Regulatory Protectionism, MNC Profits, and the Limits of International Cooperation

The previous chapter developed six hypotheses on the relationship between the interests of global producers, the choices of governments, and outcomes for international cooperation. This chapter takes up three of these hypotheses that pertain to the effects of regulatory barriers to trade for firms, governments and international institutions. First, productive firms benefit from the effects of regulatory barriers on competition. Second, governments use regulatory barriers to trade to advantage local MNCs. Third, the existing institutions that govern trade negotiations are ill suited to enable liberalization in the face of regulatory barriers to trade. These three hypotheses are connected by the economic and political consequences of intra-industry competition between multinationals and more marginal firms. Chapter 4 takes up the remaining three hypotheses, which center on competition within the firm and the consequences of regulation for the allocation of profits across the supply chain.

The empirical focus of this chapter is on a prominent class of regulatory barriers to trade, so called technical barriers to trade (TBT). A technical barrier to trade is a technical reg-
ulation, which, according to the WTO, mandates product characteristics or their related processes and production methods, and the administrative provisions which pertain to such a mandate. These regulations are cited as among the most trade restrictive and are particularly problematic for complicated manufactures. Over 16,000 technical regulations have been notified to the WTO, 12,000 since the beginning of the Doha Round of tariff negotiations. These measures have led governments to file almost 400 ‘specific trade concerns’ to the TBT Committee at the WTO, suggesting that these barriers remain a significant problem for the participants in the multilateral trade system. The importance TBTs as barriers to trade for firm level outcomes, as well as recent monitoring efforts on these barriers at the international level, make TBTs a prominent example of regulatory barriers to trade.

TBTs provide useful data with which to probe my hypotheses. They are product-specific measures, and are often reported using the same schedules as are tariffs. This allows a direct comparison to the choice of tariffs. In addition, TBTs regulate products that are the traditional target of tariff protection but have liberalized, especially manufactures, as opposed to sectors like agriculture that remain more closed to trade. Finally TBTs respond to a broad set of interests, including consumer safety advocates, downstream manufacturers concerned about quality, and environmental activists which offer a strong alternative to the competitive interests I argue drive levels of regulation.

In particular, first in order to examine the interests of firms regarding regulatory barriers to trade, I examine evidence from the US chemical industry access to the European market under new Community-wide regulations. Evidence from public documents on lobbying activity by US firms suggests substantial intra-industry conflict over the proposed regulatory measures. Using a novel dataset of patent activity, I show that the regulatory changes in the

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1 While the WTO defines ‘technical regulation’, the agreement does not contain an explicit definition of ‘technical barrier to trade’. Legally, any measure yet to be found incompatible with the agreement is not a barrier to trade from the perspective of the WTO. I make no such distinction.

2 Notifications are available in the WTO TBT Information Management System.
EU had the effect of concentrating the market, advantaging the largest and most profitable firms.

Second, to evaluate the response of governments to the competitive consequences of regulatory protection, I examine a novel dataset of technical barriers to trade collected by the WTO Secretariat. I show that regulatory barriers can allow governments to distort trade in favor of the most productive firms and their affiliates. Much as Stolper and Samuelson pointed out in 1941, trade may be beneficial to a country in aggregate terms but harm broad based groups. Governments, particularly those governments whose markets are sufficiently developed as to have downstream manufacturers, use these barriers to advantage local affiliates of large foreign firms.

Finally, in order to examine the consequences of regulatory protection for international cooperation, I examine data from the Uruguay Round of trade negotiations. Contracting Parties were unwilling to commit to reciprocal negotiations in those sectors characterized by global production. These empirical findings challenge the standard narrative that global supply chains are cause for governments to look beyond traditional trade politics, and open new opportunities for deeper international cooperation. Insofar as regulatory protection distorts competition among traders, and shifts the composition of trade toward the most productive firms, the rules of the multilateral trade system offer little redress. Rather, the success of the multilateral system in eliminating tariffs among developed countries has led to a perverse outcome: the developing countries which have not been obligated to reduce tariffs are facing partners whose non-tariff barriers are unconstrained by the market access based rules.

The chapter is organized as follows. In Section 3.1, I use cross-national data on the content of technical barriers to trade to demonstrate that technical barriers have risen in the recent period, and now make up a substantive share of overall non-tariff barriers to trade.

3Pascal Lamy, the Director General of the WTO (Lamy (2012)).
Section 3.2 examines the US chemical industry access to the European market under new Community-wide regulations. Using public documents on lobbying activity by firms and post-regulatory economic activity in patents, I demonstrate the substantive import of the distributional effects of this regulatory barrier. Section 3.3 then broadens the analysis to consider the implementation of regulatory barriers in a global context, showing how technical barriers to trade are more often employed in those products that exhibit production and exchange patterns indicative of global production. Section 3.4 considers tariff negotiations in sectors with and without a wide set of non-tariff barriers in the Uruguay round negotiations. I find that it is those sectors subject to relationship specific exchange, which is characteristic of global production, that is the least reciprocated by the US. I suggest that as firm level political pressures rise in importance, policy makers may find that traditional mechanisms available to the multilateral trade system will be unable to resolve disputes over regulatory barriers to trade. The chapter concludes with summary findings.

3.1 What are Technical Barriers to Trade?

Technical barriers to trade are non-tariff barriers that arise from a mandatory application of a standard. Many analyses of NTMs limit attention to subsets of NTMs that are the most analogous to tariffs. These ‘core measures include explicitly protectionist measures such as anti-dumping duties, countervailing duties and various import and export quotas. Anti-dumping and countervailing duties are not part of the regular tariff schedule and are not revenue measures, but have the same economic implications as a traditional tariff. Quotas operate on volume rather than value, but the overall effect of quotas depends on the process

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4 One of the challenges in this literature is that the legal terminology does coincide with common usage. In WTO legal parlance, a ‘standard’ only refers to voluntary measures.

5 The term ‘core is used by UNCTAD, and identifies measures that are openly protectionist (Kono (2006)). However, core is used as a catch-all term for whatever measures are included in a calculation of tariff equivalence. For example Kee, Nicita and Olarreaga (2006) includes technical regulations in the definition of core NTMs.
for allocating import licenses. Despite their differences from tariffs, these measures have been a focus of multilateral negotiations since the beginning of the multilateral trade system, and are explicitly addressed in GATT/WTO law.

Technical barriers to trade fall under a second kind of NTM: quality measures. These measures pertain to characteristics of products that may be sold. Structurally, these measures operate as a ban, in which any product that is not properly labeled, packaged, inspected, tested, or certified, will be forbidden in a market. These measures are thought to be more difficult to measure and observe than either tariffs or core measures, leading to several international organizations to develop classification systems.

Technical barriers to trade entered the international trade legal language when the WTO started to turn to non-tariff issues in the course of the Kennedy Round of trade negotiations. Figure 3.1, which displays the occurrence of the term ‘technical barriers to trade’, suggests that this term was increasingly referenced through the negotiation of the 1979 Standards Code negotiated in the Tokyo Round. Technical measures were distinguished from Sanitary and Phytosanitary (SPS) measures in the Uruguay Round. While SPS measures are technical regulations, their connection to agriculture and the explicit Article XX(b) exemptions in the GATT for the protection of human, animal or plant life or health led governments to distinguish SPS measures in the Punta del Este Declaration that initiated the negotiations of the Uruguay Round and eventually created the WTO.

