a dynamic-inconsistency problem (Mansfield and Bronson, 1997: 95). Firms, therefore, will sink the required costs only if the destination country can credibly commit to keep its market open.

A political–military alliance that links the importing and exporting countries can enable the destination country to make this commitment. As the income transfer a tariff generates is inefficient, a state interested in maximizing aggregate alliance power has an interest in forgoing taxes on its ally's exports. This makes its open-market commitment credible. If alliance ties unravel, however, the destination country has an incentive to renege on this commitment. While many industrial countries wield a credible threat of retaliation sufficient to deter reneging, developing countries more typically require the help of a third-party DRM to do so.

In practice, the costs associated with filing a claim in the GATT/WTO are formidable for developing countries. Nonetheless, at least 32 of them filed cases between 1975 and 2003 (Davis and Bermeo, 2009: 1040). Their utilization rate corresponds roughly to their share of world trade: developing countries initiated about 11% of all disputes begun under the GATT; the corresponding statistic for the WTO is about 33% (Bown, 2004: 64). Existing studies also report that defendants in cases brought by developing countries fully liberalize the measures under dispute in 36% of complaints lodged under the GATT and in 50% of the cases they filed under the WTO (Busch and Reinhardt, 2003: 725).

Joint membership in a trade regime and in an alliance, then, can supply a developing-country member state with the deterrent power that makes investing in transaction-specific assets incentive compatible. The hypothesis this implies is that trade involving developing countries will expand when they belong both to the regime and to a political–military alliance. It also implies that omitting a role for alliances risks confounding their effects and those of the GATT/WTO, exaggerating the impact of the postwar regime on developing-country trade.

I turn next to the data.

Empirical analyses

As in earlier studies, I use a gravity model to analyze bilateral trade flows. The dependent variable is the logged value of the annual imports of each state in a country pair from the other between 1946 and 2004. Each analysis includes year fixed effects, which account for factors influencing trade that vary across time but are constant across dyads. As both recent theoretical analyses of the gravity model and concerns about unobserved heterogeneity recommend, I also include dyadic fixed effects to control for characteristics that vary across dyads but are constant across time.[12] Thus, the coefficient on GATT/WTO membership, for example, measures the change in trade that occurs between two countries when both of them join the regime.

The covariate of principal interest is an indicator variable that assumes a value of one if both states in a dyad are GATT/WTO members, disaggregated as described below. As in Goldstein *et al.* (2007a, 2007b), other dichotomous variables assign a value of one to dyads in which only one state is a member of the GATT/WTO (*onein*) and to country pairs in which both states belong to a currency union or a reciprocal or unilateral PTA. I also control for whether states are signatories of agreements negotiated under the Generalized System of Preferences (GSP), which allows developed countries to give developing countries of their choosing

12 Thus, I do not include covariates that are constant across time (e.g., contiguity, common language) as they drop out of the analysis. Recent work recommends including time-varying importer and exporter fixed effects, but the memory required to do so for the size of the data set makes this infeasible. The dyadic effects, however, control for the time-invariant component of multilateral trade resistance (Felbermayr and Kohler, 2009: 6–7).

unilateral access to their markets.[13] With two exceptions, I use the Goldstein *et al.* data to measure these variables.[14]

One exception is population, which their data set does not include. Because it is a standard element of gravity models, I use the Penn World Tables to measure the logged annual value of the product of the population of the states in a dyad (Heston *et al.*, 2006). For the years between 1946 and 1949, I rely on Angus Maddison's data.[15] Population data exist for all but about 8,000 observations in the sample. These observations drop out of the sample; sensitivity analyses show that their omission does not affect the results.

The second exception is the Goldstein *et al.* measure of countries with colonial ties. They state that they distinguish country pairs that include an imperial power and its colony, two colonies of the same empire, or two former colonies of the same metropole (2007b: 51). However, their colonial-indicator variable takes on a value of one only in the roughly 1,600 observations that include two members of an existing empire.[16] I replace their measure here with two variables. The first assumes a value of one if states in a dyad are current members of the same empires; it is zero otherwise (*empires*). The second variable takes on a value of one if one or both colonies in a dyad are former members of the same colonial empire (*former colonies*). In the sample, both dyad members belong to an existing empire in 1,629 dyads. About 25,500 former-colonial dyads exist, accounting for about 7% of the sample.

