

Is the WTO Passé?[†]

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The WTO has delivered policy outcomes that are very different from those likely to emerge out of the recent wave of preferential trade agreements (PTAs). Should economists see this as an efficient institutional hand-off, where the WTO has carried trade liberalization as far as it can manage, and is now passing the baton to PTAs to finish the job? We survey a growing economics literature on international trade agreements and argue on this basis that the WTO is not passé. Rather, and subject to some caveats, our survey of research to date suggests that the WTO warrants strong support while a more cautious view of PTAs seems appropriate. (JEL F13, F14, K33, N70)

1. Introduction

Together with its predecessor the General Agreement on Tariffs and Trade (GATT), the World Trade Organization (WTO) has delivered policy outcomes for its member

governments that are very different from those likely to emerge out of the recent wave of preferential trade agreements (PTAs). Over nearly seventy years, the GATT/WTO concluded eight rounds of multilateral trade negotiations, reducing the average ad valorem tariff on industrial goods to below 4 percent and expanding the multilateral system's membership from 23 to 161 economies. But the GATT/WTO liberalization process has ground to a halt with the ninth and seemingly moribund Doha Development Round. Furthermore, the scope of GATT/WTO liberalization, with its focus on border measures, has mainly been shallow. By contrast, PTAs have emerged as the vehicle by which countries reduce their tariffs from current WTO levels down to zero, albeit on a discriminatory basis: the number of PTAs has expanded from roughly 100 in 1990 to nearly 400 today. And the intended scope of PTA

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liberalization, which reaches further and further behind the border, is increasingly deep.¹

Should economists see the current state of affairs as an efficient institutional handoff, with the GATT/WTO having carried trade liberalization as far as it could manage, and now passing the baton to PTAs to finish the job and help governments arrive at their international efficiency frontier?² And if so, can PTAs rely on their own systems of dispute resolution to ensure that governments remain at the frontier? If these questions can be answered in the affirmative, then economists could view PTAs as a legitimate successor to the GATT/WTO and reasonably conclude that “the WTO is passé.” But there are alternative interpretations of these developments.

One possibility is that PTAs are indeed needed to complete or complement the liberalization process and move governments

to their international efficiency frontier, but that a central role for dispute resolution would continue to reside at the WTO. Under this view, PTAs and the WTO are complementary to an efficient multilateral trading system, and both deserve support.

More ominously, the current state of affairs might be seen as ultimate proof that PTAs are stumbling blocks to the multilateral system. According to this interpretation, the WTO still has important liberalization work to do, but it has stalled out short of its goal because of the existence and ready availability of PTAs. From this perspective, liberalization under the GATT/WTO may have ground to a halt short of the international efficiency frontier, but PTAs should be seen as a root cause of the WTO’s current woes, rather than its legitimate successor.

A third possibility is that governments may have already achieved the international efficiency frontier under the GATT/WTO liberalization process—or if not yet, they could achieve it with selective fixes—so that the WTO is in better shape than it appears; rather it is the kind of additional liberalization associated with the recent rise of PTAs that represents a failure of efficient international trade policy cooperation. With this interpretation, PTAs are liberalization run amok.

In this paper, we make use of a growing economics literature on international trade agreements to sort through these interpretations and suggest answers to the questions posed above. To facilitate our discussion, we adopt a simple organizing principle: we group papers in the literature by their stance on what makes a trade agreement valuable to its member governments, that is, by the nature of the “problem” that a trade agreement is supposed to “solve” for its member governments. According to this organizing principle, there are four strands of the literature.

The oldest and most established strand of the literature is the “terms-of-trade” theory

¹Here and throughout our survey, we focus on international agreements to liberalize market access for traded goods and services, which for short we refer to as “trade agreements.” The GATT focused on liberalizing market access for goods and, as we explain further below, took a shallow integration approach. The WTO’s *General Agreement on Trade in Services* (GATS) extended the market-access focus of GATT to trade in services, but GATS has yet to produce meaningful liberalization (Francois and Hoekman 2010). The WTO agreements also include the *Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS), the principal concern of which is the protection of intellectual property rights, rather than issues of market access. While distinct from our trade agreements focus, in the conclusion we briefly discuss a literature related to the TRIPS agreement in the context of our discussion of linkage across issue areas in trade agreements. Finally, while we consider the GATT/WTO multilateral agreement in some detail, we do not delve into the specific details of the individual PTA agreements.

²By “international efficiency frontier,” we mean policy choices that could not be adjusted to generate Pareto gains across countries when each country’s welfare is judged by the preferences of its government. This focus on government preferences generally follows the literature, though a distinction is made in some of the literature between *ex ante* and *ex post* government preferences. We discuss these points further in our survey. Our survey does not focus on research that assesses the value of trade agreements from the perspective of a specific sector, country or subset of countries.

of trade agreements. This theory posits that governments use trade agreements to undo the policy inefficiencies that are associated with unilateral policy choices when those choices can shift the costs of intervention onto trading partners through movements in foreign exporter prices (terms of trade). In this theory, addressing an international externality (which travels through the terms of trade) is the central purpose of a trade agreement. The “commitment” theory also has a well-established history in the literature, but here the central role for an international externality is absent. Instead, governments value trade agreements as a way to tie their hands (make commitments) against their own lobbies and citizens. The two remaining strands of the literature, what we call the “delocation/profit shifting” and the “offshoring” theories of trade agreements, are more recent arrivals. They can be viewed as attempts to identify new international externalities that go beyond the terms-of-trade externality to include the local prices in each country, and that can give rise to and shape international trade agreements. The delocation/profit-shifting theory argues that such non-terms-of-trade externalities have been important for understanding real-world trade agreements all along, while the offshoring theory suggests that non-terms-of-trade externalities may only have become prominent with the recent rise of offshoring and international supply chains.

As might be anticipated, the strength of the literature’s support for the various interpretations of recent developments depends on which purposes are central to real-world trade agreements. While we discuss below evidence that lends support to all four theories, a growing body of evidence points to the terms-of-trade theory as central for understanding the actual trade agreements that we see. We therefore first evaluate these developments from the perspective of the terms-of-trade theory, surveying both

the theoretical and empirical literature to assess the various interpretations and establish some initial answers. We then survey the commitment, delocation/profit-shifting and offshoring theories, describing where they yield different assessments of these interpretations, and we utilize this description in combination with a survey of the relevant empirical literature to suggest qualifications to the answers provided by the terms-of-trade theory.

To preview, the literature we survey does not support the view that the WTO is passé. On the contrary, from the perspective of the terms-of-trade-theory strand of the literature, the WTO appears to be structured in a way that is likely to encourage policy outcomes that are viewed as efficiency enhancing by WTO member governments, while the analogous claim for PTA-led liberalization is less clear. The commitment, delocation/profit-shifting, and offshoring theories do raise important caveats to unqualified support for the WTO, and there are features of PTAs that these theories support. But until more empirical evidence suggests otherwise, these other strands of the literature do not establish that PTAs, rather than the WTO, should be entrusted with the rules of globalization.

To set the stage, we next provide a brief overview of the main institutional features of the world trading system, focusing on the multilateral framework provided by the GATT/WTO and the current state of PTAs. Section 3 reviews the terms-of-trade theory of trade agreements and surveys the empirical literature that relates to its essential tenets. In sections 4 and 5, we use the terms-of-trade strand of the literature as a lens through which to evaluate the GATT/WTO and PTA approaches to trade liberalization, and from this perspective we interpret recent developments in the world trading system. Section 6 surveys the literature on the commitment, delocation/profit-shifting, and offshoring

theories of trade agreements and identifies insights from each that suggest qualifications to the answers provided by the terms-of-trade theory. Section 7 turns to an evaluation of dispute settlement in the world trading system. Finally, section 8 concludes, identifies directions for future research, and discusses the possible role of critical mass and plurilateral agreements in strengthening and revitalizing the GATT/WTO approach.

2. *The World Trading System: A Brief Overview*

Individuals and firms ultimately drive globalization, but governments set the rules of the game, and the rules can be very important to the outcome. Here, we briefly summarize the two main sets of rules for the world trading system: the policy commitments and their enforcement under the GATT/WTO, and the sets of rules associated with the web of PTAs currently in force. We describe how the recent wave of PTAs is changing the rules of globalization along a number of important dimensions, relative to the rules established by the GATT/WTO and even previous PTAs, and we suggest that there are important choices embedded in these two institutional forms.

2.1 *The GATT/WTO Multilateral System*

We begin with some background on the GATT/WTO multilateral system.

2.1.1 *A Short History of Tariff Liberalization under the GATT and WTO*

From the backdrop of the Smoot–Hawley tariffs imposed by the United States in 1930 and the international retaliatory response that followed, the GATT was created in 1947 with twenty-three countries and grew in membership over the next five decades before being consolidated into the WTO in 1995. As of 2015, the WTO counts 161 member economies—including both the European Union and each of the

twenty-eight European Union member states individually.³

The trans-Atlantic economies of the United States, Canada, and a number of European countries were not only a driving force behind the creation of the GATT, but they provide perhaps the most familiar story line for how the GATT facilitated gradual, multilateral trade liberalization and allowed countries to sustain an extensive period of low most-favored-nation (MFN) tariffs. These countries used the GATT forum to reduce MFN tariffs reciprocally through periodic negotiating rounds (WTO 2007), and they then locked in those low tariffs through legally binding commitments. Table 1 illustrates the multilateral trade liberalization process of negotiations (percentage tariff cuts) covering 1947–94, and table 2 documents the resulting average applied *ad valorem* tariff rates for a number of these countries in 1952 and again in 2005 after eight rounds of GATT negotiations.⁴

³The European Union is a member of the WTO; for legal reasons it was officially known until 2009 as the European Communities. The twenty-eight individual countries of the European Union are also WTO members in their own right. The European Union is a single customs union with a single trade policy and tariff, and the European Commission “speaks” on behalf of the European Union member states in most WTO matters. Nevertheless, most other customs unions are not represented in the WTO in this manner, with individual countries retaining WTO membership rights and obligations.

⁴By 1952, average import tariffs expressed in *ad valorem* terms had already fallen substantially from peak levels in the 1930s and 1940s due to a combination of inflation, as many were imposed as specific duties, and the negotiated liberalization of the first three GATT rounds. Irvin (1995, table 5.2) reports average tariff rates in 1931 (after the US imposition of its Smoot–Hawley tariff) for France, Germany, and Italy of 38, 40, and 48 percent, respectively. Irvin (2011, 2012) describes the political-economy forces behind the import protection that increased sharply during the Great Depression, and Irvin, Mavroidis, and Sykes (2008) describe the negotiations that ultimately led to establishment of the GATT in the late 1940s. WTO (2007) also provides an extensive analysis tracking the multilateral trade liberalization that took place over the sixty-year period following the GATT 1947 inception.

TABLE 1
GATT/WTO—60 YEARS OF TARIFF REDUCTIONS

Implementation period	Round covered	Weighted tariff reduction	Weights based on MFN imports (year)
1948	Geneva (1947)	−26	1939
1950	Annecy (1949)	−3	1947
1952	Torquay (1950–1951)	−4	1949
1956–1958	Geneva (1955–1956)	−3	1954
1962–1964	Dillon Round (1961–1962)	−4	1960
1968–1972	Kennedy Round (1964–1967)	−38	1964
1980–1987	Tokyo Round (1973–1979)	−33	1977 (or 1976)
1995–1999	Uruguay Round (1986–1994)	−38	1988 (or 1989)

Notes: MFN tariff reduction of industrial countries for industrial products, excluding petroleum. Tariff reductions for the first five rounds refer to the United States only. The calculation of average rates of reductions are weighted by MFN import values.

Source: © World Trade Organization (WTO) 2016. *World Trade Report 2007: Six Decades of Multilateral Trade Cooperation: What Have We Learnt?* table 5.

TABLE 2
APPLIED TARIFF RATES OF SELECTED GATT/WTO MEMBERS, 1952 AND 2005

Economy	1952	2005
Austria	17	4.2
Benelux	9	4.2
Denmark	5	4.2
France	19	4.2
Germany	16	4.2
Italy	24	4.2
Sweden	6	4.2
United Kingdom	17	4.2
European Union (EU-25)	—	4.2
Canada	11	3.8
United States	16	3.7

Notes: Computed as simple average of fifty-two products in 1952 and of all tariff lines in 2005.

Source: © World Trade Organization (WTO) 2016. *World Trade Report 2007: Six Decades of Multilateral Trade Cooperation: What Have We Learnt?* appendix table 7.

The trans-Atlantic GATT experience is not, however, how countries have universally liberalized their MFN tariffs, or even entered into the GATT/WTO system. There are two prominent classes of exceptions that are best illustrated by the GATT/WTO experience of other member countries.

First, some countries did not enter the system at its inception; indeed, many “late-comers” did not seek or were not admitted entrance into the agreement until well after the initial set of GATT Contracting Parties had already substantially negotiated MFN tariff liberalization. As such, the GATT/WTO has had the flexibility to accommodate accessions by major economies, including West Germany in 1951, Japan in 1955, China in 2001, and Russia in 2012.⁵

Second, many developing countries chose not to participate in the reciprocal tariff liberalization negotiations that took place under successive GATT rounds. Instead, countries including GATT founders India and Brazil requested and utilized “special and differential treatment” exemptions from reciprocity in order to pursue import substitution policies. While such countries may currently apply relatively low (in historical terms) MFN tariffs, their liberalization episodes frequently were not undertaken reciprocally, but instead unilaterally (e.g., India) or in concert with a period of preferential liberalization (e.g., Brazil). These and other countries also did not follow the trans-Atlantic approach of gradually lowering their MFN tariffs over decades; instead, their period of low and sustained multilateral tariffs began suddenly and not until the 1990s. And unlike the United States and the European Union, the relatively low MFN tariff rates that countries like Brazil and India apply have not

been legally bound under the WTO at similarly low levels.

Finally, the WTO’s 161 members notwithstanding, there are at least three dozen countries that are not yet members. While most are developing countries and some liberalized their trade regimes independently of the WTO (through either preferential or unilateral tariff liberalization), there remain roughly 500 million people that reside in countries entirely outside of the WTO system. Seven percent of the global population has not taken on WTO obligations and does not enjoy the WTO legal benefits that we describe in more detail below.

2.1.2 *Contemporary Tariff Commitments under the WTO*

Table 3 summarizes many of the salient features resulting from the GATT/WTO’s “shallow” integration approach to trade liberalization, including information on contemporary multilateral tariffs across and within the major economies. The table splits countries into three groups—the high-income members of the Group of 20 (G20), the emerging-economy members of the G20 (which includes the BRICS, namely, Brazil, Russia, India, China and South Africa), and a selected sample of other major developing countries with 2012 populations of over 50 million—some of which are not (yet) WTO members, as they are currently only WTO “observers.”⁶ Overall, the tariff data indicate substantial heterogeneity across countries and industries and include many examples of applied MFN import tariffs, as well as the bindings that have been legally negotiated to constrain them, that are not close to free trade.

⁵China was an original contracting party to the GATT, but withdrew in 1950. The other two original contracting parties to subsequently withdraw from the GATT were Lebanon and Syria.

⁶Governments with WTO observer status are non-members that are granted limited rights (e.g., access to certain WTO meetings) and are expected to uphold certain obligations (e.g., minimal contributions to the WTO’s budget).

TABLE 3
TRADE POLICY UNDER THE WTO FOR SELECTED ECONOMIES, 2012

WTO member economy	MFN applied rate, simple average (1)	Binding rate, simple average (2)	Binding coverage (3)	Coverage of applied duties > 15 percent (4)	Maximum applied rate (5)	MFN applied rate, agriculture only (6)	TTB coverage (7)
<i>G20 High Income</i>							
Australia	2.7	10.0	97.1	0.1	28.0	1.2	1.0
Canada	4.3	6.9	99.7	6.9	551.0	16.2	1.2
European Union	5.5	5.2	100.0	5.1	605.0	13.2	3.0
Japan	4.6	5.2	99.7	3.8	692.0	16.6	<0.1
Saudi Arabia	5.1	11.3	100.0	0.4	427.0	6.2	NA
South Korea	13.3	16.6	94.6	10.4	887.0	52.7	0.5
United States	3.4	3.5	100.0	2.7	350.0	4.7	6.8
<i>G20 Emerging</i>							
Argentina	12.5	31.9	100.0	36.0	35.0	10.5	3.2
Brazil	13.5	31.4	100.0	36.2	55.0	10.1	1.9
China (2011)	9.6	10.0	100.0	14.6	65.0	15.6	1.3
India	13.7	48.6	73.8	19.6	150.0	33.5	6.5
Indonesia	7.0	37.1	96.6	1.6	150.0	7.9	1.7
Mexico	7.8	36.1	100.0	13.8	254.0	21.2	1.1
Russia	10.0	7.8	100.0	11.7	292.0	13.3	NA
South Africa	7.6	19.0	96.4	20.6	>1,000	8.4	0.6
Turkey	9.6	28.6	50.3	10.8	225.0	41.2	4.9
<i>Developing, Other*</i>							
Bangladesh (2011)	14.4	169.2	15.5	40.1	25.0	17.2	**
Burma	5.6	83.4	17.6	5.0	40.0	8.6	**
DR of the Congo	NA	96.2	100.0	NA	NA	NA	**
Egypt	16.8	36.7	99.4	19.2	>1,000	66.7	NA
Ethiopia [†] (observer only)	17.3	**	**	50.8	35.0	22.4	**
Iran [†] (observer only, 2011)	26.6	**	**	45.7	400.0	30.4	**
Nigeria (2011)	11.7	119.1	19.1	39.0	35.0	15.5	**
Pakistan	13.5	59.9	98.7	36.1	100.0	15.5	0.3
Philippines	6.2	25.7	67.0	3.1	65.0	9.8	0.1
Thailand	9.8	27.8	75.0	22.6	142.0	21.8	0.7
Vietnam	9.5	11.4	100.0	24.7	135.0	16.1	NA

Notes: Parentheses indicate data availability for a year other than 2012. *Selected other developing countries chosen as those with 2012 populations greater than 50 million. **Indicates nonuser (or unreported user) of the policy instrument. NA = not available. G20 = Group of 20. [†] Indicates WTO nonmember. Columns (1), (2), (5), and (6) are ad valorem rates, and columns (3), (4), and (7) are shares of import products.

Source: Tariff data taken from WTO, ITC, and UNCTAD (2013) and temporary trade barrier (TTB) data taken from Bown (2014).

Consider first the United States. The simple average MFN tariff that the United States applies to imports from any other WTO member is 3.4 percent. One hundred percent of the US tariff lines are bound at some level, and the simple average binding rate is 3.5 percent. This is the rate above which a country promises not to raise its applied MFN tariff, and this rate serves as the formal legal commitment that a country submits to the WTO membership. The WTO permits countries to apply tariffs below their bound rates, provided that such offerings are made to all other members on a nondiscriminatory (MFN) basis. That the US applied MFN import tariff is pushing up against the binding rate is an indicator that it has very little scope to unilaterally increase its applied MFN import tariffs without running afoul of WTO rules.

While average US applied and bound MFN tariffs are quite low, there is considerable heterogeneity both across and within even high-income countries. Most major industrialized economies have almost universal binding coverage and applied rates that are relatively close to their tariff bindings. Nevertheless, while applied MFN tariffs may be low in historical terms, they range from an average of 2.7 percent (Australia) to 13.3 percent (the Republic of Korea, hereafter South Korea). There also remain important examples of outliers or tariff “peaks” in high-income economies; for example, 2.7 percent of US tariffs have applied MFN rates higher than 15 percent, with the highest rate being 350 percent. Canada, the European Union, and South Korea each have more than 5 percent of MFN tariff lines with rates higher than 15 percent, and maximum applied rates in these economies are greater than 500 percent.

Tariffs exhibit even more heterogeneity across emerging and developing economies. While average applied MFN tariffs are also relatively low for these countries in historical terms, the rates applied by even the relatively advanced (G20) emerging

economies are typically substantially higher than their high-income-country counterparts. Furthermore, some countries (e.g., India) have not committed to legally binding a significant share of their tariff lines at any level. Finally, within the set of products that countries have committed to legally bind, there can be significant differentials between applied rates and the binding commitment. This last point holds for all of the G20 emerging economies (including Argentina, Brazil, India, and Mexico) with the exception of the relatively new WTO accession countries of China (2001) and Russia (2012), for which the existing membership demands included relatively low levels of MFN tariff bindings.⁷

Heterogeneity across the tariff data can be even more extreme for other major (but poorer) developing countries. Some WTO members (e.g., Bangladesh, Burma, Nigeria) have committed to upper limits for tariff bindings on fewer than 20 percent of their import tariff lines. Even on products for which these WTO members bind their tariffs, the average binding rates may be more than 100 percentage points higher than applied rates.

There are also important differences in applied MFN tariff heterogeneity within countries across sectors. As one important example, table 3 shows many instances of sharp differences between average applied tariffs in agricultural products relative to overall rates of protection. Within the G20, a few countries such as Argentina, Australia, and Brazil offer lower average import tariffs for agriculture than they do for other products. For most others, however, the rates in agriculture are substantially higher (Anderson, Rausser, and Swinnen 2013).

Finally, applied MFN tariffs are not the only important trade policy instrument within

⁷ As of 2012, Russia had not yet fully phased in its MFN applied tariff cuts under its WTO accession terms, and thus its average applied rate was still above its average binding commitment.

the multilateral WTO system. An increasing number of countries since the early 1990s have begun to invoke GATT/WTO exceptions to their negotiated tariff bindings and use the temporary trade barrier (TTB) policies of antidumping, safeguards, and countervailing duties.

Before 1990, industrialized economies such as Australia, Canada, the European Union, and the United States dominated overall use of TTBs, and especially the most predominant antidumping policy (Blonigen and Prusa 2003). Since the early 1990s, a number of emerging economies have subsequently become major users of TTBs (Bown 2011b) as they reduced their applied import tariffs. The last column of table 3 provides data on the import coverage of the TTBs cumulatively applied in 2012. As examples, eleven different G20 economies had more than 1 percent of their tariff lines also subject to an imposed TTB in 2012; some of these countries did not even have an antidumping law in place twenty-five years earlier. Many also had one or more episodes over this twenty-five-year period during which the cumulative TTB import coverage rose to as high as 4–6 percent.

Table 3 reveals two other features of TTB use. First, not all WTO members use these policies. Indeed most of the poorest WTO members have never implemented a formal antidumping or safeguard proceeding, a feature that can be partially explained by the fact that the tariff bindings of these countries are sufficiently above their applied rates that they can adjust tariffs upward unilaterally in response to shocks. Second, even members of a customs union—i.e., countries that eliminate tariffs on internal trade with each other and share a common applied MFN tariff toward nonmembers, examples of which we describe in more detail below—do not necessarily apply a common set of TTB policies. In 2012, for example, customs union partners Argentina and Brazil had different shares of

product lines covered by TTBs, as did the partners Turkey and the European Union.

2.1.3 *GATT/WTO Commitments Relating to Behind-the-Border Measures*

The GATT traditionally eschewed efforts to negotiate restrictions on the use of behind-the-border measures of its member governments. As Hudec (1990, p. 24) describes in his depiction of the genesis of GATT's shallow-integration approach, while governments understood that behind-the-border measures could have trade effects, the GATT never had its heart in deep integration:

The standard trade policy rules could deal with the common types of trade policy measure governments usually employ to control trade. But trade can also be affected by other “domestic” measures, such as product safety standards, having nothing to do with trade policy. [When GATT was created in 1947,] ... governments would never have agreed to circumscribe their freedom in all these other areas for the sake of a mere trade agreement.

The WTO emphasizes a shallow-integration approach as well but has attempted to venture into the realm of “deeper” integration, most substantively with the aborted Doha Round attempts to negotiate directly over the “Singapore issues” of foreign investment and competition policy.⁸ It is also important to

⁸In addition to foreign investment and competition policy, the Singapore issues included trade facilitation and government procurement. Trade facilitation focused on the removal of nontariff barriers “at the border” (e.g., procedures for clearing customs), and the Doha Round has produced a Trade Facilitation Agreement (TFA). The attempt in the context of the Doha Round to negotiate multilateral rules for government procurement failed along with the attempts to negotiate a multilateral agreement covering foreign investment and competition policy. Instead, a revised version of the plurilateral Government Procurement Agreement (GPA) first signed in 1979 was negotiated among 43 WTO members and entered into force on April 6, 2014. The WTO TRIPS Agreement is a deep-integration agreement, but it is not considered a market-access agreement (see also note 1).

point out that many of the deep-integration issues of apparent focal interest to recent PTAs are not entirely absent from consideration by the WTO Agreements (WTO 2012). It is simply that the GATT/WTO shallow-integration approach has addressed such issues differently.

For example, it is true that WTO member governments maintain considerable freedom to implement unilaterally a variety of public policy interventions, including those that adversely affect trade flows. Examples include allowances for the protection of plant, animal, and human health, as well as the establishment of product standards. But the WTO provides governments with guidance so as to discourage such interventions from becoming nontariff barriers applied without a legitimate public policy motive. For trade in goods, these exceptions and guidelines are outlined in the GATT's basic rules on national treatment found in Article III and are further elaborated under the GATT's original Article XX, and the WTO's agreements on *Technical Barriers to Trade (TBT)*, and *Sanitary and Phytosanitary Measures (SPS)*. Furthermore, countries can bring nontariff issues to light by also filing "specific trade concerns" with relevant WTO standing committees. Finally, the GATT/WTO provides member governments with the right to initiate, under formal dispute-settlement proceedings, "violation" complaints against behind-the-border measures that violate these guidelines, and even "non-violation" complaints against behind-the-border measures that do not violate the guidelines but still erode negotiated market access commitments.

2.1.4 *Dispute Settlement under the WTO and GATT*

Access to formal dispute-settlement procedures has always been part of the GATT/WTO system. The 1947 GATT's Article XXIII established the basic provisions

whereby government-to-government dispute resolution would take place, and over the subsequent fifty years, contracting parties initiated more than 250 disputes within the GATT fora in attempts to formally resolve a variety of trading frictions that arose.⁹ Legal scholars generally characterize the GATT-provided mediation that took place during this period as a "diplomacy-based" approach to dispute resolution.

Many elements of the system changed dramatically in 1995 with the WTO inception, as the current system is much more "legalistic" than its GATT predecessor. Members initiated nearly 500 formal WTO disputes against one another between 1995 and 2014, or nearly twice as many as during the GATT period of 1947–94. The literature identifies a number of contributing explanations, including that more countries are now actively involved in the trading system, there is substantially more trade, and countries have taken on more legally binding commitments.

Over time, more and more WTO members have found themselves involved in formal disputes. To date, nearly fifty out of the 161 WTO members have initiated a case as a "complainant" (i.e., the plaintiff) and more than fifty members have faced a dispute as a "respondent" (i.e., the defendant). More than half of the membership has been formally involved in at least one dispute via the legal status as an "interested third party." This can be an important role even for countries without trade stakes in a particular dispute, given that jurisprudence arising from a dispute between any two countries—e.g., a policy dispute pitting Colombia versus Panama or Moldova versus Ukraine—could have policy implications for the entire WTO membership, including the United States and European Union.

⁹See Bown (2002; table 1).

The United States and the European Union are the two most frequent WTO litigants; combined, they have initiated roughly 40 percent of all disputes; roughly 50 percent of all disputes involve one or the other as a respondent; and a significant share involves one challenging the other. Nevertheless, many other industrialized countries have also been frequent WTO litigants, including Australia, Canada, Japan, New Zealand, and South Korea. Finally, the share of WTO disputes involving developing country members, with the exception of least developed countries, has risen over time and includes a large number of developing country versus developing-country disputes.¹⁰ Developing countries that are frequent WTO litigants include Argentina, Brazil, Chile, China, Colombia, Guatemala, Honduras, India, Indonesia, Mexico, Panama, Peru, the Philippines, and Thailand.

2.2 PTAs

While a central pillar of the GATT/WTO system is the MFN principle, GATT Article XXIV provides an exception to MFN that allows GATT/WTO members to form PTAs that satisfy certain features. The key stipulations are that the PTA must eliminate tariffs on “substantially all” trade among the member countries, and that the external MFN tariffs that member countries continue to apply to imports from outside the PTA not increase as a result of PTA formation.

For decades during the post–World War II period, much of the analysis of PTAs centered primarily on one successful experience of regional integration—i.e., the continuing and ongoing evolution of western Europe. The 1951 Treaty of Paris established the European

Coal and Steel Community (ECSC) which was expanded with the 1957 Treaty of Rome to create the six-country European Economic Community (EEC). Today’s European Union is the result of continued integration over the subsequent five decades, including numerous country accessions (twenty-eight member countries, as of 2015) as well as substantial “deepening” of negotiations and agreements beyond trade preferences and toward factor market, economic, monetary, and even *political* integration.

Beginning in the late 1980s, a number of other potentially economically meaningful PTAs arose that have subsequently been sustained. These include the 1987 CUSFTA (Canada–US Free Trade Agreement) that was subsequently expanded into the NAFTA (North American Free Trade Agreement) through the addition of Mexico in 1994. There are also increasingly important developing country PTAs, including the MERCOSUR (Mercado Común del Sur) customs union involving Argentina, Brazil, Paraguay and Uruguay in the early 1990s, ASEAN (Association of Southeast Asian Nations) Free Trade Area involving Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand in the early 1990s, and CAFTA–DR (Central American Free Trade Area–Dominican Republic) involving the United States and five Central American economies in the mid-2000s. As of 2014, the WTO reports that it has been notified of nearly 600 reciprocal trade agreements in existence, and nearly 400 agreements are currently in force (WTO 2014b).¹¹

¹⁰The poorest and least-developed country members of the WTO system—of which there are dozens—are almost entirely absent from participation in formal WTO dispute settlement. Bown and Hoekman (2008) provide a discussion of the political-economic hurdles faced by these countries in the WTO that can help account for this fact.

¹¹The number of notifications and trade agreements in force differ for several reasons. One is because notifications include not only new agreements, but also the accession of new countries to existing agreements—e.g., Croatia’s accession to the European Union in 2013. Second, some agreements notified to the GATT/WTO later become “inactive” (or no longer in force), when they become superseded by a subsequent agreement that was later notified and which is currently in force—e.g., CUSFTA is no longer in force as it was superseded by NAFTA.

2.2.1 *Tariffs and Behind-the-Border Measures in PTAs*

There are two key areas in which PTAs push beyond the multilateral, WTO commitments. The first is by reducing import tariffs even lower than WTO levels, albeit on a discriminatory basis. The second is by negotiating beyond tariffs directly over new, behind-the-border policy instruments.

WTO (2011) provides a recent and relatively comprehensive characterization of the patterns of tariffs and trade taking place under PTAs. With the sharp increase in PTAs since 1990, the value of trade between PTA members has grown faster than the world average; not surprisingly, the share of intra-PTA trade in world trade has nearly doubled from 18 percent in 1990 to 35 percent in 2008.¹² And when intra-EU trade flows are included in these statistics, intra-PTA trade as a share of world trade increased from 28 percent to 51 percent over this period. However, the WTO (2011) data analysis, based on a matching of product-level trade flows to tariffs and preferential tariffs to MFN tariffs, reveals a number of other stylized facts, some of which challenge the conventional wisdom regarding the degree to which PTAs serve as a force for discriminatory tariff liberalization.

First, while many theoretical models typically assume PTAs result in zero applied tariffs between partners, real-world PTAs do not always lead to zero tariffs on all intra-PTA goods trade. Empirically, the many negotiated *exceptions* within PTAs have resulted in a significant number of PTA tariffs remaining at levels above zero, including 8 percent of tariffs for the major PTAs of the United States, Canada, European Union, and Japan (Damuri 2012). Indeed, in an analysis of the PTAs involving eighty-five countries and 90 percent of world trade in 2007, the WTO

(2011, pp. 124–25) finds that roughly 66 percent of tariff lines with MFN tariff “peaks” (MFN rates defined as greater than 15 percent) have not been reduced *at all* through PTAs. Hence, while existing PTAs should be viewed as a significant force in eliminating (roughly one third of, and on a discriminatory basis) the tariff peaks that remain among WTO members, a majority of these tariff peaks are nevertheless still in place.

Second, while a large and increasing share of world trade takes place between PTA members, this share substantially overstates the amount of *preferential trade* between members. In many instances, there is no preference margin because the MFN tariffs are also zero. Furthermore, even where positive preference margins exist, exporters may not utilize available preferences because of both the resource costs (to sourcing inputs from less efficient suppliers in PTA markets) and bureaucratic costs (to proving legal compliance) due to rules of origin and local value-added requirements needed to gain access to the lower preferential rates.¹³

How much trade really takes place under preferential tariffs? First, between 49 percent (including intra-EU trade) and 65 percent (excluding intra-EU trade) of world trade takes place between countries that are not part of a common PTA.¹⁴ Second, excluding intra-EU trade, the WTO estimates that only 16 percent of global trade is eligible for any preferential tariffs and less than 2 percent is eligible to receive preferences with margins above 10 percentage points. Including intra-EU trade in these statistics implies

¹³See, however, Keck and Lendle (2014) for a recent challenge to the position that preferences often go unutilized.

¹⁴Considering these figures with and without intra-EU trade flows may be important depending on the context, given that the European Union is a unique PTA, in that it is not only a customs union but has undertaken deeper integration along many dimensions—including factor markets and monetary integration for a substantial subset of member countries—and also steps toward political integration.

¹²The data reported here and below derives specifically from section II of WTO (2011, pp. 47–86).

that 30 percent of global trade is eligible for any preferential tariffs and 4 percent is eligible for margins over 10 percentage points. Despite the explosive increase in PTA adoption, the WTO estimates that overall, excluding (including) intra-EU trade, 84 percent (70 percent) of world merchandise trade still takes place on an MFN basis.

These numbers can help put the impact of existing PTAs in perspective. PTAs have served as the primary conduit for tariff discrimination in the WTO system. And they have led to discriminatory tariff reductions below MFN levels that are far from insignificant. But it would appear that, to date, PTAs have not delivered discriminatory tariff liberalization on a wide enough scale to cause widespread “trade diversion” (the reduction in imports from third countries; see Viner 1950).¹⁵

Finally, an increasingly important characteristic of many of the current PTA negotiations is that they are no longer primarily about tariff liberalization, but instead are pushing toward deeper integration that addresses nontariff and behind-the-border policies.¹⁶ The nascent literature on deeper integration currently splits new PTA issue areas into two categories. The first are “WTO-plus” PTA provisions—i.e., those that also exist under

the WTO, but where PTA members use their agreement to take on commitments to go further. Tariffs are the clearest example; e.g., WTO members make legally binding MFN tariff commitments, and PTAs involve partners lowering at least some of those tariffs toward each other even further. Other examples include services, intellectual property rights, and product standards—each of which has at least some basic WTO coverage. The second category for PTA provisions are “WTO-extra” areas, and these involve issues that are not yet explicitly addressed by the WTO. Examples of WTO-extra areas include labor standards, environmental standards, foreign direct investment provisions, movement of capital, competition policy, data protection, and even potential cooperation over other domestic regulations in order to help achieve improved levels of “regulatory coherence” across PTA member countries.

Horn, Mavroidis, and Sapir (2010) characterize the “depth” of PTA provisions by applying this categorization to the many US and EU PTAs in existence as of 2008.¹⁷ The initial evidence was that EU PTAs tend to have many more WTO-extra provisions, but that the pattern is reversed when the analysis conditions on the legal enforceability (under dispute settlement) of the provisions, as US PTAs contain more legally enforceable WTO-extra provisions. In follow-up work, the WTO (2011, Section D) extended this approach in order to characterize fourteen different WTO-plus provisions and thirty-eight different WTO-extra provisions for a wider sample of PTAs, including a number involving only developing countries. Their

¹⁵A potentially important caveat to this last observation, however, is suggested by the results of Handley (2014) and Handley and Limão (2015), which we discuss further below: in the presence of policy uncertainty there can be large differences between the trade effects of an applied MFN tariff of zero that is bound at a much higher level in the WTO and a PTA tariff that is both applied *and bound* at zero. Such differences are missed by a focus on preference margins relating to applied tariffs alone, and inferences about the degree of trade diversion caused by existing PTAs that adopt this focus could be significantly understated as a result. See also the discussion in Bhagwati (2008) and the survey in Panagariya (2000).

¹⁶Some of these nontariff policies under negotiation are applied at the border. For example, policies like anti-dumping and safeguards are applied at the border but frequently as quotas or price undertakings. Other examples of nontariff barriers that arise at the border may include customs regulations, import valuation, etc.

¹⁷Other recent contributions characterizing and assessing such PTA provisions include work by WTO Secretariat legal staff (Chase et al. 2013) and political scientists (Allee and Elsig 2015). Note that the latter assess a larger coverage of dispute-settlement provisions in preferential agreements in a publicly available “design of trade agreements” (DESTA) database (Dür, Baccini, and Elsig 2014). See also WTO (2011).

work has established a new and rich set of databases for future research to explore the heterogeneity in application of these provisions across different PTAs.