Even though the Standards Code was divided into a TBT and SPS agreement, the phrase ‘technical barriers to trade’ does not occur in the TBT Agreement or anywhere else in the WTO texts. As a rule, the WTO Secretariat does not record, or even define, technical barriers to trade, instead referring broadly to technical regulations that unnecessarily restrict trade. Instead, the task of defining TBT has been left to outside organizations and academics. The principal database on non-tariff measures, the Trade Analysis and Information

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6See WTO (2012), pg. 120.
Figure 3.1: Language of Technical Barriers

Data derived from the Google Books Ngram Viewer using the English corpus (Michel et al. 2011).
System (TRAINS) developed by UNCTAD in the early 1990s, includes a category for technical regulations. Other organizations, such as the OECD, explicitly define technical barriers to trade as technical regulations, minimum standards and certification systems for health, safety and environmental protection.

One of the principal difficulties facing the WTO with regard to defining TBTs, besides not wishing to prejudge a measure as being legally impermissible, is that the TBT Agreement attempts to restrain non-government actors as well as national regulators. Product standards that arise from voluntary industry agreement or market adoption can be as problematic as a government mandate. However, the extent of legal obligation on non-government actors has yet to be decided in the context of a dispute. Given the lack of an ‘official’ definition, I discuss below three alternative metrics of TBTs. Given these definitional challenges, it shouldn’t be surprising that measuring TBTs themselves has been difficult. These direct measurement strategies can be organized into three categories: self-notifications, indirect measures including surveys and model-based residual analysis, and finally complaints. The following briefly addresses each of these techniques.

In an ideal world, one could characterize every regulatory measure enacted by each government. Unfortunately, most regulation does not occur by legislation alone, and those that do, still depend on decisions by regulators to flesh out a legislative premise. Moreover, regulatory changes are not one directional, they can either loosen standards or raise them, depending on the product specific context. The TBT Agreement enables negotiations over technical regulations by encouraging member states to self-notify the TBT committee of potentially trade restrictive regulatory measures. Since the creation of the Agreement on TBT, governments have notified 16,808 separate measures to the committee that may have a significant effect on trade of other members. Figure 3.2 displays these measures across the history of the agreement through 2010."
Figure 3.2: TBT Notifications

TBT notifications obtained from the World Trade Report 2012, [WTO (2012)](https://www.wto.org). The blue bars represent the number of measures (left axis) while the black dots represent the number of notifying countries (right axis).
In an average year, 65 out of the over 150 member states notify the TBT Committee of regulatory measures. The U.S. National Institute of Standards and Technology collects all notifications made to the WTO and distributes them to interest groups for comment. These notifications are voluntary on the part of governments, but may attract complaints or even disputes from other WTO members. Despite this potential threat, many governments do notify regulatory changes. Figure 3.3 organizes each of these notifications into the top 25 governments from 2012-2013.

Data aggregated from the US National Center for Standards and Certification Information in the National Institute of Standards and Technology (NIST) from 2012-2013. Note the NIST does not distribute US notifications.

The geographic and political diversity of these notifications is matched by diversity in the set of covered sectors: the state with highest participation, Saudi Arabia, included a seven page Draft of Technical Regulation for Croissants (G/TBT/N/SAU/473) as well as
ten pages of requirements for certain diameters and tolerances from hot-rolled steel bars (G/TBT/N/SAU/478), both for the purposes of consumer safety. These notifications are not evenly reported, and work is underway at the WTO to encourage more systematic and complete submissions.

While these measures suggest a variety of purposes behind regulation, they do not suggest the extent to which these measures act as a barrier to commerce. To answer this question, scholars have used surveys of individual firms. In 2010, the International Trade Centre (ITC) began the implementation of a large-scale company level survey on NTMs in a little over a dozen developing and least-developed countries. These surveys sample 600-1200 firms from each of 13 sectors. Each sector covers more than 2% of total exports, excluding minerals and arms. A private survey firm samples companies, and then uses phone interviews to screen for difficulties with NTMs. Companies that report problems receive detailed in-person follow-up surveys. The firms are asked about the nature of the barrier, the affected products at the 6-digit level of the Harmonized System and the partner country. These results are then disseminated among national business and government leaders.

ITC business surveys reveal that the principal barrier to trade is conformity assessments covering more than 30 percent of cases of NTM complaints. Figure 3.4 compares the percentage of kinds of burdensome NTMs reported in the survey to the same measures weighted by the amount of affected trade. This trade weighted average places technical requirements on par with assessments and testing, suggesting that both the procedural obstacles and the substance of TBT matter for firms.

These report reveal that technical regulations are a problem for firms, but have several significant limitations. First, these firm level reports rely entirely on developing country firms, excluding a great deal of variation in the experiences of firms in developed economies. Second, even if there is variation among these firms in their characteristics, the design of the survey may lead firms to overemphasize barriers which are easily communicated. For
Figure 3.4: ITC Burdensome Measures

ITC measures reported in the World Trade Report 2012. [WTO (2012)]
instance, figure 3.5 displays the ITC breakdown of TBT and SPS sub-categories. The main complaint by firms is product certification, but certification may be a stand in for any number of requirements, including product quality or an inspection. Third, surveys can only reach firms that are active in a market. One of the principal lessons from the economics of international trade is that adjustment to non-tariff barriers occurs through the entry and exit decisions of firms. Whatever the barrier, these measures were not so onerous as to drive firms to exit.

Figure 3.5: Breakdown of ITC reported measures by type

ITC measures cited in the World Trade Report 2012, **WTO (2012)**

This limitation is shared by more econometric techniques to estimating the presence of non-tariff measures. For example, Kee, Nicita, and Olarreaga (2006) use observed trade flows and predictions from gravity models to estimate the extent to which non-tariff measures, including technical barriers, limit trade. However, finding an *ad valorem* equivalent misses the distinguishing characteristic of regulatory barriers to trade, namely that they act as a fixed cost. Recent cross-sectional analyses of regulatory barriers using data from foreign
affiliates of multinationals suggest that regulatory barriers have significant implications as entry barriers.\(^8\) These analyses improve on those that depend on notifications, but modeling based techniques have difficulty targeting particular barriers. More precise examination of TBTs is possible using the dispute resolution process of the Agreement on TBT. While only 47 TBT Agreement disputes have been filed at the Dispute Settlement Body of the WTO, member states have submitted hundreds of ‘Specific Trade Concerns’ to the TBT specific committee. Governments use these concerns to address foreign regulations that pose a problem for commerce while not yet reaching a full dispute.\(^9\) Figure 3.5 displays the coverage of these concerns by the government responsible for the measure.

TBT notifications are available on the WTO website, and analyzed for the World Trade Report 2012 (\cite{WTO2012}).

\(^8\)See, Crivelli and Gröschl (2012).
\(^9\)The extent to which these notifications presage WTO disputes is not yet clear.
Figure 3.5 suggests that the vast majority of technical regulations are promoted by the EU, which reflects both the regulatory capacity of the EU, the presence of highly productive multinationals, as well as the nature of EU federalism. When EU member states submit regulations to the WTO, they do so as dual members of the organization, and their regulations can be characterized as EU or national protections. In any case, while potential regulatory barriers to trade are most often notified by emerging markets such as Saudi Arabia, Brazil and Mexico, members appear to complain more about larger markets, such as the EU, China, and the United States. Figure 3.6 breaks down these measures by the two digit HS code, suggesting that TBT notifications occur most often in the chemical industry, an industry centered in Germany, the United States, and China, followed by products manufactured of base metals, zinc and lead, all of which come disproportionately from China.

