

THE EMPIRICAL LANDSCAPE OF TRADE POLICY *

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FEBRUARY 2016

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The authors acknowledge financial support from the World Bank's Multi-Donor Trust Fund for Trade and Development, the Strategic Research Partnership on Economic Development, and the Student Summer Bursary of the Faculty of Economics at the University of Cambridge. The authors thank Caroline Freund and Michele Ruta for detailed comments on an earlier draft, as well as suggestions from Kyle Bagwell, Mostafa Beshkar, Emily Blanchard, Bruce Blonigen, Avinash Dixit, Bernard Hoekman, Rod Ludema, Penny Goldberg, Ohyun Kwon, Phil McCalman, Nina Pavcnik, Robert Staiger, Alan Sykes, and Alan Winters. Aksel Erbahar, Carys Golesworthy, Semira Ahdiyyih, and Karthik Raghavan provided outstanding research assistance.

1 Introduction

This chapter surveys the broad features of and developments in the use of trade policy across countries, within countries, and over time. Our goal is to describe and, whenever possible, quantify the extent of cross-sectional heterogeneity in currently applied commercial policy that is the result of trade liberalization efforts taking place across countries, their trading partners and economic sectors, over time.¹ We construct a relatively comprehensive picture of trade policy for 31 economies that represented 83 percent of the world’s population and 91 percent of the world’s GDP in 2013. Our main conclusion is that substantial trade policy barriers currently remain as an important feature of the world economy. We also argue that many of these policy barriers are likely to remain as permanent features, given the design of trade agreements.

Our assessment contrasts sharply with that of many academic economists who, operating for years in an environment in which “[t]he grossly incomplete and inaccurate information on policy barriers available to researchers is a scandal and a puzzle” (Anderson and van Wincoop 2004, p. 693.), have mistakenly concluded that policy barriers to trade have largely disappeared.² The ‘good’ news is that research no longer needs to operate behind a veil of ignorance created by the lack of information on border barriers; commodity-level data on a variety of trade policy instruments is now routinely being made available for most economies in the world.

The picture that emerges from our analysis of the empirical landscape of trade policy is complex, but consists of three main themes.

First, while there has been a broad trend toward a more liberal trading system over the last 70 years coinciding roughly with establishment of the General Agreement on Tariffs and Trade (GATT) in 1947, there remains tremendous variation around that trend in the form and restrictiveness of border policies. Even today, governments continue to use a wide variety of policy tools to restrict imports. The fundamental dichotomy in the lexicon of import policies has been between price-based measures (import tariffs) and quantity-based measures (quotas). However, a variety of specialized categories have arisen within these broad classes. The development of trade agreements has played an important role in both constraining access to certain policies, and yet also making other policies more readily available under certain types of legal-economic conditions. One result is an extensive variety of policies in use at any one moment in time. Moreover, across countries and sectors, the trade regime can exhibit extensive heterogeneity in the level of restrictiveness. Including consideration of all border policy barriers is thus likely to be important; for example, in their major contribution to estimating the *combined* restrictiveness of various trade policies, Kee, Nicita and Olarreaga (2009) conclude that restrictiveness measures that include non-tariff barriers are 87 percent higher on average than measures based on tariffs alone.

¹This paper builds from a number of previous *Handbook* chapters describing various elements of how trade policy is used in practice, and notably Feenstra (1995), Rodrik (1995), Staiger (1995), and Maggi (2014).

²For example, while acknowledging that “[i]t is difficult to quantify protectionism,” Krugman (1995, p. 338) concluded “there is no question that the general profile of world protectionism since the early twentieth century has been the inverse of that of world trade.” Accounts like this which overstate the comprehensiveness of liberal trade have influenced a generation of international trade economists.

A second emerging theme is that history tends to repeat itself. While some of the most popular forms of border policies have changed over the decades since World War II, having been shaped by the constraints imposed by the evolution of the GATT and World Trade Organization (WTO), many of the same sectors have repeated episodes of protection, and the circumstances in which countries raise their barriers to trade resurface time and again.

The third theme is that the success of the world trading system in reducing traditional border barriers and integrating economic activity, even though arguably incomplete, has opened up new areas of policy conflict that are expected to grow in importance. Bilateral frictions between trading partners have moved beyond tariffs and quotas to the international externalities associated with domestic policies - i.e., domestic tax and subsidy regimes, health and safety standards for products, as well as labor and environmental regulations. In order to survey the empirical landscape of domestic policies that impact trade, we use case studies to highlight important themes. Partly because of the lack of internationally comparable data on domestic policies, rigorous empirical work in this area is very thin.³ As such, the literature is unsettled as to the positive and normative understanding of the extent to which regulatory and standards policies unduly inhibit trade and what, if anything, the trade agreements could or should do about it.

As we catalogue and describe what is known about trade policy in 2013 and 2014 - the most recent years for which we observe near-complete data reporting - one objective is to correct the widely-held misunderstanding that trade is already free from policy impediments. Among academic economists, there remains considerable disagreement about the importance of policy barriers and, perhaps by implication, the value associated with additional research studying commercial policy. First, it has become increasingly clear from firm-level studies that there exist some sizeable additional costs associated with *international* commerce relative to domestic commerce;⁴ the uncertainty is whether the costs arise from policy-induced barriers or something else. Anderson and van Wincoop (2004), through a combination of direct observation and inferences from a gravity trade model, quantify the representative border-related trade costs for an industrialized country at 44 percent ad valorem and the representative transportation costs at 21 percent. In contrast, Hummels (2007, p. 136) suggests that the importance of policy barriers has been completely eclipsed by real transportation costs: “For the median individual shipment in U.S. imports in 2004, exporters paid \$9 in transportation costs for every \$1 they paid in tariff duties.”

One purpose of this chapter is to clarify why comparing summary measures of duty payments (or even applied tariffs) versus other transportation costs at a particular moment in time is simply not appropriate for understanding the full economic importance of policy barriers. Three simple examples help to illustrate the point. First, the real world consists of significant non-tariff policy

³The lack of sufficiently detailed data for analysis of commercial policy is not new; it is only recently that researchers have even had access to data on policies that are straightforward to measure and assess, such as tariffs and more recently, temporary trade barriers. Bown (2011a) presents a discussion of recent developments regarding the latter. Data collection on ‘behind the border’ policies that affect trade lags even further.

⁴For example, Bernard, Johnson, Redding and Schott (2007) and Eaton, Kortum and Kramarz (2011) have documented that only a small fraction of a country’s manufacturing firms tend to engage internationally, with 18 percent of US firms exporting in 2002 and 15 percent of French firms exporting in 1986, respectively.

instruments; these include a number of border policies that, while *technically* applied as a tariff, are typically not captured in the data of these ‘headline’ measures of tariffs. Second, trade policy is commonly applied in a non-uniform manner across trading partners. Third, applied trade policy can vary considerably over time, especially in response to the business cycle, movements in the real exchange rate, or due to trade volume shocks; nevertheless, these changes usually do not arise through changes in the applied MFN tariff, but via something else.⁵

In the coming sections, we document that policy barriers to trade still exist; they vary considerably across products, trading partners and time; they take many forms; and they arise under legal frameworks (established by international trade agreements) that can result in subtle differences in both the frequency of their use and of their trade-reducing potential.

Section 2 begins with an analysis of the focal instrument of the international trading system - the ad valorem import tariff. Our first results describe the most-favored-nation (MFN), or nondiscriminatory, ad valorem import tariff, i.e., the ‘headline’ border policy instrument. A cross-country examination of the contemporaneous data reveals a number of interesting facts. While overall levels of import protection are relatively low across countries in historical terms, important heterogeneity remains across countries and industries, as well as in terms of the enforceable legal commitments that have been made under the multilateral trading system. Our second results analyze *discriminatory*, or less-than-MFN tariffs that countries apply to selected partners via preferential trading arrangements, such as free trade agreements, customs unions, unilateral preference schemes, or partial scope agreements. Because countries have taken on additional liberalization under such arrangements, we find additional heterogeneity in tariff height across trading partners and sectors; this also arises due to differences to the comprehensiveness in product coverage arising under different types of agreements.

We extend the analysis of border policies in Section 3 beyond ad valorem import tariffs. Even though the preferred policy in the contemporary trading system is the ad valorem tariff, specific tariffs remain a surprisingly common feature of trade policy in a number of high-income and emerging economies. Furthermore, although today’s institutional environment has delivered low import tariffs, contemporary use of temporary trade barrier policies - such as antidumping duties, safeguards, and countervailing duties - by some countries has been increasing and is characterized by heterogeneity across economic sectors and trading partners. Use of temporary trade barriers can substitute for ad valorem import tariffs and other historically popular border policies (e.g., quantitative restrictions), whose use has been restricted by trade agreement rules. We then proceed through our lexicon of non-tariff policies by documenting the use of quotas and price undertakings within the WTO. Even though the WTO’s special policy tools have legal definitions that imply use should be limited to specific circumstances or to achieve a specific policy objective, we summarize empirical research which shows that these import restrictions are influenced by the same factors

⁵Other mistaken views of trade policy arise from the multiplicity of instruments and their heterogeneity of usage across countries. For example, Rose (2013) concludes that trade protection is no longer counter-cyclic based on a series of cross-country analyses implementing a univariate regression of changes in a single policy instrument on a business cycle measure.

that drove traditional border barriers in earlier eras.

Once we have covered the contemporary landscape of border policies, we examine the longer-term evolution of these policies to better place the current system into historical context. Starting in 1947, Section 4 provides information on the pre-GATT starting point for tariffs, as well as a brief history of the ebb and flow in the use of a number of special import restrictions that arose over this longer time horizon. This includes import restrictions to safeguard the balance of payments; the discriminatory treatment of Japan despite its GATT accession in 1955; the multi-fibre arrangement (MFA), other voluntary export restraints, and the sectoral carve out for agriculture; and special and differential treatment for developing countries. This section not only clarifies how the current landscape of trade policy arose, but it also allows us to emphasize our second theme of history frequently repeating itself, albeit through different policy tools, by different countries, or against different trading partners.

Section 5 then returns to the contemporary landscape by introducing a set of ‘behind-the-border’ policies that have the ability to substantially impact international commerce.⁶ These include domestic subsidies and taxes, as well as standards and regulations. A comprehensive characterization of such data is notoriously difficult and fraught with measurement concerns empirically; thus we survey case studies from recent policy conflicts in order to highlight important areas. Our survey covers roughly 10 percent of the population of formal trade disputes arising during the WTO’s first twenty years. We conclude that the next major frontier for the world trading system involves how it confronts the trilemma of respecting local preferences in domestic policy, internalizing cross-border policy spillovers that operate through trade flows, and facilitating greater trade integration to sustainably maximize the value of the world’s productive resources.

In Section 6, we summarize our characterization of the empirical landscape by identifying five major puzzles, arising from these trade policy facts, for the research literature to continue to pursue. Finally, Section 7 concludes.

2 Ad valorem Import Tariffs

The natural place to begin an empirical analysis of contemporary trade policy is with the *ad valorem* import tariff, the most prevalently applied trade tax in existence, whether under a multilateral trade agreement such as the GATT/WTO or under preferential trading arrangements (PTAs). We begin by describing the role of ad valorem import tariffs under the WTO before turning to the different ways that they are manifest under the various forms of preferential trade arrangements.

Some of the analysis below relies on cross-country data comparisons where, for reasons of data quality, we do not attempt to be comprehensive. Instead, we focus on a sample of 31 economies listed in Table 1.⁷ These major economies were not chosen randomly - they include the Group

⁶One set of border policies that we do not directly address are export policies, and in particular export taxes or export quotas. Some discussion of export subsidies will arise in this section by implication of our discussion of domestic subsidies, especially where they impact two exporting countries competing in a third market.

⁷Here and throughout we refer to economies and countries interchangeably even though we will generally rely on

of 20 (G20) economies plus an additional set of developing countries each with 2013 populations of over 40 million. Collectively in 2013, these 31 economies represented 83 percent of the world's population, 91 percent of GDP, 80 percent of imports, and 79 percent of exports. Figure 1 illustrates their geographic diversity.

2.1 The WTO

The WTO had 161 members as of 2015. This means that the WTO rules governing import restrictions apply to almost all countries that are engaged in international trade; indeed, 29 out of the 31 economies of Table 1 are WTO members. The tariff rate that a WTO member applies to imports from all other WTO members is known as the most-favored-nation (MFN) applied tariff rate or MFN rate. Each WTO member has negotiated its own tariff schedule over importable products; the WTO's principle of non-discrimination requires that the tariff rate for each product be identically applied across WTO trading partners. Second, the vast majority of MFN tariffs are applied in ad valorem form, as opposed to a rate defined as a specific, or per unit, duty. Third, as we discover below in our analysis of tariffs under PTAs, the MFN applied ad valorem import tariff is the border tax applied to an overwhelming share of traded products in the global system.

2.1.1 MFN applied rates, tariff bindings/caps, and binding commitments

Membership in the WTO requires that countries take on a number of commitments with respect to their tariffs. First is the commitment that the applied tariff will be imposed at the same rate against imports from all other WTO members through the most-favored-nation (MFN) principle of nondiscrimination. Second, WTO members choose the set of products over which they take on some legally binding commitment - a cap above which they will not raise their applied tariff. Third, for each of those products (or tariff lines) with some legally binding commitment, the member chooses an exact value for this upper limit. This upper limit is referred to as the 'tariff binding' or 'tariff cap'. MFN applied rates (i.e., the statutory rates in national tariff schedules) must therefore be less than or equal to the tariff binding in order to be legal under the WTO. The difference between the tariff binding rate and the MFN applied rate is frequently referred to as the 'water' in the tariff binding or alternatively, 'binding overhang.' Finally, whereas the first commitment of MFN is a principle to which all WTO members must abide (subject to well-defined exceptions, some of which are described below), WTO members individually establish their second (set of products with any cap) and third (level of the binding tariff) commitments. These commitments have often resulted from decades of interaction with other WTO members under GATT negotiating rounds.

The data for these commitments reveal substantial heterogeneity for ad valorem import tariffs across countries. The first column of Table 1 presents the simple average of the MFN applied ad valorem information about the European Union collectively as opposed to its member states individually. Since these countries have a common trade policy set by the European Commission, we treat them as one economy. The 28 member countries of the EU as of 2013 included Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the UK.

valorem import tariff rate for our sample of major economies in 2013, only two of which were not members of the WTO.⁸ The United States, for example, applied an MFN tariff to imports from other WTO members at a simple average rate across the roughly 5200 6-digit Harmonized System (HS06) products of 3.4 percent in 2013. Among the high-income G20 members, Australia had the lowest average MFN applied tariff (2.7 percent) and Korea had the highest (13.3 percent). The emerging economy members of the G20 tend to have slightly higher MFN applied import tariffs, ranging from Indonesia (6.9 percent) to India (13.5 percent). The other developing countries in the sample that were WTO members by 2013 had applied MFN tariffs that were even slightly higher than the typical G20 rates, ranging from an average of 5.6 percent (Burma) to 16.8 percent (Egypt). Finally, the WTO non-member countries, such as Ethiopia and Iran, had average MFN applied rates that were substantially higher.⁹

The MFN tariff rates that countries apply are not, however, their legal commitments under the WTO. The second column in Table 1 lists the average WTO tariff binding commitment (or tariff cap) that the country has taken on, and the third column lists the share of imported products over which it has agreed to take on some upper limit binding commitment. Economies such as the US, the EU, Saudi Arabia, Argentina, Brazil, China, Mexico, Russia, Democratic Republic of Congo, and Vietnam have agreed to bind 100 percent of their tariff lines. For countries that have not agreed to bind all of their products at some upper limit, the remaining products have tariff upper limits that are ‘unbound.’ For example, India has not agreed to a binding upper limit to its applied MFN tariff for more than 25 percent of its imported products. Turkey has not made legally binding MFN commitments for nearly 50 percent of its products, though because most of Turkey’s applied MFN tariffs are tied to those imposed by the European Union through its customs union arrangement, the fact that the EU has bound 100 percent of its tariffs may serve as a *de facto* anchor (in lieu of a binding legal commitment) for Turkey as well.¹⁰

⁸More details on these data are described in the Appendix. First, the applied tariffs are the statutory tariffs that governments set, and the measure derives from tariff schedules (policy data) that either the government reports itself (to the WTO) or which are collected via official government publications by other international organizations; typically these are reported on an annual basis. Put differently, these measures of tariffs are *not* imputed from data on customs revenue collections. Furthermore, these applied tariff measures do *not* include other border charges or taxes, including safeguards tariffs and antidumping duties that we describe in Section 3.2 below. Second, throughout this analysis we only utilize simple average tariffs; the alternative of constructing trade-weighted average tariffs can lead to the well-known problem of downward bias due to products with high tariffs receiving low weights (because of small import volumes). The intuition is provided by the limiting example of a prohibitive tariff level which receives zero weight in the averaging calculation. Third, the calculations in Table 1 derive from data that does include consideration of ad valorem equivalent estimates for products over which the import tariff that the country applies is a specific duty. We describe data on the prevalence of import tariffs applied as specific duties in Section 3.1 below. In other areas of this chapter - such as when we wish to focus on changes in tariffs arising from *policy decisions* - we deliberately drop from consideration the products for which tariffs are applied as specific duties.

⁹We note that an MFN tariff is legally a meaningless concept for countries such as Ethiopia and Iran as they are not WTO members and are thus not legally bound by a multilateral trade agreement to impose a nondiscriminatory import tariff. This similarly holds for the ‘MFN’ tariffs (reported below) applied prior to GATT/WTO membership for countries that ultimately become members. Furthermore, our use of the word ‘legal’ to describe WTO tariff commitments refers to treaty obligations that countries voluntarily assume, as enforcement of WTO ‘law’ is by the mutual agreement of all parties, as is described in greater detail elsewhere in this volume.

¹⁰Turkey and the European Union do not have a ‘complete’ customs union as agriculture is excluded entirely, and there are special provisions for steel, textile, and apparel products. Furthermore, as we describe in more detail below,

The second column in Table 1 reveals that even for the economies that have agreed to bind the vast majority of their tariffs under the WTO, there is wide variation in the average upper limit. While the first column identifies 14 different economies that applied MFN tariffs that averaged to less than 10 percent, only Canada, China, the EU, Japan, Russia, Ukraine, and the US have undertaken WTO legal commitments to *keep* those tariffs at an average of 10 percent or less. And while average applied and WTO binding rates are almost identical for China, the EU, Japan, Russia, and the US, most emerging economies and developing countries have average WTO binding rates that are significantly higher than their average applied MFN rates.¹¹ Within the G20 emerging economies, the existence of this ‘water’ in the tariffs or ‘binding overhang’ is particularly prominent, as average bindings may be 2 to 5 times higher than applied rates. For other developing countries listed in Table 1 such as Bangladesh and Nigeria, the average binding commitment is more than 100 percentage points higher than the MFN applied rate in 2013.

The last three columns in Table 1 present information on the products covered by very high tariffs of over 15 percent, or ‘tariff peaks.’ For example, even though the United States has an applied MFN tariff that averages 3.4 percent, 2.7 percent of its imported products in 2013 faced MFN applied tariffs of 15 percent or more. The peak US tariff was 350 percent. For Canada, another country with low average applied tariffs, nearly 7 percent of its imported products in 2013 faced tariffs of over 15 percent, with a peak rate of 484 percent. For emerging and developing countries, even larger shares of imported products are subject to these tariff peaks, though interestingly the maximum rate that a number of these countries (e.g., Argentina, Brazil, China, Bangladesh, Burma, Ethiopia, Nigeria, Philippines) apply against any imported product is significantly lower than the maximum rate imposed by each of the G20 high income economies.

As we detail below, research seeking to understand the variation in MFN applied tariffs has been an important topic for a number of different areas of recent empirical work.¹² Bagwell and Staiger (2011) and Ludema and Mayda (2013) use the MFN applied rates of WTO members to empirically investigate implications of the terms-of-trade theory of trade agreements under a modeling framework in which these tariffs may represent ‘cooperative’ levels.¹³ Broda, Limão

the countries also independently negotiate their own free trade agreements and they administer their own temporary trade barrier policies independently; thus the external trade policy toward third parties in practice is not perfectly ‘common’ in a number of important ways. Bown (2014a) presents a discussion, but the legal-economic sources of these types of divergences under a customs union are an important and under-studied area of research. See also Limão and Tovar (2011).

¹¹Average applied rates are higher than average binding rates for an economy like the European Union in Table 1 because of a combination of the procedure of averaging from product-level data and of the computation of ad valorem equivalents for products’ rates applied as specific duties (in a given year, reflecting current prices) versus binding rates. For Russia, an additional contributor to the fact that its applied MFN rates were higher than its binding rates is likely due to its relatively recent WTO accession and it has not yet fully phased in all of its associated applied MFN tariff reductions.

¹²Bown (2015) presents a related assessment of the applied MFN tariffs for different categories of developing countries; including WTO non-members, those whose products are largely ‘unbound’, and those with substantial levels of tariff binding overhang.

¹³See also Nicita, Olarreaga, and Silva (2014) and Beshkar, Bond and Rho (2015) that pursue different implications of the terms-of-trade theory of trade agreements by exploiting variation in the difference between MFN applied rates and WTO tariff bindings.

and Weinstein (2008), on the other hand, use the MFN applied rates to examine two different empirical contexts. First, they examine variation in applied MFN tariffs for a number of WTO *non-member* countries in order to assess the relevance of the terms-of-trade theory for tariff formulation for countries unconstrained by trade agreements that may attempt to exploit market power and implement ‘noncooperative’ or Nash tariffs. Second, they also show how the MFN applied rate of a particularly prominent WTO member - the United States - does not appear influenced by terms-of-trade considerations, which is consistent with it being viewed as the cooperative tariff policy under the WTO.

2.1.2 MFN applied tariffs across sectors, and within-sectors by end-use

In addition to significant heterogeneity in average applied MFN tariffs across countries, next consider potential heterogeneity across sectors within countries. Figure 2 begins by providing additional detail on average applied MFN rates and legal bindings for three groups of policy-imposing countries - the G20 high-income, the G20 emerging, and the other developing countries as classified in Table 1 - and sixteen industries.¹⁴

Figure 2 illustrates a number of relatively clear patterns. First, high-income countries have lower average applied MFN tariffs than emerging economies and other developing countries almost universally across sectors. Second, across country groupings, the average applied MFN tariffs are also typically higher in sectors such as agriculture (animal products, vegetable products, and foodstuffs), textiles and apparel, and footwear. Third, while the high-income economies have relatively little binding overhang in any sector, there is evidence of significant water in the bindings for emerging and developing countries across all sectors. However, the greatest amount of overhang is in agriculture, suggesting that this is the sector in which emerging and developing economies have the greatest discretion to raise tariffs while maintaining their WTO commitments.¹⁵

Figure 3 presents an alternative approach to the tariff data by examining the share of HS06 imported products within a sector for which the MFN applied rate is defined as being a tariff peak, or a tariff applied at or above the threshold level of 15 percent. For high-income economies, nearly 30 percent of products in the foodstuffs sector had an applied MFN tariff in 2013 of 15 percent or more. Similar peak tariffs can be found for high-income economies in 18 percent of products in the animal sector, 15 percent in footwear, 13 percent in vegetables, and 6 percent in textiles and apparel. The distribution of peak tariffs across sectors is quite similar for emerging and developing countries, it is simply that in emerging and developing countries the share of products within each sector that has such high tariffs is significantly larger. Nearly 70 percent of footwear products in developing countries had applied MFN tariffs at rates that are higher than 15 percent in 2013.

¹⁴Industry classification is given in Table Appendix B.

¹⁵Some countries have used this flexibility to make relatively high frequency - e.g., weekly, monthly, etc. - changes within years (and thus potentially not captured in the annual data) to applied MFN tariffs on agricultural products, perhaps in light of both political economy concerns and the uncertainty of yields due to weather-related shocks and growing seasons. Recent WTO disputes challenging such policies imposed by Chile and Peru are described in Bagwell and Sykes (2005a) and Saggi and Wu (2016), respectively. More generally on agricultural tariffs, see Hoekman, Ng, and Olarreaga (2002, 2004).

Our next diagnostic considers potential differences in applied MFN tariff rates depending on the end-use of the product; here we rely on the Broad Economic Categories (BEC) characterization that maps the underlying HS06 products into two categories: final goods (for consumption) and intermediate inputs.¹⁶ The data in Figure 4 provide some evidence of ‘tariff escalation’ – i.e., that countries tend to apply higher import tariffs on final goods than they apply on intermediate inputs - perhaps to increase domestic value-added into production (and exports) or to affect inclusion in international supply chains. Overall, MFN applied tariffs on final goods average 70-75 percent higher for the G20 high income and emerging economies (and more than 90 percent higher for other developing countries) than the average MFN tariffs that those same countries apply to products classified as intermediate inputs. Within sectors, the Figure 4 evidence of tariff escalation is fairly strong across almost all sectors and country groups as average applied MFN tariffs on final goods are significantly higher than on intermediate goods. The evidence is strongest across sectors for the G20 emerging economies and other developing countries; the evidence of tariff escalation is weakest in high-income economies in sectors such as vegetables, chemicals, wood and wood products, and other miscellaneous products.¹⁷

Finally, we note that an additional source of variation across products within an HS06 category relates to the product’s use. Consider the tariff rate on intermediate inputs in a country which uses a ‘dual import’ or ‘duty drawback’ tariff regime. Such regimes apply different MFN tariff rates for the same product (and from the same foreign source) depending on whether the ultimate *consumer* of the final processed good is domestic or foreign. Under such regimes, imported inputs into a final product designated for export are allowed to enter the economy duty-free (or with the applied MFN tariff being refunded), whereas the same inputs face the normal MFN applied tariff if the input is used to produce a good that could be consumed domestically. Sometimes these systems are administered via a geographic area being designated as an export processing zone; in other instances, the regimes may not be constrained by geography but only by the willingness and ability of firms to comply with national government legal requirements such as customs declarations. While we do not provide data characterizing such schemes, research increasingly investigates their potential impact on a variety of economic activities, especially with China being a prominent example of an export-led major economy that utilizes a special import tariff system in which firms are designated as processing firms or ordinary exporters.¹⁸

2.1.3 MFN applied tariffs over recent history

Next consider the data on changes to applied MFN tariffs over the period covering the tail end of the GATT era and the first decades of the WTO. Table 2 presents a cross section of data across

¹⁶For ease of exposition, we strip out BEC categories of ‘mixed use.’

¹⁷Note that in the minerals and fuel industries, no HS06 products are classified as final goods.

¹⁸See Madani (1999) for an overview of export processing zones. Processing firms are not allowed to sell the goods they produce domestically; they pay zero or low tariff rates on their imported inputs. An ordinary exporting firm producing the same good must pay the applied import tariff rate but faces no constraints on selling goods domestically and abroad. Recent papers have analyzed the productivity implications of these dual tariff structures (Yu, 2015) or the implications for domestic factor demands (Brandt and Morrow, 2015).

our sample of countries for three key years chosen to reveal the impacts of important institutional milestones arising across three decades: 1993, 2003, and 2013.¹⁹ The table also provides information on when (if ever) the country became a member of ('Contracting Party to') the General Agreement on Tariffs and Trade (GATT), as well as when (if ever) the country became a member of the WTO.

For example, for countries that were members of the GATT, the 1993 data in Table 2 reflects their applied MFN 'GATT' tariffs *before* they implemented any changes resulting from the Uruguay Round of negotiations that ushered in the WTO. By 2003, the countries that joined the WTO at its 1995 inception had phased in most of their Uruguay Round tariff liberalization commitments; thus a comparison of 1993 and 2003 for such countries provides a first-order assessment of the impact of the Uruguay Round on average applied MFN tariffs. For China, which joined the WTO through an accession process that concluded in 2001, 1993 and 2003 present data on pre-WTO and post-WTO accession applied MFN tariffs. Similarly, the comparison of 2003 versus 2013 data reveals information on pre-WTO versus post-WTO accession applied MFN tariffs for more recently acceding countries such as Russia (2012), Saudi Arabia (2005), Ukraine (2007) and Vietnam (2008).²⁰ Finally, given that there have not been any further multilateral tariff cuts negotiated between 2003 and 2013, any differences in applied MFN tariffs between those two years for the long-standing GATT/WTO members must reflect the impact of 'something else.'

The Table 2 evidence on changes to applied MFN tariffs for the G20 high-income economies over this extended period is somewhat mixed. Long-standing GATT/WTO members such as the European Union, Japan and the United States already had relatively low MFN applied rates at the end of the GATT period in 1993 at 7.0, 4.4, and 5.6 percent, respectively. These economies cut their average applied tariffs by another 1 to 3 percentage points as a result of the Uruguay Round; nevertheless, given their low initial applied levels, low tariff bindings and resulting lack of 'water' (see again Table 1), applied MFN tariffs for these economies were virtually unchanged between 2003 and 2013. For other high income countries such as Australia and Canada, average applied MFN tariff cuts over the 20 year period have been larger. On the other hand, Korea's average applied MFN import tariff is actually higher in 2013 than it was in 1993. Saudi Arabia's tariff by 2013 is roughly one third of its 1993 level; this largely reflects the commitments it undertook as part of its 2005 WTO accession.

¹⁹We examine this particular period for two reasons. First, we are interested in the highest quality (across country) data on MFN applied tariffs for a consistent classification scheme, and the Harmonized System went into effect in 1988. Thus any attempts to assess changes in tariffs for a period before and after the 1988 threshold will have to confront serious concordance issues that will differ country-by-country, but which will make averaging or examining product level changes nontrivial. Second, despite the Harmonised System (HS) beginning in 1988, data for many countries in our sample does not become routinely available until the early 1990s. Nevertheless, as we describe in further detail below, picking 1993 as a common starting point does miss out on some countries' substantial tariff liberalization periods that may have already begun in the early 1990s (India), 1980s (Argentina, Brazil, Colombia, Mexico), or even earlier. We return to a discussion of changes of MFN tariffs over the 1947-1994 period, where we are forced to rely on alternative data and measures for tariffs, and we discuss the associated caveats of utilization of such data, in a later section.

²⁰Note finally that the data for 2013 in particular in Table 2 may differ from Table 1 as we are now limiting our consideration of products to which the tariff is applied on an ad valorem advice, so as to focus on policy changes and not changes in ad valorem equivalent rates that may arise due to changes in underlying prices.

Table 2 reveals similarly mixed evidence on changes in average MFN applied tariffs across the G20 emerging economies over this period. China and India began the early 1990s with extremely high applied tariffs that still averaged 56.3 and 39.1 percent, respectively; these countries subsequently underwent tariff liberalization reforms and the result is that by 2013 their MFN applied rates averaged only 9.6 and 13.3 percent. Other countries such as Indonesia, Mexico, and South Africa also had much lower applied MFN tariffs in 2013 relative to 1993. However, countries like Argentina, Brazil, and Turkey began the period with relatively low applied MFN tariffs and the average levels of their applied MFN import tariffs in 2013 are not much different than they were in 2003 or even 1993, and in some instances, they are even a bit higher. Finally, while Russia's applied MFN import tariffs did not change much on average over these decades; nevertheless, Russia did enter the WTO in 2012 and took on legally binding commitments over 100 percent of those tariffs at relatively low rates (see again Table 1, column 2), some of which Russia is still phasing in.

Finally, the lower third of Table 2 indicates that the sample of other developing countries has, for the most part, engaged in a general period of tariff liberalization over these twenty years. For all of the countries with available data, applied MFN tariffs in 2013 were significantly lower than they were in 1993. A number of these developing countries cut their average applied MFN tariffs by 20 percentage points or more from their levels in the early 1990s, when the average applied MFN tariff for Nigeria was 34.4 percent, for Kenya was 35.2 percent, for Thailand was 45.7 percent, for Pakistan was 50.8 percent, and for Bangladesh was 82.8 percent.

While the data in Table 2 suggest that tariffs were generally lower (or at least not much higher) in 2013 relative to 1993 for most of these 31 economies, the next question concerns the inter-temporal path of this liberalization. Did liberalization over this period take place gradually, or were tariff cuts implemented in large increments? Whether continuous or discrete, was the liberalization a continual downward process or were there significant fluctuations so that tariffs fell initially, then increased (as policies were reversed), before falling again?

Figure 5 begins to address these questions by providing additional information on the year-to-year changes in levels of average applied MFN tariff rates across the three country groups over the WTO period of 1996-2013. For the United States, which began the period with extreme low applied MFN tariffs on average, applied MFN tariffs declined by an average of 0.3 percentage points each in 1996, 1997, 1998, and 1999 as it implemented its Uruguay Round commitments. After 2000, however, there is little annual change to the US average applied MFN tariff. The same basic pattern holds for Australia and Japan; for Canada and the EU, applied MFN tariff cuts were larger on average in 1996 and 1998 than 1997 and 1999; nevertheless, after 2000 applied MFN tariffs for these economies were also mostly unchanged. The main exception during this period among the high-income G20 economies was Korea, whose average applied MFN tariff increased by 5.2 percentage points in 1996 immediately preceding the Asian Financial Crisis, declined by 3.9 percentage points in 1999, increased by 3.5 percentage points in 2000, and only since has remained relatively stable, albeit at a high (relative to the other high-income G20 economies) average level.

For G20 emerging and other developing economies, the data on annual changes in average

applied MFN tariffs illustrated in Figure 5 suggests a bit more variation. For example, the average applied MFN tariffs in Argentina and Brazil increased by 2.4 and 2.8 percentage points, respectively, in 1998, in part to address a recession associated with the contagion of the Asian Financial Crisis that had spread to Brazil. They cut those tariffs by an average of 2.3 and 1.4 percentage points, respectively, in 2001, in the lead-up to Argentina's abandonment of its fixed exchange rate regime and default in 2002. Turkey similarly had fluctuations in its average applied MFN tariff that were greater than 1 percentage point per year for four out of five years during 1999-2003 in the face of its own financial crisis. India, however, had the greatest year-to-year fluctuations among the G20 emerging economies during this period. In 10 out of the 11 years between 2000 and 2010 India's average applied MFN tariffs changed by at least 1 percentage point: in three of those years (2000, 2004, 2009), India's average tariffs increased considerably, and in six of those years, the tariffs decreased considerably. Finally, for the other developing countries presented in the lower panel of Figure 5, there is evidence of even more annual variation in applied tariffs; nevertheless, the largest annual changes are primarily episodes of tariff cuts, some of which were associated with WTO accession (e.g., Vietnam in 2008).

To what extent are the data on annual changes in average applied MFN tariffs capturing the underlying changes taking place at the product level? To investigate the possibility that changes in average tariffs may not fully capture the churning taking place at the product level - i.e., sizeable tariff increases for some products being offset by tariff decreases for others - Figure 6 plots the share of HS06 products for each country for which the applied MFN tariff *changed* from the previous year by a 'sizeable' threshold level of 5 percentage points or more. For the G20 high incomes economies, there are relatively few HS06 products during this period for which applied MFN tariffs changed by such a large amount; their incidence is largely concentrated into downward movements associated with implementation of Uruguay Round commitments (e.g., Canada in 1996 and 1998) or WTO accession (e.g., Saudi Arabia in 2005).²¹

For the G20 emerging economies and other developing countries in Figure 6, however, there is some additional evidence of product-level fluctuations and year-to-year change in the applied MFN tariff. Argentina, for example, adjusted the MFN applied tariff on more than 12 percent of its products by 5 percentage points or more each year between 2001 and 2004 in the period around its economic crisis. Turkey adjusted the MFN applied tariff on more than 5 percent of its products by 5 percentage points in five different years between 1996 and 2003. Even larger year-to-year fluctuations have taken place for a number of the other developing countries shown in the lowest panel of Figure 6, including a few that we have omitted from the Figure (but included in the Notes) for ease of exposition and scaling.

