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Trade Policy Implications of a Changing World: Tariffs and Import Market Power

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ABSTRACT: Economic theory suggests that countries' tariff commitments in trade agreements reflect their import market power at the time of negotiations. However, as countries grow, their market power in different sectors can change in unforeseen ways and their commitments may no longer reflect changed economic conditions. Using a newly built dataset of pre-Uruguay Round applied tariffs and relying on the theoretical framework of the terms-of-trade motive for trade agreements, we estimate hypothetical tariff commitments under current levels of market power and compare them with actual tariff commitments. We find that lower tariff commitments required to reflect current economic conditions would amount to a reduction in annual tariff costs of up to $26.4 billion – equivalent to nearly 10% of global tariff costs. Our results reveal substantial heterogeneity between countries and sectors. The sectors with the largest potential tariff cost reductions are vehicles (HS 87) and machinery and appliances (HS 84-85). Product-level tariff reductions would range from 0 to 18.5 percentage points and are on average largest for China. In the past, the GATT/WTO system has updated tariff commitments through periodic rounds of negotiations, and our findings support the revival of the WTO's negotiation function in this area.

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WORKING PAPERS

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Contents

Introduction

The main motivation for countries to join the WTO is their conviction that WTO membership will increase trade, help their economic development and foster economic growth. The WTO was created in 1995 based on terms negotiated between 128 original members. Subsequently, 36 new members have acceded under individual terms and conditions negotiated with existing members. Countries' import market power has been shown to be a key determinant of these terms and conditions (Bagwell and Staiger, 2011; Beshkar, Bond, and Rho, 2015; Beshkar and Lee, 2022). While GATT-WTO rounds of negotiation are seemingly static, the world is dynamic. As countries develop, their share of world trade in different products will inevitably change, and so will their ability to affect world prices. This would imply that recurring rounds of trade negotiations would be helpful to maintain commitments at mutually acceptable levels or that commitments be conditioned on some measure of import market power. To our knowledge, we are the first to make this point in the economic policy literature, which has important implications for how multilateral rounds or commitments should be designed, and from a theoretical perspective, how these negotiations should be modelled.

Relying on a model by Bagwell and Staiger (2011) – arguably the most rigorous theoretical framework explaining countries' participation in international trade agreements – we provide novel estimates on the extent to which import market power has influenced tariff commitments for a set of original and acceded WTO members. We make use of a new dataset of pre-Uruguay Round applied tariffs in addition to standard data sources. Based on these estimates, we predict the commitments that might have been negotiated under current levels of market power. We estimate that tariff cuts required to reflect current economic conditions would amount to a reduction in annual tariff costs of up to $26.4 billion. Our results reveal substantial heterogeneity between countries and sectors. The sectors with the largest potential tariff cost reductions are vehicles (HS 87) and machinery and appliances (HS 84-85). Product-level reductions would range from 0 to 18.5 percentage points, with China featuring the largest average reductions.

Given the strong support in the literature for the importance of import market power in determining tariff bindings, we further argue that continuous rounds of trade negotiations are necessary owing to shifts in market power over time that, in part, may be endogenously determined by earlier rounds of liberalisation. Opening up to trade changes a country's pattern of specialisation and opens up potential for structural transformation at a pace and manner which are often difficult to predict. This implies that terms-of-trade externalities can arise in products where tariffs were initially set at a cooperative level.

Many countries have benefitted greatly from expanded market access opportunities after joining the WTO and their rapid economic growth and development has exceeded expectations (Tang and Wei, 2009; Larch et. al, 2019). As they have developed, their import market power has increased for certain products, while domestic production expanded for others. Given members' evolution of market power, existing commitments may cease to adequately reflect potential terms-of-trade externalities. Absent further adjustments, trade tensions and policy uncertainty may increase, reflecting growing incentives by all countries to deviate from the cooperative equilibrium. Those with increased market power may wish to raise tariffs to enjoy greater terms-of-trade improvements, although in practice this is mitigated by relatively high existing tariffs; the rest may wish to use higher tariffs as leverage in negotiations. Some observers have viewed the Trump administration’s unilateral tariff increases in 2018 as bargaining tariffs, with the goal of inducing trading partners to reduce their tariffs (Mattoo and Staiger, 2020; Sheldon, 2022). Interestingly, our estimated reduction in US trading partners’

annual tariff revenue necessary to neutralize terms-of-trade externalities is of comparable magnitude to US annual tariff revenue increases between 2018 and 2019.