The recoding of the colonial variable helps to explain the puzzling Goldstein *et al.* finding that variations in accession affect the influence of the GATT/WTO on trade. The distribution of colonial pairs across the formal, mixed-dyad, and NMP groups is highly skewed. Country pairs that include states with current colonial ties account for less than 1% of formal-member dyads and about 2% of mixed dyads; they are, however, about 20% of NMP country pairs. The corresponding statistics for dyads that include former members of the same colonial empire are 8%, 14%, and 21%, respectively. Because dyad members that share colonial ties, particularly if they are current, are likely to trade more with each other on average, differences in group composition rather than in their mode of accession may explain the finding that the impact of the GATT varies across them.

To test whether this is so, I first distinguish the colonial pairs that are also members of the GATT. I create a variable that assumes a value of one when current colonies are GATT members; it is zero otherwise (*GATTmembers/empires*). Another variable indicates dyads in which both members of a former-colony pair adhere to the GATT (*GATTmembers/former colonies*). Almost 80%

13 Unilateral PTAs provide one-way market access but are not GSPs (e.g., the Lome Convention) (Goldstein *et al.*, 2007b: 46).

14 Their data set (Tomz_IO_2007.zip) is posted at: www.stanford.edu/~tomz.

15 http://www.ggdc.net/maddison.

16 I recode about 30 of the colonial-orbit dyads in Goldstein *et al.* (2007) (e.g., the CIA fact book codes Egypt as independent as of 1922 and Indonesia as of 1945).

Table 1. Bilateral Trade, 1946–1994: Formal Members, Mixed Dyads, NMPs, and Colonies

GATT members/no colonial pairs	
Formal members	0.37 (0.04)
Mixed dyads	0.36 (0.04)
NMPs	0.40 (0.08)
GATT members/colonial pairs	
Empires	0.18 (0.15)
Former colonies	0.03 (0.11)
Empires	0.52 (0.13)
R^2	0.84
N	276,922

Note: Regressand: logged bilateral trade flows, measured in 1967 US dollars. Directed dyad and year fixed-effects analysis using *areg* in Stata 11 with robust standard errors clustered on directed dyads in parentheses. Controls for one in dyads, PTAs, currency unions, GSPs, GDP, and population, are included but not reported.

of both existing and former colonial pairs are regime members. I then account separately for other dyads in each of the formal-member, mixed-dyad, and NMP groups – i.e., each group includes the country pairs that Goldstein *et al*. originally assigned to them, absent those with colonial links.

Table 1 reports the results of an analysis that includes these variables, as well as population and all covariates that Goldstein *et al*. include. Because the WTO required all of its members to formally accede to the organization, neither the mixed-dyad group nor the NMP group exists after 1995. The analysis, therefore, is limited to the years between 1946 and 1994.[17] As the existing-colony and former-colony variables together are collinear with the dyadic fixed effects, the former-colony variable drops out of the analysis. As is standard, the excluded group consists of: (1) country pairs in which neither state is a GATT member, and (2) dyads in which states do not belong to another group included in the analysis (e.g., a PTA).

The results show that the effects of the GATT on trade by membership type converge when accession and colonial status are not conflated. In the text, I express the coefficients on the dichotomous variables as the percentage change in trade (i.e., e^{β}–1) relative to the excluded group. Trade between members of the formal-dyad group other than those with colonial ties increases by about 45%.[18] For the mixed-dyad and NMP group, the corresponding statistics are 43% and 49%. No pair-wise difference between the groups is statistically significant.[19] As

17 Including a control for the advent of the WTO and extending the analysis through 2004 does not alter these results.

18 Unless noted otherwise, the p-values of all estimates I report below are $\leqslant 0.05$.

19 The p-value for both the difference between formal and NMP pairs and for formal and mixed dyads is 0.67; it is 0.57 for the difference between mixed and NMP dyads.

expected, members of an existing colonial empire trade slightly more than twice as much with each other as do states in the excluded group. Joining the GATT, however, has no statistically significant impact on either their trade (p-value = 0.23) or on that between former colonies (p-value = 0.79). Thus, consistent with Goldstein *et al.*'s intuition, mode of accession, independent of colonial ties, does not affect trade between GATT members.