One potentially surprising outcome arising from Figures 5 and 6, however, involves the Great Recession period of 2008-2009. The evidence from these figures is that for these 31 countries there was not a significant increase in average tariffs or share of product lines with sizeable changes in ap-

²¹While not shown in the Figure because it is an outlier, in 2002 during its WTO accession negotiations, Saudi Arabia also changed 86 percent of its tariff lines by 5 percentage points or more.

plied tariffs during this most recent crisis. We review the research-to-date on potential explanations in the next section.²²

2.1.4 Research on MFN tariffs

Researchers have carried out a number of important studies that rely heavily on cross-sectional, cross-country, and panel data on MFN tariffs.²³ The snapshot of the data characterized by Figure 5 and Figure 6 and our discussion in the last section already point to complications likely to arise from research using such data to understand the determinants of applied MFN tariffs or tariff bindings either across countries or within countries over time. Seeking to explain cross-sectional differences within a country (e.g., see again Figures 2, 3, and 4) based on any underlying, micro-founded theoretical determinants such as product-level elasticities, import penetration, economic shocks, or redistributive elements tied to political-economy, must also confront the environmental reality that the data generation process is also significantly influenced by (a) country-specific features, some of which are institutional (e.g., timing of GATT/WTO accession and taking on of commitments), others of which may be tied to aggregate-level (unemployment, growth) shocks and (exchange rate regime) flexibilities on non-trade-related policy instruments; (b) legal constraints arising under the GATT/WTO multilateral system, such as the ‘bindingness’ (or fluctuations in water) stemming from tariff caps; (c) legal flexibilities arising under the GATT/WTO multilateral system, such as access to alternative (substitutable) trade policies, including the temporary trade barriers of antidumping, safeguards, and countervailing duties, and (d) other non-MFN trade policy changes arising through preference regimes, free trade areas, and customs unions. This section describes a number of recent research contributions that have begun to tackle these issues.

The impact of multilateral negotiations (or the lack thereof) on MFN tariffs What determines the tariffs set by the countries not involved in the multilateral, GATT/WTO trade agreements? Broda, Limão and Weinstein (2008) use the MFN applied tariff rates for a cross-country sample of non-GATT/WTO member countries and present evidence consistent with the terms-of-trade (or market power) theory for tariff formulation that countries unconstrained by trade agreements may attempt to shift some of the costs of those tariffs (through lower exporter-received prices) onto trading partners. In our 31 economy sample, the 1993 applied tariff data for countries such as China, Russia, Saudi Arabia, and Ukraine are in the Broda-Limão-Weinstein study of unconstrained/optimal tariff formulation.

For countries that undergo an accession to the WTO, Bagwell and Staiger (2011) empirically

²²To foreshadow a second theme described below, the issue in examining trade policy’s responsiveness to macroeconomic shocks, there is sometimes a shift in the form of the policy instrument being used. Although we do not necessarily observe increases in average ad valorem tariff rates to macro shocks, Bown and Crowley (2013a, 2014) have documented the countercyclical use of other trade policies, specifically temporary trade barriers, in recent decades.

²³Applied tariffs that are imposed not as ad valorem duties but as specific duties may also have the ad valorem equivalent of the rate change over time alongside changes in prices. We will largely abstract from that issue in this section so as to focus on policy changes, referring again to this when we introduce the data on specific duties more formally in Section 3 below.

investigate the terms-of-trade theory of trade agreements under a framework in which ‘noncooperative’ (Nash) policies are represented by pre-WTO MFN tariffs and ‘cooperative’ (politically optimal) policies are represented by post-WTO accession MFN applied tariffs. Their evidence is consistent with the theory and thus the resulting interpretation is that post-WTO accession policies may reflect the ‘politically optimal’ tariffs and that negotiated entry into the WTO may neutralize concerns associated with the exertion of market power. The only major economy that acceded to the WTO during the Bagwell-Staiger sample period of 1995-2006 which overlaps with our data is China (2001). However, other major economies that have subsequently acceded to the WTO, Democratic Republic of Congo (1997), Vietnam (2007), Ukraine (2008), and Russia (2012), are included in our sample.

For a number of other countries, the MFN tariffs in effect during the post-1995 WTO period reflect not only the latest results of negotiations that took place under the Uruguay Round, but they also reflect a legacy of relatively low tariffs at the start of the Round resulting from seven earlier GATT rounds of multilateral negotiations occurring since 1947. To examine the implications of the terms-of-trade theory for such long-term members of the GATT/WTO, Ludema and Mayda (2013) develop a theory and an empirical investigation that explores the role of endogenous participation of exporting countries. One of their key contributions is to provide an explanation for where the GATT/WTO has failed to achieve success in lowering tariffs (and internalizing terms of trade externalities). Indeed, their results concerning the relatively high remaining applied MFN tariffs across countries in sectors such as agriculture, textiles and apparel, and footwear (see again Figure 2, especially for the G20 high-income economies), can be linked to diffuse exporting interests, and the lack of concentration across countries. Thus terms-of-trade effects may not get internalized in these sectors due to the standard free-rider problem that exporting countries are unable to organize sufficiently to get the importing country to come to the negotiating table in order to engage in reciprocal tariff liberalization. The Ludema-Mayda sample includes 13 economies that overlap with our set, including Argentina, Australia, Brazil, Canada, Colombia, European Union, India, Indonesia, Japan, Korea, Mexico, Thailand and the United States.²⁴

The impact of preferential tariff liberalization on MFN tariffs What is the effect on MFN tariffs when only subsets of countries lower their tariffs toward one another, under one of the GATT/WTO-permitted ‘exceptions’ to MFN that we describe below in Section 2.2? Do such preferences serve as a ‘stumbling block’ to additional MFN liberalization, or a ‘building block’ to future MFN applied tariff cuts (Bhagwati, 1991)? While we defer until the next section our analysis of the data on preferential, bilateral tariffs, here we highlight that the literature to date for the impact on MFN tariffs suggests that the evidence is mixed.

In two country-specific studies, Limão (2006) for the United States and Karacaovali and Limão

²⁴In a distinct approach using quantitative modeling techniques, Ossa (2014) constructs counterfactual estimates for the size of Nash (noncooperative) tariffs in a model featuring seven regions (including the US, EU, Japan, China, India, Brazil, and rest of the world) and computes the median to be 58.1 percent, which is even somewhat higher than even the pre-GATT level tariffs that Bown and Irwin (2015) estimate for the US, EU and Japan to be closer to 22 percent.

(2008) for the European Union, there is evidence that the free trade agreements that these economies had in place prior to the conclusion of the Uruguay Round significantly limited the cross-sectional pattern of MFN tariff cutting arising as a result of the Round. In particular, MFN tariffs were cut less as a result of the Uruguay Round for products with positive imports from PTA partners relative to similar products from which imports from PTA partners were zero.

On the other hand, Estevaderordal, Freund and Ornelas (2008) present a cross-country study for a group of 10 Latin American economies over 1990-2001 and show that preferential tariff liberalization in the region early in the period was subsequently followed by applied MFN tariff liberalization. One potential explanation for the differences with the Limão (2006) and Karacaovali and Limão (2008) results is that these Latin American countries were granting much larger preference margins (the difference between the applied MFN tariff and the applied preferential tariff) than in the US and EU cases. As such, Latin American governments may have cut MFN tariffs as well so as to avoid the potentially harmful economic distortions that may arise through trade diversion (Viner, 1950). A second potential explanation behind the EU and US results described earlier is their FTAs may also be ‘special,’ in the sense that the preferences were granted, frequently to small countries, and with the intention of the preference margin serving as a form of compensation for non-trade related objectives in cooperation between the countries.²⁵ One final note about the cross-country results of Estevaderordal-Freund-Ornelas is that the many-country source allows them to identify where the results tend to break down. In particular, the ‘building block’ results only hold for the FTA countries in their sample (e.g., in our 31 economies sample, these include Colombia and Mexico) and they do not hold for the economically important economies of Argentina and Brazil that have a customs unions that includes a supposedly common external MFN applied tariff policy.²⁶

The impact of real exchange rate, business cycle, and other aggregate-level shocks on MFN tariffs Dating back to the experience of the Great Depression in the 1930s, there is a presumption that macroeconomic shocks can have significant effects on trade policy.²⁷ Indeed, Irwin (2012) attributes much of the protectionism arising after the onset of the Great Depression to the inflexibility of exchange rates due to the gold standard; sharp real exchange rate appreciations that decrease the relative price of imports across the board may intensify import competition facing domestic producers and increase demands for applied tariffs. There is also an historical literature, likely motivated by the 1929 stock-market crash and the US imposition of the Smoot-Hawley tariffs in 1930 (see also Irwin, 2011), that US tariffs are countercyclical (Bohara and Kaempfer 1991;

²⁵For a theory behind this result associated with the countries like the US seeking to retain preference margins for certain FTA partners in order to compensate them for non-trade objectives, such as higher environmental or labor standards, intellectual property rights protection, or cooperation in fighting the ‘war on drugs’, see Limão (2007).

²⁶Calvo-Pardo, Freund and Ornelas (2011) also provide evidence of the building block effect for the ASEAN Free Trade Agreement. In a more recent study of the Central American Free Trade Agreement-Dominican Republic (CAFTA-DR) that involves five central American countries signing an FTA with the United States in 2004, Tovar (2012) finds evidence first of an initial stumbling block effect of preferential tariff reductions on subsequent applied MFN tariffs that is then followed by a (weaker) subsequent building block effect.

²⁷On the other hand, there is not a robust theoretical literature linking business cycles and import protection. An exception is Bagwell and Staiger (2003).

Cassing, McKeown and Ochs 1986) and rise following periods of recession (negative or weak real GDP growth, increases in unemployment), high inflation, etc.²⁸

As we have already inferred from our analysis of the cross-country data presented in Figures 5 and 6, despite the massive and simultaneous macroeconomic contraction that took place globally during the Great Recession of 2008-2009, most countries did not substantially increase their applied MFN tariff protection. Research that examines changes in applied MFN tariffs during the crisis include Kee, Neagu and Nicita (2013), Rose (2013), Gawande, Hoekman and Cui (2015), and Foletti, Fugazza, Nicita and Olarreaga (2011). Nevertheless, as we further investigate in more detail below, the fact that applied MFN tariffs did not increase universally during the Great Recession does not necessarily imply that import protection overall is no longer sensitive to macroeconomic fluctuations. It could have been that countries did not respond with applied MFN tariff increases because of the success of WTO disciplines on tariff bindings in particular, but then any domestic demands for new import protection were pushed toward other potentially WTO-consistent trade policy instruments, including those that we introduce below in Section 3.2.²⁹

Exogenous unilateral liberalization of MFN tariffs The environment created by a country that has changed its applied MFN tariffs has been used in a number of research settings; the environment, however, frequently depends on institutional or even country-time-specific factors. One particular experience worth highlighting is India's unilateral liberalization of the 1990s, as it is another environment that has turned out to be a useful laboratory for conducting economic research.

Topalova and Khandelwal (2011), for example, find that India's MFN tariffs applied during the late 1990s were unrelated to standard political-economy determinants of trade policy. This is an important empirical result in that it establishes India's IMF-mandated tariff cuts associated with its 1991-92 macroeconomic crisis and stand-alone agreement as a plausibly 'exogenous' shock and environment suited to assess a number of important research questions related to the impact of globalization on incentives and micro-level economic activity.³⁰ Bown and Tovar (2011) find supporting evidence of this result by showing how India's applied MFN tariffs set in 1990 are consistent with the structural framework of the Grossman and Helpman (1994) model, but that they then become inconsistent with the model for the MFN tariffs applied in 2000-2002.³¹

²⁸Nevertheless, questions arise from papers in this literature which rely on estimates for tariffs based on collections of duties as a share of dutiable imports. We return to this and other aggregation and measurement issues below.

²⁹As we discuss more formally below, Bown and Crowley (2013a, 2014) consider the time-varying constraints on a country's applied MFN tariffs imposed by WTO tariff binding commitments as a contributing factor behind the potential substitution toward use of other trade policies in response to aggregate-level fluctuations.

³⁰The Indian empirical environment in the 1990s and this arguably exogenous import tariff shock has been used to study the impact of globalization on schooling and human capital acquisition (Edmonds, Pavcnik and Topalova, 2010), firm productivity (Krishna and Mitra 1998; Topalova and Khandelwal, 2011), use of intermediate inputs (Goldberg, Khandelwal, Pavcnik and Topalova, 2010) product switching (Goldberg, Khandelwal, Pavcnik and Topalova, 2010), and customs evasion (Mishra, Subramanian, and Topalova, 2008) amongst others.

³¹Bown and Tovar (2011) then go on to show how, when the measures of import protection in 2000-2002 include not only applied MFN tariffs but also the temporary trade barrier policies of antidumping and safeguards, the empirical consistency with the Grossman and Helpman (1994) framework is restored.

2.2 Preferential Trading Arrangements

By most accounts, preferential trading arrangements (PTAs) have exploded in number since the late 1980s. Furthermore, the WTO (2011), for example, finds that the share of intra-PTA trade in world trade has nearly doubled from 18 percent in 1990 to 35 percent in 2008; including intra-EU trade in these calculations leads to an increase from 28 percent in 1990 to 51 percent in 2008. However, in a detailed study of PTAs involving 85 countries and 90 percent of world trade in 2007 that matches bilateral imports to tariffs at the product level, the WTO (2011) also reports that only 16 percent of global trade was eligible for any preferential tariffs (30 percent if intra-EU trade is included). Put differently, this would imply that 84 percent (70 percent) of world merchandise trade was still taking place on an MFN basis.

To shed light on these apparent contradictions, this section examines the implications of preferential trading arrangements for the empirical landscape of bilateral tariff setting behavior. We assess the different forms of these preferential trading arrangements, what policy-imposing countries utilize them, and to whom their bilateral tariff preferences are being extended. We reveal information on the comprehensiveness of their product coverage as well as the size of the resulting bilateral tariff preference margins. This section explores the various forms of preferential trading arrangements that arise in the trading system and attempts to characterize some of their resulting implications for ad valorem tariffs.

We organize our discussion by first introducing the legal origins between PTAs under the GATT/WTO system before then introducing the major examples of PTAs currently in force in the global economy; this includes not only free trade agreements and customs unions, but also unilateral preference schemes, and lesser-known arrangements referred to as partial scope arrangements. We then turn to the data in attempt to more formally characterize key features of the bilateral tariffs arising under the various forms of these preferential trading arrangements. Not unexpectedly, given this ‘spaghetti bowl’ of preferential trading arrangements, it is well beyond our scope to provide a comprehensive empirical assessment of these preferences. Our more modest approach is to first characterize the variation of tariff preferences that the United States offers the other 30 trading partners in the sample. We then briefly compare some of the characteristics of US tariff preferences to those offered by other high income and emerging economies. Overall, while we refrain from attempting to assess the economic importance of PTAs, we do conclude that bilateral tariff preferences offer an important additional margin through which substantial heterogeneity in applied trade policy arises.

2.2.1 Legal exceptions and major agreements

The WTO mandates that members apply MFN tariffs on a nondiscriminatory basis toward imports from all other WTO members, unless there is a legally permitted exception. The legal provisions of the system have evolved since the GATT’s 1947 inception so as to allow a variety of different forms of preferential trading arrangements in which WTO members can be permitted to offer lower-than-MFN import tariffs.

One way to characterize the different preferential arrangements is through the form of their GATT-authorized legal exception. While such a characterization may not be the most useful for economic analysis, understanding the evolution of these legal distinctions also helps provide historical context. Thus we first characterize the two primary legal channels before turning to the economics and the data.³²

The original GATT 1947's Article XXIV provided the first legal exception permitting preferential tariffs by allowing formation of free trade agreements and customs unions, provided that such arrangements covered substantially all trade.³³ Historians trace the motivation for this exception to secret free trade negotiations between the US and Canada that were taking place at the same time as the GATT negotiations; nevertheless, such talks failed to result in a bilateral agreement (Chase, 2006). The foremost example of the GATT's MFN tariff loophole being utilized in practice was the post-World War II process of European integration. This began with the European Coal and Steel Community (ECSC), created by the Treaty of Paris in 1951, which established a common market for coal and steel between Belgium, France, West Germany, Italy, the Netherlands and Luxembourg. The Treaty of Rome in 1957 subsequently broadened the coverage to not only a full free trade agreement (no tariffs on goods shipped between member countries), but also a customs union that is defined as a common external tariff on imports deriving from third countries. The European Economic Community was expanded from the original six members to nine in 1973, with the accession of Denmark, Ireland and the United Kingdom; multiple accessions over the decades have since resulted in the European Union's configuration of 28 member countries as of 2013.

As the GATT trading system evolved through the 1950s and 1960s, however, the scope of the Article XXIV exception turned out to be too restrictive for the needs of the full (and expanding) GATT membership. Thus, in 1979, the Contracting Parties enacted a second legal exception to MFN under what was called the 'Enabling Clause', in which the opening paragraph explicitly allows that "[GATT] contracting parties may accord differential and more favourable treatment to developing countries, without according such treatment to other contracting parties". The GATT contracting parties have subsequently implemented through two different ways this 'differential and more favourable treatment' arising under the Enabling Clause as a loosening the 'substantially all trade' requirement of GATT Article XXIV: (1) by allowing *non-reciprocal* preferential agreements, and (2) by allowing reciprocal preferential agreements that would fall *well short of comprehensive* product coverage.

Eliminating any requirement that preferential tariff arrangements be *reciprocal* was a way to make 'GATT-legal' the ongoing practice by which higher-income countries were offering unilateral tariff preferences to lower income economies. In 1968, the United Nations Conference on Trade and

³²A third category that is sometimes utilized is the request and granting of a formal GATT/WTO waiver that would permit preferences that would otherwise violate MFN treatment. For example, in 2010, the EU requested and was granted a WTO waiver to offer additional tariff preferences for 75 products to Pakistan after a period of devastating floods.

³³Throughout the chapter we refer to the formal GATT legal 'Articles' that make these exceptions possible, or which define certain rules. In the Appendix, we provide Table Appendix A, which is a summary linking each of the key GATT Articles that we cover to the main economic policies, exceptions, or concepts that they address.

Development (UNCTAD) had recommended the creation of a Generalised System of Preferences (GSP) whereby high-income country importers would offer lower-income country exporters lower-than-MFN tariffs for their traded goods. In 1971, the European Community enacted its first GSP program, and the US offered its first program in 1974. Before the formal Enabling Clause created a permanent exemption from MFN for such programs in 1979, these programs had been made GATT-consistent through the request and granting of temporary waivers beginning in 1971.

While perhaps unintended, the Enabling Clause has also subsequently resulted in a number of preferential trading arrangements whereby two (or more countries) offer lower-than-MFN tariffs toward one another, and yet these tariffs apply to much less than 100 percent of tradable products. Interestingly, a number of developing-country only free trade agreements and customs unions have been notified to the GATT/WTO under the Enabling Clause instead of the GATT's Article XXIV; this may be because the Enabling Clause does not require such agreements to cover substantially all trade. Second, this exception has also resulted in what are referred to as 'partial scope agreements' (PSAs) in which one or more developing countries offers tariff preferences toward other developing countries, but only for a small set of products. Since these PSAs frequently allow countries substantial discretion over the product list for which tariff preferences will be made available, PSAs may have more in common with a loose collection of unilateral preference programs than many of the relatively comprehensive (and reciprocal) developing country FTAs that nevertheless also notified under the Enabling Clause. For these reasons, an alternative and more economics-based characterization of these different preferential trading arrangements may focus less on the particular legal channel through which the exception has been notified to the GATT/WTO and more on the comprehensiveness of the product coverage and the reciprocal nature of the agreement.

As of 2015, more than 250 of what the WTO refers to as 'regional trade agreements' (free trade agreements, customs unions, partial scope agreements) covering international trade in goods have been notified and were in force (WTO, 2015a); additionally, WTO members were offering nearly 30 different unilateral preference programs (WTO, 2015b).³⁴

Table 3 lists a number of prominent examples of each type of program between pairs of countries in our sample of 31 major economies. The most common form of preferential arrangement is a free trade agreement (FTA). The United States is involved in a number of FTAs, including NAFTA (with Canada and Mexico), and bilateral FTAs with Australia, Colombia, and Korea. The European Union with its 28 member countries is an example of a customs union. The EU also has a separate customs union with Turkey (sharing a common external MFN tariff toward third countries), and the EU has a number of FTAs (not customs unions) with other countries including Colombia, Egypt, Korea, Mexico, and South Africa.

Groups of developing and emerging economies have also formed free trade agreements or cus-

³⁴Given that multiple agreements or preference schemes frequently apply to the same bilateral tariff relationship for a given product, it is difficult to interpret the economic meaning of the number of agreements or programs in effect. For example, within the regional trade agreement figures, Thailand is part of the original ASEAN agreement; ASEAN has an FTA with Australia and Thailand has its own bilateral FTA with Australia. A separate example of redundancy in unilateral preference programs is some policy-imposing countries make exporters from a certain country eligible for multiple unilateral schemes.

toms unions between themselves - i.e., without involvement of high-income economies. The Southern Common Market (MERCOSUR) is a customs union between Argentina, Brazil, Paraguay and Uruguay. MERCOSUR itself has also negotiated a less-than-comprehensive (bilateral) partial scope agreement with India. A prominent example of a primarily developing economy FTA is the Association of Southeast Asian Nations (ASEAN) which involves Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. ASEAN has subsequently negotiated FTAs with a number of additional countries, including Japan, Australia, China, India and Korea. Note, however, that such agreements are frequently referred to as ‘hub and spoke’ agreements - e.g., Japan, China and Korea each had a bilateral FTA with ASEAN but they did not (as of 2015) have separate free trade agreements in force with each other.³⁵ Furthermore, the East African Community is a customs union between Burundi, Kenya, Rwanda, Tanzania, and Uganda. The Common Market for Eastern and Southern Africa (COMESA) is a free trade agreement between 19 countries in Africa (including DR Congo, Egypt, Ethiopia and Kenya) that launched a customs union in 2009.

Other examples of partial scope agreements include the Asia-Pacific Trade Agreement (APTA) and Global System of Trade Preferences (GSTP). There were 43 participants in the most recent GSTP program (including Argentina, Brazil, Egypt, India, Indonesia, Nigeria, and others), and the current signatories of APTA include Bangladesh, China, India, Laos, Korea, and Sri Lanka. A country involved in these agreements typically submits a list of products - ranging from a few dozen to a few hundred - over which it offers preferential tariffs to all other signatories to the agreement.

Finally, the lower rows of Table 3 describe a number of unilateral preference schemes in force as of 2015. Seven different economies offered preferences to developing economies via their own implementation of the Generalized System of Preferences - whereby the preference-granting country decides unilaterally what trading partners and what products are on the list. Furthermore, the United States and European Union offer other unilateral preference programs in addition to GSP such as the African Growth and Opportunities Act (AGOA) offered by the US, and an additional set of tariff preferences (covering 75 products) that the EU offered to Pakistan in response to devastating floods in 2010. China, Korea, India and Thailand also have programs whereby they offer tariff preferences over a specified set of products but only to a smaller set of imports arising from least developed countries (LDCs).

2.2.2 Tariff preferences offered by the United States

We begin our analysis of the bilateral tariff data with an examination of the various ways that the United States offered different preferential trade arrangements to 30 other (exporting) economies. The bilateral tariff data utilized in this section is available from 2014.³⁶

³⁵However, Korea and China did offer some preferences toward one another as they were both signatories to the Asia-Pacific Trade Agreement (APTA), a partial scope agreement. China and Korea announced the formation of a new FTA in June 2015, but it was not yet in force by the end of the year.

³⁶Due to the limited availability of ad valorem equivalent estimates for the bilateral (and some of the applied MFN) tariffs applied as specific duties, this section only relies on the products for which tariffs are imposed as ad

A common way to define the scope of potential preference availability is to simply identify the number of products for which importing country applies a positive MFN tariff. In 2014 at the HS06 product level, the US had applied MFN tariffs that were greater than zero in 58.0 percent of imported products. We refer to these as the United States' 'preference possible' products. No tariff preference was possible by definition for the other 42.0 percent of US imported products because their applied MFN tariff was equivalent to zero. Put differently, the preferential tariff component of US FTAs is irrelevant for the 42 percent of imported products that arrive into the US market under an MFN applied tariff rate of zero.

The top panel of Figure 7 provides information for the United States' share of these preference possible products for which it actually granted a bilateral tariff preference in 2014. As previously observed in Table 3, the United States offers some bilateral tariff preferences to countries via free trade agreements including NAFTA (with Canada and Mexico), and bilateral FTAs with Australia, Colombia and Korea. The US offered a lower-than-MFN tariff in 2014 for close to 100 percent of preference possible products to each of these countries. In the few instances in which a product was not offered a bilateral tariff preference, it is typically associated with the more recent agreements (Colombia, Korea) that were not yet fully phased in.

US trading partners also receive lower-than-MFN applied tariffs under unilateral preferences offerings. In 2014, the United States offered tariff preferences to trading partners under a number of different unilateral programs; for the trading partners in our sample, this includes the African Growth and Opportunity Act (AGOA) and the Generalized System of Preferences (GSP). The top panel of Figure 7 indicates differences in the comprehensiveness (product coverage) across these US programs. For example, the US offered tariff preferences for more than 80 percent of possible products for African countries such as Kenya or Tanzania (which are eligible for AGOA) and only 65 percent of possible products for Bangladesh or Pakistan (which are eligible for GSP), despite these trading partners having comparable levels of income per capita. Furthermore, because the United States exercises discretion by excluding certain products from certain countries (that are both otherwise part of the program) from being GSP eligible, the US offers Brazil, India, Indonesia, Thailand, Turkey, and Ukraine slightly fewer tariff preferences than other GSP-eligible countries.

The top panel of Figure 7 also reveals that other major economies received zero offerings of US tariff preference products in 2014. This includes the EU, Japan and Vietnam; though these are economies with which the US was seeking comprehensive new free trade agreements in 2014 via the Trans-Pacific Partnership (TPP) negotiations (which includes Japan and Vietnam) and the Transatlantic Trade and Investment Partnership (TTIP) negotiations with the European Union.³⁷

valorem duties. Because the HS06 products with tariffs applied as specific duties have higher (on average) ad valorem equivalent estimates than the HS06 products with tariffs applied as ad valorem duties (see discussion in Section 3.1), these data on average tariffs will differ from other parts of this chapter. We would expect the differences (or potential mismeasurement) to be larger for the economies that are major users of specific duties, such as Russia, US, EU, Japan and India, and in sectors where specific duties are more prominent, including agriculture, footwear, textiles and apparel.

³⁷However, given that the US already had pre-existing FTAs with other countries involved in the TPP negotiations in particular (Australia, Canada, Chile, Mexico, Peru, Singapore) these negotiations were likely to cover significant other issue areas in addition to bilateral tariff reductions.

Other major countries to which the US did not offer preferences in 2014 include Argentina, China, Russia and Saudi Arabia. Interestingly, Argentina and Russia had previously been part of the US GSP program for a number of years; both were recently removed from eligibility. Finally, the United States not only did not offer Burma and Iran any bilateral tariff preferences in 2014, they were not even granted the US's applied MFN tariff rate (despite Burma being a WTO member); the United States had an import ban from both countries in effect in 2014.

Next consider the lower panel of Figure 7, which reports the (simple) US average applied MFN tariff for each trading partner split into two different types of preference possible products - products to which the United States offered or did not offer a lower-than-MFN tariff in the bilateral relationship. First, the simple average applied MFN tariff for US products with strictly positive applied MFN tariffs is 5.1 percent; thus the average preferential tariff 'margin' for products for which preferences are possible is 5.1 percent. As the lower panel indicates, for each partner in the US FTAs, the average applied MFN tariff for the products in which it receives a preference was 5.1 percent. For the handful of products for which the US was not yet offering a preference to Korea in 2014, the average applied MFN was lower than 5.1 percent. For the handful of products for which the US was not yet offering a preference to Australia in 2014, the average applied MFN was higher than 5.1 percent.

When the United States' bilateral tariff preference offerings do not cover 100 percent of products, are preferences typically granted in products that have high or low applied MFN tariffs? Consider the case of exports from Ethiopia, an AGOA-eligible country, and recall from the top panel in Figure 7 that the US offered Ethiopia a tariff preference in 83 percent of preference possible products; the other 17 percent of preference possible products were not granted a tariff preference. The US offers bilateral preferences to Ethiopia in products for which the average applied MFN tariff is only 4.2 percent, whereas the products excluded from the preference program and to which the US would apply the MFN tariff to Ethiopia average 9.3 percent. The figure reveals this as the typical pattern arising under the US AGOA and GSP programs - i.e., the US grants tariff preferences for products where the applied MFN rate is already relatively low. The products that are not granted preferences have higher average applied MFN tariffs that range from 8.5 to 10 percent depending on the trading partner. As a final point, note that because the US offers most bilateral preferences at a rate of zero tariffs (see discussion below); it will turn out that the bilateral preference margin is simply equal to the applied MFN tariff for preferenced products.³⁸

Figure 7 also reveals information on the countries for which the United States does not offer any preferences. In the lower panel, the first 'bin' for each trading partner is empty and the average applied MFN tariff for products in the second bin - i.e., the preference possible products tariffs, but for which no preferences are offered - is 5.1 percent. The exceptions, again, are for Burma and Iran for which the applied MFN tariffs in 2014 were irrelevant because of the US-imposed import ban.

³⁸More generally, the size of the applied bilateral tariff preference margin is equal to the applied MFN tariff minus the applied bilateral tariff.

Table 4 summarizes the United States' bilateral tariff preference offerings to the 30 trading partners in the sample. Again, in these data, the US simple average applied MFN tariff in 2014 was 2.9 percent across all products, and 58.0 percent of imported products had an applied MFN tariff that was positive and were thus preference possible. The right-most columns in the table report details on bilaterally applied tariffs and tariff preferences conditional on the products for which tariff preferences were possible because applied MFN tariffs were greater than zero. While the US simple average MFN tariff for preference-possible products was 5.1 percent, across all trading partners in the sample, the average applied MFN tariff was higher (6.3 percent) for products in which the US granted preferences than products in which the US did not grant preferences (4.2 percent). US applied bilateral tariffs are typically zero when a tariff preference is granted at the HS08 or HS10 level; however, because these data are aggregated to the HS06 level, the average bilateral tariff is slightly positive at 0.1 percent. Thus the average tariff preference *margin* for the products in which the United States actually grants a tariff preference is 4.1 percent (column 8).

Before moving on to a description of the tariff preferences that other countries offer, we make two additional points regarding US tariff preferences that we are not able to capture in the data utilized here.

First, our description of US tariff preferences has focused exclusively on the supply (offerings) side. And admittedly even our data on bilateral tariff offerings are incomplete as they exclude reference to the fact that the US also imposes upper limits (quantitative restrictions) on how much can be imported under some of these unilateral preferences. Refer the US GSP program, these are referred to as competitive needs limits (CNLs), see Blanchard and Hakobyan (2015) for an analysis. The focus on bilateral tariff offerings also does not assess the equilibrium take-up of preferences, as it does not consider demand-side factors. Preference utilization rates describe the equilibrium outcome whereby exporters export a particular product that is eligible for a preference by actually claiming the preferential tariff rate on the customs declaration form, in lieu of simply continuing to pay the (potentially higher) applied MFN tariff. Keck and Lendle (2014) provide an analysis of preference utilization rates for the United States, as well as for the EU, Canada and Australia.³⁹

Finally, like other areas of trade policy, there is additional variation to US tariff preference offerings over time as well as across trading partners and products, especially associated with the preferences that arise under the more discretionary unilateral programs. The list of products for which the US offers preferences can change from year to year; furthermore, as we have seen from Figure 7, certain GSP-eligible exporting countries may have their particular products excluded from GSP that are otherwise GSP eligible. Trading partners can also 'graduate' from a given GSP scheme over time, especially after exceeding certain income-per-capita thresholds. For example, The US graduated Bulgaria and Romania from its GSP program in 2007 (upon their accession to the European Union) and Russia in 2014. Finally, countries can also be kicked out of GSP for political reasons. For example, the United States removed Argentina from its GSP program beginning in 2012 due to Argentina's failure to pay roughly \$300 million in damages since 2005-6

³⁹See also Hakobyan (forthcoming) for a study of the utilization rates for preferences under the US GSP program.

that it owed US investors arising under a foreign direct investment dispute (USTR, 2012).

2.2.3 Tariff preferences offered by the European Union and other major economies

Next we describe some of the similarities and differences in US tariff preference offerings with those granted by other economies.

We begin with the European Union, recalling that the 28 current countries that are EU members not only have a major common internal market of zero tariffs toward trade from one another (an FTA), but they have also ceded their trade policy to a collectivized central authority (the European Commission) in Brussels that sets its common external trade policy vis-à-vis the rest of the world (thus creating a customs union). As we observed in Table 3, the EU also has FTAs with many other countries, including Colombia, Egypt, Mexico, South Africa, and Korea. Furthermore, the EU offers a number of unilateral preference programs under the Enabling Clause, including its own GSP program. One interesting point of comparison is that the EU's list of GSP-eligible countries has historically included China, which has not been a recent GSP recipient under the US program.⁴⁰ Finally, the European Union has also formed a customs union with a non-member Turkey and thus the two share a common external applied MFN tariff vis-à-vis imports third countries.⁴¹

Consider again Table 4 which also summarizes information on the European Union's bilateral tariffs toward external trading partners. In these data, the EU's simple average MFN tariff is 5.6 percent, and 76.0 percent of all HS06 products have non-zero MFN applied tariffs and are thus preference possible. These are both higher than in the United States. The simple average applied MFN tariff for the EU's preference-possible products was 7.3 percent across all trading partners in the sample, and like the United States, the EU's average applied MFN tariff was higher (10.1 percent) for products in which preferences were not granted bilaterally than products in which products were granted (6.6 percent). In the EU, the average applied bilateral tariff when a tariff preference is granted is 1.8 percent. Thus the average tariff preference margin for the products in which the EU actually grants a tariff preference was 4.4 percentage points (column 8).

More generally, a cross-country comparison of the data in Table 4 reveals a number of stylized facts on preferential tariff offerings. First, there is substantial variation as to both the amount of preference possible products that countries have available to offer, given their applied MFN tariff rates, and the amount that they do offer. For example, even within the set of high-income economies in the Group of 20, Saudi Arabia could offer preferences in nearly 90 percent of its products whereas Canada could offer preferences in less than one third of its imported products. On the other hand, Saudi Arabia actually offered preferences in less than 4 percent of the instances in which it had the opportunity, whereas the EU offered preferences in nearly 80 percent of its preference possible

⁴⁰The European Commission did finally graduate China from its GSP program as of 2015.

⁴¹The EU-Turkey customs union is much less complete than the European Union's 'internal' customs union based on a number of different measures. First, recall from Table 1 that the economies have undertaken different levels of tariff binding commitments at the WTO. Second, their average applied MFN rates are different because agriculture is excluded entirely, and there are special provisions for steel, textile, and apparel products. Third, the EU and Turkey each also administer their own temporary trade barrier policies of antidumping, countervailing duties, and safeguards and in some instances even apply these toward imports from each other (Bown, 2014a).

products. For the high-income economies, average applied MFN tariffs are typically higher for products that are not offered preferences relative to those that are offered preferences (comparison of columns 5 and 6). Finally, conditional on a preference being granted, the average bilateral preference margin that high-income economies offer is in the range of 4-5 percentage points.

Because lower income countries typically have more products with applied MFN tariffs that are positive, they have more preference possible products than higher income countries. Nevertheless, Table 4 finds that poorer countries also offer fewer bilateral tariff preferences where they are available (column 3). On the other hand, when poorer countries do offer bilateral tariff preferences, the bilateral tariff preference margin is typically higher, on average, than what high-income countries offer. For example, China can offer a preference in 93.6 percent of products, it only offers a preference in 52.8 percent of its bilateral opportunities, and the average bilateral tariff preference margin when China offers a preference is 8.6 percentage points. The average bilateral tariff preference margin offered by Mexico is 10.1 percentage points, by Argentina is 11.0 percentage points, and by South Africa is 15.2 percentage points. For other developing countries, the average bilateral tariff preference margin can be as high as 19-20 percentage points (Kenya, Tanzania).

