2 What's Left for the WTO?

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2.1 Introduction

While the WTO may seem ubiquitous, in reality there have been substantial segments of the international trading system that remain seemingly untouched by its reaches. This chapter utilizes the lens of the terms-of-trade theory of trade agreements and insights from recent empirical developments to investigate three of these areas in particular. First, as of 2013, roughly three dozen countries remained WTO nonmembers. The people living in these countries do not enjoy the basic rights and obligations of the multilateral system for all the products that they might trade. Second, another 25 countries have now been full WTO members for more than 20 years and yet their governments have not taken on even the minimum legal commitment of binding the upper limit of their import tariffs for more than two-thirds of manufactured products. Third, even among the WTO members that have legally bound their tariffs, another 45 countries have committed to binding rates that convey limited economic meaning. On average, the binding commitments are more than 15 percentage points above these countries' applied Most Favored Nation (MFN) tariff rates; put differently, these countries could immediately and permanently raise their applied MFN tariffs by an average of 400% with only minimal notification to other WTO members and with no required compensation. Combined, more than 3.5 billion people live under one of these three sets of conditions in what are predominantly developing countries.

I highlight and choose to investigate these three areas given the crossroads at which the WTO found itself even before the more recent challenges threatening the system.[1] On the one hand, trade negotiators seemed to have moved beyond the WTO. The Doha Round was a failure, albeit its weaknesses may be at least partially laid at the feet

of those who established the Doha negotiating agenda in 2001.[2] Many have argued that the agenda and approach were fundamentally unfit to deliver any sort of successful outcome along the lines of the previous institutional and reciprocal negotiating frameworks that the GATT had repeatedly delivered over eight previous rounds and more than 50 years of negotiations (Bagwell and Staiger 2014).[3]

Perhaps more threatening to the stasis that plagued the WTO, however, was that many important WTO members had already turned their negotiating efforts away from the multilateral system and toward something else. This included moving away from the GATT/WTO's historical "shallow" integration approach of negotiating over tariffs and market access in favor of the "deeper" integration and direct negotiation over behind-the-border policy instruments through the "megaregional" negotiations of the Trans-Pacific Partnership (TPP) and Transatlantic Trade and Investment Partnership (T-TIP), as well as a potential Regional Comprehensive Economic Partnership (RCEP) or Free Trade Area of the Asia-Pacific (FTAAP) (Bagwell, Bown, and Staiger 2016).[4] Shifting away from the WTO and toward these megaregional efforts was at least initially led by both historical champions of the multilateral system, such as the United States, European Union, and Japan, and other recent and chief beneficiaries, such as China.[5]

On the other hand, the economics literature has made improved strides toward understanding some of the core microeconomic and institutional underpinnings behind what has facilitated the GATT/WTO's relatively successful achievement of reaching and sustaining levels of import tariffs that were historically low, despite massive macroeconomic shocks to the system (Bown 2011a). In particular, the terms-of-trade literature of trade agreements, most closely associated with the theoretical developments introduced by Bagwell and Staiger (1999, 2002), as well as the inaugural empirical work of Broda, Limão, and Weinstein (2008), has ushered in a number of recent theoretical and empirical advancements. In section 2.2, I survey key aspects of this literature that had significantly helped clarify determinants of trade policy under the multilateral system. Many of these insights interpret the WTO as coordinating policies for countries seeking to address the prisoner's dilemma outcome of terms-of-trade externalities.

One of the primary insights from the theory is that, in order for the GATT/WTO to work at getting significant areas of the global economy to internalize such externalities, it has focused on shallow integration and the reduction of border barriers (tariffs); relied on fundamental

principles such as reciprocity, MFN treatment, and national treatment; and secured market access commitments implied by tariff reductions through a legal system of tariff bindings that is backed up by third-party dispute settlement. The research that I review in section 2.2 sheds light on some of the successes of this approach at getting countries to internalize what would otherwise be terms-of-trade *externalities* (i.e., applying tariffs that exert market power and drive down the price exporters receive for sales into the import market). Second, the literature has also begun to reveal specific places where the impact of the historical approach has proven incomplete and potential explanations behind why failures have arisen. My approach is to extend this analysis of the WTO with a particular focus on three areas of tariffs that are particularly critical to the interests of developing countries.

In section 2.3, I begin this chapter's empirical contribution by introducing the applied tariffs for the 36 countries and 500 million people that were not yet a part of the WTO system as of 2013. I choose this as my launch point not only because this is where the WTO has had the least impact to date but also because this is one of the least studied areas of international trade policy. As such, much of my effort here is expositional—a contributing reason why so little has been studied for these countries is a combination of data limitations (some of which I am able to overcome) and that these particular countries have many other economic and social problems to address in the global community that may outweigh the importance of international trade agreements. Nevertheless, this section also provides me the opportunity to compare the applied tariffs and political-economic characteristics of WTO nonmember countries with those of a group of nearly 30 other countries that recently acceded to the WTO. Furthermore, I am able to utilize newly available data and newly constructed measures of importer market power by taking advantage of newly available foreign export supply estimates provided by Nicita, Olarreaga, and Silva (2018). I then reassess—and largely confirm—prior evidence in the terms-of-trade literature on the tariff-setting behavior of a subsample of these recently acceded countries, and the role of market power in affecting the changes to their trade policies upon accession to the WTO.

I then turn to a more formal empirical investigation of two areas in which the applied tariffs of WTO members are sometimes alleged to be too high. Section 2.4 focuses on the applied tariffs for the products that are "unbound" in the WTO system. I examine a set of 25 countries (and more than 700 million people), mostly concentrated in sub-Saharan

Africa, that are long-standing WTO members but have nevertheless not yet taken on the legal commitment to bind the upper limit of their tariffs at any level for more than two-thirds of their manufactured import products. Nevertheless, while there may be arguments for the WTO to encourage these countries to bind the tariffs of these unbound products that are not motivated by terms of trade, I fail to find evidence that the applied tariffs for these unbound products are positively related to the importing country's ability to exert market power.

There is, however, evidence linking import market power influences and applied MFN tariffs for countries that have legally bound their tariffs under the WTO and yet retain considerable discretion as to the *level* at which they would be applied because of "tariff overhang." In section 2.5, I note the 45 countries (and more than 2.4 billion people) where substantial tariff overhang still remains in the WTO system, and I provide some evidence identifying this area as potentially one in which the terms-of-trade theory could motivate use of the WTO as a forum to facilitate additional tariff liberalization.

Finally, in section 2.6, I conclude by integrating this evidence alongside related work that highlights the difficulties confronting negotiators seeking to utilize the WTO system to facilitate additional tariff liberalization. I also highlight priority areas and some remaining unanswered questions for policy-related research.

Before delving into the formal theoretical and empirical analysis, it is worth acknowledging two additional points. First, my focus on tariffs and the terms-of-trade theory is limited by design so as to keep the empirical analysis manageable, but it is admittedly incomplete.[6] Second, the role of the WTO in the multilateral trading system goes well beyond its service as a forum for reciprocal tariff cutting. Put differently, even if the evidence were to indicate that the WTO's tariff-liberalization function was now somehow complete—which even the evidence that I review and provide suggests is not yet the case—the WTO *institution* makes other substantive contributions to the system that are not provided by any other entity. These include providing forums for the peaceful resolution of bilateral trade disputes between countries over their commitments and obligations (Maggi and Staiger 2011, 2015; Bown 2009; Bown and Reynolds 2015, 2017) and for transparency and the dissemination of information (e.g., the Trade Policy Review Mechanism and other reporting requirements) regarding how governments make changes to their trade policies in ways that affect trading partners' market access (Maggi 1999).

2.2 The Terms-of-Trade Approach to Trade Agreements

My analysis of where to look for evidence that the WTO's tariff liberalization performance to date may be incomplete is guided by the terms-of-trade theory of trade agreements and a number of recent pieces of empirical evidence. This section provides a brief description of the core insights of the terms-of-trade theory of trade agreements and recent empirical research that searches for evidence of this theory inside and outside the GATT/WTO system. Its main purpose is to survey the state of the art of the existing research literature in this area in order to establish expectations for my formal empirical analysis that follows. I begin with the theory of the terms-of-trade motivations for trade agreements and then turn to evidence on how this affects trade policy determination for countries outside the GATT/WTO, for countries that change their tariffs in order to enter the WTO through accession, and for countries that have been more long-standing participants in the GATT/WTO regarding their applied and binding tariffs.

2.2.1 The Terms-of-Trade Theory of Trade Agreements

Here I review the basics of the terms-of-trade theory of trade agreements introduced in Bagwell and Staiger (1999). In a noncooperative setting characterizing the absence of a trade agreement, two large countries each have a unilateral incentive to impose import tariffs at Nash levels that are too high relative to the jointly efficient outcome. Each Nash tariff is too high because it shifts some of the cost of the tariff—by reducing the price received by the trading partner's exporters of the product—onto the trading partner via a terms-of-trade externality. The result of having each country set its tariff at an excessively high level is the classic prisoner's dilemma outcome driven by terms of trade. Bagwell and Staiger then compare this outcome with an outcome whereby they suppose that each government was not motivated by terms-of-trade considerations in its objective function when setting its tariff but that each government was only (potentially) concerned with the domestic price effects of its tariff choice. In this way, their model allows for the consideration of political economy influences; for example, a government may be interested in using its tariff to redistribute income from one group in the domestic economy to another.[7]

The Bagwell and Staiger (1999) approach generates a number of insights that have subsequently had implications for empirical

analysis.[8] First, a trade agreement like the GATT/WTO can be used to coordinate tariff reductions for the governments of two large countries, neither of which would have a unilateral incentive to reduce tariffs because it would suffer losses in economic welfare through a self-imposed worsening of its terms of trade. They interpret the GATT principle of reciprocity as providing a framework for the mutual reduction of import tariffs that serves to expand trade volumes from inefficient levels of market access when under Nash tariffs to jointly efficient levels. Reciprocity allows for the mutual reduction in tariffs that serves to *neutralize* the impact on each country's terms of trade so that neither country experiences a negative price effect from its own tariff liberalization.

A second important insight, and one that often goes overlooked, is that the *only* role for the GATT/WTO in this framework is to reduce tariffs to a level that eliminates the international (terms-of-trade) externality impact of each government's tariff choice. That is, in the trade agreement equilibrium, the "politically optimal" trade agreement tariffs that the government imposes may still be *positive*. In this case, once the terms-of-trade externality has been neutralized, the jointly efficient equilibrium tariffs arising under the trade agreement may still be positive and the GATT/WTO under the terms-of-trade theory will have nothing left "to do" in terms of facilitating additional tariff liberalization.

The key implication of the theory is that when empiricists begin to examine the tariff data, the existence of positive tariffs is not, by itself, evidence that the job performance of the WTO is incomplete. Under a strict interpretation of the terms-of-trade theory, the WTO only has work to be done if any nonzero tariff is positive because the country is exercising its import market power (i.e., if, for some reason, the country is a member of the agreement but the terms-of-trade component to its tariff has not been fully exorcised). Put differently, if the nonzero tariff is positive for political or redistributive purposes (in light of the government's preferences), and all of the import market power exertion motives have been extinguished (e.g., either through reciprocal bargaining under GATT rounds or through WTO accession negotiations), then the terms-of-trade motive for the WTO would indicate that its tariff-reducing job is done.

From the perspective of this basic theory, I use the next two subsections to review recent developments in the empirical literature on trade agreements. A number of recent contributions provide evidence

supporting key elements of this basic theory. However, the evidence is also beginning to shed light on particular areas where, within the international trading system, the GATT/WTO has failed to deliver evidence consistent with the baseline theory, thus identifying potential limits as to what the GATT/WTO and the terms-of-trade approach might be able to achieve.

2.2.2 The First Wave of Evidence on Applied and Bound Tariffs for Countries Outside and Inside the WTO

In light of the main predictions of the terms-of-trade theory described, what is the empirical evidence? As this recent and evolving literature covers a number of different trade policy environments, samples of countries, and historical moments in time, I also use table 2.1 to briefly summarize this evidence.

When contemplating whether the terms-of-trade externality is a serious problem that countries seek to solve by establishing a trade agreement like the GATT/WTO, the first questions to consider are: What are the determinants of tariffs that countries set when they are not constrained by such agreements? And is there evidence that tariffs are influenced by import market power, or is the variation in import tariffs driven simply by domestic political economy influences?

Broda, Limão, and Weinstein (2008) were the first to provide an empirical approach to directly examine whether the tariffs set by a number of countries outside the WTO—and thus countries unencumbered by (multilateral) trade agreement constraints—were influenced by market power motives. Their benchmark analysis focused on the applied tariffs set by 15 countries listed in table 2.1 during the 1993–2000 period, when they were not GATT Contracting Parties or (at the time) members of the WTO. They first construct estimates of foreign export supply elasticities facing those importing countries, and then they provide strong evidence that governments impose higher import tariffs on products where they are found to have market power, as captured by the inverse of the foreign export supply elasticity that their consumers face, just as predicted by the canonical optimal tariff formula. Their first round of evidence was thus consistent with the potential terms-of-trade motive for the GATT/WTO (i.e., in the absence of such agreements, governments set import tariffs that reflect their market power, and a result is that some of the externality costs of those higher tariffs are imposed on trading partners through reductions in prices those partners' exporters receive).