Market-failure theory

To test the predictions of market-failure theory, I first disaggregate states into industrial and nonindustrial countries. As in earlier studies, I assign states to industrial status based on the International Monetary Fund (IMF) definition of them. In the industrial-country group are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, the United Kingdom, the United States, and Yugoslavia (until 1992).[20]

I assign the five largest among them, defined in terms of GDP, to the core group. The relative size of Britain, France, Germany, Japan, and the United States enables each of them to wield considerable market power, making them likely candidates for the role of principal supplier. Accordingly, I create a variable that assigns a value of one to core-group states; it is zero otherwise (*core states*). All other industrial-country pairs (*other-industrial-states*) are in another group. It includes, for example, a dyad composed of Austria and Switzerland, as well as a Britain–Austria pair. In the third group are all other country pairs – i.e., those that include either one industrial country and one developing state or two developing countries (*nonindustrial dyads*).

I then interact each of these groups with GATT/WTO membership (e.g., *core-state members*). The core-member group includes 1,082 dyads, about one-half of 1% of regime member dyads.[21] There are about 23,000 other-industrial country pairs in the regime, representing about 10.5% of its members. As each of the three base-group terms (e.g., industrial states) is collinear with the dyadic-fixed effects, they drop out of the analysis. Nonindustrial states account for by far the largest share of regime members.[22]

As is standard, I also control for dyads in which only one state is a GATT/WTO member. However, because the logic of market-failure theory implies that free

20 The IMF replaces Yugoslavia with its successor states beginning in 1992. Thus, I include Yugoslavia in the industrial-country group only through 1991.

21 Gowa and Kim (2005) include Canada and exclude Japan from their 'privileged' group. However, Japan's GDP exceeds that of Canada and other core states (except for the United States) for almost all years in the sample. Canadian output is consistently below that of any other core-group member.

22 Disaggregating this group into industrial countries paired with a developing country and developing countries paired with each other shows that no statistically significant difference exists between them (p-value = 0.13).

Table 2. The Impact of the GATT/WTO on Trade, 1946–2004

	(1)	(2)
Core-state members	1.40 (0.21)	1.41 (0.21)
Other industrial-state members	0.81 (0.07)	
core-small		0.98 (0.10)
small-small		0.76 (0.08)
Nonindustrial-state members	0.32 (0.03)	
Onein/industrial dyads	0.38 (0.07)	
Onein/other dyads	0.19 (0.03)	
Reciprocal PTA	0.32 (0.02)	
Nonreciprocal PTA	−0.06 (0.03)	
GSP	−0.08 (0.02)	
Currency union	0.51 (0.09)	
Empires	0.81 (0.21)	
Former colonies	−0.02 (0.11)	
GDP	0.65 (0.01)	
Population	0.04 (0.03)	
R^2	0.84	
N	373,728	

Note: Regressand: logged bilateral trade flows measured in 1967 U.S. dollars. Directed dyad and year fixed-effects analysis using *areg* in Stata 11 with robust standard errors clustered on directed dyads in parentheses. The analysis in col. 2 includes controls for one in dyads, PTAs, currency unions, GSPs, colonies, GDP, and population but I do not report them here.

riding will privilege industrial states in this group, I subdivide these '*onein*' dyads into two groups: (1) pairs of industrial states (*onein/industrial dyads*), and (2) all others (*onein/otherdyads*). In the first of these groups, for example, are France and Spain before 1963 and Britain and Portugal before 1962. Country pairs in which neither state is a regime member are in the base group, provided that they are not members of any other group included as a control variable (e.g., GSP signatories).