Consider finally Figure 8 which provides additional information regarding to whom each of these policy-imposing economies offered bilateral tariff preferences in 2014. As we have already observed for the United States in the bilateral context (see again Figure 7), it granted tariff preferences toward other developing countries in more than 70 percent of preference possible products (primarily through programs such as GSP or AGAO, but also an FTA with Colombia); the US offers certain G20 high-income economies (Canada, Australia, Korea) and G20 emerging economies (Mexico) preferences through NAFTA or a bilateral FTA, and other G20 emerging economies (Brazil, India, Indonesia, Turkey) preferences through GSP.

More generally, the other high-income economies in Figure 8 also tend to provide the largest share of their realized offerings of preference possible products to other developing countries, primarily through GSP-type programs (see again Table 4). The exception is the European Union, which offers an even larger share of preferences to G20 emerging economies.⁴² With the exception of Australia, high-income economies tended to offer the fewest preferences to other high-income economies, relative to their offerings toward G20 emerging economies and other developing countries. Indeed, Japan (and Saudi Arabia) offered zero tariff preferences to other high-income economies in these data. However, this pattern may also change if the TPP (which includes Australia, Canada, Japan, and the US) and TTIP (which includes the EU and US) negotiations result in Article XXIV-type FTAs that include the standard comprehensive bilateral tariff reductions.

There is also substantial variation for the bilateral preferences offered by the G20 emerging economies. Despite having the highest share of ‘preference possible’ products, India offers the fewest bilateral preferences (overall, see again column 3 of Table 4), and most of India’s preferences are offered under partial scope agreements. Argentina and Brazil also tend to offer relatively few

⁴²Recall the EU’s FTAs with Mexico and South Africa, and its customs union with Turkey. Furthermore, unlike the United States in 2014, the EU also offered GSP eligibility to Argentina, China and Russia. These countries were removed from EU GSP program in 2015.

bilateral preferences to the exporting countries in this sample, whereas China and Turkey have the largest bilateral tariff preference offerings among the G20 emerging economies and have offerings comparable to some of the high-income countries. Mexico, on the other hand, stands out by way of the concentration of its tariff preferences toward high-income economy exporters - recall its NAFTA participation (with the US and Canada) and its bilateral FTAs with the EU and Japan.

The lowest panel of Figure 8 reveals the pattern of bilateral tariff preferences that developing countries offered in 2014. Overall, they offered much fewer bilateral preferences to all groups of exporting countries. Their limited preferential offerings go toward other developing countries; these frequently through PSAs, or in the case of African countries, through customs unions like the East African Community or COMESA. Colombia, Egypt and the countries involved in ASEAN are the only ones offering tariff preferences to high-income economy exporters, and these are primarily through FTAs.

2.2.4 Research on preferential tariffs and preferential trading arrangements

Despite the increase in the prevalence of preferential tariff offerings since the 1980s, and the tremendous variation in the data observed in the last section regarding the offerings of tariff preferences across policy-imposing countries and trading partners, the empirical literature on the *determinants* of bilateral tariffs is still relatively unexplored.⁴³ One exception is Blanchard, Bown and Johnson (2016) that focuses on global supply chain determinants and use a sample of 14 high-income and emerging economies over the 1995-2009 and find that bilateral final goods tariffs are decreasing in the amount of domestic value added embodied in foreign production and the amount of foreign value added embodied in domestic production. In related work, Blanchard and Matschke (2015) examine US bilateral tariff preferences and find that US multinational affiliates' offshoring behavior impacts the likelihood of a trading partner being granted such as preference.

On the other hand, a relatively more expansive literature has examined the impacts of preferential tariffs on various channels of economic activity. We have already described research in which changes in preferential tariffs have been used to explain subsequent changes in the patterns of MFN tariffs (Limão 2006; Karacaovali and Limão 2008, Estevadeordal, Freund and Ornelas 2008). Here we simply note that research has also examined the implications of changes in preferential tariffs for changes in trade flows, and thus the trade creation and trade diversion originally identified theoretically by Viner (1950) (e.g., Romalis, 2007) and on economic welfare and economic activity more generally in quantitative models (for NAFTA see Caliendo and Parro 2015; for a global study see Caliendo, Feenstra, Romalis and Taylor, 2015).⁴⁴

⁴³There is a larger literature on the determinants of preferential trading arrangements at the aggregate level; see, for example, Baier and Bergstrand (2004) and Baier, Bergstrand and Mariutto (2014).

⁴⁴There is also a literature on the more general impact of tariff preferences arising under unilateral preference programs such as GSP; for a survey see Ornelas (forthcoming). Limão (forthcoming) surveys the economics literature on preferential trading arrangements.

2.3 Other ad valorem import tariffs beyond MFN and bilateral preferences

Before moving on to other trade policy instruments beyond the ad valorem import tariff, we conclude this section with a brief description of three other examples of ad valorem tariffs that can arise and that are not captured by the data on either applied MFN tariffs or the bilateral tariffs arising under preferential trading arrangements. We use the United States trade policy in particular to explain how each example can and has arisen.

First, consider a trading partner that is both not a member of the WTO (so it is not guaranteed an MFN tariff) and is also not part of any preferential trading agreement. For such exporting countries, the United States has a special category of tariffs in its schedule that refer to as its ‘Column 2’ tariffs. These applied tariffs are typically much higher than the MFN rates. In, 2014, the US imposed these tariffs on imports from North Korea and also from Cuba (despite Cuba being a WTO member country).

Second, there are instances under both the WTO and some preferential trading arrangements in which countries can be authorized to legally impose (higher) retaliatory tariffs after the adjudication of a formal dispute settlement process if the defendant country refuses to comply with a ruling. In these instances, the complaining country in a dispute can be granted the right to raise its bilateral tariff (on imports arising from the defendant country) to some level that is higher than even the MFN binding rate. Indeed, the United States has implemented WTO-authorized tariffs of 100 percent on imports from the European Union in response to the EU’s failure to comply with WTO legal rulings in disputes involving bananas and hormone-treated beef; in some instances, such retaliatory tariffs have remained in place for years. Mexico, the EU, and other countries have similarly been authorized to retaliate by raising tariffs on imports from the United States after disputes in which the US also failed to comply with legal rulings, under both NAFTA and the WTO, in a timely manner.⁴⁵

Third, in some instances the applied bilateral ad valorem import tariff is irrelevant because there an imposed import ban in effect; i.e., a quota, or a quantitative restriction sets imports equal to zero. For example, the United States had a ban in effect toward imports from Burma or Iran in 2014.

3 Border Instruments Beyond Ad valorem Import Tariffs

This section looks past ad valorem import tariffs to introduce other government commercial policies that affect imports at the border. These include specific duties; the temporary trade barrier policies of antidumping, countervailing duties and safeguards; quotas, tariff-rate quotas, negotiated arrangements with exporters such as price undertakings and voluntary export restraints (VERs), policies regarding the allocation of import licences, and valuation of customs transactions.⁴⁶ We

⁴⁵See, for example, the collection of research in Bown and Pauwelyn (2010) on the retaliation in WTO disputes arising between 1995 and 2008.

⁴⁶The empirical relevance of the distinction between tariffs and quotas depends on the production technology in an industry and its market structure. Since Bhagwati (1965), economists have understood the general equivalence

attempt to describe the contemporary empirical landscape of each policy instrument individually, though one theme that will emerge from our discussion of the empirical research on the determinants of these policies is the substitutability of these instruments with each other, as well as with ad valorem import tariffs.

Important empirical studies of tariff determination and of the impact of trade policy on other outcomes have frequently used data on import policies other than the ad valorem import tariffs described in Section 2. Indeed, much of the initial progress in the modern literature on endogenous import protection focused on these alternative policies because the *negotiated* ad valorem import tariffs applied by the major GATT/WTO members were inappropriate for studies of optimal, unconstrained policymaking behavior. As such, many of the policy instruments described in Section 3 (and perhaps some from Section 5, below) are important components of the measures of ‘trade policy’ (frequently sector-level coverage ratios of imports affected by non-tariff barriers) which were used in the seminal studies of endogenous import protection, including Treffer (1993), Goldberg and Maggi (1999), and Gawande and Bandyopadhyay (2000).

More recent research has utilized these data for other purposes. A number of papers that examine the determinants of governments’ optimal trade policy using ad valorem import tariffs (for example, Broda, Limão and Weinstein (2008) and Blanchard, Bown and Johnson (2016)) have validated their primary results with empirical analysis of other border barriers. Additional studies use these other border barriers to look at trade policy substitution; specifically, research has also examined whether trade agreements that constrain ad valorem import tariffs (through binding caps) result in alternative, substitutable trade policies being used to respond to shocks to political-economy associated with the tariff-cutting process (Limão and Tovar 2011; Bown and Tovar 2011), import volumes (Bown and Crowley, 2013b), or the macroeconomy (Knetter and Prusa 2003; Irwin 2005; Bown and Crowley 2013a, 2014).⁴⁷

The next parts of this section introduce the main contemporary border instruments of trade policy aside from ad valorem import tariffs.

3.1 Specific duties

While the vast majority of import tariffs are applied as ad valorem duties, there are a number of important instances in which countries apply trade policy through specific, or per-unit duties. We first consider the data on where such duties arise before turning to research on areas of its potential

of tariffs and quotas in perfectly competitive markets with a competitive allocation of quota rights. Interestingly, since its inception in 1947, the GATT/WTO system has always insisted on its members adopting tariffs rather than quotas. Important theoretical differences between tariffs and quotas have focused on deviations from the assumption of perfect competition (Panagariya, 1981, 1982) or wasteful resources devoted to gaining import licenses (Krueger, 1974). Much of the modern work in trade theory today (Melitz, 2003; Eaton and Kortum, 2003 and articles deriving from these models) is based on an analysis of an ad valorem trade cost, embodying both transportation costs and border taxes, which is often assumed to be the same across all goods, across all trading partners, or both. As we proceed through our lexicon of trade restrictions, we will suggest where important sources of policy heterogeneity might be exploited to investigate important puzzles in our understanding of international trade.

⁴⁷See also Lee and Swagel (2000).

relevance.⁴⁸

First consider countries' applied MFN tariffs. While the WTO (2014c) reports that in most countries the share of product lines with non-ad valorem tariffs is zero, a number of major economies constitute sizeable exceptions. Figure 9 reveals that specific duties remained a significant part of the applied MFN tariff policy arsenal in 2013 for many of the 31 major economies in our sample. Indeed, Russia had more than 11 percent of its product lines subject to specific duties in 2013; Thailand, the United States, European Union, and India each also applies specific duties to 5 percent or more of its imported HS06 products.⁴⁹

Figure 10 identifies for 2013 the sectoral distribution of specific duties across our three country groupings. For the high-income economies, the overwhelming incidence of specific duties is found in agriculture - more than 10 percent of animal products, more than 15 percent of vegetables, and nearly 25 percent of foodstuffs report MFN tariffs being applied as specific duties. A smaller, though still nontrivial, incidence of specific duties is found in sectors such as footwear, textiles and clothing, and fuel. For the United States in particular, MFN tariffs are applied as specific duties for nearly 50 percent of vegetables and foodstuffs, 27 percent of animal products, 10 percent of minerals, 16 percent of fuels, 9 percent of textiles and apparel, 21 percent of footwear, and 18 percent of miscellaneous products.

As we describe in more detail below, MFN applied tariffs are not the only instrument of trade policy in which specific duties are found to arise; they are also a somewhat common outcome of temporary trade barrier investigations. In some instances, a newly imposed antidumping or safeguard restriction may result in a new and additional specific duty, even though the benchmark trade policy had been applied as an ad valorem import duty.

An open research question is what explains the cross country and sectoral variation in MFN tariffs applied as specific duties, and in particular, the relatively high incidence in agriculture, footwear, textiles and clothing in high-income economies. One possible explanation relates to the work of Ludema and Mayda (2013) who show voluntary participation and exporter concentration led to a pattern of higher tariffs for some sectors under the reciprocity-based negotiations of the GATT period (1947-1995). Furthermore, for decades beginning in the 1950s, the GATT members largely pulled agriculture, textiles, and apparel outside of negotiations as well as the basic rules of the system, as we further describe in Section 4.

We conclude this section with insights from research identifying at least three other reasons why the existence of specific duties is potentially important.

The first issue involves the question of the trade-restrictiveness of the different forms of these

⁴⁸We do not focus on computed *levels* of ad valorem equivalent estimates (AVEs) to the specific duties described here because the AVEs would be time-varying for reasons unrelated to changes in policy. UNCTAD (via TRAINS) frequently provides ad valorem equivalent estimates for products with MFN tariffs applied as specific duties, using a number of different methodologies. These have been made freely available from the World Bank via the World Integrated Trade Solution (WITS) web-based software platform.

⁴⁹Switzerland is the only country with a higher share of imported products subject to specific duties than Russia in 2013, at 78.3 percent. Belarus and Kazakhstan have a customs union with Russia and thus roughly the same share of products subject to specific duties. Other countries with shares larger than 5 percent of imported products not shown in Figure 9 include Norway (7.8), Zimbabwe (6.4) Uzbekistan (5.8) and Israel (5.0).

applied tariffs, and the role of prices. It has become clear from the US experience of the Great Depression era that the trade-restrictiveness of the Smoot-Hawley tariffs of 1930, much of which were applied as specific duties, *increased* over the subsequent decade in the face of deflation and falling domestic prices. On the other hand, the subsequently high ad valorem equivalent rate of these specific duties in the early 1940s implies that much of the subsequent tariff ‘liberalization’ of US import markets during the 1940s arose not specifically because of policy decisions to cut tariffs, but simply because inflation increased, thereby reducing the ad valorem equivalent of the imposed specific duty (Crucini 1994; Irwin 1998). Given the data presented for high-income countries in Figure 10, the trade restrictiveness of tariffs imposed as specific duties in agricultural markets may fluctuate substantially due to changes in world prices for commodities.⁵⁰

Second, specific duties are also potentially economically important as they can implicitly discriminate between trading partners (or even firms within the same trading partner) without violating the MFN rule when there are heterogeneous varieties of differentiated products included in the same tariff code. Consider, for example, two varieties of shoes from two different countries that fall within the same product category and which therefore face the same applied MFN tariff rate. Suppose those two varieties of shoes have different prices because of quality differences (Schott, 2004). The ad valorem equivalent of a \$2 specific duty on a \$10 pair of shoes (say, from China, Indonesia, or Vietnam) is 20 percent, whereas the ad valorem equivalent on a \$100 pair of shoes (say, from Italy) is only 2 percent. While the ad valorem equivalent of an MFN-consistent specific duty is clearly discriminatory across trading partners, it is permissible under the WTO.⁵¹

The third point is simply that specific duties and ad valorem duties differ in their efficiency as a form of taxation, in particular under different market structures, as has been discussed in the public finance literature (Delipalla and Keen 1992, and Keen 1998).

3.2 Temporary trade barriers of antidumping, countervailing duties, safeguards

The next set of trade policy instruments that we consider are antidumping, countervailing duties, and safeguards, collectively referred to here as temporary trade barriers (TTBs) based on the common property that legally each has a temporary life span. In some of the analysis below we assess their collective use - motivated by evidence of how they have been used as substitute policy instruments - and in other areas we disentangle their use in order to show their relative importance. While the policies are related, the GATT/WTO imposes distinct legal conditions under which their use is permitted. While all three require evidence of injury to the domestic, import-competing industry,

⁵⁰The fact that many high-income countries apply specific duties to commodities implies they have a natural buffer against world price shocks as ad valorem equivalent import protection levels fluctuate with world prices. This suggests a potential explanation for the puzzling existence of large amounts of ‘water in the bindings’ for agricultural goods with ad valorem tariffs in developing and emerging economies. See again Figure 2. These countries retain discretion over their ad valorem tariff rates so that they can stabilize local prices with tariff increases if they wish to do so.

⁵¹The use of specific duties in safeguards cases is particularly noteworthy because this policy was designed by the WTO Agreements to be less discriminatory than other policy tools, like antidumping. In practice, the use of safeguards is a politically useful way for governments to discriminate between foreign suppliers, such as against varieties from a low-priced trading partner while minimizing the impact on a high-priced trading partner. See, for example, Turkey’s safeguards on imports of footwear described in Bown, Karacaovali and Tovar (2015).

antidumping also requires evidence that this was caused by low-priced ('dumped') imports, countervailing duties require evidence that this was caused by foreign-government subsidized imports, and safeguards require evidence that injury was caused by an unexpected import surge.⁵² Overall, according to metrics such as frequency of use and import coverage, the most empirically important of the policies is antidumping. Nevertheless, safeguards use has been important for certain countries and especially during certain periods, and there is also some evidence that countervailing duty use may be becoming increasingly important across countries over time.

Table 5 summarizes the use of TTBs by those of our 31 economies that employed the instruments during the 1995-2013 period, and it includes information on when the economy implemented its antidumping law, and when it initiated its first antidumping investigation.⁵³ We choose the 1995-2013 period for a number of reasons. First, it is a period that our data most accurately captures the 'stock' of TTB policies in effect.⁵⁴ Second, 1995 initiated common rules for TTB use for all WTO members.⁵⁵ Third, in this period we can easily compare the use of TTBs by pairs or groups of countries participating in important customs unions or FTAs. For example, by 1995 we observe a common external trade policy for EU-Turkey and Argentina-Brazil and thus can more easily examine potential differences in their TTB use.

For interpretive purposes, consider first the US data on the import coverage of the TTBs that it had in effect over 1995-2013. The first four columns reveal information on the cumulative share of imported products over which the United States imposed some sort of TTB policy during the period. The US imposed some TTB policy on 10.6 percent of all HS06 imported products at some point during 1995-2013. Among the four different TTB policies in use by the United States during this period, antidumping has been most prevalently applied (covering 9.0 percent of all products), followed by countervailing duties (5.1 percent), the global safeguard (2.8 percent), and the China-specific transitional safeguard (less than 0.1 percent). The fact that individual TTB policies for the US cumulate to more than 10.6 percent of total imports reflects both the *substitutability* of these policy instruments - e.g., the United States has applied different TTB policies to the same products at different points in time - as well as the *redundancy* of these policy instruments - e.g., the United States frequently applies two different TTB policies, such as an antidumping duty and a countervailing duty, to the same product and trading partner at the same moment in time.

Consider the next set of columns in Table 5 for the United States. On average over 1995-2013, the US had 4.9 percent of imported products covered by an imposed TTB in any one year, and the maximum coverage was at 6.8 percent in 2012. Finally, the mean share of imported products in a year that were subject to a new US TTB investigation - and that could potentially lead to new

⁵²For a comprehensive survey of economics research on antidumping, see Blonigen and Prusa (forthcoming); on countervailing duties and subsidies, see Lee (forthcoming); and on safeguards, see Beshkar and Bond (forthcoming).

⁵³This table updates much of the information initially presented in Bown (2011b), which also provides more detail on the underlying methodology, using more recent data from the World Bank's Temporary Trade Barriers Database (Bown, 2014a). Additional detail on the database is provided in the Data Appendix.

⁵⁴For the US and EU especially, the early 1990s featured AD duties still in effect from the 1980s but for which we do not have the HS codes because they were imposed under different product classification schemes.

⁵⁵Under the GATT, the rules for certain TTBs were different depending on whether a GATT contracting party was a signatory to plurilateral Antidumping Code and Code on Subsidies and Countervailing Measures.

import restrictions - was 0.9 percent over 1995-2013. The maximum share of imports subject to new TTB investigations was 3.9 percent of products in 2001, when the US initiated a wide-ranging safeguard investigation over imported steel.

While the United States is the most highly-researched user of TTBs historically, when measured by the share of products collectively impacted by TTBs, it was only the second largest user of these policies over 1995-2013. Mexico had nearly 23 percent of its imported products subject to a TTB policy at some point during 1995-2013; the majority of this was due to a set of antidumping import restrictions that Mexico imposed on China beginning in 1992-1993 (over 20 percent of its product lines) and which remained in effect until 2008.⁵⁶ India only began using antidumping in 1992, nevertheless, between 1995-2013, 8.0 percent of its imported products became subject to some newly imposed import-restricting TTB policy. Other economies with sizeable shares of their products covered by TTBs during this period include the European Union at 8.1 percent, Argentina at 4.8 percent, Turkey at 4.2 percent, Canada at 3.4 percent, China at 3.1 percent, and Brazil at 2.8 percent. One interesting item to note from this list is that customs union partner pairs that otherwise share a common applied MFN tariff - e.g., EU-Turkey, Argentina-Brazil - not only retain the legal authority to implement their own TTB policies independently, but the evidence from the share of product lines affected by their imposed TTBs indicates that they clearly do.

Furthermore, the composition of TTB policies employed by the United States is not systematic of each and every TTB user. While the United States has implemented each of the three major TTB policies with a significant share of import coverage during this period, most of the TTB users tend to rely primarily on antidumping. Other significant users of safeguards in our sample of economies, for example, include Argentina, Brazil, Egypt, the EU, China, India, Indonesia, and Turkey - though for the US, EU, and China, the significant safeguards use during this period was dominated by the almost simultaneous safeguards imposed over an overlapping set of steel products in 2001-2003.⁵⁷ Countervailing duty laws, on the other hand, have only recently been adopted by a number of economies and are only starting to be implemented; as such, their import coverage has been fairly limited to high-income economies such the US, EU and Canada. The China-specific transitional safeguard mechanism that was introduced as part of China's WTO Accession Protocol in 2001 has not been frequently utilized - notwithstanding the somewhat infamous use by the US on imports of tires in 2009 during the global economic crisis - the peak use was by Colombia, briefly, over a set of textile and apparel products in 2005.⁵⁸

Next consider Figure 11, which illustrates a measure of the time path of TTB use for the EU, US, China and India over a slightly longer time period of 1990-2013. The figure presents four series

⁵⁶Robertson (2011) presents a discussion of Mexico's use of TTBs during this period. Note the maximum share (23.7 percent) in any one year is higher than the cumulative share over the entire sample given the changes in the Harmonized System which added new HS06 codes that were never subject to any TTB.

⁵⁷For a discussion of the US safeguard on steel, and a comparison to the similarities on prior US use of antidumping and countervailing duties products during the 1990-2003 period, see Bown (2013). On the other hand, Blonigen et al. (2013) use the US steel industry to examine the nonequivalent market power effects of quotas and tariffs arising in the industry, some of which arose through TTB policies.

⁵⁸For a discussion of the US safeguard on tires, see Charnovitz and Hoekman (2013). For the China safeguard more broadly, see Bown (2010) and Bown and Crowley (2010).

of data - for all TTB policies (and antidumping only), a ‘flow’ measure of the share of HS06 import products each year subject to a newly-initiated TTB investigation that could result in a new import restriction; and for all TTB policies (and antidumping only), a ‘stock’ measure of the share of HS06 import products each year subject to an imposed import restriction.

Figure 11 also reveals a number of interesting features on the use of these TTBs over time. First, India began using TTBs in 1992 and China only in 1997; the US and EU use of these TTBs pre-dates the introduction of the Harmonized System in 1988, thus these data understate the TTBs that these economies had in effect in the early 1990s that had been imposed in the 1980s (or earlier) and which had not yet been removed. Second, there are spikes for the United States in 1992 and 2001 and for the EU in 2001; empirical evidence described in more detail below links significant increases in TTB use to recessionary periods (especially unemployment rate increases) as well as real exchange rate appreciations. Third, for China, the EU, and US - the significant deviation in 2001-2003 between the ‘all TTB’ series and ‘antidumping only’ series reflects the previously discussed global safeguards imposed over steel products. Fourth, there is a slight increase for these economies in the ‘flow’ of products subject to new TTB investigations during the Great Recession period of 2008-2009, but it is not nearly as sizeable as in other periods of macroeconomic downturn. Finally, turning back to Table 5 (and Figure 11), it turns out that not only the US, but also the EU and India, have a significant share of products subject to new TTB investigations each year; each averaged between 0.6 and 0.9 percent of products.

Figure 12 illustrates the sectoral breakdown - whereby we limit it to the major users of TTBs; i.e., the countries for which 2.8 percent or more of their HS06 lines were subject to a TTB during this period. We also group countries somewhat differently so as to make more direct comparisons (where relevant) between certain major trading partners.

First compare Figure 12 with the data on MFN applied tariffs in Figures 2, 3, and 10. Many of the sectors that in 2013 were still subject to high average tariffs, high incidence of tariff peaks, or high frequency of specific duties, were not necessarily the same as those in which TTBs are prevalent. Specifically, agriculture during 1995-2013 was not a frequent target of TTBs across using countries. For other sectors, such as textiles and apparel and footwear, there is variation across countries; e.g., the US has relatively high MFN applied tariffs in those sectors, but has not used TTBs in those sectors. On the other hand, despite textiles and apparel and footwear also being protected by relatively high MFN applied tariffs in countries such as Argentina, Brazil, India, Mexico and Turkey, there is also relatively high import coverage by TTBs. The rationale for these countries, as we describe next, is frequently to address increased import competition of products in these sectors from other emerging and developing economies, especially China. Third, chemicals and metals continue to be industries where TTB use is frequent, especially in high-income economies. this is consistent with use in earlier decades as we further detail below in Section 4. Contributing explanations include that these are high fixed cost, concentrated industries; this may affect an industry’s ability to organize politically and file petitions for TTB protection under these laws.

Table 6 reveals how TTBs can discriminate against certain trading partners and suggests that the incidence of TTB use may not be uniform across exporting countries. While there are different ways of examining this issue, our approach here involves presenting two measures - the trade-weighted share of the exporting country's total exports to the G20 economies over which the G20 economy had a TTB imposed, and the estimated value of those TTB-impacted exports to the G20 economy.⁵⁹ We compute these two measures both in 2013 for the G20 economies and then, for rough comparison purposes, also in 1995 for the 'G4' economies of Australia, Canada, the European Union and the United States - the major TTB users at the time. For interpretation purposes, consider an exporter like China. In 2013, 7.1 percent of China's exports to the G20 economies were subject to a TTB, and this is estimated to cover roughly \$100 billion of its exports to those economies. In 1995, only 2.9 percent of China's exports to the G4 economies were subject to a TTB, and this was estimated to cover \$3.3 billion (in constant 2013 dollars) of its exports to those four economies.

Table 6 reveals a number of interesting pieces of information. First is the sheer scale with which the value of China's exports are subject to G20 TTBs relative to all other exporting countries - in value terms, China has almost ten times more TTB-affected exports than the second most-impacted exporter, Korea, which had roughly \$14 billion of affected exports. The United States comes in third at \$12.6 billion.⁶⁰ Furthermore, a number of other emerging, developing, and 'transition' economies also have a substantial share of their exports affected by foreign-imposed TTBs. While not shown here, some of this can be tied to the fact that some of the major new users of TTB policies are other emerging economies, thus revealing TTBs as an instrument through which 'South-South' protectionism is arising (Bown, 2013). Third, countries like China, Ukraine, Moldova, Russia and Macedonia are all former 'non-market' economies (NMEs); there are special rules available for countries to impose antidumping in particular against NMEs during this period which may make it arguably easier legally to apply such import restrictions to them.

Next compare the first two columns of 2013 data to the 1995 data; in 1995 the main TTB policy in use (antidumping) was primarily targeting the newly industrializing Asian economies of Japan and Korea. Indeed, Japan went from having \$7.7 billion of exports to the G4 in 1995 being subject to TTBs (roughly 2.6 percent of its total exports to those economies), to only \$4.4 billion in 2013, and it is not even among the top 20 targeted countries as a share of the country's total exports. And while Korea was still the second largest exporter in 2013 when calculated in value terms, the share of its exports subject to TTBs in these two sets of important markets is only roughly half as large in 2013 as it was in 1995. The anecdotal evidence for Japan and Korea is at least suggestive of the idea that it may be possible for once highly-impacted exporters to 'graduate' from being targets of foreign TTB use over time.

⁵⁹These data are derived from dynamic import coverage ratios following the methodology described in Bown (2011b, 2013). The main requirement is an assumption on counterfactual import growth for products from trading partners subject to an imposed TTB during the period that the TTB was in effect. The current data relies on the relatively conservative assumption that TTB-impacted products would have grown at the same rate as the average rate of non-TTB impacted product import growth.

⁶⁰While Latvia had a larger share of its exports subject to G20-imposed TTBs than China in 2013, because it is such a small exporting country, when measured in dollar terms it was not in the top 20 most affected exporters.

One final takeaway from the data is revealed by returning to Table 5. Not all countries and not even all WTO member economies are users of TTBs.⁶¹ Indeed, the table lists the data for the users of the policies that are ‘known’ users; users are known even if detailed data on their use is not available from Bown (2014a) due to the WTO’s minimum reporting requirements. Most of the developing countries in our sample, for example, are not users of TTBs at all, and thus are not even listed.⁶² Nevertheless, there are even some high-income G20 economies - such as Japan - that have long had access to TTB policies (e.g., its antidumping law dates to 1920) but which these policies very rarely. Furthermore, there are some historical TTB users - e.g., Australia, Canada, and even South Africa - whose relative use of TTBs during this period has declined relative to earlier decades.

Before turning away from a discussion of patterns in the TTB data, we make three additional points regarding other heterogeneous aspects arising from TTB use. The first concerns the heterogeneity in the application of different policies - e.g., as we further describe in Section 3.4, these policies are applied not only as ad valorem duties, but also frequently as specific duties, price undertakings, quotas, and tariff rate quotas. The second concerns the restrictiveness of the policies - e.g., even when these policies are imposed as ad valorem import duties, often times they are set at what are designed to be prohibitive levels of greater than 100 percent, 500 percent, or 800 percent. The third concerns the duration of these imposed import restrictions - e.g., while the WTO rules for each of them are that they are supposed to be ‘temporary’ (i.e., duration of less than five years), there are duties covering some products that have been imposed for 20 - 30 years or longer.⁶³

Research on Temporary Trade Barrier Policies Similar to the increase in TTB use, the research examining this use within and across countries has also been developing substantially over time.⁶⁴ Because the literature is too voluminous to cover in its entirety, here we restrict ourselves to a set of research focused on examining TTB use in light of the constraints that trade agreements in particular impose on access to other policy instruments, such as MFN (or PTA) tariffs.

Two examples illustrate research on country-specific use of TTBs that assesses theoretical models of trade agreements and questions of trade policy substitution. First, Bown and Crowley (2013b) treat TTBs such as antidumping and safeguards as responding to terms-of-trade pressure to raise levels of import protection in the spirit of the repeated game model of self-enforcing trade agreements of Bagwell and Staiger (1990). Because US applied MFN tariffs are constrained due to WTO commitments and tariff bindings, the Bown-Crowley approach relies on data from United States TTB use at the industry-trading partner level over 1997-2006 and provides evidence consistent with

⁶¹For an exploratory analysis of why countries adopt antidumping laws, for example, see Vandebussche and Zanardi (2008).

⁶²Countries are listed if they are known users of the policy even if the details of the data on their policy use are not available (‘na’).

⁶³The data required to explore each of these points empirically is readily available in Bown (2014a).

⁶⁴Indeed, one of the features of TTB use is its flexibility in being responsive to many different forms of political-economic shocks. In one of the first papers assessing industry-level use of antidumping by the major new-user emerging economies during 1995-2002, Bown (2008) finds evidence for industry-level, aggregate-level, and political explanations for the responsiveness of antidumping across countries, industries, and time.

the terms-of-trade theory that levels of import protection increase in the face of trade volume surges, especially when those surges take place in sectors with import demand and export supply that are relatively inelastic. Second, Bown and Tovar (2011) use product-level information on India's TTBs and the canonical Grossman and Helpman (1994) model of endogenous trade policy formation to examine the impact of the 'exogenous' shock to applied MFN tariffs that took place in India beginning in the early 1990s. They show empirical results consistent with the Grossman-Helpman theory when using India's applied MFN tariffs in 1990, inconsistent with the theory when using India's applied MFN tariffs only in 2000-2002, but consistent again with the theory when using India's stock of antidumping and safeguard import restrictions in place *in addition to* India's applied MFN tariffs in 2000-2002. They interpret this as evidence that, over time, India unwound some of its commitment to reduce tariffs by substituting policy use toward antidumping and safeguard protection.

Another method to address these questions is to investigate whether TTB policy use responds to macroeconomic shocks - in particular, real exchange rate appreciations and increases in the unemployment rate - and whether this might partially explain why there is increasingly less evidence that applied MFN tariffs are responsive to aggregate-level fluctuations, as discussed in Section 2.1.4. Knetter and Prusa (2003) provide evidence consistent with such an interpretation for high-income G4 economies (Australia, Canada, EU, US) over the 1980-1998 period, as does Irwin (2005) for the United States over earlier decades. More recently, Bown and Crowley (2013b, 2014) expand upon this work in cross-country samples of five high-income economies and 13 emerging economies, respectively, covering the period of 1988-2010. They find TTBs respond to aggregate fluctuations. Specifically, they identify a number of important channels which link macroeconomic and trade policy variables to TTB use. First, for the high-income economies of the EU and the US, the flexibility of the real exchange rate, and in particular the sharp depreciations that subsequently took place (after initial sharp appreciations in 2009) likely contributed to the dampening pressure on demands for import protection during the Great Recession. Second, over time, the emerging markets' collective TTB responsiveness to macroeconomic shocks has been increasing, and thus mimicking the TTB responsiveness of high-income economies. Third, there is also evidence that as the 'water' available to governments disappears over time - i.e., the difference between a country's tariff binding cap and its MFN applied tariff shrinks - countries are forced to resort less to adjusting their MFN applied tariffs so they substitute toward TTBs.

Finally, Prusa and Teh (2010) present a cross-country study examining the relationship between free trade agreements and antidumping and conclude that antidumping actions against FTA partners tend to fall by sizeable amounts after FTA implementation, and it tends to increase by sizeable amounts against FTA non-partners after implementation.⁶⁵

⁶⁵See also Blonigen (2005) for an earlier study of antidumping and countervailing duty use under NAFTA. Bown, Karacaovali, and Tovar (2014) a more general discussion of the relationship between PTAs and TTB use and presents case studies illustrating the range of outcomes that can arise in practice.

3.3 Quantitative restrictions, import quotas, tariff rate quotas

While generally forbidden under GATT (through Article XI), quotas are still very much in contemporaneous use. They are an especially prevalent outcome in safeguard investigations; 30 percent of the import restrictions that WTO members imposed under the Agreement on Safeguards between 1995-2014 were in the form of an quantitative restriction or tariff rate quota.⁶⁶ The allocation of welfare and the costs imposed on different societal groups will vary with the precise way in which a quota is administered. In theory, a quota sets a limit on the number of units of an item that may enter a country. If a domestic government auctions off licenses to import the good, then the difference between the item's price under free trade and the domestic price of the good under the quota is a quota-rent which is collected by the importing country's government. If the government gives away licenses to import under the quota, it transfers the value of this potential (auctioned licence) revenue to whomever receives the licenses - a foreign government, a foreign export licensing board, or foreign producers. In this process, there is great scope for corruption; concern regarding corruption is one of the reasons why ad valorem tariff policies have long been encouraged whenever imposition of a border barrier was absolutely necessary.

In the example described above, we inherently assumed that for the commodity in question, the world market price was below the domestic price so that the entire quota was filled. In practice, non-binding quotas with unfilled allotments are not uncommon. In these cases, the quota fill rate, the ratio of actual imports to quota-allowed imports, can serve as a measure of how restrictive the import policy is, due to the administrative costs and uncertainty of market access associated with the quota.