Table 2.1
Selected empirical studies of trade agreements, import tariffs, and market power.

Paper	Trade Policy Environment	Countries
Broda, Limão and Weinstein (2008)	Applied tariffs set by 15 non-GATT/WTO countries as a cross section (at some point over 1993–2000)	Algeria, Belarus, Bolivia, China, Czech Republic, Ecuador, Latvia, Lebanon, Lithuania, Oman, Paraguay, Russia, Saudi Arabia, Taiwan (China), Ukraine
	Applied tariffs, statutory tariffs, and nontariff measures set by one major GATT/WTO member	United States
Bagwell and Staiger (2011)	WTO tariff binding levels upon accession for 16 new members that joined over 1995–2005	Albania, Armenia, Cambodia, China, Ecuador, Estonia, Georgia, Jordan, Kyrgyz Republic, Latvia, Lithuania, Macedonia, Moldova, Nepal, Oman, Panama
Ludema and Mayda (2013)	Applied MFN tariffs for 26 WTO members at the conclusion of the Uruguay Round	Argentina, Australia, Bolivia, Brazil, Canada, Chile, Colombia, Ecuador, European Union, Hungary, Iceland, India, Indonesia, Japan, South Korea, Madagascar, Malaysia, Mauritius, Mexico, Morocco, New Zealand, Norway, Peru, Romania, Thailand, United States
Ossa (2014)	Quantification of Nash, unilaterally optimal, and cooperative tariffs for seven countries and the rest of the world	Brazil, China, European Union, India, Japan, United States, and the rest of the world
Nicita, Olarreaga, and Silva (2018)	Applied MFN tariffs for 100 WTO members with and without binding overhang, 2000–2009	100 countries
Beshkar, Bond, and Rho (2015)	Binding levels and tariff overhang for 108 WTO members, 1995–2007	108 countries
Bown and Crowley (2013)	Antidumping and safeguard tariffs for a WTO member with applied tariffs at the binding level, 1997–2006	United States
This chapter applies the Nicita, Olarreaga, and Silva (2018) export supply elasticities as follows:		
Section 2.3	WTO tariff binding levels for 12 countries upon WTO accession (countries acceded 1998–2012)	Albania, Armenia, Cabo Verde, China, Georgia, Jordan, Kyrgyz Republic, Moldova, Nepal, Oman, Russia, Saudi Arabia, Ukraine
Section 2.4	Applied tariffs for unbound products of 25 WTO members that had bound fewer than one-third of nonagricultural products in 2013	25 countries listed in table 2.5
Section 2.5	Applied tariffs for bound products of 45 WTO members with an average of 15 percentage points or more of tariff overhang in 2013	45 countries listed in table 2.7

To further support their analysis, Broda, Limão, and Weinstein (2008) also examine the relationship between these measures of a country's import market power and a number of different trade policy instruments utilized by the United States. The United States is different from the 15 countries in their baseline sample in that it is a country *within* the GATT/WTO and one for which the theory would predict trading partners would have been motivated to seek to extinguish the terms-of-trade component of its tariffs. Indeed, Broda, Limão, and Weinstein (2008) find no statistical evidence of market power affecting MFN import tariffs applied by the United States; this is consistent with an interpretation that decades of GATT/WTO tariff reduction negotiations have eliminated the terms-of-trade cost-shifting component from the applied US tariff. Furthermore, they do find evidence that market power considerations affect US trade policies in two other places: first, the US application of nontariff measures, or the policies less constrained by GATT/WTO negotiations and rules;[9] and second, the United States' statutory (or "column 2") tariffs, which are the tariffs that the United States applied to a number of countries that were not members of the WTO and with which the United States did not have normal trading relations.

Given that countries outside the GATT/WTO agreement may impose import tariffs in a way that reflects their market power, is there other evidence that such market power is neutralized (or at least reduced) when they eventually join the WTO? Bagwell and Staiger (2011) examine this question by empirically examining the determinants of the tariff cuts made by a group of 16 countries that acceded to the WTO between 1995 and 2005, five of which (including China) overlapped with the Broda, Limão, and Weinstein sample of non-GATT countries. Unlike countries that had long been members of the GATT/WTO but whose tariff levels may have gradually been brought to more globally efficient levels over time, the Bagwell-Staiger framework investigates whether these new members brought their tariffs down from unbound (Nash-like) levels to bound (politically optimal and efficient) levels in one shot upon accession and in accordance with the terms-of-trade theory's core predictions.[10] The Bagwell-Staiger evidence is broadly consistent with the theory; that is, there is a strong positive relationship between the magnitude of tariff cuts negotiated under the WTO and the prenegotiation volume of imports. Furthermore, for the five countries with which they have overlap with the Broda-Limão-Weinstein sample, their evidence also holds when specifically controlling for the import market power as measured by Broda-Limão-Weinstein estimated trade elasticities.

While these first two papers present evidence that is consistent with the terms-of-trade theory, the bulk of that evidence admittedly derives from countries either outside the GATT/WTO (Broda, Limão, and Weinstein) or that only recently acceded to the WTO (Bagwell and Staiger). What about the trade policymaking behavior of the major economies that are both "inside" the GATT/WTO system and are the ones that have driven the GATT/WTO through 60 years of reciprocal tariff cutting under multilateral negotiating rounds? Furthermore, with the exception of the Broda-Limão-Weinstein evidence for the United States and the Bagwell-Staiger evidence for China, most of the countries in these samples were not major trading economies in the international system. This has the potential to raise concerns about the external validity for the terms-of-trade theory of trade agreements if, for some reason, these countries did not exhibit behavior consistent with that of the major players.

Ludema and Mayda (2013) provide one approach to address these concerns by examining the applied MFN tariffs under the WTO at the conclusion of the GATT's Uruguay Round of negotiations for a larger sample of 26 countries, including most of the major economies.[11] In particular, they explore whether variation in these countries' applied MFN tariffs is related to variation in these countries' import market power and their trading partners' (exporters') industrial concentration. They find that the concentration of trading partner exporter interests at the product level, as measured by the Herfindahl-Hirschman Index (HHI), helps explain applied MFN tariff variation; that is, products with a combined situation of (1) foreign export suppliers that are less concentrated and (2) an importer with more market power tend to have higher tariffs even after GATT/WTO negotiations.

The Ludema-Mayda evidence is that there is variation in the extent to which the terms-of-trade component of a country's tariff may be negotiated away under the WTO, and that can be linked to the free-rider problem arising from the GATT/WTO's MFN rule. First, this empirical result is intuitive in that it may help to explain the relatively high applied tariffs remaining under the WTO in sectors such as agriculture, textiles, and footwear, which persist because the exporting interests behind these products are diffuse. A limitation of the historical framework for conducting negotiations may have arisen because negotiations were voluntary and the tariff liberalization outcome would be

extended to all members under the MFN rule of nondiscrimination. However, because the existence of MFN implied that countries could free ride in the negotiations, sometimes a critical mass of exporting interests may not have bothered to show up at the negotiating table in the first place. Second, an important insight arising from this research is the recognition that not all terms-of-trade effects may be fully neutralized even upon a country's entry into the WTO, a point to which I return. That is, Ludema and Mayda's results identify one potential area in which there may be more tariff-liberalizing work (to neutralize terms of trade) to be "done"; nevertheless, in discovering it, they also identify how the historical GATT/WTO approach of relying on voluntary negotiations and MFN may have contributed to the process by which tariff liberalization (to neutralize terms of trade) remains incomplete.[12]

Finally, given the evidence that the terms-of-trade effects matter for determining trade policy, and that the GATT/WTO system may be working to at least partially neutralize such externalities through negotiations, how economically important is the job that the WTO has done for the major economies of the system? One way to address this issue is to ask how large Nash tariffs (i.e., the combination of best-response tariffs that countries would use) would be in a trade war, and what the economic costs of eliminating trade policy cooperation would be. Using a quantitative approach, Ossa (2014) constructs counterfactual estimates for the size of Nash tariffs in a model featuring seven regions (including the United States, European Union, Japan, China, India, Brazil, and the rest of the world) and finds the median to be 58.1% across countries and industries.[13] The quantitative model suggests substantial gains from the imposition of the tariffs that are in place relative to the levels of welfare that would arise were countries to resort to imposing their Nash tariffs under a trade war.

2.2.3 Additional Evidence on Applied Tariffs, Bindings, and Tariff Overhang for Countries Inside

The next framework that I explore is the recent theoretical and empirical contribution of Nicita, Olarreaga, and Silva (2018), which examines the relationship between a WTO member's applied tariffs and the role of import market power, contingent on whether those tariffs are constrained by WTO tariff binding legal commitments. First, they develop a theoretical model that allows for the political influence of not only import-competing sectors but also exporting sectors. In an environment

in which export policies are constrained—as under the WTO, where export subsidies are illegal—they provide a theory that predicts an exporting-country government will negotiate larger tariff reductions exactly where that importing country has the most market power. Their model predicts that in the instances in which applied tariffs are at their WTO binding rates, and countries are cooperating under the WTO, there will actually be a *negative* relationship between the importer's market power and its negotiated tariff. The intuition is that, in these instances, not only does the trade agreement get the country to reduce its tariff cooperatively (to neutralize the terms-of-trade externality) but in equilibrium the negotiation "overshoots" and the tariff ends up even lower to compensate the politically organized exporters in the trading partner. Furthermore, the theoretical prediction of the positive relationship between applied tariffs and market power also arises in the model of Nicita, Olarreaga, and Silva, but it only arises for applied tariffs that are well below tariff binding rates (i.e., applied tariffs in the presence of sufficiently large amounts of tariff binding "overhang").

The second major contribution of Nicita, Olarreaga, and Silva (2018) is empirical. First, they construct estimates of "foreign" export supply elasticities for 100 WTO member economies at the six-digit Harmonized System (HS06) level, resulting in a database of hundreds of thousands of importing-country product-specific elasticities. (I will draw heavily on these elasticities in the formal empirical analysis that I introduce.) Second, Nicita, Olarreaga, and Silva utilize these estimated elasticities to empirically investigate their model's theoretical predictions for applied tariffs imposed between 2000 and 2009. They find evidence that the inverse foreign export supply elasticity has a *negative* relationship with applied MFN tariffs when there is zero tariff overhang (i.e., when countries are "cooperating" in that applied rates are set at binding levels), and they find a *positive* relationship between the importer's market power and the applied tariff when tariff overhang levels are positive. I further empirically investigate this second result; that is, for "tariff overhang" products, are there unchecked terms-of-trade externalities that countries are imposing through their applied tariffs that the WTO could potentially use as a negotiating forum to eliminate?

In related work, Behskar, Bond, and Rho (2015) provide a theory based on terms of trade that explores the question of where a country might set its tariff binding in relation to its applied tariff under a trade agreement. Their theoretical model predicts that governments will seek

to retain flexibility and thus bind their tariffs significantly above the applied rates, where the importer has little market power. They conduct an empirical examination of product-level tariff data for a sample of 108 WTO member economies over the period 1995–2007. They also partially rely on the inverse foreign export supply elasticities generated by Nicita, Olarreaga, and Silva (2018) as the measure of import market power in their sensitivity analysis. First, they find that newly acceding WTO members bind a larger share of their product lines than did the historical GATT members under the WTO. Second, their various measures of import market power are negatively related to the level of the bindings that countries take on, as well as the size of the tariff binding overhang.[14]

A final stream of recent research that I briefly highlight explores additional economic implications of countries' failure to constrain their applied tariffs by leaving sufficient tariff overhang between the applied rates and their tariff bindings.[15] Handley and Limão (2015) develop a dynamic, heterogeneous firms model with sunk costs of exporting and show that investment in and entry into export markets is reduced when trade policy is uncertain. Furthermore, they show how a credible commitment implied by a trade agreement (e.g., reducing tariff bindings) can increase trade even if applied trade barriers are already low.[16] Handley (2014) provides an application of some of the key elements of this theory to the context of WTO tariff bindings and the case of Australia, finding that the growth of exporter-product varieties would have been 7% lower between 1993 and 2001 without the binding commitments that Australia took on upon its WTO entry. While Handley's results suggest gains (to the exports) of a trading partner, one would expect that the *reciprocal* reduction of uncertainty (i.e., two countries jointly eliminating uncertainty by simultaneously binding their applied tariffs at low levels) could lead to analogous joint gains that accrue under the distinct exercise of two countries simultaneously lowering those applied rates under a trade agreement that neutralizes terms of trade in the first place.[17]

2.3 WTO Nonmembers (and Recently Acceded Members)

This section focuses attention on WTO nonmember countries in the international trading system as of 2013. One ultimate question of interest—for which I will admittedly only be able to provide very indirect evidence—is whether such countries apply import tariffs that

reflect market power motives and whether those would be neutralized should those countries accede to the WTO. First, I introduce the WTO nonmembers and their political-economic characteristics. Then I examine a comparison group of countries that recently acceded to the WTO. I then empirically investigate the implications of the terms-of-trade theory of trade agreements for that second group of countries by applying the Nicita, Olarreaga, and Silva (2018) foreign export supply elasticities to the basic estimation approach introduced by Bagwell and Staiger (2011).