Figure 3.6: TBT Specific Trade Concerns

The next sections examine one prominent European TBT in depth: the reform of the
3.2 Do Multinational Enterprises favor NTMs?

In industries with differentiated products and relatively dispersed productivities, the most productive firms (multinational corporations) benefit from regulations which act as entry barriers. Because of differences in firm level endowment, multinational corporations’ preferences for regulatory trade differ from that of more marginal competing exporters.

One of the most significant challenges in analyzing the role of multinational corporations in international cooperation is that firm preferences and political activities are difficult to observe. The standard political economy approach is to model the conditions under which economic actors’ preferences can be easily aggregated, and then argue that either electoral incentives or political contributions cause governments to respond to some weighted sum of aggregate interests. For example, in order to link politics with underlying economic interests it is assumed that worker’s preferences over trade are sensitive to the effects of trade on employment and wages, and that as a result districts with a higher proportion of workers would elect like minded representatives. While interest groups are observed donating to political campaigns, preferences are only indirectly measured by candidate position taking and legislative behavior, particularly when issues cross political boundaries and since a great deal of regulation happens in the bureaucracy. These non-legislative forms of rule making are particularly relevant because global production generates pressure to employ non-tariff barriers to shift profits from foreign independent exporters to multinational enterprises. While this intra-industry division in interests follows from well established economic theories and facts, it remains an open question whether the alleged distributional consequences of non-tariff barriers generate political interests, and further whether or not those interests are important for policy.
The closest empirical work on whether firm characteristics condition responses to regulatory barriers to trade is Fontagné et al. (2012), which examines sanitary and phytosanitary (SPS) specific trade concerns. Sanitary and phytosanitary measures are regulations designed to promote human, animal and plant life and health. In response to concerns about the efficacy of GATT prohibitions on non-tariff measures aimed to protect agriculture, the WTO SPS Agreement collects government allegations of illegitimate regulatory barriers to trade, known in WTO parlance as “specific trade concerns”. Fontagné et al. (2012) use a detailed dataset of the universe of French firm export volume and participation from 1995-2005, and finds that SPS concerns negatively effect the volume of export and the propensity to participate in international trade for all but the largest and most export-dependent firms. In addition, detailed analysis reveals that SPS concerns lead to an increase in the unit value of firm exports for smaller exporters, indicating that smaller firms must upgrade their products to remain competitive, while the largest players may sell more at lower prices and upgrade less. The value of exports sold by trading firms after the imposition of an alleged SPS barrier declines for most firms but rises for big exporters. The authors suggest that some of the positive effects of trade barriers for largest firms may derive from the reduced competition in the SPS-imposing market.

By examining lobbying of the policymakers in the United States we see that multinational corporations’ preferences for non-tariff barriers can differ from that of competing exporters, and that these preferences matter for policy. Firms lobby the U.S. bureaucracy, in this case, to oppose EU legislation through congressional testimony and company media, as well as public commentary. The U.S. government collects public comments on proposed regulations, allowing direct observation of the positions taken by individuals, firms and industry groups. While dozens of regulations are announced every day that attract the ire of U.S. firms, I consider one particularly prominent case: regulations which transform European oversight of the chemical industry. This important regulatory expansion presents a test case for whether
large multinational firms and smaller independent firms differ in their preferences over foreign regulations.

### 3.2.1 EU REACH

In 2007, the EU enacted its most complex piece of legislation to that date: an overhaul of European chemical laws. The reform, fittingly called Registration, Evaluation and Authorization of Chemicals (REACH), aims to protect human health and the environment while strengthening the innovativeness and competitiveness of the EU. The 700 pages of legislation unifies the regulatory framework of EU members for chemicals on the European market, expands the set of products that are subject to regulation and shifts responsibilities and costs from government regulators to firms. These regulations directly affect a significant portion of U.S.-EU trade, as the chemical industry makes up about $44 billion of U.S. exports to the EU, approximately 20 percent of total U.S.-EU trade. The examination of REACH reveals that regulations have differential effects on firms, generating the sorts of intra-industry conflict that challenges international cooperation.

As a potential ‘technical barrier to trade’ and a major test case for international cooperation on regulatory policy, the EU submitted the legislation to WTO members for review, after which the U.S. Trade Representative (USTR) solicited comments from the public and industry. The commentary and public statements by affected industry reveals significant opposition to the legislation, even after years of heavy and arguably successful lobbying in Brussels. The Society of the Plastics Industry (SPI), an industry group that represents

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11 The first REACH proposal was adopted by the European Commission on 29 October 2003. The European Council reached a Political Agreement for a Common Position on 13 December 2005. Finally, the representatives of the European Parliament and the Council found a negotiated agreement of the final version of REACH in early December 2006, and entered into force in 2007, allowing firms until 2008 to comply with the pre-registration obligations.
12 For an analysis of how REACH began amidst widespread opposition from the European chemical industry, see Selin (2007).
13 Initially, even the most productive chemical firms voiced opposition to parts of the proposed REACH
both small and large firms, voiced fierce opposition. SPI argues that REACH is only designed to enhance the “competitiveness and innovation” of the EU chemical industry, rather than being necessary to promote health. To fight the measure, SPI is pressuring the USTR to find that REACH violates not only WTO rules but also the Agreement on Technical Barriers to Trade and the Sanitary and Phytosanitary Agreement. Going beyond trade law, the SPI further argues that the regulation violates international investment law, as “REACH’s data-sharing obligations constitute an unlawful public taking without just compensation.”

Not all firms maintained opposition to the finalized REACH legislation. In concordance with the economic reasoning, Dow Chemical and BASF, the two largest multinational chemical companies in the world, did not join SPI in publicly opposing REACH in 2009. Dow Chemical, which dropped its SPI affiliation in 1999, claims on its website that “since Dow has always made product safety a top priority, compliance with REACH is directly in line with [their] 2015 Sustainability Goals.” While BASF is a SPI member, it called for full REACH implementation as early as 2006. Afterward, BASF voluntarily committed to go beyond the REACH reporting requirements for all of their chemical products, joining Dow Chemical and other industrial leaders.

This is not to say that Dow Chemical and BASF are particularly green. Both companies lobbied in Brussels though their European affiliates to lower the overall costs of the legislation. In the original proposal, violations of REACH were to be met with a fine no greater than 10% of global sales. This fee, drawn from anti-trust legislation, was dropped after significant lobbying by the largest U.S. chemical companies. The final legislation lacked any well defined punishment, leaving it up to the EU member states, none of whom chose to link fines to global sales.

The SPI bills itself as having almost 1,000 members, employing 1.1 million workers in companies that “range from large from large multinational corporations to small and medium sized companies, many of which are family-owned businesses”. These workers are present in 17,600 facilities, a vast majority of whom work in small firms.

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14 The SPI bills itself as having almost 1,000 members, employing 1.1 million workers in companies that “range from large from large multinational corporations to small and medium sized companies, many of which are family-owned businesses” (Pratt (2009)). These workers are present in 17,600 facilities, a vast majority of whom work in small firms.