2.2.2 *Dispute Settlement under PTAs*

In contrast to the WTO, there is very little empirical record of sustained and effective dispute resolution taking place under the major PTAs. With the exception of the European Union, dispute-settlement provisions in most PTAs have rarely been used, and when actually triggered, their record of resolving disputes is mixed at best.¹⁸ It is also not uncommon for the use of PTA dispute-settlement procedures to generate third-country spillovers, and thus wider disputes that are left for the WTO system to resolve, or for PTA members to simply ignore the existence of their PTA's dispute-settlement provisions in order to take frictions directly to the WTO for resolution. We illustrate with examples from two different PTAs.

Consider first the MERCOSUR customs union and its dispute-settlement procedures. While Tallberg and Smith (2014) report that very few (roughly twenty) disputes were

initiated under MERCOSUR between 1993 and 2005, one particularly high profile MERCOSUR dispute ended with Brazil imposing a new import restriction on retreaded tires from non-MERCOSUR partners, but not on its MERCOSUR partners. This policy discrimination arose after a MERCOSUR legal ruling in 2002 that PTA partners must be exempted from application of such import restrictions. Citing a similar MERCOSUR rule, in 1997 Argentina had imposed a new import restriction on footwear from non-MERCOSUR partners, but not on its MERCOSUR partners. Because MERCOSUR rules apparently required that imports from MERCOSUR partners be exempted from the policies, Brazil's and Argentina's newly imposed import-restricting policies provided an additional implicit preference to PTA partners relative to non-partners. In both instances, non-MERCOSUR countries, including the European Union and Indonesia, challenged the discriminatory treatment under formal WTO dispute-settlement procedures.¹⁹

Like MERCOSUR, NAFTA also has its own dispute-settlement provisions, and they have also rarely been triggered; e.g., fewer than fifteen disputes were initiated under NAFTA between 1994 and 2010, and NAFTA dispute settlement largely fell into disuse after 2001 (Tallberg and Smith 2014). Nevertheless, the small number of NAFTA disputes should not necessarily be interpreted as evidence that its PTA partners are not experiencing bilateral trading frictions that require third party mediation. The three NAFTA partners (United States, Canada, and Mexico) have taken more than twice as many disputes against one another to formal WTO dispute settlement since NAFTA's inception than they have taken to the NAFTA forum.

¹⁸The European Union has a different institutional design, including a supranational framework that initiates disputes against member states from within and thus does not rely exclusively on the "state-to-state" framework of dispute resolution found in the WTO and many other PTAs. One result is that the EU's dispute-settlement provisions have led to thousands of disputes. Tallberg and Smith (2014, p. 126) report that the supranational European Commission initiated more than 30,000 cases over 1978–2009 against its member states. Furthermore, the commission only referred 11.5 percent of these initiated disputes to the European Court of Justice for a legal decision. On the other hand, EU member states have initiated only a handful of disputes against one another. Finally, the EU's free trade agreement with Iceland, Liechtenstein, and Norway under EFTA contains a supranational Surveillance Authority (SA) modeled similarly to the European Commission; Tallberg and Smith (2014, p. 138) report that the SA initiated roughly 400 disputes against the three EFTA member states over 1994–2008, and that the member states filed zero EFTA disputes against one another during this period.

¹⁹These disputes are described in greater detail in section 7.3 below. Bown and Trachtman (2009) provide a discussion of the WTO dispute over *Brazil—Retreaded Tyres*.

And some of these bilateral frictions—e.g., over US–Canada trade in softwood lumber; over US–Mexico trade in the related products of sugar, corn, high-fructose corn syrup, and ultimately soft drinks—actually started as formal NAFTA disputes but could not be resolved under the NAFTA forum. The disputes escalated and ultimately spilled over to require resolution through formal WTO litigation.²⁰

2.3 Different Paths Forward

The WTO and PTAs are on different trajectories. The extent of their divergence to date may still be modest, but the “mega-regional” PTAs currently under consideration, such as the Transatlantic Trade and Investment Partnership (TTIP) between the United States and European Union, or the Trans Pacific Partnership (TPP) between the United States, Japan, and other Pacific trading partners, could change this dramatically.

In short, globalization is looking increasingly different under these two sets of rules. Perhaps nowhere is this better illustrated in current affairs than by the potential implications depending on whether the United States and the European Union throw their weight behind the WTO and a reenergized Doha Round, or rather put their efforts into negotiating new PTAs. Consider the likely differences in globalization’s outcomes depending on which of these strategies is pursued.

If the United States and the European Union were to put their full support behind a reenergized Doha Round, even the most ambitious conclusion of the round would by all accounts entail relatively small cuts in average tariffs and more substantial, but

still modest, reductions in the remaining tariff peaks (and agricultural export subsidies). And any nod to deep integration would likely be modest. Contrast this description of a successful WTO Doha Round with what has been learned about the TTIP and TPP initiatives.

Consider first the TTIP negotiations. The TTIP has adopted as its main focus the streamlining of domestic standards across the Atlantic. The BBC puts it this way:

Direct tariffs on goods and services between the two are already low, but there are other barriers such as regulatory and safety standards, inspection procedures, and preferences for domestic business. Removing these could significantly reduce the costs for companies doing transatlantic business.

Consider next the TPP. Here again, the focus is on harmonizing domestic standards. As Marketplace Morning Report (1/28/2014) put it, “The Trans-Pacific Partnership has been called NAFTA on steroids.” *The New York Times* continues:

If successful, the TPP agreement would eliminate most remaining tariffs on nearly \$2 trillion in goods and services exchanged between the United States, Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam. [But the TPP] ... would go far beyond lowering tariffs, with provisions requiring countries to maintain compatible regulatory regimes, facilitate corporate financial transactions, establish copyright and patent protections to govern intellectual property rights and to safeguard foreign investors.

Evidently, the likely form of liberalization under mega-regional initiatives differs substantially from that which might be expected through reenergized multilateral negotiations in the WTO. It is thus important to have a reasoned and informed general perspective about the relative merits of regional and multilateral liberalization initiatives. Toward this

²⁰Davey and Sapir (2009) discuss the evolution of the US–Mexico disputes over sweeteners that ultimately culminated in the WTO’s *Mexico—Taxes on Soft Drinks* case, and Bown and Sykes (2008) describe the fifth WTO dispute brought by Canada over *US—Softwood Lumber*.

goal, in the next five sections, we consider the implications of the theoretical and empirical literature on trade agreements. It is also important in this context to consider possible means through which the WTO might be further revitalized. We postpone discussion of this issue until the concluding section.

3. *The Terms-of-Trade Theory of Trade Agreements*

In this section, we offer a brief review and empirical assessment of the essential predictions of the terms-of-trade theory, and we use the theory as a lens through which to view the broad contours of existing WTO policy commitments, offering an initial consideration of the possibility that the WTO membership might have already arrived at the international-efficiency frontier.

3.1 *Theory*

To present the essential predictions of the terms-of-trade theory, we develop a benchmark two-country, two-good perfectly competitive general-equilibrium trade model. We first develop the model under the assumption that governments have only tariffs as instruments of policy intervention, and consider the purpose of a trade agreement. We then extend the benchmark model to allow that governments also have behind-the-border policy instruments at their disposal, in order to consider whether the purpose of a trade agreement is changed in this richer policy setting.

3.1.1 *Trade Model*

We assume that readers are familiar with the two-country two-good perfectly competitive general-equilibrium trade model, and we focus here only on the essential notation and equations.²¹ The two countries, home

(no *) and foreign (*), produce, consume, and trade two goods, x and y , under conditions of perfect competition, with home the natural importer of x and foreign the natural importer of y . The relative price facing home producers and consumers in their local market is $p \equiv p_x/p_y$, while the relative price facing foreign producers and consumers in their local market is $p^* \equiv p_x^*/p_y^*$. With nonprohibitive home and foreign ad valorem tariffs denoted respectively by t and t^* , and with $\tau \equiv (1+t)$ and $\tau^* \equiv (1+t^*)$, international goods-market arbitrage implies $p = \tau p^w \equiv p(\tau, p^w)$ and $p^* = p^w/\tau^* \equiv p^*(\tau^*, p^w)$, where $p^w \equiv p_x^*/p_y$ is the “world” (i.e., untaxed) relative price. The foreign terms of trade are given by p^w , and the home terms of trade by $1/p^w$.

Production (as well as the distribution and level of factor incomes) is fully determined in each country by the local relative price in that country, while each country’s consumption depends on both the local relative price in that country and the terms of trade (with the latter, together with the local price, determining the tariff revenue collected by the country and distributed to its consumers). Each country’s trade is simply the difference between its consumption and production. Hence, for any local and world prices, home imports of x can be written as $M(p, p^w)$ and home exports of y can be written as $E(p, p^w)$. The analogous functions for foreign are $M^*(p^*, p^w)$ and $E^*(p^*, p^w)$. For any prices, the home and foreign national budget constraints are then given by the respective trade balance equations

$$\begin{aligned} (1) \quad & p^w M(p, p^w) = E(p, p^w), \quad \text{and} \\ (2) \quad & M^*(p^*, p^w) = p^w E^*(p^*, p^w), \end{aligned}$$

²¹A more complete description of the model appears in any undergraduate international economics textbook (or

see Bagwell and Staiger 2010b for a recent development of the model in the context of the trade-agreements literature).

with the equilibrium world price $\tilde{p}^w(\tau, \tau^*)$ then determined by the market clearing condition for x ,

$$(3) \quad M(p(\tau, p^w), p^w) = E^*(p^*(\tau^*, p^w), p^w),$$

and with Walras' law ensuring that the y -market clears as well. Finally, with market-clearing local and world prices written as $p = p(\tau, \tilde{p}^w)$, $p^* = p^*(\tau^*, \tilde{p}^w)$, and $\tilde{p}^w = \tilde{p}^w(\tau, \tau^*)$, we impose the following standard price assumptions to rule out the Metzler and Lerner paradoxes:

$$(4) \quad \frac{dp(\tau, \tilde{p}^w(\tau, \tau^*))}{d\tau} > 0 > \frac{dp^*(\tau^*, \tilde{p}^w(\tau, \tau^*))}{d\tau^*},$$

$$\frac{\partial \tilde{p}^w(\tau, \tau^*)}{\partial \tau} < 0 < \frac{\partial \tilde{p}^w(\tau, \tau^*)}{\partial \tau^*}.$$

According to (4), each country's tariff is "protective" of its import-competing sector (i.e., the imposition of a tariff raises the local price of the import good), and each country is "large" in world markets and can improve its terms of trade with an increase in its tariff.

3.1.2 Government Preferences

When it comes to the goals of trade policy, real-world governments have diverse sets of preferences, in some cases adopting trade policies that would seem to promote aggregate national income, while in other cases adopting trade policies with a clear distributional goal in mind. This diversity is reflected in the trade-policy literature, where assumed government preferences range from national income maximization (see Dixit 1987; Johnson 1953; Kennan and Riezman 1988; and Mayer 1981 for important formalizations, and Kowalczyk and Riezman 2011 for a recent survey), to those of a representative democracy, as reflected in the preferences of the median voter (see Mayer 1984 for the initial formulation; and Dutt and Mitra 2002; and Dhingra 2014 for important follow-up

work), to those of a government influenced by lobbies (for early formalizations, see Olson 1965; Caves 1976; Brock and Magee 1978; Feenstra and Bhagwati 1982; Findlay and Wellisz 1982; Hillman 1982; and Baldwin 1987; and see Grossman and Helpman 1994 and 1995b, for the canonical treatment in the more recent literature).

The diversity of government preferences, both in the real world and in the formal trade-policy literature, raises the question of whether these preference differences across governments might translate into different purposes across the trade agreements that governments negotiate. To ensure that our answers regarding the purpose of a trade agreement are not dependent on adopting a particular formulation of government preferences from this diverse set, we follow Bagwell and Staiger (1999a, 2002) and adopt a "reduced-form" approach to modeling government preferences, representing the objectives of the home and foreign governments with the general functions $W(p, \tilde{p}^w)$ and $W^*(p^*, \tilde{p}^w)$, respectively. We thus represent welfare in terms of the prices that the tariffs induce, rather than directly in terms of the tariffs themselves. We place no restrictions on a government's preferences over its local prices. As local prices determine the level and distribution of factor incomes, this allows us to incorporate all of the formal models of trade-policy motives mentioned above. We do impose one assumption on the government welfare functions, namely, that holding its local price fixed, the welfare of a government increases when its terms of trade improve:

$$(5) \quad W_{\tilde{p}^w}(p, \tilde{p}^w) < 0 < W_{\tilde{p}^w}^*(p^*, \tilde{p}^w).$$

This assumption, which amounts to a statement that each government would like more tariff revenue if it could achieve this extra revenue without experiencing any change in its local price, is met by each of the formal

models of trade policy determination that we mentioned above.²²

3.1.3 Nash Tariffs

In the absence of a trade agreement, the two governments choose their tariffs unilaterally and noncooperatively, and we assume that these choices are characterized by an interior Nash equilibrium. The first-order conditions that define the *Nash tariffs* are

$$(6) \quad \frac{dW(p, \tilde{p}^w)}{d\tau} = W_p \frac{dp}{d\tau} + W_{\tilde{p}^w} \frac{\partial \tilde{p}^w}{\partial \tau} = 0, \text{ and}$$

$$\frac{dW^*(p^*, \tilde{p}^w)}{d\tau^*} = W_{p^*}^* \frac{dp^*}{d\tau^*} + W_{\tilde{p}^w}^* \frac{\partial \tilde{p}^w}{\partial \tau^*} = 0.$$

The top equation of (6) defines the home government's best-response tariff, while the bottom equation defines the foreign government's best-response tariff, with the Nash tariffs defined where both governments are on their respective reaction curves.

Notice that, as the top equation of (6) highlights, in the Nash equilibrium the home government strikes a balance between the effects on its welfare of the local-price and world-price movements induced by its tariff choice. The welfare implications of the local-price movement are domestic in nature, reflecting the trade-off for the home government between the benefits of any distributional changes (e.g., induced political support) and the costs of the induced economic distortions. By contrast, the welfare implications of the world-price movement are international in nature, as they reflect the benefits to the home government of shifting some of the costs of its policy choice onto the foreign country. The cost shifting occurs because an improvement in the

home country's terms of trade is necessarily a deterioration in the foreign country's terms of trade. An analogous interpretation holds for the foreign government, as the bottom equation of (6) highlights.

In the special case where governments maximize national income with their unilateral tariff choices, (6) defines the standard (Johnson 1953) "optimal tariff" for each country, which is simply the inverse of the trading partner's export supply elasticity. As Johnson demonstrated, when governments seek to maximize national income, setting a tariff at this level is the optimal way for a country to exploit its monopoly power on world markets. For this case, on the margin the tariff creates costly distortions in the local market (the local-price movements in the first terms in (6)) but some of these costs are borne by the trading partner (via the world-price movements in the second terms in (6)). For the more general cases of government preferences included in (6), the local-price movements carry additional welfare implications for the governments and this leads to Nash tariffs that will, in general, differ from the Johnson "optimal tariff" formula, but the trade-off faced by each government in setting its unilaterally optimal tariff is otherwise the same.

3.1.4 Efficiency Frontier

If a trade agreement is to be useful to governments, there must be an inefficiency associated with the Nash tariff choices of the governments when evaluated with reference to their objectives. A trade agreement can then provide value to both governments by correcting this inefficiency. Absent such an inefficiency, it would not be possible for a trade agreement to yield Pareto benefits for the governments involved. We therefore next characterize the efficiency frontier.

The *international efficiency frontier* is defined by the set of tariffs that

²²We also assume sufficient concavity of W and W^* so that the second-order conditions for the optimization problems that we consider below are satisfied.

satisfy the familiar tangency condition $\frac{d\tau}{d\tau^*}|_{dW=0} = \frac{d\tau}{d\tau^*}|_{dW^*=0}$.²³ Making use of the home and foreign government welfare functions $W(p, \tilde{p}^w)$ and $W^*(p^*, \tilde{p}^w)$, this tangency condition can be written as

$$(7) \quad \frac{[\tau W_p + W_{\tilde{p}^w}] \frac{\partial \tilde{p}^w}{\partial \tau^*}}{W_p \frac{dp}{d\tau} + W_{\tilde{p}^w} \frac{\partial \tilde{p}^w}{\partial \tau}} = \frac{W_p^* \frac{dp^*}{d\tau^*} + W_{\tilde{p}^w}^* \frac{\partial \tilde{p}^w}{\partial \tau^*}}{\left[\frac{1}{\tau^*} W_p^* + W_{\tilde{p}^w}^* \right] \frac{\partial \tilde{p}^w}{\partial \tau}}.$$

The characterization of the efficiency frontier provided by (7) is a generalization of the more familiar Mayer (1981) locus of efficient tariffs for the case of national income maximizing governments. As is well-known, when governments maximize national income, reciprocal free trade ($\tau = 1 = \tau^*$) is efficient; yet as Mayer pointed out, this is but one point on the efficiency frontier defined by the locus of points $\tau = 1/\tau^*$ that ensure equality of the home and foreign local prices p and p^* . Under the assumption that governments maximize national income and with the particular forms for $W(p, \tilde{p}^w)$ and $W^*(p^*, \tilde{p}^w)$ that this implies, (7) reduces to the Mayer locus $\tau = 1/\tau^*$.

With the efficiency frontier defined, it is now a simple matter to use (6) and (7) to confirm that Nash policies are indeed inefficient in this model. Hence, according to the terms-of-trade theory, an inefficiency exists when governments set their tariffs noncooperatively, and therefore there is a role for a trade agreement to address this inefficiency and improve the welfare of each government.

²³When international lump sum transfers are available at the negotiation stage, as is typically assumed in the trade-agreements literature when partial equilibrium models of trade are employed, internationally efficient policies maximize the joint government surplus, with the division of surplus then allocated across participating governments via lump sum transfers. In later sections, when we refer to efficient policies in the context of partial equilibrium models, we will adopt this joint-government-surplus-maximizing perspective unless otherwise noted.

3.1.5 Interpreting the Purpose of a Trade Agreement

The inefficiency of Nash policies is not surprising. After all, the cost-shifting motives that are embodied in the second term of each reaction curve in (6) impose a negative externality on the trading partner, pointing to an obvious source of inefficiency. And in fact it can be confirmed that Nash tariffs are higher than efficient tariffs.²⁴ But recalling that our reduced-form government preferences are specified in a way that is sufficiently general to capture all of the leading models of trade policy determination, it seems reasonable to expect that additional sources of inefficiency might also arise depending on which model of trade policy determination is relevant; in this light, it would be surprising if the cost-shifting externality were the *only* source of inefficiency that a trade agreement can correct in our model. Yet this is what the terms-of-trade theory implies.

To see this, let us suppose that the home and foreign governments were replaced by hypothetical governments that were not motivated by the terms-of-trade implications of their unilateral trade-policy choices; that is, let us consider a hypothetical home government for which $W_{\tilde{p}^w} \equiv 0$ and a hypothetical foreign government for which $W_{\tilde{p}^w}^* \equiv 0$. If these hypothetical governments were to select their tariffs noncooperatively, then according to (6) their tariff choices would satisfy

$$(8) \quad W_p(p, \tilde{p}^w) = 0 = W_p^*(p^*, \tilde{p}^w).$$

Following Bagwell and Staiger (1999a, 2002), we refer to tariffs that satisfy (8) as *politically optimal tariffs*. If politically optimal tariffs are efficient, where as in (7) efficiency is evaluated relative to actual home- and

²⁴See Bagwell and Staiger (1999a, 2002).

foreign-government preferences, then we may conclude that the terms-of-trade externality is the sole rationale for a trade agreement in this model. But it is immediate that (7) is satisfied when evaluated at tariffs that satisfy (8) and hence, politically optimal tariffs are efficient.

Of course, as (7) suggests, there will, in general, be an entire locus of tariff combinations that satisfy the condition for efficiency, and the politically optimal tariffs represent only one point on this locus. The politically optimal tariffs are arguably focal, however, as they remedy the terms-of-trade inefficiency in a direct way. For example, in the case where governments maximize national welfare, we have already observed that efficient tariffs lie on the locus defined by $\tau = 1/\tau^*$, as Mayer (1981) showed. The politically optimal tariffs in this case correspond to the reciprocal free trade point $\tau = \tau^* = 1$, which seems focal because it conforms to the trade policies that national income maximizing governments would have adopted in the first place, if they were not motivated by terms-of-trade/optimal-tariff considerations.²⁵

Having determined that the cost-shifting externality is the only source of inefficiency of the Nash policies according to the terms-of-trade theory, it is worth emphasizing now the role that the large-country assumption plays in establishing a purpose for a trade agreement in this theory. In a world of small countries where no country can impact its terms of trade with its tariff choices, no country can engage in

international cost shifting and Nash policies are therefore efficient. According to the terms-of-trade theory, then, the inefficiencies that a trade agreement can address are associated with the policies of governments that exercise market power on world markets. This is, of course, the same conclusion that Johnson (1953) drew, but that is in fact the striking point: the introduction of government preferences that can capture the wide diversity of government motives that we see in the real world does not qualify, complicate, or change this conclusion.

When it comes to the purpose of a trade agreement, therefore, the terms-of-trade theory embodies a very simple idea. A trade agreement can be valuable to governments, but only if in the absence of an agreement governments would attempt to shift costs onto one another and as a consequence adopt inefficient unilateral policies. The terms-of-trade externality is simply the mechanism by which this cost shifting occurs. But while simple and intuitive at one level, the practical relevance of this idea has traditionally met with deep skepticism among many economists. Some of this skepticism reflects a lack of empirical evidence relating to the central tenets of the theory, such as the degree and prevalence of market power that real-world governments can wield in international markets and whether their unilateral tariff choices reflect this market power when they possess it, and in section 3.2 we survey the recent empirical work that is beginning to fill this gap. But some of the skepticism reflects a more visceral objection to the plausibility of the theory. Here, we briefly consider three of the main objections of this kind.

A first objection is that the terms-of-trade theory unrealistically posits that governments seek to maximize national income with their tariff choices. But as we have just illustrated, while the terms-of-trade theory was originally posed by Johnson (1953) under

²⁵ Our claim that politically optimal tariffs are focal does not translate into a claim that a trade agreement necessarily delivers the politically optimal tariffs. That depends, in part, on whether politically optimal tariffs lie on the contract curve, which in turn requires that countries not be too asymmetric. For example, as is well known, in the case of national income-maximizing governments, a sufficiently big country can “win the tariff war,” meaning that it is better off in the Nash equilibrium than at reciprocal free trade (see Johnson 1953, and Kennan and Riezman 1988).

this assumption, it holds equally well when governments have political motivations. A second objection is that there is a disconnect between the theory and the way real-world governments think. This objection is often expressed by the view that real-world governments almost never mention the “terms of trade” in their policy discussions, and instead the language of real trade agreements and the negotiators who craft them emphasizes “market access.” But this disconnect may be more apparent than real, because the insights of the terms-of-trade theory can be easily translated into the language of market access. Specifically, when a government raises its import tariff, it shifts in its import demand curve, and the resulting “price effect” under which the home country enjoys a terms-of-trade improvement is accompanied by a “volume effect” under which the foreign country experiences a reduction in access to the home market. Using this link between price and volume effects, the terms-of-trade theory can then be recast using the market-access language that trade-policy negotiators favor.²⁶ A third objection relates to the role played by tariff revenue in the theory’s account of the terms-of-trade motives of governments, and the apparent unimportance of tariff revenue to real-world governments. There are two main responses to this objection. First, as we describe in the next section, the cost-shifting motives at the center of the terms-of-trade theory do not hinge on government pursuit of tariff revenue.²⁷ Second, it is not clear that tariff revenue should be seen as unimportant to real-world governments. For example, as Kim (2013) points out, the United States collected \$31 billion in tariff revenue for FY

2012, an amount comparable to what the United States spent in FY 2012 on foreign aid (\$23 billion) and foreign military assistance (\$14 billion) combined.

3.1.6 Behind-the-Border Measures

We now briefly discuss an extension of the benchmark model in which governments also have behind-the-border policy instruments at their disposal, and consider whether the purpose of a trade agreement is changed in this richer policy setting. Our extended model broadly mirrors that of Bagwell and Staiger (2001a).

Specifically, we introduce into the trade model of the previous section a home standard, σ , and a foreign standard, σ^* . To fix ideas, we interpret these standards as a labor regulation (e.g., maximum legal work hours per week) in each country that impacts that country’s production possibilities: for a given local price in a country, we assume that changes in its standard shifts its production of x and y , and hence its import demand and export supply functions, and therefore the market clearing world price. Proceeding to derive the market clearing world price as before, we therefore now have $\tilde{p}^w = \tilde{p}^w(\sigma, \sigma^*, \tau, \tau^*)$. In addition to the assumed responses of \tilde{p}^w to τ and τ^* contained in (4) above, we now assume that each country can also improve its terms of trade with an increase in its standard (i.e., we assume $\partial \tilde{p}^w / \partial \sigma < 0$ and $\partial \tilde{p}^w / \partial \sigma^* > 0$).

We assume that each government cares directly about its standard, but does not care directly about the standard imposed in the other country. Hence, the choice of standards can impose international pecuniary externalities (through \tilde{p}^w), but by assumption does not impose non-pecuniary externalities at the international level. With this we can now express the government welfare functions in this extended model by $W(\sigma, p, \tilde{p}^w)$ and $W^*(\sigma^*, p^*, \tilde{p}^w)$. We continue to impose the structure in (5) on these extended government

²⁶ Bagwell and Staiger (2002) provide a formal definition of market access and further develop the relationship between the terms-of-trade theory and the language of market access.

²⁷ See also the discussion of local-content requirements in section 4.5.

welfare functions, and we continue to leave unrestricted how governments care about changes in their own local prices. We also leave unrestricted how governments care about changes in their own standards.

There are now four first-order conditions that define the Nash tariff and standards choices:

$$\begin{aligned}
 (9) \quad & \frac{dW(\sigma, p, \tilde{p}^w)}{d\tau} = W_p \frac{dp}{d\tau} + W_{\tilde{p}^w} \frac{\partial \tilde{p}^w}{\partial \tau} = 0, \\
 & \frac{dW(\sigma, p, \tilde{p}^w)}{d\sigma} = W_\sigma + [\tau W_p + W_{\tilde{p}^w}] \frac{\partial \tilde{p}^w}{\partial \sigma} = 0, \\
 & \frac{dW^*(\sigma^*, p^*, \tilde{p}^w)}{d\tau^*} = W_{p^*}^* \frac{dp^*}{d\tau^*} + W_{\tilde{p}^w}^* \frac{\partial \tilde{p}^w}{\partial \tau^*} = 0, \text{ and} \\
 & \frac{dW^*(\sigma^*, p^*, \tilde{p}^w)}{d\sigma^*} \\
 & = W_{\sigma^*}^* + \left[\frac{1}{\tau^*} W_{p^*}^* + W_{\tilde{p}^w}^* \right] \frac{\partial \tilde{p}^w}{\partial \sigma^*} = 0.
 \end{aligned}$$

In addition to the two conditions defining the home and foreign best-response tariffs, which are unchanged from our earlier discussion and which therefore have the same interpretation, there is an additional condition for each government in (9) that defines its best-response standard. Here, each government weighs the direct impact on its welfare of its standards choice against the impact of this choice on its welfare that runs through the induced local- and world-price effects.

Turning to the efficient policies in this extended setting, there are now three tangency conditions that must be satisfied for efficiency:

$$\begin{aligned}
 (10) \quad & \frac{[\tau W_p + W_{\tilde{p}^w}] \frac{\partial \tilde{p}^w}{\partial \tau^*}}{W_p \frac{dp}{d\tau} + W_{\tilde{p}^w} \frac{\partial \tilde{p}^w}{\partial \tau}} = \frac{W_{p^*}^* \frac{dp^*}{d\tau^*} + W_{\tilde{p}^w}^* \frac{\partial \tilde{p}^w}{\partial \tau^*}}{\left[\frac{1}{\tau^*} W_{p^*}^* + W_{\tilde{p}^w}^* \right] \frac{\partial \tilde{p}^w}{\partial \tau^*}}, \\
 & \frac{W_\sigma}{\partial \tilde{p}^w / \partial \sigma} = \tilde{p}^w \frac{W_p}{\partial \tilde{p}^w / \partial \tau}, \text{ and} \\
 & \frac{W_{\sigma^*}^*}{\partial \tilde{p}^w / \partial \sigma^*} = -\frac{p^*}{\tau^*} \frac{W_{p^*}^*}{\partial \tilde{p}^w / \partial \tau^*}.
 \end{aligned}$$

The top condition in (10) is the same tangency condition as in (7) that defined the efficiency frontier in our benchmark model. This condition can be interpreted as ensuring that the home and foreign tariffs are set so that the volume of trade between the two countries is at an efficient level.²⁸ The remaining two conditions can then be interpreted as ensuring that each country's mix of border and behind-the-border policies delivers, in an efficient way, this efficient level of trade volume.

Finally, we may again define politically optimal policies and make use of these hypothetical constructs to investigate the purpose of a trade agreement in this extended setting. We therefore consider a hypothetical home government for which $W_{\tilde{p}^w} \equiv 0$ and a hypothetical foreign government for which $W_{\tilde{p}^w}^* \equiv 0$. If these hypothetical governments were to select their tariffs and standards noncooperatively, then according to (9), their tariff and standards choices would satisfy

$$(11) \quad W_p(\sigma, p, \tilde{p}^w) = 0 = W_\sigma(\sigma, p, \tilde{p}^w), \text{ and}$$

$$W_{p^*}^*(\sigma^*, p^*, \tilde{p}^w) = 0 = W_{\sigma^*}^*(\sigma^*, p^*, \tilde{p}^w).$$

As before, if these politically optimal policies are efficient, where as in (10) efficiency is evaluated with reference to actual home and foreign government preferences, then we may conclude that the terms-of-trade externality remains the sole rationale for a trade agreement in this extended model. But it is immediate that (10) is satisfied when evaluated at tariffs and standards that satisfy (11); hence, politically optimal tariffs and standards are indeed efficient.

In fact, as is suggested by this result, regardless of the extent of behind-the-border measures that governments may have at their

²⁸See Bagwell and Staiger (2001a) for elaboration on this interpretation and the remaining interpretations of the efficiency conditions that we describe in the text.

disposal, according to the terms-of-trade theory the purpose of a trade agreement remains the same. Governments use trade agreements to undo the policy inefficiencies that arise with unilateral policy choices when those choices can shift the costs of intervention onto trading partners through movements in foreign exporter prices (terms of trade).

We may now emphasize a further insight offered by the terms-of-trade theory that follows from its stance on the purpose of a trade agreement. Specifically, as the only “problem” for a trade agreement to “solve” is terms-of-trade manipulation, and as the tariff is the first-best policy for terms-of-trade manipulation, the terms-of-trade theory implies that the tariff is the *only* policy that is distorted in the Nash equilibrium: behind-the-border measures are set efficiently under Nash choices. This insight is lurking in the conditions presented above, and it can be confirmed by noting that the top two conditions of (9) imply the middle condition of (10), while the bottom two conditions of (9) imply the bottom condition of (10). Hence, the only efficiency condition that is not met in the Nash equilibrium according to the terms-of-trade theory is the top condition of (10) that determines the efficient level of tariffs (which are lower than their Nash levels) and the efficient level of trade volume (which is higher than the Nash level). In this sense, the terms-of-trade theory provides a foundation for trade agreements that adopt a shallow approach to integration.²⁹

Our formal discussion here has focused on a particular form of behind-the-border measure that is best thought of as a production standard, such as a workplace regulation or a regulation on the use of an

open-access resource in the production process. So it is important to note that the points we have emphasized apply more broadly to behind-the-border measures of various kinds, including tax and subsidy policies and various forms of standards beyond production standards.³⁰ Of particular relevance to the world trading system are product standards, such as minimum burn-through rates for doors or prohibitions on lead additives to paint, that can raise the costs of supplying a market but, unlike import tariffs, do not raise revenue. In light of the prominent role played by tariff revenue in our account of the terms-of-trade motives of governments described above, it might be thought that those motives do not apply to such standards. But our discussion applies equally well to these kinds of behind-the-border measures, once it is understood that international cost-shifting occurs when such product standards are imposed, as long as foreign exporters do not pass the full cost of meeting the product standards on to consumers in the country where the standard applies.³¹

3.2 Evidence

We now survey the evidence related to the central tenets of the terms-of-trade theory. We focus on three basic questions. First, how significant and widespread is the market power that countries possess in world markets? Second, do the unilateral tariff choices of countries reflect the market power that they possess? And third, does the pattern of negotiated tariff liberalization that we observe correlate with the pattern of observed market power in the way that the theory suggests it should? Answers to these questions seem central to all of the theory’s predictions, and so we focus on

²⁹More specifically and as we describe in more detail below, the terms-of-trade theory supports an approach to behind-the-border measures that revolves around reliance on a “market-access preservation” rule.

³⁰For an extension of these points to the case of domestic tax/subsidy policies, see Bagwell and Staiger (2006).

³¹See Staiger and Sykes (2011) for a treatment of product standards in this context.

them here, postponing until later points in our survey a discussion of the empirical work relating to various other predictions of the terms-of-trade theory.

3.2.1 *Market Power*

Do countries routinely possess a degree of market power in world markets that would allow them to manipulate their terms of trade? To answer this first question, we begin by observing that there is a large body of indirect evidence that suggests an affirmative answer. We are referring here to the literature on exchange-rate pass-through.

To establish the connection between the exchange-rate pass-through literature and an answer to our first question, we proceed in two steps. First, we note that Feenstra (1989) shows theoretically that the pass-through to domestic prices associated with exchange-rate shocks can be thought of as comparable in magnitude to the pass-through associated with tariff changes, and he offers econometric evidence supporting this hypothesis of symmetric pass-through between tariffs and exchange rates in the data. Second, we note that, while we have adopted above a general-equilibrium setting to present the terms-of-trade theory, the theory can also be developed in a partial-equilibrium model, where cost shifting then occurs through changes in the terms of trade provided that foreign exporters bear some of the incidence of the import tariff so that it is not fully passed through to domestic prices.³² That is, incomplete pass-through of the tariff to domestic prices is synonymous with cost shifting, and the exercise of importer market power. Hence, by the second step, the terms-of-trade effects of a tariff arise whenever the incidence of the tariff is not fully passed through to domestic prices; and by

the first step, we may look to the vast empirical literature on exchange-rate pass-through for indirect evidence about the degree of tariff pass-through.

What does the exchange-rate pass-through literature imply for the answer to our first question? First, in light of the conclusion from Goldberg and Knetter's (1997) survey of this literature that pass-through rates average about 60 percent, it would appear that the existence of countries that possess substantial market power in world markets is routine. Second, after surveying this literature in his handbook chapter, Feenstra (1995, p. 1569) concludes that, while there is strong evidence that pass-through is less than complete, the magnitude of pass-through differs substantially across industries and therefore ". . . we should not have any presumption about the extent of terms of trade gain due to tariffs, but must treat each industry on a case-by-case basis."

Turning to the direct evidence on this first question, in a provocative paper, Magee and Magee (2008) construct measures of world market concentration and trade elasticities to argue that even a "large" country like the United States has little market power to exert on world markets, suggesting that market power can safely be ignored when considering the effects of tariffs. But for the most part, the literature has produced results that are consistent with the conclusions from the indirect evidence emphasized above. For example, the studies of Kreinin (1961), Winters and Chang (2000), Chang and Winters (2002), Anderson and van Wincoop (2002), and Bown and Crowley (2006), among others, all offer evidence that unilateral tariff changes can significantly affect a country's terms of trade. On the other hand, in their study of New Zealand's unilateral trade liberalization of the 1980's, Winkelmann and Winkelmann (1998) find only weak evidence of incomplete pass-through of New Zealand tariffs to prices in the New Zealand economy,

³² See Bagwell and Staiger (2001b) for a development of the terms-of-trade theory of trade agreements in the context of a partial-equilibrium model.

and only in a few industries, and conclude that New Zealand truly is an example of a small country in most products. Finally, using high-frequency data on the price of raw sugar in New York City from 1890 to 1930, Irwin (2014) finds that about 60 percent of any US tariff increase was borne by foreign exporters with only 40 percent passed through to domestic-consumer prices.³³

These studies seem to confirm the basic conclusion of Feenstra (1995), that there is abundant evidence of substantial market power, but its presence varies greatly from industry to industry and country to country. This conclusion is further reinforced by the most comprehensive study to date on the issue, that of Broda, Limão, and Weinstein (2008). Focusing on the unilateral tariff choices of fifteen countries prior to their membership in the GATT/WTO, Broda et al. estimate the foreign-export supply elasticities faced by each of these countries, which as they note, provides an inverse measure of the market power that each was able to exert on the foreign-export (world) prices. With these estimates, they confirm that most countries, even apparently “small” countries, have significant ability to alter their terms of trade on many imported products with their tariff choices.