The administration of some quotas, especially those used in safeguard cases, allocates the import licenses to historical exporters. For example, a quota might allocate a value-based measure of domestic market share to all foreign producers, for example 50 percent, and then further divide the aggregate quota to historical exporters based on historical market shares. This system has the advantage of dramatically reducing competitive pressure on domestic producers, partially placating major foreign producers, while facing minimal resistance from the major losers, i.e., disorganized consumers and potential new entrants from foreign countries. This system nominally satisfies non-discrimination by providing market access to historical exporters, but prevents new market entrants that have the potential to put downward pressure on consumer prices.

More commonly, governments establish tariff rate quotas which allow a specified quantity to enter duty free subject to an import license, an additional quantity to enter at a moderate tariff subject to import licenses, and a further quantity to enter at a very high or prohibitive tariff. These tools are primarily used today by middle and low per capital GDP countries.

The most significant quota system of the last half-century, the multi-fibre arrangement (MFA) - that we introduce more formally in Section 4 - was only recently dismantled in 2004. A number

⁶⁶Bown and McCulloch (2003) examine the WTO safeguards imposed over 1995-2000 and highlight the discriminatory nature of such applications, including for quantitative restrictions which base within-quota shares on historical market presence, thus discriminating against new entrants.

of studies have focused on different aspects of the MFA (Brambilla, Khandelwal and Schott, 2010; Harrigan and Barrows, 2009; Dean, 1995; Khandelwal, Schott, Wei, 2013), and especially the implications of its expiration.

3.4 Price undertakings and voluntary export restraints

A second form of quantitative restriction is a voluntary agreement by exporters to raise their prices and/or restrain their export volumes. These policies are referred to as price undertakings or voluntary export restraints (VERs), and while they share many common economic features; they are currently treated in different ways under the WTO. For while VERs were supposedly banned in the Agreement on Safeguards established in 1995, price undertakings are encouraged as an outcome in the 1995 WTO Agreement on Antidumping.⁶⁷

Not surprisingly, given the high frequency of antidumping use across countries, price undertakings are also a relatively common outcome of the investigations.⁶⁸ Consider, for example, the data on antidumping outcomes for the European Union. Overall, approximately 20 percent of EU antidumping investigations that found evidence of dumping by foreign exporters over 1989-2011 resulted in a negotiated price undertaking. These arrangements typically consist of a minimum import price (MIP) and a market share allotment.⁶⁹ Thus, the impact of an undertaking, like that of a quota, will depend on the competitive structure of the industry with considerable scope for losses to consumers if the market is imperfectly competitive.

Table 7 summarizes the EU's usage of different *forms* of import barriers arising as the outcomes of antidumping investigations over 1989-2011. Each entry is the percent of total antidumping measures, by export origin, implemented in the form listed.⁷⁰ That is, the first entry, 65.0 percent, indicates that almost two thirds of antidumping measures were ad valorem duties. Almost 10 percent of measures imposed by the EU were specific duties; as noted earlier, these specific duties tend to discriminate against lower priced varieties.

Next consider the breakdown of the form of antidumping measures by export origin. Broadly, the EU tends to favor ad valorem import tariffs to restrict imports from G20 high income and emerging economies. In contrast, the EU is much more likely to negotiate price undertakings if the exporter is a developing country; the EU negotiates a price undertaking in roughly 40 percent of

⁶⁷Bown (2002a) presents a discussion. As we further describe below in Section 4, one of the political motivations for the attempts to ban VERs was that they has become an incredibly common outcome to US safeguard and antidumping investigations in the 1970s through early 1990s, especially with respect to bilateral frictions that the United States had at the time with Japan (Bown and McCulloch, 2009).

⁶⁸Two exceptions are the United State and China; these countries imposed most of their antidumping import restrictions during this period as ad valorem duties.

⁶⁹However, these are non-transparent in that official EU publications do not report the negotiated prices or market shares. Rather, official *Decisions* and *Regulations* report the names of the lead foreign negotiating authority (for example, a foreign Chamber of Commerce or industry association) and all firms that are participating in the undertaking. This set-up leaves the Commission with flexibility to adjust minimum import prices and market shares as the situation warrants.

⁷⁰During this period, according to the Temporary Trade Barriers Database (Bown, 2014a) the EU implemented a total of 492 antidumping measures. In roughly 5 percent of cases, the form of the final antidumping measure is unknown.

the instances in which it imposes an antidumping measure against a developing country. On one hand, the frequency of these quantitative restrictions applying to developing countries could speak to a pernicious bias discriminates against new entrants. On the other hand, price undertakings may be preferred by developing country exporters if the alternative is an EU import tariff because, with a price undertaking, at least the exporter receives any ‘quota rents’ associated with the restriction.

Two final examples illustrate the continued economic relevance of these ‘voluntary’ policies. Consider first the price undertaking that the EU negotiated with China regarding imports of solar panels from China in 2012. From China’s perspective, this was an important trade policy event as solar panels comprised 7 percent of *all Chinese exports to the EU* in 2012. Interestingly, the cumulative abnormal return of Chinese solar panel producers to the European Commission’s decision to institute a price undertaking was, on average, negative (Crowley and Song, 2015). Although a quota could, in theory, improve profitability of exporters by facilitating collusive price increases, it seems that for Chinese solar panel producers, the loss of future sales growth in Europe more than offset any gains associated with the elimination of aggressive price competition insured by the undertaking’s minimum import price.⁷¹ Second, while VERs are not commonly in use currently, they were used in a major industry as recently as 2008. Upon the expiration of the MFA in 2005, the US and EU quickly negotiated a set of VERs for China’s exports of textiles and apparel to their markets for the period covering 2005-2008.⁷²

3.5 Import licensing, customs valuation, and trade facilitation

The final two border ‘policies’ that we introduce include additional ways that governments can manipulate administrative hurdles to impact trade. A government may impose additional requirements that traders have official import licences in order to sell goods in its market, and then impose barriers to the acquisition of such licences. Furthermore, while the GATT and WTO contain substantial legal provisions instructing authorities on how to evaluate merchandise for assessment of duties, customs valuation procedures can also deliberately be distorted.

While we are unaware of any attempts to comprehensively catalogue import licensing requirements or variation in customs valuation procedures, thus making it difficult to assess their more general impact, there are certainly case studies revealing instances in which each has likely had a significant impact on international trade. The WTO has an Agreement on Import Licensing Procedures, and a prominent recent concern has arisen over Argentina’s institution of import licensing

⁷¹This is in sharp contrast to the investor response to the announcement of the 1981 US automobile voluntary export restraint that is introduced in Section 4. The announcement of the VER, which gave the right to issue export licenses to the US to Japanese authorities, sent the stock prices of Japanese automobile producers up (Ries, 1993), a phenomenon that demonstrated how import quotas facilitate collusive behavior in an oligopolistic market (Harris, 1985; Krishna, 1989). By establishing the restriction as a count of units rather than as a market share, the US government also provided an incentive for Japanese exporters to improve quality and increase price-cost markups (Berry, Levinsohn, and Pakes, 1999; Goldberg, 1995; Feenstra, 1988).

⁷²For a discussion, see Bown (2010, pp. 307-311). The leverage that the US and EU arguably had with China was that they could have imposed the China-specific transitional safeguard - e.g., an import tariff - to curtail China’s export growth. By agreeing to the VERs, China was able to keep the quota rents associated with the (potentially inevitable) border restrictions.

requirements for hundreds of products beginning in 2012. In particular, the EU, US and Japan have used the WTO's formal dispute settlement process to challenge Argentina's requirements for the declarations needed for import approval, the variety of licences required for the importation of certain goods, and the substantial delay in granting the approval to import. Overall, WTO (2015c) indicates that in at least 44 formal disputes initiated between 1995 and 2015, the complaining country alleged that the responding country violated some element of the WTO's Agreement on Import Licensing. Furthermore, in at least 17 disputes during the period, the complaining country alleged that the respondent violated some element of the GATT/WTO provisions on customs valuation.

There is a small but growing empirical literature examining various administrative channels that affect trade; indeed, negotiators have recently put a priority on it through the WTO's newly signed Trade Facilitation Agreement. The World Bank's *Doing Business* reports are the best known source of comprehensive data about time delays and related problems associated with moving goods across a border. Djankov, Freund and Pham (2010), for example, use these data to estimate a gravity model of trade and find that each additional day of delay before shipment reduces trade by more than 1 percent. Volpe Martincus, Carballo and Graziano (2015) utilize detailed export transaction data from Uruguay to estimate the impact of customs delays on firm exports. Finally, researchers using data on customs valuation to examine bureaucratic corruption include the Javorcik and Narcisco (2008) study of tariff evasion practices in Eastern European economies and the Mishra, Subramanian, and Topalova (2008) study of tariff evasion in India.

4 The Historical Evolution of Border Barriers Under the GATT

We have characterized the contemporary landscape of trade policy as littered with numerous border barriers beyond ad valorem tariffs. Collectively and cumulatively, the status quo is trade policy marked by considerable heterogeneity - across countries, products, and trading partners. But how did the international trading system arrive at this point? With only a few exceptions, our discussion of history thus far has been limited to the evolution of trade policy since the 1995 inception of the WTO. Here we briefly appeal to a longer view of the history of the multilateral trading system by focusing on major trade policy developments taking place over the period spanning 1947-1994, covering the full GATT era.

We begin with the level of tariffs for the major economies at the outset of the GATT negotiations in 1947. This year ushered in the new multilateral trading system.⁷³ After reporting on the evolution of applied tariffs over the period, we then introduce a number of major exceptions to the GATT rule that countries should limit the form of their import protection to their applied MFN tariffs. As we introduce each of the GATT system's major exceptions, we also assess recently released data from the GATT archives on their use. A key observation we make is that protectionist

⁷³The historical context matters, as the GATT system arose and was shaped by a number of major geo-political events. These include the catastrophic economic policies of the 1930s Great Depression era, the devastation of Western Europe and Japan during World War II, and the rise of the Cold War between the United States and Soviet Union. See, for example, Irwin, Mavroidis and Sykes (2008) for the negotiating origins of the GATT.

forces have been pushing back against trade liberalization since the inception of the multilateral system. Amidst a general decline in ad valorem tariff rates, new trade restrictions emerged. Thus still open questions for researchers to pursue include quantifying the importance of this push-back and further clarifying how it relates to trade-restricting policy substitution that has arisen today.

When the GATT members drafted the agreement, they included a number of contingency clauses regarding the use of trade restrictions, because they understood that changing economic conditions might force countries to renege on their tariff commitments temporarily or to have to renegotiate their tariffs to higher levels permanently. We have already observed the current incarnation of some of these provisions in our discussion of contemporary border barriers, because some of these exceptional policies, like antidumping and safeguards, have been part of the GATT/WTO system since 1947. In other instances, the exceptions that we discuss arose on an ad hoc basis. In a few others, their use waned and they have largely disappeared from the current policy landscape for one reason or another.

In keeping with our organizational structure, we attempt to use the lens of policy instruments to describe the major trade policy developments arising during the GATT era. We begin by examining the procedures by which countries could increase their MFN tariffs through renegotiations, before we push beyond applied tariffs to other border barriers. We include a discussion of a form of emergency import restriction necessitated by the fixed exchange rate regime of the post-war era that countries could implement to address a macroeconomic (balance of payments) crisis.

We also highlight other exceptions and carve outs that arose during the GATT period, some of which cannot be tied to any singular policy instrument or exception. In particular, the GATT had to accommodate the contentious integration of major new members such as Japan into the system; it responded to demands from developing countries for special and differential treatment; it sought to retain relevance despite major economies brokering side deals that resulted in entire sectors (textiles and apparel, agriculture) being pulled out of the rules of the system; it oversaw the rise of less transparent and less market-oriented ‘grey area measures’ such as voluntary export restraints; and it witnessed the increased use of antidumping by high-income economies, a temporary trade barrier policy that has since exploded in use globally.

In a final section we draw a few implications from this era for contemporary research and policy. Some of the policies of importance were only temporary; others have arguably had effects that persist to this day. Along the way, we also highlight important venues for additional research, especially given the troves of historical data, digitization, and electronic archives increasingly being made publicly available to researchers.⁷⁴

4.1 Pre-GATT 1947 tariff levels, and tariff trends over the GATT period

The GATT negotiations began in 1947 with 23 countries - referred to as ‘Contracting Parties’ - ultimately signing on to the agreement. The initial activity consisted of a round of reciprocal tariff

⁷⁴The Data Appendix includes a detailed introduction and discussion of the GATT archival data utilized in this Section.

cutting negotiations between those countries, as well as the establishment of a set of principles, rules and exceptions, set out as distinct ‘Articles’ in the agreement, that together launched the new multilateral trading system.⁷⁵ The US, Canada, Australia, the countries of Western Europe, and the other Contracting Parties then repeatedly convened under GATT negotiating rounds over the next five decades to bargain for additional tariff reductions and sometimes consider adoption of new rules.⁷⁶ Eight different negotiating rounds were initiated and concluded between 1947 and 1995.

For a number of reasons, very little is known about the exact levels of import tariffs that countries applied in 1947, immediately prior to the first set of GATT tariff-cutting negotiations. Bown and Irwin (2015) suggest that the average applied import tariff in 1947 was likely around 22 percent for the United States, Japan, and the major countries of Western Europe.⁷⁷

While the exact starting point for tariff negotiations may not be known, there is a consensus on the evolution of average applied imports tariffs for these major economies over the subsequent decades. Overall, Figure 13 presents the path of average tariffs for these major countries between 1947, beginning at roughly 22 percent, and 1999, by which time most of the GATT’s Uruguay Round tariff reduction commitments had been phased in, at roughly 3 percent.

However, the remainder of this section showcases a number of ways by which this ‘headline’ result, of a broad downward trend in average tariffs for the major economies, masks important variation. First, this figure reveals nothing about the applied tariffs for countries other than the United States, Japan, and Western Europe, most of which had quite different tariff liberalization experiences and (current) end points (see again Table 1).⁷⁸ Second, even for these major economies, the average tariff fails to capture what was happening with other major border barriers during this period.

4.2 Changing tariff rates under the GATT

As noted above, countries could raise their tariff rates under the GATT. Two distinct legal provisions in the original GATT permitted countries to increase their tariffs after negotiations with

⁷⁵For a description of the key GATT Articles - the rules and exceptions - that we have introduced and referenced throughout this chapter, see Table Appendix A.

⁷⁶Bagwell, Staiger and Yurukoglu (2015), for example, present a micro-level empirical bargaining investigation of the negotiations that took place during the GATT’s (third) set of negotiations, referred to as the ‘Torquay Round’ of 1950-1951.

⁷⁷Bown and Irwin (2015) suggest a number of reasons why calculating average tariffs for 1947 is difficult. First, there was a lack of transparency across countries about their applied policies; i.e., data unavailability. Second, even if data were available, there was no common tariff classification scheme across countries, making it potentially difficult to make meaningful cross-country comparisons of simple average tariffs. Third, alternative measures of trade-weighted average tariffs, while readily calculable from available data, suffer from potentially severe biases associated with high tariffs leading to low import volumes and thus under-weighting. Fourth, the frequency of tariffs being applied as specific duties is known to have been a major measurement issue for United States tariffs during the period (e.g., Irwin 1998, Crucini 1994); and while the prevalence of specific tariff use for other countries during this period is unknown, it is expected to potentially also play a major complicating role.

⁷⁸The WTO (2007) provides an important survey of the first sixty years of the GATT/WTO system and includes additional, country-specific descriptions of tariff data over the decades for a number of countries not covered in depth here, such as Brazil, India, Senegal, Nigeria, Argentina and Korea (pp. 211-219).

key trading partners. The first one was for permanent changes to the tariff (Article XXVIII), and thus was a renegotiation of commitments. The other allowed a temporary increase to the tariff (Article XIX) in light of unforeseen, but temporary, events. One common feature of both is that tariff-changing countries were required to provide *compensation* to the affected trading partners. This compensation could take the form either of a mutually agreeable tariff reduction in some other sector or of the affected trading partner being permitted to raise its tariff in some other sector in response. A second common feature is that, unlike other GATT provisions introduced below, these changes to tariffs were meant to apply only to limited and well-defined *products*, and not entire sectors or bundles of imports.⁷⁹

Over the entire GATT period of 1947-1994, countries invoked Article XIX on 150 different occasions to increase their tariffs temporarily and Article XXVIII on 275 occasions to increase their tariffs permanently (WTO, 1995). While there is little empirical research examining the use of these provisions, access to some newly available archival data from their use during the 1950s allows us to investigate the extent to which temporary Article XIX measures were triggered right after the GATT's inception.⁸⁰ For example, the early GATT negotiations for tariff reductions could have significantly over-estimated the amount of tariff-cutting liberalization that government might be able to sustain, thus triggering the need to renegotiate commitments on either a temporary or permanent basis.

We begin with the permanent tariff increases triggered under Article XXVIII. Between 1950 and 1959, the GATT Contracting Parties invoked Article XXVIII only 70 times (WTO, 1995). Thus it appears that formal actions to raise tariffs permanently under Article XXVIII were relatively rare, and when they arose the requests were scattered across countries and were for distinct products across a number of different sectors. The lack of major permanent tariff increases, at least for the major GATT members, is consistent with the downward trend in average applied tariffs for these countries over the GATT period (see again Figure 13).

Next, consider the frequency with which countries resorted to *temporary* escape from their tariff commitments (Article XIX). A distinctive element of this channel is the mandate that, in order to justify use of Article XIX, governments were required to provide some evidence of unforeseen events having taking place. In particular, they were supposed to make the case that imports of the

⁷⁹For example, an Article XIX action typically involved a tariff line item or group of line items like 'hatter's fur' (USA, 1951), 'strawberries' (Canada, 1957) or 'hard coal' (West Germany, 1957) rather than a broad industrial classification like 'chemicals' or 'machinery.'

⁸⁰In terms of research, Bown (2004) examines invocations of Article XIX and XXVIII over the 1973-1994 period in one of the relatively few empirical pieces seeking to explain why countries used these provisions to implement additional import protection. The evidence there is consistent with a theory that countries invoked these exceptions when they needed to make changes to their trade policies between negotiating rounds and wanted to do so in accordance with GATT rules so as to avoid a dispute and potentially more severe retaliation by affected trading partners. For a theoretical exploration of the different GATT rules on *compensation* under Article XIX and XXVIII versus under dispute settlement (GATT Article XXIII), see Bown (2002b). A case study of US import policy in the 20th century by Robert Baldwin (1983) suggests that the United States' use of Article XIX cycled with changes in US trade law. The US law regarding safeguards varied in the stringency of qualifying criteria over decades with the result that safeguards were never used under the 1962 US Trade Act, but were far more common after reforms to the law in 1974.

product had increased considerably and unexpectedly, and this was causing injury to the domestic, import-competing industry. Notably, the Article XIX provision has subsequently been transformed into the WTO's Agreement on Safeguards. We have presented cross-country data on safeguards use over 1995-2013 in substantial detail in Section 3.2.

Overall, countries triggered temporary tariff increases in only 19 instances under Article XIX over 1950-1959, with slightly more than half being requested by the United States.⁸¹ Figure 14 displays the use of Article XIX by sector over 1950-1959 so that we can make comparisons to how it has been used in more recent decades, such as 1990-1999 and 2000-2009, mostly taking place under the WTO's Agreement on Safeguards (which began in 1995). The figure presents the share of all cases that high income (today's G20 high income countries) and developing countries (today's G20 emerging economies) triggered in the different periods by sector.⁸² The main insight from Figure 14 is that we have seen a dramatic change in the sectoral distribution of safeguard use over time. On the one hand, in the 1950s, high income countries utilized safeguards in a wide variety of industrial sectors: 22 percent of investigations were in footwear, 20 percent in minerals, 11.7 percent in transportation equipment, 8.3 percent in both textiles and plastics, and only 6.7 percent in metals. In more recent decades, safeguards have been used primarily to restrict trade in metals. Interestingly, for the developing countries, the pattern of industrial concentration is reversed; two thirds of safeguards in the 1950s were in machinery while in more recent decades, safeguards were used for chemicals, plastics, wood products, textiles, stone, metals, machinery and miscellaneous goods.

In summary, actions to raise tariffs in the first decade of the GATT appear to have been in disperse product categories across a wide variety of countries. Unlike other policy tools discussed below, Article XIX and XXVIII were not used to dramatically reduce imports at the aggregate level or to dramatically reduce trade in an entire sector of the economy.

4.3 GATT exceptions and the rise of major carve-outs

In this section we briefly introduce a number of major exceptions to the general application of the GATT rules and procedures that resulted in important 'carve outs' from liberal trade during 1947-1994. These take on a number of different forms.⁸³

⁸¹Data on Article XIX investigations between 1950-1959 was collected from the GATT digital archive at Stanford University and each verbal description of a product was matched to the modern HS06 product classification.

⁸²The definition of core European countries is West Germany, France, the Netherlands, Belgium, the United Kingdom, and Italy.

⁸³This section deliberately omits reference to preferential trading arrangements; see again our earlier discussion in Section 2.2. The one major example of a successful and sustained PTA established early in the GATT era was the European Economic Community. Other major PTA examples such as CUSFTA/NAFTA, MERCOSUR, and ASEAN were all established at the tail end of the GATT period.

4.3.1 Emergency import restrictions to address balance of payments problems

From the end of World War II until 1971, the major economies participated in the Bretton Woods system of fixed exchange rates in which countries pegged their currencies to the US dollar.⁸⁴ Understanding that macroeconomic forces could lead to an overvalued currency, and that this could lead to a balance of payments (BOP) deficit and the loss of foreign currency reserves, the GATT included Article XII which explicitly permitted government use of import restrictions to defend a currency's peg and prevent a forced devaluation.⁸⁵ Balance of payments actions were rarely used by the major economies after the system of flexible exchange rates was introduced in 1971.⁸⁶ However, when BOP actions were taken during the GATT's first 25 years to address a fundamental macroeconomic imbalance, they tended to be broad-based import restrictions of sizeable magnitudes. This is quite distinct from the product-specific (Article XIX, XXVIII, or antidumping) exceptions or even sector-specific exceptions introduced below regarding textiles, apparel, and agriculture.

To give one example, in January 1952, the government of the United Kingdom was forecasting a balance of payments deficit for 1952 of about £500 million. The Chancellor of the Exchequer circulated a top secret Cabinet memo which declared: "The gold and dollar reserves continue to fall at an alarming rate... unless we tackle this situation... by the middle of the year we shall not be able to hold the pound at \$2.80... Unless we stem this tide, it will swallow us up, and we shall reach a point at which we can no longer buy the basic food and raw materials on which this island depends..." (Butler, 1952). By early March, the UK suspended or restricted imports on an enormous variety of foodstuffs and manufactured goods with the objective of reducing imports in 1952 by "about 10 per cent of the value of imports in the year 1951." (UK, 1952) The list of restricted items was broad and included cheese, cloth, dishwashing machines, roof tiles, metal buckets, fish hooks, and umbrellas.

Figure 15 presents data on the number of import restrictions necessitated by BOP problems between 1950 and 1959.⁸⁷ While the absolute number may be small in any given year, the actions taken as a fraction of the total GATT membership at the time was sometimes substantial. For example, in 1952, *nearly half* of the initial 23 GATT Contracting Parties - Australia, Brazil, Chile, Finland, France, New Zealand, Pakistan, Rhodesia, Sweden, South Africa and the UK - imposed import restrictions for balance of payments problems.

4.3.2 Japan's GATT accession and the 'temporary' Article XXXV exception

Two major economies were not included as part of the original 23 Contracting Parties that negotiated the launching of the GATT at the end of World War II - West Germany and Japan. Both

⁸⁴In 1971, the Bretton Woods system effectively collapsed when the United States abandoned the gold standard.

⁸⁵Irwin (2012) describes how the mismanagement of currencies contributed to the disastrous trade policy environment of the 1930s and thus to the deepening and persistence of the Great Depression.

⁸⁶BOP consultations and import restrictions continued in the 1970s and 1980s for many small and low-income countries that pegged their currencies to a major currency after the collapse of Bretton Woods.

⁸⁷These data on the number of reports to the GATT of import restrictions necessitated by BOP problems are collected from the GATT Digital Archive.

were eventually allowed entry - West Germany acceded in 1951 and Japan acceded in 1955.⁸⁸

However, Japan's accession to the GATT in 1955, and its re-industrialization and export-led growth strategy led to a major period of adjustment for many GATT members. Indeed, upon Japan's GATT entry in 1955, more than 50 countries invoked the GATT's Article XXXV exception which allowed them to refuse to apply the Agreement's legal obligations to their trade with Japan. The implication was that most of the GATT membership set a higher tariff on imports from Japan, even after it joined the GATT, than the MFN tariff they applied to imports from all other members.

The length of this temporary non-application of the GATT varied substantially. Major economies including Australia, Belgium, France, Netherlands, and the UK did not recognize Japan's full membership into the GATT for nearly a decade (until 1963 or 1964). Many others did not revoke their Article XXXV exception, and thus reduce their tariff on imports from Japan to MFN levels, until the 1970s or later.

4.3.3 The rise of voluntary export restraints, including the multi-fibre arrangement

Unlike much of the GATT membership, the United States championed Japan's accession to the GATT and offered Japanese exporters MFN tariff treatment in the US market. However, industries in the United States also faced acute pressure as they struggled to adjust to increased imports from Japan beginning in this period. This led the US government to a number of *other policy instruments* to slow down Japan's export growth; the most prolific of these were in the form of negotiated voluntary export restraints, the policy that we introduced conceptually in Section 3.4.

A first example of a major set of quantitative restrictions and VERs arose in the face of increased imports of textiles and apparel from Japan; this led first to the Short Term arrangement covering cotton textiles (1961-1962), followed by the Long Term arrangement covering cotton textiles (1962-1974), and ultimately the multi-fibre arrangement (MFA) that remained in place between 1974 and 2004.

The textile and apparel sector turned out to be the tip of the iceberg for the VERs that the US negotiated with Japan. For example, in the decade between 1975 and 1984, the US had at least six different sectors in which its safeguard (Article XIX) investigations ultimately resulted in VERs with Japan; major sectors included autos, televisions, steel and footwear (Bown and McCulloch, 2009). Furthermore a set of US antidumping investigations begun in 1985 over DRAMS and other semiconductors also resulted in VERs with Japan.

To be clear, there was no GATT legal exception or provision that expressly authorized VERs. They arose on an ad hoc basis, and they were frequently the result of negotiations that had developed after the United States had a domestic industry trigger one of the other potential GATT exceptions, such as a safeguard (Article XIX) or antidumping (Article VI) investigation.

⁸⁸As we have already discussed, during the period in which West Germany was becoming a formal part of the GATT system, it was also involved in substantial efforts at Western European integration, including the ECSC in 1951 and the 1957 establishment of the European Economic Community and customs union. See again Section 2.2.

4.3.4 Agriculture

From the GATT's inception, the agricultural sector was treated as unique and thus one for which the GATT rules and obligations would not comprehensively apply. Two of the primary proponents for such an approach were the United States and the countries of western Europe. Indeed, the United States had requested and was granted a waiver (under Article XXV) in 1955 that even the basic GATT provisions on tariffs (Article II) and quantitative restrictions (Article XI) not be applied to its agricultural sector. Europe was also not in favor of applying basic GATT tenets to the agricultural sector; beginning in the late 1950s, the EEC was busy developing its Common Agricultural Policy (CAP) of integrating European agricultural markets; policies included high border barriers as well as establishing a complex system of domestic price support and other subsidy programs.⁸⁹

Without understating the importance of the sector, but given the particular complexities of the underlying domestic and trade policies involved, as well as the lack of clarity regarding the applicability of GATT-era disciplines, we limit further discussion here to two additional points. First, although agriculture was seen as special and outside of GATT rules during the period, a number of formal and contentious trade disputes concerning agriculture arose under the GATT. In particular, the US and EEC formally confronted each other on a number of different occasions.⁹⁰ Second, while agriculture was formally brought back into the multilateral system through the WTO Agreement on Agriculture in 1995, it remains a sector marked by high levels of import protection. As we have already observed via Figures 2, 3, and 10, contemporary tariffs (applied rates and bindings) in the sector remain high, with a high incidence of both tariff peak products and tariffs applied as specific duties. Furthermore, and as we will discover in Section 5, agriculture is a sector characterized by significant *domestic* policy interventions, such as subsidies, crop insurance, and other price (and income) support schemes. Finally, agriculture is a sector to which special trade rules for health and safety (through the WTO Agreement on Sanitary and Phytosanitary Measures) frequently apply.

4.3.5 Special and differential treatment for developing countries

The GATT was a voluntary agreement. Countries chose for themselves how much tariff cutting they would attempt to extract from trading partners via the repeated rounds of multilateral negotiations and, in return, how much tariff-cutting they would agree to undertake at home. A number of major developing countries helped to found the GATT in 1947, including Brazil, Burma, India, Pakistan, South Africa, Sri Lanka, and Zimbabwe. In the 1950s and 1960s, the GATT membership expanded to include a number of developing countries after they gained independence from colonial rule. Nevertheless, during most of the GATT period, the majority of developing countries did not pursue

⁸⁹For an introduction to agricultural issues in the GATT and WTO, see Hoekman and Kostecki (2009, pp. 270-303). For historical data dating back to 1955 on agricultural distortion in major markets, see Anderson and Valenzuela (2008) and Anderson and Nelgen (2013).

⁹⁰Disputes arose in a challenge to the CAP in 1962, and in bilateral skirmishes in products including dairy, processed fruits and vegetables, animal feed proteins, sugar, poultry, as well as the infamous 'chicken war' (Hudec, 1993).

export-oriented trade and development strategies, but instead chose to pursue import-substitution regimes.

The original GATT 1947 introduced special and differential treatment (SDT) for developing countries via Article XVIII. In the 1960s, the GATT adopted its Part IV ‘Chapter on Trade and Development’ which specified additional principles by which high-income countries were encouraged to reduce trade barriers in products of particular interest to developing countries. Finally, and as we have already observed in Section 2.2, in the 1970s major economies like the European Economic Community and United States implemented lower-than-MFN tariffs on imports of many products from developing countries under the Generalized System of Preferences (GSP). This exception to MFN was brought into the GATT system legally with the adoption of the Enabling Clause in 1979.

Looking back at this historical episode, however, the consensus is that the GATT period was not a successful one for integrating developing countries into the multilateral trading system. One explanation offered by economists is that all of the exceptions associated with SDT combined to result in a strong *disincentive* for developing countries to engage the same ‘reciprocity’ process that was the mechanism that arguably made the GATT such success for the high-income countries. Because developing countries had been offered export market access (via unilateral preferences) ‘for free,’ developing countries did not have to simultaneously reform their import-competing sectors; this is what high-income countries had been required (by market forces) to do in exchange for the reciprocal market access that had been granted to their exporters.⁹¹

Second, because developing countries were not offering anything (market access) of their own in exchange for special tariff cuts, they could not influence either the products or the countries from which they would receive these tariff cuts. And, as was observed already via Figures 7 and 8, countries typically have not offered unlimited, unilateral tariff cuts for 100 percent of their imported products even to developing countries. Furthermore, the comparative advantage of most developing countries had them involved in potential export sectors that were diffuse globally; the result was low-income countries had great difficulty in organizing negotiations among themselves to coordinate tariff liberalization ‘requests’ being made of major importing countries (Ludema and Mayda, 2013).

Overall, developing countries were not successful at getting their true export interests reflected as part of negotiated bargains. As such, one legacy of the GATT period is that agriculture, textiles, and apparel - sectors of production and export interest for developing countries - were essentially excluded from trade liberalization and the application of the GATT system’s basic rules.

⁹¹McCulloch and Pinera (1976) offer an early skeptical view of the benefits of GSP, for example. Subramanian and Wei (2007) provide empirical evidence that the GATT had relatively little impact on developing country trade, potentially due to the asymmetries implied by such preferences. See also Staiger (2006) and Bagwell and Staiger (2014).

4.3.6 Antidumping in historical perspective

The last trade policy exception from the GATT period that we introduce is antidumping.⁹² As described in Section 3.2, the GATT system permitted countries to impose antidumping import restrictions against products sold at low (dumped) prices if such imports caused injury to the domestic, import-competing industry. Today antidumping is in use by a wide range of high-income and emerging economies.

Prior to the 1990s, only four economies - Australia, Canada, the EEC and the US - used antidumping import restrictions with any regularity. In the 1980s, for example, the United States began to use antidumping with increased frequency to address the increase in imports in a number of different sectors from Japan, as well as some of the other newly industrializing economies of East Asia, such as Korea and Taiwan.⁹³

Here we take advantage of newly compiled data on historical use of antidumping by the GATT's high income economies, so as to compare their use of the policy during the 1970s with their more contemporary use. Figure 16 depicts the share of antidumping investigations across industrial sectors for three different decades.⁹⁴

Interestingly, Figure 16 reveals a number of similarities arising for antidumping use by both the United States and Europe. In the 2000s, the industry demands for new import restrictions were mostly concentrated into the metals (steel) sector. However, this was not always the case. In the 1970s, less than 25 percent of US antidumping investigations were in the metal sector. In both economies in the 1970s, antidumping use was much more evenly dispersed across sectors, including chemicals, machinery, plastics, stone, and transportation equipment.

4.4 Implications for the contemporary landscape of trade policy

We summarize our history of the GATT period with four important observations.

First, for the GATT period, an empirical analysis focused exclusively on applied tariff data is likely to result in a serious mischaracterization of the landscape of trade policy. Whether it was the implementation of quantitative restrictions to protect the balance of payments due to aggregate-level shocks in the 1950s, the imposition of Article XIX (safeguard) exceptions, the exemption of Japan from MFN tariff treatment for a decade (*after* its GATT accession), the rise of sector-wide voluntary export restraints (the MFA), the proliferation of VERs in other major sectors and markets (US steel, autos, footwear), or the inception of antidumping; from the GATT's earliest

⁹²Under the GATT 1947, both antidumping and countervailing duties were permitted under Article VI. Additional provisions for these policies were put forward through 'plurilateral codes' as a result of the GATT's Tokyo Round of negotiations in 1979.

⁹³See Irwin (2005) for a presentation of the historical use of antidumping by the United States. Blonigen and Prusa (2003) present an early survey of the literature on antidumping; most of the empirical research in particular that had arisen in the 1980s and 1990s had focused on the United States and, to a lesser extent, the European Economic Community.

⁹⁴Data used to construct these figures for 1970-1979 come from the GATT digital archive series COM.AD, and for 1990-2000 from the Temporary Trade Barriers database. For the 1970s, we mapped the verbal descriptions of products involved into HS06 product categories.

years, the full story of border barriers under the multilateral trading system requires much more than measuring applied tariff rates.

Second, there can be substantial shifts away from one border policy tool and toward another, even within countries and potentially within sectors, over the decades. For example, consider the United States, and the textiles and apparel industry. The US used both temporary (Article XIX) and permanent (Article XXVIII) actions to restrict imports of textiles and apparel in the 1950s. However, with the subsequent establishment of the Short- and Long-Term Arrangements on cotton textiles and then the MFA, beginning in 1961, the next four decades featured a notable absence of US special import restrictions in these sectors under its antidumping and safeguard policies.⁹⁵

Third, while each of these policy instruments (and exceptions) has had at least one episode of major use in the past, sometimes a particular policy falls out of favor. This occurs for a variety of different reasons. For VERs, the new rules developed under the WTO Agreement on Safeguards, which were negotiated by the same countries that utilized these policies in the 1980s, explicitly discouraged their use. In this case, it appears that governments were tying their own hands to reduce the use of a policy that they understood had undesirable costs. However, these same governments appear to have turned to something else (e.g., antidumping and price undertakings) when new demands for protection arise. For the balance of payment exceptions, however, the demand was largely eliminated with the collapse of the Bretton Woods system of fixed exchange rates.