In Table 2, I report the result of an analysis of bilateral trade between 1946 and 2004 that includes the variables indicating each group and all other covariates standard in the literature – that is, membership in PTAs, whether unilateral or not, GSPs, and currency unions; the logged product of the population of each country in each pair in each year; and indicators for states with current or former colonial ties.[23] As is standard, I also include the logged product of the gross domestic

23 The post-colonial variable in this and other analyses below does not drop out because Hong Kong becomes a colony of China only in 1997. Thus, the Hong Kong–China dyad switches from zero to one in 1997. The Hong Kong–British dyad is collinear with the dyadic fixed effects because it is an existing British colony until 1997 and a former British colony thereafter.

product (GDP) of each country in each pair in each year, as well as directed-dyad and year fixed effects. The model I estimate is:

$$\begin{aligned}\ln(imports)_{ijt} = {} & \alpha + \beta_1(core\text{-}state\ members)_{ijt} + \beta_2(other\text{-}industrial\ state\ members)_{ijt} \\ & + \beta_3(nonindustrial\text{-}state\ members)_{ijt} + \beta_4(onein/industrial\ dyads)_{ijt} \\ & + \beta_5(onein/other\ states)_{ijt} + \beta_6(reciprocal\ PTAs)_{ijt} \\ & + \beta_7(unilateralPTAs)_{ijt} + \beta_8(currencyunion)_{ijt} + \beta_9(GSP)_{ijt} \\ & + \beta_{10}(empires)_{ijt} + \beta_{11}(formercolonies)_{ijt} + \beta_{12}(\ln(GDP_i * GDP_j))_t \\ & + \beta_{13}(\ln(pop_i * pop_j))_t + \mu_i + \sum \delta_t\ \text{year}_t + \varepsilon_{ijt}\end{aligned} \tag{1}$$

The results in the first column of Table 2 are consistent with market-failure theory. They show that the regime exerts its strongest impact on core-state trade: their bilateral imports are three times as high as are those between states in the excluded group. Trade between states in the other-industrial group is significantly smaller than is that of core-group trade, but it is still more than twice as large as trade between countries in the excluded group. The corresponding statistic for other member pairs is about 38 %. The difference between each treatment group and the base group is statistically significant, and pair-wise comparisons show that the differences between the groups themselves are also significant.

The results in Table 2, col. 1, also show that the effect of industrial-country status extends to dyads in which only one country is a GATT/WTO member. Trade between states that are both developed countries, only one of which adheres to the regime, is about 46 % higher than is trade between base-group members. As a whole, the results of this analysis are consistent with the claim that market-failure theory makes about the dominance of large industrial states in the postwar regime, as well as with their inability to preclude free riding by smaller states with similar relative factor endowments.[24] This does not, of course, exclude the possibility that the data are also consistent with other theories that generate similar predictions about the impact of the regime on its members.

Table 2 also makes clear that dyadic income exerts a large, positive, and significant impact on bilateral trade flows and that country groups other than the GATT/WTO also affect trade. Most notably, dyads that include two members of existing colonial empires trade more than twice as much with each other as do states in the base group. The corresponding statistics for reciprocal PTAs and currency unions are about 40 % and 65 %, respectively. In contrast, both unilateral PTAs and GSPs exert small negative effects on trade (p-values $= 0.054$ and $\leqslant 0.0001$, respectively). These results are similar to those of other studies.

24 These results are robust to restricting the sample to the years before the WTO replaced the GATT, to including the EU as a regressor, and to adding Canada to the core group.

The logic of market-failure theory and the GATT/WTO practices consistent with it suggest that trade expansion may also vary across the two subsets of states that the 'other industrial' group subsumes. Because each core state sought to extract compensation for any benefits its tariff cuts endowed on smaller industrial states, trade should expand to a larger extent between core states and smaller industrial countries than between the latter. To test this idea, I divide the set of other industrial-country regime members into two groups: (1) core states paired with relatively small industrial countries (*core-small*), and (2) small industrial states paired with each other (s*mall-small*).