3.2.2 *Unilateral Tariffs*

We next turn to the second question raised above: do the unilateral tariff choices of countries reflect the market power that they possess?

An early paper that provides evidence on this question is Olarreaga, Soloaga, and Winters (1999). Examining the determinants of the common external tariff adopted by MERCOSUR in 1996 (a period when the

common external tariff of MERCOSUR was essentially unconstrained by WTO commitments), they conclude that terms-of-trade effects account for a substantial part (between 6 and 28 percent) of the explained variation in the structure of MERCOSUR tariffs, despite the fact that during the period of their analysis, MERCOSUR had only a 1 percent market share of world trade.

This question is also addressed by the Broda, Limão, and Weinstein (2008) paper discussed above. Specifically, after estimating the foreign-export supply elasticities faced by each of the fifteen non-GATT/WTO member countries in their sample, Broda et al. relate this measure of the power to affect world prices to the unilateral (i.e., prior to WTO accession) tariff choices that each country made. They find that, prior to joining the WTO, these countries set tariffs an average of 9 percentage points higher on imports for which they could exert large effects on world prices, as compared to the tariffs they set on imports where their ability to affect world prices was limited—an impact whose magnitude is roughly comparable to the size of the average tariffs in these countries. They also find that this terms-of-trade motive explains more of the cross-industry variation in tariffs than is explained by commonly used political-economy variables.

Hence, according to the Olarreaga, Soloaga, and Winters (1999) and Broda, Limão, and Weinstein (2008) findings, governments who set their trade policies unilaterally and noncooperatively respond to terms-of-trade motives and the market power that they possess strongly and in the way that the theory predicts. These findings are reinforced by the recent paper of Dhingra (2014). Dhingra shows that the median-voter model of noncooperative tariff determination is strongly rejected by the data in its traditional small-country formulation, but that its central predictions receive strong cross-country empirical support, once it is

³³Irwin (2014) also finds a striking asymmetry between pass-through rates for tariff increases and tariff reductions, with the latter passed through fully to consumers. He attributes this asymmetry to asymmetric demand responses.

cast in a large-country setting and the existence of market power and terms-of-trade motives are taken into account when predicting the cross-country pattern of tariffs.

3.2.3 *Negotiated Tariffs*

Finally, we consider the third of our three questions: does the pattern of negotiated tariff liberalization that we observe correlate with the pattern of observed market power in the way that the theory suggests it should? As with the literature that takes up this question, we focus below on the pattern of negotiated tariff liberalization in the GATT/WTO, rather than PTAs. We consider the pattern of liberalization that has taken place within PTAs and its compatibility with the terms-of-trade theory in the context of later discussions.

In light of the literature's finding surveyed just above that market power is a strong determinant of unilateral tariff choices, one way to pose this third question is to ask whether the same can be said for negotiated tariffs. If market power is an equally strong determinant of negotiated tariffs, then this would indicate a lack of support for the view that trade agreements serve to limit the exercise of market power by their member governments; on the other hand, if negotiated tariffs are unrelated to market power, then together with the findings reported in the literature that unilateral tariffs are strongly related to market power, this would suggest that trade agreements do indeed limit the exercise of market power. This is the approach that Broda, Limão, and Weinstein (2008) take. Focusing on the United States, they find that US nontariff barriers and so-called "statutory" tariff rates—neither of which has been the subject of negotiations within the GATT/WTO—are significantly and positively related to the degree of market power that the United States exerts on the world prices of its import products, while the US MFN

tariffs—which have been subjected to the many rounds of GATT/WTO negotiations—exhibit no such relationship.

A related approach is taken by Nicita, Olarreaga, and Silva (2013). They focus on the nature of the tariff commitments made by WTO member countries—commitments that, as we have described above, take the form of bindings defining the maximum allowable level for the tariff—and exploit the fact that countries differ in the degree to which their negotiated WTO tariff commitments constrain their applied tariffs (i.e., the tariff levels that they actually set). Nicita et al. observe that tariffs that are unconstrained by WTO bindings should exhibit a positive correlation with market power, for the reasons associated with unilateral tariffs that we describe above. But Nicita et al. also derive a new prediction: they argue that tariffs constrained by WTO bindings (the "cooperative tariffs") should exhibit a negative correlation with market power. This prediction follows under their assumptions that (a) exporters enjoy extra political-economy weight in the objectives of their governments, and (b) their governments lack trade instruments of their own (e.g., export subsidies) to shift surplus to these exporters. Under these assumptions, the only way for a government to help its exporters is to negotiate a tariff cut in the foreign markets served by its exporters, and the political payoff to the government from negotiating such tariff cuts will be higher the greater the importer market power is in the foreign market where the negotiating efforts are focused (and hence the greater the exporter price effect of the tariff cuts). On this basis, they predict that the cooperative tariff levels will be negatively correlated with importer market power. Examining the tariffs of 101 WTO members, Nicita et al. find that the sign of the correlation between tariff levels and market power indeed switches from positive to negative as the WTO tariff bindings vary from levels that are well above

applied tariff rates to levels that are at the applied tariff rates.³⁴

Beshkar, Bond, and Rho (2015) derive a related prediction in an extension of the basic terms-of-trade model that emphasizes the trade-off between commitments and flexibility. (We discuss their paper further in section 4.2.) Within this extended model, they show that applied tariffs are more likely to be set at their WTO-bound levels at any point in time the greater the market power is for that product possessed by the importing government; and with a sufficiently high level of import market power, applied tariffs are always set at the level of the negotiated binding. Beshkar et al. find strong evidence for these predicted relationships between negotiated tariff commitments and importer market power with data on the tariffs of 109 WTO member countries.

A different approach to this question is taken by Bagwell and Staiger (2011). They use the terms-of-trade theory to derive an expression for the component of the non-cooperative tariff that embodies the international cost-shifting motive. They then use this expression to derive the pattern of negotiated tariff cuts that is implied by the terms-of-trade theory; intuitively, if the cost-shifting component is big, then the negotiated tariff cut implied by the terms-of-trade theory should be large. Working from this basic insight, Bagwell and Staiger show that the tariff cuts predicted by the terms-of-trade theory can be expressed as a function of pre-negotiation import volumes and prices, and measures of the power to affect world prices. The predicted relationship is then confronted with data from

the accession negotiations of sixteen countries that joined the WTO subsequent to its creation in 1995, and strong and robust support for the predictions of the terms-of-trade theory are found in the observed pattern of negotiated tariff concessions.

Ludema and Mayda (2013) advance the literature on this question by allowing that free-rider issues associated with the MFN principle (which we discuss at length further below) might impede governments from fully addressing terms-of-trade manipulation in their GATT/WTO tariff negotiations. Augmenting the basic terms-of-trade model with a model of endogenous bargaining participation, they show that negotiated tariffs should be negatively related to the product of the importer's market power and exporter concentration. Intuitively, the lower exporter concentration is, the more severe the free-rider problem associated with MFN will be, and the less effective negotiations will be in ridding the tariff of its cost-shifting component. Further, the larger the market power, the larger this cost-shifting component will be. Ludema and Mayda take this prediction to the tariff data for thirty WTO member countries and find strong support, concluding (p. 1837) that "...the internalization of terms of trade effects through WTO negotiations has lowered the average tariff of these countries by 22 to 27 percent compared to its noncooperative level."

Yet a different perspective on answering this question is provided by Bown and Crowley (2013b), who investigate empirically some of the predictions of the terms-of-trade theory when that theory is developed in a repeated-tariff game setting subject to stochastic trade volume shocks and where self-enforcement constraints are binding.³⁵ A basic prediction of the

³⁴Nicita, Olarreaga, and Silva (2013) also report that the expected positive correlation between tariffs and market power emerges in their data only once the WTO tariff commitments are sufficiently above the applied tariff levels. They view this as something of a puzzle, and suggest that it may reflect some form of implicit cooperation among WTO member countries.

³⁵Bagwell and Staiger (1990) develop this model, which we describe along with additional discussion of the findings of Bown and Crowley (2013b) in section 4.2.

terms-of-trade theory in this setting is that, where the self-enforcement constraint is binding, cooperative tariffs must rise somewhat in the face of import surges in order to mitigate the increased temptation implied by the higher import volume to shift costs onto foreign exporters with an even higher tariff. Among the additional predictions of the model highlighted by Bown and Crowley is that, for a given import surge, a cooperative tariff increase is more likely on a product if the market power possessed by the importing government on that product is higher. Utilizing data on the time-varying protective measures (antidumping and safeguard actions) of the United States over the period 1997–2006, the authors confirm these and other predictions of the terms-of-trade theory in this setting.

Summarizing, the empirical papers surveyed above provide a growing body of evidence consistent with the central tenets of the terms-of-trade theory of trade agreements. While we discuss below evidence that lends some support as well to the other strands of the trade-agreement literature, our review here suggests that, at a minimum, the terms-of-trade theory is central for understanding actual trade agreements, and provides a reasonable basis from which to seek initial answers to our survey's motivating questions.

3.3 *Has Globalization under the WTO Gone Far Enough?*

With the broad features of the terms-of-trade theory of trade agreements described, we now pose a first and basic question. Viewed from the lens of this theory, might it be possible to conclude that globalization under the GATT/WTO has already allowed its member governments to reach the international efficiency frontier? This is a question that we must confront in the ensuing pages in the process of answering the motivating questions of our survey. But we pause here to

dispel one natural misconception, namely, that an immediately plausible answer to this question might be “No, as long as trade is not truly free.” The terms-of-trade theory requires a more nuanced answer because, according to this theory, the purpose of a trade agreement is not to secure free trade, but to remove the inefficient cost-shifting component from the unilateral tariff choices of its member governments. As we have observed, this outcome could be compatible with free trade, but only under certain strong assumptions about the preferences of governments—assumptions that seem unlikely to be met in the real world. Accordingly, the continued existence of tariffs is not by itself evidence of further work to be done. To know whether globalization under the WTO has gone far enough requires, according to the terms-of-trade theory, a more nuanced assessment of the theoretical and empirical issues addressed by the literature we survey below.

Much as the continued existence of tariffs cannot by itself be interpreted as a sign of lingering inefficiencies in the GATT/WTO system, neither can one interpret the lack of negotiated GATT/WTO commitments on behind-the-border measures as a sure sign of GATT/WTO failings according to the terms-of-trade theory. Indeed, as is suggested by our discussion of behind-the-border measures above and as we highlight further below, the GATT/WTO shallow-integration approach is compatible with efficiency in the presence of certain kinds of accompanying rules, rules that we will suggest at a broad level find representation in the GATT/WTO. Again with regard to behind-the-border measures, to know whether globalization under the WTO has gone far enough requires, according to the terms-of-trade theory, a more nuanced assessment.

Finally, we emphasize two important points that are implicit in our discussion here and should be kept in mind as we proceed through the survey. First, for the most part the

terms-of-trade theory of trade agreements treats government preferences as fixed and sovereign, much as consumer preferences are taken as sovereign in standard consumer theory, and seeks to understand trade agreements as agreements that lead to Pareto improvements for the member governments when gauged from the perspective of their own preferences. This is clearly not the only possible assumption, and below we also discuss some papers in this strand of the literature that entertain alternative assumptions. But the assumption does resonate well with the “member driven” nature of real-world trade agreements, especially the GATT/WTO. As we later discuss, the commitment theory strand of the trade agreements literature can be interpreted as adopting a major departure from this assumption, and so we consider these alternatives in more depth when we survey that strand of the literature.

A second point is that the terms-of-trade theory (and the other strands of the trade agreements literature as well) takes the policy instruments that a government has at its disposal as fixed. Hence, while it is well-known (Bhagwati and Ramaswami 1963) that a tariff is a second-best instrument for virtually every domestic policy goal that could be imagined, the trade-agreements literature starts from the view that there are often constraints (usually unmodeled) that prevent governments from using the first-best instruments for their policy goals and lead them to use tariffs to achieve these goals instead. And given that these governments are constrained to use tariffs for, e.g., distributional reasons, the trade-agreements literature then explores the role of trade agreements in eliminating inefficiencies from their tariff choices.³⁶ This feature is important to keep in mind, as without

it the notion that the use of tariffs could ever be compatible with a position on the efficiency frontier (beyond tariffs that reside on the Mayer locus) would seem strange.

4. *Evaluating the GATT/WTO Approach to Trade Liberalization*

We now turn to an evaluation of the GATT/WTO approach to trade liberalization from the perspective of the terms-of-trade theory of trade agreements literature. This strand of the literature seeks to evaluate the design and performance of the GATT/WTO as an institution that could plausibly help governments in their attempts to solve the terms-of-trade externality problem that we described in section 3. We use our survey of this literature to ask: Is the GATT/WTO well-designed at a fundamental level to help governments address the terms-of-trade problem? And can the successes and failures of the GATT/WTO record be broadly understood to reflect the strengths and weaknesses of these design features when interpreted within the context of the terms-of-trade problem? If the answers to these questions are affirmative, then we tentatively conclude that the GATT/WTO is an institution worthy of the continued support of economists. This is not to say that PTAs might not also be deserving of support—we take up that question in the next section—but rather to say that the GATT/WTO appears fundamentally well-designed and thus worthy of support when viewed from the perspective of the terms-of-trade theory.³⁷

³⁷Our discussion here presupposes that institutions matter for solving problems of international trade policy cooperation. As Maggi (2014) emphasizes, this assumption indicates the existence of underlying frictions, even though these frictions are not often explicitly modeled. That institutions matter in this context seems clear from the historical experience with international trade policy cooperation, and the many failed attempts at international cooperation that preceded the creation of GATT. See Bagwell and Staiger (2010b) and the literature cited therein for further discussion of the historical antecedents of GATT.

³⁶We discuss some partial exceptions in the literature at later points in our survey, such as Limão and Tovar (2011), but even there the availability of first-best instruments are ruled out by assumption.

We organize our discussion into six parts. Section 4.1 considers the GATT pillars of reciprocity and the most-favored nation (MFN) clause, and the general self-enforcing nature of GATT/WTO commitments. Sections 4.2 through 4.5 survey the literature on more specific features of the GATT/WTO approach that are central to identifying current concerns. Throughout, we highlight a number of significant challenges facing the GATT/WTO approach. Section 4.6 summarizes by offering an initial terms-of-trade-theory-based perspective on how the GATT/WTO has worked, its current woes and possible fixes.

4.1 Reciprocity, MFN, and Enforcement

In this section, we review research based on the terms-of-trade approach that examines the three pillars of the GATT/WTO architecture: reciprocity, MFN, and enforcement.

4.1.2 Reciprocity

Governments reach agreements to lower tariffs through GATT/WTO negotiation rounds. It is often observed that these negotiations reflect a norm of reciprocity and entail a “balance of concessions,” whereby each government makes the “concession” of lowering its import tariffs in exchange for receiving the benefit of a similar concession from a trading partner. Such a norm would be difficult to interpret in a model with small countries. The reciprocity norm, however, admits a straightforward interpretation when countries are large.

To develop this point, we return to the terms-of-trade model described in section 3. Let us suppose that the two governments start at the Nash tariffs. We know from our earlier discussion that these tariffs are inefficiently high, due to the terms-of-trade externality. Since each government selects its best-response tariff at a Nash equilibrium, no government can

gain from a unilateral tariff cut. This simple observation provides an immediate interpretation for why a government regards its own tariff cut as a concession. Governments may enjoy mutual gains, however, if they jointly reduce mutual tariffs. Indeed, as Bagwell and Staiger (1999a, 2002) show, when governments start at the Nash tariffs, (τ^N, τ^{*N}) , as defined by (6), they can mutually gain from moving to a new pair of tariffs (τ, τ^*) only if they both offer strictly lower tariffs, so that $\tau < \tau^N$ and $\tau^* < \tau^{*N}$. A general form of reciprocity is thus *necessary* for mutual gains.

We may also interpret reciprocity at a more specific level. Following Bagwell and Staiger (1999a, 2002), let us associate the principle of reciprocity with mutual changes in trade policy that bring about changes in the volume of each country's imports that are of equal value to changes in the volume of its exports. Formally, for given initial and subsequent tariff pairs, (τ^0, τ^{*0}) and (τ^1, τ^{*1}) , respectively, a set of tariff changes $\Delta\tau \equiv \tau^1 - \tau^0$ and $\Delta\tau^* \equiv \tau^{*1} - \tau^{*0}$ satisfies the *principle of reciprocity* if

$$(12) \quad \tilde{p}^{w0} [M(p^1, \tilde{p}^{w1}) - M(p^0, \tilde{p}^{w0})] \\ = [E(p^1, \tilde{p}^{w1}) - E(p^0, \tilde{p}^{w0})],$$

where $\tilde{p}^{w0} \equiv \tilde{p}^w(\tau^0, \tau^{*0})$, $\tilde{p}^{w1} \equiv \tilde{p}^w(\tau^1, \tau^{*1})$, $p^0 = p(\tau^0, \tilde{p}^{w0})$, $p^1 = p(\tau^1, \tilde{p}^{w1})$, and trade-volume changes are valued at the initial world price, \tilde{p}^{w0} . In this two-good model, as Bagwell and Staiger establish, a set of tariff changes satisfies the principle of reciprocity if and only if the world price is unchanged so that $\tilde{p}^{w0} = \tilde{p}^{w1}$. This finding may be easily confirmed by applying (1) to (12), where (1) is applied at both the initial and subsequent tariff pairs.

Is liberalization according to the principle of reciprocity *sufficient* for mutual

gains? To address this question, we start at the Nash tariffs as characterized in (6) and consider for simplicity the preferences of the home government. Given (4) and (5), it is straightforward to see that $W_p < 0$ when tariffs are at their Nash levels. Thus, at Nash tariffs, the home government would prefer more trade (a lower relative price of imports) if it could achieve a greater trade volume without inducing a loss in the home country's terms of trade. A unilateral tariff cut delivers greater trade volume for the home country, but it does so at the cost of a deterioration in the home country's terms of trade. By contrast, mutual changes in trade policy that satisfy the principle of reciprocity enable the home country (and similarly the foreign country) to enjoy greater trade volume without suffering a terms-of-trade loss. Thus, and as Bagwell and Staiger (1999a, 2002) show, starting at the Nash equilibrium, trade liberalization that satisfies the principle of reciprocity is sure to raise each government's welfare, at least initially.³⁸ This finding offers an interpretation for the reciprocity norm that guides trade-liberalization negotiations in GATT/WTO.

While more evidence is needed, recent empirical work offers some support for the important role played by reciprocity in GATT/WTO tariff negotiations. In an early effort, Shirono (2004) considers the Uruguay Round and finds that the negotiated tariff reductions conform well with the reciprocity norm. Limão (2006, 2007) considers US tariff cuts in the Uruguay

Round and also reports evidence consistent with the application of reciprocity. After constructing a measure of market-access concessions and identifying instruments that address possible endogeneity concerns, he presents evidence of reciprocity for US products that were not subject to nontariff barriers. Among such goods, US import tariff reductions embody a general form of reciprocity, being greater for goods exported from countries whose own tariff cuts provided greater market access to US exports. Karacaovali and Limão (2008) provide similar support for reciprocity in a related exercise for the European Union. Finally, we also note that evidence of reciprocity may be stronger in some product groups than in others. Gulotty (2014) focuses on tariff liberalization by the United States in the Uruguay Round and reports evidence that sectors with highly contract-intensive products, characteristic of global production, do not exhibit reciprocity.

The principle of reciprocity is a key pillar of the GATT/WTO approach to trade liberalization. Our discussion to this point considers the principle of reciprocity as a bargaining norm that characterizes the manner in which tariffs are reduced in GATT/WTO negotiations. The principle of reciprocity, however, also explicitly arises in GATT/WTO rules that govern the manner in which tariffs may be raised as part of renegotiation or dispute resolution procedures.

4.1.3 *Most-Favored Nation Treatment*

A second pillar of the GATT/WTO architecture is the *principle of nondiscrimination*. For member countries, this principle requires that a country apply the same tariff on a given import good, regardless of which country exports the good. This principle is embodied in the most-favored nation (MFN) rule, under which no exporter of a

³⁸In a symmetric setting, if governments were to liberalize according to the principle of reciprocity and move, thereby, from the Nash equilibrium to the politically optimal tariffs, then they would enjoy mutual gains all along this path. In an asymmetric setting, if governments were to liberalize according to the principle of reciprocity, then mutual benefits may disappear before the efficiency frontier is reached. In both settings, mutual gains are enjoyed provided that the liberalization does not go too far.

given good can be treated any less favorably than any other exporter.

To interpret and evaluate the principle of nondiscrimination, we extend the terms-of-trade model in a simple fashion to allow for three countries. As before, the home country imports good x and exports good y . We now assume, however, that there are two foreign countries. Foreign countries 1 and 2 each trade with the home country, importing good y and exporting good x , and we assume for simplicity that the two foreign countries do not trade with each other. The local price in the home country is again represented as $p \equiv p_x/p_y$, while the local price in foreign country i , where $i = 1, 2$, is given by $p^{*i} \equiv p_x^{*i}/p_y^{*i}$. The world price for trade between the home country and foreign country i is denoted as $p^{wi} \equiv p_x^{*i}/p_y$ and represents the terms of trade for foreign country i . Let t^i represent the home-country ad valorem tariff applied to imports from foreign country i , and let t^{*i} denote the ad valorem tariff of foreign country i applied to imports from the home country. Defining $\tau^i \equiv 1 + t^i$ and $\tau^{*i} \equiv 1 + t^{*i}$, we then have from arbitrage conditions that $p^{*i} = p^{wi}/\tau^{*i}$ and $p = \tau^1 p^{w1} = \tau^2 p^{w2}$. From here, we see that if the home country adopts discriminatory tariffs, defined by $\tau^1 \neq \tau^2$, then different world prices, $p^{w1} \neq p^{w2}$, obtain for its two foreign trading partners. The foreign country that receives the lower import tariff enjoys a better terms of trade. If instead the home country satisfies the principle of nondiscrimination (i.e., the MFN rule), defined by $\tau^1 = \tau^2 \equiv \tau$, then $p^{w1} = p^{w2} \equiv p^w$ follows, and so the two foreign countries enjoy the same terms of trade, p^w . Under the MFN rule, the home country's terms of trade are given as $1/p^w$.

Our next steps are to determine market-clearing prices and represent each government's welfare function. We begin with the simplest case, where the home

country's tariffs satisfy the MFN rule. In that case, as noted, a single world price obtains. The market-clearing world price, $\tilde{p}^w(\tau, \tau^{*1}, \tau^{*2})$, may then be determined similarly to how we do so above for the two-country model. With the market-clearing local prices then given as $p(\tau, \tilde{p}^w) = \tau \tilde{p}^w$ and $p^{*i}(\tau^{*i}, \tilde{p}^w) = \tilde{p}^w/\tau^{*i}$, we may represent the respective government welfare functions as $W(p, \tilde{p}^w)$, $W^{*1}(p^{*1}, \tilde{p}^w)$, and $W^{*2}(p^{*2}, \tilde{p}^w)$. Following Bagwell and Staiger (1999a, 2002), we may now again impose two key assumptions: each country can improve its terms of trade by raising its import tariff (i.e., $\partial \tilde{p}^w(\tau, \tau^{*1}, \tau^{*2})/\partial \tau^i > 0 > \partial \tilde{p}^w(\tau, \tau^{*1}, \tau^{*2})/\partial \tau$); and each government prefers an improvement in its terms of trade, holding fixed its local price (i.e., $W_{\tilde{p}^w}(p, \tilde{p}^w) < 0 < W_{\tilde{p}^w}^{*i}(p^{*i}, \tilde{p}^w)$).

Analogous steps apply as well for the case in which the home country utilizes discriminatory tariffs, although in that case the home country's terms of trade are more complex to define. As Bagwell and Staiger (1999a, 2002) discuss, when the home country's tariffs are discriminatory, the home country's multilateral terms of trade are defined as a weighted average of its bilateral terms of trade, $1/p^{w1}$ and $1/p^{w2}$, where the weights are export shares and thus depend on foreign local prices. It follows that international externalities associated with foreign import tariffs then travel through home's multilateral terms of trade via foreign local-price channels, as well as bilateral terms-of-trade channels. Intuitively, when the home government employs discriminatory tariffs, it cares not just about the bilateral terms of trade but also about the share of exports that comes from each partner, as it enjoys greater tariff revenue when a higher share of a given import volume comes from the partner on which the import tariff is highest. The formal counterpart to this intuition is that the home country enjoys

improved multilateral terms of trade when a greater share of its imports comes from the partner on which it places the highest import tariff.

With the three-country model described, we now consider the value of the principle of nondiscrimination.³⁹ A simple observation is already at hand: when the MFN rule is used, international externalities associated with tariff choices are channeled through the world price alone, just as in the two-country model. A key implication is that the main findings presented above for the two-country model carry over as well to the multi-country model when the MFN rule is imposed. Specifically, as Bagwell and Staiger (1999a, 2002) show, if home-country tariffs are nondiscriminatory, then Nash tariffs are inefficient, politically optimal tariffs are efficient, and a small liberalization between the home country and a foreign trading partner that starts at the Nash tariffs and that satisfies the principle of reciprocity is sure to generate mutual gains for the two negotiating governments.⁴⁰ The latter finding suggests a broad complementarity between the principles of reciprocity and nondiscrimination: the latter principle ensures that international externalities travel through the world price, which is a channel that the former principle is well-equipped to manage.

The multi-country model also allows consideration of sequential negotiations between trading partners. The possibility of sequential negotiations is easily motivated in the trade-agreement context. First,

within a given negotiation round, some bilateral negotiations may precede others, suggesting that strategic considerations associated with sequential negotiations may come into play. Second, liberalization efforts in the GATT/WTO system have occurred over more than sixty-five years in the context of eight different negotiation rounds, and so negotiations among a given set of countries naturally occur through time across different negotiation rounds. Finally, accession dates differ across GATT/WTO members, so that some countries participating in a given negotiation round may not have participated in earlier rounds. To capture new insights associated with the sequential nature of negotiations, we assume that the home government initially negotiates with the government of foreign country 1 and subsequently negotiates with the government of foreign country 2. A key question is whether the principle of nondiscrimination may be interpreted as having efficiency-enhancing implications in this sequential context.

We begin by putting this question in broader context and highlighting potential inefficiencies that the MFN rule may introduce. As Caplin and Krishna (1988) emphasize, the MFN rule is a restriction on the set of instruments and thus shifts in the bargaining frontier; hence, an efficiency-enhancing role for nondiscrimination is available only if the bargaining process in the absence of the MFN rule delivers inefficient outcomes. Furthermore, in the context of sequential negotiations, it is commonly argued that the MFN rule may lead to a “free-rider” problem, whereby a country refrains from offering significant concessions since it expects anyhow to enjoy MFN tariff cuts from trading partners undertaking their own negotiations. As Caplin and Krishna argue, the MFN free-rider concern suggests that bargaining under the MFN rule may fail to deliver efficient outcomes even

³⁹For analyses of the MFN rule in other modeling frameworks, see Bagwell and Staiger (2001a), Choi (1995), McCalman (2002), and Saggi (2004), for example. Bagwell and Staiger (2010b) and Horn and Mavroidis (2001) offer further discussion of research on the legal and economic aspects of the nondiscrimination principle.

⁴⁰By contrast, due to the presence of local-price externalities, politically optimal tariffs are not efficient when discriminatory tariffs are used.

relative to the MFN-constrained efficiency frontier.⁴¹

We now consider sequential bargaining in the three-country model, where the first-stage bargain between the governments of the home country and foreign country 1 determines (τ^1, τ^{*1}) and the second-stage bargain between the governments of the home country and foreign country 2 determines (τ^2, τ^{*2}) . Our first step is to identify a bargaining inefficiency that arises in the absence of the MFN rule. As Bagwell and Staiger (2005b) show, under a slight strengthening of the assumptions given above, any proposed efficient tariff vector is vulnerable to bilateral opportunism: by appropriately lowering the second-stage tariffs that they apply to one another, the governments of the home country and foreign country 2 can enjoy mutual welfare gains that come about at the expense of the government of foreign country 1. Intuitively, such second-stage tariff reductions lead to a terms-of-trade loss for foreign country 1, and for two reasons. First, the discriminatory tariff cut that the home government offers stimulates export supply in foreign country 2 and thus generates downward pressure on the world price of foreign country 1's export good. Second, the tariff cut offered by the government of foreign country 2 induces greater demand for the home export good and thus generates upward pressure on the world price of foreign country 1's import good.

⁴¹ Ludema (1991) shows, however, that an MFN-efficient bargaining outcome is possible, if participating countries have the option to reject an agreement and continue bargaining when another country free rides and refuses to cut its own tariffs. For bargaining within a given round, Ludema's finding suggests that the threat of delayed agreement may be an important defense against free riding. His model, however, may be less well-suited for bargaining that occurs over time and across rounds, as then negotiations in one round may be undertaken with a view toward endogenously affecting the outside options for acceding countries in future rounds.

In the absence of the MFN rule, bilateral opportunism in the second-stage bargain thus ensures an inefficient outcome. The prospect of second-stage bilateral opportunism may feed back and limit the scope of the first-stage bargain as well. If the government of foreign country 1 were to foresee that the value of any first-stage concession obtained from the home government might be eroded by an even greater concession extended to foreign country 2, then the government of foreign country 1 might be cautious in extending its own first-stage concession. In light of the inevitable bargaining inefficiencies that arise in the absence of the MFN rule, we move now to the second step of our discussion and examine whether the MFN rule addresses the bilateral opportunism problem and thereby promotes efficiency. As Schwartz and Sykes (1997) argue, it is natural to expect that the MFN rule could be helpful in this regard. After all, the concession-erosion concern is addressed under the MFN rule, since foreign country 1 is then assured of receiving any home tariff cut that is subsequently offered to foreign country 2. In terms of our discussion in the preceding paragraph, the MFN rule addresses the first reason for the terms-of-trade loss of foreign country 1. Unfortunately, however, the MFN rule does not address the second reason. Even if the home tariff satisfies the MFN rule, foreign country 1 may suffer a terms-of-trade loss due to the tariff cut extended by foreign country 2. Building on this point, Bagwell and Staiger (2005a) show that a subset of the tariffs that are efficient within the MFN class are also vulnerable to bilateral opportunism, even when the MFN rule is imposed. The principle of nondiscrimination is thus helpful but not completely effective in eliminating the scope for bilateral opportunism.

Is there a simple rule which, in combination with the MFN rule, fully eliminates the scope for bilateral opportunism? In fact, as Bagwell and Staiger (2005b) show, bilateral

opportunism is impossible if any bilateral negotiation must satisfy both the principle of nondiscrimination and the principle of reciprocity. As in the two-country model, under the principle of reciprocity, a negotiation between the governments of the home country and foreign country 2 maintains the world price between these countries. In addition, as argued above, the principle of nondiscrimination implies that foreign countries 1 and 2 have a common terms of trade, \tilde{p}^w . It follows that a bilateral negotiation between the governments of the home country and foreign country 2 that satisfies the principles of nondiscrimination and reciprocity leaves unaltered foreign country 1's terms of trade. Since foreign country 1's tariff is not altered, foreign country 1's local price, $p^{*1} = \tilde{p}^w / \tau^{*1}$, also remains unchanged. We thus arrive at the following *welfare-preservation result*: if the governments of the home country and foreign country 2 engage in a bilateral negotiation that satisfies the principles of nondiscrimination and reciprocity, then government welfare in foreign country 1, $W^{*1}(p^{*1}, \tilde{p}^w)$, is preserved. This result implies as well that the MFN rule does not generate a free-riding incentive when bilateral negotiations also abide by the principle of reciprocity.⁴²

To see the intuition behind the welfare-preservation result, let us suppose that the governments of the home country and foreign country 2 enter into a bilateral negotiation in which they lower their respective tariffs. Under the MFN rule, exporters from foreign country 1 then face a lower home import tariff, which in isolation provides improved access to the home market. But the impact of foreign

country 2's tariff cut also must be considered. In foreign country 2, this tariff cut lowers the local price of the import good relative to the export good, and thus both stimulates consumption of the import good and production of the export good. For both of these reasons, foreign country 2's export volume increases. Hence, and as the Lerner symmetry theorem would suggest, foreign country 2's import tariff cut has the same effect as would an export subsidy increase. Thus, while exporters in foreign country 1 enjoy a lower home import tariff, they also face, in effect, subsidized competing exporters from foreign country 2. Under the principles of reciprocity and nondiscrimination, these effects exactly balance out, with the increase in home import demand exactly fulfilled by the expanded export volume from foreign country 2. Exporters in foreign country 1 thus ultimately do not gain additional access to the home market, which is to say that the bilateral negotiation has no impact on foreign country 1's terms of trade.

Bagwell and Staiger (2010a) provide further analysis of sequential bargaining in the three-country model. They assume that the home government negotiates sequentially with the two foreign governments, where the home government makes take-it-or-leave-it offers and negotiations are over MFN tariffs as well as lump-sum international transfers. The assumption that such transfers are feasible is extreme but ensures tractability. The MFN rule alone is then completely ineffective in addressing bilateral opportunism: for any proposed MFN-efficient outcome, the governments of the home country and foreign country 2 can adjust the tariffs and transfers under their control so as to enjoy mutual gains that come at the expense of the government of foreign country 1.

In addition to this “backward-stealing problem,” they identify a “forward-manipulation problem”: the home government may keep its MFN tariff inefficiently

⁴² In recent work, Ossa (2014) argues that the presence of differentiated products can interfere with the ability of reciprocity and MFN to neutralized third-party effects. An interesting direction for future research is to assess the welfare-preservation result in other modeling frameworks.

high in its initial negotiation, and thus engage in “foot dragging,” in order to endogenously generate a less attractive outside option (i.e., disagreement point) for its subsequent negotiation partner. Hence, governments generally would be unable to achieve an efficient outcome, even if the backward-stealing problem were addressed.⁴³ Bagwell and Staiger (2010a) argue, however, that efficient outcomes may be reached when the MFN rule is combined with other bargaining rules. The forward-manipulation problem, in particular, may be addressed if the opportunities for renegotiation are so “sweeping” as to disconnect the initial negotiation outcome from the outside option in the subsequent negotiation. At the same time, we note that other problems may arise if the renegotiation option is too readily available, as then the significance of any GATT/WTO tariff commitment would be put in question.

We turn now to the empirical evidence that concerns the nondiscrimination principle. A first form of evidence considers the trade-volume impacts associated with GATT/WTO membership and relates these impacts to the theoretical implications developed above. Subramanian and Wei (2007) find that GATT/WTO membership is associated with large and significant trade-volume impacts for developed countries, but that the trade-volume impacts of membership are small or nonexistent for most developing countries.⁴⁴ Since developed countries have

been the most active participants in GATT/WTO rounds, one interpretation of this finding draws from the welfare-preservation result presented above. In particular, if developed countries negotiate tariff reductions that broadly adhere to the principles of reciprocity and nondiscrimination, then the trade-volume impacts on third-party countries should be limited. As Bagwell and Staiger (2014) discuss, an implication of this interpretation of relevance for the Doha Round is that substantial trade-volume gains for developing countries from negotiated tariff reductions may be achieved most effectively if, in markets where they are large, developing countries negotiate reciprocally with each other and with developed countries. This implication runs counter to the nonreciprocal approach for developing countries in the Doha Round, as codified under “special and differential treatment” clauses. A second interpretation of the Subramanian–Wei finding is that developed countries have managed to circumvent the MFN rule and discriminate against nonparticipating GATT/WTO members. Further empirical analysis of this interpretation is certainly warranted. We note, however, that in the specific context of GATT/WTO bilateral dispute-settlement negotiations, Bown (2004c) finds evidence that countries comply with the MFN rule.⁴⁵

⁴³ Limão (2007) explores a related forward-manipulation strategy. In his model, a government engages in foot dragging in order to influence a future bargain involving a preferential trade agreement with non-trade objectives. We provide further discussion of preferential trade agreements in section 5.

⁴⁴ The uneven trade effects of GATT/WTO membership found by Subramanian and Wei overturn the findings of an earlier paper by Rose (2004) that constrained the trade effects of GATT/WTO membership to be the same for all countries and found no membership effect at all. Evidence that the trade effects of GATT/WTO membership are restricted primarily to developed countries has subsequently been confirmed by a number of papers (see,

for example, Chang and Lee 2011; Eicher and Henn 2011; and Dutt, Mihov, and Van Zandt 2013, though Eicher and Henn attribute to PTAs most of the trade effects that Subramanian and Wei attributed to WTO membership).