Fourth, given the relative substitutability of many of these policy instruments, and perhaps due to the fact that many of the ‘problems’ that trade policy instruments are seen to solve remain the same (e.g., competitive adjustment due to new market entrants, macroeconomic shocks, exchange rate misalignment for currencies that are not truly floating, etc.), it also turns out that history tends to repeat itself. Frequently the story-line stays the same, it is simply the countries, sectors, governments, or particular policy instruments that change.

We conclude this section by highlighting some of the parallels between what is perhaps the most significant trade policy ‘issue’ of the contemporary period - i.e., the integration of China into the global trading system - with events that took place in the 1950s. First, the 2001 WTO accession of China mirrors certain aspects of the 1955 GATT accession of Japan. For example, while the GATT membership in the 1950s adjusted to Japan’s entry by either raising tariffs (above otherwise mandated MFN levels) by invoking Article XXXV or negotiating VERs, the WTO membership in the 2000s adjusted to China’s entry by imposing product-specific import restrictions like antidumping (see again Section 3.2 and Table 6).

Second, the 1950s and the 2000s also featured significant concerns over macroeconomic imbalances with implications for trade policy.⁹⁶ In the 1950s, under the Bretton Woods system,

⁹⁵By the 2004 expiration of the MFA, most of the domestic textile and apparel industry had left the United States, and thus there was very little domestic industry pressure for new import protection.

⁹⁶To be clear, the 1950s were not the only episode during the GATT era in which macroeconomic shocks triggered major trade policy actions. See, for example, the Nixon-era US import surcharge in response to the Bretton Woods collapse in 1971 (Irwin, 2013), or the pressure on US trade policy in the 1980s due to the over-valued dollar prior to the Plaza Accord.

many countries implemented import restrictions for balance of payment purposes. In the 2000s, under a system of flexible exchange rates for major currencies (dollar, euro, yen) and fixed or managed exchange rates for others (renminbi), interest has returned to using import policy to address macroeconomic imbalances, including those associated with China's current account surplus and its potentially 'undervalued' currency. Economics has no universally-accepted definition of what constitutes an 'undervalued' currency and, even if one were developed, it is unclear whether the WTO would have the institutional capacity to effectively monitor currency values. Nevertheless, an evocative academic debate arose during the 2000s regarding the appropriate role for including currency manipulation provisions into trade agreements.⁹⁷

5 Behind-the-Border Policies

This section returns to *contemporary* economic policies and pushes beyond border barriers to introduce some of the domestic laws and regulations that can also significantly impact international commerce. Such 'behind-the-border' (BTB) policies start with relatively straightforward domestic taxes and subsidies; these policies mostly become relevant when their *application* discriminates between domestic- and foreign-produced varieties of substitutable goods. However, concerns over BTB policies have moved well beyond simple taxes and subsidies and increasingly include competition policy, foreign investment regulations and local content requirements, labor and environmental regulations, other production process standards designed to protect animal or plant health, product standards to ensure consumer safety, and product labeling that is a response to consumer demands for information. And yet, most of these other areas are much more complex in that a compelling case can be made for *some* form of domestic policy intervention. Furthermore, the channels through which the alleged discrimination against foreigners arises can also be much more subtle.

We rely on two motivations for bringing BTB policies into our analysis of the empirical landscape of international commercial policy.

First, economic theory shows that the effects of an import tariff can be replicated through the appropriately chosen combination of a domestic consumption tax and a domestic production subsidy. Thus, if left unconstrained, basic economics would expect governments to implement such domestic policies, if only to simply replace dismantled import tariffs, because of incentives to shift costs onto trading partners (e.g., Bagwell and Staiger 1999, 2001) or because of commitment problems with respect to their private sectors (Maggi and Rodriguez-Clare 1998; Limão and Tovar 2011).

Second, while our empirical focus will be on contemporary BTB policies, we recognize that governments have long confronted the possibility of such policy substitution by addressing the issue in actual trade agreements. The 'shallow' approach of the original GATT 1947 did not ignore BTB

⁹⁷See Mattoo and Subramanian (2009) for arguments in favor of bringing the issue of currency undervaluation into the WTO; Staiger and Sykes (2010) describe a number of difficulties arising with such a proposal. The gradual appreciation of the Chinese renminbi against major currencies since 2005 served to decrease some of the intensity of the debate around the issue.

policies but included the nondiscrimination principle of national treatment (Article III); this stated explicitly that aside from the import tariff that a good must pay to cross the border, imports could not be subject to additional forms of regulatory or tax discrimination (Horn, 2006). However, the GATT 1947 also explicitly allowed governments to impose BTB policies (that might affect trade) through Article XX's 'General Exceptions' for conservation of exhaustible natural resources, public health, public morals, etc. The establishment of the WTO in 1995 created further Agreements attempting to clarify some of the characteristics for permissible BTB policy exceptions, including those concerning animal, plant, or human health (sanitary and phytosanitary - or SPS - measures) and also product standards (technical barriers to trade - or TBT). Nevertheless, a number of US and EU preferential trade agreements in particular that have been negotiated since the early 1990s have gone even further, resulting in 'deep' integration negotiations directly over BTB policies themselves. Finally, while GATT negotiators may have deliberately chosen not to negotiate over BTB policy levels in multilateral rounds, almost immediately upon the WTO's 1995 inception, BTB policies have become a major subject of intense scrutiny, debate, and ultimately dispute thereby giving rise to formal legal jurisprudence under the WTO dispute settlement system.⁹⁸ The evolving body of case law arising under the WTO's Dispute Settlement Understanding (DSU) through Panel and Appellate Body Report rulings is clearly affecting the way that countries structure and apply their BTB policies in practice.

Nevertheless, any consideration of domestic policy immediately presents additional complexities for research on optimal policymaking and institutional design. One complication is the nature of the additional information required for policy evaluation. For almost every BTB policy introduced below, a global efficiency case could be made to justify at least some activist government intervention. For example, the first-best (global) policy to attack a negative externality in consumption - e.g., pollution via tailpipe emissions - is a consumption tax. Similarly, the first-best policy to address positive externalities in production would be through a targeted production subsidy. First, this is qualitatively unlike the case of border policies; whereas a positive import-tariff can be Pareto-improving relative to free trade at the national level for a large country, the tariff is nevertheless Pareto-inferior when measured at the global level because of its beggar-thy-neighbor, cost-shifting effects (via changes in the terms-of-trade). But second, the quantitative details of the policy intervention - i.e., its form and its level - also become of critical importance.

This chapter's approach to introducing BTB policies is admittedly modest; despite their increasing importance for policymakers or negotiators, empirical research in the area is highly underdeveloped, and there is no consensus on even how to measure the economic magnitude of many of the critical issues. As a first step, we therefore characterize the contemporary landscape of behind-the-border policies by surveying case studies of particularly contentious domestic policies that have been the subject of formal WTO disputes. We introduce both supply-side and demand-side policies that governments have employed and that trading partners have challenged. However, unlike our earlier presentation of border barriers, we refrain from providing data or summary measures of any

⁹⁸For more on the legal process by which dispute settlement operates under the WTO, see Mavroidis (forthcoming).

BTB policies here.⁹⁹

The benefits of our approach include the following. First, the examples illustrate that some of these BTB policies are pervasive across countries and over time, or they are in economically sizeable markets; this motivates them as worthy of additional substantial research scrutiny. Our tables below cover roughly 50 formal WTO disputes over BTB policies, which is about 10 percent of the population of WTO disputes arising between 1995 and 2015. Indeed, in their survey of all border and BTB policies subject to WTO disputes over 1995-2011, Bown and Reynolds (2015) find that WTO disputes collectively investigated nearly \$1 trillion in goods imports, an average of \$55 billion per year, or roughly 0.5 percent of world imports in 2011. Second, the case studies also highlight complexities that researchers inevitably face in bringing such scrutiny to bear, including attempts to disentangle which elements of BTB policies are ‘legitimate’ - from a global, efficiency-enhancing perspective in light of the relevant market failures - from ‘illegitimate’ elements that result in mainly (uncompensated) cost-shifting or profit-shifting across countries. Third, for most of the case studies, we explicitly direct the interested reader to papers from a now established and growing literature whereby legal scholars and economists have been paired to provide a jointly-written, detailed analyses of the domestic policies, markets, and jurisprudence arising under the individual WTO dispute.¹⁰⁰ The tables in this section thus provide references pointing to these dispute-specific introductions to the policies and the more detailed analyses.

There are also, however, certainly a number of limitations to our approach. First, a discussion of hand-picked case studies is certain to be fraught with sample selection concerns.¹⁰¹ For example,

⁹⁹As of the time of writing, there are no comprehensive data sets that convincingly collect data on BTB policies. There have been a few piecemeal approaches. One has been to survey firms and traders as to which non-tariff barriers exporters feel most impede their ability to trade. Other and more comprehensive approaches at data collection are ongoing, including efforts by international organizations such as UNCTAD and the World Bank, that review domestic laws and regulations and categorize them according to an established template of well-defined categories of non-tariff measures (NTMs). These NTMs are then mapped to HS06 products based on the descriptions of the products mentioned in the laws and regulations. While such efforts at data collection and construction are surely a step in the right direction, other significant efforts will be required before these data will be usefully implemented for research. For example, informed judgments will be required to convert data on the existence of behind-the-border policies to a characterization of them as behind-the-border *barriers*, given that such policies frequently apply to both domestic and foreign-produced goods. Second, the raw data will also require conversion through credible and model-driven econometric techniques so as to construct ad valorem equivalent estimates of the barriers. Third, more data will be needed so as to provide measures of the potential *externalities* that these BTB policies are alleged to confront in the first place. Fourth, identifying the affected HS06 products associated with some BTB policies (e.g., local content requirements) will require mappings through input-output tables or firm-specific data, given the critical economic incentives that are affected by the nature of the policy. Overall, the data construction work in this area, unlike in tariffs and other border barriers, is very much still in its nascent stage.

¹⁰⁰Beginning in 2001, in a project initially sponsored by the American Law Institute, Henrik Horn and Petros Mavroidis initiated a program that annually convened a set of legal scholars and economists so as to provide reports assessing the new case law arising from the WTO’s Appellate Body (and unappealed Panel Reports). These joint assessments have subsequently been published annually by Cambridge University Press, primarily through special issues of the *World Trade Review*. In 2011, one of the co-authors of this chapter (Bown) took over co-directing the project (from Horn) with Mavroidis. After more than 15 years, the result is a body of work covering more than 100 WTO legal decisions.

¹⁰¹An example of research examining the specific trade concerns (STCs) that governments have brought to the WTO under the SPS or TBT committees is Fontagné, Orefice, Piermartini, and Rocha (2015). More generally, Bown (2009, chapter 3) surveys the early research on some determinants of which policies governments choose to challenge under the WTO.

the majority of BTB policies are taken from large markets with democratic political systems in which policies are developed (and applied) under conditions of relative transparency (Canada, EU, US, Japan, etc.). Furthermore, these economies also have relatively low levels of border barriers (see again Section 2); this raises the question of whether the BTB policy under scrutiny was there all along, and only worth challenging once the border barriers had first been addressed, or whether the BTB policy only arose after the border barrier was dismantled. Finally, given the lack of available data in this particular area, we make no attempt to provide cross-country, within-country, or inter-temporal comparisons of any magnitudes of these BTB policies.¹⁰²

We introduce BTB policies by focusing on case studies lumped into one of two broad (and imperfect) categories.¹⁰³ The first includes supply-side policies; the common theme is that the policies are applied in a way that trading partners allege favor domestic producers relative to foreign producers of substitutable varieties of the good. The second involves demand-side policies; the allegation is typically that such policies discriminate by encouraging consumption of locally-produced varieties and discouraging consumption of imports of competing goods. As the case studies reveal, the incentive to discriminate can happen directly through taxes, subsidies (or tax exemptions), or indirectly and more subtly (and perhaps even without intent) through the design and implementation of a regulation, through production or (consumer safety) product standards, or even through product labeling.

One final caveat is in order before delving into the case studies. Our goal is to illustrate the complexities involved in the behind-the-border policies increasingly implicated by international agreements over commercial policy. We refrain from passing judgment on any particular BTB policy; i.e., our selection of BTB policies should not be construed as a commentary on their trade restrictiveness or on any particular WTO legal decision. Indeed, a close read of more than 20 years and 100 WTO legal decisions indicates a surefire tension that has arisen. On one hand, the WTO's Dispute Settlement Body (DSB) almost never questions the legitimacy of the respondent country's underlying domestic policy under dispute; i.e., the WTO approach seems to respect national sovereignty and its member governments' right to regulate to address market failures and externalities. On the other hand, in almost every dispute, the DSB finds that the respondent country has done something fundamentally wrong via the manner through which it has *applied* its

¹⁰²Other limitations of our approach is that it does not attempt to provide even a cross-section of imposed BTB policies in existence at any moment in time - i.e., some of the BTB policies highlighted below may no longer be in effect. Admittedly, some of these BTB policies are in more 'dynamic' areas (relative to tariffs) in that the policies may require continuous evolution given the nature of the underlying externality or market failure - e.g., as new scientific evidence arises or as market structures evolve, etc. A more complete survey of the literature on non-tariff barriers can be found in Ederington and Ruta (forthcoming). See also the survey and compilation of policies provided in WTO (2012).

¹⁰³One reason why these categories are imperfect is that some of the BTB policies affect both demand and supply, and another is that some of the disputes involve a simultaneous challenge to more than one BTB policy. Furthermore, a tension can arise between characterizing the policy according to the discriminatory economic incentives that it creates (typically the complaining country's allegation) or the 'exception' - e.g., consumer, animal or plant health; conservation of a natural resource - that seeks to justify its existence (claimed by the responding country). An alternative and more legalistic method of organization could be based on the formal WTO legal provisions being challenged in the dispute.

BTB policy.

5.1 Behind-the-border policies affecting supply

This section introduces a number of domestic policies that primarily affect the supply side of the market - either by lowering domestic firms' costs or by raising a foreign rival's costs by potentially forcing them to undertake additional investment to meet a standard or regulation.

5.1.1 Domestic subsidies: aircraft, agriculture, semiconductors, and clean energy

We begin with examples of domestic subsidies impacting production. In some sectors, the subsidies could be motivated on efficiency grounds as designed to confront externalities, or imperfect markets; in others, the subsidies may only be motivated as a second-best form of income redistribution for a politically-motivated government with an incomplete set of policy instruments.

Domestic subsidies abound in the civil aircraft industry, dating well back to the GATT period. Indeed, government intervention in the civil aircraft market even pre-dates the eventual rivalry between US-based Boeing and Europe-based Airbus. Subsidies, tax exemptions, and other forms of policy intervention in this market have triggered attempts to design international rules since at least the 1970s.¹⁰⁴

Consider the implications of a production subsidy that a European government grants to Airbus. Such a subsidy expands the domestic production capacity in the European market and, all else equal, would decrease European imports of aircraft from Boeing. In 2004, the US government filed a WTO dispute over European subsidy policies. As Table 8 indicates, the EU filed a similar (and almost simultaneous) dispute challenging US subsidies to Boeing. Admittedly, the policies under dispute are much more complex than simple production subsidies and include tax exemptions offered at the sub-federal level (e.g., by Washington state to Boeing); EU 'launch-aid' to help overcome the start-up costs of developing new models; the civil aircraft subsidy spillovers arising from US government military contracts to Boeing, given that military aircraft technology has 'dual use' (for civil aircraft) applications; and export-credit and guarantee arrangements offered to (consumer) airlines.

Civil aircraft subsidies can have additional strategic effects given the unique nature of the global duopoly in the market; i.e., the two producers not only compete for sales in each others' market, but for sales in third country markets.¹⁰⁵ Additionally, Table 8 reveals that a very similar WTO dispute has played out between Canada and Brazil in a separate segment of the civil aircraft market; each of these countries was challenged for offering subsidies to smaller aircraft (regional jet) producers Bombardier and Embraer, respectively, in disputes that led to authorized retaliation. Finally, and while admittedly more of a consumer-side policy, the US has recently alleged in a formal WTO

¹⁰⁴The GATT's Tokyo Round of negotiations produced a plurilateral 'code' in 1979 that applied to international trade in civil aircraft.

¹⁰⁵The Boeing-Airbus storyline helped motivate the substantial strategic trade policy literature that arose in the 1980s; for a survey, see Brander (1995). Irwin and Pavcnik (2004) provide an empirical study of the Boeing-Airbus rivalry and policies of the 1990s.

dispute that China has been offering a subsidy (value-added tax exemption) for domestically-produced aircraft.

Agriculture is another sector in which domestic subsidies frequently arise, albeit in different forms.¹⁰⁶ The EU's Common Agricultural Policy has a long history of BTB policies sparking disputes. One specific example was the EU's domestic price support system for sugar; the subsidies to domestic production transformed the EU from a net importer to a net exporter, with the excess supply dumped onto export markets. Australia, Brazil, and Thailand - other major exporters of sugar - ultimately challenged the EU policy at the WTO. Similarly, US agricultural policy, and in particular various iterations of the US Farm Bill legislation, has also been subject to considerable international scrutiny. For example, in 2002 Brazil brought a formal WTO dispute against the US cotton subsidies. In both the EU and US disputes, the complaining countries' concerns with the subsidy were less over their impact for lost export sales to the policy-imposing country's own market, and instead for lost sales competing with EU sugar or US cotton exports in third markets.

Two additional industries - semiconductors and clean energy products - further highlight the complexities of subsidies arising as part of national industrial policies.

Semiconductors have been subject to considerable government intervention since at least the 1980s; indeed, our discussion of border barriers in the last section illustrated the industry as one in which antidumping measures and voluntary export restraints were prevalent between the United States and Japan.¹⁰⁷ More recently a leading Korean producer, Hynix, which accounted for 4 percent of *total* Korean exports globally, became financially insolvent. In October 2001 and again in December 2002, Hynix's creditors organized financial bail-outs in order to save the company. The US, EU and Japan, major importers and producers of semiconductors at the time, each asserted that the Korean government had subsidized the industry by orchestrating the bailouts and they then each responded by imposing countervailing duties on Korean semiconductors.

This kind of dispute introduces another channel through which BTB policies can be impacted by WTO legal decisions; this is due to a particular way that certain areas of the WTO Agreements are structured. While the primary 'policy' triggering the friction between the US, EU, Japan and Korea was Korea's BTB subsidy, the subject of the WTO dispute was the US and Japanese countervailing duty policies in *response* to the Hynix bailout; not the bailout itself. In this kind of a dispute, for example, the WTO could not rule that Korea should reform its subsidy policy, it could, at most, direct the US or Japan to reform how their countervailing duty policies addressed the Korean subsidy (Hynix bailout) policy. However, any adjustments to the rules for when it is permissible for a trading partner to implement countervailing duties would be expected to *indirectly*

¹⁰⁶Agriculture is perhaps the one sector for which there exists more systematic provision of data for a number of BTB policies. For example, the OECD has routinely produced a cross-country database on 'producer and consumer support estimates' for agricultural support payments. Furthermore, Kym Anderson has worked with the World Bank to produce a historical database of distortions to agricultural incentives covering the period of 1955-2011 (Anderson and Valenzuela 2008, Anderson and Nelgen 2013)). For a survey of the political economy of agricultural policy, see Anderson, Rausser and Swinnen (2013).

¹⁰⁷Irwin and Klenow (1994) provide an empirical study of the semiconductor industry and learning-by-doing spillovers over the 1974-1992 period.

affect how a country like Korea implements its subsidy policies in the first place.

Finally, an even more recent (and potentially contentious) concern for behind-the-border policies has arisen in a number of interrelated markets for clean energy products. Consider first the market for solar panels, though similar BTB policies are affecting markets for wind towers and wind turbines.¹⁰⁸ Solar panels are potentially distinct from a number of other sectors in that their *consumption* - i.e., a shift toward clean energy production and away from more polluting fossil fuels - may be associated with positive externalities (that may even be global in scope, considering climate change), and which could legitimize an efficiency case for policy intervention. Beginning in 1999, governments in Europe implemented consumption subsidies to stimulate consumer demand for solar energy. The result has been a massive increase of the quantity of solar generating capacity in Europe; for example, in Germany by 2014, installed solar capacity was larger than natural gas, hard coal, and brown coal (Burger, 2014).

Although the European consumption subsidy was partially intended to benefit the German firms that were instrumental in the technological development of solar panels, by 2012, China's solar panel exporters had captured 80 percent of the European market. This prompted new EU import restrictions of solar panels from China under its antidumping policy. In essence, the *nondiscriminatory* nature of the original European consumption subsidies helped trigger such an increase in imports that the EU government came under political pressure to apply new border barriers.

The Chinese government responded to the resulting drop in exports to the EU by implementing a number of its own BTB policies, as well as adjusting its own policies at the border. For example, China introduced a regulation to force industry consolidation and a program of consumption subsidies in 2013. The effect of these and other Chinese and EU policies has also spilled over into third markets for panels and into upstream product markets. China imposed antidumping duties on imports of solar grade polysilicon - a key input for solar panel production and for which demand likely fell with the decline in sales by downstream Chinese solar panel producers - from the United States, EU and Korea beginning in 2013. Furthermore, in the United States solar panel market, a subsidiary of a German firm, Solar World AG, filed a series of antidumping and countervailing duty cases against imports from China and Taiwan (but not Germany) beginning in 2011; they have subsequently resulted in the US imposing new import tariffs against these countries.¹⁰⁹ There has also been a WTO dispute over solar panels; however, similar to the semiconductors example, the resulting WTO dispute was filed by China and thus concerned the US application of its countervailing duty that was the policy response to the set of Chinese subsidies. The WTO dispute thus only indirectly concerns the underlying Chinese BTB policy itself.

These last examples in particular raise a host of questions for research and for the design of international institutions to coordinate BTB policy actions that might address various types of market failures, as well as local and global, non-pecuniary externalities, including climate change.

¹⁰⁸This section draws from Crowley and Song (2015). Cosar, Grieco and Tintelnot (2015) provide an empirical study of the European wind turbine industry.

¹⁰⁹India also initiated an antidumping investigation into imported solar cells from China, Taiwan, US and Malaysia in 2012.

5.1.2 Other supply-side policies: competition, production standards, environment and labor

Next turn to Table 9, which provides examples of other supply-side policies that been the subject of WTO disputes. As will become apparent, the public policy motives behind them are frequently even more complex than for supply-side subsidies; furthermore, the manner by which these BTB policies potentially discriminate between domestic and foreign-produced varieties can also be much more subtle.

First, a number of WTO disputes have arisen in the area of competition policy, perhaps partly because there is no agreement fully articulating the scope of international cooperation for antitrust authorities. The United States has used the WTO to file disputes against Canada, Japan, and China, for example, and in each case one of the key allegations was that US producers were unable to sell their products to foreign consumers because of bottlenecks in the distribution networks in those countries due to excessive domestic market power. The US alleged that the concentration of the domestic industry resulted in discrimination against US exports of wheat, photographic film (Kodak), and audio-visual products (Hollywood movies), respectively, relative to domestically-produced varieties. On the other hand, there are also examples in which a relatively concentrated export industry in one country has used the WTO in the attempt to prevent implementation of a domestic policy that might *increase* the level of competition. In particular, Russia has challenged the EU's attempts at 'unbundling' vertically integrated providers of natural gas and electricity that would expectedly change the market structure facing energy service providers.

Another increasingly contentious area of domestic policy concerns the production process standards to which suppliers are being held accountable. Consider, for example, India's set of import restrictions on US poultry products; the policy was motivated out of the concern that the existence of the bird flu virus would affect the process of producing poultry in a trading partner (US) and thus result (through trade) in the virus being transmitted to its own domestic poultry industry.¹¹⁰ First, the internationally accepted scientific standards for avian influenza (AI) establish two different 'levels' of the virus by which to characterize countries that experience AI outbreaks. Countries with outbreaks of the very harmful, highly pathogenic AI virus are to have their poultry exports become subject to commercial policy restrictions, whereas countries experiencing only the low pathogenic AI virus should not have their exports affected. Second, the standards also establish a process of 'regionalization'; i.e., if a country with an AI outbreak can show that it has curtailed the geographic spread of the virus so that certain regions within the country are unaffected by the AI, trading partners should not impose commercial policy restrictions on imports from those unaffected regions. Two of the key US allegations involved in the AI dispute were that India's import ban on US poultry products was being justified by the application of domestic standards that were 'too restrictive' in light of these international standards. In particular, India did not permit poultry imports even from countries (like the US) that had reported outbreaks of only low pathogenic AI, and India also did not follow the principle of regionalization.

¹¹⁰This section draws on Bown and Hillman (2016).

As this example illustrates, a key aspect of the BTB policies over standards is the regulatory *justification* - i.e., scientific evidence, public health concern, or even ethical or moral outrage - behind the policy *application* which frequently takes the form of a blunt import ban (thus arising through a border policy). It is typical for foreign suppliers to allege that such standards are either too restrictive (in light of scientific evidence) or are applied in a way that discriminates against foreign relative to domestic production, potentially by forcing them to undertake additional costly investment to meet compliance requirements.¹¹¹ Thus, any process by which to evaluate whether a domestic standard is too restrictive mandates a commonly accepted benchmark for purposes of comparison.

The WTO system has outsourced the benchmarking of standards to scientists organized under the auspices of international standards-setting agencies; for the case of food safety to Codex Alimentarius, for animal health (e.g., the AI-example above) to the World Animal Health Organization (OIE), and for plant health to the International Plant Protection Convention (IPPC). Table 9 documents a number of disputes arising in these areas, including over animal health and safety standards; in addition to the Indian policies on poultry (related to bird flu in the US), similar thematic disputes have taken place over US policies on beef (related to foot and mouth and disease in Argentina), Korean policies on beef (related to mad cow disease in Canada), and Russian policies on pork (related to African Swine Fever in the EU).

The WTO has considered challenges to a number of other environment-related policies that also affect production processes or standards. One example includes the US mandate that wild-caught shrimp must use nets that have turtle-excluder devices installed, so as to protect endangered sea turtles. The European Union had its ban on imports of seal products challenged by Canada and Norway; one of the claims of the exporters was that the EU policy was not applied in a nondiscriminatory manner because it actually exempted certain EU-based producers (indigenous communities) of seal products. Finally, one of the very first disputes filed with the WTO involved Brazil and Venezuela challenging provisions of the US Clean Air Act as requiring different standards for imported versus domestically-produced gasoline.

Finally, the US has also initiated a dispute over a trading partner's domestic labor market policies. In this case, the US alleged that Guatemala was not enforcing its own labor laws regarding unionization, collective bargaining, and work conditions for workers in each of its major export sectors, including shipping, apparel, steel and agriculture.¹¹² To date, labor standards disputes remain relatively rare; indeed, this particular dispute was not initiated under the WTO, which does not have provisions for labor standards, but under a free trade agreement that does contain such provisions.

¹¹¹Staiger and Sykes (2011) provide a model in order to show how a government may have an incentive to 'over-regulate' - i.e., impose standards that while nondiscriminatory are nevertheless 'too high' from a global perspective - because it can shift some of the costs of those standards onto trading partners by reducing their terms of trade.

¹¹²This is an example, however, in which the domestic policy is being challenged because it is lowering domestic firms' costs (in industries that export to the US) and not raising foreign firms' costs (in US industries attempting to export to Guatemala).

5.2 BTB policies affecting demand

We next turn to case studies of demand-side policies that can have a similar effect of negatively impacting imports.

5.2.1 Taxes, foreign investment measures, and local content requirements

The most straightforward example of a demand-side, behind-the-border policy is a domestic consumption tax that discriminates by incentivizing consumption of local varieties relative to consumption of imported varieties of substitutable goods.

A relatively common theme for a WTO dispute has involved alcohol, and the allegation that governments impose discriminatory consumption taxes on different varieties. The lower tax on the domestic variety stimulates demand facing the domestic industry relative to the taxed foreign variety; specific examples listed in Table 10 include beer and wine in Canada, pisco in Chile, sochu in Japan, soju in Korea, or distilled spirits in the Philippines. The government defense typically attempts to justify the tax differential by claiming that their locally-produced variety is not a ‘like product’ or a ‘directly competitive or substitutable product’ relative to the imported varieties.

A second and more subtle example of indirect consumption taxes or subsidies commonly arises through regulations to foreign direct investment; governments frequently create tax incentives for such investment that are *conditional* on certain local content requirements being met. As Table 10 indicates, automobiles are a common sector in which countries attempt to encourage foreign investment but also mandate local content requirements. The policy is typically structured so that a government incentivizes (with subsidies or other general tax exemptions) foreign automakers so that they establish a local production facility, and the preferential tax treatment would be applied conditional on the resulting economic activity (local production of autos) containing local content (e.g., locally produced auto parts) above a minimum threshold. As such, some of the effect of the foreign investment subsidy is then passed on - via the local content requirement - to indirectly subsidize consumption of locally-produced inputs relative to foreign-produced inputs (Bagwell and Sykes, 2005b). Indeed, in the automobile sector alone, the EU, Japan, and the United States have brought disputes against at least six other WTO members with foreign investment regimes that were alleged to have such local content requirements in place (Brazil, Canada, China, India, Indonesia, and Philippines).

More recently, the renewable energy sector - e.g., wind turbines and towers, solar panels - has also faced a number of WTO challenges to foreign direct investment regulations for their inclusion of local content requirements. The allegation is that such requirements artificially stimulate demand for locally-sourced inputs and upstream industries and thus discriminate against imported inputs. Examples from these sectors include regulations imposed by Canada, the EU, China, and India and disputes brought by Japan, China and the United States.¹¹³

¹¹³Some of these disputes also concern the consumption subsidies and other BTB policies described earlier in the market for solar panels.

5.2.2 Other demand policies: consumer safety, product labeling, and IPRs

Table 11 presents our final examples of demand-side policies, including product standards for consumer safety, consumer product labeling, trademarks, and other regulations related to intellectual property rights (IPRs) enforcement.

Consumer product safety standards are similar to the production standards described earlier, in that foreign exporters typically allege that the consumer safety standard for a product is either too restrictive, and not justified in light of scientific evidence and international standards, or it is being applied in a manner that discriminates against imports relative to consumption of domestically-produced varieties. Perhaps the highest-profile examples of such disputed policies are the EU's 'Frankenstein food' regulations applied to hormone-treated beef and to food and agricultural products containing genetically modified organisms (GMOs). The United States and other countries appealed to the lack of scientific evidence supporting EU attempts to justify these policies through the 'precautionary principle,' or that the long-term effects of such product characteristics on human, animal, and plant health, as well as the environment, were unknown. As indicated earlier, the WTO relies on Codex Alimentarius as the international organization in charge of establishing scientific standards for food safety; as such, its standards play an important benchmarking role against which to compare any country's chosen level of domestic standards.

As Table 11 indicates, the EU is not the only WTO member to have its public health policies on consumer safety standards legally challenged. There have been WTO challenges to the United States for its bans on clove cigarettes, Internet gambling, and Mexican commercial trucking services. Furthermore, Japan has also challenged Korea's restrictions on imported agricultural products after the Fukushima nuclear incident. The objective of these policies is allegedly to reduce or restrict consumption of a product (cigarettes, hormone-treated beef, etc.) or activity (gambling) that a policymaker believes is harmful to the consuming public. Disputes can arise if consumption of an imported variety declines, either absolutely or relative to consumption of the domestic variety, resulting in a loss to foreign exporters.¹¹⁴

An alternative group of consumer policies challenged as BTB policies are those regulating information about a product that could shift demand for the product or bifurcate a market into different varieties in a way that enriches some producers and harms others. In essence, these disputes are over government control of advertising, broadly-defined.

For example, product labeling rules have also faced a number of WTO challenges. The allegation is that information on the label increases demand for the domestic variety and reduces demand for the foreign variety. These rules on labeling often require firms to provide information about certain product attributes. In some cases this is a domestic legal requirement arising from a consumer's 'right to know.'

These consumer labeling schemes can be mandatory or voluntary. If a label is mandatory,

¹¹⁴In some cases, a close substitute for the imported variety might not be available domestically. For example, Indonesian flavored cigarettes come in different flavors than domestically produced American cigarettes. Or, various forms of gambling might be banned locally.

failure to satisfy the labeling requirements means a product cannot be sold. This could result in discrimination against foreign products if the cost of labeling imported products is more expensive. For example, the US had a country of origin labeling (COOL) scheme in place for cows and hogs that required the animals, as well as the resulting beef and pork products, be traceable to their source country. Mexico and Canada challenged the US policy as discriminatory by arguing that it imposed additional costs on US beef and pork producers that source cows and pigs (as imported inputs) from Mexico or Canada.

On the other hand, under a voluntary scheme, if a good failed to satisfy a label's requirements, it could still be sold. However, without the informative label that implies higher quality, demand for the good might collapse. If an informative label raises demand for the domestic variety, and the absence of a label reduces demand for a foreign variety, the labeling scheme or policy has a discriminatory impact on foreign exporters. For example, Mexico challenged a US law which enforced a voluntary labeling scheme for 'dolphin safe' canned tuna. Mexico argued that this voluntary label created an adverse and discriminatory impact on foreign-caught tuna marketed in the US.

Finally, some consumer labels have been challenged in intellectual property cases, but the underlying issue is essentially the same - a label shifts demand for a foreign, imported product in a way that hurts its producer. Cases regarding 'geographical indicators' are similar to mandatory and voluntary labeling; the alleged intent is to increase demand for one variety of a good (e.g., cheese from Parma, Italy) and reduce demand for other varieties (a similar-tasting cheese made in the US). Australia and the US challenged the European Union's efforts to establish geographical indicators or trademarks for a number of its agricultural products - feta cheese, parmesan cheese, kalamata olives, etc. - based on where the product originated. In another case, Australia tried to reduce demand for all varieties of cigarettes by requiring plain packaging on cigarette boxes. In this case exporters claimed that the Australian policy had reduced the value of the exporters' intellectual property; i.e., the value of their brand or trademark was reduced due to the Australian regulation that *limits* the ability of cigarette makers to differentiate their product through labeling.

6 Trade Policy Puzzles

This section outlines five important questions that call for further research and which are motivated by our survey of the contemporary and historical landscape of trade policy.

Question 1: What explains the variation in a country's trade policy across products, time, and trading partners?

Despite substantial increases in data availability for border policies and trade flows at the product level, the literature still does not have a full grasp on the forces behind the considerable variation that we have documented. In Section 2, we illustrated substantial variation for measures of bound, MFN applied, and preferential tariffs across products, time, and trading partners. In Section 3,

we found evidence of similar heterogeneity in countries' application of various other border policies that are not captured by measures of applied tariffs.

The research approach to this first puzzle has been to treat it as if it were at least three separate questions, isolating one particular component at a time. We consider each in turn.

What explains the variation in a country's trade policy across products? Improved understanding of the cross-sectional variation of import protection requires the integration of at least two complementary literatures. A number of recent papers have examined the determinants of the cross-sectional variation in MFN tariffs by appealing to optimal tariff theory and the terms-of-trade theory of trade agreements (Bagwell and Staiger 1999, 2002).¹¹⁵ The results provide intuitively appealing evidence that market power considerations influence the determinants of trade policy in expected ways; these papers are especially noteworthy given the seriousness with which they treat institutional (trade agreement) constraints relative to earlier approaches. However, a limitation is the frequent tendency of these papers to abstract from domestic political-economy by simply employing country-industry level fixed effects to control for these forces. Furthermore, there is substantial variation remaining in the tariff data that is left unexplained by the terms-of-trade motive.

The other major strand of the literature interested in cross-sectional variation investigates the micro-founded, domestic political-economy theory of Grossman and Helpman (1994). These papers typically examine determinants of non-tariff barriers rather than MFN tariffs because the MFN tariffs negotiated under the GATT/WTO do not accurately reflect unconstrained political or redistributive incentives.¹¹⁶ While these papers conclude that political economy matters for trade policy, they find that the weight politicians place on campaign contributions is extraordinarily small relative to the weight that they place on social welfare; this implies that campaign contributions also do not seem to explain much of the cross-sectional variation in tariffs. Finally, because the influential papers in this literature tend to examine cross-sectional variation in measures of *non-tariff* barriers,¹¹⁷ it is difficult to fully compare their insights with those from the terms-of-trade literature.