The GATT/WTO system has usually addressed such situations (and the possible build-up of trade tensions) through periodic "rounds" of negotiations seeking to reflect new market realities (Baldwin and Robert-Nicoud, 2015). Seven rounds prior to the Uruguay Round principally involved like-minded developed countries and had as their objective to substantially reduce tariffs and to eliminate preferences (WTO, 2007). Table 1 shows the resulting incremental tariff reductions. These rounds of negotiations have helped to rebalance commitments. However, no new rounds have been concluded since 1995. The WTO has added members through the rigorous Article XII accessions process, creating possible asymmetries between the tariffs of these new members and those that joined before (Subramanian and Wei, 2007; Tang and Wei, 2009). At the same time, the last two decades have witnessed significant and unforeseen changes in the shares of world trade across countries. This paper provides further empirical support for the continuing importance of the WTO's negotiating function in light of recent developments.

Table 1: Past rounds of tariff reductions

GATT/WTO – 60 years of tariff reductions
(MFN tariff reduction of industrial countries for industrial products (excl. petroleum))

Implementation Period	*Round covered*	*Weighted tariff reduction (%)*	*Weights based on MFN imports (year)*
1948	Geneva (1947)	-26	1939
1950	Annecy (1949)	-3	1947
1952	Torquay (1950-51)	-4	1949
1956-58	Geneva (1955-56)	-3	1954
1962-64	Dillon Round (1961-62)	-4	1960
1968-72	Kennedy Round (1964-67)	-38	1964
1980-87	Tokyo Round (1973-79)	-33	1977(or 1976)
1995-99	Uruguay Round (1986-94)	-38	1988(or 1989)

Note: Tariff reductions for the first five rounds refer to the United States only. The calculation of average rates of reductions are weighted by MFN import values.
Source: WTO (2007).

The rest of the paper is organised as follows: Section 2 reviews the relevant literature, Section 3 describes the data, including a new, unpublished database on applied tariffs before the conclusion of the Uruguay Round. We also provide descriptive statistics of the main variables used in the regression analysis. In Section 4, we present our empirical model and estimation results. Section 5 presents the results of our counterfactual exercise on what tariff bindings might have looked like under present day market power conditions. Section 6 concludes.

Literature Review

Why is import market power important for trade policy? As WTO members grow their economies, they may become significant buyers of certain products on the world market and able to influence the world price. This creates an incentive to use trade policy to take advantage of potential terms-of-trade gains (Johnson, 1953; Grossman and Helpman, 1995; Bagwell and Staiger, 1990, 2002, 2010, 2011). A large enough importing country may apply tariffs to drive down the world price net of tariffs, as the burden of trade taxes is shared between the consumers in the importing country and the producers in exporting countries. This can benefit the country imposing the tariff at the expense of exporting countries, as it is able to import more for the same amount of exports. In other words, its tariff action has a negative externality on its trading partners' terms-of-trade.

However, if all countries acted on this impulse, terms-of-trade gains would cancel each other out, leaving everyone worse off, with higher tariffs and less overall trade. It follows that cooperation to escape this prisoner's dilemma, in the shape of trade agreements, is mutually beneficial. Indeed, Bagwell and Staiger (2002, 2010) argue this is the principal purpose of trade agreements: they define a cooperative equilibrium where mutually agreed maximum or "bound" tariff levels act to internalise terms-of-trade externalities.[1] One might then ask why do GATT/WTO negotiations place the emphasis on market access rather than terms-of-trade. Bagwell, Mavroidis, and Staiger (2002) point out the negative externality generated by an import tariff can be equivalently interpreted as a terms-of-trade loss or a restriction of market access; concern about the impact of foreign market access restrictions on the price received by domestic exporting firms is in fact concern about their terms-of-trade effects.

But how exactly is import market power related to bound tariffs? Bagwell and Staiger (2011) start by showing that in a setting without political economy motives (even though not quite realistic), a trade agreement fully internalises import market power based terms-of-trade externalities and politically optimal bindings are zero (i.e. uncorrelated with market power). However, when governments have political economy motives, their model implies that the reduction from pre-negotiation tariff levels is proportional to pre-negotiation import levels,[2] with new (generally non-zero) bound levels being also inversely correlated with the latter when controlling for the former.[3] The authors then show empirically, using a sample of 16 acceded WTO members, that in line with their model, bindings are determined by pre-accession imports and tariff levels.

Other studies have confirmed the role of terms-of-trade for tariff setting. Broda, Limão, and Weinstein (2008) show that importers that have market power use it in setting noncooperative trade policy, like in the case of tariffs prior to WTO or in areas not covered by cooperation. Beshkar, Bond, and Rho (2015) confirm for a sample of 108 WTO members that both optimal bindings and flexibility (the difference between bindings and

[1] Beyond neutralising terms-of-trade externalities, other economic rationales for trade policy commitments in international agreements include political economy considerations, making credible commitments vis-à-vis domestic constituencies, internalising production relocation and environmental externalities, and reducing trade policy uncertainty.