15 Quote taken from the Dow Corporate Website.

16 See Westervelt (2007). Interestingly, BASF explicitly denies changing its position on REACH, a senior manager claiming that “BASF welcomed REACH already in 2006 when it was adopted and has not changed its position on REACH since then” EurActive (2012). However, by 2006, REACH had already undergone significant changes in its structure, including dropping the connection between punishments and world-wide turnover that would have disproportionately affected the largest firms.
legislation. In 2004, Representative Henry Waxman released a report outlining how the chemical industry succeeded in using its access and influence to persuade the Administration to intervene to weaken REACH. But their incentive to lobby ended when the burden on these firms became manageable, allowing BASF and Dow to voice support while the cost remained prohibitive for smaller firms in the rest of the industry. Broadly, interviews by an industry trade magazine of senior executives at 15 major multinational chemical companies reveal that “over the next five years, companies believe that regulatory compliance will advance from a relatively small cost of doing business to a major driver of competitive advantage.”

Smaller firms, particularly in North America, are expected to suffer significant business disruptions.

Subsequent industry statements indicate that these disruptions have come to fruition. According to 2012 congressional testimony offered by the President and CEO of a small chemical company based in Albany, Georgia, the effects of REACH include significant barriers to entry, preventing some companies from launching, and even upon launching, slowing down innovation. The CEO argues that while his company is “currently in the process of launching several industry changing products in the EU, and our launch will take many months longer than it would have otherwise.” In terms of numbers, as of 2010, 86 percent of REACH registrations were submitted by large companies rather than small and medium enterprises. These experiences indicate that smaller companies are finding it difficult to handle the increased costs.

The actions of Dow and BASF explains firm’s preferences over legislation as a function of productivity. However, large incumbent firms may just be making up for shifts in public

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18 See, Scott (2009). This may also be a consequence of the innovative capacity of the top firms, as companies innovate around technical restrictions, Marcoux and Urpelainen (2011).

19 Scott (2008).

20 According to the company website, Equinox Chemicals has approximately 25 employees.

21 Testimony for Mark Grimaldi (2012)

perceptions of past environmental failures. The Director of the Department of Light Industry in the Czech Ministry of Trade, Blancka Ksandrova, for example argued that the lack of opposition observed in the Czech chemical industry is a consequence of efforts to correct perceptions of misbehavior during the communist era.

While these concerns would explain general resistance of incumbent firms to appear to be too directly opposed to environmental measures, it does not explain the initial willingness to openly lobby for changes to the rules, and the subsequent divide of opinion within the chemical industry. Dow Chemical, DuPont, and BASF each openly, and not so openly, lobbied the EU for lower standards before endorsing the legislation. In the same cable which described the acceptance on the part of incumbent Czech firms, Ksandrova expresses great concern about the effect of the REACH process on entrepreneurs who want to bring a new product to market, and that there is a discussion for having either the EU or the Czech government pay part of the registration costs to minimize the impact on small and medium enterprises although this support would be unavailable to American producers, such as the members of SPI.

Today, after the implementation of the agreement it is clear that the industry remains divided. When asked about the nuances among the interests of the U.S. chemical industry on REACH, a senior lobbyist for one of the largest US chemical firms responded that:

The nuanced view stems from the fact that REACH often works to the advantage or large companies who have the resources to establish and run compliance programs. Smaller companies must often go outside and pay for the resources to comply. Ironically, REACH has succeeded in doing what the antitrust laws were designed to prevent — giving a competitive advantage to large companies.

The fundamental tension between REACH requirements and the obligations of antitrust law aside, the perception of REACH today is that it benefits a few, large, and perhaps

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23Scoop.co.nz "Cablegate: Czech Republic on EU Chemicals Policy"
25Scoop.co.nz "Cablegate: Czech Republic on EU Chemicals Policy"
3.2.2 EU REACH’s Effect on Patent Activity Concentration

The American opponents of the EU REACH program did not get the U.S. to file a dispute with the World Trade Organization and the EU was not otherwise deterred. According to the logic offered in Chapter 2, these regulations should concentrate economic activity toward the largest firms. One way to measure international economic activity and test this hypothesis in a technical industry is to examine intellectual property. Because the EU REACH program is targeted primarily at novel chemical products, and because the regulation is primarily an entry barrier, patents are a reasonable substitute for more detailed transaction level data.\(^{27}\) The data below show that under the EU REACH program, patent activity is concentrated in the largest firms. Contemporaneous analysis of the Japanese chemical market does not exhibit the same concentration, substantiating claim that the EU REACH program advantaged large firms.

In the context of international intellectual property law, the primary patent offices are the United States Patent and Trademark Office, the European Patent Office (EPO) and the Japan Patent Office (JPO). The Derwent Innovations Index provides a listing of initial patent filings for each of these offices as well as analytical tools that indicate the frequency of filings for the top firms matching a query.\(^{28}\) Aggregating patents filed under the International Patent Classification for chemistry or polymer science and that have a prefix on the patent number that matches either the relevant patent office generates a list of the top companies that file in a given period, in this case 3 year increments from 1995 to 2012.

One challenge with this and with many other business and financial databases is that

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\(^{27}\) Patents represent an investment in future economic activity in a market, but are available to firms of all sizes.\(^{28}\) See, Derwent Innovations Index on the Thomson Reuters Web of Knowledge research platform, Thomson-Reuters (2013).
companies, particularly multinational corporations, are not always associated with a country of residence, and often are reported with varying abbreviations, (Pharm vs Pharma), legal entity types (BASF AG vs BASF SE), or reflect acquisitions and mergers (GlaxoSmithKline). As a result, the frequency data included hundreds of entries that were not independent companies, and no analysis could focus on only American firms. To correct this problem, a list of company locations and names were obtained by parsing patent summaries from LexisNexis, which were in turn fed to a fuzzy matching algorithm to connect the parsed names and locations to the original dataset.

Figure 3.7: US Patent Filings in EPO and JPO 2000 vs 2009

Between 1995 and 1997, the top five percent of American patenting firms together contributed 5.6 percent of all chemical industry patents in the European Patent office. Between 2004 and 2006, this measure rose to 8.2 percent of all European Patents. The bottom 50 percent of American patenting firms in the sample contributed 17 percent and 16 percent in

\[29\] To make the match I used the best fit of the generalized Levenshtein edit distance (the minimal possibly weighted number of insertions, deletions and substitutions needed to transform one string into another).
the 1995-97 and 2004-06 periods respectively. While the majority of American firms either retained their share of patent activity or declined, the top firms expanded patent activity. Figure 3.7 displays the various quantiles of American firms at the EPO in 2000 and compares that to the quantiles of American firm patent shares in 2009, indicating that while there is an improvement of the share of the top firms, the trend during the implementation of the EU Reach program is driven by the few largest firms. A Kolmogorov-Smirnov test rejects the exact equality of the two distributions and indicates that the distribution of patents is significantly shifted toward the largest firms (p-value .02).

To ensure that the global chemical market was not experiencing a uniform swing, data is also considered from the Japanese Patent office. While the top five percent of US companies experienced significant growth in patent activity in Japan (more than doubling from .18 percent to .43 percent) this improvement was shared a much wider set of the industry, as the bottom 50 percent of firms increased their share of patents from .25 percent to 1.12 percent, a more than fourfold improvement.\footnote{One alternative measure of these phenomena, or the extent of extreme values in a population is the kurtosis of a distribution.\footnote{Kurtosis(X) = E[(X - μX)^4]} Table 3.1 displays the kurtosis of the distribution of European Patent Office and Japanese Patent Office filings. While a kurtosis of about 3 is consistent with a normally distributed variable, the EU experiences more extreme observations in the same period as the EU REACH program. Again, the Japanese Patent office does not exhibit the same pattern.