Even attempts to combine these two strands of the literature would likely remain incomplete if they are not also complemented by efforts to construct unified measures of trade restrictiveness in the face of multiple (both tariff and non-tariff barrier) trade policy instruments. Kee, Nicita and Olarreaga (2008, 2009) provide an important first step by combining information on a number of different forms of trade policy to construct aggregate-level trade restrictiveness indices (TRIs) that are comparable across countries; indeed, their estimates suggest that measures of restrictiveness

¹¹⁵See Broda, Limão and Weinstein (2008), Bagwell and Staiger (2011), Ludema and Mayda (2013), Nicita, Olarreaga and Silva (2014), and Behskar, Bond and Rho (2015); see also the discussion in Section 2.1.4. For a more comprehensive survey of these papers, see Bown (2015).

¹¹⁶There are exceptions, including Bown and Tovar (2011).

¹¹⁷See, for example, the seminal contributions of Goldberg and Maggi (1999) and Gawande and Bandyopadhyay (2000) that relied on US non-tariff barrier data. There have been a variety of extensions to the Grossman-Helpman model attempting to identify the missing source of the remaining variation; e.g., by adding labor (Matschke and Sherlund, 2006) or foreign lobbies (Gawande, Krishna and Robbins, 2006). For a survey see McLaren (forthcoming).

that include non-tariff barriers are 87 percent higher than measures that only include tariffs.¹¹⁸ Their-model driven approach builds upon the seminal theoretical contributions of Anderson and Neary (1992, 1994, 1996). However, both more research and improved data are needed to generate appropriate and comprehensive measures of trade policy restrictiveness at the *product* level.

What explains the variation in a country's trade policy over time? The literature's limited understanding of the determinants of the *time* variation in trade policy arises from similar problems. Firstly, it is not clear which policy instrument(s) researchers should examine when different countries use different policies to restrict imports over time. A common approach has been to examine the determinants of the inter-temporal variation for the policies that high-income and emerging economies utilize, such as antidumping and safeguards, to make trade policy changes and that are transparently and systematically reported.¹¹⁹

There are at least three deficiencies with such an approach. It teaches us nothing about the time-variation in trade policy for countries that do not utilize these particular instruments, but which may vary another border barrier, such as an MFN tariff. Researchers would ideally take the existence of multiple policy instruments into account and combine them via a comprehensive and consistently-defined measure of time-varying import protection that would include data on all policy instruments that are available to governments.¹²⁰ Finally, a limitation of aggregate-level empirical studies is that the theory relating aggregate shocks (e.g., to GDP growth, to unemployment, or to real exchange rates) to cross-product and cross-trading partner policy changes is underdeveloped.¹²¹

What explains the variation in a country's trade policy across trading partners? Perhaps the most sorely under-exploited source of variation in the trade policy data is the considerable heterogeneity across trading partners. The few papers thus far that have begun to explore determinants of variation in tariff preferences across trading partners have tended to focus on the influence of global supply chains on trade policy determination. On the other hand, a slightly more established literature examining the application of other border barriers, such as antidumping, has examined a few additional channels to explain patterns of discretionary import protection.¹²²

Question 2: Why do some countries set higher import tariffs than others?

¹¹⁸Kee, Nicita and Olarreaga (2008, 2009) also construct estimates for the ad valorem equivalents of non-tariff barriers, based on a more limited 'first-generation' class of non-tariff measure data collected by UNCTAD.

¹¹⁹See Knetter and Prusa (2003), Bown and Crowley (2013a,b; 2014) and the discussion in Section 3.2.

¹²⁰The Kee, Neagu, and Nicita (2013) approach is the closest in this respect; however, even this paper does not have access to data from all of the potential policy instruments that one would like to include and its time dimension (one year before and after the onset of the Great Recession) is extremely limited. See Irwin (2010) for an approach to assessing the restrictiveness of US policies in historical data covering 1867-1961.

¹²¹The most developed theoretical model perhaps Bagwell and Staiger (2003), which also provides an in-depth discussion of the problem.

¹²²Regarding research on determinants of bilateral tariff preferences, see Blanchard, Bown and Johnson (2016); Blanchard and Matschke (2015) examine the influence of US multinationals, see also the discussion in Section 2.2.4. Examples from the more substantial literature examining the determinants of trading partner variation in TTBs at the disaggregated level include Blonigen and Bown (2003) for the role of retaliation threats, Crowley (2011) for trading partner shocks, and Bown and Crowley (2013b) for an application of the Bagwell and Staiger (1990) terms-of-trade motive in a repeated game setting. See also the survey of antidumping by Blonigen and Prusa (forthcoming).

Both in the contemporary and historical data, there can be surprisingly large differences across countries in the average level of tariffs. This is surely most important for understanding why even applied MFN tariffs in *developing* countries remain relatively (and perhaps stubbornly) high. While much of this may be explained by standard political-economy and terms-of-trade models described earlier, to what extent do other features, such as differences in per-capita income, the institutional capacity of governments to collect revenue, or the political form of the government itself, play a role? Empirical work typically incorporates these ideas into the Grossman-Helpman (1994) theory described earlier.

First, one long-standing explanation for why developing countries set higher tariffs than developed countries is that collecting government revenue at the border is more efficient administratively than other forms of taxation. For example, Keen (2008) reports import tariffs account for 20 percent or more of tax revenues in many developing countries. Furthermore, Baunsgaard and Keen (2010) find that low-income countries undergoing trade reforms have been only partly successful (20-25 percent) at recovering lost tariff revenue by switching to other sources of taxation; this is suggestive of why poorer countries may retain higher levels of tariffs than countries at more advanced stages of development. In formally taking this issue to the question of the determinants of trade policy using a Grossman-Helpman framework across a sample of 40 countries, Gawande, Krishna and Olarreaga (2015) empirically confirm that developing country governments with weak tax systems place a high weight on tariff revenue in their social welfare function.

Second, and more generally, country-level differences are likely explained by fiscal concerns, the transparency of government, the form of governance, and its responsiveness to public welfare. In their cross-country examination of the political-economy determinants of applied tariffs, Gawande, Krishna and Olarreaga (2009) observe a positive correlation between the value of the estimated social welfare parameter for a country and measures of its government's level of corruption. Finally, in their inter-temporal study of Turkey during different forms of political governance (dictatorship in 1983, democracy in 1984 and thereafter), Mitra, Thomakos, and Ulubasoglu (2002) find evidence that the government's weight placed on social welfare in tariff-setting decisions is higher during the democratic regime.

Overall, more research is needed to understand country-level differences in trade policy. Future work in this area likely requires attention to the details of how trade policy interacts with *domestic* policy, including general tax and fiscal policy. Research in this area could both integrate broader insights from, as well as potentially influence, the broader public finance literature. Currently there is very little overlap between these two literatures.

Question 3: Why and how can two distinct types of trade agreements - preferential trade agreements and the WTO - currently coexist?

We have described in Section 2 the co-existence of two different types of agreements - a generally nondiscriminatory, multilateral agreement characterized by the WTO, and a world in which most of the same 161 WTO member economies participate in discriminatory preferential trade arrange-

ments with subsets of their trading partners. Limão (forthcoming) reviews a large literature on the potential dynamic linkages between PTAs and multilateral liberalization, as well as other important questions; nevertheless, we are currently left without a definitive answer as to how and why such different types of agreements can coexist.¹²³

An open question, of course, is the extent to which this co-existence even matters empirically for international trade. Caliendo, Feenstra, Romalis and Taylor (2015), for example, apply a new dataset of bilateral tariffs to a quantitative model of trade between 189 countries in 15 industrial sectors and find that 90 percent of the gains from trade over 1990-2010 came from multilateral trade liberalization efforts. In their analysis, little is gained from PTAs, which is potentially surprising given that their two decade period of analysis coincided with an explosion in the number of preferential trade agreements signed globally. Furthermore, a continuing puzzle in the co-existence of these types of agreements is that the take-up rate of tariff preferences - that is, the frequency with which eligible exporters take advantage of their lower preferential tariff rate by asking that it be applied to their merchandise - is well-below 100 percent. If imports are being taxed at the rate specified in a multilateral trade agreement, why does the preferential trade agreement exist?

These remain important questions given the current trade policy environment, in which governments are close to implementing major new ‘mega-regional’ preferential trade agreements through the proposed Trans-Pacific Partnership (TPP) and the Transatlantic Trade and Investment Partnership (TTIP). The answers to the long-term co-existence questions may have more to do with the effect of any new provisions in these agreements on the sorts of behind-the-border policies that affect trade described in Section 5.

Question 4: How do trade agreements act as a commitment device for governments in a world of uncertainty?

The large literature on the value of trade agreements could be broadly divided into papers that argue that trade agreements internalize international externalities and papers that argue that trade agreements solve a government’s commitment problem.¹²⁴ For researchers studying the commitment problem, the puzzle is: if trade agreements are designed to act as a commitment device, then why do agreements allow trade restrictions under numerous easy-to-satisfy contingency clauses, and why do they permit some countries to maintain high tariffs?

A handful of empirical studies have explored potential implications for the commitment role in practice. For example, Staiger and Tabellini (1999) suggest that the GATT rules helped the US government make commitments via-à-vis its private sector during the Tokyo Round of GATT negotiations. Tang and Wei (2009) show that developing countries required to make deep tariff cuts

¹²³For example, Limão (2006) and Karacaovali and Limão (2008) find for the US and EU, respectively, that preferential liberalization has acted as a stumbling block to MFN liberalization, while Estevadeoral, Freund and Ornelas (2008) has found a building block effect for Latin America. See also the survey in Bagwell, Bown, and Staiger (forthcoming).

¹²⁴For the international externality theory, see Bagwell and Staiger (1999, 2002) for the terms-of-trade theory and Ossa (2011) for firm-delocation; for the commitment theory, see Staiger and Tabellini (1987), Maggi and Rodriguez-Clare (1998, 2007) and Limão and Tovar (2011).

at the time they joined the WTO had higher investment and growth after accession than those with more limited tariff commitments. Finally, Bown and Crowley (2014) find that the binding tariff commitments of emerging economies under the WTO explain some of their policy substitution toward WTO-consistent policies like antidumping and safeguards in response to macroeconomic shocks.

However, if we presume that one purpose of a trade agreement is to act as commitment device, we might expect this to be an especially important motivation for *developing* countries (that may lack terms-of-trade motives) in their decision to voluntarily participate in such agreements. However, the data in Section 2 (see, in particular, Figure 2) clearly reveal a fundamental empirical inconsistency with that starting point: most *developing* country WTO members do not use an important foundational element of the WTO as a commitment device. That is, most developing countries have committed to a maximum tariff that is much higher than their applied MFN tariffs, and many of the poorest WTO members have not bothered to commit to maximum tariff rates at all.

Theorists have made a number of advancements in helping to understand the potential value of a trade agreement that sets rules on upper bounds (bindings) as opposed to applied tariff rates, and a strength of this institutional design literature is that it offers an explanation for the existence of tariff caps and other contingent trade policies.¹²⁵ However, an inherent assumption in much of this literature is that the uncertainty over future tariff rates has minimal costs to the economy relative to the costs associated with an inflexible tariff that is inappropriate for the economy's current state.

The trade-agreement-as-commitment literature thus stands in contrast to a newly evolving empirical literature that highlights how trade policy *uncertainty*, such as over future tariff rates, can dissuade firms from making the investments necessary to successfully enter into export markets. In this literature, locking in tariff rates through trade agreements makes the rate of return on a firm's investment in export-related capital more certain and leads to export growth. Handley and Limão (2015), for example, document higher exports by Portuguese firms upon Portugal's accession to the EEC in which trading partners locked in commitments to maintain tariff preferences.¹²⁶

Furthermore, Crowley, Song and Meng (2016) document that Chinese firms are less likely to enter foreign markets in the face of the heightened trade policy uncertainty against their products that has arisen through the proliferation of antidumping. Examining entry by Chinese exporters from 2001-2011, tariff scares begun by the implementation of a new antidumping duty in one economy tends to deter the entry of multi-product, multi-destination exporters into other economies with active antidumping policies.¹²⁷

¹²⁵See, in particular, Amador and Bagwell (2012, 2013), Beshkar, Bond and Rho (2015), and Beshkar and Bond (2015).

¹²⁶Handley and Limão (2014) and Pierce and Schott (forthcoming) provide examinations of ways through which China's 2001 WTO accession resolved US trade policy uncertainty, led to additional Chinese exports, and had other important economic implications. Handley (2014) provides an assessment of the uncertainty associated with Australia's WTO tariff bindings.

¹²⁷The intuition for this result can be seen as an extension to the result initially provided by the Staiger and Wolak (1994) study of US antidumping that found that even investigation alone (without imposition of the import restriction) could have a trade-reducing effect within the US market; Crowley, Song and Meng (2016) extend this

Overall, these recent developments seem somewhat divided between one strand of research directed toward understanding why flexibility tools are part of an agreement, and another showing how uncertainty (that would likely arise from such flexibility) dissuades trade. A unified framework integrating both the costs and benefits associated with the uncertainty and commitment problems could result in major progress.

Question 5. Why do trade agreements permit, and governments actually utilize, multiple policy instruments that restrict trade, especially given differences in their efficiency costs?

In this chapter we have characterized trade-restricting policies in different ways. For example, we have categorized them according to their economic features - e.g., tariffs are price-based and quotas are quantity-based - as well as according to their legal features - e.g., antidumping addresses unfair trade and safeguards address unexpected trade. We have shown through our discussion of temporary trade barriers how quotas, VERs, and price undertakings are used in the current period. We have documented empirically the frequency with which certain countries apply their MFN tariffs as specific duties. The diversity of trade-restricting policies across countries, and within a country over time, is puzzling, especially when they are utilized in what appears to be similar circumstances.

There are a number of piecemeal approaches that have begun to address variant elements of the underlying question. For example, When do countries choose to pursue one broad trade policy as opposed to another?¹²⁸ Why do governments use one particular policy instrument over another when multiple instruments are seemingly available at once?¹²⁹ Why do different countries restrict imports in similar circumstances through different policies and exceptions?¹³⁰

Overall, interest in these questions, as well as others regarding the substitutability of different types of policies is only likely to increase, given that the real world for international commercial policy is also moving increasingly behind-the-border. The fact that BTB policies are both the subject of intense negotiations under TPP and TTIP, and that they are frequently the topic of investigation of WTO dispute settlement (see again Section 5) suggests they are becoming an increasingly important area for addressing questions associated with trade agreement design, including identifying feasibility as well as the potential limits to international cooperation.

insight to the implications for the failure to enter into third markets.

¹²⁸For example, ‘big-picture’ approaches include Baier and Bergstrand (2004) and Baier, Bergstrand and Mariutto (2014) on the determinants of FTA formation, as well as Vandenbussche and Zanardi (2008) on the determinants of when a country adopts an antidumping law.

¹²⁹Less attention has been paid to this type of question; an exception includes Bown (2004), which investigated why countries utilized GATT-authorized exceptions to implement import protection as opposed to policies that resulted in a formal dispute.

¹³⁰For example, the US, EU, Canada, and Australia all tend to use temporary trade barriers to implement new import restrictions, whereas Japan, a similarly high-income country in which applied tariff rates are legally bound by its WTO commitments, mostly does not. Furthermore, why do many emerging economies (e.g., Argentina, Brazil, Mexico, India, Indonesia, Turkey), each of which could unilaterally raise its MFN tariffs on many products without violating its WTO legal commitments, nevertheless implement trade policy changes through TTBs?

7 Conclusion

Having presented a portrait of the complexity of international commercial policy as of 2013-2014, along with fundamental questions that this portrayal raises for *trade policy* research, we conclude with observations on ways through which these newly available data sources may help our understanding of other areas of the international economy.

Over the last decade, empirical research on firms engaged in international trade has exploded. This includes firms involved in multi-country production through foreign direct investment, and in cross-border production structures and global supply chains. Scholars have provided a sound understanding of many of the differences between manufacturing firms that operate domestically and those that engage globally.

However, while these firm-level studies are informed by a wealth of data on the destinations for their outputs, origin of inputs, prices, quantities, worker matching, revenues, debts, firm-to-firm relations, etc. - they most often treat the policy environment as an afterthought. The richness of changes in the trade policy barriers - that we have documented result in considerable heterogeneity over time, across destinations, and products - are typically swept up in these studies into an economy-wide trade cost or a product-specific fixed effect.

Furthermore, there have also been substantial developments in empirical research into firm-pricing behavior (domestically and internationally), the importance of the relationship between the parties in international trade transactions, and the extent to which exchange rates pass through into transaction-level prices. This literature has deepened our understanding of the substantial differences in the prices of tradeable goods across borders. However, very little research on product-specific trade policy changes - many of which have magnitudes that dwarf the annual changes to exchange rates - has been undertaken in a way that would inform our understanding of the remaining pricing puzzles.

The fact that fewer than 20 percent of manufacturing firms in major economies export anything to anyone suggests that policy barriers to trade continue to matter. Similarly, increasingly disaggregated, high-frequency data on the prices of traded goods indicates that cross border price differences remain sizeable. Is there more that can be learned by incorporating similarly detailed trade policy data into microeconomic studies of firms and international pricing? Our hope is that this chapter sparks research ideas about how to take advantage of the rich variation in policy data to learn more about these other important questions facing the global economy.

To wrap up our analysis, we make a final, more practical, point regarding the increasing availability of trade policy data. Although a wealth of policy data is now almost continuously becoming available, because these data are still relatively new, in many instances, these data are not yet 'clean'. Thus working with these data will require researchers to make some human capital investment into the details of the policies themselves so that they can check and verify the accuracy of newer datasets especially. A basic knowledge of trade agreements and the relevant domestic institutions is extremely helpful to understand the structure of data reporting and the potential substitutability of policy tools. In our view, the opportunities provided by this newfound data

availability far outweigh the costs of this one-time investment.

To assist economists embarking on research in trade policy, we include two additional resources. First, we provide a Data Appendix with an in-depth description of the underlying sources for the data that we utilize in our empirical exercises. Second, and as our discussion of the landscape of trade policy has revealed, a large amount of policy data is collected and referred to by distinct GATT legal provisions that are known as ‘Articles.’ For ease of reference, in Table Appendix A, we provide a summary which links each of the key GATT Articles that we have utilized in the chapter to the main economic policies, exceptions, or concepts that they address.

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Data Appendix

This section introduces the main sources of the underlying data sets for the various trade policy instruments that we have utilized in the empirical analysis.

Tariff Data In Section 2 we first utilized data on product-level MFN tariffs. These data arise from a number of different sources, including the WTO's Integrated Database (IDB), WTO's Consolidated Tariff Schedules (CTS), UNCTAD's Trade Analysis Information System (TRAINS) database, as well as from the UN International Trade Centre (ITC) in Geneva. In some instances, the ITC may be the first source of the raw data (even if it is ultimately attributed to UNCTAD/TRAINS), as one UN agency sends it to another for further cleaning and processing before making it available to the public. Data on WTO tariff binding commitments is made available through WTO's CTS; these bindings are essentially unchanged since the negotiation of the Uruguay Round in 1995, with the exception of new accession countries for whom binding rates were established at the date of their accession. Data from each of the other sources is on MFN *applied* rates.

In terms of the classification, it is important to note that the Harmonised System only began in 1988 and was slowly adopted by countries starting thereafter. As such, a common product-level classification scheme across countries - an important necessary condition for meaningful construction of clean measures for simple average tariffs, for example - is only potentially available beginning in 1988. Next, the 'products' in these data series are only comparable across countries at the 6-digit Harmonised System (HS06) level, and there are roughly 5200 HS06 products in existence at any moment in time.¹³¹ These tariff data are also frequently available at the 'tariff-line' level - e.g., 8-digit, 10-digit, etc. - i.e., under the national customs authority's own scheme for how it chooses to differentiate product varieties beyond the HS06 level, over which it has authority. To the extent that data are reported at the HS06 level, they have been averaged from the underlying level in some way, typically as a simple average.

The tariff data from the WTO, UNCTAD, and the ITC has been made freely available to the public over the last few years through a consortium arrangement that also includes the World Bank and the wing of the United Nations statistical division that collects and reports commodity-level trade data. In addition to financial support, the World Bank's substantive contribution to the arrangement has been to develop and provide technical support and an on-line software platform called World Integrated Trade Solution (WITS) for publication dissemination of the data. To be clear, the World Bank's WITS is not the underlying source for any of the data - it is merely the platform by which the data has been made available from the WTO, UNCTAD or ITC to the general public.¹³² WITS makes available on its website a user's manual that provides details on

¹³¹Revisions to the Harmonized System, affecting upwards of 200 products each time, were undertaken in 1996, 2002, 2007, and 2002.

¹³²One concern with the current, decentralized arrangement is whether it creates the right incentive structure to make and implement fixes of importance to scholars; e.g., when users discover data problems in historical data. I.e., typically the World Bank (WITS) is not in a position to fix the publicly provided data because it did not collect the data in the first place. Furthermore, because these UN agencies (and even the WTO) have both tight budget

the underlying sources of data, the descriptions of the different types of policy data made available, as well as other useful information. Through the arrangement, WITS also provides HS06 level bilateral import and export data that is collected by UN Comtrade. Furthermore, in recent years, the WTO, UNCTAD and the ITC have made varying efforts to release the raw data directly to the public via their own websites as well.

The raw data from the WTO and ITC typically do not contain information on estimated ad valorem equivalents for all of the tariffs applied as specific duties that we analyze in Section 3.1. In the data sets made available through WITS, UNCTAD has undertaken efforts to construct ad valorem equivalent estimates for the tariffs imposed as specific duties. At least four different calculations for the AVEs are provided, each based on a different methodology. However, these data are not as comprehensively available as the raw data. In some years, for example, they are completely missing. Furthermore, their values will expectedly vary significantly over time, of course, due to changes in prices, even when the applied tariff policies themselves have not changed.

The Section 2 analysis relied on preferential tariff data that was also, for the most part, collected by the ITC and UNCTAD. That data is also typically made publicly available through WITS, and in many instances, UNCTAD will compute AVE estimates for the products with preferential tariffs applied as specific duties. However, it has been our experience that the raw preferential tariff data made available in WITS is much more problematic - in terms of comprehensiveness of coverage - than the applied MFN tariff data. For example, in certain years no preferential tariff data may be available for an entire country. In other years, some, but not all, of a country's preferential tariffs will be recorded. Thus these data need to be clearly cleaned by researchers and cross-validated against other external sources (at a minimum, which catalog the existence of preferential trade agreements, such as WTO (2015a, 2015b)). Much of the preferential tariff data that we utilize in this chapter for the year 2014 was actually acquired directly from ITC.

We repeat here three important points made in the chapter regarding the MFN and preferential applied tariff data in particular. First, the applied tariffs are the statutory tariffs that governments set, and the measure derives from tariff schedules that either the government reports itself (to the WTO, for applied MFN rates) or which these UN agencies collect and compile from official government sources, and typically these are reported on an annual basis. Furthermore, the applied tariff data does *not* include other border charges or taxes, including safeguards tariffs and antidumping duties. (To the extent that these are applied in a particular context, they would need to be added onto the existing level of the applied MFN or bilateral tariff.) Second, throughout the chapter and for consistency, the statistics that we report utilize simple averaging for the tariffs; the alternative of constructing trade-weighted average tariffs can lead to the well-known problem of downward bias due to products with high tariffs receiving low weights (because of small import volumes). Third, sometimes the underlying data that we utilize to construct measures of average tariffs (e.g., at the country or sector level) may utilize ad valorem equivalent estimates for products over which

constraints (for data production) and whose mandate is more focused on contemporary policy rather than historical policy - even if by 'history', we are referring to only two or three years in the past - they may not face the proper incentives to bear the costs of implementing major fixes to the historical data that may be incomplete or incorrect.

the import tariff that the country applies is a specific duty. In other instances it may not; as we indicated in the chapter, our decision of whether or not to include them depended on the context.

Antidumping, Safeguards, and Countervailing Duties - Temporary Trade Barriers -

Data The Section 3.2 analysis on temporary trade barriers is based on the data collected annually and made publicly available through the World Bank's Temporary Trade Barriers Database (Bown, 2014a). The data was first made freely available to the public over the Internet in 2005; since 2009, it has been updated at least at the annual frequency.¹³³ The Temporary Trade Barriers Database website also posts a complete users manual describing the data sources and all of the available variables utilized here and others made available (but not utilized here).

The raw data on antidumping and countervailing duties in the Temporary Trade Barriers Database are collected directly from official government sources; i.e., it is important to note that these are not based on what countries report to the WTO. As such, the database includes much additional detail that the WTO has historically been unable to provide - because it relies on self-reporting by members - including product-level tariff codes for products subject to the policies, the dates of key aspects of the investigations (initiation, preliminary decisions, final decisions, policies imposed, and policies removed wherever possible), the trading partners investigated, the type of border barrier imposed (ad valorem duty, specific duty, price undertaking, etc) as well as its level. Finally, and where available, the database also includes information on the domestic firms, industry associations, or labor groups behind the petition initiating the investigation, and it also has firm-specific trade barriers for the foreign firms (and their names) when cases result in different levels of the new barriers applying to different firms within the same country.

The information on the use of safeguards compiled into the Temporary Trade Barriers Database, is however, gathered from information on what government's report to the WTO Committee on Safeguards. Under this particular policy, governments have been mandated to report sufficiently detailed information on the HS codes associated with their product-level trade restrictions, as well as the other key pieces of information, including exemptions for trading partners excluded from application of the policy. The safeguards policy is distinct from the WTO's reporting requirements for antidumping and countervailing duties.

Historical Data from the GATT Archives Data on the GATT-era (1947-1994) use of safeguards (Article XIX), antidumping, and import restrictions related to balance of payments difficulties (Article XII) were compiled from information in hundreds of documents housed in the Stanford GATT digital archive. The selection of years for the figures presented was driven by the availability of reports in the digital archive. Notably, documents for different policy instruments in several decades have yet to be uploaded to the archive.

¹³³Bown 2011a provides a discussion of its use during the 2008-2010 crisis, during 2009-2010 it was updated and released on a quarterly basis. The project was conceived in the early 2000s because countries reported so little information about their temporary trade barriers use to the WTO, that it was insufficiently detailed for research purposes. Yet governments did report the information publicly, through official publications; this only required collating the information from national sources into a common format.

The GATT archive organizes documents according to the nomenclature that was used by the GATT. Thus, work of the Committee on Anti-Dumping Practices is reported in a series beginning COM.AD, work of the Committee on Government Procurement is reported in a series beginning GPR, etc.. Somewhat confusingly, some document series include reports on a wide array of issues. At the same time, some policies are reported in multiple document series and it appears that there is no overlap; i.e., if a tariff increase is reported in one series, the same increase does not appear to be reported in other series.

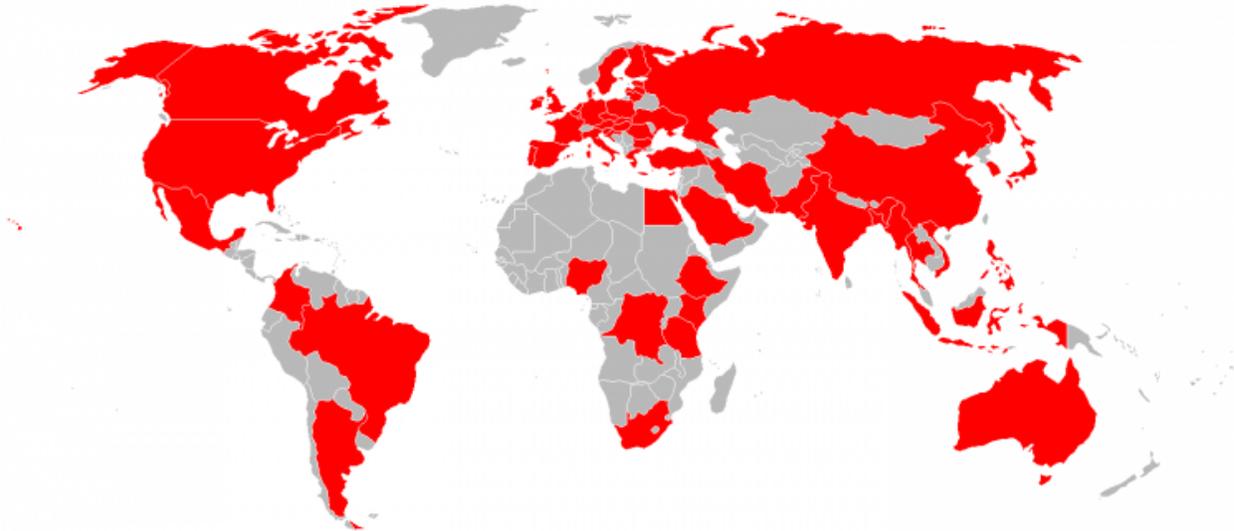
The information on antidumping described in Section 4.3.6 was collected from a series of approximately 270 documents reported by the GATT's Committee on Anti-Dumping Practices between 1970 and 1979. During this period, the Committee issued 86 basic documents/reports, but with various addendums included, the archive holds about 270 individual documents. Periodic reports issued by this committee include lists of all countries that reported antidumping activity in the relevant period, the trading partners affected by the antidumping case, verbal descriptions of the products involved, information about provisional duties imposed, and information about final antidumping measures imposed. In some cases, countries have reported the removal of duties, the termination of investigations that did not result in duties, and the outcomes of negotiated settlements like price undertakings. Our analysis concurred these verbal product descriptions to modern HS product classifications. While the information is similar to what is reported to the WTO in the modern era, it appears to be less systematically reported. Moreover, it does not include information on values of trade, prices of goods, or magnitude of antidumping duties.

Information on safeguards (Article XIX) for 1950-1959 utilized in Section 4.2 is reported in the L: General Series (Limited Distribution) and the GATT/CP series. In this period, there are almost 1500 individual documents in the L: series and over 900 individual documents in the GATT: series. Only a small fraction of these documents relate to Article XIX actions so significant effort must go into identifying the relevant documents for Article XIX and then extracting the information contained in the documents. As with antidumping, we recorded data on the country imposing the measure, the product(s) involved, that date the investigation began, and the final policy outcome.

Information on changes in import restrictions to address BOP problems used in Section 4.3.1 is also reported in the L: General Series. From these reports, we recorded the country imposing the measures and the date of implementation. These reports also include long lists of products whose importation has been banned or restricted in an effort to reduce the country's trade deficit.

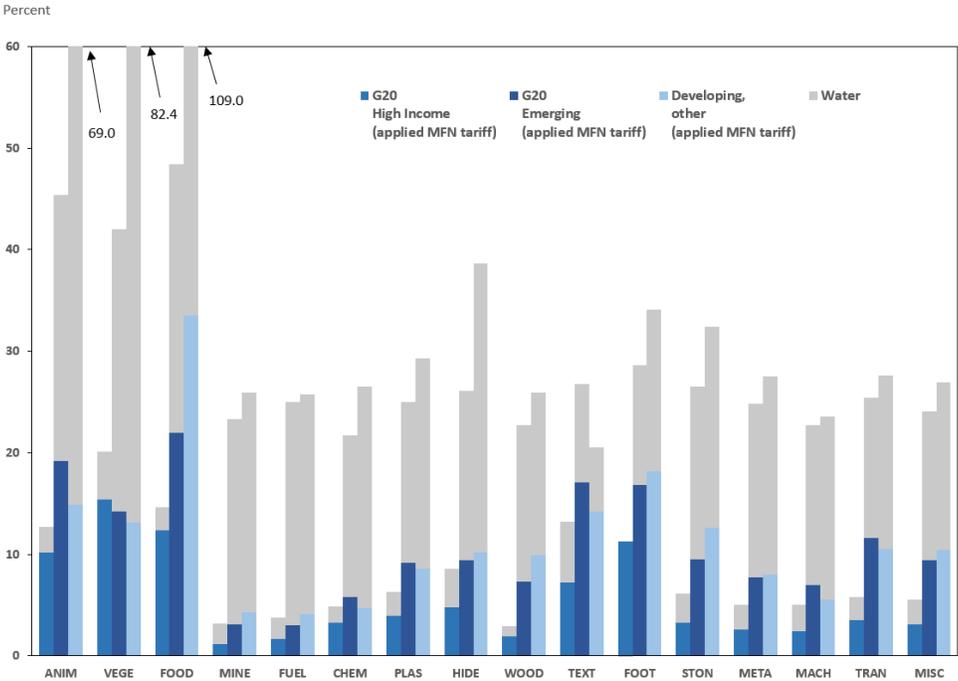
Finally, we recorded data on permanent renegotiations of tariff rates under Article XXVIII that were reported in the L: General Series between 1950 and 1959. However, we do not report this information in the chapter because this series of reports seems to cover only a small subset of all Article XXVIII actions. In particular, *GATT Analytical Index* (WTO, 1995) provides summary information on actions taken by countries during the period 1947-1994 and indicates that most Article XXVIII renegotiations were recorded in a series of documents classified as SECRET. The SECRET document series is not (currently) included in the GATT digital archive.

Figure 1: Geographic Coverage of the 31 Economies in the Empirical Exercise



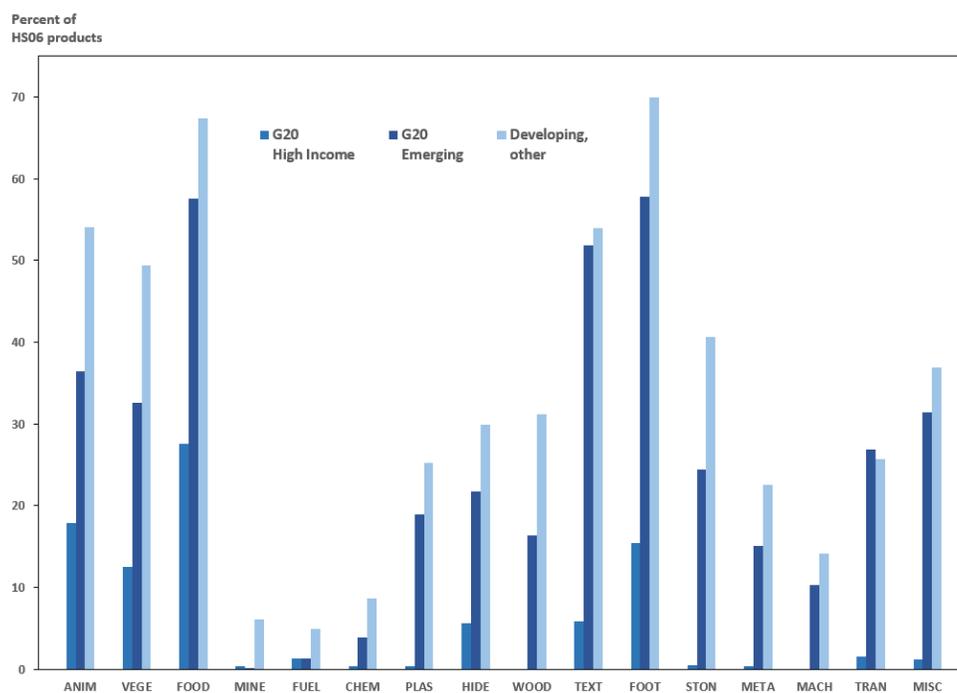
Source: Constructed by the authors.