⁴⁵ Subramanian and Wei (2007) report small and insignificant impacts of a developing country's WTO membership on its overall imports, which under balanced trade implies comparably small and insignificant impacts on its overall exports. They also report that developing countries—whether or not they are WTO members—export more to developed countries that are WTO members, and in their conclusion emphasize this as a possible source of gain for developing countries associated with the WTO. Their findings on overall trade are the relevant findings for our purposes, which is why we emphasize these findings in the text.

A second form of evidence relates GATT/WTO negotiated import tariff reductions to industry and country characteristics. Ludema and Mayda (2009, 2013) relate negotiated bilateral tariff reductions to measures that capture foreign exporter concentration and importer market power. In particular, Ludema and Mayda (2013) find evidence that the level of the importer's tariff resulting from negotiations is negatively related to the product of two terms: exporter concentration (as measured by the Herfindahl–Hirschman index) and the importer's market power (as measured by the inverse elasticity of export supply, on a product-by-product basis). The positive effect of market power on a country's MFN tariff thus diminishes as exporter concentration increases, which is consistent with the view that negotiations are especially effective in “undoing” terms-of-trade-driven inefficiencies when exporter concentration is large. The important role played by exporter concentration supports the existence of an MFN free-rider effect. They also provide evidence that the free-rider effect is quantitatively important: they estimate that between 12 and 25 percent of potential liberalization, on average, goes unrealized, with most of this gap falling on the exports of developing countries due to their low-concentration product mix. Their findings thus also suggest a novel concentration-based interpretation of the Subramanian–Wei (2007) finding.

4.1.4 *Enforcement and Repeated-Game Models*

Our preceding discussion assumes that a negotiated trade agreement can be enforced. While this abstraction is helpful for interpreting and evaluating the principles of reciprocity and nondiscrimination, the manner in which a trade agreement is enforced is also essential to understand. According to the terms-of-trade theory of trade agreements, the strategic environment

confronting governments setting trade policy corresponds to a prisoners' dilemma setting. In a symmetric, two-country and two-good model, for example, if governments were to attempt to cooperate with a common tariff strictly below the Nash level, then each government would have an incentive to “cheat” by raising its tariff to the best-response level. What deters governments from cheating? Since there is no GATT/WTO jail or other external enforcement device, a government cooperates in a trade agreement if and only if the government perceives that such behavior is in its self interest. In other words, and as argued by McMillan (1986, 1989), Dixit (1987), and Bagwell and Staiger (1990), the theory of repeated games suggests that a trade agreement must be self-enforcing so that, for each government, the short-term gain from cheating is smaller than the long-term discounted cost of any consequent breakdown in cooperation.

We highlight here three implications of this repeated-game perspective. First, this perspective suggests an interpretation of the decision by initial GATT contracting parties to concentrate protective measures, with certain exceptions, into tariffs. As Bagwell and Sykes (2004) argue, by “tariffing” quantitative restrictions such as quotas, governments facilitate mutually beneficial and reciprocal trade liberalization. Specifically, by imposing tariffs rather than allocating quotas across foreign exporters, governments make market-access gains easier to assess and thereby reduce negotiation transactions costs, reduce the uncertainty facing perhaps risk-averse exporters and thus enhance the value of market-access concessions, and increase the transparency of trade-policy conduct so that cheating is less tempting. The latter point corresponds to the familiar notion from repeated-game theory that cooperation is typically easier to achieve

when players' actions are publicly observable or transparent.⁴⁶

As Maggi (1999) shows, a second and related implication of the repeated-game perspective is that a trade agreement may facilitate self-enforcing cooperation by enhancing third-party transparency. Maggi distinguishes between bilateral and multilateral enforcement mechanisms. Under a bilateral enforcement mechanism, if country A deviates with respect to the tariff that it applies to country B, then countries A and B revert to a Nash trade war. Countries A and B continue to cooperate with country C, however. By contrast, under a multilateral enforcement mechanism, if country A deviates with respect to the tariff that it applies to country B, then country A reverts to a Nash trade war with both countries B and C. Maggi shows that a multilateral enforcement mechanism can achieve greater cooperation than is possible under a bilateral enforcement mechanism. Correspondingly, when a trade institution ensures that any deviation would be observed by all member countries, the future cost of cheating could be quite severe indeed, which in turn implies that more efficient tariffs can be achieved without violating the self-enforcement constraint.

A third implication of the repeated-game perspective is that novel predictions may be generated when the self-enforcement constraint binds and political or economic shocks occur.⁴⁷ Intuitively, when a change in the environment upsets the balance between the short-term incentive to cheat and the long-term discounted value of cooperation,

an adjustment in trade policy may be required to bring the self-enforcement constraint back into balance. We develop this point further in section 4.2, when we interpret GATT/WTO safeguard rules.

A final point is that our discussion here concerns retaliation that occurs off the equilibrium path in the repeated game. The role of such retaliation is to induce compliance; however, off-equilibrium-path retaliation is, by definition, not predicted by the model and thus should be distinguished from retaliation that actually appears in WTO rules and practice. At various points below, we note that on-equilibrium-path retaliation consistent with WTO rules and practice emerges naturally in the model once the repeated-game model is extended to include privately observed shocks.

4.1.5 Implications of Basic WTO Principles and Rules

We summarize above research on reciprocity, nondiscrimination, and enforcement, all from the perspective of the terms-of-trade theory. Our discussion suggests that the principles of reciprocity and nondiscrimination appear well-designed for addressing the inefficiencies associated with the terms-of-trade externality. The theory also provides a natural means for interpreting the self-enforcing nature of trade agreements. At the same time, our review directs attention to significant challenges that confront the GATT/WTO approach. The possibility of third-party externalities warrants particular attention, whether such externalities are positive (and raise free-riding concerns) or negative (and raise bilateral-opportunism concerns). The theory reviewed above suggests that third-party externalities are eliminated when tariff policies adhere to the principles of reciprocity and nondiscrimination. The extent to which negotiated tariff cuts satisfy the principle of reciprocity may differ somewhat across

⁴⁶An additional and important advantage that tariffs have over quantitative restrictions on trade is that the latter may be more difficult to apply and enforce on a nondiscriminatory basis. See, e.g., Curzon (1965, p. 130) for an early discussion of this issue.

⁴⁷As Furusawa (1999) shows, the repeated-game approach also suggests that greater patience is not always beneficial for a country in trade-agreement negotiations, when the negotiation outcome also must be self-enforcing.

market settings, however, and GATT/WTO rules allow for exceptions to the MFN rule, with the most important exception being the provisions for preferential trading agreements. Addressing the potential for third-party externalities thus remains an ongoing challenge for the GATT/WTO.

Our review also encourages consideration of the interaction between potential free-rider benefits and the benefits of GATT/WTO membership for developing countries. Recent empirical work indicates that many developing countries have not experienced significant trade-volume benefits from GATT/WTO membership. The research reviewed above delivers two possible interpretations. First, if free-rider benefits are significant, then countries may perceive modest gains from pursuing trade-liberalization negotiations in general, but perhaps especially with developing countries whose exporters often operate in unconcentrated industries. Second, if free-rider benefits are largely eliminated, then developing countries may benefit little from pursuing a nonreciprocal approach to trade liberalization. Together, these interpretations suggest that the benefits of GATT/WTO membership for developing countries may be enhanced if negotiated tariff reductions adhere closely to the principles of reciprocity and nondiscrimination and if, in markets where they are large, developing countries negotiate reciprocally with each other and with developed countries.

4.2 *Bindings, Binding Overhang, and Safeguards/Contingent Protection*

A fundamental design feature of the GATT/WTO is that governments negotiate “tariff bindings” or “bound-tariff levels” rather than exact-tariff levels. For a given country and good, a bound tariff, which is also referred to as a “tariff cap,” identifies the maximal import tariff that can be applied. A tariff cap thus permits “downward flexibility,” in that a government can

apply a tariff that is strictly below the tariff cap. In that event, “binding overhang” is said to occur.⁴⁸ But a tariff cap constrains “upward flexibility,” since under normal circumstances the applied tariff cannot exceed the cap. Some potential for upward flexibility does exist within the GATT/WTO agreement, however, when certain contingencies arise. In this section, we review economic research utilizing the terms-of-trade theory that interprets tariff caps, binding overhang, and contingent protection or “safeguards.”

We develop our discussion in the context of a standard partial-equilibrium model with two symmetric countries and three goods.⁴⁹ One of the goods is the import good for the home country, while another good is the import good for the foreign country. The third good is a standard numeraire good, which is produced in both countries under constant returns to scale where labor is the only factor in the model. For the two non-numeraire goods, production occurs in each country under conditions of perfect competition and with diminishing marginal productivity. The resulting supply functions are upward sloping. We assume further that the consumers in both countries have a common utility function, which is additively separable and takes a quasi-linear form. The consumption of the numeraire good exhibits constant marginal utility while the consumption of each of the non-numeraire goods exhibits diminishing marginal utility. The latter property delivers downward sloping demand functions for the non-numeraire goods. Finally, each country has available a tariff for its import good, and we assume that trade in the numeraire good is untaxed.

⁴⁸The phrase “water” or “water in the binding” is sometimes used interchangeably with “binding overhang.”

⁴⁹Symmetry here means that the two countries are “mirror images” of one another. This model is frequently used in trade-policy research. See, for example, Bagwell and Staiger (2001b).

4.2.1 *Tariff Bindings and Tariff Caps*

With this standard model in mind, we now consider the interpretation of tariff caps. At the time of negotiation, we imagine that governments are in an “ex ante” stage, with each government being uncertain about the importance that it will place in the future on profits in the import-competing sector relative to consumer welfare. After government preference shocks are realized, tariffs are applied in a manner consistent with the negotiated trade agreement. In this “ex post” stage, a government’s optimal unilateral tariff and also the efficient tariff are higher when the government’s “type” (i.e., the welfare weight that the government attaches to import-competing profits) is larger, where efficiency here is defined relative to ex post joint government welfare. Due to the terms-of-trade externality, the optimal unilateral tariff is higher than the efficient tariff for any government type, provided only that the efficient tariff does not prohibit all trade. In this context, the challenge is to design a trade agreement that permits some flexibility, so that applied tariffs may respond to preference shocks and thereby facilitate greater efficiency, without opening the door to opportunistic tariff hikes.

To fix ideas, we begin with a couple of extreme scenarios in which governments can design a trade agreement in the presence of preference shocks that achieves full efficiency (i.e., an efficient tariff in each state). First, if governments’ realized types were publicly observed and verifiable, and if there were no contracting costs, then governments could write a “state-contingent” contract that delivers full efficiency. Second, even if each government’s type was privately observed, standard arguments establish that governments could again achieve full efficiency if a lump-sum contingent transfer instrument

were available.⁵⁰ These scenarios are extreme, however. Governments are likely to have some private (or at least unverifiable) information about their preferences, and explicit monetary transfers are not required in GATT/WTO rules and are rarely used in WTO dispute resolution.⁵¹

Motivated by these considerations, we therefore turn now to a scenario in which governments negotiate a trade agreement under uncertainty, have private information about their respective preferences at the time that tariffs are applied, and do not have available an instrument with which to effect contingent transfers. Allowing for a continuum of possible government types that are distributed uniformly, Bagwell and Staiger (2005a) consider this scenario in a linear-quadratic model and compare two possible trade agreements.⁵² In the first agreement, governments adopt a *rigid tariff rule*, under which each government commits to an exact tariff level for all types. Since a government’s type enters its welfare function in a linear fashion, the most efficient agreement of this kind places the rigid tariff at the level that is efficient for the average type.⁵³ They then compare this agreement with one in which each government adopts a *weak-binding tariff rule*, consistent with GATT/WTO rules, under which it commits to a tariff cap. They find that the most efficient weak-binding yields strictly higher expected joint government welfare than does the most efficient

⁵⁰ See Bagwell and Staiger (2005a) for details in the trade-agreement context.

⁵¹ Further, even monetary transfers may entail inefficiencies, due to the distortions associated with raising funds through taxation.

⁵² In a linear-quadratic model, economic agents have quadratic payoffs and the corresponding demand and supply functions are linear.

⁵³ As discussed in footnote 23, under the assumption that governments have available at the negotiation stage an instrument with which to make noncontingent, lump-sum transfers, efficiency in the ex ante negotiation stage for this partial-equilibrium model is evaluated relative to expected joint government welfare.

rigid tariff, and that the most efficient weak binding is strictly higher than the most efficient rigid tariff. Intuitively, under a weak binding, the applied tariff exhibits binding overhang when a government draws a low type, and so the binding only constrains the applied tariff when the government's type is high and the efficient tariff is thus also high.

Amador and Bagwell (2013) generalize this analysis in several directions. Allowing for more general payoff and distribution functions, they derive conditions under which a trade agreement with a tariff cap (i.e., a weak-binding tariff rule) maximizes expected joint government welfare among *all* incentive-compatible trade agreements. They thus provide a first theoretical explanation for the use of tariff caps in an optimal trade agreement. Their approach is to represent the problem of finding an optimal trade agreement for the import good of the home country as a delegation problem, in which the principal's expected welfare corresponds to the associated expected joint welfare of the two governments and the agent is the government of the home country.⁵⁴ In this context, a trade agreement identifies a set of permissible tariffs. In the *ex ante* stage of trade-agreement design, the two governments thus choose the set of permissible tariffs for the home-country import good that maximizes *ex ante* joint welfare while satisfying the incentive-compatibility constraint that the home government will choose its preferred tariff from this set, after observing its type. The tariffs induced by rigid-tariff rules and weak-binding tariff rules are of course candidate solutions, but so, too, are many discontinuous tariff functions. Amador and Bagwell further allow that the trade agreement may specify that tariff choices are

bundled with money-burning expenditures perhaps corresponding to administrative procedures. They characterize a rich set of environments, which includes the linear-quadratic model with a uniform distribution as a special case, in which the optimal trade agreement takes the simple form of a tariff cap. The optimal trade agreement then also exhibits binding overhang and does not employ money burning.⁵⁵

Beshkar, Bond, and Rho (2015) extend the linear-quadratic model to a setting with asymmetric countries. They restrict attention to tariff caps and provide theoretical and empirical support for the prediction that the optimal tariff cap is higher, and thus the likelihood of binding overhang is greater, when importer market power is lower. To gain some intuition for their theoretical findings, it is helpful to consider the extreme case of a small country. Since the tariff policy of a small country imposes no terms-of-trade externality on its trading partner, the optimal trade agreement would permit such a country to impose its unilaterally optimal trade policy for whatever preference shock it experiences. A high (i.e., unrestrictive) tariff cap achieves this goal. More generally, when a country has more market power in a sector, its tariff policy imposes a greater externality on its trading partner, and so a lower tariff

⁵⁴ A delegation game is a principal–agent game in which the agent has private information and transfers are infeasible. The delegation game was first introduced and analyzed by Holmstrom (1977).

⁵⁵ Related results arise in other settings as well. Amador and Bagwell (2013) move beyond the partial-equilibrium model with perfect competition and use their main propositions to establish conditions under which a tariff cap is also optimal for a monopolistic-competition model of trade with a fixed number of firms. (Ossa 2012, explores a similar model while focusing on other issues.) Amador and Bagwell (2012) similarly employ these propositions to provide conditions for the optimality of a tariff cap in a linear-quadratic model with a uniform distribution when private information concerns the weight that tariff revenue receives in the government welfare function. Finally, the models discussed here assume a continuum of possible types. As Bagwell (2009) confirms, the optimal trade agreement does not take the form of a tariff cap in the linear-quadratic model when government preferences concerning the relative importance of import-competing firms are drawn from two possible types.

cap, with an associated reduced frequency of binding overhang, is optimal. Using data on applied and bound tariffs for WTO member countries, they then provide strong empirical support for this prediction.⁵⁶

Tariff caps and binding overhang have also received attention in other modeling frameworks. In a model with contracting costs, Horn, Maggi, and Staiger (2010) compare a weak binding rule and a rigid tariff rule. The framework is different from that considered by Bagwell and Staiger (2005a), but interestingly points to a related set of insights as regards bindings and overhang. Horn, Maggi, and Staiger (2010) show that a weak binding rule is preferred to a rigid tariff rule, since the former permits efficiency-enhancing downward flexibility, and they also note that the weak binding rule is characterized by binding overhang. A different approach is pursued by Maggi and Rodriguez-Clare (2007). As we also discuss in section 6.1, they analyze a model in which trade agreements address both commitment and terms-of-trade problems. In their model, binding overhang does not occur in equilibrium; however, the potential to apply a tariff below the bound level induces ex post lobbying that has the beneficial effect of diminishing an ex ante problem of excess investment.

The tariff-cap theory described above establishes a rationale for tariff caps when governments have private information and contingent transfers are infeasible. As we argue next, in addition to providing an interpretation of tariff caps and binding overhang, this theory provides a foundation from which to understand contingent protection. A key idea is that contingent protection may potentially enhance efficiency by “linking” tariff choices through time for a given government or across governments and creating, thereby,

some scope for imperfect contingent transfers. More generally, contingent protection provides a form of upward flexibility that, in some cases, may enhance efficiency when certain shocks occur. At the same time, it also must be emphasized that tariff caps are a valuable means of “stabilizing” tariff commitments and diminishing the potential for “unwinding” tariff commitments.⁵⁷ The optimal rules for contingent protection thus reflect a delicate balance between maintaining reduced tariffs in response to the terms-of-trade externality and providing some upward flexibility in light of various shocks that may confront governments.

4.2.2 *Contingent Protection Such as Safeguards and Antidumping*

Bagwell and Staiger (2005a) explore a role for contingent protection when governments experience preference shocks that are privately observed. Formally, they consider a repeated-game model in which government’s privately observed types are iid through time, and they show that expected joint government welfare may be improved when the tariff choices of any given government are appropriately linked through time.⁵⁸ Their analysis is motivated by the “escape clause” defined in the *WTO Agreement on Safeguards*. This agreement describes contingencies under which a country can set a tariff above the tariff cap and thus achieve some degree of upward flexibility.⁵⁹ As Bagwell and Staiger note, an interesting feature of the WTO

⁵⁷For further discussion of the importance of tariff stabilization, see Curzon (1965, chapter 4). Focusing on India, Bown and Tovar (2011) provide empirical evidence that countries use antidumping and safeguard exceptions to unwind commitments to lower tariffs in the presence of domestic political-economic pressure.

⁵⁸Their work builds on a literature in game theory that associates continuation values with transfers. See Athey and Bagwell (2001) and Fudenberg, Levine, and Maskin (1994).

⁵⁹For an overview of the the WTO safeguards agreement, see Wauters (2010).

⁵⁶See Bacchetta and Piermartini (2011) for additional empirical evidence regarding tariff caps and binding overhang.

safeguards agreement is that it embodies a *dynamic-use constraint*: if a government imposes escape-clause protection in an industry for X years, then it is not allowed to reimpose escape-clause protection in that industry for the next X years. This constraint introduces an opportunity cost to a government from selecting an escape-clause tariff, so that incentive compatibility is achieved when only a government with a sufficiently high type in the current period imposes an escape-clause tariff. The dynamic-use constraint may thus promote further efficiency by facilitating more efficient tariffs when a government draws a sufficiently high type. The prospect of improved efficiency emerges because a government that goes above the cap today effectively makes a transfer to the other government in the form of an improved continuation value.

Martin and Vergote (2008) develop a related set of insights for a situation in which the tariff choices of one government are linked to those of the other government. They consider antidumping duties as allowed under certain contingencies in the WTO *Anti-dumping Agreement*. Motivated by empirical work by Blonigen and Bown (2003), Feinberg and Reynolds (2006), and Prusa and Skeath (2002) that provides evidence of a retaliatory role for antidumping duties, Martin and Vergote argue that such on-equilibrium-path retaliation may facilitate efficiency gains by ensuring that the home government protects its import-competing industry with an antidumping duty only when the current importance of that industry to the home government is sufficiently great. In this case, when the home government imposes an antidumping duty, a link is forged to a future retaliatory antidumping duty of the foreign country. Upon raising its applied tariff via an antidumping duty, the home government thereby again makes a transfer to the foreign government in the form of an improved continuation value.

Our discussion of contingent trade-policies above focuses on the idea that the potential for upward flexibility might improve efficiency when governments are privately informed about their preferences, if contingent transfers achieved through continuation values ensure that only governments with high types exercise this potential. The WTO *Safeguards Agreement* and also the WTO *Anti-dumping Agreement*, however, explicitly indicate contingencies under which upward flexibility can be exercised. For example, the WTO *Safeguards Agreement* permits the application of a safeguard tariff when the domestic industry is seriously injured as a result of increased imports. If such contingencies are interpreted as defining verifiable market conditions, then an alternative modeling approach is suggested under which a government that seeks to impose a contingent trade policy must incur the necessary costs to publicly verify that the relevant contingent state is present.⁶⁰ Beshkar and Bond (2016) offer a first example of this modeling approach. They analyze a partial-equilibrium model with asymmetric country sizes that features costly state verification, in the specific sense that at a cost, the importing government can publicly verify the welfare weight that determines its type. A novel feature of their model is that both caps and escape clauses are endogenously determined as part of an optimal trade agreement. Interestingly, they find that circumstances under which the possibilities of overhang (downward flexibility) and escape (upward flexibility) coexist are relatively rare. Intuitively, when higher types use the escape clause, the cap can be set at a lower level; this implies, in turn, that the likelihood of overhang is small.

⁶⁰As Sykes (2003) discusses, however, the extent to which the WTO *Safeguards Agreement* and subsequent legal cases serve to articulate a clear set of contingencies may be questioned.

An alternative theory of escape clauses dispenses with the possibility of private information and focuses instead on the self-enforcement constraints that underlie any cooperative trade agreement. Bagwell and Staiger (1990) offer a first paper of this kind. They consider a partial-equilibrium model with two countries, in which publicly observed trade-volume shocks occur in an iid fashion over time. When a country imports a large volume, it has an increased incentive to cheat on a cooperative agreement and select its unilaterally optimal tariff. The cost of such behavior is that it may induce governments to abandon cooperation and revert to Nash trade policies in the future. If governments maximize national income and are sufficiently patient, then they can enforce free-trade policies for all possible trade-volume shocks. If governments have moderate patience, however, then they can enforce free-trade policies only in periods with low trade volumes. When trade volumes take higher values, the incentive to cheat is acute at free-trade policies and the gains from defection overwhelm the discounted future cost of initiating a Nash trade war. Governments with moderate patience can still cooperate in the presence of large trade volume shocks, but they do so by setting positive (and below-Nash) tariffs. Intuitively, by cooperating with a positive tariff, governments reduce the incentive to cheat and bring it back in line with the future discounted cost of Nash reversion. The positive tariffs that accompany high trade-volume shocks can be interpreted in terms of an escape clause, and Bagwell and Staiger show that an escape clause of this kind is a feature of an optimal self-enforcing trade agreement for governments with moderate patience.⁶¹

Bown and Crowley (2013b) provide a first empirical investigation of the cross-sectional

and intertemporal predictions of the Bagwell–Staiger (1990) model. As discussed, that model predicts that an import tariff increase is more likely when the import volume increases. In addition, conditioning on a positive import surge, the model predicts that the probability of a tariff increase is positively associated with less elastic import demand and export supply functions and also with less variable import demand volumes. Since the escape clause featured in the Bagwell–Staiger model could correspond to any instrument of special protection, such as a safeguard tariff or an antidumping duty, Bown and Crowley analyze the model's predictions using data on US import tariff increases arising under the US antidumping and safeguard laws and find strong support for the predictions of the model.

A special feature of the Bagwell–Staiger (1990) model is that trade-volume shocks are iid through time. A trade-volume shock thus affects the incentive to cheat in the current period, but has no direct impact on the discounted future value of cooperation. Bagwell and Staiger (2003) extend the model to allow for both iid shocks to the trade-volume level and stochastic but persistent trends in the growth rate for trade volume.⁶² At any given point in time, governments observe the current shock to the trade-volume level and observe, as well, whether the trading relationship is in a fast- or slow-growth phase, where the relationship moves between the two phases according to a Markov process. They find that the most cooperative trade agreement for governments with moderate patience is countercyclical: all else equal, the most cooperative tariffs are

⁶¹Their work builds on methods developed by Rotemberg and Saloner (1986) for the study of collusion.

⁶²Hochman and Segev (2010) extend the Bagwell–Staiger (1990) model in a different direction by allowing that governments may imperfectly observe the trade-volume shock before applying tariffs. Another interesting extension is considered by Tabakis (2010), who examines the use of special protection when countries are transitioning into preferential trading agreements.

lower in a fast-growth phase. The key intuition is that governments have more to lose from initiating a trade war in a (persistent) fast-growth phase; as a consequence, they can then withstand the heightened incentive to cheat that a lower cooperative tariff implies.⁶³ Bown and Crowley (2013a) provide an empirical investigation of the macroeconomic determinants of time-varying trade policy. Using quarterly data for the United States, European Union, Australia, Canada, and South Korea, they find evidence of a countercyclical trade policy response in the pre–Great Recession period (namely, the first quarter of 1988 through the third quarter of 2008).⁶⁴ Their findings are broadly consistent with the theoretical predictions in Bagwell and Staiger (2003), as well as those in Crowley’s (2011) reciprocal-dumping model, which predicts an increase in import restrictions in response to macroeconomic weakness abroad.

A different perspective on safeguards is offered by Sykes (1991, 2003). He observes that instruments of special protection are often applied to assist declining domestic industries. Firms in such an industry retain a large share of the benefits of price-increasing protection, since temporary protection is unlikely to encourage entry in a declining industry. Thus, firms in a declining industry may lobby hard for protection and, therefore, figure prominently in the domestic government’s welfare function. Foreign exporters are naturally harmed by the domestic tariff; however, if the foreign export industry is growing, then they may complain little about facing protection, since their profits would eventually be lost to entry anyhow. These firms, therefore, may not figure prominently

in the foreign government’s welfare function. Thus, governments in an *ex ante* state may be attracted to a safeguard rule for declining industries, since the welfare benefit to the government that uses the safeguard may exceed the welfare cost to the government whose exporters face the safeguard.

4.2.3 *Implications and New Directions*

Our survey highlights that tariff caps and binding overhang occur in an optimal trade agreement when governments are privately informed about their preferences and contingent transfers are infeasible. With this foundation in place, we then consider three complementary theories for the use of special instruments of protection. First, when governments experience privately observed preference shocks, upward flexibility might promote further efficiency, provided that higher tariffs are only used by governments facing high political pressures. This incentive compatibility constraint, in turn, can be met, when current tariffs are linked to future tariffs so that contingent transfers can be achieved, at least to some degree, through changes in continuation values. The incentive-compatibility constraint also can be met when costly state verification is feasible. Second, optimal cooperation when trade volumes are volatile entails a low baseline tariff coupled with an escape clause that allows for higher tariffs when trade-volume shocks are high. Safeguards emerge in an optimal trade agreement in this setting and indeed complement tariff liberalization, as the baseline tariff would be higher were safeguards not allowed. Finally, safeguards may enable governments to achieve greater welfare by rewarding (penalizing) industries that figure more (less) prominently in governments’ welfare functions. This theory associates the use of safeguards with declining industries. While more empirical work is needed, we also identify studies that provide empirical support for themes emerging from the theoretical analyses.

⁶³This work builds on methods used by Bagwell and Staiger (1997a) to analyze collusion over the business cycle.

⁶⁴Bown and Crowley (2014) provide additional empirical support from a sample of thirteen emerging economies and use of annual data covering the period 1995–2010.

We conclude this section by mentioning a new literature that assesses the value of tariff bindings, as distinct from reductions in applied tariffs, in the presence of policy uncertainty.⁶⁵ Handley (2014) and Handley and Limão (2015) focus on the implications of policy uncertainty when exporters face sunk-market entry costs. They observe that tariff bindings reduce policy uncertainty by constraining the range of possible tariffs, limiting losses in the worst-case scenario and thereby stimulating entry into export markets. Formalizing this insight, they use their models to empirically quantify the trade effects of WTO bindings (for Australia, in Handley 2014) and PTA bindings (for Portugal joining the European Union, in Handley and Limão 2015), reporting large trade effects for each case. The study of tariff caps and policy uncertainty represents an especially promising direction for new research.

4.3 *Subsidies*

The appropriate treatment of subsidies in a trade agreement is subtle. On the one hand, a domestic production subsidy can be a “first-best” instrument with which to address a market failure that results in an inefficiently low level of output. A production subsidy may also be an attractive instrument for a government with political-economic objectives that wishes to redistribute surplus to producers in a given industry. On the other hand, some restrictions on the use of domestic production subsidies are necessary, since otherwise a government could always give a domestic production subsidy to an import-competing industry so as to undermine the benefits offered to other countries through negotiated tariff cuts. The appropriate treatment of export subsidies is also subtle. An export

subsidy lowers the world price for the export good and thus generates a terms-of-trade gain for importing countries, but it may also displace exports from other countries and alter entry and exit patterns across countries. In this section, we review the GATT/WTO legal treatment of subsidies and discuss economic research utilizing the terms-of-trade theory that interprets and evaluates this treatment.⁶⁶

4.3.1 *Subsidy Rules under the GATT versus the WTO*

The treatment of subsidies in GATT was relatively tolerant: a foreign trading partner could respond to the subsidies of the domestic country through two possible means.⁶⁷ First, the foreign government could unilaterally impose a countervailing duty (CVD) if its import-competing industry experienced material injury as a consequence of an export subsidy given to producers in the domestic country. Second, the foreign government could file a non-violation complaint if it had previously negotiated a tariff reduction from the domestic government on a given product and the domestic government later offered a subsidy to its import-competing producers of that product. To succeed, the foreign government would have to show that a new or increased domestic subsidy program emerged that had the effect of nullifying or impairing the market-access benefits that the foreign government had reasonably expected at the time of the tariff negotiation.⁶⁸ In this case, the domestic government would not be required to remove the subsidy; however, it would be expected to make policy adjustments that restored the foreign country's

⁶⁶For closely related discussions, see also Bagwell (2008) and Bagwell, Staiger, and Sykes (2013).

⁶⁷Sykes (2005a) offers a detailed discussion of the evolution of subsidy rules under GATT and the WTO.

⁶⁸See Petersmann (1997, pp. 151–4) for discussion of the conditions under which a subsidy could be determined to upset market-access expectations.

⁶⁵In addition to the Handley (2014) and Handley and Limão (2015) papers we discuss in the text, other recent papers in this emerging literature include Limão and Maggi (2015) and Pierce and Schott (2016).

negotiated market access. In addition, as part of GATT negotiations, several countries agreed to restrict the use of export subsidies, especially for non-agricultural goods.

The treatment of subsidies in the WTO's *Agreement on Subsidies and Countervailing Measures* (the SCM Agreement) is much more restrictive. First, except as allowed for in the *Agreement on Agriculture*, export subsidies (and also local-content subsidies) are prohibited. Second, "specific" subsidies that have "adverse effects" on other members are actionable, where adverse effects could take the form of an injury to an industry in another member country, the nullification or impairment of benefits expected by another WTO Member, and "serious prejudice" to the interests of another WTO Member. The first two forms of adverse effects are broadly reflected in the GATT treatment of subsidies and may be associated with the use of CVDs and non-violation complaints by the adversely impacted member country. The more novel ingredient is serious prejudice, which may occur if the effect of a subsidy offered by the domestic country is to cause a loss of exports by a WTO member into the domestic market or a third-country market. Importantly, a domestic production subsidy can be actionable under the SCM Agreement independently of whether the subsidy nullifies or impairs the market-access expectations associated with an earlier tariff negotiation.⁶⁹

⁶⁹As regards countermeasures, if the domestic government refuses to remove an export subsidy, then the complaining member government may take "appropriate countermeasures." For an actionable subsidy, in the absence of an agreement on compensation, and if steps to remove the adverse effects are not undertaken or if the subsidy itself is not withdrawn, then the complaining member may be granted authority to impose countermeasures that are "commensurate" with the adverse effects attributable to the subsidy. See Lawrence (2003, pp. 54–60); Mavroidis (2000); Spamann (2006); and Bown and Ruta (2010) for further discussion.

WTO rules thus treat subsidies in a fairly severe manner. In contrast to import tariffs, for which caps are negotiated, export subsidies are banned. As well, under WTO rules, a country that uses a domestic production subsidy must withdraw it, or remove its adverse effects, even if the subsidy itself does not upset any negotiated market-access expectation. We consider next research that interprets and evaluates the WTO's treatment of subsidies.

4.3.2 *Production Subsidies*

We begin with the treatment of domestic production subsidies. On the one hand, and as mentioned above, a domestic production subsidy is a first-best instrument with which to address a market failure that leads to an inefficiently low level of production.⁷⁰ A domestic production subsidy also may be an attractive instrument for a government with political-economic preferences that seeks to redistribute surplus to the import-competing industry. On the other hand, if the use of domestic production subsidies were completely unregulated, then governments would be unable to achieve efficient outcomes through reciprocal tariff negotiations alone. Intuitively, in the absence of any restrictions on the use of such subsidies, a government that exchanged reciprocal tariff cuts with a trading partner could subsequently "undo" the market-access consequences of its own tariff cut by providing a production subsidy to its domestic import-competing industry. This discussion suggests that domestic production subsidies have a potential efficiency-enhancing role to play, but that their use must be regulated in some manner. Given these considerations, we may ask: how

⁷⁰An import tariff is another instrument that might be used to expand domestic production levels; however, an import tariff is a second-best instrument. An import tariff is equivalent to a consumption tax and a production subsidy, and thus affects both consumer and producer margins.

should domestic production subsidies be treated in a trade agreement?

The described trade-offs suggest a potential answer to this question: grant each government flexibility over its domestic policies, provided that the overall effect of its chosen domestic policies does not erode the market-access commitments made through its preceding tariff negotiations. Under this approach, after tariffs are negotiated, a government would be allowed to adjust its domestic policies in any way, so long as the overall effect does not result in a terms-of-trade loss for its trading partner. To analyze this approach, Bagwell and Staiger (2006) augment the two-country, general-equilibrium terms-of-trade model considered above to include domestic tax/subsidy policies. Assuming that the set of domestic instruments available to governments is sufficiently rich to create a degree of policy redundancy, they find that GATT rules enable governments to achieve an efficient outcome using tariff negotiations.⁷¹ A key feature of GATT rules in this context is that a government can file a non-violation complaint if it suffers a terms-of-trade loss as a consequence of a change in the domestic policies of its trading partner. The WTO's SCM Agreement places further restrictions on the use of domestic production subsidies. These restrictions limit policy redundancy and may thereby prevent governments from achieving efficient outcomes through tariff negotiations.

Bagwell and Staiger (2006) also consider a setting with limited instruments. In this setting, GATT rules are no longer sufficient for achieving efficiency through tariff negotiations. Intuitively, in a limited-instrument setting, a government may be unable to reposition its subsidy to an efficient level

without imposing a terms-of-trade loss on its trading partner. Indeed, when the set of instruments is limited, the SCM Agreement could represent an improvement over GATT rules. For example, if governments respectively maximize national income and no market failure exists that creates a corrective role for domestic production subsidies, then the use of subsidies would be inefficient. More broadly, though, market failures and/or redistributive goals suggest a potential role for domestic production subsidies in an efficient outcome for governments. As Bagwell and Staiger argue, tight restrictions on subsidies could then have a "chilling effect" on tariff negotiations.⁷² To the extent that the SCM Agreement imposes tight restrictions on the use of domestic production subsidies, GATT rules on subsidies may then be preferred to those in the WTO.

GATT non-violation rules on domestic policies identify an attractive approach in granting flexibility to governments up to the point where an externality is imposed on trading partners. At a practical level, however, it also must be acknowledged that non-violation rules have their own limitations.⁷³ As two illustrations, we mention that it may not be obvious what a government should reasonably expect at the time of negotiation, and it also may not be clear where to draw the line in terms of which sorts of domestic policy changes are appropriately disciplined using non-violation nullification-and-impairment complaints.

⁷²The idea is that governments may be hesitant to negotiate tariff bindings if subsidies are disciplined heavily, since tariffs may then be the best remaining means of providing assistance to domestic import-competing industries.

⁷³Another important caveat is that a market-access-preservation rule may fail to be optimal in settings with private information, as Lee (2016) argues. We discuss his and related papers in greater detail in section 5.

⁷¹Sufficient policy redundancy is satisfied if each government has available an import tax, a domestic production subsidy, and a domestic consumption tax.

4.3.3 *Export Subsidies in Two-Country Models*

We turn now to the treatment of export subsidies. We begin with a basic observation: in the simple two-country, two-good general-equilibrium terms-of-trade model described above, an increase in the domestic country's export subsidy would have the same effect on prices, and thus government welfare functions, as would a decrease in its import tariff. This observation, known as the Lerner symmetry theorem, follows since either policy change would lower (raise) the relative price of the domestic import good in the domestic (world) market. One implication is that both policy changes would generate a terms-of-trade loss (gain) for the domestic (foreign) country. Since each government's welfare is expressed as a function of the relative price in its country and its country's terms of trade, it follows that the two policy changes affect government welfare functions in the same fashion as well. Hence, our arguments above carry over immediately when governments select export instead of import policies. In particular, Nash export policies are inefficient and result in too little trade, and governments can mutually gain from an agreement on export policies only if they agree to make reciprocal adjustments that lead to greater trade volume.