These findings are broadly consistent with a study by the EU Commission in 2002 of the services sector which concluded that “Evidence collected from SMEs and SME-supporting organizations suggests that many SMEs back off after initial inquiries about administrative requirements and procedures because they feel they do not have the necessary resources to deal with the current complexity. Such agencies report that micro enterprises in particular...
Table 3.1: Kurtosis of Patent Filings Among Top US Chemical Firms

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<thead>
<tr>
<th>Year</th>
<th>EU</th>
<th>Japan</th>
</tr>
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<tbody>
<tr>
<td>1995-1997</td>
<td>9.5</td>
<td>1.9</td>
</tr>
<tr>
<td>1998-2000</td>
<td>7.6</td>
<td>2.8</td>
</tr>
<tr>
<td>2001-2003</td>
<td>11.9</td>
<td>2.8</td>
</tr>
<tr>
<td>2004-2006</td>
<td>15.1</td>
<td>1.4</td>
</tr>
<tr>
<td>2007-2009</td>
<td>15.8</td>
<td>2.8</td>
</tr>
<tr>
<td>2010-2012</td>
<td>6.4</td>
<td>1.2</td>
</tr>
</tbody>
</table>

were easily dissuaded from engaging in cross-border activities.\(^{32}\)

The EU Reach program concentrated economic activity among the largest firms, which in turn generated pressure from smaller firms to oppose the program. Taken together, the evidence from firm and industry group lobbying activity, statements from employees and representatives of the largest firms, and the economic trends in the industry during the implementation of the program, the EU Reach case highlights the way that regulatory barriers to trade have politically and economically substantive distributional consequences. Given evidence of interests of the largest firms for anti-competitive regulations, I ask below whether the predicted response by governments, the adoption of regulatory measures, occurs more often when governments retain some of the profits of the largest firms in a sector.

### 3.3 Specific Trade Concerns and Global Production

Above, we examined the incidence of regulatory protection, showing that large appear to benefit from reduced competition, but do governments respond to these interests? To answer this question, I examine data developed by the WTO on the kinds of non-tariff measures most likely to impose fixed costs. In the WTO, governments are expected to communicate their concerns over regulatory barriers to trade to each other in a relatively transparent fashion,

before initiating a dispute. The WTO collects and codes the products subject to these concerns in a database of Specific Trade Concerns in both the sanitary and phytosanitary (SPS) committee and the technical barriers to trade (TBT) committee.\footnote{A detailed discussion of these measures are available in the 2012 World Trade Report (WTO (2012)).} Below, I examine TBT “specific trade concerns” to determine whether they are used more often on those products that exhibit the distributional effects on firms described above. If a sector is likely to have “entangled” firms, then the government with a stake in the profits of those firms are more likely to use an NTM to shift resources away from foreign competition.\footnote{While Technical Barriers to Trade may address legitimate public policy concerns, NTMs are not associated with a rise in domestic consumer demand for regulation (Kono (2006)).}

In order to determine the nature of production networks, I employ a measure of contract intensity developed by Nunn (2007).\footnote{This measure has become common in the economics and political science literature, see Feenstra et al. (2012) and Carnegie (2013).} Building on Rauch (1999), Nunn uses the proportion of an industry’s inputs, weighted by value, that require relationship-specific investments in their production. Rauch coded each input as sold on an exchange, reference priced, or neither.\footnote{Using industry concordances from Feenstra (1996), the BEA, and Jon Haveman, Nunn was able to aggregate Rauch’s measure to a 4-digit SITC industry code.} This process provides data on the fraction of each input that is sold on an organized exchange, reference priced, and neither, with the latter classified as relationship specific or contract intense.

### 3.3.1 WTO Database of Specific Trade Concerns

The Specific Trade Concerns (STCs) databases are the result of research by the WTO Secretariat on whether applied tariffs and TBT/SPS measures substitute for one another. The TBT-STC Database provides information on 317 concerns raised in the TBT Committee between January 1995 and June 2011, providing a binary indicator of conflicts between governments on technical barriers to trade. While these concerns do not necessarily arise to the level of a dispute, the data has advantage over the small number of cases submitted.
to the WTO dispute settlement mechanism or the relatively frequent notification process, which relies on self-reporting by governments. Moreover, Specific trade concerns raised by WTO members are highly disaggregated. However, as with any measure of conflict, the STC database has issues of selection that are more severe than for business surveys.

While STCs reflect challenges faced by individual exporters, those exporters must channel these concerns to governments in order for them to be raised at the WTO. And, even if a government wishes to raise the concern, it will only be recorded as a specific trade concern if informal mechanisms do not work. Members sometimes request the WTO Secretariat to put concerns on the agenda but withdraw them before they are presented to the Committee, arguing that a bilateral arrangement has been found. Because of these selection effects, the World Trade Report 2012 suggests that specific trade concerns may provide a distorted picture of the trade-restrictive or trade-distorting effects of TBT and SPS measures. However, the selection effect is most severe if the target of analysis is to analyze all barriers to trade, as opposed to just those that are a problem for international cooperation. To address the reporting bias, that is cases are only observed when the target state did not cut a deal, I focus analysis on variation in TBT use within a market and an industry. With these caveats in mind, STCs offer a significant improvement over existing measures of non-tariff barriers.

While multinational firms are likely to be more capable in overcoming fixed cost associated barriers to trade, not all governments benefit from shifting profits toward those firms. In many industries a sizable share of value added are now in the headquarter services side of the supply chain, for example R&D, marketing and management, as opposed to the manufacturing intensive parts of the supply chain. To account for the fact that governments with these services obtain the largest share of the profits of multinational corporations, I evaluate a proxy for countries with a disproportionate share of headquarter activity, the amount of income derived from licensing intellectual property, recorded as royalty receipts. Using data from the World Bank on royalty receipts from the balance of payments statistics, I take the
natural log as a measure of multinational activity for each country.

<table>
<thead>
<tr>
<th></th>
<th>Range</th>
<th>Median</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBT</td>
<td>[0, 1]</td>
<td>0</td>
<td>.104</td>
</tr>
<tr>
<td>Contract Intensity</td>
<td>[.02, .09]</td>
<td>.38</td>
<td>.43</td>
</tr>
<tr>
<td>ln(Royalty Receipts)</td>
<td>[9, 25]</td>
<td>19.2</td>
<td>19.9</td>
</tr>
</tbody>
</table>

I suggest in Chapter 2 that the joint presence of multinational activity and contract intense production should result in TBT adoption by host governments. Table 3.2 displays this hypothesis in a binary form: A high level or low level of contracted production across the rows, and a high level or low level of multinational activity across the columns. Governments with no interest in the profits of large foreign firms would have no incentive to employ non-tariff barriers to shift profits toward those firms (cell A < cell D). Further, when levels of royalty receipts are low, but production remains tied into global networks, the government and industry are likely located in the upstream portions of the supply chain. These firms are often not producing for a local market, and are dependent on the purchasing decisions of downstream firms. Employing a TBT would be disruptive of this network (cell A < cell C).

Finally, if production is not tied into specific contracts, but the government is located in a headquarters country, the level of TBT incidence would reflect some balance between consumer interest and the normal market access considerations (cell A < cell B).