2.3.1 Introduction and Political-Economic Characteristics

As figure 2.1 illustrates, the nonmembers of the WTO are found throughout the world; nevertheless, they are disproportionately concentrated in the Middle East and North Africa, East Africa, and Central Asia. Table 2.2 provides summary data for key economic characteristics of these countries, as well as comparable data for a separate list of important comparison countries that recently acceded to the WTO (i.e., between 1998 and 2014).[18] For ease of exposition, I rank the countries

Figure 2.1
WTO nonmembers, members with substantial unbound products, and members with substantial tariff overhang in 2013. Constructed by the author. For the list of WTO nonmembers, see table 2.2. WTO members with substantial unbound products are defined as countries having fewer than one-third of nonagricultural products with tariff bindings; for the list, see table 2.5. WTO members with substantial tariff overhang are defined as countries having more than one-third of nonagricultural products with tariff bindings but with average tariff overhang of 15 percentage points or more; for the list, see table 2.7.

Table 2.2
Economic characteristics of WTO nonmembers and recently acceded WTO members in 2013.

WTO Nonmember Country	WTO Observer Status	GNI per Capita (2013 US$)	Population (millions)	Imports (billions, 2013 US$)	Exports (billions, 2013 US$)	Recent WTO Accession Country	WTO Accession Year	GNI per Capita (2013 US$)	Population (millions)	Imports (billions, 2013 US$)	Exports (billions, 2013 US$)
Low-income countries						**Low-income countries**					
Liberia	Observer	410	4.3	1.6	0.6	Nepal	2004	730	27.8	7.2	2.1
Ethiopia	Observer	470	94.1	13.8	5.9	Cambodia	2004	950	15.1	11.2	10.0
Eritrea	No	490	6.3	0.6	0.4	Tajikistan	2013	990	8.2	5.8	1.6
Afghanistan	Observer	690	30.6	10.0	1.3	Kyrgyz Republic	1998	1,210	5.7	6.9	3.4
Comoros	Observer	840	0.7	0.4	0.1	Yemen*	2014	1,330	24.4	11.0	8.1
South Sudan	No	950	11.3	5.1	2.1	Laos	2013	1,450	6.8	5.2	4.2
Sao Tomé and Principe	Observer	1,470	0.2	0.1	<0.1	Vietnam	2007	1,740	89.7	136.8	143.8
Sudan	Observer	1,550	38.0	10.7	6.4						
Uzbekistan	Observer	1,880	30.2	18.0	15.7						
Syria*	Observer	NA	22.8	7.6	1.9						
North Korea*	No	NA	24.9	4.8	4.0						
Somalia*	No	NA	10.5	0.8	0.6						
Lower-middle-income countries						**Lower-middle-income countries**					
Bhutan	Observer	2,330	0.8	1.1	0.7	Moldova	2001	2,470	3.6	6.5	3.5
Kiribati	No	2,620	0.1	0.2	<0.1	Vanuatu	2012	3,130	0.3	0.4	0.4
Micronesia*	No	3,280	0.1	0.3	0.1	Georgia	2000	3,560	4.5	9.3	7.2
Timor-Leste*	No	3,940	1.2	1.6	0.2	Cabo Verde	2008	3,620	0.5	0.9	0.6
Marshall Islands*	No	4,310	0.1	0.1	<0.1	Armenia	2003	3,800	3.0	5.0	2.8
Bosnia and Herzegovina	Observer	4,780	3.8	9.5	5.7	Ukraine	2008	3,960	45.5	98.3	83.2
Algeria	Observer	5,330	39.2	63.6	69.7	Samoa	2012	3,970	0.2	0.4	0.2
Iran*	Observer	5,780	77.4	60.1	93.0	Tonga	2007	4,490	0.1	0.3	0.1
Tuvalu*	No	5,840	0.0	0.2	<0.1	Albania	2000	4,510	2.9	6.8	4.5
Serbia	Observer	6,050	7.2	23.6	18.6	Macedonia	2003	4,870	2.1	7.4	5.5
Nauru	No	NA	<0.1	0.1	0.1	Jordan	2000	4,950	6.5	24.0	14.3
Middle- and higher-income countries						**Middle- and higher-income countries**					
Iraq	Observer	6,720	33.4	75.0	77.9	China	2001	6,560	1,357.4	2,203.6	2,440.5
Belarus	Observer	6,730	9.5	45.9	43.9	Montenegro	2012	7,250	0.6	2.7	1.8
Turkmenistan	No	6,880	5.2	15.6	25.8	Seychelles	2015	13,210	0.1	1.3	1.1
Azerbaijan	Observer	7,350	9.4	19.8	35.8	Croatia**	2000	13,420	4.3	24.6	24.9
Lebanon	Observer	9,870	4.5	33.8	27.7	Russia	2012	13,850	143.5	471.6	594.8
Palau	No	10,970	<0.1	0.2	0.2	Lithuania**	2001	14,900	3.0	33.9	33.2
Kazakhstan	Observer	11,550	17.0	61.9	88.7	Latvia**	1999	15,290	2.0	17.8	16.8
Seychelles	No	13,210	0.1	1.3	1.1	Estonia**	1999	17,780	1.3	21.2	21.4
Equatorial Guinea	Observer	14,320	0.8	10.7	13.8	Oman	2000	25,150	3.6	27.8	48.5
Bahamas	Observer	21,570	0.4	4.7	3.5	Saudi Arabia	2005	26,260	28.8	229.3	387.6
Andorra*	Observer	NA	0.1	1.5	<0.1	Taiwan, China*	2002	NA	23.4	267.4	304.6
Holy See (Vatican City)	Observer	NA	<0.1	NA	NA						
Libya*	Observer	NA	6.2	26.8	34.9						
Monaco*	No	NA	<0.1	1.2	1.1						
San Marino*	No	NA	<0.1	2.1	2.6						
Subtotal (Nonmembers)			490.4	534.3	583.9	Subtotal (recently acceded)			1,814.7	3,644.8	4,170.8
World		10,683	7,125.1	22,719.6	23,442.6	World		10,683	7,125.1	22,719.6	23,442.6
Share of world			6.9%	2.4%	2.5%	Share of world			25.5%	16.0%	17.8%
						Share of world (not including China)			6.4%	6.3%	7.4%

Sources: World Bank's World Development Indicators. *Data unavailable so supplemented with estimates from CIA, *The World Fact Book*. GNI=gross national income, NA=not available.
Income classifications *not* based on official World Bank categories. ** Indicates country also acceded to the European Union during this period and adopted the EU's common external tariff.

in each group by gross national income (GNI) per capita, and I split them roughly into three categories based on GNI per capita. I refer to the three groups as low income, lower-middle income, and middle and higher income.[19] For countries that are not yet members of the WTO, I also provide information on whether they have formally been granted "observer" status by the WTO.[20]

Table 2.2 reveals a number of stylized facts about the WTO nonmembers. First, they are disproportionately poor countries—at least 28 of the 38 countries had GNI per capita in 2013 that was less than the world average of $10,683. Second, there is a wide range in population size among these countries. Some are tiny (and relatively wealthy) city-states or islands, with less than a million people. Others are poorer and larger countries in Africa, the largest being Ethiopia, with 94 million people. Combined, 490 million people lived in these WTO nonmember countries, or 6.9% of the total world population.

Most of the WTO nonmember countries had imports that were greater than exports in 2013. The exceptions are mostly made up of major energy (oil and/or natural gas) producers/exporters, such as Algeria, Azerbaijan, Equatorial Guinea, Iran, Iraq, Kazakhstan, Libya, and Turkmenistan. For the rest of the countries with imports substantially larger than exports, this is potentially notable for two reasons. First, the expectation might be that their imports would be limited because their import policies are legally unaffected and undisciplined by the WTO system. Second, many of the nonmembers are relatively poor and are therefore likely (at least in principle) to be beneficiaries of unilateral preference programs offered by WTO member countries. Ceteris paribus, their firms may face lower-than-MFN tariffs for their sales to those markets, which would tend to encourage their exports. Nevertheless, at least at first glance, the data do not suggest this.

Finally, I briefly mention some other geopolitical factors that are likely contributors to the question of why these countries are not (yet) members of the WTO. First, 14 of these countries can be characterized as states in Fragile and Conflict Affected Situations (FCS) (World Bank 2014), which are areas affected by civil war or other forms of violence and strife. Second, while Russia finally acceded to the WTO in 2012 and a handful of former Soviet republics had become members earlier, five of the former Soviet republics (Azerbaijan, Belarus, Kazakhstan, Turkmenistan, and Uzbekistan) have not yet gained entry.

Next compare the WTO nonmembers with the list on the right-hand side of table 2.2, which includes the countries that acceded to

the WTO between 1998 and 2014. The recently acceded countries are also disproportionately poor and include a range of small and large countries by population. The list of recently acceded countries also includes countries with geopolitical constraints, such as Russia and other former republics of the Soviet Union (Armenia, Georgia, Kyrgyz Republic, Moldova, Tajikistan, and Ukraine, as well as Estonia, Latvia, and Lithuania, which since then have also acceded to the European Union), and also FCS countries such as Nepal and Yemen. Overall, I conclude that these sets of WTO nonmembers and countries that have recently acceded to the WTO have a number of similarities.

2.3.2 Establishing a Benchmark: The Experience of Recently Acceded WTO Members

What might accession to the WTO mean for nonmember countries? To provide context, in this subsection I benchmark these nonmember countries' applied tariffs against the tariffs of a set of recently acceded WTO member countries. Table 2.3 introduces the most recently available information on the applied tariffs for these WTO nonmember countries. The table documents the mean of their applied rates, as well as their minimum and maximum rates, and the standard deviation of applied tariffs across import products. The average tariff of these countries ranges from a high of 35.1% (Bahamas) to a flat import tariff of 2.5% applied to every imported product (Timor-Leste). Some of these countries do have tariffs that peak at rates higher than 100%.

Table 2.3 also provides important summary statistics for the tariffs of the recently acceded WTO members as a point of comparison. For these recently acceded countries, I present four pieces of information: (1) the tariffs they applied five years before their WTO membership, (2) the share of imported products over which the country agreed to bind its tariffs upon accession to the WTO, (3) the average tariff binding rate that the country committed not to exceed when joining the WTO, and (4) the MFN tariff rate that the country applied to all other WTO members in 2013.

First, table 2.3 indicates that even the poorest recently acceded countries have bound almost 100% of their tariffs at some level. As I will observe in subsection 2.4.1, this is very different from the figure for many developing countries at similar levels of income per capita that joined the WTO upon its inception in 1995 or had previously been a Contracting Party to the GATT and did not similarly bind all of their products' tariffs. (I investigate and address this issue for such countries separately.

Table 2.3
Tariff characteristics of WTO nonmembers and recently acceded WTO members in 2013.