This result is familiar when governments respectively maximize national income. In that case, free trade is efficient, but each government's optimal unilateral policy is an export tariff. The key intuition is that a government can use an export tariff to induce its competitive export industry to restrict output as would a monopolist, where monopoly rents are now retained in the form of tariff revenue. In the resulting Nash equilibrium, both governments impose export tariffs, and the trade volume is inefficiently low. More generally, the sign of a government's unilaterally optimal export policy depends on the

government's specific preferences. The Nash export policy is an export subsidy for a government that gives sufficient welfare weight to the interests of its export sector.⁷⁴ The fundamental point, though, is the governments' noncooperative export policies, whatever their sign, induce too little trade from the governments' joint perspective.

A trade agreement can thus generate mutual gains for governments only if it facilitates reciprocal *increases* in export subsidies (or reciprocal decreases in export tariffs) relative to noncooperative levels. Intuitively, an increase in a country's export subsidy generates a positive terms-of-trade externality for its trading partner, whose consumers now enjoy a lower price on their import good. While this argument makes sense within the context of the terms-of-trade approach to trade agreements, it runs completely counter to the treatment of export subsidies in the WTO. There are thus two possibilities: either the WTO's prohibition on export subsidies is misguided, or the simple two-country, competitive-markets version of terms-of-trade theory is missing something important. To explore the latter possibility, we discuss next a sequence of enriched terms-of-trade models within which to further explore the treatment of export subsidies.

4.3.4 *Export Subsidies in Third-Market Models*

One potential cost of export subsidies not featured in the above discussion is that an export subsidy offered in one country lowers the world price and thereby imposes a negative terms-of-trade externality on other exporting countries. To explore this issue, we follow the "strategic-trade" literature

⁷⁴See, for example, Bagwell and Staiger (2001b) and Grossman and Helpman (1995b).

and construct a “third-market” model.⁷⁵ Specifically, we illustrate our points using a simple partial-equilibrium model with a single good, where all firms are located in Countries 1 and 2 and all consumers are located in Country 3. Firms in Countries 1 and 2 then compete for sales to consumers in Country 3. We ask two questions. First, when would a government have a unilateral incentive to offer an export subsidy? Second, when, if at all, should an international trade agreement discipline the use of export subsidies?

Following the pioneering model of Brander and Spencer (1985), we focus on a setting in which a fixed number of firms engage in Cournot competition for sales in Country 3. The key issues involved can be illustrated in a simple third-market model with two firms, wherein Firm 1 is located in Country 1, Firm 2 is located in Country 2 and all consumers are located in Country 3. In the absence of any subsidy, Firms 1 and 2 have the same constant marginal cost. The governments of Countries 1 and 2 respectively maximize national income. The game has two stages. The governments simultaneously select their respective specific (i.e., per unit) export subsidies, and after observing these selections Firms 1 and 2 simultaneously select their respective output levels.

⁷⁵As we discuss in section 6.2, some recent research evaluates whether the strategic-trade and “delocation” theories of export subsidies can be interpreted as providing a rationale for trade agreements that is distinct from that provided by the terms-of-trade externality. Bagwell and Staiger (2012a, 2015) argue, however, that the problem for a trade agreement to solve in the profit-shifting and delocation settings can be given a terms-of-trade interpretation, provided that both import and export policies are available. In particular, they show that politically optimal policies remain efficient in these settings when a full set of trade policies is available. We thus include some discussion of these theories here, as part of our discussion of the implications of the terms-of-trade approach for the treatment of export subsidies, while postponing further discussion of the rationale of trade agreements in these settings until section 6.2.

A key finding is that, starting at free trade, a government that maximizes national income now has a unilateral incentive to offer an export subsidy. As is now well known, an export subsidy lowers the cost of the exporting firm and thus shifts out this firm’s output reaction curve. The strategic advantage of such a shift is that the other exporting firm responds by reducing its own output. An export subsidy thus “shifts profits” to the subsidizing country. The overall effect of a strategic export subsidy is to expand aggregate output and thus induce a fall in the world price. Hence, as in the competitive model, an export subsidy generates a positive terms-of-trade externality for the importing country. A new feature of the third-market model is that an export subsidy generates as well a negative terms-of-trade externality for the other exporting country.

Of course, the other exporting country has a similar incentive to subsidize exports, and the resulting subgame perfect Nash equilibrium involves export subsidies from both exporting countries. The two exporting countries end up worse off when export subsidies are legal, since their strategic efforts offset and simply result in a lower world price. Consumer and global economic welfares, however, are higher when subsidies are allowed than would be the case were subsidies banned. The described model therefore provides an interpretation for why exporting countries would seek a ban on export subsidies as a means to keep the price high, but it suggests that an international trade agreement designed to maximize the combined welfare of all countries in fact should encourage even greater use of export subsidies than occurs in the noncooperative equilibrium.⁷⁶

⁷⁶The market is initially distorted with too little production as a consequence of oligopolistic competition. The equilibrium with strategic export subsidies expands output closer to the competitive level, and a trade agreement could further improve global welfare by increasing subsidy levels so that the competitive level of output is produced.

This simple third-market model has been extended in many directions to allow for alternative forms of imperfect competition, multiple exporting firms in exporting countries, consumers in exporting countries, endogenous cost technologies, and other considerations.⁷⁷ Such extensions provide important qualifications about the sign of the unilaterally optimal export policy, but a robust feature of models with a fixed number of firms is that a more expansionary export policy provides a positive terms-of-trade externality to importing consumers.

Returning now to the two questions identified above, we note that the simple third-market model described here provides an interpretation for the unilateral appeal of export subsidies, but it also suggests that export subsidies may be undersupplied. The model thus does not provide a foundation from which to understand a cap on export subsidies, much less the WTO's prohibition on export subsidies. The model also fails to provide an interpretation for the fact that the WTO treats export subsidies more severely than import tariffs.⁷⁸ In short, we conclude that the simple third-market model fails to rationalize the treatment of export subsidies in the WTO.⁷⁹

⁷⁷Eaton and Grossman (1986) and Maggi (1996) provide the key studies examining the dependence of the sign of optimal export policies on the form of imperfect competition in the product market. Bagwell and Staiger (1994) argue that the sign of the optimal strategic R&D policy is less sensitive to the form of imperfect competition. See Brander (1995) for a review of the strategic-trade literature.

⁷⁸We develop these conclusions for a model with imperfect competition. As Bagwell and Staiger (2001c) show, if governments have political-economic objectives that give sufficient weight to export interests, then similar conclusions hold in a third-market model with perfect competition when marginal cost is increasing.

⁷⁹The simple third-market model described here neglects many potential welfare costs associated with export subsidies. Export subsidies may generate distortions in production and encourage rent-seeking behavior, for example. We do not intend to minimize the importance of such considerations; however, we also point out that

4.3.5 *Export Subsidies and Industrial Policy*

The models described so far do not focus on the long-run implications of export policies for industrial structure. To explore this issue, we now follow Venables (1985) and consider the “delocation” effects of trade policies in a two-country partial-equilibrium model with two-way trade in a homogeneous good. The game has three stages. In the first stage, governments simultaneously select (specific) import and export tariffs. Each government seeks to maximize national income in its country. In the second stage, after observing trade policies, potential entrants decide whether to locate in the domestic or foreign market, where entry entails a positive fixed cost. In any country, entry occurs until expected profits (including the fixed cost) are driven to zero. Finally, in the third stage, after observing trade policies and the numbers of firms located in each of the two countries, the entering firms simultaneously choose Cournot output levels, where an individual firm selects both an output level for the market in which it is located, as well as a separate output level for exportation into the other market. The two markets are segmented, and a positive (per unit) transport cost must be incurred for exported units.

A key feature of this model is that it exhibits a Metzler paradox: if a government raises its import tariff (or raises its export subsidy), the price of the good within its country falls. To see the intuition, suppose that we start at global free trade with levels of entry in each country that generate zero profit for each firm, and suppose that the domestic government then imposes a slight import tariff (or a slight export subsidy). Holding fixed the numbers of firms in each country, domestic

similar welfare costs are associated with import tariffs. For further discussion of these and other neglected welfare costs associated with export subsidies, see Bagwell, Staiger, and Sykes (2013, pp. 186–9).

firms would then enjoy positive profits while foreign firms would experience negative profits. Some adjustment in the patterns of entry across the two countries is thus necessary to restore zero profits. Due to positive transport costs, each firm sells greater output in its local market than in its export market. Hence, the only way to reduce the profit of a domestic firm while increasing the profit of a foreign firm is to adjust entry patterns until the domestic price falls and the foreign price rises. Consequently, the domestic policy change must induce (reduce) entry into the domestic (foreign) market to such an extent that the domestic price falls (foreign price rises). In this sense, when a government imposes a higher import tariff (or export subsidy), it “delocates” firms from the other country to its own country.

As Venables (1985) shows, if all policies are initially set at free trade, then the domestic government can gain by imposing a small import tariff. Producer surplus is unaffected by the change, since free-entry conditions ensure that firms earn zero profit. But a small import tariff generates positive tariff revenue and also leads to a lower price and higher consumer surplus in the domestic country, due to the Metzler paradox. A small export subsidy likewise leads to a lower price and higher consumer surplus in the domestic country. However, the small export subsidy imposes a cost in the form of subsidy expenses. Venables shows that, when demand and costs are linear, a small export subsidy also generates a net gain for the domestic government. Both policy changes result in a higher foreign price, lower foreign consumer surplus, and lower foreign government welfare. Starting at free trade, therefore, Venables’ analysis shows that export subsidies are unilaterally attractive and impose a negative terms-of-trade externality on the trading partner.

Bagwell and Staiger (2012b) generalize the analysis of the linear Cournot delocation

model. They show that the Nash policies for governments in fact are characterized by the use of import tariffs and export tariffs. Thus, while an export subsidy is unilaterally attractive for a government when its import policy is free trade, the government prefers an export tariff when its import tariff is optimally set at a positive level. Intuitively, when a positive import tariff is in place, an export tariff generates additional tariff revenue on imports by encouraging foreign entry and thus exports. They also find that free trade in import and export policies is efficient.

Together, these findings suggest a possible interpretation of the treatment of export subsidies in GATT/WTO. The linear Cournot delocation model suggests that governments would perceive a unilateral gain from using export subsidies only once import tariffs were negotiated to levels sufficiently close to free trade. From this perspective, it is not surprising that GATT rules did not impose strong restrictions on the use of export subsidies. Over time, however, as import tariffs were negotiated through GATT rounds to lower levels, governments may have perceived a unilateral gain from imposing export subsidies. Furthermore, since free trade is an efficient outcome in the linear Cournot delocation model, governments could achieve mutual gains given low import tariffs if they were to cap or even prohibit export subsidies. In this way, the model offers a potential efficiency-enhancing interpretation of the prohibition of export subsidies in the WTO SCM Agreement.

Among the models reviewed above, the linear Cournot delocation model offers the most successful interpretation of the treatment of export subsidies in the WTO. At the same time, we note that the model is not completely successful. The linear Cournot delocation model also predicts that governments would benefit from a prohibition of import tariffs, and so it does not deliver an interpretation for why export subsidies are

treated more severely in the WTO than are import tariffs. We also note that the model rests on a specific structure (Cournot competition, segmented markets) and applies only for governments that focus on the long-run implications of trade policy.⁸⁰ The strategic “profit-shifting” models described above may be more appropriate if governments are focused on trade-policy implications that manifest over the short run.

4.3.6 *Implications for Subsidy Rules under the WTO*

In sum, the appropriate treatment of subsidies in a trade agreement is a subtle issue. Our review of the literature in this section focuses on models for which trade policies generate terms-of-trade externalities for trade partners. The review reinforces the subtle implications of subsidies: domestic production subsidies can play both efficiency-enhancing and opportunistic roles, export subsidies generate positive externalities to foreign consumers and negative externalities to foreign firms in models with fixed industrial structures, and export subsidies may generate negative externalities to foreign consumers in long-run settings with endogenous entry and exit. On the whole, our review does not provide strong support for the specific treatment of subsidies in the

WTO. We describe work suggesting that WTO rules on domestic production subsidies may be a step backward, relative to GATT rules, and we also summarize a range of models under which export subsidies are actually undersupplied relative to the efficient level for governments. While the linear Cournot delocation model provides a potential interpretation for an agreement to limit or even prohibit the use of export subsidies, the existing formal models that we review do not identify a reason for treating export subsidies more severely than import tariffs.

4.4 *Non-Violation Complaints, Shallow Integration, and National Treatment*

The central implication of the terms-of-trade theory of trade agreements is that governments set unilateral tariffs at levels that are inefficiently high, since they fail to internalize the terms-of-trade implications of their tariff policies for each other. A trade agreement can “undo” this inefficiency by facilitating mutually advantageous and reciprocal tariff reductions that expand the volume of trade to more efficient levels. Tariffs are not the only instruments, however, that impact the terms of trade. For large countries, domestic taxes, subsidies, and standards may also affect the terms of trade and lead thereby to possible inefficiencies. At the same time, domestic policies may have legitimate and even first-best roles to play as instruments with which to address market failures or distributional concerns within a country. Attempts to regulate domestic policies through a trade agreement, therefore, must balance the possible opportunistic use of such policies against the efficiency-enhancing roles that such policies may play. We thus arrive at the following question: how should domestic policies be treated in a trade agreement? In this section, we describe research that responds to this question while utilizing the terms-of-trade approach to trade agreements.

⁸⁰ Bagwell and Lee (2015) examine trade policies in the alternative long-run model of Melitz and Ottaviano (2008), wherein firms have heterogeneous costs and engage in monopolistic competition. They show that, starting at global free trade, a country gains when it introduces a small import tariff or a small export subsidy, provided in the latter case that transportation costs are low and productivity dispersion is high. These interventions, however, lower the welfare of the trading partner. Other work examines optimal export policy when relative wage effects are induced through general-equilibrium channels. For example, in Ricardian settings, Itoh and Kiyono (1987) characterize a welfare-enhancing role for targeted export subsidies, and Costinot et al. (2015) offer a full characterization of optimal trade policies. Relatedly, Demidova (2015) considers a general-equilibrium version of the Melitz–Ottaviano model and shows that the Metzler paradox then no longer obtains.

In fact, we have already encountered this question above in the specific context of our discussion of the treatment of domestic production subsidies. As we note there, a natural answer to this question is that a trade agreement should grant each government flexibility when choosing its policies, provided that the overall effect of any policy changes does not erode the market-access commitments achieved through its preceding tariff negotiations. Bagwell and Staiger (2001a) formally explore this answer in a two-good general-equilibrium model of trade in which governments have available domestic policies (e.g., labor or environmental standards), as well as tariff policies. Working with a model in which all international externalities flow through the terms of trade, their main finding is that efficiency can be achieved through tariff negotiations alone, provided that each government is free to make subsequent adjustments in its domestic and trade policies that leave its negotiated market access commitment (i.e., the terms of trade) unaltered. As discussed in section 4.3, Bagwell and Staiger (2006) obtain a related finding in the specific context of domestic production subsidies.

As noted in section 3.1, a key assumption of the Bagwell–Staiger (2001a) model is that each government only has a direct interest in the domestic policy adopted by its country, where this interest in turn may reflect various national considerations that impact the government's welfare (e.g., a government may have a direct interest in the health and safety of its citizens, or in the environmental quality within its country's borders). The lack of any direct interest by any one government in the domestic policy selected by another government indicates that the model does not allow for nonpecuniary international externalities (e.g., global pollution). For this family of models, the domestic policy choices of one government therefore impact the welfare of another government only indirectly,

through the terms of trade. Notice, though, that “race to the bottom” concerns are about the pecuniary international externalities (trade effects) associated with a choice of weak standards, and so this family of models is capable of capturing those concerns.

When international externalities travel only through the terms of trade, the main finding of Bagwell and Staiger (2001a) suggests that a “shallow integration” approach to trade agreements may suffice. Governments need not negotiate directly over domestic policies; instead, they may negotiate over tariffs alone, provided that the market-access gains so achieved are secure. The important task for an international agreement in this context is then to ensure that negotiated market-access concessions are secure against opportunistic policy adjustments. Bagwell and Staiger (2001a) and Bagwell, Mavroidis, and Staiger (2002) argue that current GATT/WTO rules, which focus on market access, can with some strengthening strike the right balance, so that governments can set efficient domestic policies while pursuing international negotiations over tariffs alone.

4.4.1 *Non-violation Complaints and the Preservation of Market Access*

In particular, GATT rules that permit non-violation complaints are a potentially attractive means of securing market-access concessions. A government may file a non-violation complaint when a trading partner undertakes a policy change that nullifies or impairs the market access gains that a government reasonably expected as part of an earlier negotiation. For example, following a tariff negotiation, the possibility of facing a non-violation complaint might deter a government from an opportunistic (terms-of-trade improving) relaxation in the production standards that it requires for an import-competing industry. Existing rules are insufficient, however, to enable a government to adjust its policy mix following a tariff

negotiation by raising its standards in the import-competing industry while also raising its import tariff so as to maintain its negotiated market-access commitment. Bagwell, Mavroidis, and Staiger (2002) propose that a modification to GATT rules of renegotiation, whereby a government could use a higher standard in an import-competing industry as compensation for a higher import tariff, could in principle provide the needed flexibility.⁸¹

Ederington (2001) explores related themes in a model in which all international externalities travel through the terms of trade and any agreement on tariffs and domestic policies must be self-enforcing. In his model, each government has two instruments—an import tariff and a domestic production tax—and the latter instrument has a legitimate role, since domestic production generates a non-pecuniary externality that resides entirely within the country in which production occurs. Both policies affect the terms of trade, and the challenge is to ensure that the efficient policy mix is selected. In Ederington's model, the efficient domestic policy is a Pigouvian tax that offsets the domestic distortion, and the efficient level of the domestic tax in fact is independent of the import tariff and thus the level of market access. Consistent with the themes developed above, Ederington shows that the most cooperative solution is achieved when domestic policies are set at the efficient (Pigouvian) level and import tariffs are lowered so as to expand market access to the level that is as close to efficient as possible before the self-enforcement constraint of the repeated game binds. The key intuition is that an efficient domestic policy raises the discounted future value of cooperation,

which in turn enables governments to enforce lower tariff levels.⁸²

4.4.2 *The Principle of National Treatment*

Our discussion of the terms-of-trade implications of domestic policies to this point emphasizes the benefit that the domestic country may enjoy when domestic production standards in an import-competing industry are relaxed in an opportunistic manner. As Staiger and Sykes (2011) argue, however, the bulk of WTO disputes concern instead cases in which foreign suppliers complain about standards that apply to their own products. Following a similar line of reasoning, we may anticipate a potential incentive for the domestic government to set standards on foreign products in an opportunistic fashion that could undermine the security of negotiated market-access gains for the foreign exporters. A key design feature of GATT/WTO rules that guards against such opportunism is the “national treatment” principle. This principle, which is embodied in GATT Article III, the WTO *Agreement on Technical Barriers to Trade* (TBT), and the WTO *Agreement on Sanitary and Phytosanitary Measures* (SPS), restricts the ability of member governments to impose regulations on foreign suppliers that are more stringent than those imposed on domestic suppliers.

To formally explore the effectiveness of the national treatment principle, Staiger and Sykes (2011) adapt and extend the general insights of Bagwell and Staiger (2001a) to a product-standards setting. In the Staiger–Sykes model, the domestic government

⁸¹ At the same time, and as discussed at the end of section 4.3.2, we note that there may be practical limitations with extensive reliance on GATT non-violation rules.

⁸² Lee (2007) considers a related model but with the important difference that each government is privately informed about the magnitude of the domestic production externality in its country. As Lee shows, in this case it may be optimal to distort the tariff in order to limit the potential for disguised protectionism, which occurs when a government misrepresents its information by selecting a low production tax even though the externality cost is high.

chooses trade policy as well as domestic tax and regulatory policy with respect to a product that is domestically produced and also imported. Regulatory policy has a legitimate role to play in their model, since domestic consumption generates a negative and non-pecuniary consumption externality that resides entirely within the domestic country. Staiger and Sykes show that governments of large countries indeed have incentive to impose discriminatory tax and regulatory policies against foreign imported products once import tariffs are bound. The model thus provides an interpretation of the national treatment principle as a guard against such opportunistic behavior. Moreover, when product-specific consumption taxes are infeasible, they further show that the domestic government has an incentive to impose inefficiently stringent nondiscriminatory product standards even in the presence of a national treatment clause, since foreign exporters bear some of the cost of achieving higher product standards that benefit domestic consumers. In light of their findings, they conclude that the national treatment principle can play an important role in preventing tax and regulatory discrimination but leaves a potentially important role for the non-violation clause to address nondiscriminatory regulations that are excessively stringent.⁸³

The national treatment principle has been interpreted and evaluated in other studies, as well. Horn (2006) and Horn, Maggi, and Staiger (2010) examine the national treatment principle with a focus on domestic taxes

rather than regulatory standards. Grossman, Horn, and Mavroidis (2013) also provide an extensive study of the GATT national treatment provision and argue that case law, economic theory, and the negotiation record all suggest that the purpose of the national treatment provision is to outlaw protectionist use of domestic policies.⁸⁴

4.4.3 *Moving Beyond Shallow Integration?*

The case for shallow integration described above rests on the assumption that all international externalities are pecuniary and travel through the terms of trade. This case can be weakened, however, when governments possess private information, a point we discuss in section 5.3. And as Antràs and Staiger (2012a, 2012b) argue, more complex forms of integration may be required in the presence of offshoring, which alters how prices are determined and complicates the nature of international pecuniary externalities. We discuss their work in section 6.3. Similarly, “deeper” forms of integration may be needed if the trade agreement is created with the goal of also addressing non-pecuniary international externalities (e.g., global pollution).⁸⁵ Limão’s (2005) model, which we discuss next, offers one illustration of this point.

Limão (2005) explores a model of self-enforcing cooperation among governments, with the new feature that production in the import-competing sector generates a negative non-pecuniary externality that travels (at least to some degree) across national borders. Each government selects an import tariff and a domestic production tax, and both policies affect the terms of

⁸³Staiger and Sykes (2011) also observe that one of the findings reported by Broda, Limão, and Weinstein (2008) and that we discussed in section 3.2 above—that US nontariff barriers are positively related to US market power over world prices—may reflect limitations of the GATT/WTO national treatment and non-violation clauses to police terms-of-trade manipulation through behind-the-border measures. See also Staiger and Sykes (2013, forthcoming).

⁸⁴Other related studies include Battigalli and Maggi (2003), Copeland (1990), and Costinot (2008).

⁸⁵For discussion of the extent to which GATT/WTO rules can be used to address non-pecuniary international externalities, see, e.g., Bagwell, Mavroidis, and Staiger (2002) and Trebilcock, Howse, and Eliason (2013, chapters 17 and 18) and the references cited therein.

trade. In Limão's model, therefore, international externalities travel through the terms of trade as well as through a non-pecuniary channel. His findings illustrate that a form of "deep integration" is attractive to governments in such a setting as a means of relaxing enforcement constraints, where deep integration in this context refers to a policy linkage whereby the potential for retaliation in both policies deters deviations in any one policy alone.⁸⁶ In particular, Limão finds that governments can achieve higher welfare in a self-enforcing agreement when the policies are linked; however, there is no guarantee that linkage raises the level of cooperation in each policy.⁸⁷

In total, our survey of research in this section provides support for the shallow-integration approach of the GATT/WTO when externalities are pecuniary and travel through the terms of trade. GATT/WTO rules concerning non-violation complaints and national treatment can be interpreted from this perspective as resting on a solid economic foundation. Anticipating discussion in later sections, we also note that the case for shallow integration can be weakened when governments possess private information, and arguments for deeper integration also emerge in settings where international externalities travel through other channels.

4.5 Investment and Services

The creation of the WTO in 1995 includes new agreements related to investment and services. In this section, we consider these new agreements and discuss economic research utilizing the terms-of-trade theory

that interprets and evaluates the provisions contained therein.

4.5.1 Foreign Direct Investment, Local Content, and International Cross-ownership

We start with the treatment of investment in the GATT/WTO, with an initial focus on foreign direct investment (FDI). The past two decades have witnessed a significant growth in FDI activity.⁸⁸ This growth encourages consideration of the investment measures that host governments may impose and the appropriate treatment of those measures in the GATT/WTO. Investment measures interact with GATT rules when they have direct effects on trade; in particular, local content, export, and trade-balancing requirements may distort investment decisions and generate tension with basic GATT rules concerning national treatment and quantitative restrictions.⁸⁹ As Trebilcock, Howse, and Eliason (2013, chapter 15) discuss, the *WTO Trade-Related Investment Measures*

⁸⁸FDI may be attractive to firms for a variety of reasons. For example, FDI may provide access to cheap inputs, reduce trade costs, and facilitate "tariff jumping." FDI may also be advantageous relative to outsourcing as a means of maintaining tighter control over technology. At the same time, firms considering FDI confront a variety of possible costs, including the possibility of rent expropriation via government policy changes after sunk costs are incurred. For a survey of research on multinational firms, see Antràs and Yeaple (2014).

⁸⁹Local content requirements concern measures that require foreign-owned firms to discriminate between domestic and imported goods that are used as inputs for production in the host country; export requirements concern measures that require exportation of a certain percentage of the foreign-owned firm's output; and trade-balancing requirements concern measures that impose a relationship between what the foreign-owned firm is allowed to import into the host country and the value of its exports. In some situations, trade-balancing requirements may be defended under GATT rules if they are necessary to address a balance-of-payment crisis. See Trebilcock, Howse, and Eliason (2013, Chapter 15) for further discussion of the implications of GATT rules for the treatment of investment measures.

⁸⁶Retaliation in Limão's (2005) repeated-game model occurs off the equilibrium path and thus carries the interpretation of a breakdown in cooperation with respect to the relevant policies.

⁸⁷See also Spagnolo (1999a, 1999b), who develops related themes for a distinct class of interdependent payoffs.

Agreement (TRIMs) builds on GATT rules to subject some measures with direct effects on trade, such as local content requirements and quantitative restrictions, to explicit scrutiny under GATT norms. The appeal of additional restrictions on investment measures, however, is controversial, with some countries expressing concerns about the broader implications of extensive investor-protection provisions in trade agreements. Investment was removed as a topic for further discussion in the WTO Doha Round. A number of investment agreements have arisen, however, via bilateral investment treaties (BITs) and as part of investor-protection provisions in PTAs.

The purpose of restrictions on investment measures in a trade agreement can be developed at several levels. We mention two here.⁹⁰ First, in the absence of a trade agreement that imposes restrictions on investment measures, a government might be tempted to impose measures favoring local input suppliers as a means of generating advantageous price changes for its country. Second, a trade agreement that appropriately restricts investment measures may also encourage efficiency-enhancing FDI when the host government is otherwise unable to commit not to expropriate foreign rents once the foreign firm has sunk costs. We briefly discuss the first purpose next and note that the second purpose is more directly associated with the “commitment theory” of trade agreements developed in section 6.

Bagwell and Sykes (2005) examine conditions under which a local content requirement generates advantageous price changes

for the domestic (i.e., host) country. As they emphasize, a local content requirement is logically distinct from import tariffs and quotas, since a local content requirement does not generate government revenue. They consider a simple two-country partial-equilibrium model in which a single homogenous input supplied in both the domestic and foreign country is used by foreign-owned firms to manufacture a final good for sale in the domestic market. When markets are competitive and the domestic country is small in that its local content requirement does not affect the world (i.e., foreign) input price, a domestic local content requirement raises the domestic input price, and thus redistributes domestic surplus and creates deadweight loss, but does not generate an international externality.⁹¹ If instead a foreign monopolist supplies the final good, then a domestic local content policy may redistribute surplus from the foreign monopolist to domestic input suppliers.⁹² Such a policy becomes more appealing to the domestic government when the foreign monopolist does not respond by significantly reducing output. In turn, a significant output reduction is less likely if the domestic country has market power (i.e., is large) so that its local content policy induces a fall in the foreign input price that offsets to

⁹¹ Bagwell and Sykes (2005) assume that the local input supply function is upward sloping and that the final-good production technology exhibits constant returns to scale. In the case of a small domestic country and a competitive final-good market, a domestic local content requirement raises the domestic input price but has no impact on the foreign input price. Profit in the final-good sector is then likewise unaffected, being zero in any case. The absence of an international externality in this setting implies that there is no obvious role for an international agreement on local content requirements. See Corden (1971), Grossman (1981), and Voudsen (1990, chapter 2) for further analyses of local content requirements in models with competitive markets and small countries.

⁹² See Brander and Spencer (1981) for analysis of a related model, in which an import tariff is used to extract surplus from a foreign monopolist.

⁹⁰ Another possible consideration is that restrictions on investment measures may play an efficiency-enhancing role in managing unilateral policies designed to enhance technology spillover. A full analysis of the international externalities associated with such policies requires a comparison of the market-access benefits that firms may enjoy via FDI with the technological knowledge that they may provide.

some degree the rise in the domestic input price. The end result is that, for settings in which market power is present, local content policies may be unilaterally appealing to the domestic government and harmful to the foreign trading partner. From this perspective, restrictions in trade agreements on the use of local content requirements rest upon a solid economic foundation when market power is present.

Blanchard (2010) explores a different aspect of the relationship between foreign investment and trade agreements. She does not focus on investment measures and rules that restrict such measures; instead, she considers the broad implications of general cross-border equity holdings for optimal tariffs and the role of the GATT/WTO. Augmenting the two-country, two-good, general-equilibrium model of trade described above to include exogenous international cross-ownership, she identifies the channels through which cross-border ownership impacts the optimal tariff. The internal effect is that a country has less incentive to maintain a high tariff in the presence of a larger degree of foreign ownership in the local import-competing industry, and the external effect is that a government likewise has less incentive to raise its tariff for a terms-of-trade gain when its constituents hold a greater stake in the foreign export industry.⁹³ Finally, the compositional effect is that industry bias in ownership patterns may encourage a government to manipulate local prices to benefit industries with a relatively higher proportion of national ownership.

As Blanchard (2010) argues, consideration of cross-border ownership leads to interesting policy implications. An implication of the external effect is that a country may

welcome foreign investment into its export sector as a means of encouraging a unilateral tariff reduction from its trading partner.⁹⁴ Similarly, the internal effect implies that foreign investment into an import-competing sector may encourage the host country to lower its import tariff as a means of extracting rent from foreign investors. Perhaps the most provocative implication of her analysis is that international ownership, by encouraging governments to liberalize their tariffs unilaterally, may substitute partially (or even in some cases completely) for negotiated tariff reductions.⁹⁵ Indeed, with a sufficient degree of international cross-border ownership, unilateral tariffs are lower than efficient, and the role of an international agreement is then to facilitate reciprocal and efficiency-enhancing restrictions in market access.⁹⁶ Finally, Blanchard argues that the principle of reciprocity continues to serve as an important guide to efficient outcomes, once the definition of market access reflects ownership positions. More generally, the implications of cross-border ownership for the optimal design of GATT/WTO rules is an important subject that warrants further attention.

⁹⁴See also Blanchard (2007) and Krishna and Mitra (2005). Blanchard and Matschke (2015) provide some evidence to this effect through an assessment of the impact of US multinational firms' affiliate offshoring behavior on US tariff preferences.

⁹⁵While international ownership may lead in this way to lower tariffs, Gulotty (2014) argues that greater international ownership does not similarly lead to reductions in regulatory barriers. He argues that regulatory barriers raise fixed costs, and that the associated reduction in entry may lead to net gains for efficient, globalized firms. See also Ethier (1998) for a different perspective under which regional agreements and associated foreign direct investment activity arise endogenously in response to multilateral liberalization.

⁹⁶In relation to the Bagwell–Staiger (1999a, 2002) model described above, a key difference here is that international ownership operates via the external effect to diminish the absolute value of $W_{\bar{p}^w}$ and $W_{\bar{p}^w}^*$ and may even reverse the sign of these terms.

⁹³As Blanchard (2010) notes, her analysis of optimal tariffs under exogenous international cross-ownership generalizes and combines themes from previous theoretical work.

4.5.2 *Services*

We briefly consider next the treatment of services in GATT/WTO. A variety of evidence confirms that services play an increasingly important role in modern economies.⁹⁷ In a survey of research on services trade and policy, Francois and Hoekman (2010) indicate that the theoretical literature on services trade highlights the complementarity between international services trade and FDI, the implications of different market structures and national regulatory policies for services trade, and the way in which international service firms are organized. They also describe increasing evidence that services liberalization is a major potential source of economic performance gains.

Government policies that affect international service firms are disciplined in the WTO *General Agreement on Trade in Services* (GATS). As Trebilcock, Howse, and Eliason (2013, chapter 13, p. 480) indicate, the GATS is a “highly complex accord.” This agreement recognizes that services may be supplied through various modes and provides a framework for market-access negotiations across these modes. While GATS contains a general MFN provision (subject to some exceptions), national treatment and market access commitments apply only where WTO members make specific commitments to such coverage in their schedules. The impact of GATS on services reform is challenging to estimate. Francois and Hoekman (2010, p. 678) review the evidence to date and conclude that “the available, limited, evidence suggests that, with the exception of the European Union, most services policy reform has been unilateral. The contribution

of the GATS to services reform has been negligible.”⁹⁸

Given the significant potential gains from services liberalization, it is natural to ask why the reciprocity mechanism that underlies trade agreements has not played a greater role in achieving policy reforms in services. Francois and Hoekman (2010) review the literature relating to this question and identify a number of potential factors. Among these factors, we mention here one that is related to our discussion above: given that FDI is a significant mode for supplying non-tradable services, Blanchard’s (2007, 2010) arguments imply that unilateral liberalization initiatives may substitute, to some degree, for reciprocal trade liberalization through trade-agreement negotiations. More generally, as Antràs and Staiger (2012a, 2012b) argue, the rise of offshoring may have changed the nature of the international externality that a trade agreement must address, which suggests in turn that trade agreements may require additional restrictions for services policies that are associated with offshoring. The purpose and design of trade agreements for market settings with offshoring is an important direction for research, which we discuss in further detail in section 6.3.

Investment and services are of increasing importance in the international economy. The WTO includes agreements that place restrictions on measures that affect investment and services, but the appropriate nature of such restrictions is controversial. Drawing on research that employs the terms-of-trade approach to trade agreements, we argue that restrictions in trade agreements on the use of local content requirements can be interpreted as resting upon a solid economic

⁹⁷For further discussion, see Francois and Hoekman (2010) and Jensen (2011).

⁹⁸As Francois and Hoekman (2010, p. 678) note, countries that acceded to the WTO after 1995 tended to make more GATS commitments and represent a further exception, although care is required in assuming that GATS commitments are actually implemented. See also Eschenbach and Hoekman (2006) and Hoekman (2008).

foundation when market power is present. We also summarize research that indicates that international ownership may substitute to some degree for negotiated tariff reductions. Finally, as we note, recent research suggests a significant potential for gains from services policy liberalization, even though the liberalization achieved to date through multilateral negotiations appears modest. To our minds, all of this points to a valuable role for future research directed toward understanding the impact of trade-related investment measures and services policies and, correspondingly, the appropriate design of WTO restrictions in this context.

4.6 *The Story Line thus Far . . .*

As interpreted through the lens of the terms-of-trade theory, the original 1947 GATT was created to solve the central economic problem of the day: the US Smoot-Hawley tariffs of 1930 and the international retaliatory response that followed had led to a terms-of-trade driven prisoners' dilemma with excessively high trade barriers. The task confronting governments was to set up an institution that could work well to internalize the international (terms-of-trade) externality at the root of the high-tariff problem, and thereby induce governments to make the tariff choices they would have made had they not succumbed to the temptation of international cost shifting (terms-of-trade manipulation) in the first place. If successful, GATT would lead necessarily to lower tariffs and expanded market access from those countries and in those industries where significant market power was present. But with significant market power not universal in all countries and all industries, GATT would not lead to lower tariffs from all countries and in all industries; and with the evident desire of governments to use trade policy for goals beyond that of national income maximization, GATT would also not be expected to lead to universal free trade. Finally, while

some constraints on domestic policies would be needed to ensure that subsequent adjustments in those policies did not undo market-access commitments achieved via tariff restraints, GATT's lack of any deeper integration beyond such constraints would not imply a weakness of the GATT system.