Table 3.2: Theoretical Expectations

<table>
<thead>
<tr>
<th></th>
<th>Low Royalty Receipts</th>
<th>High Royalty Receipts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low CI</td>
<td>A &lt; B</td>
<td>A &lt; B</td>
</tr>
<tr>
<td></td>
<td>∨ ≪ ∧</td>
<td></td>
</tr>
<tr>
<td>High CI</td>
<td>C &lt; D</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.3 presents the percentage of country-products with a specific trade concern re-

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For an in depth theory and motivation for similar predictions for per-unit costs of trade, see Osgood (2012).
See Hoekman and Jackson (2013).
garding a technical barrier to trade in 2001, indicating that the hypothesized pattern holds in the data. Assuming normality and using a difference in proportions test, we can test whether the main hypothesized relationship holds between cells A and D. The 2 sample difference of proportions test generates a test statistic that rejects the null of equal proportions. While this result is highly significant, the small proportions of actual TBT adoption in cells A and C may make the gaussian approximation underlying this statistical test inappropriate.

<table>
<thead>
<tr>
<th></th>
<th>Low Royalty Receipts</th>
<th>High Royalty Receipts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low CI</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>High CI</td>
<td>1</td>
<td>25</td>
</tr>
</tbody>
</table>

An alternative to an asymptotic analysis of differences in proportions is to approach the problem from a Bayesian perspective. Given a uniform Beta prior ($\alpha = \beta = 1$), the posterior density given the number of TBT $r$ over the number of country-products $n$ provide the following differences:

$$\theta | r, n \sim \text{Beta}(1 + r, 1 + n - r)$$

Figure 3.8 displays the differences of these updated Beta distributions using the pooled data (1997-2012). The first three histograms in figure 2 show that the differences between cell D and cells C, B and A respectively do not include 0. The fourth histogram profiles the difference between cell C and A, which is negative and non-zero, but substantively small. This indicates that at low levels of multinational activity, TBT use does not vary strongly with the extent of relationship specific contracts. Finally, the last two histograms in figure 2 reveal that cell B is greater than cell A, and that cell B is greater than cell C. This is broadly consistent with the extent of multinational activity being an important determinant.

$^{39} \chi^2_{df=1} = 1702$
Confirming the above analysis, the same pattern appears in a probit regression, displayed in table 3.4. The coefficients in model (1) suggest that headquarter countries (those with high levels of royalty receipts) impose TBT measures more often on products that are contract intense. Moreover, is correlation is robust to the inclusion of fixed effects at the country and industry level. Interestingly the incidence of TBT is negatively associated with high levels of contract intensity, suggesting that the complexity of the production process alone is not the only cause of regulatory barriers to trade. These correlations are consistent with
the findings in the EU case that technical barriers advantage local affiliates of multinational corporations.

Table 3.4: TBT Specific Trade Concerns at the WTO 1995-2011

<table>
<thead>
<tr>
<th>TBT Adoption</th>
<th>(1) Estimate (S.E.)</th>
<th>(2) Estimate (S.E.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract Intense</td>
<td>-3.25* (0.14)</td>
<td>-3.15* (0.15)</td>
</tr>
<tr>
<td>Year</td>
<td>0.115* (0.001)</td>
<td>0.168* (0.002)</td>
</tr>
<tr>
<td>ln(recipts)</td>
<td>0.2* (0.003)</td>
<td>0.08* (0.012)</td>
</tr>
<tr>
<td>Contract Intense×ln(recipts)</td>
<td>0.158* (0.006)</td>
<td>0.145* (0.007)</td>
</tr>
<tr>
<td>(Intercept)</td>
<td>-235* (1.39)</td>
<td>-340* (3.06)</td>
</tr>
</tbody>
</table>

Country Fixed Effects (included)  
Industry Fixed Effects (included)  

N 461057 461057  
Deviance 246248.089 188513.282  
−2LLR(Modelχ²) 128779.301* 186514.107*  

* p ≤ 0.05

Just because governments may employ regulatory barriers, and that those barriers become the subject of specific trade concerns, does not in itself pose a problem for international cooperation. While the negotiations over GATT/WTO rules have had success in a variety of areas of international cooperation, is there any reason to think that these regulatory barriers pose a problem for the continued success of these rules? The final section provides evidence that the adoption of regulatory protection has interfered with the operations of the multilateral trade system.
3.4 Political Economy of Reciprocity over NTMs with Global Production

The WTO has rules on tariff and NTMs that allow harmed governments to make tariff adjustments that re-equilibrate market access, eliminating international price distortions. The fortuitous match between economically efficient rules and the historically contingent text of the GATT has both been used to explain the longevity of the GATT/WTO system as well as co-operation more generally on trade issues.

The use of reciprocity is argued to be the underlying logic of the formal rules governing member states, negotiating modalities as well as the dispute settlement system. However, the rule of reciprocity operates under the assumption that what matters for trade is changes to the level of market access, a characterization which abstracts from the identity of the participants in the market. Below I explore the institutional conditions under which reciprocity yields cooperation and then argue that the presence of different kinds of trade barriers generates problems for reciprocity in market access.

As background, the multilateral trade system does not operate on a single notion of reciprocity. In an influential analysis, Keohane distinguished “specific” reciprocity from “diffuse” reciprocity. The former involves explicit obligations for explicit benefits, where all concessions are matched by a contribution. Reciprocity is diffuse when cooperative actions are made to satisfy the obligations that come with community membership. According to this distinction, GATT Contracting Parties and the WTO membership fall between the two extremes of specific and diffuse reciprocity relations, depending on the degree that explicit concessions were required to partake in the benefits of the organization. A further distinction can be made between static and dynamic forms of reciprocity, which differ in their appeal.

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\(^{40}\text{cf. }\text{Regan} (2010).\)

\(^{41}\text{See }\text{Keohane} (1986).\)
to strategy and the conditions necessary to obtain reciprocity. For example, the tit-for-tat strategies considered in Axelrod (1984) involve dynamic reciprocity, a ‘nice’ strategy of bilateral relations that retains equality of response. Static reciprocity is a characterization of negotiating outcomes, a state of equality in gains from an interaction. Further, the theory of negotiation in the GATT/WTO system has been characterized as a form of reciprocal mercantilism. That is, each government agrees to reduce its level of protection in return for a reciprocal concession from its trading partner. In economic terms, an equal change in import volume ensures that neither country is worse off after an agreement. This occurs by retaining the ratio of world prices, or put it another way, the terms of trade. This principle was incorporated into the international system by the U.S. RTAA program, and further promoted under the GATT.

The GATT system enacted a dispute settlement mechanism which encouraged reciprocal agreements and enforced ex post reciprocity. Violations of GATT tariff concessions are discouraged by authorizing retaliation up to an equal volume of tariffs by the complaining state. In theory, these rulings re-equilibrate the terms of trade and encourage reciprocity in the initial offers. In practice, the non-market access effects of policies, among other problems, challenge the use of tariff volume as a mechanism for cooperation. However, if WTO rules primarily operate by creating cooperative norms, the agreement may not need to explicitly address every potential manipulative behavior in order to still depend on ‘diffuse reciprocity’. If reciprocity is sufficiently diffuse, the success or failure of a particular rule is less significant. Economic analysis, however, generally assumes that the GATT/WTO

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42 See Axelrod (1984).
43 See Krugman (1997), pg. 114.
44 This notion of reciprocity has the distinct advantage of being cleanly operationalized in a general equilibrium framework. Under a trade balance condition, a change in a pair of tariffs, \( \tau^0 = \{ \tau^0_H, \tau^0_F \} \) to \( \tau^1 = \{ \tau^1_H, \tau^1_F \} \) is reciprocal if \( p^w(\tau^1) - p^w(\tau^0) M(p^1_H, p^w(\tau^1)) = 0 \) Bagwell and Staiger (1998).
45 The RTAA required the president to receive reciprocal reductions in tariffs prior to granting a tariff concession. This version of specific reciprocity, built in the interwar period, was carried over into the founding of the GATT. Each tariff reduction is enacted jointly with another government’s decision to reduce tariffs.