[2] When demand and supply are non-linear, this becomes a more general term capturing international cost-shifting motives.

[3] The reasoning is that with political economy factors at play, governments face additional resistance in reducing tariffs, and so mutually agreed reductions are more concentrated in sectors where the externalities (due to import market power) are largest.

applied tariffs) are inversely related to importer market power.[4] In their model, countries negotiate ceiling bindings above their applied tariffs to retain a certain flexibility to address shocks in a world with asymmetric information across countries.

Data and Empirical Strategy

We take data on trade flows from the UN Comtrade database. Data on applied tariff rates and WTO binding commitments are taken from various WTO sources.[5] WTO bindings are taken from the WTO CTS database and are based on member countries' schedules of accession. Applied tariffs in force before the conclusion of the Uruguay Round are taken from a hitherto unreleased database available to us, but not yet processed or included in the WTO's IDB database. These data are available at tariff line level for 74 GATT members for various years between 1988 and 1996. Applied tariffs in force prior to WTO accession of members that joined after the Uruguay Round are taken from the WTO IDB database, as are applied tariffs currently in force. Data in different HS versions are concorded using conversion tables from UN Statistics Division. Our analysis is at the six-digit HS subheading level, the closest available proxy for product markets. We refer the reader to Appendix A for the years used for each member in our estimation samples. Our final sample, determined by the availability of data from the four above mentioned databases, includes 31 Uruguay Round participants and 10 subsequent accessions, covering all G20 economies except Argentina.

Our data also reveals substantial heterogeneity across countries and industries in terms of their evolution of world import shares, and hence of changes in import market power. While it is reasonable to anticipate changes from trade liberalisation, the exact path and timing of these changes are difficult to foresee. Figure 1 uses emerging markets such as Brazil, China, Mexico and Viet Nam as examples to illustrate how world import shares may shrink or grow as a country develops.

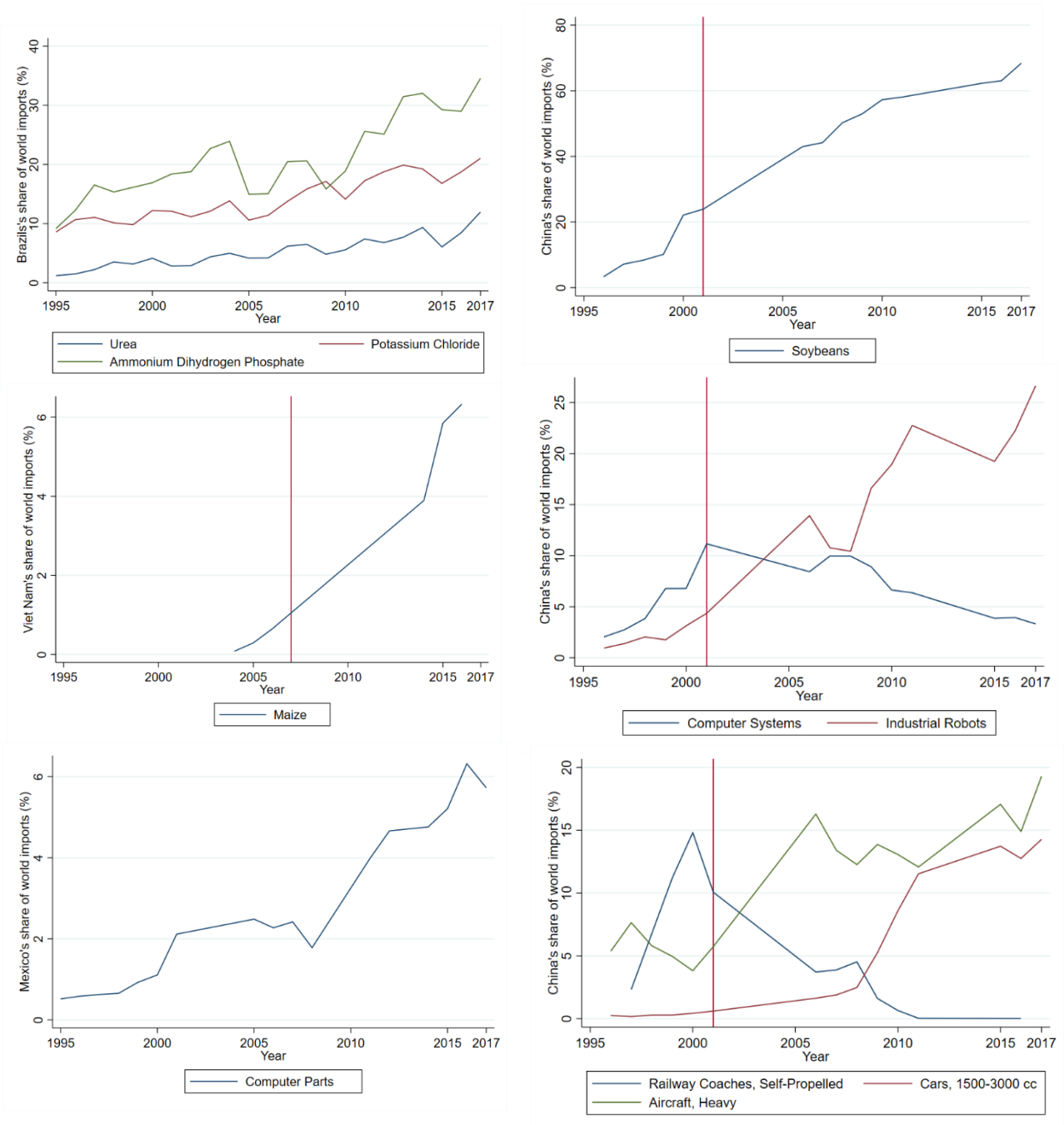
For example, as Brazil’s agricultural output has expanded, it has gained significant market shares in key fertilizer imports. Meanwhile China’s share of soybean imports has risen from around 5% to 70% in just two decades, notably also due to an increased demand for animal feed as meat consumption has risen. Likewise, Viet Nam’s share of maize imports has risen from around 0% to over 6% since its WTO accession.