WTO Nonmember Country	WTO Observer Status	MFN Applied Tariff Rate, 2013				Recent WTO Accession Country	WTO Accession Year	MFN Applied Tariff Rate (simple avg.), Pre-WTO‡	MFN Applied Tariff Rate (simple avg.), 2013	WTO Binding Tariff Rate (simple avg.)	WTO Binding Coverage (%)
		Simple Average	Min.	St. Max.	Dev.						
Low-income countries						**Low-income countries**					
Liberia	Observer	10.0	0.0	50.0	6.9	Nepal*	2004	12.3	12.2	26.0	99.4
Ethiopia	Observer	17.3	0.0	35.0	11.8	Cambodia	2004	16.4	10.9	19.1	100.0
Eritrea	No	7.9	0.0	25.0	8.5	Tajikistan	2013	7.6	7.6	7.9	100.0
Afghanistan	Observer	5.9	0.0	40.0	3.9	Kyrgyz Republic*	1998	0.0	4.5	7.4	99.9
Comoros	Observer	15.3	0.0	20.0	7.8	Laos	2013	9.7	9.7	18.8	100.0
Sao Tomé and Principe	Observer	10.2	0.0	20.0	4.1	Vietnam	2007	16.4	9.4	11.4	100.0
Sudan	Observer	21.2	0.0	40.0	15.8						
Uzbekistan	Observer	15.1	0.0	30.0	10.9						
Syria	Observer	16.5	0.0	80.0	23.2						
Lower-middle-income countries						**Lower-middle-income countries**					
Bhutan	Observer	21.9	0.0	100.0	13.7	Moldova*	2001	6.0	8.8	6.7	100.0
Timor-Leste	No	2.5	2.5	2.5	0.0	Vanuatu	2012	14.0	9.1	39.7	100.0
Bosnia and Herzegovina	Observer	6.5	0.0	824.4	13.4	Georgia*	2000	10.6	1.4	7.2	100.0
Algeria	Observer	18.6	0.0	30.0	10.3	Cabo Verde*	2008	10.4	10.3	15.8	100.0
Iran	Observer	26.6	3.0	400.0	28.7	Armenia*	2003	3.0	3.6	8.5	100.0
Tuvalu	No	7.7	0.0	35.0	9.8	Ukraine*	2008	7.0	4.5	5.8	100.0
Serbia	Observer	7.4	0.0	30.0	7.3	Samoa	2012	11.0	11.3	21.1	100.0
						Tonga	2007	11.7	11.7	17.6	100.0
						Albania*	2000	15.9	3.8	7.0	100.0
						Macedonia	2003	14.4	6.5	6.9	100.0
						Jordan	2000	22.1	9.5	16.2	100.0
Middle- and higher-income countries						**Middle- and higher-income countries**					
Belarus	Observer	8.8	0.0	100.0	6.6	China*	2001	23.7	9.6	10.0	100.0
Turkmenistan	No	5.1	0.0	150.0	15.4	Montenegro	2012	4.6	4.2	5.1	100.0
Azerbaijan	Observer	9.7	0.0	1478.8	26.0	Croatia**	2000	10.6	4.6	4.1	100.0
Lebanon	Observer	6.3	0.0	334.0	13.7	Russia*	2012	9.0	8.8	7.3	100.0
Palau	No	4.2	0.0	1370.1	29.1	Lithuania**	2001	3.6	4.6	4.1	100.0
Kazakhstan	Observer	8.7	0.0	100.0	6.6	Latvia**	1999	4.3	4.6	4.1	100.0
Equatorial Guinea	Observer	17.9	0.0	30.0	9.5	Estonia**	1999	0.1	4.6	4.1	100.0
Bahamas	Observer	35.1	0.0	75.0	16.2	Oman*	2000	4.7	4.5	13.6	100.0
Libya	Observer	21.3	0.0	3000.0	113.8	Saudi Arabia*	2005	11.9	4.7	10.7	100.0
						Taiwan, China	2002	7.8	5.6	5.7	100.0

Compiled by the author from WTO IDB and CTS and UNCTAD TRAINS made available via the World Bank's World Integrated Trade Solution (WITS) dataset.

‡ Preaccession data taken from five years prior to WTO accession. **Acceded to the European Union during this period and thus adopted the EU's common external tariff. Yemen and Seychelles not included because they acceded in 2014 and 2015, respectively. *Countries utilized in the econometric exercise of table 2.4.

Second, a number of countries that recently acceded to the WTO were not forced to make substantial cuts (on average) to their applied tariffs upon entry into the agreement. Indeed, for more than half of the 27 recently acceded WTO members listed in table 2.3, their average binding commitment under the WTO is actually higher than the average tariff the country applied five years prior to WTO entry, meaning that the country could (on average) increase its applied tariffs upon entry into the WTO and still be in compliance with its obligations. Major exceptions include a number of large economies, such as China, Saudi Arabia, Taiwan (China), and Ukraine. However, a notable characteristic of all recently acceded WTO members is the relatively limited amount of average tariff overhang between binding rates and applied MFN tariffs in 2013. With the exception of Vanuatu (30.6 percentage points), no newly acceded member had an average level of tariff overhang exceeding 13.8% in 2013 (Nepal). As subsection 2.5.1 reveals, this is also substantially different from that for countries that acceded to the WTO upon its entry into force in 1995—there were 45 WTO members with more than 15 percentage points of average tariff overhang in 2013.

Figure 2.2 illustrates the industry-level variation for these tariff data summarized by table 2.3. The three panels represent the average tariffs by sector for three groupings of countries—low-income countries, lower-middle-income countries, and middle- and higher-income countries. For each sector, there are two sets of bars. The first set reflects the average tariffs for the recently acceded WTO members, and the second set reflects the average tariffs for the WTO nonmembers. Finally, for WTO members, for each sector there are three pieces of information: the gray bar reflects the average MFN applied rate in 2013, the white bar reflects the tariff binding overhang (or water) above the applied rate, and the black star reflects the average applied tariff that was in place five years *prior to* the country's WTO accession. For the WTO nonmember countries, the black bar represents the average tariff in the sector that the countries in that income group applied in 2013.

First, compare the black stars with the black bars (i.e., compare the average applied tariffs for the recently acceded countries five years prior to their WTO membership with the average applied tariffs of the nonmembers). Overall, figure 2.2 suggests that the patterns are quite similar (conditional on income group) across industries; on average at least, the "future" WTO accession countries apply import tariffs that are similar to the applied tariff starting point of the recently acceded countries before they gained WTO entry. And while there is variation across

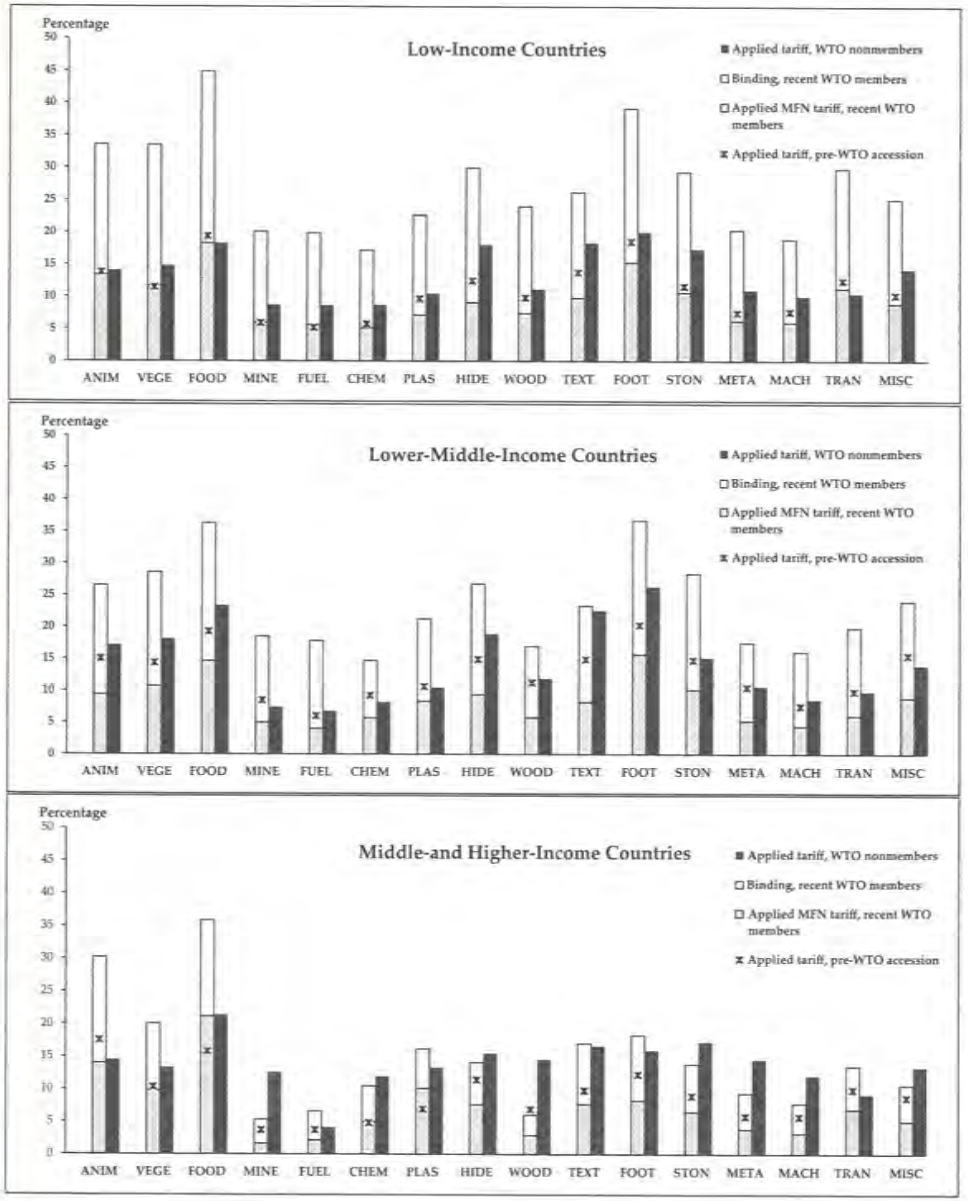

Figure 2.2
Average tariffs for WTO nonmembers versus recently acceded WTO members, by industry and country group. Constructed by the author from tariff data at the HS06 level from the WTO IDB, CTS, and UNCTAD TRAINS and from available data and country groupings provided in table 2.3.

sectors and income groups, if anything, the evidence would suggest that WTO nonmembers apply rates that are slightly higher than the applied rates of the recently acceded countries five years prior to their joining the WTO.

Second, focus attention on the applied tariff *changes* for the countries that recently acceded to the WTO; that is, the difference between the star (applied tariff level five years prior to WTO accession) and the gray bar (applied tariff level in effect in 2013). The pattern across industries and country groupings is that applied rates tend to fall on average when a country joins the WTO. In levels, the average changes are largest for the lower-middle-income group of countries in the middle panel. This reflects the fact that more tariff cutting is likely expected of them (relative to low-income countries) and that they are starting from higher tariff levels (relative to higher-income countries).

Third, consider the differences in tariff binding overhang that result upon entry into the WTO. On average in 2013, there was more tariff overhang remaining upon WTO accession for low-income countries than for higher-income countries.

While table 2.3 and figure 2.2 suggest a path forward for WTO nonmember countries—if what is expected of them roughly corresponds to the impact of WTO accession on the tariffs of recently acceded members—I have not yet provided any evidence that this is linked to the terms-of-trade theory of trade agreements. In subsection 2.3.3, I consider the potential implications of WTO accession for nonmembers through the lens of this theory and drawing from evidence arising from the experience of recently acceded countries.

2.3.3 Empirical Evidence from Tariff Bindings for Countries That Recently Acceded to the WTO

The first empirical question is whether it is likely that accession to the WTO by these nonmembers would neutralize any terms-of-trade externalities that their applied tariffs impose on trading partners.

Because I do not have the ability to test this counterfactual, instead I examine whether there is evidence from the group of recently acceded WTO member countries to suggest that terms-of-trade externalities of their import tariffs were reduced when they joined the WTO. The alternative (i.e., that there is no relationship between their post-WTO accession tariffs and market power influences) would suggest that these countries joined the WTO with something else in mind, and thus

some other approach aside from the terms-of-trade theory would be required to motivate why they find the WTO valuable.

In order to specifically investigate this question, I broadly follow the Bagwell and Staiger (2011) estimation approach described earlier. In particular, I examine whether there is a relationship between the binding rate that country c adopts for HS06 product g after WTO accession ($\tau_{gc}^{WTO\ binding}$), and two theoretically motivated determinants: (1) the preaccession applied tariff rate ($\tau_{gc}^{pre\text{-}WTO}$) and (2) the inverse of the foreign export supply elasticity ($1/\omega_{gc}^{*}$). I thus estimate models of the form

$$\ln(1+\tau_{gc}^{WTO\ binding}) = \alpha_g + \alpha_c + \beta_0 \ln(1/\omega_{gc}^{*}) + \beta_1 \ln(1+\tau_{gc}^{pre\text{-}WTO}) + \epsilon_{gc}, \quad (2.1)$$

where α_c is the importing-country fixed effect, α_g is the HS06 product fixed effect, and ϵ_{gc} is the iid error term. The Bagwell-Staiger theory clearly predicts $\beta_1 > 0$ and $\beta_0 < 0$, or that the post-WTO binding rate will be positively related to $\tau_{gc}^{pre\text{-}WTO}$ and negatively related to the measure of the importer's market power ($1/\omega_{gc}^{*}$).

My estimation exercise serves to complement the original Bagwell-Staiger approach in a number of ways. First, I utilize a slightly different sample of countries (see table 2.1 for the list), though notably my additional countries include a number of relatively large (by population) importers, such as Russia, Saudi Arabia, and Ukraine, that acceded to the WTO only after the Bagwell-Staiger sample period. Second, here I rely heavily on the export supply elasticities provided by Nicita, Olarreaga, and Silva (2018), which were not available at the time of the original study. Third, I utilize fixed effects to address other potential determinants of tariffs.[21]

Before turning to the estimates, I also explain here the general approach that I take throughout to address potential data limitations.[22] For example, one potential concern is that the elasticities are themselves estimates, and some of the estimated values are extreme.[23] First, I winsorize the dataset of the elasticities by setting the extreme values to be the values at the 10th and 90th percentiles of the distribution. Second, in the baseline specifications for each of the regressions, I will take the log of the inverse of foreign export supply elasticity, and I will utilize as a robustness check either an indicator for "high-elasticity" products (defined as those above the median of the distribution) or the *level* of

the inverse of foreign export supply elasticity. Third, I will also use as my measure of import tariffs $\ln(1+\tau)$, though I frequently report as a robustness check a measure of the tariff that is simply the level of the tariff, τ.