Figure 2: Average Applied MFN Tariffs in 2013 and Tariff Bindings, by Industry and Country Group



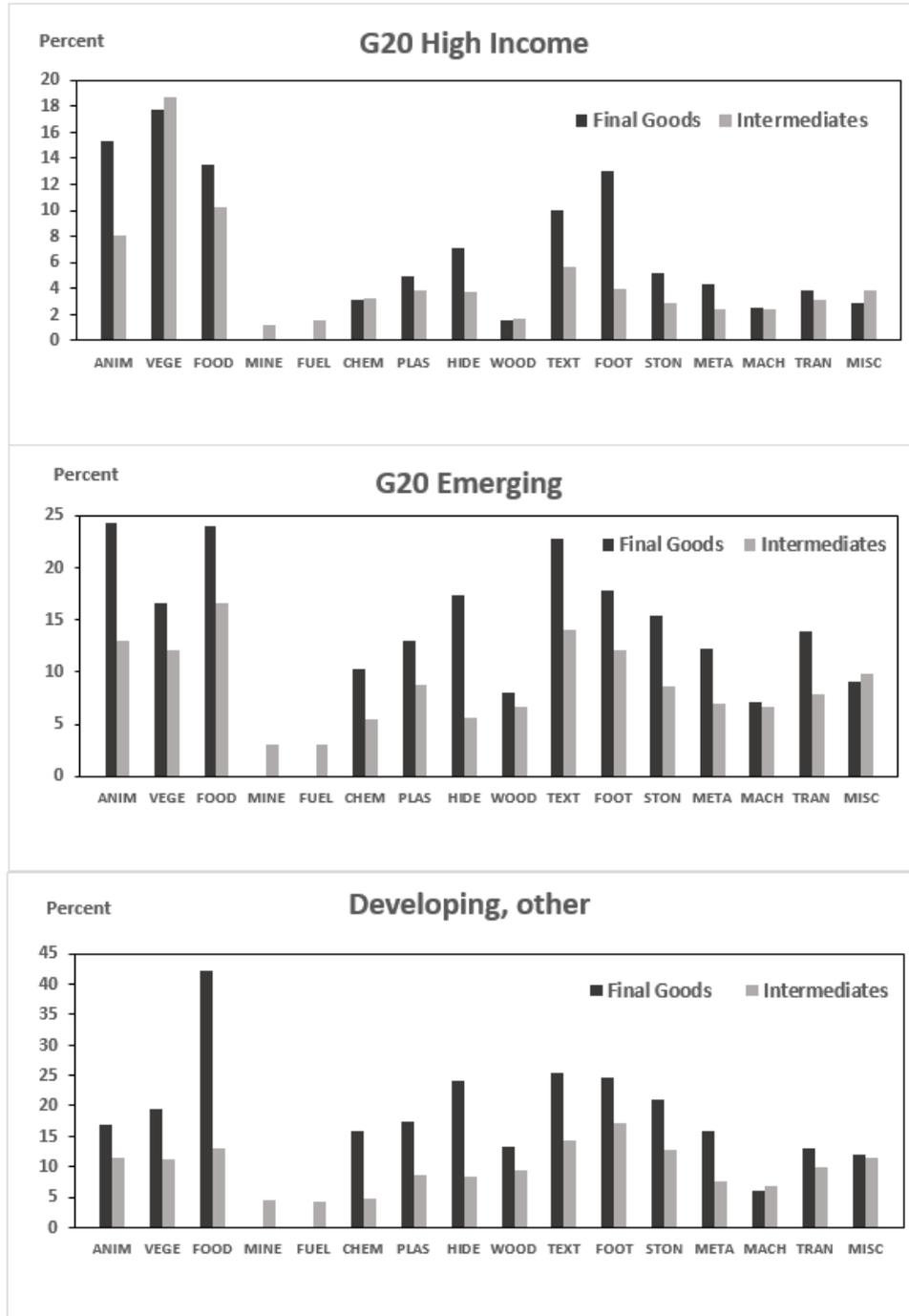
Source: Constructed by the authors from tariff data at the HS-06 level from the WTO and UNCTAD/TRAINS. ‘Water’ defined as the difference between the country’s tariff binding legal commitment and its applied MFN rate. Country groupings based on Table 1.

Figure 3: Applied MFN Tariff Peaks in 2013, by Industry and Country Group



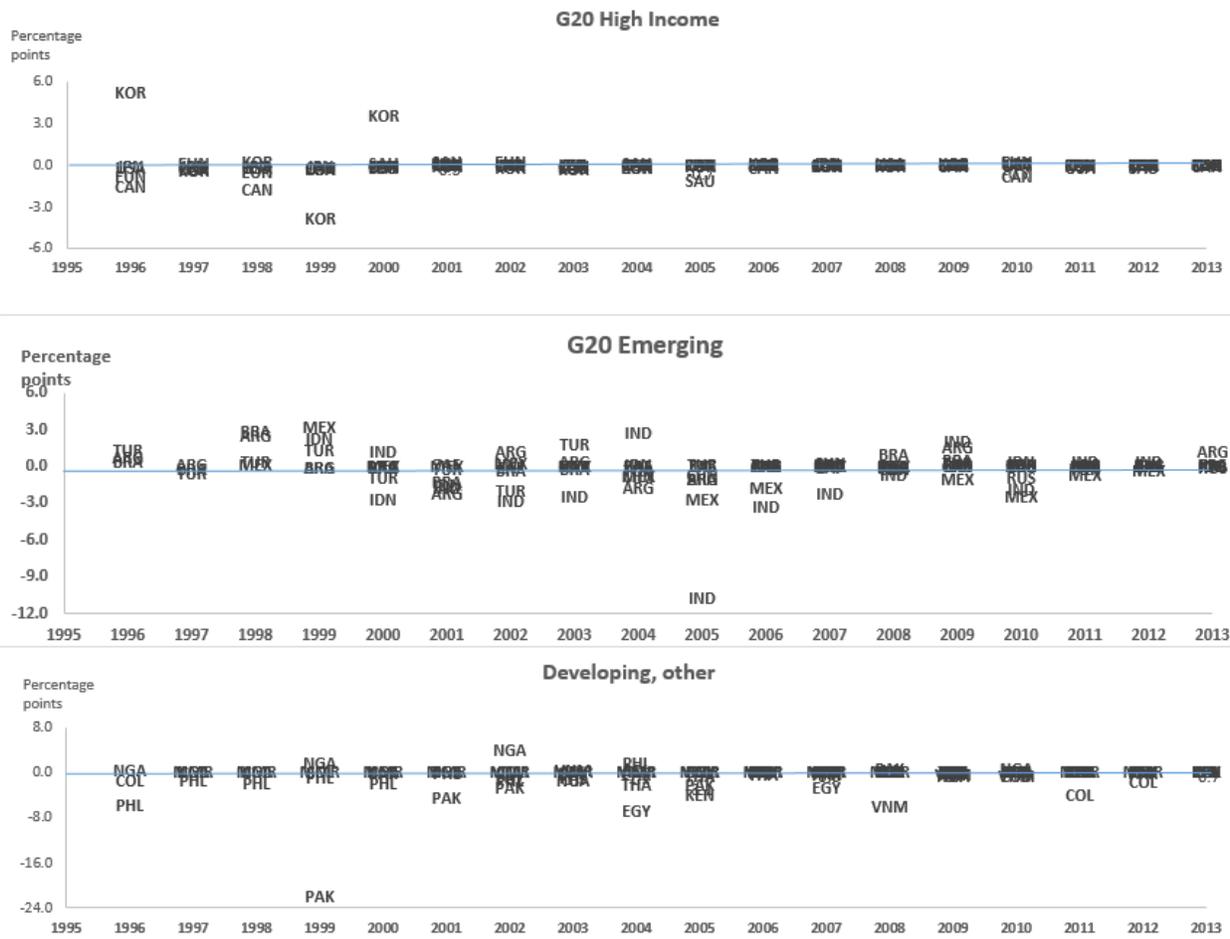
Source: Constructed by the authors from tariff data at the HS-06 level from the WTO and UNCTAD/TRAINS. A tariff peak is defined as an HS-06 product with an applied MFN tariff greater than 15 percent. Country groupings based on Table 1.

Figure 4: Tariff Escalation: Average Applied MFN Tariffs in 2013, by End Use Categories, Industry and Country Group



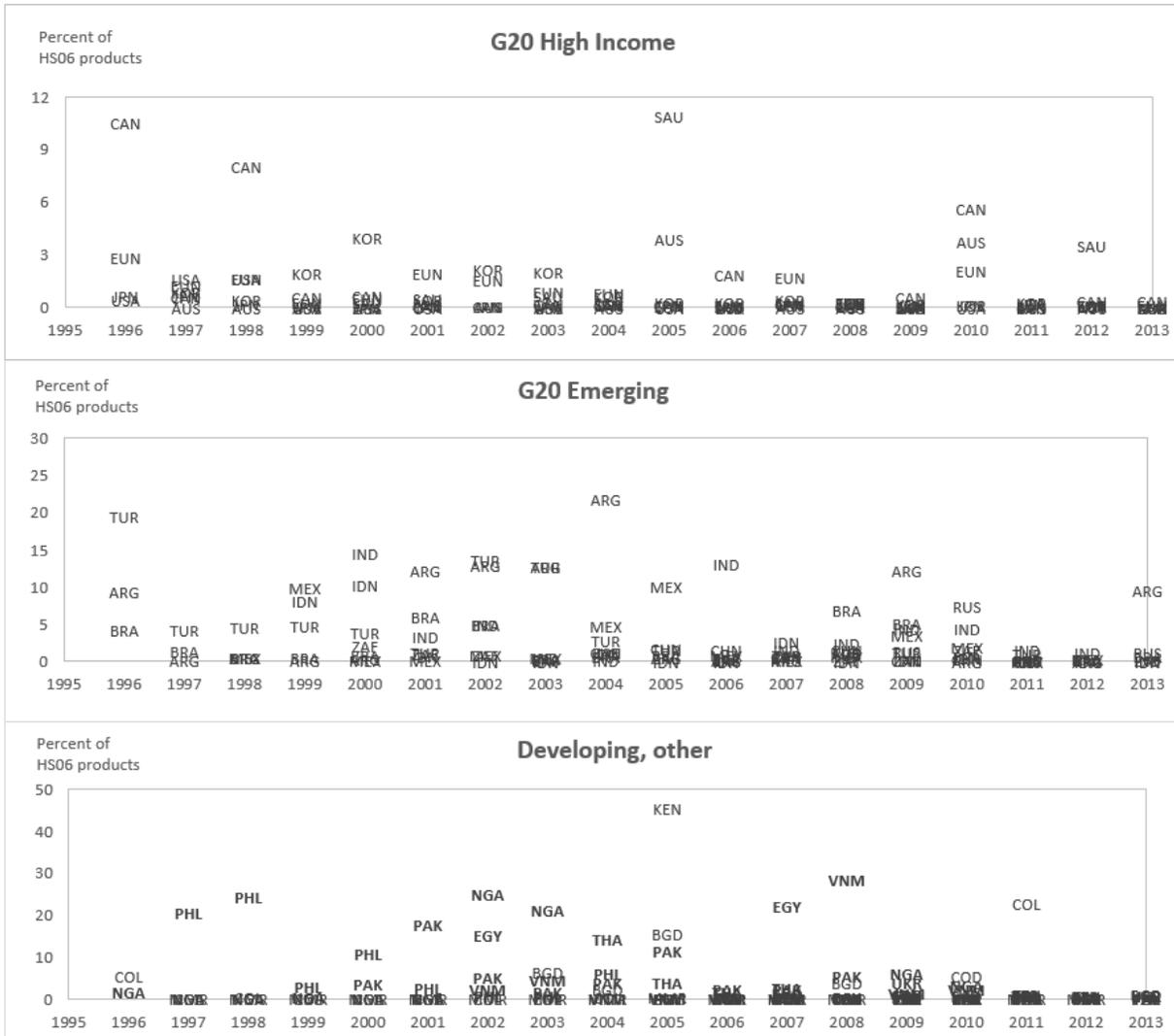
Source: Constructed by the authors from tariff data at the HS-06 level from the WTO and UNCTAD/TRAINS. End use categories for each HS06 product taken from the BEC, with mixed use goods dropped. Country groupings based on Table 1.

Figure 5: Annual Changes in Average Applied MFN Tariffs 1996-2013, by Country Group



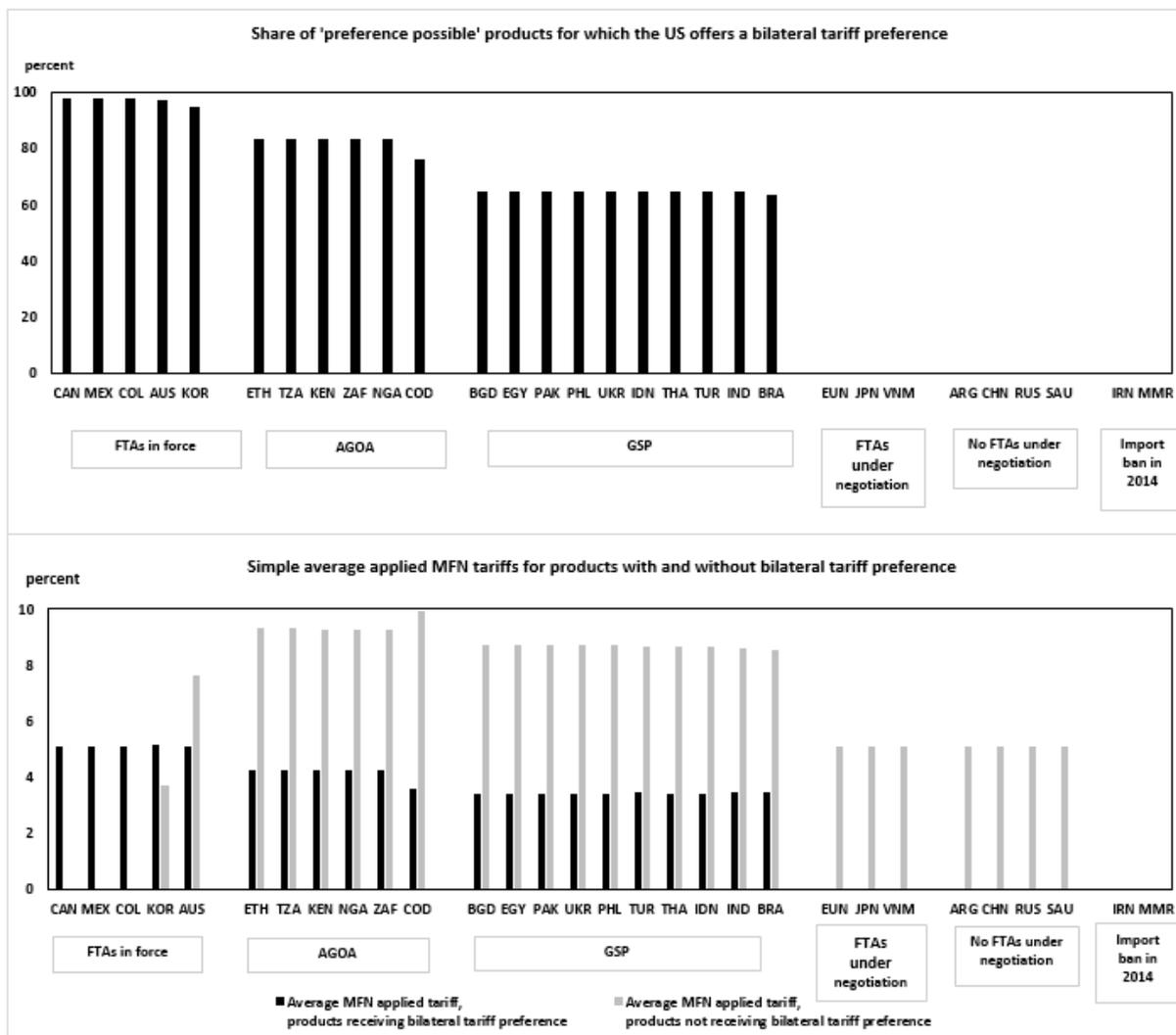
Source: Constructed by the authors as the annual difference in the simple average MFN applied tariffs, with tariff data taken from WTO and UNCTAD/TRAINS.

Figure 6: Import Products for which the Annual Change in Applied MFN Tariffs was Greater than 5 Percentage Points 1996-2013, by Country Group



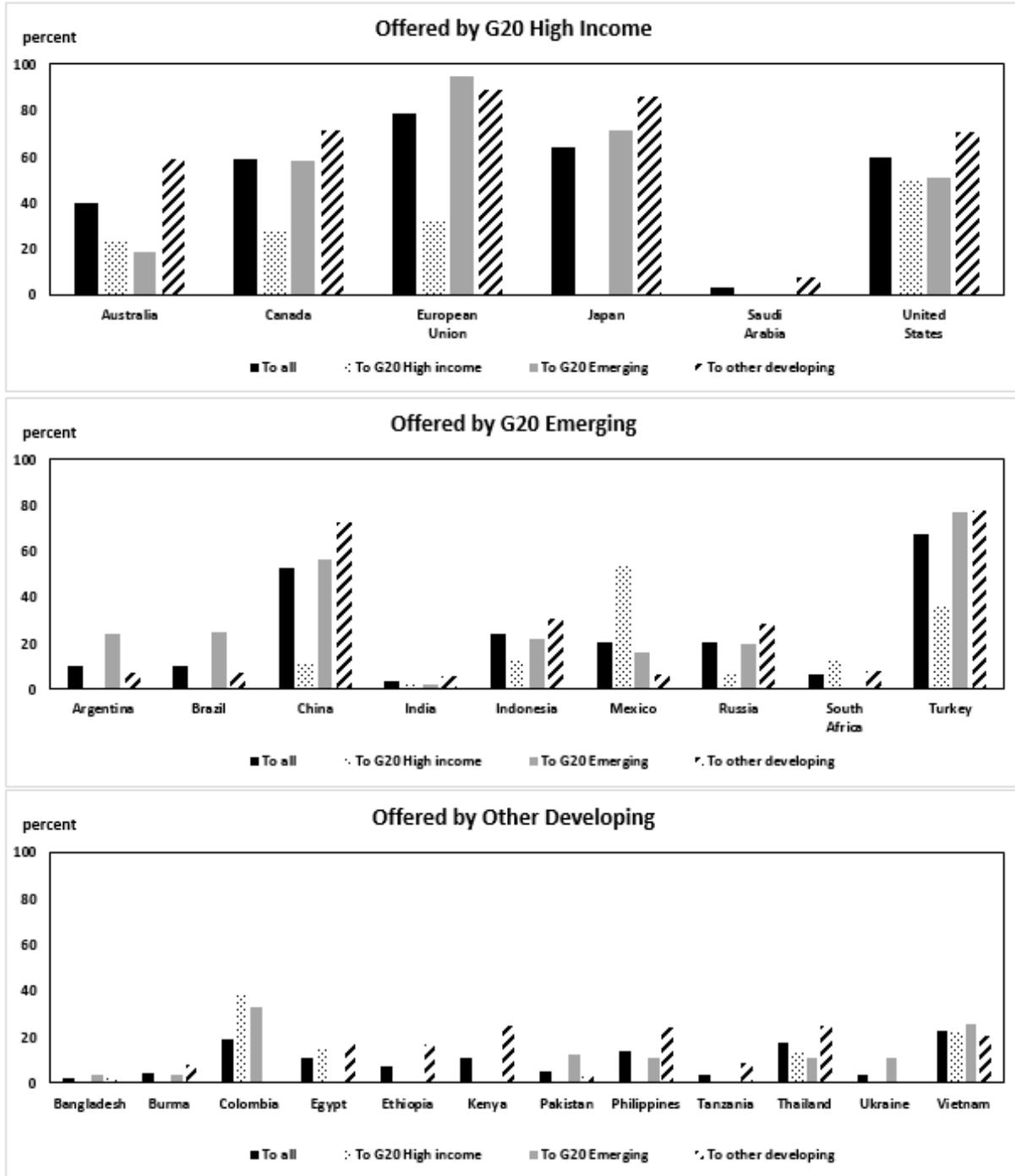
Source: Constructed by the authors as the share of HS06 products for which the absolute value of the annual difference in MFN applied tariffs from the prior year was larger than 5 percentage points, with tariff data taken from WTO and UNCTAD/TRAINS. For scaling purposes, the following outliers are omitted from the figure: Saudi Arabia 86 percent of products (2002), India 77 percent of products (2005), Philippines 60 percent of products (1996), Pakistan 81 percent of products (1999), and Egypt 51 percent of products (2004).

Figure 7: United States's Bilateral Tariff Preferences toward Major Economies, 2014



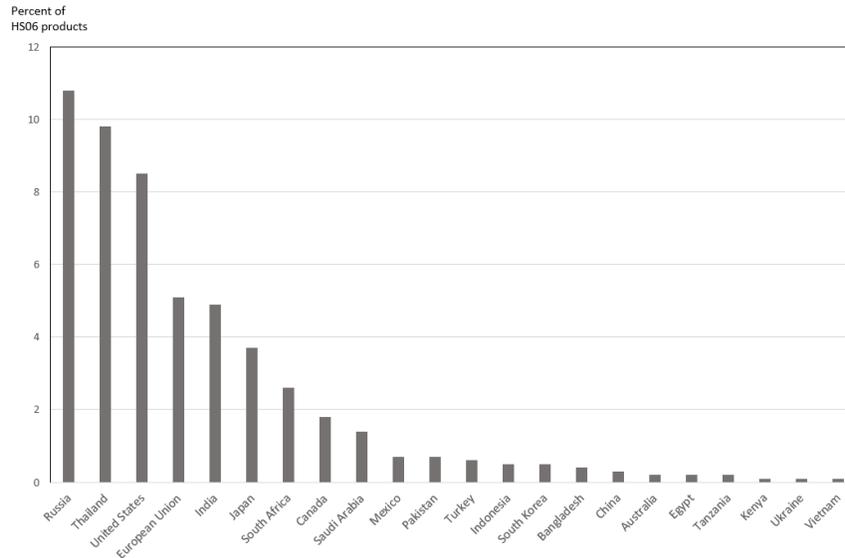
Source: constructed by the authors with bilateral tariff data at the HS06 level from UN International Trade Centre. 'Preference possible' products, defined as HS06 products with non-zero applied MFN tariffs in 2014 (58.0 percent of US imported products), not including products with tariffs applied as specific duties. For country acronyms, see Table Appendix C.

Figure 8: Bilateral Tariff Preference Offerings by Policy-Imposing Economy, 2014



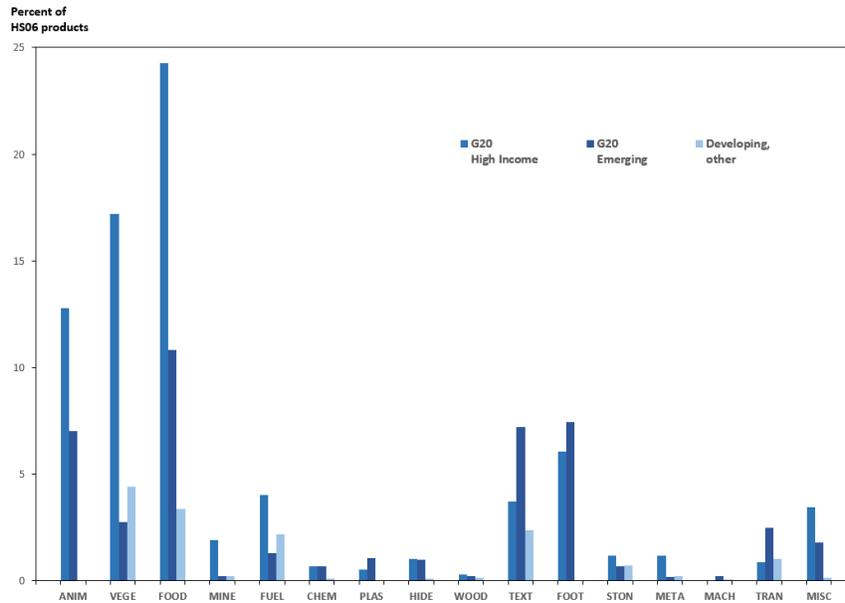
Source: constructed by the authors with bilateral tariff data (policy-imposing economy vis-à-vis 30 trading partners listed in Table 1) at the HS06 level from UN International Trade Centre. Data illustrates percent of the ‘preference possible’ HS06 products for which the policy-imposing economy offers bilateral tariffs to exporting countries in each group. For list of exporting countries in each group (G20 high income, G20 emerging, other developing) see Table 1.

Figure 9: Import Products with MFN Tariffs Applied as Specific Duties in 2013, by Country



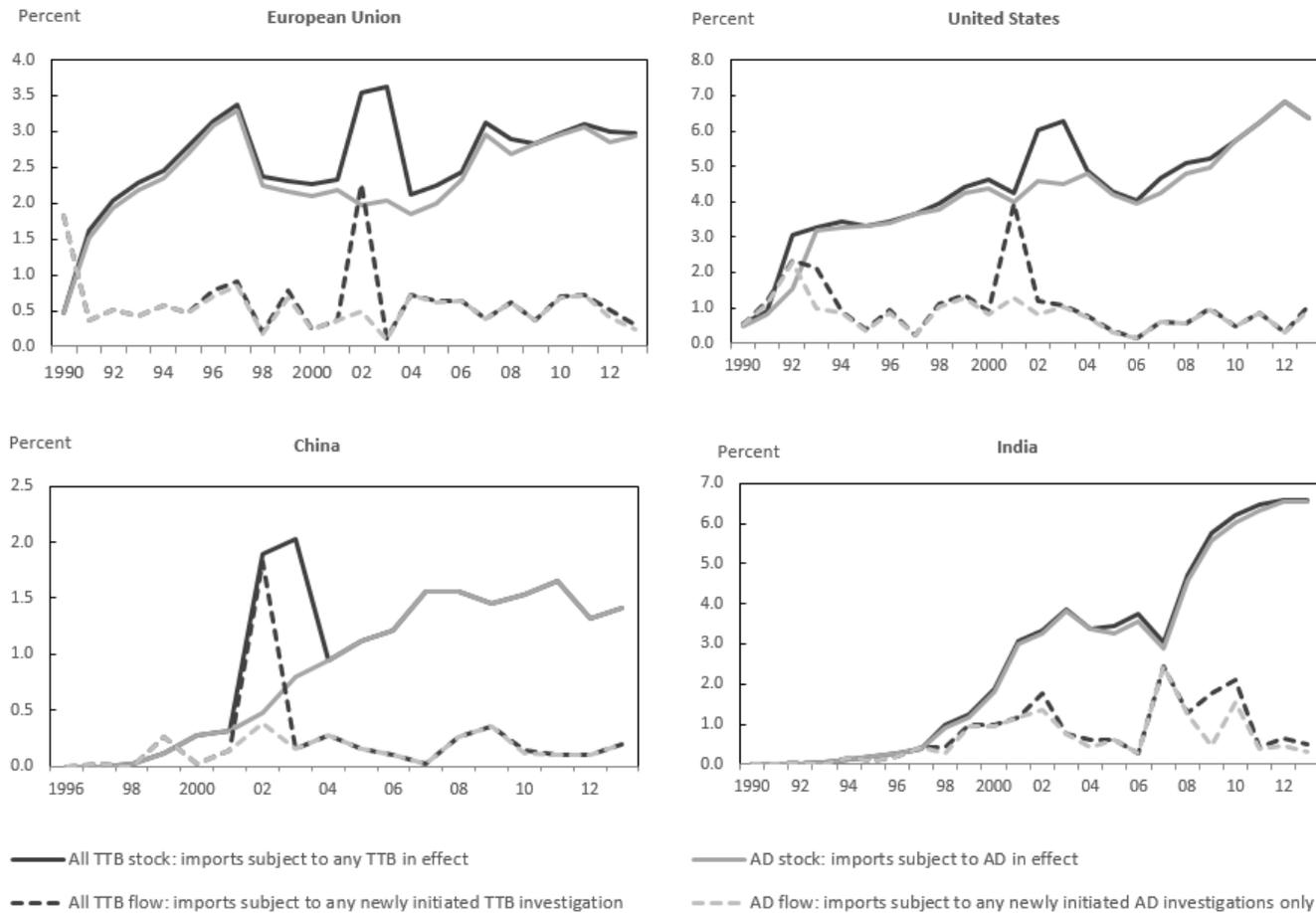
Source: Constructed by the authors from WTO (2014c). Includes 31 economies from sample of Table 1; the remaining 9 countries from Table 1 each had zero HS06 products with MFN tariffs applied as specific duties in 2013.

Figure 10: Import Products with MFN Tariffs Applied as Specific Duties in 2013, by Industry and Country Group



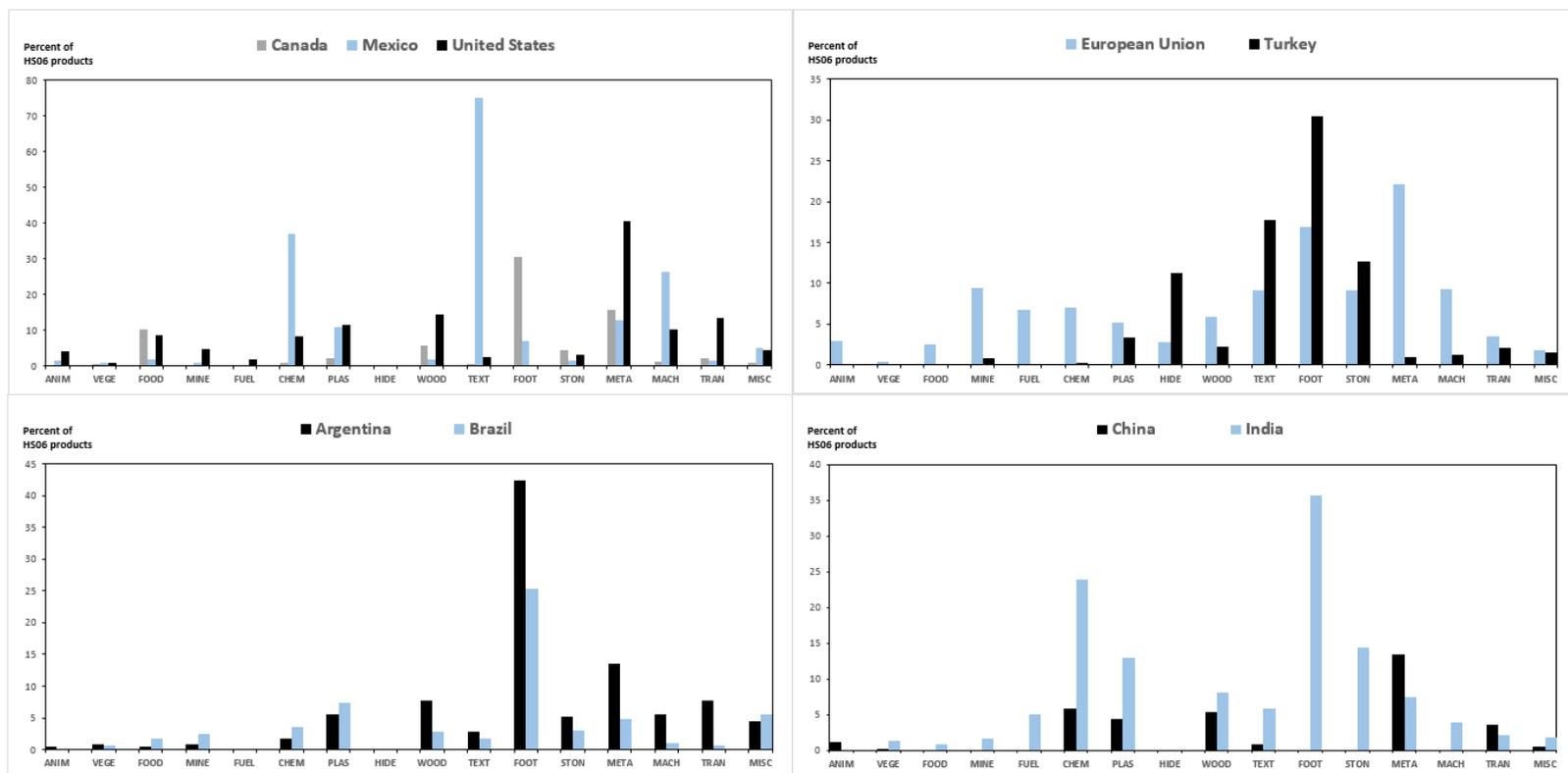
Source: Constructed by the authors from tariff data at the HS-06 level from the WTO and UNCTAD/TRAINS. Country groupings based on Table 1 and includes all countries, even those revealed in Figure 9 as having zero MFN tariffs applied as specific duties.

Figure 11: Import Products Subject to Newly Initiated TTB Investigations and Imposed Import Restrictions for Selected Economies, 1990-2013



Source: Share of HS06 import protects subject to TTBs. Constructed by the authors from temporary trade barrier (TTB) data at the HS-06 level from Bown (2014b); TTBs include antidumping, countervailing duties, global safeguards and China-specific transitional safeguards.

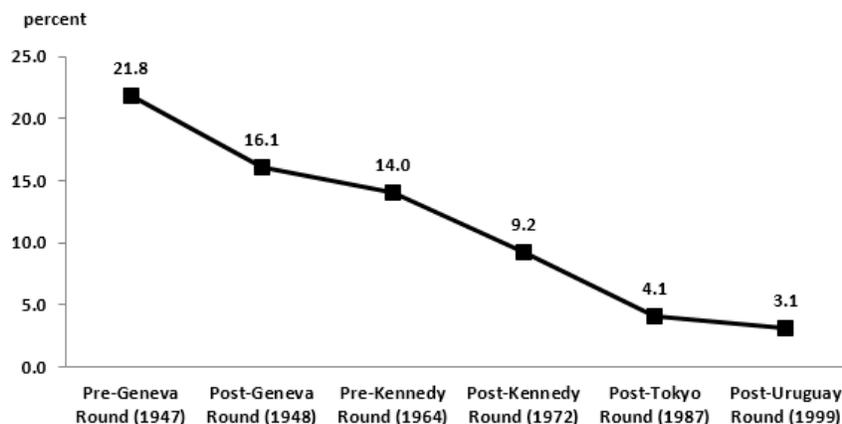
Figure 12: Import Products with an Imposed Temporary Trade Barrier in Effect over 1995-2013, by Policy-Imposing Economy and Industry



Source: Constructed by the authors from temporary trade barrier (TTB) data at the HS-06 level from Bown (2014b); TTBs include antidumping, countervailing duties, global safeguards and China-specific transitional safeguards.

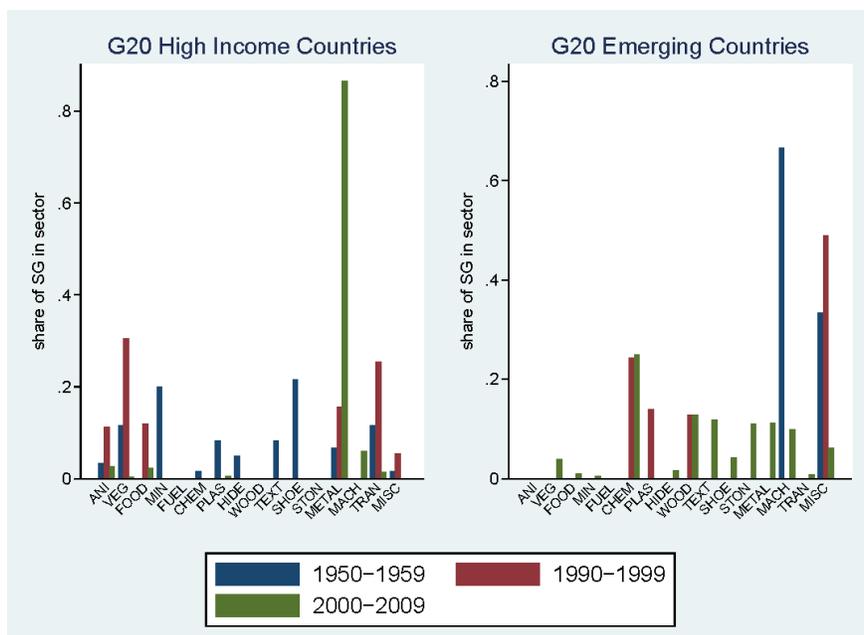
Notes: during this period Canada, Mexico and the US had a common FTA (NAFTA), European Union and Turkey had a customs union (common external applied MFN tariff), and Argentina and Brazil had a customs union (common external applied MFN tariff).