32
system involves specific reciprocity, allowing analysts to isolate specific externalities, such as the terms of trade externality or a commitment problem, addressed by agreements.

The main example of diffuse reciprocity in the multilateral trade system is the “unconditional MFN” provision in GATT Article I. After a reciprocal negotiation, each government must extend their concession to all other members, members which themselves incur no obligation to offer additional concessions before being offered the same terms. The persistence of “free” benefits limits concerns about inequities in the balance of obligations and benefits, and the need of calibrated breach clauses. However, as Bagwell and Staiger argue, unconditional MFN can facilitate reciprocal arrangements by limiting the incentive for governments to use tariffs to distort renegotiation with third parties. In this framework, MFN agreements ensure that the only externality caused by trade agreements operate through the world price, which, when joined with reciprocal trade rules, ensures that terms of trade externalities are eliminated. The “free” extension of concessions assures partners that governments will not collude. In the following section, I identify whether specific reciprocity is operant in the GATT/WTO system, before asking whether regulatory protection is served by that reciprocity.

Reciprocity was formally required for US trade negotiations by the 1934 Reciprocal Tariff Agreements Act. Figure 3.9 compares the change in imports and exports with the United States before and after each bilateral trade agreement signed during the RTAA period (1934-1947). Overall, the U.S. experienced a 120 million dollar excess of exports over imports after these trade agreements were signed, approximately 18 percent of total exports prior to negotiations. In a similar analysis of reciprocity in the GATT, Finger, Reincke and Costro

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46 Keohane notes that in practice negotiations are designed to limit free riding by requiring concessions from all principal suppliers (Keohane (1986)).
47 See Bagwell and Staiger (2002).
48 While MFN provisions may in theory prevent early trading partners from excluding later negotiators, the long history of preferential agreements seems at odds with this function. I discuss this further in Chapter 4.
Robert Gulotty (2002), find that there is no evidence for specific reciprocity, either dynamic or static, in trade relations for the Uruguay Round. In that study, twenty-three of thirty-three countries had an imbalance at least half as large as their concessions given \cite{Finger, Reincke and Castro (2002)}. Both of these observations ignore confounding factors in the estimation of reciprocity. For example, just looking at actual trade balances in the 1930s ignores the destabilizing effects of war on trade flows. By grouping together each countries tariff schedule, we are unable to examine the extent to which product and industry characteristics promote or detract from reciprocal tariff negotiations.

Figure 3.9: Reciprocity in the Bilateral Period

3.4.1 Regulatory Protection, Contract Intensity, and Reciprocity

Evidence that outcomes are not balanced does not imply that reciprocity is not followed during the negotiations. In this section, I discuss a tariff policy level analysis of reciprocity, and show that the findings in this chapter can help address a puzzle in this literature:
under what conditions do GATT/WTO rules actually elicit reciprocal tariff negotiations? I find that an apparent failure of reciprocity can be explained by the presence of regulatory protection, which is imperfectly addressed by the reciprocal, trade volume based enforcement mechanisms of the WTO.

Limão (2006) provides a detailed, disaggregated analysis of reciprocity by the US with its trading partners in the Uruguay Round, controls for political and economic confounding factors. The study offers a statistical analysis of pre and post Uruguay Round tariff policy negotiations between the US and its partners that does not rely on trade volumes. Reciprocity of tariff policy requires that trade negotiations balance the trade weighted reductions in tariff protection (Bhagwati (1991)). In that sense, Limão follows the terms of trade externality explanation of trade agreements as a mechanism to exchange market access.

To evaluate partner market access changes, each import is coded with an aggregate tariff change by the foreign suppliers of each of these imports. Because the unit of analysis is the US product level tariff, Limao aggregates proposed changes to tariffs, by measuring changes in market access in each country $k$, by $\Delta ma^k_j = \sum (-\Delta \tau^k_{jt})w^k_{jt}$, where $\Delta \tau^k_{jt}$ is the percentage tariff reduction by country $k$ in each imported good $j$ weighted by trade share $w$. For example, if Germany lowers its tariffs on soybeans, the effect of that change will be weighed by the consumption of American soybeans by Germany. This is then summed over all products that Germany imports. Each american import is then connected to the change in market access of the principal suppliers of each of those imports. Germany’s tariff reduction on soybeans would enter the U.S. calculations for a tariff on German export, such as automobiles, along with the market access changes of all other principal suppliers of automobiles.

In order to control for confounding factors in the estimation of reciprocity, by Limão

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50 After the Uruguay Round, the US negotiated down tariffs by an average of 2.8 percent.

51 Germany imported 867 million dollars worth of soybeans from the US in 2012.
Robert Gulotty DRAFT 9-10-13

(2006) also considers data on NTMs from the TRAINS database. The period studied, the Uruguay Round, occurs before the completion of the TBT agreement, requiring an alternative measure of NTMs to that considered above. Unfortunately, the NTBs in the TRAINS dataset include anti-dumping duties and other pseudo-tariff border measures. Although TRAINS database is the most complete collection of publicly available information of NTMs, the classification by the Coding System of Trade Control measures depends in part on voluntary self-notifications to the WTO, and in part on information obtained from national and regional Trade monitors. Finally, in order to better understand the mechanism at work behind the effects of NTMs on reciprocity theorized above, I employ the product’s contract intensity as a proxy for the kind of production networks of the product.

Regressing US tariffs on this aggregated measure, with an interaction with the TRAINS NTM database, we can estimate the relationship between foreign tariff concessions and US tariff concession. This model includes controls for the relative bargaining power of the foreign governments supplying each product, as well as the presence of PTAs, and an indicator variable for whether there are multiple tariff lines aggregated into the HTS 8 level. Row 1 of Figure 3.10 displays the point estimate and confidence intervals of such an estimate in a standard OLS model.

The OLS results reflect an under-identified model. Reciprocal trade negotiations imply that changes in US tariff are endogenous to changes in tariffs by partner countries. Determining whether US tariffs and foreign tariffs are positively correlated requires taking into account the fact that in most cases they are co-determinative. To address the endogeneity problem, Limão uses the unilateral liberalization in each product by US trade partners (1986-1992) as the instrument for that total liberalization in that product (1986-1995). This assumes that the choice of unilateral liberalization occurred without regard to the possibil-

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52To distinguish the TRAINS measure from the TBT concepts used in the rest of the paper, I relabel TRAINS-NTMs NTBs.
ity that the US will reciprocate eventually, and that no third factor drives both unilateral liberalization and the US response.\footnote{\textsuperscript{53}}

The negotiated tariffs were implemented between 1995 and 2000. The IV second stage estimate of the marginal effect of foreign tariff concessions, for products with a NTB, is displayed in row 2 of Figure 3.10. The result, originally reported in Limão (2006), is that for those products with NTBs, not only does the U.S. not reciprocate, but foreign governments experience a higher tariff when they had made a concession.\footnote{\textsuperscript{54}} That is, US tariff changes among those products with NTBs are negatively correlated with the changes in market access by the principal suppliers of those products.