Table 2.4 provides evidence of the expected strong negative relationship between the inverse foreign export supply elasticity and the WTO tariff binding commitment taken upon accession for this sample of 12 countries that recently acceded to the WTO. That is, ceteris paribus, newly acceding members are requested (through WTO negotiations) to take on lower tariff binding commitments on products for which they have higher market power and thus where their tariffs (if left unchecked) would result in larger terms-of-trade externality losses for trading partners. Note that I also find a strong positive relationship between the pre-WTO applied tariff and the WTO tariff binding commitment, in line with the theoretical prediction. In column 2, I show the robustness of the results by replacing the log of the inverse foreign export supply elasticity with an indicator that takes on the value of 1 if the elasticity is "high" (above the median value) and 0 otherwise, and again the estimated size of the coefficient is negative. The specification in column 3 substitutes the levels of the tariffs and the elasticities for the log levels that are used in the baseline specification and elsewhere in the table. In column 4, I add importing-country fixed effects. Columns 5 and 6 split the sample in two, depending on whether the importing country was large (by population) (i.e., China, Russia, Saudi Arabia, and Ukraine) or small. While both sets of estimates of the elasticity are negative, as predicted by the theory, the estimate of the elasticity is no longer significant for the small-country (by population) subsample. Nevertheless, even this nonresult is somewhat reassuring, given that I would expect the results to be more likely to break down in the small-country subsample.

Overall, this section suggests evidence consistent with the terms-of-trade theory of trade agreements and that the preexisting WTO membership has negotiated tariff binding commitments for newly acceding WTO nonmembers that serve to reduce the negative (terms-of-trade) externality impact of their tariffs on trading partners. Again, to the extent that there are similarities between the WTO *nonmembers'* applied tariffs and the tariff-setting behavior of these recently acceded WTO members before their WTO accession, any future WTO accession by the nonmembers could also be expected to have them take on lower

Table 2.4
Market power and post-WTO accession import tariff bindings for recently acceded countries.

Regression equation: $\ln(1+\tau_{gc}^{WTO\ binding}) = \alpha_g + \alpha_c + \beta_0 \ln(1/\omega_{gc}^*) + \beta_1 \ln(1+\tau_{gc}^{pre\text{-}WTO}) + \epsilon_{gc}$

	Baseline (1)	High Inverse Elasticity Indicator (2)	Level Inverse Elasticity (3)	Add Importer Fixed Effect (4)	Large Countries Only (5)	Small Countries Only (6)
Log inverse elasticity: $\ln(1/\omega_{gc}^*)$	−2.39***			−0.66**	−1.40***	−0.62
	(0.30)			(0.29)	(0.41)	(0.65)
Indicator for high inverse elasticity		−0.06***				
		(0.01)				
Inverse elasticity: $(1/\omega_{gc}^*)$			−1.49***			
			(0.19)			
Log preaccession tariff: $\ln(1+\tau_{gc}^{pre\text{-}WTO})$	0.26***	0.26***		0.31***	0.35***	0.27***
	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)
Preaccession tariff: $\tau_{gc}^{pre\text{-}WTO}$			0.24***			
			(0.03)			
Product-level (HS06) fixed effects	Y	Y	Y	Y	Y	Y
Importing-country fixed effects	N	N	N	Y	Y	Y
Observations	26,417	26,417	26,417	26,417	13,659	12,758
R^2	0.48	0.48	0.43	0.62	0.68	0.66

Notes: Robust standard errors are in parentheses. Estimates for the constant term are suppressed. Pre-WTO accession tariffs for HS06 product g were taken five years prior to accession date for 12 countries (c): Albania, Armenia, Cabo Verde, China, Georgia, Jordan, Kyrgyz Republic, Moldova, Nepal, Oman, Russia, Saudi Arabia, and Ukraine. Large countries in column 5 are defined as China, Russia, Saudi Arabia, and Ukraine.
***, **, and * indicate statistical significance at the 1%, 5%, or 10% level, respectively.

tariff binding commitments where they would otherwise have more import market power.

2.4 WTO Members with Unbound Tariffs

This section begins my examination of the tariffs that WTO members apply, and in particular whether there is scope for the WTO to "provide" a forum for additional applied tariff reductions motivated by terms of trade for these countries. Put differently, my approach for the next two subsections will be to examine different areas in the WTO system where speculation has been that applied tariffs remain "too high," and I ask whether the level of applied tariffs in each area remains influenced by measures of import market power. Evidence of such a relationship would be consistent with identification of additional tariff-reduction work for countries to utilize the WTO to potentially pursue under the terms-of-trade theory of trade agreements. However, an alternative may be that, while applied tariffs in one or more areas may appear "too high" (or otherwise unconstrained by the WTO), the applied tariffs are not related to product-level measures of the importing country's market power. If this is the case, there may be little scope to engage the WTO in an attempt to neutralize terms of trade to get the country to reduce its tariffs further.

This section begins by focusing on unbound tariffs. These are the products for which countries have not taken on the legal commitment to set any upper limit for their MFN applied import tariffs. I first introduce where unbound tariffs are most prevalent in the WTO system, and then in Subsection 2.4.2 I investigate whether there is evidence linking import market power motives and applied tariff levels in the areas where tariffs are unbound.

2.4.1 Description of the Countries and Unbound Products

Table 2.5 introduces the WTO member countries with the largest share of products for which their applied import tariffs are unbound. Given that a condition of WTO entry for all countries was the expectation that they would agree to bind all tariffs for their agricultural products, I rank the countries in the table by the share of their *nonagricultural* tariff lines that are bound. The left side of the table lists the 25 WTO member countries ("Group A") that will serve as the main sample for the regression analysis that I describe in subsection 2.4.2; these are countries that have bound fewer than one-third of their nonagricultural import

Table 2.5
Economic and tariff characteristics of WTO members with substantial unbound tariffs in 2013.

Countries with WTO Binding Coverage That Is Less than 33% of All Nonagricultural Products (Group A)						Countries with WTO Binding Coverage That Is between 33% and 95% of All Nonagricultural Products (Group B)					
WTO Member Country	WTO Accession Year	GNI per Capita (2013 US$)	Population (millions)	Binding Coverage, Nonag. (%)	MFN Applied (simple avg.), 2013	WTO Member Country	WTO Accession Year	GNI per Capita (2013 US$)	Population (millions)	Binding Coverage, Nonag. (%)	MFN Applied (simple avg.), 2013
Cameroon	1995	1,290	22.3	1.7	18.0	Turkey	1995	10,980	74.9	35.0	10.8
Tanzania	1995	840	49.3	1.8	12.8	Hong Kong SAR, China	1995	38,520	7.2	35.2	0.0
Gambia	1996	500	1.8	2.2	14.1	Tunisia	1995	4,210	10.9	52.7	15.5
Kenya	1995	1,160	44.4	2.3	12.8	Central African Republic	1995	320	4.6	58.9	18.0
Togo	1995	530	6.8	2.4	11.9	Singapore	1995	54,580	5.4	63.9	0.1
Ghana	1995	1,770	25.9	2.8	12.9	Philippines	1995	3,270	98.4	63.9	3.7
Uganda	1995	600	37.6	4.3	12.7	Thailand	1995	5,360	67.0	68.4	10.4
Bangladesh	1995	1,010	156.6	4.4	14.0	Bahrain	1995	21,330	1.3	71.1	5.4
Congo	1997	2,590	4.4	5.0	18.0	India	1995	1,560	1,252.0	71.2	13.3
Zambia	1995	1,780	14.5	5.5	13.2	Israel	1995	33,930	8.1	72.4	3.4
Zimbabwe	1995	860	14.1	5.7	13.2	Malaysia	1995	10,420	29.7	75.4	5.0
Mauritius	1995	9,570	1.3	6.0	1.5	Korea	1995	25,870	50.2	93.5	12.2
Nigeria	1995	2,690	173.6	8.4	11.7	Brunei	1995	NA	0.4	94.1	1.3
Burundi	1995	260	10.2	12.1	12.8	Iceland	1995	46,650	0.3	94.3	5.9
Macao SAR, China	1995	71,270	0.6	12.7	0.0						
Suriname	1995	9,370	0.5	13.3	10.4						

(continued)

Table 2.5
(continued)

Countries with WTO Binding Coverage That Is Less than 33% of All Nonagricultural Products (Group A)						Countries with WTO Binding Coverage That Is between 33% and 95% of All Nonagricultural Products (Group B)					
WTO Member Country	WTO Accession Year	GNI per Capita (2013 US$)	Population (millions)	Binding Coverage, Nonag. (%)	MFN Applied (simple avg.), 2013	WTO Member Country	WTO Accession Year	GNI per Capita (2013 US$)	Population (millions)	Binding Coverage, Nonag. (%)	MFN Applied (simple avg.), 2013
Malawi	1995	270	16.4	20.8	12.7						
Madagascar	1995	440	22.9	21.2	11.7						
Cuba	1995	NA	11.3	21.2	10.3						
Cote d'Ivoire	1995	1,450	20.3	23.7	11.9						
Sri Lanka	1995	3,180	20.5	28.2	10.5						
Guinea	1995	460	11.7	30.9	11.9						
Burkina Faso	1995	660	16.9	31.3	11.9						
Benin	1996	790	10.3	31.4	11.9						
Mali	1995	690	15.3	32.0	11.9						
Subtotal (Group A)			709.5			Subtotal (Group B)			1,610.5		
World		10,683	7,125.1			World		10,683	7,125.1		
Share of world			10.0%			Share of world			22.6%		

Sources: World Bank's World Development Indicators, tariffs constructed by the author with data from WTO CTS, IDB, and UNCTAD TRAINS.
Ranked by binding coverage of nonagricultural products. GNI=gross national income, NA=not available.

products. Cameroon has committed to a legally binding upper limit on the smallest share of imported products, at 1.7%, followed by Tanzania and Gambia.

An examination of the 25 WTO members with less than 33% of bound nonagricultural products suggests a number of common characteristics. First, they are disproportionately poor, as only one (Macao SAR, China) had GNI per capita in 2013 greater than the world average of $10,683. Second, with only a handful of exceptions (Bangladesh, Macao SAR (China), Cuba, Sri Lanka, and Suriname), figure 2.1 reveals that the vast majority of countries with unbound tariffs are located in sub-Saharan Africa. Third, while there are also a range of large and small (by population) countries with substantial unbound tariffs, in total the numbers add up: more than 700 million people—or 10% of the world's population—live in WTO member countries that have bound fewer than one-third of their nonagricultural tariffs at any level. Finally, the last column on the left side of table 2.5 does suggest relatively little variation in average applied tariffs across these countries—with the exception of Macao SAR, China, and Mauritius, the average applied MFN tariff (over all products) for the 23 other WTO member countries ranges between 10% and 20%. A major element of this results from the fact that many of these countries are part of the ECOWAS (Economic Community of West African States), which has been developing a customs union arrangement and thus a common external tariff against nonparticipants, including the MFN tariff that each would apply against imports arising from all other (nonparticipant) WTO members.

The right side of table 2.5 provides similar summary statistics for WTO member countries that have bound between 33% and 95% of their nonagricultural product tariff lines. These 14 countries ("Group B") will be used in robustness checks in the formal regression analysis in subsection 2.4.2, but a cursory examination of their economic characteristics suggests that they are much more diverse. At the extremes, some countries on the list are very poor (Central African Republic) and others very rich (Singapore), and with populations that are very small (Brunei and Iceland) or very large (India). The 2013 average applied MFN tariff also ranges substantially from free trade (Hong Kong SAR, China) to 18% (Central African Republic). Finally, Turkey in particular is also notable in that, while it may have bound relatively few (only 35%) of its nonagricultural products legally at the WTO, it has constrained its applied MFN tariffs through other trade agreement means (i.e., by forming a customs union arrangement with the European Union

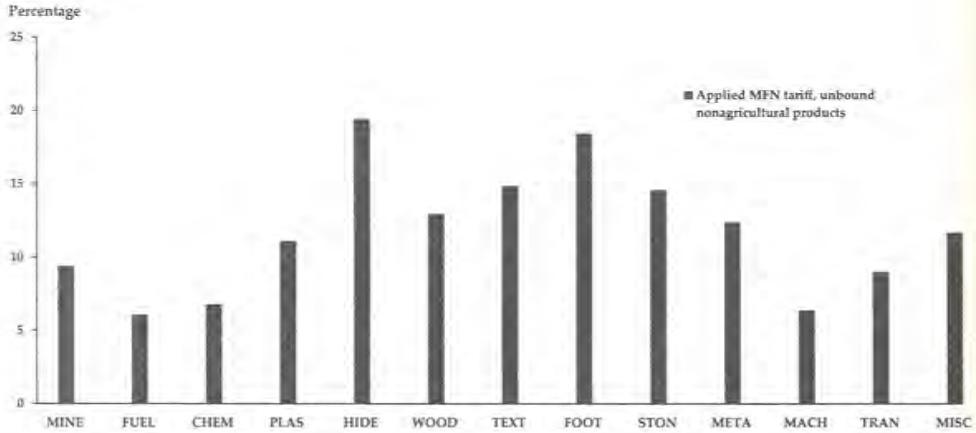

Figure 2.3
Average applied MFN tariffs for WTO members with substantial unbound tariffs in 2013, by industry. Constructed by the author from tariff data at the HS06 level from the WTO IDB, CTS, and UNCTAD TRAINS and from the data for the 25 WTO member countries in table 2.5 ("Group A") with less than 33% of nonagricultural tariffs that are bound.

covering most of its nonagricultural products, with the exception of steel and textiles).