Other signs of China’s development and a growing middle class are its share of car imports, which has risen from around 0% to 15% and its share of heavy aircraft imports, up from 5% to 20%. Chinese manufacturing has also grown in technological sophistication and its share of industrial robot imports has grown from around 0% to over 25%. Mexico, on the other hand, has become increasingly active in assembly stages of global value chains, its share of computer parts imports up from under 1% to around 6%. However, as domestic industries develop, import shares may shrink. For example, China’s share of railway coach imports has risen first from 2.5% to 15% before shrinking to 0% over the same period, with a similar pattern found for computer systems.

[4] The intuition for this is twofold. First, there is a demand for flexibility in the agreement to accommodate preference shocks, but as terms-of-trade externalities are higher in sectors with greater importer market power, flexibility entails cumulatively greater externalities as shocks arise in these sectors. Therefore, an optimal agreement will balance the demand for flexibility with the need to internalise higher externalities through lower bindings in these sectors. Second, for any given level of bindings, unilateral optimal applied tariffs are higher for greater importer market power, implying less flexibility.

[5] Non-ad valorem tariffs are excluded from the dataset.

Figure 1: Evolution of shares of total world imports (1995−2017)



Source: Authors' calculations based on UN Comtrade Database. Vertical line denotes WTO accession year.

Our benchmark empirical specification is equivalent to equation (15a) in Bagwell and Staiger (2011)[6]:

$$\tau_{ic}^{WTO} = \beta_0 + \beta_1 \tau_{ic}^{Pre-WTO} + \beta_2 V_{ic}^{Pre-WTO} + \delta_{HS2(i)} + \lambda_c + u_{ic} \quad (1)$$

In this specification c represents a WTO member, i a tariff line at the HS six digit level, τ_{ic}^{WTO} is the WTO binding, $\tau_{ic}^{Pre-WTO}$ is the pre-WTO applied tariff, $V_{ic}^{Pre-WTO}$ is the pre-WTO value of imports, $\delta_{HS2(i)}$ is an HS chapter level fixed effect, λ_c is a country fixed effect and u_{ic} is the error term.

The upshot of terms-of-trade theory (see Section 2) is the prediction that, given a product's political economy and demand and supply slope parameters, the magnitude of the negotiated tariff reduction $\tau_{ic}^{Pre-WTO} - \tau_{ic}^{WTO}$ is proportional to the potential for generating a terms-of-trade externality, also referred to as international cost-shifting motives, which in the linear case is captured by the ratio of pre-negotiation import volume to world price, proxied by $V_{ic}^{Pre-WTO}$.[7] Rearranging terms yields (1), where the sign of β_2, our main parameter of interest, is expected to be negative.[8] The sign of β_1 is expected to be positive if the pre-WTO political economy considerations that determined $\tau_{ic}^{Pre-WTO}$ prevail.

Estimation Results

Table 2 presents results for Uruguay Round participants by WTO development status and product categories agriculture (AG) and non-agricultural market access (NAMA). The rationale is that political economy and demand and supply characteristics captured by the model parameters may differ and negotiations for AG and NAMA followed separate tracks with different modalities and objectives.