The literature we have surveyed thus far lends broad support to the view that, at a fundamental level, governments succeeded with the GATT/WTO in creating an institution that is well-designed to solve the terms-of-trade problem. Many of the GATT/WTO's core features appear sensible when interpreted in the context of this problem, and many of the outcomes negotiated within the GATT/WTO are broadly consistent with what might be expected from such an institution.

The literature does, however, point out some potential difficulties with the GATT/WTO approach, and these difficulties may account for some of the central challenges that the WTO confronts today. The evolution in the treatment of subsidies from GATT to the WTO is especially puzzling from the perspective of the terms-of-trade theory, both with regard to domestic subsidies and even more so with regard to the relatively severe treatment of export subsidies.

Beyond the puzzling GATT/WTO treatment of subsidies, the literature emphasizes the possibility of a serious free-rider problem under the MFN principle, and there is some evidence that this problem is significant. To the extent that the principles of MFN and reciprocity together allow countries that negotiate reciprocal tariff cuts to appropriate the gains from their bargains and thereby keep free riding to a minimum, the exemption from reciprocity granted to developing countries may ironically have kept these countries from enjoying to their full potential the benefits of GATT/WTO membership, again something that the evidence seems to bear out. This feature may in

turn have contributed to a significant “late-comer” problem for the Doha Round, as the round grapples with how to better integrate developing and emerging economies into the world trading system when the major developed countries have already negotiated low average MFN tariffs.

Moreover, where there are significant deviations from the MFN principle, such as can arise with the formation of PTAs, the literature points to these deviations as complicating international externalities beyond the simple terms-of-trade problem that the GATT/WTO seems well-designed to solve, suggesting in turn that the rise of PTAs could be creating difficulties for the GATT/WTO approach. Finally, while services trade and international investment flows are of increasing importance to the global economy, the literature has developed only a nascent understanding of the international externalities associated with them, and so the ability of the GATT/WTO approach to function well in their presence is still an open question.

5. *Evaluating the PTA Approach to Trade Liberalization*

We have described in the previous section how the GATT/WTO approach to liberalization derives broad support from the theoretical and empirical terms-of-trade literature. Does the terms-of-trade theory also support the view that PTA-driven liberalization can be seen as contributing to a solution to the terms-of-trade problem? In this section we review the relevant theoretical and empirical literature that speaks to this question.

5.1 *PTAs, External Tariffs, and Multilateral Bargaining*

We begin with a focus on the impact of PTAs on the external (MFN) tariffs of PTA-member countries, and ask: might PTAs be seen to work in tandem

with the tariff liberalization efforts of the GATT/WTO, or should PTAs be seen rather to work against these efforts? According to the terms-of-trade theory, noncooperative Nash tariffs are set inefficiently high on products where the countries possess market power; hence, one way to shed light on this question is to assess the impact of PTAs on the noncooperative external MFN tariffs of the member countries on such products. If the formation of PTAs lowers these tariffs, then it could be argued that PTAs work in tandem with the GATT/WTO's own efforts to reduce these tariffs, and that PTAs are hence building blocks for the needed multilateral liberalization that the GATT/WTO is also orchestrating. On the other hand, if the formation of PTAs raises these tariffs, then PTAs would appear to increase the degree of multilateral tariff liberalization that is needed to reach the efficiency frontier, and it could be argued that PTAs pose stumbling blocks to multilateral liberalization in this case.

There is a large literature that evaluates the impact of PTA formation on the external noncooperative MFN tariffs of member countries. This literature has identified several effects of PTAs on external tariffs, where PTAs may take the form of free-trade agreements (FTAs) or customs unions (CUs), with the key difference being that, in addition to eliminating tariffs on intra-union trade, CU members adopt a common external tariff policy toward the trade of nonmembers.

Two of the effects identified by this literature operate to *reduce* the external tariffs of PTA members: a “tariff complementarity effect” that can take two forms and applies to FTAs and CUs, and a “rent destruction effect” that applies to FTAs. Richardson (1995) identifies a first tariff complementarity effect: when an FTA is formed between countries that are competing importers of a common product from third countries, each

FTA partner has an incentive to lower its external tariff on this product slightly below that of its FTA partners so as to increase its share of the tariff revenue collected on imports from outside the FTA, and this competition for tariff revenue between FTA partners can lead to a downward spiral in their external tariffs. Bagwell and Staiger (1999b) identify a second tariff complementarity effect: in a competing-exporter world where each FTA or CU member competes with nonmembers for exports to other members, when FTA or CU members reduce their tariffs to zero on imports from one another, the resulting trade diversion (i.e., the reduction in imports by members from nonmembers) encourages members to lower the tariffs that they apply on imports from nonmembers.⁹⁹ The rent-destruction effect is highlighted by Ornelas (2005a, 2005b, 2005c, and 2008) and is also a force for lower external tariffs among FTA members. In a setting where special interest lobbies push for tariff protection, Ornelas shows that the rents from the external tariffs of one FTA member country spill over to producers in FTA partner countries, creating a free-rider problem for national lobbies within the FTA that interferes with their ability to obtain high external tariffs from their governments.

Two further effects operate to *increase* the external tariffs of PTA members, but operate only for CUs. A “market power effect” (see Kennan and Riezman 1990, Krugman 1991, Bond and Syropoulos 1996a, 1996b, Bagwell and Staiger 1997b and 1999b, and Cadot, de Melo, and Olarreaga 1999) arises when CU members are competing importers of a common product, and can collectively exert more market power on the

world price of that product with their common external tariff than they could individually. A separate “coordination effect” (see Kennan and Riezman 1990) operates to raise the external tariffs of CU members even when countries are competing exporters: when one CU member raises its external tariff on a product that it imports from third countries, other CU members that export that product to the first CU member gain as they receive higher prices for their exports to the first CU member, and this is a positive externality of higher external tariffs that can be internalized among CU members when they set their common external tariff policy.

Of course, while the impact of PTA formation on noncooperative Nash external MFN tariffs is suggestive of the nature of the relationship between PTAs and the GATT/WTO, it provides at best an incomplete picture of this relationship. First, it is not clear that the impact of PTAs on noncooperative MFN tariffs translates—even with the same sign—to the impact on cooperative MFN tariffs. For example, Limão (2007) shows that an FTA that pursues non-trade objectives can result in higher cooperative MFN tariffs, in circumstances where FTA partners agree to provide non-trade concessions to a country in exchange for preferential market access rents created and maintained by the high external tariffs of the country. In effect, Limão demonstrates that the FTA partners can become a force pushing against negotiated reductions in the country’s external MFN tariffs (and hence their rents). And Bagwell and Staiger (1997b, 1997c, 1999b) show that when self-enforcement constraints bind in a multilateral agreement over external tariffs, the formation of FTAs and CUs can have impacts on the most cooperative MFN tariffs achievable that are the opposite of the impacts on the Nash external tariffs, and that vary through time if the PTAs

⁹⁹Other papers featuring a tariff complementarity effect in various settings include Bond, Riezman, and Syropoulos (2004), Bond, Syropoulos, and Winters (2001), Freund (2000b), Syropoulos (1999), and Yi (1996).

are implemented in stages.¹⁰⁰ Second, recall that the terms-of-trade theory directs attention to the question of whether PTAs reduce the degree of inefficient terms-of-trade manipulation embodied in the external tariffs of PTA partners, and the results surveyed above are not always presented with this question in mind.¹⁰¹ Finally, while a reduction in the external MFN tariffs of PTA members triggered by the formation of the PTA might be viewed as partially solving the terms-of-trade problem and thereby making the remaining task easier for the GATT/WTO, Bagwell and Staiger (1999a, 2001b) show that the introduction of PTAs and the violation of MFN that this implies can change (does change for FTAs, can but need not change for CUs) the nature of the problem that a trade agreement must solve, from a simple terms-of-trade problem to a more complicated problem in which international externalities also travel through local prices. Bagwell and Staiger thus argue that PTAs are inherently at odds with the GATT/WTO's approach to multilateral trade liberalization, which seems best-suited to address simple terms-of-trade problems.

In any case, with these various effects identified and pointing in different directions, it is clear that theory alone cannot resolve the issue of the impact of PTA formation on the

external MFN tariffs of member countries.¹⁰² We therefore turn to the empirical literature on this question.

What is the impact of PTA tariff liberalization on subsequent efforts toward multilateral tariff liberalization?¹⁰³ Limão (2006) provides a first product-level investigation into whether PTAs are stumbling blocks or building blocks for multilateral liberalization. His approach involves a comparison of two different types of products—those for which a country has positive imports from PTA partners and those for which it only imports from PTA non-partners. An examination of subsequent US multilateral tariff changes made as a result of the Uruguay Round provides evidence that the United States granted smaller MFN tariff reductions in products with positive US imports from PTA partners. The evidence applies not only to products imported from large PTA partners, such as the countries in NAFTA, but also to imports from smaller PTA partners. Given that even those smaller US PTA partners export in nearly 15 percent of product lines, and that these products also have positive levels of imports from non-PTA partners, a further implication is that even small US PTAs were a stumbling block to the multilateral liberalization taking place under the Uruguay Round (consistent with the model of FTAs with non-trade objectives in Limão 2007).

In addition to the United States, another important environment to conduct such an exercise is the European Union. Karacaovali and Limão (2008) first confirm the evidence found for the United States by showing that the European Union cut MFN tariffs on products not imported from PTA partners by nearly twice as much as it cut tariffs on products imported from partners during the

¹⁰⁰ Other work that considers the effects of exogenous PTAs on self-enforcing multilateral tariff cooperation includes Bond and Syropoulos (1996b) and Saggi (2006). In additional related work, Levy (1997) and Krishna (1998) argue that FTAs can erode the political support for further agreements to reduce MFN external tariffs, and thereby act as stumbling blocks to multilateral trade liberalization. A literature also exists that examines the impact of multilateral liberalization on the formation of PTAs. Using different frameworks, Ethier (1998) and Freund (2000b) argue that PTAs may be a response to successful multilateral liberalization.

¹⁰¹ For example, the rent-destruction effect identified by Ornelas (2005a, 2005b, 2005c, and 2008) does not have a clear prediction related to this question.

¹⁰² Bagwell and Staiger (1998) and Freund and Ornelas (2010) reach a similar conclusion.

¹⁰³ See Freund and Ornelas (2010) for a more extensive survey of this empirical literature.

Uruguay Round. Furthermore, the size of the EU stumbling block effect is larger for the products that are exported by more PTA partners. Second, they exploit additional margins of the data on the EU PTAs by grouping PTA partners based on whether they eventually acceded to the European Union between the ends of the Tokyo Round and Uruguay Round of negotiations. They find evidence consistent with theoretical predictions that accession countries should not trigger stumbling block effects,¹⁰⁴ and that the stumbling block effect is only associated with products from countries with which the European Union had PTAs in place at that time.

Changes to multilateral tariffs need not only take place in the context of GATT/WTO negotiating rounds. It is natural, however, to analyze tariff changes achieved through negotiation rounds when considering the United States and European Union during the recent period in which detailed tariff data are available. This is true for two reasons. First, for most products, US and EU applied MFN tariffs are relatively close to their legal tariff bindings so that the tariffs cannot be increased without violating multilateral commitments. Second, US and EU tariffs were relatively low to begin with during this period, and so there is also not much scope for downward variation in the form of additional unilateral reductions. However, these two conditions do not apply to a number of developing countries in the international trading system that had both (1) sufficiently high applied MFN tariffs at the time of PTA implementation to allow for the possibility of meaningful unilateral reductions, and (2) legally binding commitments sufficiently above their applied MFN

rates to allow applied rates to legally increase as well without violating these commitments.

Estevadeordal, Freund, and Ornelas (2008) exploit these features of the data for ten Latin America countries over 1991–2000. They assess patterns of applied MFN tariff changes following the implementation of PTA tariff reductions, under agreements like MERCOSUR, the Andean Community, and other intra-Latin American PTAs formed in the decade. These countries exhibit, on average, a positive relationship between changes in preferential tariffs and subsequent changes to applied MFN tariffs—evidence that Latin America’s preferential agreements worked as a building block toward unilateral MFN liberalization during this period. Higher shares of intra-PTA imports are also associated with reductions in applied MFN tariffs, even for relatively small preference margins. However, the results are limited to the free trade areas and do not hold for Latin America’s trade agreements that were formulated as customs unions during that period, such as MERCOSUR.

In a related approach, Calvo-Pardo, Freund, and Ornelas (2011) assess multilateral tariff changes following the preferential tariff reductions associated with the creation of the ASEAN Free Trade Area in 1992. ASEAN is another setting in which preferential liberalization led to applied MFN tariff cuts, with MFN tariff cuts found to be larger in products with larger preference margins and thus a greater scope for trade diversion.¹⁰⁵

¹⁰⁵Tovar (2012) also studies how developing countries make unilateral changes to applied MFN tariffs after the formation of a PTA. She examines four countries after the formation of the CAFTA-DR in 2004. The results for CAFTA-DR are different than the earlier studies, as they suggest at least an initial stumbling-block effect. Countries increased (or decreased by less) MFN tariffs on products that had previously been subject to larger preferential tariff reductions in the first two years after PTA implementation, and this is somewhat offset in the subsequent two-year period during which the countries reduced their MFN tariffs. An interesting feature of this evolving effect is that it is consistent with the pattern expected under an FTA according to the model of Bagwell and Staiger (1997c).

¹⁰⁴According to the theoretical model of Karacaovali and Limão (2008), EU accession countries would be eligible to receive a transfer or revenue collected under the common external tariff that offsets the potential loss in intra-PTA trade that they would suffer as a result of additional multilateral tariff reduction.

What are the potential explanations for the differences across settings? One potential contributor is government policy responsiveness to the threat of trade diversion. The Estevadeordal, Freund, and Ornelas (2008) and Calvo-Pardo, Freund, and Ornelas (2011) settings resulted in original PTA liberalization that led to large preference margins (relative to pre-PTA applied MFN rates). Consistent with the tariff complementarity effect, economically costly trade diversion could have arisen if governments did not subsequently also lower their applied MFN tariffs. The US and EU environments, on the other hand, subject to the Limão (2006) and Karacaovali and Limão (2008) studies, resulted in preference margins that were much smaller with potentially less scope for trade diversion. Second, the US and EU preferences were more unilateral in nature. The theory in Limão (2007) emphasizes the nonreciprocal nature of US and EU preferences and that they were offered as compensation for countries that took up non-trade obligations in areas such as environmental or labor standards, intellectual property rights protection, and supporting the war on drugs. An open question for research is whether building-block effects may be more likely to dominate in reciprocal PTAs.¹⁰⁶ The rising importance of “WTO-extra” provisions in PTAs (Horn, Mavroidis, and Sapir 2010) suggests that this should be a priority area for additional research.

Preferential tariffs and MFN tariffs are certainly not the end of the line when it comes to trade policy, as there are a number

of other potential nontariff barriers to trade. The GATT/WTO provides several exceptions that countries can invoke to implement higher levels of protection for legitimate environmental, health, or other public safety concerns, for example under Article XX. Furthermore, most of the same major economies involved in multilateral and preferential trade liberalization since the late 1980s are also major users of antidumping and safeguards (Bown 2011b), another major category of GATT/WTO exceptions allowing countries to temporarily implement higher levels of import protection under certain conditions.¹⁰⁷ While the general relationship between PTA liberalization and nontariff barriers use is not yet well understood, here we highlight a recent paper that initiated the investigation of this relationship.

Antidumping is the most frequently applied TTb (temporary trade barrier) policy in use across countries and over time since the 1980s. Prusa and Teh (2010) use a cross-country sample involving eighty PTAs and antidumping use dating back to 1980. While there is only a modest impact of PTA formation on the overall use of antidumping, after controlling for other aggregate-level determinants, there is evidence of important differences in policy treatment between PTA partners and non-partners. PTA implementation is associated with both a reduction in antidumping actions against new PTA partners and an increase against non-partners. Prusa and Teh attribute some of this post-PTA change in behavior to PTA variation in the legal provisions affecting antidumping use—i.e., the sort of “WTO-plus” provisions described in more detail in section 2.2. In any event, these findings suggest that reorientation of TTbS toward the

¹⁰⁶ Recent work by Mai and Stoyanov (2015) provides initial evidence on this topic. They examine the effect of CUSFTA on Canadian trade policy. Consistent with the tariff complementarity effect, they find that the CUSFTA led to declines in Canadian external tariffs. But they also find that Canadian external tariffs declined more slowly in industries that generated more revenue for US exporters to Canada. This latter effect suggests an attempt by Canada to limit preference erosion in industries of particular importance to its PTA partner (i.e., the United States).

¹⁰⁷ Bown, Karacaovali, and Tovar (2015) provide a more general survey on the relationships between PTAs and the use of temporary trade barriers such as antidumping and safeguard actions.

imports of non-PTA partners could be an important avenue by which PTAs lead to rising external tariffs.

Finally, in addition to the literature we survey above, an active literature models the choice countries face between PTA formation and multilateral trade bargaining.¹⁰⁸ That literature is concerned with the question whether global free trade is more or less likely to be achieved when PTAs are available as an alternative to multilateral tariff negotiations. Guided by the terms-of-trade theory, our focus here is on a related but distinct question, namely, whether PTAs contribute to (building blocks) or interfere with (stumbling blocks) the ability of multilateral negotiations to achieve (globally) efficient policy outcomes when judged against the governments' own preferences. With regard to this statement of the stumbling block/building block question, the findings of this related literature can be summarized as follows. First, when there are no bargaining frictions, as is assumed by most of the literature, efficiency would always be achieved under multilateral negotiations if PTAs were banned, and so PTAs can't possibly be building blocks in the sense we are interested in here. In this case PTAs can facilitate the attainment of global free trade, but only when global free trade does not mark a Pareto improvement over the outcome that would be delivered if PTAs were banned (see, e.g., Aghion, Antràs and Helpman 2007, and Saggi and Yildiz 2010).¹⁰⁹ Nevertheless,

in this no-bargaining-frictions case, PTAs can be stumbling blocks to Pareto efficient outcomes under certain conditions (see, e.g., Aghion, Antràs, and Helpman 2007; Seidmann 2009; and Saggi, Woodland, and Yildiz 2013). Second, when there are bargaining frictions (as in McCalman 2002 and McLaren 2002) so that a building block role for PTAs is possible, no such building block role has been found, but a stumbling block role has again been shown to be possible. Hence, while these papers show that PTAs can serve as a building block for the attainment of global free trade, if anything this branch of the literature reinforces the view that PTAs should be viewed with some caution from the perspective of efficiency when judged against the governments' own preferences.

5.2 PTAs and Third-Country Externalities

According to the terms-of-trade theory, the purpose of a trade agreement is not to secure free trade, but to allow governments to internalize the terms-of-trade externalities associated with their tariff choices. As we discuss in section 4.1, the GATT/WTO appears well-equipped to help governments internalize terms-of-trade externalities, in part through its norms of reciprocity and MFN, which can help to keep the terms-of-trade consequences for third countries to a minimum when subsets of countries negotiate tariff cuts. PTAs, by definition, deviate from the MFN norm, raising the possibility that, rather

¹⁰⁸Other related research considers the endogenous network of stable PTAs when multilateral liberalization is not included as an option. See Goyal and Joshi (2006); Furusawa and Konishi (2007); Mrázová, Vines, and Zissimos (2013); and Yi (1996). Another related strand of the literature considers endogenous formation of CUs using the core as the solution concept. See, for example, Riezman (1985, 1999) and the survey by Kowalczyk and Riezman (2011).

¹⁰⁹This is a point also made by Maggi (2014). The attainment of global free trade does not lead to a Pareto improvement in Aghion, Antràs, and Helpman (2007) because governments are assumed to maximize something other than real national income in the relevant case;

in Saggi and Yildiz (2010), this is so because international lump sum transfers are assumed to be unavailable. We note, however, two qualifications. First, as Freund (2000a) argues in an oligopoly context, the path by which global free trade is achieved may matter. In her model, world welfare is higher when global free trade is achieved through expanding preferential agreements, rather than through multilateralism. Second, and as we discuss briefly in the next section (see footnote 122), a possible commitment theory interpretation of these findings could suggest that PTAs enhance efficiency when viewed from an *ex ante* perspective.

than contributing to a solution to the terms-of-trade problem, PTAs are a surviving vehicle for imposing terms-of-trade externalities on third countries within the GATT/WTO system. Under this possibility, some PTAs may be viable, in the sense that their member governments support their formation, only because they have been able to use discriminatory tariff cuts between them to impose negative terms-of-trade externalities on third countries and convert those third-country losses into their own gains.¹¹⁰ This possibility is emphasized by Bagwell and Staiger (2005b), and it provides one reason, according to the terms-of-trade theory, why the proliferation of PTAs could reflect a development that is inefficient from a global perspective.

A necessary feature for PTAs to impose negative terms-of-trade externalities on third countries is that the discriminatory market access granted to PTA partners diverts trade volumes that would otherwise have occurred between PTA member countries and third countries. This trade diversion effect of a PTA is the trade volume reduction that can lead to changes in trade prices with third countries, and hence to third-country terms-of-trade impacts. A number of papers have emphasized the likelihood that PTAs rely on substantial trade diversion in order to keep them viable (see, for example, Grossman and Helpman 1995a and Krishna 1998; and see Ornelas 2005a, 2005b, 2005c for qualifications to this claim). The possibility described above is a particular version of this claim, in which the third-country terms-of-trade externality associated with trade diversion is the

mechanism by which an otherwise nonviable PTA is kept viable.

What is the evidence regarding the importance of third-country externalities imposed by PTAs? The evidence is mixed, with some studies finding substantial trade diversion and terms-of-trade impacts of PTA formation on third countries and other studies finding only insignificant effects.

Chang and Winters (2002) take up the international externality question by investigating the experience of third-country export prices to Brazil in light of MERCOSUR. Relying on product-level unit values data to proxy for export prices, they find that intra-PTA tariff reductions are empirically associated with the price declines of third-country (Chile, South Korea, Japan, the United States) exports to Brazil, relative to the prices of these third-countries' exports of the same products to the rest of the world.¹¹¹ Furthermore, welfare calculations arising from the model's estimates indicate PTA non-partner countries such as the United States and Germany experienced sizable welfare losses due to the price declines, even after taking into account the effects of Brazil's subsequent MFN tariff reductions in many of the same products. Winters and Chang (2000) present a similar approach by examining the impact of Spain's 1986 EC accession on US and Japanese exports to Spain. They argue that these earlier results are not as strong due to methodological and data issues, including the reliance on data at higher levels of aggregation. Nevertheless, results from this study are consistent with the Chang and Winters (2002) evidence from MERCOSUR. In particular, they find that each 1 percent preferential Spanish tariff cut toward new PTA members is associated with roughly a 0.5 percent export price decline

¹¹⁰Note that a PTA can generate a negative terms-of-trade externality for third countries even when a (modest) tariff complementarity effect is present, since third countries receive smaller tariff cuts than do member countries.

¹¹¹In related work, Schiff and Chang (2003) find that even the threat of duty-free exports from Argentina into Brazil resulted in price declines for US exports into Brazil.

for Japanese and US exporters to Spain, relative to these new PTA partners' (France, Germany, Italy, the United Kingdom) export prices of the same good.

That important negative terms-of-trade externalities arise after PTA formation is consistent with some, though certainly not all, of the evidence arising from other studies. Romalis (2007), for example, finds that the European Union's trade with the United States, Canada, and Mexico was negatively impacted by the implementation of NAFTA, confirming significant trade diversion effects, but finds little in the way of third-country price impacts associated with these trade volume reductions. Both Romalis (2007) and Clausing (2001) find only insignificant trade diversion effects from the Canada–US FTA, a result consistent with the analysis of Trefler (2004), who finds that Canada's trade creation associated with CUSFTA dominated the welfare effects of any trade diversion. Using data on the manufacturing trade and FTAs for sixty-four countries over the period 1990–2002, Dai, Yotov, and Zylkin (2014) report large trade diversion impacts of FTA formation, with the largest third-country impacts suffered by existing FTA members when a country joins a new FTA from which its other FTA partners are excluded. On the other hand, Frazer and Van Biesebroeck (2010) find no evidence that US preferences under the African Growth and Opportunity Act (AGOA) drew African exports in those products away from the European Union in ways that may have affected EU consumer prices.¹¹²

¹¹²Furthermore, there is also mixed evidence on international externalities associated with the application of other discriminatory trade policy, such as antidumping. Bown and Crowley (2006, 2007) find international externalities associated with US antidumping imposed on Japanese exports via the trade volume ("trade deflection") and price (third-market terms-of-trade) effects on its exports of those products to third markets. However, Bown and Crowley (2010) investigate similar trade restrictions imposed on a developing country exporter (China, during

A potential limitation of this literature is suggested by the results of Handley (2014) and Handley and Limão (2015), which we have discussed at various points in the survey. They show that in the presence of policy uncertainty, there can be large differences between the trade effects of, on the one hand, an applied MFN tariff of zero that is bound at a much higher level in the WTO, and on the other hand a PTA tariff that is both applied *and bound* at zero. Such differences are likely to be missed in studies such as those above that attempt to relate trade effects of PTAs to preference margins on applied tariffs alone. Also relevant is the paper by Prusa and Teh (2010) discussed previously: their finding that PTA formation is associated with both a reduction in anti-dumping actions against PTA partners and an increase against non-partners suggests a form of third-country externality that may be difficult for typical studies of the trade impacts of PTAs to measure.

Finally, in recent work, Spearot (2016) develops a general-equilibrium version of the Melitz and Ottaviano (2008) model that allows for differences in firm productivity distributions across supplying countries, and shows how the model can be structurally estimated with product level bilateral trade and tariff data and used for counterfactual experiments. Of particular interest to our discussion here is Spearot's counterfactual calculations of the impacts of a country unilaterally eliminating all of its (post-2000) remaining tariffs. As Spearot notes, if existing PTA-induced tariff discrimination causes sufficient trade diversion, even a large country such as the United States with low MFN tariffs could gain in terms of real national income by eliminating its remaining MFN tariffs. And this is exactly what Spearot finds

(1992–2001) and do not find evidence of trade deflection to third countries in that setting.

for the United States (and others including India, Japan, and South Korea).

Relatedly, Caliendo and Parro (2015) and Tintelnot (2014) build on the Eaton and Kortum (2002) framework to quantify the trade impacts of NAFTA (Caliendo and Parro) and the trade and production impacts of the proposed Canada–EU trade and investment agreement (Tintelnot). Caliendo and Parro find small price and quantity impacts of NAFTA on the rest of the world, while Tintelnot finds larger potential third-country impacts of the proposed Canada–EU agreement. Tintelnot’s findings are especially relevant for assessing the potential of recent PTAs to impose third-country externalities, as he focuses on the deep-integration features of the proposed agreement and their impacts on the location of multinational production facilities for export platform purposes.

Taken together, we interpret the literature as indicating that the potential for PTAs to impose important third-country externalities is real and has at times probably been exercised, but that it does not appear to be a pronounced and consistent feature of existing PTAs. It is possible that PTAs have mostly not imposed significant third-country effects, at least in part because of the role of the GATT/WTO dispute procedures in policing such effects, a possibility that is given some credence by the literature we survey in section 7.3. In any event, the literature surveyed above establishes that the potential for third-country externalities is there, and suggests that the problem could become more substantial with the increasing focus of new PTAs on deep integration. Maintaining a cautious view of PTAs in light of this potential seems warranted.

5.3 *PTAs and Deep Integration*

We consider now the growth in deep-integration PTAs. Does the terms-of-trade theory provide support for this develop-

ment? We describe above how the theory can provide support for shallow integration; this is the basic message of Bagwell and Staiger’s (2001a) claim that a well-working market-access-preservation rule can allow countries to achieve efficient outcomes through tariff negotiations without directly negotiating over domestic policies. This message survives a variety of generalizations of the original model in which it was made, but requires qualification when governments possess private information.¹¹³ In Bajona and Ederington (2011), the private information takes a “hidden-action” form and is over the degree of a government’s intervention with domestic policies. The case for shallow integration then survives largely intact, albeit with some modification: an efficient self-enforcing agreement generally takes the form of a minimum market-access level combined with a binding tariff cap. But, as Lee (2016) shows, if private information takes a “hidden-information” form and concerns a government’s type (e.g., the magnitude of a domestic distortion associated with an externality), and if the type is uncertain at the time the agreement is written, then a simple market-access-preservation rule leads to excessive protection for some types and is not optimal. Furthermore, while a state-contingent market-access-preservation rule could implement the first-best allocation were the state observable, such an allocation is not incentive compatible when information

¹¹³Sauré (2014) argues that qualifications to the case for shallow integration also arise when the agreement must be self-enforcing and there exist intertemporal linkages that can affect the deviation payoff, so that the extent to which an agreement is self-enforcing may vary with policies, even among policies that generate the same market access. Sauré shows that the freedom over domestic policies provided under shallow integration then might induce a government to adjust its policies in a manner that ultimately changes its own gains from deviation in an unanticipated way and renders the new policies unsustainable. It is an open question whether such adjustments would be exercised in related models were governments to anticipate the consequences for their own self-enforcement constraint.

is hidden. In the hidden-information setting, Lee shows that a form of deep integration is needed to construct the optimal agreement.

Hence, the terms-of-trade literature suggests that the case for shallow integration can be weakened to the extent that private (and perhaps especially hidden) information is important in trade negotiations. While more research is clearly needed, the possibility is thus raised that governments might achieve efficiency gains in trade agreements that include some deep integration rules. But granting this possibility, what form would such rules take? Could they be provided via modest adjustments to WTO rules, or are deeper forms of integration required? And, if the latter, do PTAs represent the best path forward? Or, might instead deep integration initiatives in PTAs generate third-party externalities and be inefficient from a multilateral perspective?

To date, the terms-of-trade literature has not gone far enough to sort through these possibilities and provide answers. But there is suggestive evidence from a small empirical literature focusing on the trade effects of regional integration of TBT and SPS measures that does point to the potential for important trade-diverting effects of these kinds of agreements, with particular harm to the exports of developing countries not party to the agreements (see, in particular, WTO 2012, p. 152).¹¹⁴ We therefore see providing answers to these questions as an important area for future research. At this point, given the broad affinity between the GATT/WTO design and solutions to the terms-of-trade

problem, we view the current terms-of-trade strand of the trade-agreement literature as suggesting a presumption that any deep integration that would be required to achieve efficiency (say, due to the presence of private information) is likely better provided within the GATT/WTO than by PTAs.¹¹⁵ But we also see significant value in further research that explores whether certain forms of deep integration might exist that are achieved most easily among smaller groups of countries at similar developmental stages and that impose little or no costs on third countries. As Maggi (2014) also emphasizes, future research of this kind might explicitly include bargaining frictions, which may be higher for negotiations that involve many countries and complex issues. For such forms of deep integration, the corresponding agreement might be well placed in a PTA or, alternatively, in a plurilateral or critical-mass agreement within the WTO.¹¹⁶

5.4 *The Story Line Continued...*

As WTO liberalization efforts seem to have stalled, PTA liberalization has taken off. Has the explosion of PTAs interfered with the WTO's ability to deliver countries to the global efficiency frontier? Or are PTAs carrying countries to the global efficiency frontier in ways that the WTO could not? Or, are PTAs succeeding where the WTO could not because PTAs can impose costs on third countries that WTO rules successfully internalize, in which case PTAs are likely moving the world away from the global efficiency frontier?

¹¹⁴See, for example, Disdier, Fontagné, and Cadot (2015), who find evidence that regional agreements between developed and developing countries that focus on harmonizing standards tend to reduce the exports of the developing country members to third countries, and Chen and Mattoo (2008), who find that regional agreements to harmonize standards can reduce developing country exports from outside the region. The findings of these studies complement the findings of Tintelnot (2014) that we discuss above regarding the potential for deep integration PTAs to impose third-country externalities.

¹¹⁵Even in the private-information models, the underlying problem is still the terms-of-trade problem, and so Nash domestic policies are set efficiently, with the inefficiency amounting simply to a level of market access that is too low. From this perspective, it is not obvious why PTAs would be better than the WTO at providing the degree of deep integration necessary to achieve efficient market access levels in the presence of private information.

¹¹⁶We discuss plurilateral and critical-mass agreements further in the concluding section, where we consider potential approaches for strengthening the WTO.

Our survey of the terms-of-trade literature suggests a cautious interpretation of the benefits of PTAs to the world trading system. As we have emphasized, this literature provides broad support for the view that the GATT/WTO is fundamentally well-designed to minimize the influence of terms-of-trade externalities on the policy choices of member governments and thereby solve the terms-of-trade problem. The literature provides a more mixed view of PTAs in this regard, with theory pointing out many avenues through which PTAs could permit terms-of-trade externalities to reenter the calculus of trade-policy making, and empirical evidence providing only partial assurance that these avenues have not been exercised. In this sense, the terms-of-trade literature supports a cautious view of the wisdom of entrusting PTAs with the rules of globalization. The literature also provides ample reasons for caution concerning the position that PTAs are complementary to the GATT/WTO. Both the theory and evidence are mixed; hence, as a general matter, whether PTAs are stumbling blocks or building blocks for multilateral liberalization remains ambiguous.

6. *Beyond the Terms-of-Trade Theory*

We now survey the literature on the commitment, delocation/profit-shifting and offshoring theories of trade agreements. Our purpose is to identify insights that would qualify or alter the answers given by the terms-of-trade theory to the questions that motivate our survey.

6.1 *The Commitment Theory*

The most established alternative to the terms-of-trade theory of trade agreements is the commitment theory. According to this theory, governments value trade agreements as a way to tie their hands against their own lobbies and citizens. Of course there is no

reason why trade agreements couldn't serve multiple purposes, which is to say the commitment and terms-of-trade theories need not be mutually exclusive. The question for us here is whether the commitment theory offers a more supportive interpretation of PTAs relative to the GATT/WTO than does the terms-of-trade theory and, if so, whether there is sufficient empirical support for the commitment theory more generally to qualify or alter the initial conclusions we have drawn from our survey of the terms-of-trade theory literature concerning the relative merits of PTAs and the GATT/WTO.

While expressions of the commitment theory of trade agreements can be found in a variety of early papers (see, for example, Carmichael 1987; Staiger and Tabellini 1987; Lapan 1988; Matsuyama 1990; Tornell 1991; and Brainard 1994), a particularly elegant treatment that has become the workhorse model of this idea is provided by Maggi and Rodriguez-Clare (1998). Their model is one of a small open economy, where the terms-of-trade argument for trade agreements is absent. The focus of the model is on the idea that an anticipated trade-policy-lobbying relationship between a government and producers in some sector is likely to distort the equilibrium allocation of resources in the economy toward that sector, and on the possibility that the lobby might then not fully compensate the government for this distortion. To formalize this possibility, Maggi and Rodriguez-Clare extend the lobbying model of Grossman and Helpman (1994) to include a prior stage in which resources in the economy are allocated across sectors. They confirm that the government is compensated by the lobby for the ex post distortions its trade-policy choice imposes on the economy *given* the sectoral allocation of the economy's resources that are sunk at the time the trade policy choice is made; this finding is the same as in the original Grossman and Helpman model.

However, Maggi and Rodriguez-Clare establish that the lobby does *not* compensate the government for the ex ante distortions in the sectoral allocation of resources created by the anticipation of the government's relationship with the lobby. This second finding is novel, and as Maggi and Rodriguez-Clare show, it provides a reason that the government might (under certain conditions which they explore) wish to tie its hands ex ante against influence by the lobby ex post. And in this way, a possible commitment role for a trade agreement is thereby identified.¹¹⁷

The commitment theory has been used to offer interpretations of some of the features of the GATT/WTO that appear puzzling when viewed through the lens of the terms-of-trade theory. One example is Potipiti (2012), who uses the commitment theory to explain why, in the WTO, tariffs are the subject of negotiated limits while export subsidies are banned outright. From the perspective of the standard terms-of-trade model, and as discussed in section 4.3, this feature is puzzling at two levels: the standard theory suggests that, if anything, export subsidies should be encouraged, and it also does not rationalize treating export subsidies more severely than import tariffs. Potipiti shows that these puzzles can be resolved in the context of the commitment theory, once an asymmetry between the rents earned by import-competing and exporting interests is introduced.