Table 2, col. 2, reports the results of an analysis that includes variables indicating each of these groups. In the interest of clarity, I report only the estimates on the industrial-group variables; other estimates are identical to those in the first column. As before, core-group trade increases relative to that of the excluded group by a factor of three. Trade between members of other industrial-country pairs varies as market-failure theory implies: it increases by about 165% in the case of core-small state pairs and by about 115% in the case of smaller industrial countries paired with each other. The difference between these two effects is both substantively large and statistically significant.

Thus, the evidence that Table 2 presents is consistent with the prediction of market-failure theory that regime effects will vary systematically both among industrial countries and between industrial countries and developing countries. While the most dramatic trade expansion occurs between core states, trade also expands by progressively smaller but still sizeable amounts in cases in which member-country dyads include either one large and one relatively small industrial country or two relatively small industrial countries.

Security externalities

Market-failure theory does not predict, however, the impact that the GATT/WTO exerts on developing-country trade. Table 2 shows that trade between members of dyads that include at least one developing-country is 38% higher than is trade between states in the excluded group. Although recent work shows that some developing countries do exert market power with respect to some goods (e.g., Broda *et al*., 2008), it is clear that these states were not central players in the tariff bargaining that occurred under the auspices of the postwar regime.

To examine whether the theory linking security and trade can help to better explain the developing-country result, I first create a variable that takes on a value of one when both states in a country pair are allies (*allies*). To do so, I use data from Brett Ashley Leeds's Alliance Treaty Obligations and Provisions (ATOP) data set.[25] I code states as allies if they are signatories of a formal agreement in which they pledge 'to cooperate against military threats'.[26] As the ATOP data end

25 http://atop.rice.edu.

26 This includes defense, offense, and consultative pacts (ATOP Codebook, 65).

Table 3. The Impact of the GATT/WTO and Alliances on Trade, 1946–2003

	(1)	(2)	(3)
Core-state members	1.35 (0.22)	1.35 (0.22)	1.35 (0.22)
Core-state members and allies	−0.02 (0.22)	−0.02 (0.22)	−0.04 (0.22)
Other industrial-state members	0.78 (0.07	0.78 (0.07)	0.77 (0.07)
Other industrial-state members and allies	0.01 (0.07)	0.00 (0.07)	0.00 (0.07)
Nonindustrial-state members	0.28 (0.04)	0.27 (0.04)	0.27 (0.04)
Nonindustrial-state members and allies	0.26 (0.04)	0.27 (0.04)	0.27 (0.04)
De facto members		0.09 (0.03)	
De facto members and allies		−0.35 (0.11)	
Allies	0.12 (0.05)	0.12 (0.05)	0.15 (0.05)
Former allies and GATT members			0.18 (0.09)
Former allies and nonmember states			−0.04 (0.10)
R^2		0.83	
N		371,705	

Note: Regressand: logged bilateral trade flows. Directed dyad and year fixed-effects analysis using *areg* in Stata 11 with standard errors clustered on directed dyads in parentheses. Controls for PTAs, currency unions, GSPs, current and former colonies, GDP, and population included but not reported.

in 2003, the analyses here do so as well. I interact the ally term with each of the three GATT member terms – pairs of core states, other-industrial countries, and nonindustrial country pairs. The predictions I test are that: (1) allies trade more with each other than do states in the excluded group, and (2) GATT/WTO membership will increase trade between allies when at least one of them is a developing country.