Our novel finding is that the terms-of-trade motive was a significant determinant of developing country NAMA tariff commitments during the Uruguay Round (Column 6).[9] We do not find a significant role for the terms-of-trade motive in the case of developing country AG products or in the case of developed economies during the Uruguay Round. These findings are consistent with the fact that developed countries had decreased their tariffs already over seven prior rounds of negotiations, while developing countries accepted their first meaningful tariff bindings in the Uruguay Round – and this only in NAMA, as the main purpose of AG negotiations was the "tariffication" of quantitative restrictions and not actual tariff constraints. Since WTO bindings cannot take values less than zero, we also confirm that these results are robust to using TOBIT estimation (see Appendix B).

Evaluated at the sample means a ceteris paribus increase in pre-WTO NAMA imports by one standard deviation is predicted to lower bound tariff levels by about 0.5% based on the full sample of developing countries. However, there are large differences across the countries in the sample, ranging from 0.0% to 3.7%.

[6] Bagwell and Staiger (2011) present results of their benchmark specification (15a) in Table 3A.

[7] See equation (11) in Bagwell and Staiger (2011).

[8] Equivalently in Bagwell and Staiger (2011), rearranging equation (11) yields equation (12) (and equation (13) in the non-linear case), the parameters of which can be estimated using regression equations (14a) and (14b), and versions of the former with fixed-effects, (15a) and (15b). We focus our analysis on the benchmark specification (15a) since elasticity data is not available at sufficient disaggregation and country-year coverage to estimate (14b) and world prices are not available at sufficient disaggregation to estimate (15b).

[9] This coefficient is comparable to -0.0044 found by Bagwell and Staiger (2011) for acceded members.

Table 2: OLS regression results for the sample of countries participating in the Uruguay Round

Dependent Variable: WTO binding	(1) Developed All Goods	(2) Developed AG	(3) Developed NAMA	(4) Developing All Goods	(5) Developing AG	(6) Developing NAMA
Pre-WTO tariff	0.676***	0.439***	0.673***	0.241***	0.430***	0.126***
	(0.009)	(0.051)	(0.006)	(0.008)	(0.031)	(0.005)
Pre-WTO import value	0.000	0.000	0.000	0.003	0.037	-0.003***
	(0.000)	(0.001)	(0.000)	(0.002)	(0.032)	(0.001)
Constant	4.161	1.885	0.882***	35.930***	17.230***	25.032***
	(2.992)	(2.636)	(0.143)	(1.746)	(1.619)	(0.451)
Observations	38,987	3,834	35,153	68,753	9,946	58,807
R-squared	0.476	0.414	0.667	0.539	0.533	0.694
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses; *** denotes p<0.01, ** p<0.05 and * p<0.1

Table 3 presents results for members that acceded after the Uruguay Round. Using a sample with little overlap with that of Bagwell and Staiger (2011) we also find that the term-of-trade motive was a significant determinant of their WTO commitments.[10] In line with their results, our coefficient for AG products is an order of magnitude larger in absolute value compared to NAMA products, with aggregate results driven by the latter. These findings are also robust to using TOBIT estimation (see Appendix B).

Evaluated at the sample means a ceteris paribus increase in pre-WTO imports by one standard deviation is predicted to lower bound tariff levels by about 1.0% based on the full sample, 5.5% for AG and 0.8% for NAMA. Given the heterogenous sample, there are large differences across countries, ranging from below 0.1% to 25.0% for AG and 0.0% and 2.6% for NAMA.[11]

While these quantifications provide a useful comparison of our novel findings with the existing literature, they concern a hypothetical one standard deviation difference in imports. In the next section, we focus on the possible implications of actual observed changes in market power which exhibit substantial variation across countries and sectors.

[10] Our sample of 10 acceded members is determined by the availability of pre-accession tariffs in the WTO IDB database which are notified by each member. Our data has only three countries (China, Nepal, and North Macedonia) in common with the 16 acceded members in Bagwell and Staiger (2011), who rely on the UNCTAD TRAINS database for tariffs.

[11] In Bagwell and Staiger (2011) the equivalent figure at the full sample mean is 1.7%.

Table 3: OLS regression results for the sample of countries that acceded to WTO after 1995

Dependent Variable: WTO binding	(1) All Products	(2) AG	(3) NAMA
Pre-WTO tariff	0.455***	0.526***	0.451***
	(0.008)	(0.027)	(0.006)
Pre-WTO import value	-0.001**	-0.019***	-0.001**
	(0.000)	(0.003)	(0.000)
Constant	5.023***	2.142**	3.466***
	(0.720)	(0.886)	(0.287)
Observations	41,160	4,542	36,618
R-squared	0.676	0.619	0.720
Country FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes

Robust standard errors in parentheses; *** denotes p<0.01, ** p<0.05 and * p<0.1

Counterfactual Exercise

We simulate a counterfactual scenario to predict the level of WTO bindings that would have been negotiated had current import market power conditions prevailed at the time of creation of/entry into WTO, using the sample of countries where import market power turned out to be a significant predictor of commitments.