Before moving on, the last note that I make about table 2.5 concerns those countries that are *not* found in the table. The rest of the WTO membership (more than 100 WTO members) that are not listed in the table have bound 95% or more of their nonagricultural products. I have already presented the tariff data for some of these countries (i.e., the recently acceded WTO members) in table 2.3.

Finally, consider figure 2.3 which illustrates the average MFN applied tariffs by sector for the 25 WTO members with less than 33% of their nonagricultural products bound. Much of the cross-industry pattern is similar to what is commonly observed in other settings for low-income countries (again see figure 2.2, for the comparable tariffs for low-income WTO nonmembers and recently acceded members); for example, relatively higher applied tariffs in sectors such as footwear, textiles, hides, and skins, and lower applied tariffs for fuel, chemicals, and machinery.

2.4.2 Empirical Evidence for Unbound Tariffs

To my knowledge, there is no theoretical or empirical work exploring the finer question of why a WTO member would choose to bind some products and yet leave other products unbound. Nevertheless, in

this subsection, I use the following model to empirically examine the question of whether measures of importer market power are related to applied tariffs for these *unbound* products:

$$\ln(1+\tau_{gc}^{WTO\ applied}) = \alpha_g + \alpha_c + \gamma_0 \ln(1/\omega_{gc}^*) + \epsilon_{gc}. \quad (2.2)$$

If importing countries continue to exert market power over their applied MFN import tariffs ($\tau_{gc}^{WTO\ applied}$) for these unbound products, the theoretical expectation is that γ_0 would be positive.

Table 2.6 presents the results. The general finding is that there is no evidence that market power considerations are driving applied tariff rates for unbound products when the model is estimated on the 25 countries ("Group A") that have committed to bind their tariffs for less than 33% of their nonagricultural products. The first column is the baseline specification, which indicates no statistically significant relationship between the log of the inverse of the foreign export supply elasticity $\ln(1/\omega_{gc}^*)$ and the applied MFN tariff rate, given by $\ln(1+\tau_{gc}^{WTO\ applied})$. In fact, when I introduce importing-country fixed effects in column 2, there is actually a negative and statistically significant relationship between the measures of import market power and applied MFN tariffs. While, to my knowledge, no one has previously investigated this particular area of unbound tariffs for WTO member countries, these results have some similarities to the pattern of results found by Beshkar, Bond, and Rho (2015), who examine binding tariff levels for 108 WTO members. They find tariff binding levels are negatively related to market power, especially in the presence of substantial amounts of tariff overhang (which they refer to as "weak bindings"). Their theoretical model interprets this negative relationship between import market power and tariff binding levels (in the presence of tariff overhang) as allowing countries flexibility to raise their applied rates in response to shocks. While speculative, a similar motivation could also be at work explaining the applied tariffs for products that are unbound in the WTO system.

Indeed, the last two columns of table 2.6 provide additional evidence of this negative relationship between importer market power and applied MFN tariffs for unbound products by altering the sample of unbound products on which the model is estimated. In column 4, I also include in the sample the unbound products for the 14 WTO member countries (in "Group B") of table 2.5 that had (overall) between 33% and 95% of their nonagricultural products bound. In column 5,

Table 2.6
Market power and WTO members' applied tariffs for unbound products in 2013.

	Regression equation: $\ln(1+\tau_{gc}^{WTO\ applied}) = \alpha_g + \alpha_c + \gamma_0 \ln(1/\omega_{gc}^*) + \epsilon_{gc}$				
	Baseline (1)	Add Importer Fixed Effect (2)	High Inverse Elasticity Indicator (3)	Add 33% to 95% Bound to Sample (4)	Alternative Unbound Sample (5)
Log inverse elasticity: $\ln(1/\omega_{gc}^*)$	0.44	−1.28***		−0.96***	−2.43***
	(0.63)	(0.45)		(0.34)	(0.70)
Indicator for high inverse elasticity			−0.02		
			(0.02)		
Product-level (HS06) fixed effects	Y	Y	Y	Y	Y
Importing-country fixed effects	N	Y	Y	Y	Y
Observations	25,326	25,326	25,326	36,525	11,199
R^2	0.44	0.71	0.71	0.69	0.70

Notes: Robust standard errors are in parentheses. Estimates for the constant term are suppressed. Columns 1, 2 and 3 include only the 25 WTO member countries (Group A) with less than 33% of nonagricultural products bound, as listed in table 2.5. Column 4 adds 14 countries (Group B of table 2.5) that have bound between 33% and 95% of their nonagricultural products. Column 5 estimates the model on only the 14 Group B countries that have bound between 33% and 95% of their nonagricultural products.
***, **, and * indicate statistical significance at the 1%, 5%, or 10% level, respectively.

I estimate the model on only the subsample of data from those 14 WTO member countries. In both cases, the estimate of γ_0 is negative and statistically significant.

To conclude this section, I am unable to find evidence to suggest that the applied MFN tariff levels for unbound products under the WTO are positively associated with importer market power considerations. Under the basic terms-of-trade theory of trade agreements, if countries with unbound tariffs are not applying them to exert market power and impose externalities on trading partners, this suggests little role for the WTO to facilitate applied tariff reductions in this area. While there may be other theories that would motivate welfare improvements arising from countries voluntarily binding these tariffs through the external commitment of a trade agreement, such as the trade policy and uncertainty literature associated with Handley and Limão (2015, 2017), Handley (2014), or Limão and Maggi (2015), in this instance the motivation may not arise from the basic terms-of-trade theory itself.

2.5 WTO Members with Bound Tariffs but Substantial Tariff Overhang

A second contentious area within the WTO system involves countries that, while having taken on the legal commitments to bind their tariffs at some upper limit, have set the upper limit so high relative to the applied MFN tariff that the binding level is economically meaningless. The difference between the legally binding commitment and the applied tariff is again defined as the amount of tariff overhang. In this section, I examine whether applied import tariffs are positively associated with importer market power considerations for products characterized by substantial tariff *overhang*.

My approach in this section follows the theoretical insights and empirical framework introduced by Nicita, Olarreaga, and Silva (2018), described earlier. To summarize, they studied the applied tariffs for roughly 100 WTO member countries and provide two key empirical results. First, when applied tariffs are constrained by WTO binding commitments (e.g., in the extreme, suppose that the applied rate is equal to the binding commitment, so there is zero tariff overhang), then there is a negative relationship between importer market power and the applied tariff. Second, when applied tariffs are unconstrained by WTO binding commitments (e.g., in the extreme, suppose that there is substantial tariff overhang because tariff bindings have *not* been negotiated

down close to applied levels), then there is a positive relationship between importer market power and the applied tariff. It is this second result in particular that I investigate in more detail.

2.5.1 The Description of the Countries and Products with Overhang

First, I need to identify the set of WTO member countries with bound tariffs but with significant amounts of tariff overhang remaining between their tariff binding commitments and their applied rates. table 2.7 provides the list of WTO member countries that each have at least 15 percentage points of average tariff overhang. First, it is interesting to note that almost all the countries in table 2.7 acceded to the WTO at the time of its inception in 1995. As is apparent from the data in table 2.3 for countries that acceded to the WTO sometime later (i.e., in 1998 or later), they were only allowed to enter the WTO with much less tariff overhang in place.

Second, it is important to clarify that none of the countries listed in table 2.7 overlap with the "Group A" countries (of table 2.5) that had bound less than 33% of their nonagricultural products (i.e., these two lists are mutually exclusive). However, a handful of countries do appear in both table 2.7 and the "Group B" list of countries in table 2.5 (i.e., those with less than 95% of their nonagricultural products being bound).[24] While these countries' *unbound* products were included as part of the robustness checks provided in columns 4 and 5 of table 2.6, here I only consider the countries' *bound* products. Therefore, because the unbound products are dropped from the analysis here, the country-product pairs included in the robustness check regressions of table 2.6 and those presented next are mutually exclusive.

The countries in table 2.7 share some similarities, but also a number of notable differences, with the WTO nonmembers and recently acceded members (again see tables 2.2 and 2.3) and the list of WTO members with substantial unbound tariffs (again see table 2.5) discussed thus far. Like the earlier lists, the countries with substantial tariff overhang are also developing countries (e.g., nearly three-quarters of the 45 countries had a 2013 GNI per capita at or below the world average). Nevertheless, these developing countries with substantial tariff overhang do have higher GNI per capita on average than the developing countries that are WTO nonmembers, WTO members that recently acceded, or WTO members with substantial unbound products.

Table 2.7
Economic and tariff characteristics of WTO members with substantial tariff overhang in 2013.

WTO Member Country	WTO Accession Year	GNI per Capita (2013 US$)	Population (millions)	Tariff Overhang (simple avg.), 2013	Tariff Binding Rate (simple avg.)	MFN Applied Rate (simple avg.), 2013	Binding Coverage (%)
Panama	1997	10,700	3.9	16.2	23.0	6.8	99.9
Maldives	1995	6,850	0.3	16.2	36.7	20.5	99.1
Israel	1995	33,930	8.1	17.2	20.7	3.4	72.4
Turkey	1995	10,980	74.9	17.5	28.3	10.8	35.0
Brazil	1995	12,550	200.4	17.9	31.4	13.5	100.0
Senegal	1995	1,050	14.1	18.1	30.0	11.9	100.0
Central African Republic	1995	320	4.6	18.1	36.1	18.0	58.9
Argentina	1995	14,590	41.4	18.5	31.9	13.4	100.0
Chile	1995	15,230	17.6	19.1	25.1	6.0	100.0
Egypt	1995	3,140	82.1	20.6	36.1	15.5	99.1
Uruguay	1995	15,640	3.4	21.1	31.6	10.5	100.0
Philippines	1995	3,270	98.4	21.9	25.6	3.7	63.9
Brunei	1995	NA	0.4	22.9	24.2	1.3	94.1
Venezuela	1995	11,730	30.4	23.2	36.5	13.3	100.0
Paraguay	1995	3,980	6.8	23.5	33.5	10.0	100.0
Peru	1995	6,270	30.4	26.1	29.4	3.4	100.0
Honduras	1995	2,120	8.1	26.4	32.1	5.7	100.0
Morocco	1995	3,030	33.0	27.0	41.2	14.3	100.0
Dominican Republic	1995	5,770	10.4	27.0	34.3	7.3	100.0
Papua New Guinea	1996	2,020	7.3	27.1	31.5	4.4	100.0
Mexico	1995	9,880	122.3	27.5	35.2	7.7	100.0
Bolivia	1995	2,550	10.7	28.3	40.0	11.6	100.0
Bahrain	1995	21,330	1.3	28.8	34.2	5.4	71.1
Indonesia	1995	3,760	249.9	29.9	37.1	7.2	96.0
El Salvador	1995	3,720	6.3	30.6	36.6	6.0	100.0
Niger	1996	410	17.8	33.0	44.9	11.9	96.1

(continued)

Table 2.7
(continued)

WTO Member Country	WTO Accession Year	GNI per Capita (2013 US$)	Population (millions)	Tariff Overhang (simple avg.), 2013	Tariff Binding Rate (simple avg.)	MFN Applied Rate (simple avg.), 2013	Binding Coverage (%)
Nicaragua	1995	1,750	6.1	35.3	41.1	5.7	100.0
Colombia	1995	7,610	48.3	35.6	42.3	6.8	100.0
Guatemala	1995	3,340	15.5	35.9	41.6	5.7	100.0
India	1995	1,560	1,252.0	36.2	49.6	13.3	71.2
Costa Rica	1995	9,450	4.9	37.2	42.7	5.6	100.0
Jamaica	1995	5,220	2.7	39.4	49.8	10.4	100.0
Tunisia	1995	4,210	10.9	43.0	58.5	15.5	52.7
Trinidad and Tobago	1995	15,640	1.3	45.3	55.8	10.5	100.0
Guyana	1995	3,750	0.8	45.4	56.6	11.2	100.0
Grenada	1996	7,490	0.1	46.3	56.7	10.4	100.0
Belize	1995	4,510	0.3	47.4	58.1	10.7	100.0
Antigua and Barbuda	1995	13,050	0.1	48.1	58.6	10.5	100.0
Dominica	1995	6,860	0.1	48.4	58.7	10.3	96.4
Saint Lucia	1995	7,060	0.2	51.8	62.1	10.3	100.0
Saint Vincent and the Grenadines	1995	6,540	0.1	52.5	62.7	10.2	100.0
Barbados	1995	*NA*	0.3	65.6	78.2	12.6	100.0
St. Kitts and Nevis	1996	13,760	0.1	65.7	76.0	10.3	100.0
Lesotho	1995	1,590	2.1	70.8	78.4	7.6	100.0
Rwanda	1996	630	11.8	76.6	89.4	12.8	100.0
Subtotal			2,442.0				
World		10,683	7,125.1				
Share of world			34.3%				

Sources: World Bank's World Development Indicators, tariffs constructed by the author with data from WTO CTS, IDB, and UNCTAD TRAINS.
Members with average tariff overhang greater than 15 percentage points, ranked from lowest to highest. GNI=gross national income, NA=not available.