The results in the first column of Table 3 show that the data are consistent with the theory. Allies trade about 13% more with each other than do base-group members, a statistically significant difference. Joint membership in an alliance and in the trade regime has a sizeable and statistically significant impact on trade only in cases involving a developing country. Dual allegiance raises trade in these cases by about 30%, an impact slightly larger than regime membership alone and more than twice as large as alliance ties alone.[27] As such, trade involving developing countries that are allies and regime members is almost twice that of other states in the same GATT/WTO member (i.e., nonindustrial-country) group.[28] As the theory about security externalities predicts, the effect of joint membership is actually negative though insignificant in groups that include either core-state members (p-value = 0.93) or other industrial states (p-value = 0.91).[29]

27 This is the exponentiated coefficient on the variable that interacts nonindustrial-country allies and GATT/WTO membership.

28 This is the sum of the coefficients on three variables: nonindustrial GATT/WTO member dyads, allies, and the relevant interaction term (i.e., nonindustrial-state members and allies).

29 These results are robust to including the EU as an independent variable, adding Canada to the core-member group, and restricting the analysis to the years preceding the advent of the WTO.

That it is the GATT/WTO insurance mechanism that matters in these cases emerges more clearly if I distinguish member states based on their ability to avail themselves of it. While NMPs enjoyed most basic rights, the *de facto* members among them – i.e., the newly independent states that joined the regime without completing a formal accession protocol – did not have the 'right to assistance in resolving disputes between themselves and contracting parties' (Goldstein *et al.*, 2007b: 42, n 15). In these cases, the logic of the security-externalities argument implies that the interaction between regime membership and alliance ties should not exert any additional impact on trade.

To test whether membership in both alliances and the regime affects trade when states do not have access to the DRM, I add to the analysis a variable that assumes a value of one in instances in which GATT/WTO dyads include at least one *de facto* member, as well as a variable that interacts these dyads with the alliance variable. Because all *de facto* members are former colonies, they are a subset of nonindustrial dyads. The results in Table 3, col. 2, are consistent with the theory. They show that regime membership does not affect trade between allies when either is a *de facto* member (p-value = 0.85).[30] Thus, regime membership enhances the impact of alliances only if the states they link can access the insurance against reneging it provides.

Finally, the theory implies that the effect on trade of alliance termination should vary with regime membership – that is, trade should decline as alliances end only if the states they linked are not GATT/WTO signatories. Table 3, col. 3, reports the results of an analysis that distinguishes between former allies on this basis. It includes a variable that assumes a value of one when former allies are regime members and another variable that takes on a value of one in other cases of former allies. The results show that no change in trade occurs between former allies if they are regime members (p-value = 0.30). Former allies that are not regime members trade significantly less, however, than former allies and regime members. These results are consistent with the existence of a mechanism that promotes trade by helping to insure developing countries against the reneging that can ensue when alliances end.

Conclusion

Taking into account both the economics and politics that produced and affected the operation of the GATT/WTO creates a very different picture of its impact than do existing studies. The analyses here are consistent with the predictions of market-failure theory. They show that the bargaining that occurred under the auspices of the postwar trade regime system privileged trade between its largest industrial-country members. As a consequence of the MFN clause, the tariff cuts these states

30 This is the p-value of the sum of the coefficient on the variable that interacts nonindustrial-member dyads and allies and of the coefficient on the term that interacts *de facto* members and allies.

made also allowed trade to flourish to a smaller but still substantial amount between large and small industrial countries and between the smaller industrial countries themselves.

A comparable increase in trade involving developing countries occurs only in cases which reflect the play of politics in an anarchic international system. Absent its imprint, small countries are vulnerable to hold up if their firms sink costs into exporting. In its presence, it is possible for destination countries to credibly commit not to raise their tariffs ex post. Although waning alliance ties recreate a time-consistency problem, small countries can insure themselves against the risk of reneging in this event when they can access the DRM that regime membership makes possible.

Thus, two processes seem to have governed trade expansion under the auspices of the postwar regime. In one, the GATT/WTO seems to have facilitated the ability of large states to escape the 'bad' equilibrium outcome that a single-shot PD game inevitably produces. In the other, the regime enabled small-state allies to reduce the risk associated with production for export. As such, this paper suggests that considerable value added inheres in an analysis of the postwar trade regime that takes into account the economics and politics that both created it and influenced its operation.

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