For this purpose, a country's change in market power is given as $\Delta V_{ic} = V_{ic}^{CF} - V_{ic}^{Pre-WTO}$. $V_{ic}^{Pre-WTO}$ denotes pre-WTO imports. For the Uruguay Round, these represent averages over the years 1992-1994 (or closest years, subject to data availability) and for acceded members these are averages over the three years prior to their accession. We define a counterfactual $V_{ic}^{CF} = V_{ic}^{Present}\left(\frac{V_i^{pre-WTO}}{V_i^{Present}}\right)$ where the pre-WTO and current periods are specific to each member and imports are rebased to account for the change in market size. For current imports we use averages over the years 2015-2017 (or closest years, subject to data availability) for all members.

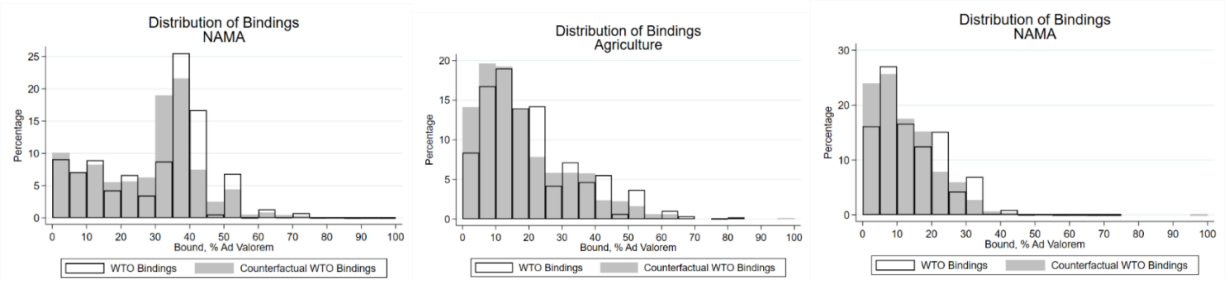
Using estimated model parameters we simulate the gap between the predicted bindings under the counterfactual current import volume and the pre-WTO import volume. This difference $\Delta\widehat{\tau_{ic}^{WTO}} = \tau_{ic}^{\widehat{WTO,CF}} - \tau_{ic}^{\widehat{WTO}} = \widehat{\beta_2}\Delta V_{ic}$ is negative if a member's imports grew in relative terms.

To gauge how binding commitments might be updated as a result of changes in import market power, we propose to calculate a hypothetical new bound rate $\tau_{ic}^{WTO,CF} = \max\{0, \tau_{ic}^{WTO} + \Delta\widehat{\tau_{ic}^{WTO}}\}$, that is, the old bound rate adjusted by the predicted gap, but restricted to values of zero or above. Since the rationale for engaging in new

negotiations is to internalise externalities, bindings need to be updated only when new externalities arise ($\Delta\widetilde{\tau_{ic}^{WTO}} < 0$).

Figure 2: Comparison of actual and counterfactual bindings

(a) Uruguay Round – Developing Members – NAMA (b) Acceded Members – AG (c) Acceded Members – NAMA



Source: WTO, authors' simulations. Country-specific figures available upon request.

On aggregate, changes in import market power imply a shift towards lower tariff bindings for both the Uruguay Round and acceded members (Figure 2). This implies that on average countries are capable of exerting terms-of-trade externalities on their partners and that there could be important gains from negotiating new multilateral tariff reductions.

Product-level reductions for Uruguay Round developing members range from 0 to 10.4 percentage points and for acceded members up to 18.5 percentage points. Table 4 presents the countries and products with the largest implied reductions in each group.

Table 4: Top 5 predicted tariff reductions by country and product

Country	*Sector (HS6)*	*Description*	*Reduction (ppts)*
Acceded Members AG			
China	220421	Wine of fresh grapes, containers of 2L or less	14.0
Viet Nam	100590	Maize (corn)	13.5
China	020329	Meat of swine, fresh, chilled or frozen	12.0
China	020230	Meat of bovine animals, frozen, boneless	12.0
China	240120	Tobacco, unmanufactured, stemmed or stripped	10.0
Acceded Members NAMA			
China	870323	Motor cars, passenger, between 1500cc and 3000cc	18.5
Saudi Arabia	870324	Motor cars, passenger, over 3000cc	3.7
China	901380	Liquid crystal devices, other	3.6
China	870324	Motor cars, passenger, over 3000cc	3.5
China	880240	Aeroplanes and other aircraft, over 15 tons	3.0
Uruguay Round NAMA			
Morocco	854240	Hybrid integrated circuits	10.7
Morocco	852313	Unrecorded media for sound or similar, over 6,5mm	10.1
Venezuela	410422	Bovine leather, pre-tanned	8.3
Mexico	847330	Parts and accessories for data processing machines	7.9
Venezuela	900990	Parts and accessories for photocopying apparatus	7.6