Figure 13: Estimates of Average Tariffs for the United States, Western Europe, and Japan, 1947-1999



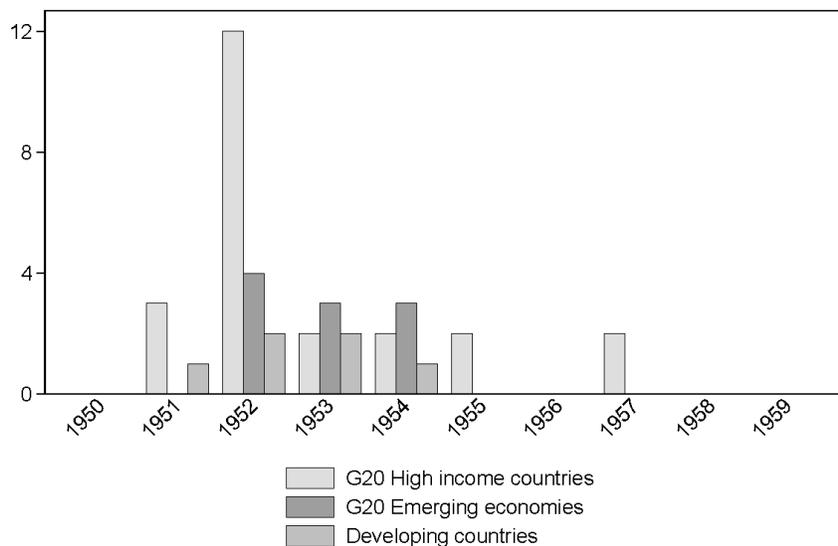
Source: Bown and Irwin (2015, Figure 1), based on backcast estimates for 1947 average tariffs, computed from data on simple average tariffs in effect at the beginning of the Kennedy Round (1964) and reports on the size of average tariff cuts arising during the initial GATT negotiating rounds.

Figure 14: Temporary Import Protection Actions under Article XIX and WTO Agreement on Safeguards: share of total investigations by sector by decade



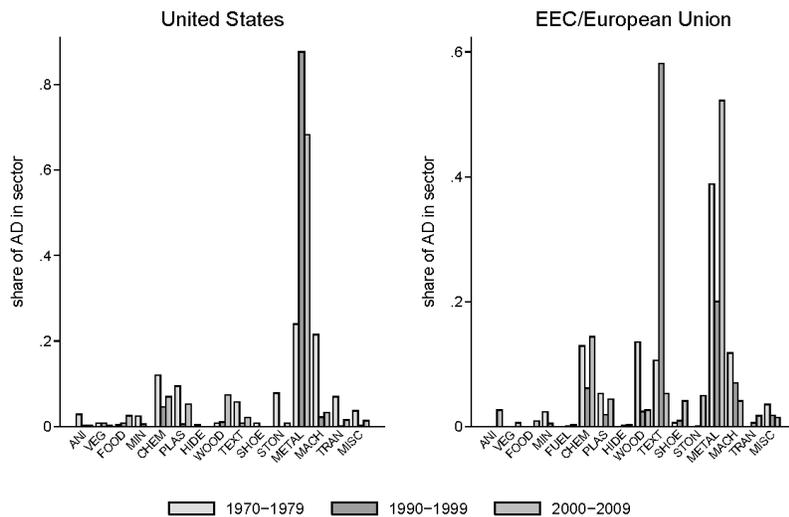
Source: Constructed by the authors from Bown (2014b) and L: series reports from 1950-1959 in the GATT digital archive. The share reported for each decade is the count of safeguards investigations by HS06 product and export origin within one of 16 industrial sectors divided by the count of safeguards investigations by HS06 and export origin summed over all industrial sectors.

Figure 15: Balance of Payment Import Restrictions under Article XII, 1950-1959



Source: Constructed by the authors from the L: reports from 1950-59 in the GATT digital archive.

Figure 16: Article VI and Agreement on Antidumping: share of antidumping investigations by sector by decade



Source: Constructed by the authors from Bown (2014b) and COM.AD reports from 1970-1979 in the GATT digital archive. The share reported for each decade is the count of antidumping investigations by HS06 product and export origin within one of 16 industrial sectors divided by the count of antidumping investigations by HS06 and export origin summed over all industrial sectors.

Table 1: MFN Ad Valorem Import Tariffs for Selected Economies, 2013

Country/territory	MFN applied rate, simple average	WTO binding rate, simple average	Binding coverage	Coverage of applied duties > 15 percent	Coverage of binding rates > 15 percent	Maximum MFN applied rate
	(1)	(2)	(3)	(4)	(5)	(6)
G20 High-income						
Australia	2.7	10.0	97.0	0.1	13.4	140.0
Canada	4.2	6.8	99.7	6.8	7.3	484.0
European Union	5.5	5.2	100.0	5.1	4.8	511.0
Japan	4.9	4.7	99.6	3.7	3.7	736.0
Korea	13.3	16.6	94.6	10.4	20.5	887.0
Saudi Arabia	4.8	11.2	100.0	0.2	1.1	298.0
United States	3.4	3.5	100.0	2.7	2.7	350.0
G20 Emerging						
Argentina	13.4	31.9	100.0	36.0	97.8	35.0
Brazil	13.5	31.4	100.0	36.2	96.4	55.0
China	9.9	10.0	100.0	15.6	16.4	65.0
India	13.5	48.6	74.4	19.0	71.5	150.0
Indonesia	6.9	37.1	96.6	1.7	90.7	150.0
Mexico	7.9	36.2	100.0	15.7	98.7	210.0
Russia	9.7	7.7	100.0	10.1	2.1	441.0
South Africa	7.6	19.0	96.1	20.7	39.6	>1000
Turkey	10.8	28.6	50.3	13.6	28.9	225.0
Developing, other*						
Bangladesh	13.9	169.2	15.5	41.2	15.1	25.0
Burma	5.6	84.1	17.8	5.0	14.6	40.0
Colombia	8.8	42.1	100.0	2.1	98.0	98.0
DR of the Congo (2010)	11.0	96.2	100.0	28.5	98.9	20.0
Egypt (2012)	16.8	36.9	99.3	19.2	70.7	>1000
Ethiopia [†] (2012)	17.3	**	**	50.8	**	35.0
Iran [†] (2011)	26.6	**	**	45.7	**	400.0
Kenya	12.7	95.1	14.8	41.4	14.8	100.0
Nigeria	11.7	118.3	19.1	39.0	19.1	35.0
Pakistan	13.5	60.0	98.7	36.0	94.9	100.0
Philippines	6.3	25.7	67.0	3.2	56.0	65.0
Tanzania	12.8	120.0	13.3	41.8	13.3	100.0
Thailand	11.4	27.8	75.0	25.5	66.0	226.0
Ukraine	4.5	5.8	100.0	2.7	3.8	59.0
Vietnam	9.5	11.5	100.0	24.8	27.7	135.0

Source: tariff data taken from WTO (2014c). Notes: parentheses indicate data availability for year other than 2013. *selected other developing countries chosen as those with 2013 populations greater than 40 million. G20=Group of 20. † indicates WTO non-member. **indicates legal bindings not relevant for WTO non-members. Columns (1), (2), and (6) are ad valorem rates, and columns (3), (4), and (5) are shares of import products.

Table 2: Average Applied MFN Ad Valorem Import Tariffs for Selected Economies: 1993, 2003 and 2013

	GATT membership year	WTO membership year	Simple average applied MFN tariff for		
			1993	2003	2013
G20 High-income					
Australia	1948	1995	8.8	4.2	2.7
Canada	1948	1995	9.0	5.1	3.7
European Union	**	1995	7.0	4.4	4.4
Japan	1955	1995	4.4	3.2	3.0
Korea	1967	1995	11.7*	11.6	12.2
Saudi Arabia	NM	2005	12.1*	6.0	4.6
United States	1948	1995	5.6	3.7	3.5
G20 Emerging					
Argentina	1967	1995	11.2	14.2	13.4
Brazil	1948	1995	14.0	13.5	13.5
China	NM	2001	39.1	11.4	9.6*
India	1948	1995	56.3*	26.5	13.3
Indonesia	1950	1995	17.9	6.9	6.7
Mexico	1986	1995	13.7*	18.0	7.7*
Russia	NM	2012	7.8	10.7*	8.9
South Africa	1948	1995	16.0	5.6	7.4
Turkey	1951	1995	9.3	10.0	10.8
Developing, other*					
Bangladesh	1972	1995	82.8*	19.5	14.0
Burma	1948	1995	–	5.5	5.6*
Colombia	1981	1995	12.3*	12.3	6.8
DR of the Congo	NM	1997	–	12.0	11.0*
Egypt	1970	1995	34.6*	26.9	16.8*
Ethiopia	NM	NM	28.9*	18.8*	17.3*
Iran	NM	NM	–	27.3	26.6*
Kenya	1964	1995	35.2*	15.2*	12.8
Nigeria	1960	1995	34.4*	28.6	11.7
Pakistan	1948	1995	50.8*	17.1	13.5
Philippines	1979	1995	22.9	4.7	6.3
Tanzania	1961	1995	20.3	13.6	12.8
Thailand	1982	1995	45.7	15.4	10.4
Ukraine	NM	2008	7.0*	7.0*	4.5
Vietnam	NM	2007	14.1*	16.8	9.4

Source: constructed by the authors with applied ad valorem duties data at the HS06 level taken from WTO and UNCTAD/TRAINS. Notes: *data for that year not available and so chosen as the closest available year. G20=Group of 20. NM indicates GATT or WTO non-member. **Different European Union member states became GATT Contracting Parties in different years. For the purposes of this table, ad valorem equivalent rates of tariffs applied as specific duties are omitted from the calculations.

Table 3: Major Preferential Trade Arrangements in Force in 2015

Type of Arrangement	Number in force	Major Examples
Free Trade Agreement (FTA)	233	North American Free Trade Agreement (NAFTA) US-Australia, US-Colombia, Korea-US Canada-Colombia, Canada-Korea EU-Colombia and Peru, EU-Egypt, EU-Korea, EU-Mexico, EU-South Africa, EU-Ukraine Association of Southeast Asian Nations (ASEAN) FTA ASEAN-Japan, ASEAN-Australia-New Zealand, ASEAN-China, ASEAN-India, ASEAN-Korea India-Japan Japan - Australia, Japan - Indonesia, Japan - Mexico, Japan - Philippines, Japan - Thailand, Japan - Vietnam Korea-Australia, Korea-India Pakistan-China Thailand-Australia Turkey-Egypt Turkey-Korea Ukraine-Russia
Customs Union (CU)	19	European Union (EU) EU-Turkey MERCOSUR (Southern Common Market) East African Community Common Market for Eastern and Southern Africa (COMESA)
Partial Scope Agreement (PSA)	14	Asia-Pacific Trade Agreement (APTA) Global System of Trade Preferences (GSTP) Latin American Integration Association (ALADI) MERCOSUR-India
Unilateral Preference Scheme	28	Generalized System of Preferences (GSP) schemes: Australia, Canada, European Union, Japan, Russia, Turkey, United States Duty-free treatment for certain less developed countries (LDCs): China, Korea, India, Thailand Other examples: African Growth and Opportunities Act (AGOA) - US Trade preferences for Pakistan - EU

Source: constructed by the authors from WTO (2015a,b). The list of 'major examples' is not comprehensive as it omits preferential trade arrangements that do involve at least two of the major economies listed in Table 1.

Table 4: Bilateral Import Tariff Characteristics under PTAs for Selected Economies, 2014

Country/ territory	All prod- ucts	Preference possible (PP) products with non-zero applied MFN tariffs						
	MFN applied tariff	PP prod- ucts (as a share of all HS06 products)	Products given prefer- ences (as a share of all PP prod- ucts)	MFN applied tariff, all PP products	MFN applied tariff, prefer- ence not given	MFN applied tariff, prefer- ence given	Bilateral applied tariff, prefer- ence given	Bilateral tariff prefer- ence margin, prefer- ence given
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
G20 High-income								
Australia	2.7	52.5	39.8	5.1	5.1	5.0	0.6	4.4
Canada	2.2	31.3	58.8	7.1	7.7	6.7	1.5	5.2
European Union	5.6	76.0	78.7	7.3	10.1	6.6	1.8	4.8
Japan	2.8	47.5	64.4	5.8	7.0	5.2	0.8	4.4
Saudi Arabia	4.7	89.7	3.6	5.3	5.3	5.3	0.0	5.3
United States	2.9	58.0	59.7	5.1	6.3	4.2	0.1	4.1
G20 Emerging								
Argentina	13.6	96.7	10.0	14.1	14.2	13.5	2.5	11.0
Brazil	13.6	96.8	10.2	14.0	14.0	13.7	3.9	9.8
China	9.6	93.6	52.8	10.3	11.4	9.3	0.7	8.6
India	12.4	97.3	3.6	12.7	12.6	15.0	9.2	5.8
Indonesia	7.2	90.6	23.7	8.0	8.2	7.2	0.6	6.6
Mexico	7.4	57.0	20.3	12.9	13.0	12.6	2.5	10.1
Russia	8.8	89.4	20.2	9.9	9.6	11.1	5.7	5.4
South Africa	7.5	43.7	6.8	17.3	17.2	17.3	2.1	15.2
Turkey	10.8	80.4	67.1	13.4	29.4	5.6	1.9	3.7
Developing, other								
Bangladesh	14.6	93.5	2.0	15.6	15.4	22.6	21.2	1.4
Burma	5.6	96.9	4.6	5.8	5.4	13.4	4.9	8.5
Colombia	6.3	54.2	18.7	11.7	11.7	11.9	1.9	10.0
Egypt	16.8	90.6	10.7	18.6	18.6	18.6	5.6	13.0
Ethiopia	17.3	95.7	7.1	18.1	18.1	18.1	16.3	1.8
Kenya	12.8	63.8	10.7	20.0	20.0	20.0	0.7	19.3
Pakistan	13.4	94.3	5.2	14.2	14.2	15.1	13.1	2.0
Philippines	6.3	98.2	13.8	6.4	6.4	6.4	0.6	5.8
Thailand	10.7	78.3	17.6	13.6	13.7	13.5	0.3	13.2
Tanzania	12.8	63.8	3.6	20.1	20.1	20.1	0.0	20.1
Ukraine	4.4	63.8	3.6	6.9	6.9	6.9	0.0	6.9
Vietnam	9.3	64.9	22.5	14.4	14.1	15.3	4.8	10.5

Source: constructed by the authors with bilateral tariff data at the HS06 level for each importing economy vis-à-vis its 30 trading partners listed in Table 1. Data does not include ad valorem equivalent estimates for tariffs applied as specific duties. For countries for which 2014 data is not available, comprehensive data from the nearest available year was utilized. Not included are DR Congo, Iran, Korea, and Nigeria, for which bilateral tariff preference data were incomplete. G20=Group of 20. Columns (1), (4), (5), (6), (7) and (8) are simple averages of ad valorem rates, and columns (2) and (3) are shares of import products.

Table 5: Import Product Coverage by Temporary Trade Barriers over 1995-2013, by Country and Policy

	AD law/ initiation	<i>Cumulative coverage by TTB ever in effect during 1995-2013</i>					<i>Annual coverage by TTB in effect 1995-2013</i>				<i>Annual coverage by new TTB investigation 1995-2013</i>			
		All TTBs	AD only	CVD only	SG only	CSG only	St.		Min.	Max.	St.		Min.	Max.
		Mean	Dev.	Min.	Max.	Mean	Dev.	Min.	Max.	Mean	Dev.	Min.	Max.	
G20 High-income														
Australia	1906/na	2.5	2.5	0.5	0.0	0.0	0.8	0.2	0.4	1.2	0.2	0.1	0.1	0.4
Canada	1904/na	3.4	3.4	1.5	0.0	0.0	1.6	0.3	1.2	2.2	0.3	0.3	0.0	1.1
European Union	1968/1968-69	8.1	6.6	1.4	1.6	0.0	2.8	0.5	2.1	3.6	0.6	0.5	0.1	2.2
Japan	1920/1982	0.3	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.1
Korea	1963/1986	1.6	1.4	0.0	0.1	0.0	0.6	0.2	0.2	0.8	0.1	0.2	0.0	0.6
Saudi Arabia	na/na	na	na	na	na	na	na	na	na	na	na	na	na	na
United States	1916/1922	10.3	9.0	5.1	2.8	0.0	4.9	1.1	3.3	6.8	0.9	0.8	0.1	3.9
G20 Emerging														
Argentina	1972/na	4.8	4.6	0.1	0.5	0.0	2.2	0.6	1.2	3.2	0.5	0.4	0.0	1.3
Brazil	1987/1988	2.8	2.4	0.2	0.3	0.0	1.2	0.4	0.4	1.9	0.3	0.2	0.0	0.6
China	1997/1997	3.1	2.1	0.2	1.3	0.0	1.1	0.7	0.0	2.0	0.2	0.4	0.0	1.8
India	1985/1992	8.0	7.6	0.0	0.9	0.3	3.4	2.2	0.2	6.6	0.9	0.7	0.1	2.4
Indonesia	1995/1996	2.1	1.1	0.0	1.1	0.0	0.6	0.6	0.0	1.8	0.2	0.3	0.0	1.2
Mexico	1986/1987	22.9	22.8	0.6	0.0	0.0	17.5	10.0	1.0	23.7	0.2	0.1	0.0	0.4
Russia	na/na	na	na	na	na	na	na	na	na	na	na	na	na	na
South Africa	1914/1921	2.1	2.1	0.1	0.0	0.0	1.0	0.4	0.3	1.7	0.1	0.1	0.0	0.6
Turkey	1989/1989	4.2	2.5	0.0	1.6	0.1	2.9	2.0	0.6	5.9	0.4	0.5	0.0	1.8
Developing, other														
Colombia	1990/1991	2.3	1.2	0.0	0.1	1.5	0.6	0.5	0.1	1.9	0.2	0.4	0.0	1.8
Egypt	na/na	na	na	na	3.6	na	na	na	na	na	na	na	na	na
Pakistan	1983/2002	0.4	0.4	0.0	0.0	0.0	0.2	0.1	0.0	0.3	0.1	0.1	0.0	0.3
Philippines	1994/1994	0.5	0.3	0.0	0.2	0.0	0.2	0.1	0.1	0.7	0.1	0.1	0.0	0.4
Thailand	1994/1994	0.6	0.6	0.0	0.1	0.0	0.3	0.2	0.0	0.7	0.4	0.5	0.0	1.0
Ukraine	na/na	na	na	na	0.1	na	na	na	na	na	na	na	na	na

Source: coverage indicates share of a country's HS06 import product lines, constructed by the authors with data from Bown (2014b).

Notes: na indicates policy data not available, though the country is a known user of TTBs more generally. TTB = temporary trade barrier, AD = antidumping, CVD = countervailing duty, SG = global safeguard, CSG = China-specific transitional safeguard, and G20=Group of 20. AD law is year of implementation of the country's antidumping regime, and initiation refers to the year of initiation of the country's first antidumping investigation. Data for Bangladesh, Burma, DR of the Congo, Ethiopia, Iran, Kenya, Nigeria, Tanzania and Vietnam omitted.

Table 6: Exporting Countries Most Exposed to Foreign-Imposed TTBs, 2013 and 1995

Exporter	TTB-affected share of 2013 exports to G20 (percent)	Exporter	TTB-affected value of 2013 exports to G20 (billions of 2013 dollars)	Exporter	TTB-affected share of 1995 exports to G4 (percent)	Exporter	TTB-affected value of 1995 exports to G4 (billions of 2013 dollars)
1. Latvia	17.7	1. China	100.3	1. Korea	7.6	1. Japan	7.7
2. China	7.1	2. Korea	14.0	2. Venezuela	6.2	2. Korea	4.6
3. Ukraine	5.7	3. United States	12.6	3. Ukraine	5.7	3. China	3.3
4. Kuwait	5.1	4. Japan	4.4	4. Lithuania	4.4	4. United States	1.8
5. Korea	3.9	5. India	3.5	5. China	2.9	5. Thailand	0.9
6. Argentina	3.8	6. Thailand	3.5	6. Thailand	2.8	6. Brazil	0.7
7. Moldova	3.7	7. Indonesia	2.9	7. Japan	2.6	7. Malaysia	0.6
8. Indonesia	3.1	8. Russia	2.5	8. Brazil	2.2	8. Canada	0.6
9. India	2.7	9. Mexico	2.5	9. Turkey	1.9	9. Hong Kong	0.5
10. Russia	2.3	10. Germany	2.5	10. Russia	1.8	10. Germany	0.5
11. Slovenia	2.3	11. Argentina	1.9	11. Egypt	1.6	11. Russia	0.4
12. Thailand	2.3	12. Ukraine	1.7	12. Hong Kong	1.5	12. Turkey	0.4
13. Macedonia	2.1	13. Malaysia	1.6	13. Malaysia	1.4	13. Singapore	0.4
14. Trin. & Tobago	2.1	14. Vietnam	1.3	14. Saudi Arabia	0.9	14. Netherlands	0.2
15. U.A.E.	1.6	15. Brazil	0.8	15. Poland	0.8	15. United Kingdom	0.2
16. Oman	1.6	16. Italy	0.8	16. Singapore	0.8	16. Italy	0.2
17. Poland	1.6	17. Canada	0.6	17. Australia	0.5	17. Venezuela	0.2
18. Kenya	1.5	18. U.A.E.	0.6	18. United States	0.5	18. Poland	0.2
19. Vietnam	1.3	19. France	0.6	19. Argentina	0.5	19. France	0.2
20. United States	1.3	20. Singapore	0.5	20. South Africa	0.5	20. Ukraine	0.2

Source: Trade-weighted shares of imports subject to foreign-imposed TTBs, constructed by the authors using HS-06 level data from Bown (2014b) matched to UN Comtrade import data and using the methodological approach of Bown (2011b, 2013). G20 = Group of 20 economies listed in Table 1. G4 = Australia, Canada, European Union, and United States only.

Table 7: European Union Border Barriers Resulting from Imposed Antidumping, 1989-2011

	Export Origin			
	All countries	G20 High income	G20 Emerging	Developing
Tariffs				
Ad valorem duty	65.0	75.3	68.2	56.5
Specific duty	9.6	9.6	12.0	6.2
Price undertakings				
Price undertaking	13.2	6.8	6.6	24.9
Price undertaking/Ad val. duty	4.9	2.7	2.5	9.6
Duty if min. price breached	2.2	4.1	2.5	1.1
Other (outcome unknown)	5.1	1.5	8.2	1.7

Source: constructed by the authors with data from Bown (2014b). Entries are share of imposed border restrictions resulting in that type of imposed border barrier.

Table 8: Disputed Behind-the-Border Policies Predominantly Affecting Supply, 1995-2015

Behind the Border Policy	WTO Dispute (Complaining Countries)	Legal-Economic Research
Subsidies/Taxes		
US and EU subsidies to Boeing and Airbus for large civil aircraft	<i>US - Large Civil Aircraft (EU)</i> <i>EU - Large Civil Aircraft (US)</i> <i>US - Tax Incentives (EU)</i>	Hahn and Mehta (2013); Neven and Sykes (2014)
Brazil and Canada subsidies to Embraer and Bombardier for regional aircraft	<i>Canada - Aircraft (Brazil)</i> <i>Brazil - Aircraft (Canada)</i>	Howse and Neven (2005b)
China's value-added tax exemption for domestically produced aircraft	<i>China - Tax Measures Concerning Certain Domestically Produced Aircraft (US)</i>	
US cotton farming subsidies	<i>US - Upland Cotton (Brazil)</i>	Sapir and Trachtman (2008)
EU subsidy regime for sugar	<i>EU - Export Subsidies on Sugar (Australia, Brazil, Thailand)</i>	Hoekman and Howse (2008)
US tax exemptions for Foreign Sales Corporations (FSC) regarding their export-related foreign trade income	<i>US - FSC (EU)</i>	Howse and Neven (2005a)
Korea subsidies to semiconductor producers targeted by Japanese countervailing measures	<i>Japan - DRAMs (Korea)*</i> <i>EU - Countervailing Measures on DRAM Chips (Korea)*</i> <i>US - Countervailing Duty Investigation on DRAMs (Korea)*</i>	Francois and Palmetier (2008); Prusa (2008); Crowley and Palmetier (2009)
China subsidies to clean energy products targeted by US countervailing measures	<i>US - Countervailing Measures (China)*</i>	Brewster, Brunel and Mayda (2016)

Source: constructed by the authors. *indicates dispute concerned the trading partner's countervailing duty trade policy response to the subsidy and not the underlying subsidy itself.

Table 9: Other Disputed Behind-the-Border Policies Predominantly Affecting Supply, 1995-2015

Behind the Border Policy	WTO Dispute (Complaining Countries)	Legal-Economic Research
Services and distribution (competition policy)		
Canadian Wheat Board export regime and regulations on distribution of grain imports	<i>Canada - Wheat Exports and Grain Imports (US)</i>	Hoekman and Trachtman (2008)
China regulations on distribution of imported audio-visual, music, and reading products	<i>China - Publications and Audiovisual Products (US)</i>	Conconi and Pauwelyn (2011)
Japan regulations of distributors and retailers affecting the photographic film (Kodak/Fuji) market	<i>Japan - Film (US)</i>	
EU Third Energy Package Directives and Regulations unbundling vertically-integrated provision (production, supply, and transmission) of natural gas or electricity	<i>EU - Certain Measures Relating to the Energy Sector (Russia)</i>	
Animal health and product standards		
India import measures on US poultry products due to Avian Influenza	<i>India - Agricultural Products (US)</i>	Bown and Hillman (2016)
US import measures on Argentine beef after foot and mouth disease outbreak	<i>US - Animals (Argentina)</i>	
Russia import measures on EU pork products after African Swine Fever outbreak	<i>Russia - Pigs (EU)</i>	
Korea import measures on Canada beef after mad cow disease (BSE) outbreak	<i>Korea - Bovine Meat (Canada)</i>	
Other environmental regulations		
US import measures on shrimp caught without using sea turtle excluder devices	<i>US - Shrimp (India, Malaysia, Pakistan, Philippines, Thailand)</i>	Howse and Neven (2003)
EU import measures on seals and related products	<i>EU - Seal Products (Canada, Norway)</i>	Levy and Regan (2015); Conconi and Voon (2016)
Brazil import measures on retreaded tires out of fear of spread of mosquito-transmitted diseases	<i>Brazil - Retreaded Tyres (EU)</i>	Bown and Trachtman (2009)
Japan import measures on apples over concerns about the risk of transmission of fire blight bacterium	<i>Japan - Apples (US)</i>	Neven and Weiler (2006)
China export quotas on certain rare earths and raw materials allegedly to conserve natural resources	<i>China - Raw Materials (EU, US, Mexico)</i> <i>China - Rare Earths (EU, Japan, US)</i>	Bronckers and Maskus (2014); Bond and Trachtman (2016)
US Clean Air Act rule to differentially treat imported and domestic gasoline for air pollution prevention	<i>US - Gasoline (Brazil, Venezuela)</i>	
Russia older motor vehicle recycling fee promoting purchase of environmentally friendly autos	<i>Russia - Motor Vehicles (EU, Japan)</i>	
Labor regulations		
Guatemala failure to enforce its own labor laws related to the right of association, the right to organize and bargain collectively, and acceptable conditions of work	<i>Guatemala - Issues Relating to the Obligations Under Article 16.2.1(a) of the CAFTA-DR (US)*</i>	

Source: constructed by the authors. *not a WTO dispute, as the US dispute against Guatemala was adjudicated under the Central American Free Trade Agreement Dominican Republic (CAFTA-DR).

Table 10: Disputed Behind-the-Border Policies Predominantly Affecting Demand, 1995-2015

Behind the Border Policy	WTO Dispute (Complaining Countries)	Legal-Economic Research
Subsidies/Taxes		
<p>Canada, Chile, Japan, Korea, and Philippines each with domestic tax regime discriminating in favor of locally-produced alcohol relative to foreign-produced varieties:</p> <ul style="list-style-type: none"> • Canada (wine and beer) • Chile (pisco) • Japan (sochu) • Korea (soju) • Philippines (distilled spirits) 	<p><i>Canada - Tax Exemptions and Reductions for Wine and Beer (EC);</i> <i>Chile - Alcoholic Beverages (EC, US);</i> <i>Japan - Alcoholic Beverages II (Canada, EC, US);</i> <i>Korea - Alcoholic Beverages (EC, US);</i> <i>Philippines - Distilled Spirits (EC, US)</i></p>	<p>Neven and Trachtman (2013)</p>
Foreign investment and local content requirements		
<p>Brazil, Canada, China, India, Indonesia, and Philippines regulations in the auto sector with local content requirements</p>	<p><i>Brazil - Certain Automotive Investment Measures (EU, Japan, US)</i> <i>Indonesia - Autos (EU, Japan, US)</i> <i>Canada - Autos (Japan)</i> <i>India - Autos (EU, US)</i> <i>Philippines - Motor Vehicles (US)</i> <i>China - Auto Parts (Canada, EU, US)</i></p>	<p>Bagwell and Sykes (2005b); Wauters and Vandenbussche (2010)</p>
<p>Canada regulations for renewable energy generation and local content requirements</p>	<p><i>Canada - Renewable Energy (Japan)</i></p>	<p>Charnovitz and Fischer (2015); Rubini (2015)</p>
<p>EU regulations for renewable energy generation and local content requirements, subsidies for solar energy consumption</p>	<p><i>EU - Certain Measures Affecting the Renewable Energy Generation Sector (China)</i></p>	
<p>China Special Fund for Industrialization of Wind Power Equipment and contingencies for local content requirements</p>	<p><i>China - Measures concerning wind power equipment (US)</i> <i>US - Countervailing Measures (China)*</i></p>	<p>Brewster, Brunel and Mayda (2016)</p>
<p>India Jawaharlal Nehru National Solar Mission for solar cells and solar modules and local content requirements</p>	<p><i>India - Solar Cells (US)</i></p>	

Source: constructed by the authors. *indicates dispute concerned the trading partner's countervailing duty trade policy response to the subsidy and not the underlying subsidy itself.

Table 11: Other Disputed Behind-the-Border Policies Predominantly Affecting Demand, 1995-2015

Behind the Border Policy	WTO Dispute (Complaining Countries)	Legal-Economic Research
Public health, consumer safety and product standards		
EU import measures on food and agricultural products containing genetically modified organisms (GMOs)	<i>EU - Approval and Marketing of Biotech Products (US, Argentina, Canada)</i>	Howse and Horn (2009)
US Family Smoking Prevention Tobacco Control Act of 2009 that bans most all flavored cigarettes (like cloves) but not menthol	<i>US - Clove Cigarettes (Indonesia)</i>	Howse and Levy (2013); Broude and Levy (2014)
US regulations and federal laws banning cross-border internet gambling, such as the Wire Act, Travel Act, and the Illegal Gambling Business Act	<i>US - Gambling (Antigua and Barbuda)</i>	Irwin and Weiler (2008)
France import measures on asbestos	<i>EU - Asbestos (Canada)</i>	Horn and Weiler (2003)
US import measures on Mexico's commercial trucking services due to public health and safety concerns	<i>US - Cross-Border Trucking Services (Mexico)*</i>	
EU import measures on hormone-treated beef (precautionary principle)	<i>EU Hormones (Canada, US)</i>	
Korea import measures and additional testing requirements on agricultural products from Japan after Fukushima nuclear event	<i>Korea - Radionuclides (Japan)</i>	
Consumer product labeling & intellectual property rights		
US dolphin-safe tuna labeling	<i>US - Tuna II (Mexico)</i>	Howse and Levy (2013); Crowley and Howse (2014)
US country of origin labeling (COOL) requirement for the tracking of cows and pigs (and beef and pork) intended for the US market along the global supply chain	<i>US - COOL (Canada, Mexico)</i>	Howse and Levy (2013); Mavroidis and Saggi (2014)
EU regulation related to the protection of geographical indications and designations of origin on agricultural products and foodstuffs	<i>EU - Trademarks and Geographical Indications (Australia, US)</i>	
Australia laws and regulations that impose restrictions on trademarks, geographical indications, and other plain packaging requirements on tobacco products	<i>Australia - Tobacco Plain Packaging (Dominican Republic, Honduras, Indonesia, Ukraine)</i>	

Source: constructed by the authors. *not a WTO dispute, as Mexico dispute against the US adjudicated under NAFTA.

Table Appendix A: Topics of Major GATT Articles and WTO Agreements

GATT 1947 (Article)	Topic	WTO Agreements (in addition to GATT 1947)
Article I	Most-favored nation (MFN) treatment of nondiscrimination across trading partners	
Article II	Tariff binding commitment submissions (schedule of concessions)	
Article III	National treatment (nondiscrimination between domestic and foreign-produced goods in terms of domestic policies)	
Article XX	General exceptions (for domestic policies)	Agreement on Sanitary and Phytosanitary (SPS) Measures Agreement on Technical Barriers to Trade (TBT)
Article VI	Antidumping and Countervailing Duties	Agreement on Antidumping
Article XVI	Granting of Subsidies	Agreement on Subsidies and Countervailing Measures
Article XI	Elimination of Quantitative Restrictions	
Article XII	Exceptions to protect the Balance of Payments	
Article XVIII	Special and differential treatment for developing countries	
Article XIX	Temporary safeguards/ escape clause (protection for particular products)	Agreement on Safeguards
Article XXII	Dispute settlement procedures	Dispute Settlement Understanding (DSU)
Article XXIII		
Article XXIV	MFN exception for customs unions and free-trade areas	
Article XXV	Other waivers of GATT provisions	
Article XXVIII	Permanent renegotiation of tariffs	
Article XXXV	Non-application of the entire agreement between particular countries	

Source: constructed by the authors.

Table Appendix B: Industry Classification Used in the Analysis

Acronym	Industry	Harmonized System 2-digit (HS02) Sections
ANIM	Animal products, live animals	01-05
VEGE	Vegetable products	06-15
FOOD	Prepared foodstuffs, beverages, spirits, vinegar, tobacco products, edible fats	16-24
MINE	Mineral products	25-26
FUEL	Mineral fuels	27
CHEM	Chemicals	28-38
PLAS	Plastics and rubber	39-40
HIDE	Hides, skins, leather, etc	41-43
WOOD	Wood and articles of wood, pulp and paper	44-49
TEXT	Textiles, fibres, apparel, etc	50-63
FOOT	Footwear, headgear, umbrellas, feathers, etc	64-67
STON	Stone, cement, plaster, ceramics, glassware, pearls, etc	68-71
META	Base metals and articles of base metal	72-83
MACH	Machinery, mechanical appliances, electrical equipment	84-85
TRAN	Transportation: vehicles, aircraft, vessels	86-89
MISC	Miscellaneous	90-97

Table Appendix C: Country Classification Used in the Analysis

Acronym	Country	Acronym	Country	Acronym	Country
ARG	Argentina	IDN	Indonesia	RUS	Russia
AUS	Australia	IND	India	SAU	Saudi Arabia
BGD	Bangladesh	IRN	Iran	THA	Thailand
BRA	Brazil	JPN	Japan	TUR	Turkey
CAN	Canada	KEN	Kenya	TZA	Tanzania
CHN	China	KOR	Korea	UKR	Ukraine
COD	DR Congo	MEX	Mexico	USA	United States
COL	Colombia	MMR	Burma	VNM	Vietnam
EGY	Egypt	NGA	Nigeria	ZAF	South Africa
ETH	Ethiopia	PAK	Pakistan		
EUN	European Union	PHL	Philippines		