Potipiti (2012) builds on the small open-economy model of Maggi and Rodriguez-Clare (1998). In Potipiti's version of this model, a government can join an agreement that bans tariffs and/or an agreement

that bans export subsidies, and doing so eliminates the anticipation of protection by the private sector and the associated ex ante investment distortion, and thereby generates a social welfare gain. Commitment to such an agreement, however, also requires the government to forfeit the political contributions it would otherwise collect for the protection it offers. The government thus faces a trade-off, and it commits to a trade agreement covering a particular policy only if the social welfare gain from banning the use of that policy is greater than the government's valuation of the associated loss in political contributions. Applied to export policies, the underlying Maggi and Rodriguez-Clare model can therefore account for an agreement that discourages (bans) export subsidies. But how can the asymmetry in treatment across import tariffs and export subsidies be understood? Potipiti argues that this asymmetric treatment can arise from an underlying asymmetry in growth prospects of the two sectors that he shows occurs when trade costs are decreasing through time, and from the differences in the rent-generating capacity of protection in (expanding) export and (declining) import-competing sectors that this implies. Due to the relative inability for protection to create rents in expanding as opposed to contracting sectors, he finds that it is sometimes optimal for a government to agree to a ban on export subsidies and thereby give up the (smaller) political rents in favor of the social welfare gain, while also not banning import tariffs and instead opting to retain the (larger) political rents that their use generates.¹¹⁸

¹¹⁷See also Mitra (2002), for a similar commitment story where the avoidance of wasteful lobbying resources, rather than distorted sectoral allocations, is the driving factor that motivates governments to use trade agreements as a commitment device. As Bagwell and Staiger (2002) and Maggi (2014) observe, commitment arguments can also serve as reasons against joining a trade agreement, as the papers by McLaren (1997, 2002) elegantly illustrate.

¹¹⁸Potipiti's (2012) model can explain why export subsidies might be banned while import tariffs are not banned, but it doesn't explain why some limits on tariffs might still be negotiated. However, it is not hard to see that introducing a small amount of terms-of-trade motive into the model (by relaxing slightly the small country assumption) could provide a reason for negotiating tariff bindings while not altering the other results of the model.

The commitment theory may also be used to interpret the evolution of rules on domestic subsidies from GATT to the WTO, an evolution that as discussed in section 4.3, does not find easy support under the terms-of-trade theory. Here the relevant paper is Brou and Ruta (2013), who augment the Maggi and Rodriguez-Clare (1998) model by allowing the domestic government to use both a production subsidy and an import tariff in its relationship with the lobby in an import-competing sector.¹¹⁹ Taxation to raise revenue is assumed to be distortionary, so that a production subsidy does not dominate a tariff for redistributive purposes; rather, as Brou and Ruta show, in this setting optimal intervention will typically include a mix of tariffs and production subsidies.

In the Brou–Ruta (2013) model, the fundamental reason for signing a trade agreement that commits a government to free trade is the same as that in Maggi and Rodriguez-Clare (1998) and Potipiti (2012). But Brou and Ruta add two novel twists. First, the lobby’s anticipation of both a tariff and a domestic subsidy creates *ex ante* distortions that the government is not compensated for *ex post*, and so the government may have a direct reason to sign agreements which constrain *both* tariffs and domestic subsidies. Second, if a government does sign an agreement that constrains its tariff only, this commitment

induces the government to turn more intensively to production subsidies in its political relationship with the import-competing lobby—what Brou and Ruta term “the policy substitution problem”—and the resulting distortions are themselves welfare-reducing. What Brou and Ruta show is that in the presence of a tariff-only commitment, the new subsidies associated with the policy substitution problem can be handled with a “nullification-or-impairment” rule, offering support for the GATT shallow-integration approach to domestic subsidies in much the same way that the terms-of-trade theory supports GATT’s approach to domestic subsidies. But Brou and Ruta show as well that there is a remaining distortion associated with the original subsidy level that a tariff-only agreement in combination with the GATT nullification-or-impairment rule cannot address. It is with this second finding that Brou and Ruta demonstrate that the commitment theory can provide support for the WTO’s new disciplines imposed directly on domestic subsidies, and in this sense provides support for deep integration.¹²⁰

Finally, Ethier (1998) employs the commitment theory to address whether the emergence of PTAs following a period of multilateral liberalization might be viewed

¹¹⁹Limão and Tovar (2011) also study the role of trade agreements as a commitment device when governments can use both tariffs and behind-the-border policies to redistribute to favored groups. But the focus of Limão and Tovar is on whether a government might wish to constrain its use of a more efficient instrument (in their model the tariff), knowing that this would result in more reliance on a less efficient instrument (in their model behind-the-border nontariff barriers). As they show, a government might find such a commitment desirable despite the associated efficiency costs because the commitment can improve its bargaining power relative to the lobby. Limão and Tovar do not consider the possibility that international commitments might be extended to cover behind-the-border nontariff barriers, so unlike Brou and Ruta, their model does not yield insights about the desirability of deep integration.

¹²⁰Maggi and Rodriguez-Clare (2007) show that in a large-country dynamic version of the Maggi and Rodriguez-Clare (1998) model that combines the commitment and terms-of-trade theories, it is optimal for governments to implement liberalization in two phases: a first (and in their model instantaneous) phase in which liberalization reflecting the elimination of terms-of-trade motives occurs, and then a second (and in their model gradual) phase in which further liberalization to handle the domestic commitment motive occurs. When Brou and Ruta’s (2013) finding is viewed alongside these results it is tempting to conjecture that, if behind-the-border policies such as domestic subsidies were added to the Maggi–Rodriguez-Clare (2007) model, the resulting model might yield predictions that could support, as an optimal development, the gradual spread of deep integration, but only after terms-of-trade considerations had been removed from tariff choices. We leave this conjecture as a potential topic for future research.

as a positive development for the world trading system. Actually, like Maggi and Rodriguez-Clare (2007), Ethier combines two reasons for a trade agreement into one model. One of these reasons can be interpreted as the commitment motive, and in Ethier's model this is the motive that best describes why governments might be interested in PTAs (see especially Ethier's discussion on pp. 1240-41). The second reason is an international externality, but it is not the terms-of-trade externality; rather, it is a (Marshallian) scale economy that operates at the world-wide level and creates a positive international (non-pecuniary) externality associated with greater investment. This form of international externality is what underpins the purpose of a multilateral trade agreement in Ethier's model.

Ethier's (1998) model is meant to capture the forces behind the growth in numbers of PTAs beginning in the 1990s that involved large developed countries forming PTAs with small reforming developing countries. In Ethier's model, foreign investment from the developed world is by assumption necessary for successful reform in a developing country, and PTAs are ways in which developing countries compete among themselves for the required foreign investment. In essence, a PTA with a large developed country can enable the developing country to credibly "lock in" its reforms with commitments to deep integration: these deep integration commitments attract foreign investors to sink capital in the developing country which in turn, by creating natural interests that will push the foreign government to enforce the developing country's commitments, ensures the success of the reform. As Ethier argues, once multilateral liberalization among developed countries has occurred and makes entry into the global economy attractive for developing countries, the commitment role of the PTAs can lead to a greater level of reform and investment

world-wide than would otherwise occur. The international scale economy externality then implies that the greater investment in and scale of the successfully reformed developing countries leads to gains for everyone.¹²¹

Viewed together, these papers support the potential appeal of deep integration in trade agreements as a way to solve commitment problems. Three key issues remain. First, from the perspective of the commitment theory, are there good reasons to think that the required deep integration is best carried out in PTAs, rather than in the WTO? Second, when it comes to tariff commitments, what does the commitment theory say about the appeal of *preferential* tariff cuts? And third, is there evidence that commitment motives are important for understanding real-world trade agreements?

Regarding the first question, the WTO treatment of domestic subsidies illustrates that deep integration is possible in the WTO. But the failure of the WTO's Doha Round to gain traction on the deep integration components of the so-called Singapore issues points to severe limits on how far deep integration is likely to proceed in the WTO. So to put the first question slightly differently: does the commitment theory literature provide reasons to believe that the WTO cannot generate enough deep integration, and that PTAs should be called upon to shoulder the load? Here the literature does not provide a direct answer, but there are suggestions of a partial answer: the WTO may be ineffective at helping small countries make commitments, and the *preferential* nature of

¹²¹We have confined our discussion here to the economic benefits that commitments via a trade agreement may provide, but there may also be important political benefits, as the recent paper by Liu and Ornelas (2014) suggests. Liu and Ornelas show that PTAs can serve as commitment devices for future governments that lower the probability of democracy failure, and they show as well that unstable democracies are more likely to join PTAs as a result.

PTAs may allow PTAs to be more effective for small countries in serving this role. The reason is that, as Bown and Hoekman (2008) argue, a small country is likely to face challenges in getting trading partners to utilize the WTO dispute-settlement system when it violates a trade-policy commitment; however, a small country may become “large” to foreign exporters who enjoy preferential access to its market, and those foreign exporters then have an incentive to push even a small PTA partner country to follow through on its commitments.¹²² This suggests in turn that, at least when it comes to PTAs between large developed countries and small developing countries (small because of the small-country enforcement issues associated with the WTO, developing because commitment issues are arguably most germane for developing countries), the commitment theory could provide a reason to look more favorably on PTAs than does the terms-of-trade theory.¹²³

¹²²This reasoning is not without caveats, however. For example, the rents created for the foreign exporters of a large country by preferential access to a small PTA partner market may only exist in the short run, and be dissipated by supply responses as the foreign exporter prices return to their long run MFN world-price levels. Notice also that if Ethier’s (1998) position—that it is sunk foreign investment rather than preferential trade access per se that creates the natural interests to make sure the foreign government enforces the deep integration commitments of its PTA partner—is correct, then it is not obvious why the preferential nature of a PTA should matter for enforcement, and therefore not clear why a PTA would be more effective than the WTO in this capacity.

¹²³A second suggestive possibility comes from a particular interpretation of the findings of Aghion, Antràs, and Helpman (2007). They identify circumstances under which global free trade may not be achievable via multilateral negotiations but could be achievable if FTAs are permitted; however, this possibility arises only when governments do not maximize welfare (so that global free trade is not efficient relative to governments’ own objectives). If we make a distinction between governments’ ex ante and ex post preferences and evaluate the institution relative to the former, then this result suggests a possible commitment story that could support the creation of an institution that permits PTAs. The interpretation is that governments seek to maximize overall welfare at the ex ante stage, but

Regarding the second question raised above, we have just pointed out one possible reason that the commitment theory could lend support to the preferential tariff cuts that define PTAs, namely to aid in the enforcement of commitments for small countries. But beyond this, the commitment theory of trade agreements does not display any particular affinity to PTAs over the GATT/WTO. To the contrary, as can be seen with reference to the Maggi and Rodriguez-Clare (1998) workhorse model, a preferential tariff cut could be completely ineffective in reducing the ex-ante distortions that the domestic government is seeking to address with its commitment to (in the model, multilateral) free trade.¹²⁴ More generally, the domestic distortions that the government is attempting to reduce with commitments under a trade agreement are related to local prices in the domestic economy, and any set of local prices that can be achieved via preferential tariff cuts can be achieved as well with appropriate MFN tariffs.

Finally, we turn to the third question: is there evidence that commitment motives are important for understanding real-world trade agreements? Here the evidence is thin, but supportive. Staiger and Tabellini (1999) offer early empirical support for the commitment theory. They look for evidence that

anticipate that they may be captured by lobbies in the ex post stage. To maximize their ex ante objectives, governments then might set up an institution that permits FTAs as a potential bulwark against ex post political motivations. We regard this interpretation as leading only to a suggestive possibility, however, since Aghion et al. also identify circumstances under which politically motivated governments could achieve global free trade only when PTAs are banned.

¹²⁴This would be the case as long as the domestic-country imports from non-PTA countries were not driven to zero in the presence of the preferential tariff cut (because then the unchanged MFN tariff of the domestic country together with its small size in world markets and the arbitrage condition would ensure that the local-market prices in the domestic economy are unaffected by its tariff preferences and so the sectoral allocation of domestic productive resources would be unaffected as well).

governments make different tariff choices across GATT environments that are distinguished by the degree of commitment that GATT rules provide for those choices. Focusing on US tariff choices made under the GATT escape clause (where GATT should not have helped provide commitment) and made in the Tokyo Round of GATT negotiations (where GATT rules could have helped provide commitment), Staiger and Tabellini find that US tariff decisions were more responsive to the production-distorting impacts of the tariffs in the latter decisions as compared to the former decisions, in line with what their commitment model would predict. Tang and Wei (2009) adopt a different approach. They consider the differences in the growth performance of developing countries that joined the GATT/WTO under two different kinds of accession rules: rules that applied in GATT prior to the creation of the WTO and that did not require acceding countries to undertake extensive policy commitments, and rules that applied subsequent to the creation of the WTO in 1995 and that typically required substantial policy commitments by the acceding government. Tang and Wei find that the post-accession growth performance of the developing countries that acceded to the GATT/WTO under the latter set of rules was significantly better than that of non-acceding countries and countries that acceded to GATT under the former rules, and they attribute this difference to the domestic commitment role played by the WTO. Further evidence lending some support to the commitment theory of trade agreements is provided by Limão and Tovar (2011), Liu and Ornelas (2014), and Bown and Crowley (2014).¹²⁵

¹²⁵Limão and Tovar (2011) (see note 119) employ data on Turkish tariffs and nontariff barriers and find evidence in line with their theory that Turkey was more likely to bind its tariffs in the WTO and to bind them more tightly in industries where it had low bargaining power, relative to the lobbies it faced. Liu and Ornelas (2014) (see note 121)

Summarizing, we conclude from our survey of the commitment theory strand of the literature that this theory provides some reason to be more supportive of PTAs than our survey of the terms-of-trade theory alone would suggest, though it provides no particular reason to be less supportive of the WTO. We thus see the commitment theory as moving the answer to the motivating question of our survey toward a view that PTAs and the WTO may be complementary, but in light of the relatively thin empirical support to date on the widespread importance of the commitment theory's role in actual trade agreements, probably not as yet moving the answer very far in this direction.

6.2 *The Delocation/Profit-Shifting Theory*

Another alternative to the terms-of-trade theory can be found in a growing body of literature emphasizing firm delocation and profit-shifting as sources of international externalities that might give rise to and shape the design of trade agreements. This strand of the literature shares with the terms-of-trade theory a focus on the internalization of international policy externalities as the primary task of trade agreements; but the delocation/profit-shifting theories reject the implication of the terms-of-trade theory that terms-of-trade externalities are the only—or even the most important—cause of the inefficiency that a trade agreement can correct. Instead, according to these theories, noncooperative trade policy choices are inefficient because, when left on their own, governments use trade protection to inefficiently

find evidence supporting the two key predictions of their model that PTAs are more likely to be formed by unstable democracies and participation in PTAs helps to stabilize these democracies. Finally, in their cross-country study of emerging economies, Bown and Crowley (2014) provide evidence that these countries changed how they conduct their trade policy (through antidumping and safeguards) by taking on tariff-binding commitments when joining the WTO.

“delocate” firms or shift firm profits from foreign locations to the domestic market.

The delocation/profit-shifting theories build on the unilateral incentives for trade policy intervention that arise when the assumption of perfect competition is relaxed, incentives that were first identified by Brander and Spencer (1984, 1985), Spencer and Brander (1983), and Venables (1985, 1987). Brander and Spencer argued that trade policy intervention could be used to shift firm profits toward the intervening country when firms possess market power and use their market power in the presence of entry barriers to earn profits in equilibrium. Venables showed that in a world where profits are dissipated by free entry, it is still possible to gain unilaterally with trade policy intervention, as long as there are international transport costs, due to the delocation/entry-exit effect of this intervention on foreign and domestic firms.¹²⁶ Ossa (2011) was the first to explore the consequences of the delocation effect for the purpose and design of trade agreements, while Mrázová (2011) develops the profit-shifting rationale for trade agreements.¹²⁷

Ossa (2011) considers a monopolistically competitive setting in which firms producing differentiated products compete for sales in both the home and foreign markets under conditions of free entry, and where exporting the product abroad involves shipping costs. Venables (1987) establishes that a firm-delocation motive for trade policy

arises in such an environment: if the home country offers protection to its importers or a subsidy to its exporters, foreign firms can be “delocated” to the home market and home consumers save on trade costs and enjoy a lower overall price index as a result. This home gain, however, comes at the expense of foreign consumers, whose price index rises. Hence, the firm-delocation effect represents a negative international policy externality. What Ossa demonstrates is that in his model, the transmission of the firm-delocation effect from the home to the foreign country can be interpreted as traveling through local prices, not the terms of trade. Intuitively, in Ossa’s model each country is impacted directly by the local price in the other country’s market, because each country could enjoy the savings in transport costs if it could have more of the world’s firms (and the production of their individual varieties) located locally rather than abroad; and the equilibrium pattern of firm location across countries depends on local prices in both countries via the free-entry condition.

A main thrust of Ossa (2011) is therefore that one does not have to believe that terms-of-trade effects of trade policy are important in order to understand the purpose of trade agreements. In fact, Ossa argues that a number of the prominent design features of the GATT/WTO (e.g., reciprocity and MFN) can be equally interpreted as sensible if governments are instead attempting to internalize delocation externalities with their trade agreements.¹²⁸ Accordingly, and based on Ossa’s results, if anything the delocation theory of trade agreements could be said to strengthen support for the GATT/WTO as a well-designed institution, as it broadens

¹²⁶As we discuss in footnote 75, the problem for a trade agreement to solve in models featuring profit shifting or delocation effects can be given a terms-of-trade interpretation under certain conditions. But the papers we next discuss impose conditions so that this interpretation is not valid, which is why we discuss these papers here, rather than in the context of our earlier discussion of the terms-of-trade theory. We return to this point further below.

¹²⁷Brander and Spencer (1984) offer an early analysis of the benefits of a trade agreement in a profit-shifting model.

¹²⁸This is not to say that the predictions of the terms-of-trade theory and the delocation theory are the same. For example, as Ossa (2011) demonstrates, the particular definition of reciprocity that is suggested by his model differs from that suggested by the terms-of-trade theory.

the interpretation of the problem that the GATT/WTO is well-designed to solve.

Still, while the delocation theory does not appear to undercut support for the GATT/WTO in some fundamental way, might it nevertheless swing support from shallow to deep integration, in which case, like the commitment theory, the delocation theory might be interpreted as supporting the need for PTAs to complement the GATT/WTO? This is still an open question in the literature, but the results of DeRemer (2013a) suggest that the answer to this question may be a qualified “No.” DeRemer demonstrates that shallow integration can work in a delocation model where governments have both tariffs and wage subsidies at their disposal, but DeRemer also shows that the particular form of the “market access preservation rule” that makes shallow integration work in his model bears little relationship to any of the closest analogies in the GATT/WTO. Together with Ossa’s (2011) findings, DeRemer’s results therefore suggest that the GATT/WTO is probably less well-designed to solve problems associated with international delocation externalities than it is to solve the terms-of-trade problem, but with some selective fixes there is no reason in principle that it could not be optimized in this direction, and thus no particular reason to believe that PTAs are needed to help shoulder the load.

Similarly, Mrázová (2011) develops a model of trade agreements based on the notion that such agreements help to internalize an international profit-shifting externality, and uses this model to explain the WTO ban on export subsidies that is puzzling from the perspective of the terms-of-trade theory. Mrázová’s argument is based on self-enforcement considerations: she shows that it can be easier to enforce commitments in a repeated game model of trade agreements when import tariffs are the only trade policy instrument allowed under the agreement. Offering a

different perspective, DeRemer (2013b) abstracts from self-enforcement issues but employs a profit-shifting model of trade agreements to argue that the evolution of GATT/WTO domestic and export subsidy rules can be better understood from the perspective of profit-shifting models of trade agreements than from the perspective of the terms-of-trade theory. To generate his domestic subsidy result, DeRemer assumes that governments wield a particular form of entry subsidy, and it is an open question whether the result would hold for more general forms of domestic subsidy (or for domestic policy instruments more generally).¹²⁹ But at a minimum, DeRemer’s result illustrates that profit-shifting externalities can be usefully employed to help interpret the evolution of GATT/WTO subsidy rules. And finally, Ossa (2014) assesses the importance of profit-shifting and terms-of-trade externalities in a calibrated quantitative model of trade agreements, and finds that together these externalities are sizable enough to account broadly for the observed magnitude of multilateral tariff liberalization under the GATT/WTO.

Like the delocation theory, the results from the profit-shifting theory seem to provide further support for the GATT/WTO approach to liberalization. And at least to date, the profit-shifting theory has not generated results that would indicate specific support for PTAs. These conclusions are further supported from the perspective of the findings of Bagwell and Staiger (2012a, 2015). According to their findings, as long as governments have both import tariffs and export tax/subsidies at their disposal, the

¹²⁹It is for this reason that we interpret DeRemer’s (2013b) domestic subsidy result somewhat more narrowly as applying to certain subsidies, but probably not to domestic policies more generally, while we view the analogous results of Brou and Ruta (2013) concerning domestic subsidies as suggesting (from the perspective of the commitment theory) broader implications for deep integration.

underlying problem for a trade agreement to solve in the delocation and profit-shifting models can still be given a terms-of-trade externality interpretation, though novel local-price externalities do arise when export policies are not available to governments. This means that we should expect key results across these theories to be similar, at least when the use of export policies is not ruled out, and Bagwell and Staiger confirm this for a number of the standard predictions of the terms-of-trade theory.¹³⁰

We conclude from our survey of the delocation/profit-shifting theories of trade agreements that this strand of the literature, if anything, bolsters the case for the GATT/WTO approach to liberalization, as it provides a broader base from which to interpret as sensible many of the core design features of the GATT/WTO; and while more work is needed to tease out the implications of these theories for the desirability of PTAs as a form of liberalization, at present these theories provide no specific reasons to think that PTAs offer an attractive alternative or complement to the GATT/WTO approach. Combined with the fact that, with the notable exception of Ossa's (2014) calibration exercise, there is to date no evidence on the empirical importance of these theories, we do not view the delocation/profit-shifting strand of the trade-agreement literature as providing further qualifications to our

conclusions concerning the relative merits of PTAs and the GATT/WTO.

6.3 *The Offshoring Theory*

It is by now well-documented that trade in intermediate inputs dominates modern trade flows, that many of these inputs appear to be highly specialized to their intended use, and that this has not always been so (see Johnson and Noguera 2014, as well as the discussion in Antràs and Staiger 2012a, and Baldwin 2014). This rise in the importance of “offshoring” raises the question of whether the rules and norms of the GATT/WTO, conceived at a time when the nature of trade was quite different, are still relevant today. There are two issues that have been addressed in the literature. First, the rise in offshoring has been accompanied by a significant rise in foreign investment. Adopting the perspective of the terms-of-trade theory of trade agreements, Blanchard (2007, 2010) argues that this investment might naturally reduce the magnitude of the terms-of-trade externality problem, and in this way offshoring may act to reduce the need for a GATT/WTO-type institution. We discuss Blanchard's work in section 4.5 in the context of our survey of the terms-of-trade literature. In this section, we focus on a second issue associated with the rise in offshoring: its potential to alter the mechanism of international price determination. This issue is emphasized by Antràs and Staiger (2012a, 2012b), who argue that the rise of offshoring may have changed the way that international prices are determined, and thereby the nature of the international externality that a trade agreement must address, with implications for the design of effective trade agreements.

Antràs and Staiger (2012a, 2012b) distinguish between international prices that are determined by standard market-clearing conditions and prices that are determined by bilateral bargaining between foreign suppliers and domestic buyers. The former

¹³⁰To be clear, the delocation and profit-shifting models do offer important new insights. First, to the extent that they are successful, the GATT/WTO attempts to limit export subsidies make analyses of these models without export policies an empirically relevant case to consider. Second, even when export policies are available and a standard terms-of-trade interpretation can be given to the problem, the deviation from perfect competition that is featured in the delocation and profit-shifting models can yield novel predictions, as discussed in section 4.3. And as Ossa (2014) shows in the context of a profit-shifting model, the existence of product differentiation can interfere with the ability of MFN and reciprocity to neutralize third-party spillovers in bilateral tariff negotiations.

mechanism is featured in the terms-of-trade theory, and it underpins a property that is key for the terms-of-trade theory's affinity with shallow integration: the tariff is the first-best policy for terms-of-trade manipulation and the international cost shifting that is implied. This is a key property because, as we discuss earlier in our survey, according to the terms-of-trade theory, the only "problem" for a trade agreement to "solve" is terms-of-trade manipulation, and as the tariff is the first-best policy for terms-of-trade manipulation, it then follows that the tariff is in fact the only policy that is distorted in the Nash equilibrium: behind-the-border measures are set efficiently under Nash choices.

But when international prices are determined by bilateral bargains between buyers and sellers located in different countries and these bargains are undisciplined by market clearing conditions, as Antràs and Staiger (2012a, 2012b) argue is increasingly the case with the rise in offshoring, the tariff is no longer the first-best policy for cost shifting, and governments typically find it unilaterally optimal to distort many of their policy choices—border but also behind-the-border—in an effort to manipulate international prices and shift costs onto their trading partners. This leads to Antràs and Staiger's first claim: through its implications for international price determination, the rise in offshoring is likely to erode the effectiveness of the GATT/WTO shallow-integration approach. As Antràs and Staiger show, a second claim follows when governments have political economy motives: in the presence of offshoring, and in stark contrast to the predictions of the terms-of-trade theory, these motives introduce additional policy inefficiencies that a trade agreement can address. Taken together, the implication of Antràs and Staiger's findings is that the rise of offshoring may usher in a new world in which a collection of individualized deep-integration agreements is needed to guide governments

to efficient policy choices. Strikingly, that sounds a lot like the recent wave of PTAs.

Evidently, the offshoring theory of trade agreements has strong implications for the relative merits of PTAs and the GATT/WTO, both diminishing the appeal of the GATT/WTO and elevating the appeal of PTAs. In comparison to the other theories reviewed in this section, the offshoring theory seems more fundamentally at odds with the terms-of-trade theory and the implied support for the GATT/WTO approach to liberalization. A key question for our survey is thus whether there is empirical support for the offshoring theory. In fact, we are unaware of any direct empirical evidence relating to this theory, and only a few pieces of indirect evidence, which are supportive and suggestive, but hardly definitive.¹³¹ Hence, while the offshoring theory of trade agreements has the potential to substantially alter our conclusions about the relative merits of PTAs and the GATT/WTO, in light of the lack of empirical evidence to date on the relevance of the theory, it would be premature to place much weight on its implications at this time. Clearly, however, empirical research in this area is warranted.

6.4 *Summing Up Thus Far*

Having surveyed the three additional strands of the trade-agreement literature, we are therefore left with the following view: while qualified along some important dimensions, the terms-of-trade theory's implication, that strong support for the GATT/WTO is warranted, while a cautious view of PTAs

¹³¹We are aware of two pieces of evidence that offer some indirect support for this theory. A first is presented in Antràs and Staiger (2012a), and relates to apparent difficulties in achieving negotiated reductions of tariffs on imported differentiated inputs for a set of countries acceding to the WTO. A second is contained in Orefice and Rocha (2014), who find evidence that an important predictor of whether two countries sign a deep-integration PTA is the share of their bilateral trade that is comprised of parts and components.

seems appropriate, survives largely intact. The commitment theory serves to elevate support for PTAs in certain circumstances beyond what the terms-of-trade theory would suggest, while the delocation/profit-shifting theory seems to reinforce the terms-of-trade theory's support for the GATT/WTO. The offshoring theory could potentially overturn the implications of the terms-of-trade theory in this regard, but there is so far insufficient evidence to justify a change in position based on the predictions of this theory.

The view that we put forth here reflects our assessment of research to date, and as we note, further research is required in many areas. Research on deep integration, in particular, is at an early stage. The potential coordination benefits of regulatory harmonization, as well as the potential third-party costs, represent an important direction for future research, for example. As we also note in section 5.3, another important direction is to include bargaining frictions and explore the potential benefits that such frictions suggest for negotiations among smaller groups of countries as PTA members or in WTO plurilateral or critical-mass agreements.

7. *Dispute Settlement*

Such is the apparent success of WTO dispute settlement that it is often referred to as the “crown jewel” of the multilateral trading system. Over a relatively short period, economists, political scientists, and legal scholars have developed a range of positive and normative approaches to explore important research questions in this area.¹³² For example, legal scholars now parse the

language of each newly arriving WTO legal decision—so as to draw potential precedent implications for international and domestic law, as well as for public policy—with the same voracity as the American Bar devours fresh Supreme Court rulings or Europeans tackle judgments from the European Court of Justice. Furthermore, legal and economic scholars have already teamed up for more than a decade to annually publish joint interdisciplinary assessments of each year's new WTO jurisprudence.¹³³

We begin this section by describing how the WTO dispute-settlement system has been used to date. We then survey the theory on the role of the WTO dispute-settlement system before examining the relationship between PTA implementation and WTO dispute-settlement activity. We also describe recent PTA disputes associated with the enforcement of non-trade policies. Finally, we conclude with thoughts on the relative merits of a multilateral dispute-settlement system.

7.1 *WTO Dispute-Settlement: Patterns in Use*

WTO disputes involve state-to-state level interaction. Here we characterize some of the data on the nearly 500 formal disputes initiated between 1995 and 2014, in order to first clarify what the disputes tend to be about, who they tend to be between, how the process works, and the typical outcomes that arise. Due to a number of potential issues related to sample selection, a central

¹³²Examples of seminal legal scholarship over GATT law begin with Dam (1970), Jackson (1969), and Hudec (1990). The WTO's legal process is explained in more detail by Palmetier and Mavroidis (2004). Davis (2012) provides a recent overview of political science research on WTO dispute settlement.

¹³³Beginning in 2001, Horn and Mavroidis (2003) initiated a series of annual assessments with the backing of the American Law Institute, subsequently extended by Bown and Mavroidis (2013), which pairs legal scholars with economists to jointly analyze each of the formal WTO Appellate Body (and non-appealed Panel) decisions that arise. Cumulatively these legal-economic assessments have covered nearly one hundred different individual dispute decisions to date.

argument of the literature described below is that dispute settlement cannot be appreciated or evaluated based solely on an appeal to information regarding the disputes that are observed—i.e., the procedures also have important “off equilibrium” implications that do not necessarily arise through formal disputes. Nevertheless, evidence that the WTO members are putting trust in the system by frequently triggering its use over important policies or significant amounts of trade is potentially supportive of the idea that dispute settlement is playing a significant role.¹³⁴

7.1.1 *WTO Disputes are Most Frequently Allegations of Excessive Import Protection*

We begin by appealing to an assessment drawn from a database of WTO dispute-settlement information compiled and made publicly available by Horn and Mavroidis (2011). Of the formal disputes that have arisen to date, the typical topic concerns a plaintiff (“complainant”) member alleging that the defendant (“respondent”) country has imposed an excessive level of import protection.

Horn, Johannesson, and Mavroidis (2010) examine disputes taking place between 1995 and 2010 and report that nearly 95 percent of all WTO disputes concern trade in goods, with the remainder concerning services trade or intellectual property rights protection. The most frequently invoked legal agreements in these disputes include the baseline 1947 GATT, followed by the separate 1995 WTO Agreements on *Antidumping*, *Subsidies and Countervailing Measures*, *Agriculture*, *TBT*, *Safeguards*, and *SPS Measures*.

¹³⁴Put differently, at this moment in time, the WTO members do not seem to be avoiding use of the system or clamoring to develop an alternative system. The GATT experience of the 1980s in particular suggests that this is not necessarily always the case (Bhagwati and Patrick 1990).

China, which acceded to the WTO in 2001, is an illustrative case study. China’s accession terms required it to take on significant commitments to domestic (economic) and trade-policy reform. And because China is such a large importer and exporter, and has so many trading partners, there were expectations that it would become significantly involved in WTO litigation (Bown 2010). Within a relatively short period of time, China has become an important WTO litigant; more than 40 percent of disputes initiated between 2007 and 2011, for example, featured China as either a respondent or complainant, with an almost two-to-one ratio of respondent to complainant.

China’s WTO disputes are also quite diverse. Some disputes filed against China fit the “typical” mold—i.e., they feature an allegation of excessive import protection in a politically sensitive sector such as autos, steel, or agriculture, and address a commonly challenged policy such as antidumping. However, China has also faced a number of disputes in relatively new issue areas. These include trading partners using the WTO to legally challenge China’s export restrictions over various raw materials and “rare earth” metals that are especially important in electronic goods. There have been protests over China’s tax and subsidy policies and its allegedly lax protection of intellectual property rights. Finally, trading partners have objected to China’s import restrictions on foreign *service* providers; examples include financial information services (e.g., Bloomberg, Dow Jones, Thomson–Reuters), electronic payment services (e.g., Visa, MasterCard, American Express), and audio-visual services (e.g., movie studios, media and publishers, software providers).

More generally, WTO disputes are rarely as simple as one country challenging another country’s increase of an applied MFN tariff above its legal binding. Instead, the complainant country’s typical allegation is that

the respondent has implemented excessive import protection through some nontariff policy. At least in part, the dispute can be understood to arise because of a disagreement in interpretation of whether the respondent's policy was implemented in order to achieve some other (non-trade) objective that may nevertheless be justifiable under the rules or exceptions of the WTO agreement. The appearance—if not reality—of two countries having different interpretations of the WTO raises the possibility that dispute settlement may be doing more than simply enforcing the agreement, but it may also address the incompleteness of the GATT/WTO contract. Section 7.2.2 describes advances in this particular area of research.

An early dispute-settlement literature was motivated by recognition that most disputes initiated immediately in the aftermath of implementation of the Uruguay Round commitments (e.g., 1995–98) seemed to involve the trading interests of only high-income countries. The policy concern was that the newly arising legal and institutional costs of engaging dispute settlement—given the increased “legalization” of the dispute-settlement process under the WTO relative to its immediate GATT predecessor—might be too burdensome for developing country members with limited legal capacity to enforce their market access interests.¹³⁵

Beginning with Horn, Mavroidis, and Nordstrom (2005), the evidence indicates strong correlations between dispute-settlement use, the level of country's exports, and the diversity of its trading partners. The more a country traded and the more bilateral trading relationships that it had, the greater the scope for potential frictions to arise that would result in a formal dispute. Subsequent research on disputes from the early WTO

period that also explored the potential role of other factors—such as legal and retaliatory capacities—that might affect dispute initiation tended to confirm the central importance of the result that high levels of trade were positively correlated with the triggering of disputes.¹³⁶

Nevertheless, Bown and Reynolds (2015) characterize the bilateral trade in disputed products for a sample of disputes making up more than 70 percent of the WTO caseload between 1995 and 2011 and find evidence of vast heterogeneity in the levels of market access at stake. Roughly 14 percent of WTO disputes involve bilateral trade in disputed products of tiny amounts—e.g., less than \$1 million per year—and yet 15 percent of disputes involve bilateral trade in products over more than \$1 billion per year. The heterogeneity in trade stakes across the dispute data raises research questions regarding determinants of dispute-settlement use. Some of the new theoretical advances described below may improve our understanding of these forces.

The Bown and Reynolds (2015) evidence also suggests that WTO member countries in the aggregate have entrusted the dispute-settlement system to assess policies that cover significant amounts of trade. Over 1995–2011, WTO dispute-settlement investigations collectively scrutinized nearly \$1 trillion in goods imports, an average of \$55 billion per year, or roughly 0.5 percent of world

¹³⁵ Bown (2009) provides a more comprehensive and in-depth treatment of these and related issues confronting developing country access to WTO dispute settlement.

¹³⁶ Bown (2005b), for example, provides evidence linking higher import penetration ratios to US antidumping duties in the first stage, and higher levels of bilateral trade affected by those US duties subsequently positively associated with the trading partners' decision of whether to formally challenge them through GATT/WTO dispute settlement in a second stage. In a separate study examining a cross-country sample of WTO disputes that concern policies imposed on a national treatment basis—in which the policy negatively affected all trading partners—Bown (2005a) finds that higher pre-policy levels of bilateral exports of the disputed products are positively associated with potential litigants' decisions of whether to formally engage in the dispute-settlement process.

imports in 2011.¹³⁷ These are arguably significant amounts of trade for dispute settlement to address, without even yet considering the impact of the potential precedent arising through WTO jurisprudence, as well as the “off-equilibrium” impacts of the system.

7.1.2 *The WTO Legal Process and Outcomes*

If the mandatory consultations with the respondent resulting from the initiation of a formal dispute fails to resolve the issue, the complainant country can trigger a formal legal process whereby the legal representatives of the two sides make arguments and present evidence to a WTO dispute-settlement panel. Nearly 200 of the roughly 500 WTO disputes initiated to date have resulted in formal legal rulings through Panel Reports. Of these, more than half have subsequently been appealed and received rulings from the WTO’s standing Appellate Body.

Each WTO dispute can contain numerous “claims” made by the complainant against the respondent; the data also reveal substantial variation across disputes as to the total number of claims filed. There is a “pro-trade bias” in WTO legal rulings, in the sense that the panel or Appellate Body finds that the respondent has done *something* wrong in almost every dispute that receives a formal ruling. Nevertheless, there are also selection issues associated with this interpretation that the theory that we introduce below has begun to tackle.¹³⁸

¹³⁷These are conservative statistics because they do not include roughly 30 percent of the WTO caseload of disputes that are either tied to export policies, services policies, TRIPS, or policies that affect all imports and are not linked to specific product codes. The overall level of trade directly affected by WTO disputes is likely to be much higher.