Another way to quantify our results is by their implication for tariff duties paid. To neutralize terms-of-trade externalities requires lower tariff commitments that would amount to a reduction in annual tariff costs of up to $26.4 billion – equivalent to nearly 10% of global tariff costs.[12]

This figure is composed of $4.7 billion in reductions in acceded members' AG tariffs and $14.8 billion in acceded members' NAMA tariffs, and a further $6.9 billion in Uruguay Round developing members' NAMA tariffs.

These reductions are also highly concentrated by sector. Acceded members' AG reductions are 23% in oil seeds and industrial plants (HS 12); 15% in meats (HS 02); and 13% in cereals (HS 10). Their NAMA tariff reductions are even more concentrated, with 59% in vehicles (HS 87); 11% in optical and photo equipment (HS 90); 5% in aircraft (HS 88); and 5% in machinery and appliances (HS 84-85).

Uruguay Round developing members' NAMA tariff reductions are 35% in precious metals (HS 71); 27% in machinery and appliances (HS 84-85); and 16% in vehicles (HS 87).

A sectoral approach to negotiations has practical appeal. While neutralizing terms-of-trade externalities does not necessarily require tariff reductions to come from the same products where import market power has increased, this may have to be the case when tariffs in other sectors are already relatively low or when other sectors do not feature significant import market power. Moreover, reducing tariffs in the externality-generating sector will eliminate the externality going forward and will pre-empt possible future attempts to revisit past deals (that may be effective in offsetting overall terms-of-trade distortions, but not cure the continued incentive to exert externalities in the sectors in question). Sectoral negotiations with a clearly delimited scope and objective (e.g. similar to the Information Technology Agreement (ITA)) may also be easier to conclude and thus be able to address specific sources of trade tensions in a more timely fashion.

Concluding Remarks

In the past 25 years, with the exception of sectoral initiatives such as the ITA, no major tariff negotiations have taken place at the WTO despite remarkable economic growth enjoyed by many countries and resulting changes in import market power. Current trade tensions may in part be a reflection of the terms-of-trade externalities that these shifts in market power entail and of the lack of adjustment of existing tariff commitments.

Changes in import market power have often been unforeseen and are heterogenous at the sectoral level. This would suggest that (i) rather than attempting all-encompassing rounds of tariff negotiations, the WTO could provide a forum for continuous negotiations in specific areas with periodic stock-takes of concrete outcomes achieved; (ii) rather than applying horizontal tariff-cutting formulae, new tariff bindings could be negotiated in a manner that is tailored to the specific sectoral situation; and/or (iii) negotiated tariff commitments in the form of fixed ceiling rates could be replaced by formula-type commitments that account for import market power.

[12] $\sum_{ic}\left(\tau_{ic}^{WTO}-\tau_{ic}^{WTO,CF}\right)\times V_{ic}^{Present}$