Figure 2.4
Average applied MFN tariffs and tariff bindings for WTO members with substantial tariff overhang in 2013, by industry. Constructed by the author from tariff data at the HS06 level from the WTO IDB, CTS, and UNCTAD TRAINS and from the data for the 45 WTO member countries in table 2.7 with 15 percentage points or more of average tariff overhang.

Next, to the extent that the countries with substantial unbound products were geographically concentrated in sub-Saharan Africa, the countries with substantial tariff overhang tend to be geographically concentrated in Latin America (again see figure 2.1). Nevertheless, there are important exceptions, including countries with substantial overhang arising in South and East Asia and North Africa. Furthermore, while countries with relatively large populations, such as Egypt, Philippines, Brazil, Mexico, Indonesia, and India, are notably on the list of countries with substantial tariff overhang, this list also contains a number of countries with tiny populations (11 of the 45 have less than one million people), including a number of small island economies of the Caribbean. Nevertheless, the combined population of these 45 countries is over 2.4 billion people, or more than one-third of the global population.

Figure 2.4 illustrates the average MFN applied tariffs and tariff bindings by sector for these 45 WTO members that average more than 15 percentage points of tariff overhang. The average applied tariffs exhibit cross-industry patterns similar to the other settings for developing countries (e.g., relatively higher applied tariffs in sectors such as footwear, textiles, hides, and skins, and lower applied tariffs for fuel, chemicals, and machinery. There are significant differences in binding levels across sectors, however. Tariff binding levels average over 60%

in animals, vegetables, and foodstuffs, whereas they are closer to 40% for all other (nonagricultural) sectors.

2.5.2 Empirical Evidence for Bound Tariffs with Substantial Overhang

In this subsection I follow a modified version of Nicita, Olarreaga, and Silva (2018) to empirically examine the question of whether measures of importer market power are related to applied tariffs for the countries identified in table 2.7 as having substantial tariff overhang, or an average of more than 15 percentage points between their tariff bindings and their applied MFN tariffs. In the estimation, I also condition on the country-product pairs that have 15 percentage points or more of tariff overhang as well.[25] The basic model that I estimate is again simply

$$\ln(1+\tau_{gc}^{WTO\ applied}) = \alpha_g + \alpha_c + \gamma_0 \ln(1/\omega_{gc}^*) + \epsilon_{gc}, \quad (2.3)$$

where if importing countries continue to exert market power over their applied import tariffs ($\tau_{gc}^{WTO\ applied}$) for this subset of bound products over which there is substantial tariff overhang, I expect γ_0 to be positive. The main difference from the approach described in subsection 2.5.1 is not the model but simply the subsample of countries and products (those with bound tariffs and tariff overhang) over which the model is estimated.

Table 2.8 presents the results. The general finding confirms the evidence from Nicita, Olarreaga, and Silva (2018) for this particular subsample of countries that market power considerations are positively related to applied MFN tariff rates in 2013 for these products.

The first column of table 2.8 is the baseline specification, which indicates a positive and statistically significant relationship between the log of the inverse of the foreign export supply elasticity, given by $\ln(1/\omega_{gc}^*)$, and the measure of the applied MFN tariff rate, given by $\ln(1+\tau_{gc}^{WTO\ applied})$. In column 2, I introduce importing-country fixed effects, and in column 3 I utilize the high inverse elasticity indicator variable in lieu of the continuous measure. The results are robust to these different specifications.

The next three columns of table 2.8 examine subsamples of these data. Column 4 focuses on where tariff overhang is the greatest by changing the threshold from 15 percentage points to 25 percentage points, thereby reducing the sample by almost half.[26] The size of the estimated impact of market power is even larger in the subsample of

Table 2.8
Market power and WTO members' applied tariffs for bound products with substantial tariff overhang in 2013.

	Regression equation: $\ln(1+\tau_{gc}^{WTO\ applied}) = \alpha_g + \alpha_c + \gamma_0 \ln(1/\omega_{gc}^*) + \epsilon_{gc}$						
	Baseline (1)	Add Importer Fixed Effect (2)	High Inverse Elasticity Indicator (3)	Change to 25 p.p. Subsample (4)	Nonagr. Only (5)	Agr. Only (6)	Recent Accessions Only (7)
Log inverse elasticity: $\ln(1/\omega_{gc}^*)$	1.74***	0.49**		1.37***	0.55**	0.31	−1.25***
	(0.28)	(0.24)		(0.32)	(0.25)	(0.66)	(0.38)
High inverse elasticity indicator			0.03***				
			(0.01)				
Product-level (HS06) fixed effects	Y	Y	Y	Y	Y	Y	Y
Importing-country fixed effects	N	Y	Y	Y	Y	Y	Y
Observations	68,355	68,355	68,355	38,710	60,532	7,823	30,096
R^2	0.33	0.58	0.58	0.65	0.59	0.57	0.48

Notes: Robust standard errors are in parentheses. Estimates for the constant term are suppressed. With the exception of columns 4 and 7, the model estimated on bound products for 45 countries (listed in table 2.7), each with tariff overhang greater than 15 percentage points. Column 4 model estimated on bound products for 30 countries (listed in table 2.7) with tariff overhang greater than 25 percentage points. Column 7 estimated on bound products for 12 recently acceded WTO countries listed in table 2.3. With the exception of Nepal (13.8) and Oman (9.1), the ten other countries have average tariff overhangs of 6 percentage points or less.
***, **, and * indicate statistical significance at the 1%, 5%, or 10% level, respectively.

countries and products where tariff overhang is largest. Columns 5 and 6 split the original baseline sample in two, depending on whether the products fall into agriculture. Interestingly, the potential influence of market power is not found in the agricultural product subsample of the data in column 6, though admittedly this is a much smaller sample of observations.

Finally, and as a last "consistency check" with expectations, the last column of table 2.8 presents estimates from the same model on a completely different subsample of data—the 12 countries that recently acceded to the WTO that were part of the formal econometric analysis of tariff bindings presented in table 2.4. Not surprisingly, the relationship in column 7 between the inverse foreign export supply elasticity and applied import tariffs for these 12 countries is not only not positive but is negative and statistically significant. Recall from table 2.3 that upon entry to the WTO, countries such as China, Russia, and Ukraine not only took on nearly universal tariff binding coverage but also bound their tariffs at relatively low levels compared to their applied rates. The average tariff overhang for the countries and products in the column 7 sample is only 3.6 percentage points, and less than 5% of observations in that sample have 15 percentage points or more tariff overhang.[27] The applied tariffs for the recently acceded WTO members thus have a very different empirical relationship with measures of import market power than the applied tariffs for the WTO members that have been around since the agreement's inception and that continue to have large amounts of tariff overhang.

The evidence from this section suggests that products for countries that have taken on WTO bindings but for which substantial tariff overhang remains have applied MFN import tariffs that continue to reflect import market power considerations. As such, this may constitute an area where additional WTO-facilitated negotiations for applied MFN tariff reductions would be consistent with the insights of the terms-of-trade theory of trade agreements.

2.6 Conclusions and Policy Implications

This chapter uses the lens provided by the terms-of-trade theory of trade agreements, as well as recent empirical and data advances arising in the literature, to assess whether there may be a market power neutralization motive for the WTO to facilitate additional tariff reductions in three distinct areas: (1) applied tariffs for WTO nonmembers,

(2) applied tariffs for members where they are unbound, and (3) applied tariffs for members where there is substantial tariff overhang.

An open policy question is how the WTO could be redeployed to address these areas where additional liberalization motivated by terms of trade might take place. While I have provided a mix of direct and indirect evidence for where there remains a positive relationship between import market power and applied import tariffs, I have nevertheless refrained from assessing why "high" applied import tariffs (that reflect terms-of-trade motives) have yet to be extinguished even by WTO negotiations, as well as whether institutional impediments might be overcome that would allow for their negotiated reduction.

A promising line of research involves the Bagwell, Staiger, and Yurukoglu (2015) examination of the *historical* process of reciprocal trade negotiations that took place product-by-product under the early GATT rounds. There may be lessons to be learned from the details of such experiences for any additional liberalization remaining to be undertaken today.

Nevertheless, one additional possible starting point arises out of the results that I have developed here in subsection 2.5.2. WTO members that retain substantial amounts of tariff overhang and have applied MFN tariffs that continue to reflect market power influences could potentially be grouped with one another to identify reciprocal liberalization matches in the spirit suggested by the Bagwell and Staiger (1999) theory. While obviously these regression results are only suggestive of where negotiators could potentially look in greater detail, the countries in this sample include Argentina, Brazil, India, Indonesia, and Mexico—all members of the Group of 20 (G20) and potential future leaders with a vested interest in sustaining the multilateral trading system.[28] On the other hand, the last set of results of subsection 2.5.2 presents no evidence that, on average, applied MFN tariffs and market power remain positively related for the set of recently acceded WTO members that includes China and Russia. Such evidence would tend to suggest that the countries that recently acceded to the WTO may not be great candidates to lead a new set of reciprocal tariff liberalization negotiations.

Furthermore, I have already noted one particularly important strand of research in the terms-of-trade literature that identifies variation in the concentration of export interests across countries as presenting an additional bottleneck that may mitigate the effectiveness of the

GATT/WTO's reciprocal, shallow-integration approach to tariff cutting (Ludema and Mayda 2013). The Ludema-Mayda evidence was based on a 26-country sample that included a number of high-income countries, and it does suggest that not all of the terms-of-trade motives may have (as yet) been exorcised for the high-income-economy applied MFN tariffs. While this would imply that such countries could also plausibly be part of future reciprocal bargains still to be struck, the difficulty for the WTO and trade negotiators may rest in how to make those matches and strike those bargains. Put differently, the second insight from the Ludema-Mayda evidence is that the real world of trade negotiations is certainly even more complicated than simply getting two large importing countries together to reciprocally reduce their import tariffs. The potential asymmetry of exporters in a many-country world, or the concentration (or lack thereof) of exporting interests for a particular product, may make implementation of the GATT/WTO's historical "principal supplier rule" approach to pairing negotiating interests difficult. To what extent might third-party intermediaries (such as an institution like the WTO) be needed to organize *triangular* liberalization efforts, say, if bilateral trade liberalization opportunities between partners are unlikely because of trade imbalances or other asymmetries? More research is certainly required to further investigate all these questions.

An additional and potentially related concern requiring additional exploration is that the importing countries that continue to impose positive tariffs reflecting their market power incentives may also not face significantly large "foreign" tariffs on their exported products to generate the trade-off necessary for the neutralization of the terms-of-trade cut under the traditional, reciprocal approach. This may be because the importing country receives preferential tariff treatment from trading partners for its exports, either through unilateral preferences such as the Generalized System of Preferences (GSP) or through *reciprocal* preferential trade agreements. Alternatively, "intermediate" (but not "latecomer" nonmember) countries to the system may find that they already receive MFN treatment of very low applied tariffs from the major markets of other WTO members for their exports. While the WTO system has seemingly been able to overcome this hurdle when it comes to neutralizing the terms-of-trade motives behind recently acceded WTO member countries (Bagwell and Staiger 2011; see also the results in subsection 2.3.3), it appears that it may have been much less successful in doing so in the initial tranche of acceding members

in 1995, when it did not require these countries especially to take on particularly stringent tariff binding commitments (see the results of section 2.5 and Nicita, Olarreaga, and Silva 2018).