¹³⁸Furthermore, at the level of legal rulings over particular claims made, Horn, Johannesson, and Mavroidis (2010) report that the complainant “wins” only 57 percent of the claims over which the panel ultimately rules. There are also often many claims in these disputes over which the panel declines to rule for reasons of judicial economy.

Horn, Johannesson, and Mavroidis (2010) also provide information on the average time that disputes take to work their way through the sequential steps of the WTO dispute-settlement process. On average, the process takes almost three years between the initiation of the dispute, the issuances of the panel report and Appellate Body report, and finally the outcome whereby the respondent country is required to bring itself into compliance with legal rulings or face authorized retaliation.¹³⁹

Finally, the default form of compensation in WTO disputes in the event of noncompliance is tariff retaliation by the complainant subject to limits determined by WTO arbitrators; and authorized retaliation can only begin after the legal process described above is exhausted. Overall, and despite the increased frequency of disputes arising during the WTO period, retaliation has rarely been an equilibrium outcome. Fewer than fifteen disputes have resulted in the WTO judges even having to articulate the permissible level for formal retaliation by the complainant in the event of noncompliance. Many fewer cases have resulted in the complainant country actually implementing the WTO’s authorized retaliation.¹⁴⁰ Some

¹³⁹On average, disputing countries remain in consultations for nearly six months, and then another fifteen months elapse before the WTO’s first panel ruling. While the cases that are appealed receive an Appellate Body report relatively quickly (three months) thereafter, another nine–eleven months typically elapse before expiration of the reasonable period of time necessary for the respondent to bring its disputed policy into compliance with rulings and before the potential for discussion of compensation due to noncompliance can occur.

¹⁴⁰Bown and Ruta (2010) describe the calculation of economic retaliation levels for the roughly ten disputes that had made it all the way through the WTO dispute-settlement process between 1995 and 2008, whereby arbitrators determined the upper limits to the level of permissible retaliation. The Bown and Pauwelyn (2010) volume provides a broader set of research contributions on the retaliation-setting experiences under the WTO from other perspectives in law, political science, and economics, as well as from policymakers.

high-profile exceptions notwithstanding, there are very few examples of egregious noncompliance with rulings of the sort that result in the explicit WTO authorization of retaliation.¹⁴¹ Nevertheless, some of these exceptions identify limits to the system and have become subject of areas of formal research.

7.1.3 *Dispute Use and Retaliatory Capacity*

The terms-of-trade theory suggests that trade agreements are designed to facilitate an escape from a terms-of-trade driven prisoners' dilemma. Cooperation in trade policies is achieved in a repeated game, where observed deviations may lead to a severe off-equilibrium-path punishment such as Nash reversion that corresponds to an unraveling of the agreement. A different kind of retaliation is featured in the WTO dispute-settlement system, as authorized retaliation in this context is arguably both on the equilibrium path (i.e., something that is part of the agreement and occurs in practice) and commensurate in nature.¹⁴² The terms-of-trade theory thus suggests that governments' decisions to impose certain

trade policies along the equilibrium path may be influenced by their perceptions of the retaliatory capacities of their affected trading partners. We next discuss empirical approaches providing evidence broadly supportive of this perspective.

Bown (2002, 2004b) provides theoretical and empirical approaches, respectively, to explore the potential enforcement implications of the terms-of-trade theory in the setting of dispute settlement. The theory exploits differences across the GATT/WTO-mandated limits to the compensatory retaliation response under different legal provisions and their implications in an environment characterized by trading partners with different capacity constraints on retaliation. The empirical application examines a cross-country sample of policies imposed between 1973 and 1994 and a framework in which governments are given the choice between GATT-consistent and -inconsistent policies of import protection, the latter of which would subsequently result in a formal dispute. Conditional on choosing to impose additional import protection, the evidence suggests that heightened retaliation capacity by affected trading partners makes the policy-imposing country more likely to implement policy changes in a way that conforms to the rules of trade agreements.¹⁴³

Blonigen and Bown (2003) present a related empirical analysis that focuses on US antidumping policy and provides further evidence that an enforcement system based on retaliation capacity is likely to endogenously affect the structure of policies that countries impose in the first place. That study examines

¹⁴¹The *EC—Beef Hormones* dispute involved a sustained period of retaliation by the United States, as did *EC—Banana Regime* dispute between the European Union, the United States, and Latin American banana exporting countries before it was eventually resolved. *US—Upland Cotton* has not resulted in compliance, but in a payoff (financial transfer) from United States to Brazil. *US—Internet Gambling*, discussed by Irwin and Weiler (2008), has not resulted in compliance or implemented retaliation by the tiny island nations of Antigua and Barbuda against the United States. Finally, Bown and Prusa (2011) describe the repeated challenges—fifteen different disputes over ten years—brought by a number of different WTO members to the United States use of “zeroing” in antidumping investigations.

¹⁴²For discussion of interpretations of retaliation in GATT/WTO, see Bagwell and Staiger (2002, Chapter 6). In addition, as discussed in section 4.2, commensurate retaliation may occur along the equilibrium path in less formal ways, as, for example, when a privately informed government imposes an antidumping duty while recognizing that doing so increases the likelihood that its exporters will face a similar duty in the future.

¹⁴³Bown (2004a) presents related evidence on retaliation capacity impacting the outcomes of trade disputes as well, which is consistent with the notion that such incentives are likely to affect policy choices *ex ante*. See also Bown (2004c) for evidence that the outcomes of such bilateral disputes are extended to third-country exporters in a manner consistent with successful application of the MFN rule.

US policies implemented during the GATT and early WTO period (1980–98) and finds that bilateral retaliation capacity influenced how new US import restrictions were implemented along two different dimensions. First, US industries were less likely to request that antidumping import restrictions be imposed against trading partners for which they have industry-level export exposure to retaliation; this likely affects the potential policy actions that a government is ultimately asked to consider implementing. Second, conditional on receipt of a request for additional import protection, the US government was less likely to impose duties on trading partners for which overall US exports would subsequently be exposed to bilateral retaliation under a potential WTO dispute.

7.2 *WTO Dispute Settlement: Theoretical Perspectives*

The terms-of-trade theory suggests that the WTO represents a codification of a set of cooperative strategies for governments engaged in the repeated play of a terms-of-trade driven prisoners' dilemma game. Cooperation in such a setting is possible only if governments understand that off-equilibrium-path deviations may lead to a breakdown in the agreement and a corresponding reduction in cooperation. In this general context, what, then, is the role of the WTO dispute-settlement system? This is an important and under-studied question. Here, we highlight two theoretical perspectives on this question: the system may enhance cooperation by increasing transparency (i.e., by generating and disseminating information) or by helping to "complete" the WTO contract. We also discuss research concerning possible reforms of the dispute-settlement system.

7.2.1 *Transparency and Information*

Cooperation is typically easier to achieve in prisoners' dilemma settings when

behavior is transparent or public.¹⁴⁴ The decision of GATT contracting parties to concentrate protection mainly into tariffs (rather than quotas) can be understood in this light. Nevertheless, governments may face monitoring impediments and may not be perfectly informed about the full range of trade-policy conduct of other governments. Consequently, WTO rules that generate and disseminate public information about trade-policy conduct may facilitate greater cooperation. The *WTO Trade Policy Review Mechanism* (TPRM), under which the WTO Secretariat conducts periodic reviews of the trade policies of member governments, may be evaluated in this context. We now briefly describe research in which the WTO dispute-settlement system likewise may facilitate cooperation by generating and disseminating information.

Consider again Maggi (1999), which provides a model where cooperation can be achieved under a multilateral enforcement mechanism in which third-party transparency is present and third countries stand ready to retaliate. If a trade agreement is designed to ensure that any deviation would be observed by all member governments, then the resulting off-equilibrium-path punishment could take an immediate multilateral form and thus be more severe. A dispute-settlement body that publicly identifies an off-equilibrium-path deviation could play a role in facilitating cooperation by ensuring that all member governments would be aware of the transgression. By making "bilateral" deviations observable at a multilateral level, governments thus may be able to achieve more cooperative tariffs along the equilibrium path as part of a self-enforcing agreement.

Park (2011) develops a two-country model to explore a related information role for

¹⁴⁴ See again the discussion of these and related insights for the models surveyed in section 4.2.

dispute settlement. Each government has a publicly observed trade policy (e.g., a tariff) and a “hidden” trade policy (e.g., a nontariff barrier) that is imperfectly observed by the other government, and each government privately observes a signal of the other’s hidden trade policy. Governments attempt to cooperate in this “private monitoring” setting even in the absence of a dispute-settlement system, and a key feature of optimal cooperation is that, after observing a suspicious signal, a government increases its publicly observed trade policy, which publicly initiates a trade-war phase. The prospect of a trade-war phase discourages opportunistic behavior with respect to the hidden policy; however, suspicious signals are sometimes observed even when the hidden trade policy is set at cooperative levels, so the trade-war episodes are a feature of optimal cooperation in the absence of a dispute-settlement system. Relative to this benchmark, a dispute-settlement system can facilitate greater cooperation by changing the information structure of the game through its provision of a public signal and enriching the forms of feasible punishment.

Empirically, a potentially useful environment to examine implications of the WTO’s information-dissemination role may turn out to be the Great Recession of 2008–09. For despite the highly synchronized and sudden global collapse in economic activity and trade flows, it is now well understood that a global surge in new trade protection of the scale of even earlier recessions, let alone the Great Depression of the 1930s, did not occur (Bown and Crowley 2013a). Given the relatively moderate trade-policy response, it is unsurprising that the WTO has also not been flooded with a subsequent onslaught of newly initiated disputes. However, one contributing explanation may be the sharp increase starting in 2009 of the *multilateral* monitoring efforts to improve information dissemination on trade policy changes,

including by the WTO Secretariat (through its Trade Policy Review Body), the World Bank, and establishment of the independent Global Trade Alert.¹⁴⁵

7.2.2 *Contract Completion*

Disputes sometimes arise as a result of disagreement about whether particular legal conditions are met. Legal scholars especially stress the view that countries invoke dispute settlement to address instances in which the original terms of the agreement were vague or incomplete, perhaps because it was too costly to write all possible contingencies into the original agreement. Dispute settlement may present a forum to address legitimate differences of opinion about what behavior the contract was intended to induce. We briefly describe here research that adopts this perspective.¹⁴⁶

Maggi and Staiger (2011) provide a first analysis of roles that dispute settlement might play in a trade agreement modeled as an incomplete contract. Trade takes place between two countries in a single industry. The importing country has the policy option of free trade or protection, and makes its choice after both countries and the “court” (i.e., the dispute-settlement process) observe the realization of state variables that affect welfare levels. However, it is too costly to describe the states in an *ex ante* contract, and

¹⁴⁵Bown (2011a) provides a more complete discussion of these three enhanced initiatives for additional trade policy monitoring and surveillance that arose during the Great Recession, with emphasis on motivations underlying the World Bank’s TTBs information dissemination activities in particular.

¹⁴⁶There is also a growing literature that explores the role of dispute-settlement procedures in facilitating *ex post* renegotiation of trade agreements where commitments may be viewed as either property rules or liability rules. See Maggi and Staiger (2015) where there are no disputes in equilibrium and Beshkar (2010, 2013) and Maggi and Staiger (forthcoming) where disputes arise in equilibrium. See also Bagwell (2008), Lawrence (2003), and the legal discussion of Schwartz and Sykes (2002).

the court does not observe the joint payoff to the two countries under the realization of the state variables. The two countries thus cannot write a complete state-contingent agreement. Maggi and Staiger focus on three forms of contract incompleteness: the contract may leave gaps, it may be overly rigid, or it may use vague language that leaves the obligations under the contract ambiguous in some states. The theory explores ways in which the agreement might articulate various roles for the court, including its degree of “activism,” such as limiting the court to enforce clearly stated obligations versus allowing it to interpret ambiguous obligations, or to fill gaps, or possibly to modify clearly stated obligations. The model assumes the court is costly to use and makes errors in decisions, and the contract and the court mandate are chosen together as part of the optimal design of the institution. A two-period extended model is also considered to explore implications of allowing the court to establish precedent.

Maggi and Staiger (2011) derive a number of results assessing different degrees of court activism. First, it is never optimal to allow the court to modify obligations that are clearly stated in the contract. Second, as court decisions become more accurate, its mandate changes from noninvolvement (beyond a pure enforcement role) to a more activist role, such as interpreting vague clauses and even filling in the contract where it is silent. Third, while precedent can improve efficiency by reducing expected future litigation costs on issues that would have been litigated in any event, offsetting negative effects include the costly increase of additional disputes arising over issues that would not otherwise have been litigated. Overall, the benefits of precedent outweigh the costs when governments are impatient and when the court is more likely to make mistakes.

Finally, this model can also be used to describe other important features of the

disputes that arise, especially in relation to the characteristics of the court. First, there is a tendency of the court to exhibit a pro-trade bias in its legal rulings if the litigation costs to the complainant (exporter) are high, relative to the respondent. However, this pattern arises due to selection effects associated with the importing country being more likely to actually have been at fault in the first place. Second, and following the same intuition as arises in the enforcement literature, the off-equilibrium influences of the court are what generate its beneficial impacts. Third, and also in parallel with the enforcement literature, the frequency with which countries trigger disputes provides little information on the performance of the court or the value of the dispute-settlement process to the overall agreement, a result that occurs in the model because of the interaction between the optimal choice of the contract and the optimal mandate of the court.

7.2.3 *Dispute-Settlement Reform Proposals*

Despite the apparent success of WTO dispute settlement, there have been a number of proposals for reform. Here we consider the literature that has evaluated some of these proposals. For the purpose of evaluation, it is also important to consider why such reforms may be desirable. One concern is that tariff retaliation, when implemented, may generate efficiency losses. A second concern may be the “equity” properties of dispute settlement that arise for countries with bilateral trade imbalances that may not have a sufficiently credible enforcement threat to induce policy compliance.

A first proposal is to replace the current system of trade retaliation with a system of financial compensation; this could also be motivated by the realization that financial transfers have emerged in a couple of instances as part of voluntary settlements

in actual WTO disputes.¹⁴⁷ To explore this proposal, Limão and Saggi (2008) analyze the potential role of “fines” (financial transfers) in a self-enforcing, repeated-game framework.¹⁴⁸ In order for fines to support low cooperative tariffs, they must be backed by an additional policy instrument that is not controlled by the deviating country. The natural instrument to consider is a tariff, and thus tariff retaliation remains the central backstop of the system. Accordingly, Limão and Saggi find that a system in which retaliatory tariffs enforce the payment of fines yields no more cooperation than a system that relies directly on retaliatory tariffs. While the two systems are equivalent in the absence of disputes, Limão and Saggi argue that a system with fines offers an advantage when shocks occur that lead to disputes. The intuition is simply that fines are a more efficient transfer instrument.¹⁴⁹

Mexico introduced a separate reform proposal based on the idea that countries could be allowed to trade their right to retaliate to other trading partners in lieu of implementing retaliation themselves (WTO 2002). This option may be of special interest to smaller countries that perceive less benefit from retaliating on their own. Bagwell, Mavroidis, and Staiger (2007) consider different auction formats to analyze tradeable retaliation rights

in a trade agreement setting.¹⁵⁰ They begin with a basic auction, in which two competing importers of the product on which retaliation can take place bid for the right to retaliate. The basic auction has positive externalities: the losing country prefers that the other bidding country win and impose a retaliatory tariff in comparison to the scenario in which no retaliation occurs.¹⁵¹ Intuitively, the retaliatory tariff imposed by the winning country lowers the world price of the common import good, and thereby generates a terms-of-trade gain for the losing country. Due to this positive externality, free-riding is a potential concern, and auction failures (where neither country bids) and misallocations of retaliation rights (due to pooling at the reserve price) can occur. They then consider an extended auction, in which the respondent country is allowed to bid and potentially retire the right of retaliation against it. Both positive and negative externalities can arise in the extended auction, the respondent country always wins, and the retaliation right is always retired *without* the realization of the inefficiencies. The extended auction thus suggests a potential means through which monetary compensation might be extended from a large (respondent) country to a small (complainant) country.

Drawing normative inference from these different auctions requires further thinking about the underlying motivation of the reform to the enforcement mechanism—e.g., is it to ensure compensation, encourage respondent compliance with rulings, or enhance efficiency? The results suggest that the basic auction generates lower expected revenue for the complainant than the extended auction in which the

¹⁴⁷ As a settlement in the *US—Upland Cotton* dispute, the United States agreed to transfer \$147.3 million annually as a form of technical assistance and capacity building to the government of Brazil (USTR, 2010). In the *US—Section 110(5) of the US Copyright Act* dispute, the United States paid European copyright holders 1.3 million euros annually in compensation. See Bronckers and van den Broek (2005), which also provides a more complete legal articulation of the proposal.

¹⁴⁸ See also Bagwell and Staiger (2005a). Extensions include Limão and Saggi (2013).

¹⁴⁹ Limão and Saggi (2008) develop this point by considering the possibility of unanticipated shocks. Bagwell and Staiger (2005a) also explore the benefits of monetary transfers in a repeated game model, although in their model (preference) shocks are anticipated and privately observed along the equilibrium path.

¹⁵⁰ See also Chen and Potipiti (2010), who derive the optimal auction design for this setting.

¹⁵¹ Bagwell, Mavroidis, and Staiger’s (2007) formal analysis is closely related to that of Jehiel and Moldovanu (2000).

respondent country is also allowed to participate. On the other hand, the compliance and efficiency criteria favor the basic auction under some circumstances.

7.3 WTO Dispute Settlement and PTAs

The stumbling-block/building-block literature reviewed in section 5 indicates that PTA formation can impact the extent to which multilateral tariff cooperation can be achieved in a self-enforcing agreement. A related but distinct question concerns the relationship between PTA implementation and WTO dispute-settlement activity. While there is little formal econometric work assessing implications of repeated-game models for disputes, there are many examples of actual PTA implementation resulting in policy changes that lead PTA non-members to formally challenge those policy changes through GATT or WTO disputes. These examples highlight this as a likely area of continued conflict, and thus an important area for additional research, especially in light of the proliferation of “WTO-extra” provisions arising under the new wave of PTAs.

The GATT period was replete with disputes arising after countries took on new PTA commitments involving tariffs and trade-related policies that led to adjustments of the PTA members’ external trade policy commitments toward nonmembers. The European Economic Community, in particular, faced formal GATT disputes in 1973 after the accession of United Kingdom, Ireland, and Denmark, in 1982 after the accession of Greece, and in 1987 after the accession of Spain and Portugal, where the three disputes were respectively initiated by Canada, the United States, and Argentina.¹⁵²

Other and more recent examples of disputes involve new PTA members allegedly adjusting their nontariff policies toward nonmembers, both immediately as well as long after implementation of the PTA, in the latter case due to PTA rules constraining the conduct of policy toward members in particular. The MERCOSUR tariff cuts and customs union between Argentina, Brazil, Paraguay, and Uruguay in the early 1990s provide two case studies.

Argentina’s preferential tariff cuts in footwear under MERCOSUR led to an import surge from Brazil and was the precipitating event behind one important WTO dispute. Argentina’s response to the preferential import surge was to subsequently impose a safeguard on footwear beginning in 1997. However, because of a MERCOSUR legal requirement that safeguards cannot be applied against other PTA members, Argentina exempted imports from Brazil from the policy. Not surprisingly, the policy failed to stem the import surge from Brazil—though it was effective against imports from nonmembers—and the result was that the European Union and Indonesia filed a formal WTO dispute against Argentina. The WTO rulings in the dispute were some of the first WTO jurisprudence establishing additional conditions under which countries could viably apply safeguard measures.¹⁵³

A second example escalated from Brazil’s ban on retreaded tire imports in 2000; Brazil

¹⁵²Hudec (1993) provides an expanded discussion of Canada’s dispute over cereals exports (pp. 460–61), the United States’ dispute over fruit exports (pp. 496–98), and Argentina’s dispute over corn and sorghum exports (p. 550).

¹⁵³Bown, Karacaovali, and Tovar (2015, pp. 449–52) discuss the *Argentina—Footwear* dispute, which is also noteworthy as its legal decisions resulted in the important WTO jurisprudence establishing the principle of “parallelism,” whereby safeguard-imposing countries became required to only impose safeguard measures against trading partners whose imports they had actually included in the safeguard’s injury investigation. We note that there are also important examples of countries facing WTO disputes brought by PTA partners after they have imposed a safeguard in a way that increased the level of import protection against PTA partners relative to non-partners. An example is the *Dominican Republic—Safeguard Measures* dispute; for an analysis see Bown and Wu (2014).

later claimed a public-policy motive based on environmental and human health protection. Uruguay challenged Brazil's ban under MERCOSUR's dispute-settlement provisions, and the legal ruling required Brazil to remove the ban's application on retreaded tire imports from MERCOSUR partners. Brazil's imports from some of the newly exempted MERCOSUR partners subsequently increased, and the European Union—another exporter of retreaded tires still subject to the Brazilian import ban—filed a WTO dispute. This dispute also resulted in important WTO jurisprudence—this time for the overlap of trade and environmental policy (Bown and Trachtman 2009).

7.4 *PTA Dispute Settlement and Deep Integration*

While the GATT approach emphasizes shallow integration, many PTAs pursue deep-integration linkages between domestic and trade policies. As we discuss in section 4.4, these linkages may have implications for the most cooperative tariffs that can be enforced; in particular, Limão's (2005) work raises the possibility that optimal cooperation in a linked setting with non-pecuniary international spillovers could entail a reduction in trade-policy cooperation, if the linked agreement "borrows" enforcement power from trade policy to achieve non-trade objectives.¹⁵⁴ In this section, we focus on a related but distinct theme and consider PTA disputes that are associated with the enforcement of non-trade policies. We regard this area as an especially promising area for future research.

Our discussion is motivated by recent developments. For the first time, countries are now using trade policy to explicitly

enforce some of the new, non-trade policy commitments that countries have undertaken bilaterally, outside of the WTO, in other agreements. Some of these examples stem directly from the "trade and..." provisions—such as environmental or labor standards—that were introduced into the public lexicon and came to prominence in the 1990s when NAFTA was first under consideration (Bhagwati and Hudec 1996). We describe three recent examples here.

In 2010, the United States initiated its first formal dispute for a trading partner's failure to implement sufficiently high labor standards that it had committed to uphold as part of the PTA. As background, the CAFTA–DR that the United States signed in 2004 included a number of "WTO-extra" provisions of the kind described by Horn, Mavroidis, and Sapir (2010)—including labor standards, environmental standards, and foreign direct investment provisions—that would subsequently be enforceable under the PTA's own dispute-settlement procedures. When Guatemala allegedly failed to enforce its own labor laws, the United States initiated a formal CAFTA–DR dispute (USTR 2011). Such a dispute has the potential to escalate to tariff retaliation.

The second example stems from Mexico filing, winning, and retaliating after a NAFTA dispute over the United States failure to liberalize its market for commercial trucking services due to alleged public safety concerns. As background, when NAFTA was implemented in 1994, the United States agreed to remove restrictions on commercial truck and cargo shipping services provided by Mexican firms. However, the United States announced in 1995 that it would not remove the restrictions out of alleged safety concerns that the Mexican trucks posed for the US public. Mexico initiated a formal dispute under NAFTA and in 2001, a NAFTA panel found against the US restrictions. After eight years of the United States failing

¹⁵⁴There are many high-profile examples of countries "borrowing" enforcement through trade retaliation to achieve other objectives, including countries implementing trade sanctions for allegedly political or national security purposes (Hufbauer et al. 2009)—e.g., those imposed recently on North Korea, Iran, and Russia.

to implement the panel recommendations, Mexico announced it would seek compensation by implementing NAFTA-authorized tariff retaliation over more than \$2 billion of imports. Ultimately, this retaliation on US exporters galvanized sufficient political pressure within the United States to allow for policy reform in 2011, whereby Mexican trucks were allowed to service the US market and Mexico ended its period of retaliation (Department of Commerce 2011).

The third example involves the United States implementing trade sanctions in 2012 against Argentina by removing the lower tariff preferences the United States had previously offered under the *Generalized System of Preference* (GSP) program. The United States does not have a PTA with Argentina, the trade retaliation did not follow from a formal dispute, and it was not authorized by any particular dispute-settlement process. The source of friction between the two countries is not even a trade matter; instead, it stems from a dispute over an alleged expropriation of US investments in Argentina, and as such is covered by a bilateral *investment* treaty between the two countries. The investment dispute was litigated under the International Centre for Settlement of Investment Disputes (ICSID), which determined that Argentina should compensate US investors for damages with a financial transfer. The implementation of US trade retaliation beginning in 2012 was an attempt to enforce Argentina's foreign direct investment commitments and was due to Argentina's failure to pay roughly \$300 million that it owed US investors since 2005–2006 (USTR 2012).

The Guatemala (labor standards), US–Mexico (trucking services and safety standards), and Argentina (foreign direct investment) examples highlight the need for further research to evaluate the dispute-settlement implications of existing “deeper-integration” trade agreements. This is

particularly evident if these three recent examples also signal a tendency for such agreements to move over time beyond “soft” law and toward “hard” law, where deep-integration policy commitments could then expose highly sensitive behind-the-border measures not only to litigation under formal dispute settlement, but also to enforcement through tariff retaliation.

7.5 Summary

Our review highlights central features of the WTO dispute-settlement system, the theoretical frameworks that attempt to identify a specific role for dispute-settlement procedures, the complicated relationship between WTO dispute settlement and PTA implementation, and some aspects of PTA dispute settlement in the context of deeper-integration initiatives. In this concluding section, we briefly reflect on some of the relative merits of the WTO's multilateral dispute-settlement system.

While WTO dispute settlement is widely praised, it is challenging to determine a solid benchmark against which to measure its success. Certainly the willingness of member governments to utilize WTO dispute-settlement procedures to examine disputed policies is suggestive that these procedures play an important role. Furthermore, it is also the case that for many bilateral trading relationships, the WTO's multilateral system may be the only game in town. Indeed, as we observed in section 2.2.1, one-half to two-thirds of world trade occurs between countries that are not in a common PTA, and thus between countries without an obvious alternative forum under which to resolve their potential disputes.¹⁵⁵

¹⁵⁵The WTO (2011, p. 64) reports that 65 percent (49 percent) of world trade in 2008 was extra-PTA trade excluding (including) the European Union. The trade included in the construction of these ratios does include some trade between non-WTO members, so not all of it would therefore be subject to WTO dispute settlement.

One possible relevant benchmark is to compare the current WTO dispute-settlement system to its most immediate predecessor, i.e., the multilateral dispute-settlement system under the GATT in the late 1980s. The GATT system, which was relatively toothless and based more on diplomacy than law, spurred the rogue path of unilateralism that the United States undertook through its Section 301 actions during the period (Bhagwati and Patrick 1990). US unilateralism was a signal of its strong displeasure with the old system and at least partially served to illustrate what a world without binding multilateral disciplines could look like. Ultimately these events contributed to ushering in the WTO's new dispute-settlement system in 1995, and the evolving system has arguably performed well in comparison to the GATT system.

A second possible benchmark is to compare the WTO dispute-settlement system to systems emerging in PTAs. In principle, PTA systems might be customized to better address the deep-integration initiatives that these agreements increasingly pursue. However, it is far from clear that dispute settlement in PTAs can handle the job on its own. First, there are a number of cases in which purely bilateral issues arising between partners in PTAs with relatively well-functioning dispute-settlement systems (e.g., NAFTA) could not be resolved internally and ultimately spilled over into WTO dispute settlement anyway. Second, there are other examples (e.g., MERCOSUR), in which PTA dispute-settlement decisions pushed PTA members to make policy choices that imposed externalities on nonmembers, thus leading those nonmembers to initiate WTO disputes. While the empirical record of PTA dispute-settlement use is scant, such examples at least suggest that PTA dispute settlement may cause as many problems for the WTO as they help resolve.

More research is required to better understand the tradeoffs, incentives, and forces

also at work at the particular *intersection* of preferential and multilateral commitments. Such research may be of special value now, since it is unlikely that a single overarching rule—such as, “wherever there might be a conflict in commitments or obligations, WTO law dominates PTA law”—can be relied upon. Indeed, some of the major proponents of new obligations arising under PTAs—such as the United States and European Union—are also some of the most significant litigants and contributors to WTO jurisprudence. As a thought experiment, consider once again the US–Guatemala dispute over labor standards or the US–Argentina retaliation over investment provisions and compensation. When would it make sense for Guatemala or Argentina to use the WTO to challenge potential US trade sanctions as a violation of its WTO commitments, since there are no explicit WTO provisions authorizing the United States to raise its tariffs for such reasons in the first place?

Together these considerations lend support to the WTO dispute-settlement system, but it is clear that much more research is needed.¹⁵⁶ The relative merits of multilateral and preferential dispute-settlement systems is thus an important subject for further theoretical and empirical analysis.

8. Conclusion

The world trading system seems to be at a crossroads. The emphasis of international

¹⁵⁶ An additional area in which research is needed is investor-state dispute settlement (ISDS), whereby private firms in one country have direct access to a separate court system to defend their foreign direct investment from potential government expropriation. One example of a dispute in which ISDS procedures were triggered is the case that US investors took against Argentina under the ICSID described above. Sykes (2005b) provides an introduction to bilateral investment treaties (BITs), the distinctive form of dispute settlement arising under such agreements, and how this differs from the system typically arising under trade agreements.

cooperation has apparently experienced a momentum shift away from the multilateral and nondiscriminatory framework of the GATT/WTO in favor of discriminatory arenas under new PTAs, and away from negotiations emphasizing shallow integration and toward negotiations stressing increasingly deep integration. Understanding the implications of these shifts is important. What is on the line is a choice over which international institutions will set the future rules of globalization and shape the trade-offs we face in a globalized world economy.

The best path forward may depend on how we have arrived at this particular crossroads. In broad terms, there are two possibilities suggested by the trade-agreements literature.

One possibility is that fundamental changes in the global economy, such as the rise in global supply chains and offshoring and the emergence of BRICS, have somehow affected the kinds of rules needed for international economic cooperation. According to this possibility, countries must now negotiate deeper constraints in what traditionally was considered the realm of domestic policy making; and as a consequence, greater restrictions on national sovereignty are now an inevitable feature of globalization, with PTAs the most efficacious institution for carrying out the task.

The second possibility is that changes in the global economy have created new challenges for the WTO, but the rules needed for international economic cooperation are still fundamentally the same. Under this possibility, the GATT/WTO approach to shallow integration may be in trouble, but its problems are fixable, provided that the WTO is supported and its approach strengthened.

On balance, our review of the literature to date favors the second possibility. The WTO is not passé. Subject to some caveats, as an institution, the WTO appears to be structured in a way that is likely to encourage policy outcomes that are viewed as efficiency

enhancing by WTO member governments. This position is only strengthened when also taking into consideration the WTO's relatively successful track record of resolving bilateral frictions through its system of dispute settlement. At the same time, our review also suggests some weaknesses in the WTO approach that could be related to some of the current challenges that it faces. It is likely that the task of shallow integration is not yet completed and important work remains to be done, especially for some of the major emerging economies and less developed countries. However, creative adaptations to the GATT/WTO's historically successful principles of reciprocity and nondiscrimination could seemingly be redeployed—albeit in a more guided and targeted way—to address these challenges.

While our review of the literature to date broadly supports the GATT/WTO shallow integration approach, we also highlight research that raises important caveats. As we note, the presence of non-pecuniary international externalities may motivate deeper forms of integration, and it is possible that governments can enforce greater overall cooperation in an agreement that links trade and domestic policies.¹⁵⁷ We also describe research indicating that the presence of private information or commitment problems may provide rationales for certain forms of deep integration. As well, some recent research indicates that the effectiveness of the GATT/WTO shallow integration approach

¹⁵⁷ Indeed, the WTO TRIPS agreement is a deep-integration agreement and a possible example of this sort of linkage within the WTO. As we discuss in footnote 1, we do not include in our survey the literature that investigates the purpose and design of the TRIPS agreement, as it is not a market-access agreement. Recent work adopting TRIPS as the focus includes Maskus (2000), Grossman and Lai (2004), Scotchmer (2004), and Geng and Saggi (2015). Similarly, we do not address the possible role of trade agreements with regard to other non-pecuniary international externalities, such as global warming, human rights, and geopolitics and global security.

may be undermined by offshoring and its implications for international price determination. These research areas are at early stages, however, and their full implications are uncertain. As such, they represent especially important areas for future research.

Our review also highlights some important considerations that have received relatively little attention in the formal trade-agreements literature. First, actual negotiations may entail bargaining frictions, which are plausibly higher for negotiations that involve many countries and complex issues. Second, gains from international economic cooperation in certain policies may take the form of coordination gains.¹⁵⁸ Further work on these topics may offer new insights about deep-integration initiatives and the possible benefits of negotiations among smaller groups of countries. Finally, the effect of deep-integration initiatives on third-party countries, and especially developing countries, is an important and under-explored direction for additional research.¹⁵⁹

We close our review with a brief discussion of one potential approach to strengthening the WTO in response to these challenges that has received recent attention in the literature, namely, the possibility of pursuing critical mass agreements (CMAs) or plurilateral agreements (PAs). Such agreements can

be thought of as a hybrid between the preferential trade agreements and what has otherwise been the WTO's "Single Undertaking" approach.¹⁶⁰ A CMA is defined as an agreement in a WTO-covered area between a subset of WTO member countries whereby, because WTO disciplines apply, the benefits the members offered to one another under the CMA must be extended to all other WTO members on an MFN basis. In order to prevent free riding, CMAs therefore may be only likely to occur between major subsets of large countries. The main example of a successfully concluded CMA occurring under the WTO is the 1997 *Information Technology Agreement*, which cut tariffs to zero in products covered under the agreement, and for which the original negotiations were concluded between only twenty-nine WTO members, though this has subsequently grown to more than seventy. A PA, on the other hand, is an agreement between a subset of WTO member countries in an area where either WTO disciplines are not applied ("WTO-extra") or where they are extended ("WTO-plus"), and to which, therefore, the benefits offered to one another would not need to be extended to other WTO members. Examples under the WTO include the *Agreement on Government Procurement* and the *Agreement on Civil Aviation*.¹⁶¹

¹⁵⁸ See, e.g., Hoekman (2014) on possible coordination gains in the context of the *Trade Facilitation Agreement*.

¹⁵⁹ We mention here two further important issues for future research. The first issue concerns the extent to which power asymmetries between developed and developing countries impact deep-integration negotiations among participating countries more readily in PTAs than in the WTO. The second is whether deep-integration PTAs facilitate or hinder deeper integration at the multilateral level. Deep-integration PTAs might offer laboratories in which to discover effective disciplines and thereby facilitate multilateral efforts, but they might also generate incompatible standards across PTAs that "lock in" members and thereby inhibit multilateral harmonization. For further discussion of these and related issues, see Bhagwati, Krishna, and Panagariya (2014), Trebilcock (2014), and WTO (2011, p. 182).

¹⁶⁰ Plurilateral agreements were a common outcome of GATT rounds prior to the Uruguay Round. For example, the conclusion of the Tokyo Round in 1979 led to a number of plurilateral agreements adopted mainly by industrialized countries, in issue areas such as subsidies and countervailing measures, technical barriers to trade (standards), import licensing procedures, government procurement, customs valuation, antidumping, bovine meat, dairy, and trade in civil aircraft. The Kennedy Round of negotiations in the 1960s also brought forward a plurilateral code on antidumping.

¹⁶¹ Negotiations using CMA/PA approaches in new-issue areas include attempts to liberalize trade in environmental goods and additional liberalization in services under a proposed TiSA (*Trade in Services Agreement*). Negotiations outside of the WTO among a small subset of mostly high-income countries have taken place for additional intellectual property rights protection and resulted in the anti-counterfeiting agreement (ACTA).

As Hoekman and Mavroidis (2013, 2014) point out, PAs and PTAs have important similarities and differences.¹⁶² Similarities include that both can be applied on a non-MFN basis without violating WTO rules and both seem to be going beyond the shallow integration approach of traditional GATT/WTO disciplines and into deep integration. On the other hand, important differences may make PAs more appealing than PTAs from the perspective of the multilateral system. First, PAs are “open” in that other WTO members should (in principle) be allowed an explicit path to accede to the PA in the future, whereas PTAs do not typically have an open accession process for potentially interested trading partners. Second, attempts to bring PAs into the WTO system would potentially make the content of these agreements much more transparent, which may be especially important for non-signatory countries. Third, problems arising between PA signatories would be addressed through litigation taking place under the WTO, thus more likely completing the contract in a coherent way, as opposed to the potential fragmentation of international jurisprudence that might otherwise arise under PTA dispute-settlement provisions. Combined, Hoekman and Mavroidis suggest these features of PAs could make them less likely to impose externalities on third countries than PTAs. Nevertheless, the full theoretical implications of such alternative approaches have yet to be fully explored by the literature, and thus further analysis along these lines is a ripe area for additional research.

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