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Appendix A

Table 1: Data years used in regressions and counterfactual analysis

Uruguay Round Members						
Reporter	*ISO*	*Pre-WTO Tariff Year*	*Recent Tariff Year*	*Developed (WTO)*	*Pre-WTO Imports (Avg) Years*	*Recent Imports (Avg) Years*
Australia	AUS	1988		1	1992, 1993, 1994	2015, 2016, 2017
Brazil	BRA	1989	2018	0	1992, 1993, 1994	2015, 2016, 2017
Brunei Darussalam	BRN	1994	2018	0	1992, 1993, 1994	2015, 2016, 2017
Canada	CAN	1988		1	1992, 1993, 1994	2015, 2016, 2017
Sri Lanka	LKA	1991	2017	0	1992, 1993, 1994	2015, 2016, 2017
Colombia	COL	1991	2018	0	1992, 1993, 1994	2015, 2016, 2017
China, Hong Kong SAR	HKG	1992	2018	0	1993, 1994, 1995	2016, 2017
Iceland	ISL	1988		1	1992, 1993, 1994	2015, 2016, 2017
India	IND	1988	2018	0	1992, 1993, 1994	2012, 2013, 2014
Indonesia	IDN	1989	2017	0	1992, 1993, 1994	2015, 2016, 2017
Jamaica	JAM	1991	2016	0	1991, 1992, 1993	2015, 2016, 2017
Japan	JPN	1988		1	1992, 1993, 1994	2015, 2016, 2017
Kenya	KEN	1994	2018	0	1992	2010, 2013, 2017
Rep. of Korea	KOR	1988	2018	0	1992, 1993, 1994	2015, 2016, 2017
China, Macao SAR	MAC	1991	2018	0	1992, 1993, 1994	2014, 2015, 2016
Malawi	MWI	1992	2017	0	1990, 1991, 1994	2013, 2014, 2015
Malaysia	MYS	1988	2017	0	1992, 1993, 1994	2015, 2016, 2017
Mexico	MEX	1988	2018	0	1992, 1993, 1994	2015, 2016, 2017
Morocco	MAR	1993	2017	0	1993, 1994	2014, 2015, 2016
New Zealand	NZL	1991		1	1992, 1993, 1994	2015, 2016, 2017
Norway	NOR	1988		1	1993, 1994	2015, 2016, 2017
Singapore	SGP	1989	2018	0	1992, 1993, 1994	2015, 2016, 2017
South Africa	ZAF	1988	2018	0	1992, 1993, 1994	2013, 2014, 2017
Switzerland	CHE	1988		1	1992, 1993, 1994	2015, 2016, 2017
Thailand	THA	1988	2017	0	1992, 1993, 1994	2014, 2015, 2016
Trinidad and Tobago	TTO	1992		0	1992, 1993, 1994	2013, 2014, 2015
Tunisia	TUN	1989	2016	0	1992, 1993, 1994	2015, 2016, 2017
Turkey	TUR	1989	2016	0	1992, 1993, 1994	2015, 2016, 2017
USA	USA	1989		1	1992, 1993, 1994	2015, 2016, 2017
Venezuela	VEN	1990	2016	0	1994	2011,2012, 2013
EU Members Since 1995	E95	1988		1	1994	2015, 2016, 2017

Acceded Members						
Reporter	*ISO*	*Pre-WTO Tariff Year*	*Recent Tariff Year*	*Accession Year*	*Pre-WTO Imports (Avg) Years*	*Recent Imports (Avg) Years*
China	CHN	2001	2017	2001	1999, 2000, 2001	2015, 2016, 2017
Lao People's Dem. Rep.	LAO	2008	2018	2013	2010, 2011, 2012	2014, 2015, 2016
North Macedonia	MKD	2002	2017	2003	2000, 2001, 2002	2015, 2016, 2017
Mongolia	MNG	1996	2018	1997	1996, 1997	2014, 2015, 2016
Nepal	NPL	2003	2017	2004	2000, 2003	2015, 2016, 2017
Russian Federation	RUS	2011	2016	2012	2009, 2010, 2011	2015, 2016, 2017
Saudi Arabia	SAU	2004	2018	2005	2002, 2003, 2004	2014, 2015, 2016
Ukraine	UKR	2007	2018	2008	2005, 2006, 2007	2015, 2016, 2017
Viet Nam	VNM	2006	2018	2007	2004, 2005, 2006	2014, 2015, 2016
Samoa	WSM	2011	2016	2012	2009, 2010, 2011	2015, 2016, 2017

Appendix B

Table 1: TOBIT regression results for the sample of countries participating in the Uruguay Round

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: WTO binding	Developed All Goods	Developed AG	Developed NAMA	Developing All Goods	Developing AG	Developing NAMA
Pre-WTO tariff	0. 899***	0.879***	0.813***	0.235***	0.451***	0.125***
	(0.014)	(0.072)	(0.008)	(0.008)	(0.033)	(0.005)
Pre-WTO import value	0.000	-0.001	0.000	-0.001	0.060	-0.005***
	(0.000)	(0.002)	(0.000)	(0.003)	(0.049)	(0.001)
Constant	-3.021	-14.62***	-4.253***	36.93***	13.96***	25.22***
	(4.860)	(5.480)	(0.347)	(1.982)	(2.025)	(0.502)
Observations	38,987	3,834	35,153	68,753	9,946	58,807
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses; *** denotes p<0.01, ** p<0.05 and * p<0.1

Table 2: TOBIT regression results for the sample of countries that acceded to WTO after 1995

	(1)	(2)	(3)
Dependent Variable: WTO binding	All Products	AG	NAMA
Pre-WTO tariff	0.489***	0.554***	0.483***
	(0.008)	(0.028)	(0.006)
Pre-WTO import value	-0.002**	-0.020***	-0.001**
	(0.001)	(0.003)	(0.001)
Constant	4.504***	1.093	2.628***
	(0.772)	(0.992)	(0.310)
Observations	41,160	4,542	36,618
Country FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes

Robust standard errors in parentheses; *** denotes p<0.01, ** p<0.05 and * p<0.1

Data Availability

The data underlying this article were provided by UN Comtrade and WTO under licence or by permission. Data will be shared upon request to the corresponding author exclusively for the purpose of replication.

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