There are other complications to the historical GATT/WTO approach to reciprocal liberalization that the theoretical literature has begun to identify and explore and may also serve as impediments for future liberalization. These include trade in products where prices are determined by bilateral bargaining and not market-clearing conditions (e.g., Antràs and Staiger 2012a, 2012b) and environments characterized by cross-border ownership and foreign direct investment (Blanchard 2007, 2010). While these particular impediments may be more suited to the relatively complex trade in parts and tasks that is commonly associated with high-income countries, nevertheless, as Johnson and Noguera (2017) document, the importance of such trade is increasing almost everywhere over time.

Finally, I conclude by pointing out that even once countries are inside the WTO and the terms-of-trade incentives may have been extinguished from their applied MFN tariffs, significant institutionally provided flexibilities exist so that trade policy is not truly and permanently locked in at levels that may turn out to be too low in the face of political-economic shocks. Bown and Crowley (2013b), for example, provide evidence consistent with the Bagwell and Staiger (1990) theoretical, repeated-game framework of trade agreements that interprets some use of antidumping measures and safeguards as governments managing the terms-of-trade pressure—even once they have bound their applied MFN tariffs at low levels—associated with trade volume shocks.[29] Thus, while the WTO may still have some work to do, so as to more completely exorcise the terms-of-trade incentives from its members' applied MFN tariffs, even after potential completion of those efforts, some trade policy flexibility (and influence of terms-of-trade motives affecting the use of such flexibility) may likely remain.

Data Appendix

The sources of the applied MFN tariff data for WTO members, the tariff binding data for WTO members, and the applied tariff data for WTO nonmembers are a combination of WTO, Integrated Data Base (IBD), Consolidated Tariff Schedules (CTS) data base, and United Nations Conference on Trade And Development Trade Analysis Information System (UNCTAD TRAINS). Some of the tariff data are more

disaggregated than the HS06 level, in which case I first construct means at the HS06 level before further employing them.

The data on the inverse export supply elasticities at the HS06 level for 100 WTO member countries are from Nicita, Olarreaga, and Silva (2018).

The sources of the data on the economic characteristics of countries are primarily the World Bank's World Development Indicators. For some countries with missing data, estimates from the CIA's *World Factbook* were used.

Notes

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1. The United States presented a number of challenges to the WTO by holding up the appointment of WTO Appellate Body members and through the Trump administration's 2018 imposition of tariffs on steel and aluminum under the allegation that they are a threat to American national security (The Economist 2018).

2. The only negotiated tariff reduction taking place under the WTO in the intervening period was for the 201 products arising through the plurilateral Information Technology Agreement in 2015, which involved a critical mass of more than 20 WTO members. Similar negotiations to cut tariffs plurilaterally under an Environmental Goods Agreement have stalled. I will not investigate those products or negotiations here.

3. Other explorations behind the stalled Doha Round and its ineffectiveness include Martin and Mattoo (2011) and Jones (2010). For a behind-the-scenes perspective on many of the personalities involved, see Blustein (2009).

4. Krishna (2014) also provides a skeptical view of the proliferation of preferential trade agreements and its implications for the multilateral trading system. See also Maggi (2014).

5. Even though the United States had negotiated a successful TPP agreement, Donald Trump pulled the country out of it on his third day in office. It has since been renegotiated by the remaining 11 member countries as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, or CPTPP.

6. In addition to the terms-of-trade theory described in more detail later, there are other prominent theories of trade agreements that I will not integrate into my formal analysis but also deserve mention. The first alternative approach to trade agreements is the commitment theory (Maggi and Rodríguez-Clare 1998, 2007; Staiger and Tabellini 1987; Limão and Tovar 2011), in which governments may seek an external agreement to tie their own hands in relation to their private sectors. Other recent alternative theories include consideration of other potential international externalities aside from the terms-of-trade externality, such as those that may arise through firm delocation (Ossa 2011, 2012). A third theory is motivated by the rise of offshoring (Blanchard 2007, 2010; Antràs and Staiger 2012a, 2012b). Bagwell, Bown, and Staiger (2016) provide a more extensive survey of theoretical and empirical advances in these areas as well as the terms-of-trade literature. Bown and Crowley (2016) survey the empirical landscape of tariffs and other trade policy instruments in historical perspective and in more detail.

7. In this way, it allows for political economy influences of many different classes of models, including that of Grossman and Helpman (1994).

8. Some of the terms-of-trade externality analysis in the context of trade policy was provided by Johnson (1953–1954). Bagwell and Staiger (2002) provide a book-length treatment that considers a number of alternative applications of the model to trade agreements under different settings, including consideration of some forms of nonpecuniary exernalities and domestic policy instruments.

9. As I will describe in more detail, Bown and Crowley (2013b) provide a separate empirical analysis of a particular class of nontariff barriers for the United States. That study covered a different time period and assessed the terms-of-trade implications of a slightly different theoretical model (Bagwell and Staiger 1990), but it also provides evidence consistent with the terms-of-trade theory.

10. To clarify, Bagwell and Staiger (2011) compare a country's unbound (applied MFN) tariff rates before the country's WTO accession with its legally binding tariff commitment post-WTO accession and not its postaccession applied MFN rate.

11. See also Ludema and Mayda (2009) for an alternative approach focused exclusively on the United States.

12. Bown and Crowley (2013b) provide additional evidence that terms-of-trade motives continue to affect trade policy decisions for WTO members, albeit in a different trade policy setting. They provide evidence consistent with the Bagwell and Staiger (1990) repeated-game model of trade agreements by focusing on the US use of antidumping restrictions and safeguards over 1997–2006. They find for a country like the United States (with applied tariffs virtually at their binding level), the flexibility of antidumping restrictions and safeguards can be seen as allowing the government to raise import protection levels in response to trade volume shocks arising from terms-of-trade motivations.

13. This is notably higher than the estimates of the tariffs applied at the height of the Great Depression in the 1930s, after the US imposition of the Smoot-Hawley tariff in 1930 and international retaliatory response. See Bown and Irwin (2017) for a discussion of the range of tariffs more likely to have been in effect just prior to the GATT's starting point in 1947, which they put at around 22%.

14. To clarify, Beshkar, Bond, and Rho (2015) focus on the determinants of the level tariff bindings (taking applied rates as given), whereas Nicita, Olarreaga, and Silva (2018) focus on the determinants of the level of *applied* tariffs (taking binding rates as given). Nicita, Olarreaga, and Silva do not investigate the impact of import market power on either the level of tariff *bindings* or the *amount of overhang* between the binding and the applied tariff; an instrumental variable for the amount of overhang is interacted with the measure of importer market power.

15. Separately, there is some empirical evidence related to the commitment theory of trade agreements. However, it is much less developed in the literature. Examples include Tang and Wei (2009), which finds some evidence of a positive impact of WTO accession on economic growth. Bown and Crowley (2014) find evidence for some developing countries that WTO entry has committed them to change how they implement increases to their levels of import protection (in response to macroeconomic shocks) by switching to different (and WTO-sanctioned) trade policy instruments, and this is both different from how they operated before the WTO and similar to the commitments and trade policy use of higher-income WTO members. See also Staiger and Tabellini (1999) for evidence on the role of the GATT in allowing the United States to make trade policy commitments during the Tokyo Round of negotiations.

16. Handley and Limão (2015) provide a structural approach to estimate the model and apply it to Portuguese firm-level data. Their policy environment does not entail the binding of tariffs under the WTO. Instead they examine the 1986 Portuguese trade agreement accession to the European Economic Community, which reduced trade policy uncertainty by locking in zero import tariffs from European trading partners. Francois and Martin (2004) provide an alternative theoretical approach examining the role of tariff bindings in reducing the uncertainty associated with market access. Limão and Maggi (2015) provide a more general theory examining when trade agreements can provide gains through the reduction of trade policy uncertainty. Conditional on the level of income risk aversion in a country, gains from reducing trade policy uncertainty are more likely to arise for economies that are more open and specialized and that have lower export supply elasticities.

17. See also Handley and Limão (2017) for an examination of the resolution of trade policy uncertainty facing Chinese firms resulting from accession to the WTO in 2001 and the reduction of uncertainty surrounding tariffs applied by the United States that had persisted during the 1990s through the annual Senate debate on whether to renew China's MFN treatment. They find that the WTO's effect on reducing the threat of a trade war explains 22% of China's export growth to the United States, and that the reduction in policy uncertainty lowered US prices and increased consumers' incomes by the welfare equivalent of an 8 percentage point tariff decrease.

18. I utilize data on accessions starting only in 1998 (instead of, for example, 1996) because some of the initial wave of WTO accession countries in 1996 and 1997 were countries that may simply have waited to begin the domestic legal process to formally ratify WTO membership until after the major WTO members had done so, recalling the US experience of failing to ratify the International Trade Organization (ITO) in the 1940s, which led to the GATT.

19. Note that these three country groupings do not correspond to the World Bank's official categories.

20. Governments with WTO observer status are not members but are granted limited WTO rights, such as access to certain WTO meetings. They are also expected to uphold other obligations, such as making some (minimal) contributions to the WTO's operating budget.

21. Finally, my estimation exercise here and in what follows relies only on ordinary least squares. Unlike the prior literature, I do not estimate instrumental variables, so the estimates reported here should not be interpreted as identifying magnitudes associated with causal effects.

22. The appendix provides a full description of the data and its sources.

23. For a discussion of a variety of potential approaches to adopt for assessing the robustness of results, see Broda, Limão, and Weinstein (2008) and Nicita, Olarreaga, and Silva (2018).

24. These countries are Israel, Turkey, Central African Republic, Philippines, Bahrain, India, and Tunisia.

25. That is, I drop from the sample all products within these 45 countries that have bound tariffs but applied MFN tariffs that are within 15 percentage points (or less) of the binding rate. Because I am therefore conditioning on a sample of countries and products that *only* have tariff overhang, I do not need to include interaction terms as in Nicita, Olarreaga, and Silva (2018) in order to thereby separate out the potential negative relationship between measures of import market power in the absence of such overhang (i.e., when the applied MFN tariff is equal to the binding rate).

26. For the countries involved in this subsample, again see table 2.7, and the bottom two-thirds of the listed countries, beginning with Peru (26.1%).

27. While not presented in the table, I can also confirm another relationship identified by Nicita, Olarreaga, and Silva (2018) for this particular sample of countries: that when applied rates are equal to binding rates (so "cooperation" is the strongest), the relationship between market power and the applied MFN tariff is still negative.

28. However, this is complicated by the fact that many of the countries on this list (e.g., Mexico, Colombia, Peru, and Chile) are actively involved in the formation of preferential tariff agreements with major high-income economies. These agreements may serve as an alternative to neutralizing the terms-of-trade motives associated with certain applied *bilateral* tariffs (with respect to major trading partners at least) if not their applied MFN tariffs.

29. For evidence that macroeconomic shocks—real exchange rate shocks, real GDP and unemployment shocks—also trigger new import protection under such temporary trade barrier policies permitted under the WTO, see Bown and Crowley (2013a, 2014) for cross-country studies on high-income and emerging economies, respectively, in the spirit of the Bagwell and Staiger (2003) theoretical framework. Vandenbussche and Zanardi (2008) describe motivations for the rise of antidumping laws—the most commonly invoked temporary trade barrier policy—across the WTO membership over time, and Bown (2011b) provides a recent empirical account of the use of the policies across countries over time.

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3 Dragons, Giants, Elephants, and Mice: Evolution of the MFN Free-Rider Problem in the WTO Era

Rodney D. Ludema, Anna Maria Mayda, and Jonathon C. F. McClure

To be blunt, there is hesitation to make indirect concessions to China, whether or not people are willing to name the dragon in the middle of the room.
—Francois (2008)

For them, the elephant—or rather, the dragon—in the living room was China. Brazil, India, and other emerging economies were reluctant to further reduce industrial tariffs on an MFN basis because market opening towards OECD countries on this basis would also result in market opening towards China, whom they increasingly feared as a competitor.
—Kleimann and Guinan (2011)

3.1 Introduction

Today's World Trade Organization (WTO) oversees a vastly different trading system than the one it inherited 20 years ago, in large part because of three major trends: the accession of new members to the WTO, the rise of emerging economies, and the proliferation of preferential trade agreements (PTAs). The 2012 WTO had 157 members, 45 of which had acceded since the WTO replaced the General Agreement on Tariffs and Trade (GATT) in 1994.[1] Most notable among these new entrants are two of Asia's largest economies, the People's Republic of China (which acceded in 2001) and the Russian Federation (which acceded in 2012). The second trend is the rise of "emerging" economies, most notably Brazil, Russia, India, and China (BRIC). On average, emerging economies have grown far faster than the rest of the world. From 2004 to 2013, the average annual real GDP growth rates of Brazil, China, India, Indonesia, and Russia averaged 6.5%, while growth in Germany, France, Japan, the United Kingdom, and the United States averaged only 1.2% over the same period.[2] Along