Limão explains the lack of reciprocity as an unwillingness of U.S. partners to demand reciprocal reductions when those reductions will be watered down by an American NTB. The tariffs concessions on NTB measures reflect the endogenous choice to substitute for tariff concessions.\footnote{\textsuperscript{55}} In fact, there is a statistically significant correlation between US NTBs and US tariff concessions during the Uruguay round. US Tariff concessions were larger, on average among those products with existing NTBs than those without, even though foreign concessions, both unilateral and overall concessions, were lower.

The marginal effect of foreign tariff concessions is negative for products with an NTB, indicating that something more than just a disincentive for US partners to request tariff reductions. Not only does the US reduce tariffs more on those products with NTBs, but among those products with NTBs, those with the fewest foreign concessions experience the largest reductions. To explain this, I argue, as above, that governments may employ NTMs to induce profits to be shifted toward entangled exporters in the foreign market, which itself

\footnote{\textsuperscript{53}Government choices to unilaterally lower tariffs, in theory, represent a change in the politically optimal tariff level. If local political preferences or institutions are shaped by the international forces that led the US to liberalize, then the instrument is invalid.}

\footnote{\textsuperscript{54}The Limão (2006) result is robust to 2 digit industry level controls, as well as a battery of alternative specifications.}

\footnote{\textsuperscript{55}For an extensive analysis of NTM policy substitution, see the World Trade Report 2012.}
may lead the foreign governments to respond negatively to tariff concessions on those products.

To address the endogeneity of the TRAINS measure and to determine whether the results regarding NTBs are in driven by international contracting incentives, I extend the analysis to include the measure of contract intensity. Model 3 replaces the NTB indicator for the measure of contract intensity, obtaining an estimate for reciprocity for concessions among foreign suppliers in contract intense goods that is of a comparable magnitude to those products that are subject to NTBs. Contract intense products do not experience reciprocal concessions. Row 3 of Figure 3.10 allows comparison of the marginal effects of a tariff concession for products that have an NTB on the one hand and products that are contract intense on the other. Finally, row 4 of Figure 3.10 displays the marginal effect of foreign tariff concessions for NTB products when controlling for contract intensity. The results from the second stage, available in the appendix, indicate that it is not the presence or absence of NTBs, but rather the contract intensity of the product, that best predicts the failure of reciprocal reductions during the Uruguay Round.

The puzzling result that sectors with NTBs experienced negative responses to concessions, or negative reciprocity, is only partially resolved by showing that these products are also contract intensive. Theories of international cooperation in a global production environment identify intra-firm bargaining problems that may similarly challenge international negotiators. Moreover, the negotiations described here occurred before the conclusion of two important new agreements on regulatory barriers to trade, the TBT and SPS Agreements. Interestingly, these agreements go beyond attempting to identify specific regulatory levels, instead appealing to international standards.

\[56\text{See }\text{Staiger (2012). However, recent empirical work finds that TBT and SPS measures are no more prevalent on intermediate products (World Trade Report (2012)).}\]
3.5 Summary Conclusion

This chapter examines three hypotheses on the competitive consequences of regulatory barriers for trade on firms, governments and international institutions. I can now summarize the findings and offer brief extensions.

- Using the REACH case study, I show how American industry leaders benefit from new regulations of the chemical sector in Europe. This illustrates how regulatory barriers to trade act as fixed costs, advantaging the most productive firms.

- Observational analysis of technical barriers to trade reveals that TBTs are more often employed in sectors where production and patterns of trade are consistent with global production, suggesting that Government interests in the market conditions in other countries, specifically the differential capacity for corporate interests to access markets, lead them to engage in regulatory protection.
In the Uruguay round negotiations, the sectors subject to relationship specific exchange, characteristic of global production, exhibit the least reciprocity by the United States.

These findings offer a political explanation for the persistence of regulatory protection. Regulatory barriers generate a broader political coalition for protectionism than do tariffs. While the largest and most productive MNCs are disproportionately harmed by tariffs, high productivity insulates MNCs, and their local affiliates, against the costs of regulatory protection. At the same time, more marginal foreign exporters, who lack a constituency in the host market, are fully exposed to the costs of regulatory protection. As host governments enact regulation, they reduce competition in favor of MNCs’ local affiliates.\footnote{While in the model the interests of host governments are to promote local rather than foreign firms, a separate question is whether host governments interests in local unaffiliated producers over MNC affiliates may also influence trade policy.}

In general, these findings suggest that as firm level political pressures rise in importance, policy makers may find that traditional mechanisms available to the multilateral trade system will be unable to resolve disputes over regulatory barriers to trade. In particular, the form of specific reciprocity as embraced by the WTO legal system may be insufficient for governing today’s global economic environment. As trade shifts from primarily a market driven phenomena to specific, globalized contracts, the externalities generated by competition between globalized and less globalized firms may limit the use of tit-for-tat style reciprocal trade retaliations.

The evidence developed in this chapter also helps to resolves an outstanding puzzle in the welfare and market access implications of regulatory measures.\footnote{From an efficiency perspective, any use of non-tariff measures poses a puzzle, especially when tariffs are unbound (\textcite{Limao and Tovar(2009)}). Regulatory barriers and other non-tariff measures are imperfect substitutes for tariffs, but as described below, generate distortions that benefit certain firms.} A survey of econometric studies of technical barriers to trade finds that regulatory barriers do not have a consistent effect on trade flows.\footnote{See \textcite{Swann(2010)}.} Examining specific trade concerns in the agricultural sector reveals
that measures subject to complaint appear to expand trade. Using disaggregated trade data, Crivelli and Gröschl find that governments are more likely to file complaints at the WTO against foreign sanitary and phytosanitary measures that increase the volume of exports.\footnote{See, Crivelli and Gröschl (2012).}

The willingness on the part of governments to voice concerns about measures which increase exports implies that trade volume does not track interests, is explained by the fact that governments are not acting against the market access implications of regulatory barriers, but instead are objecting to distortions in the composition of trade.

Findings on the differential impact of regulatory barriers on firm highlight shortcomings in the way that aggregate, sector, or even product level trade data is used to address questions of development and growth.\footnote{Marshall and Stone point out that the study of depersonalized economic activity is broadly inconsistent with agent centered theories of strategic interactions and rational expectations, see Marshall and Stone (2013).} State centered approaches to understanding the structure of international economic relations have gotten too far away from explaining the “developments within a particular international economic structure” (Krasner (1976)). Analysis of TBTs reveals that aggregate outcomes, such as trade rounds, or regulatory protection, may depend more on the relations between states and individual firms than state-to-state relations.

Finally, with regard to the design of cooperative institutions, this chapter suggests that reciprocity rules are an important mechanism to address some externalities, but not all. Using statistical analysis of the use of reciprocity norms in trade negotiations, I find that the US did not negotiate reciprocal outcomes for those products with non-tariff measures, and that the lack of reciprocity is most evident in products that are tied into specific contracts. Finally, looking to the correlates of actual TBT use, I find that regulations on products with the same confounding factors that limit reciprocity receive a higher proportion of international charges of protectionism. These results help explain why TBT measures continue to be a major area of dispute in the multilateral system, and why the Director General of the
WTO argues that “[he does] not think it is far-fetched to argue that the proper management of NTMs is among the greatest challenges we face in international cooperation.”

Table 3.5: Analysis of Reciprocity

<table>
<thead>
<tr>
<th></th>
<th>OLS (1)</th>
<th>IV (2)</th>
<th>IV (3)</th>
<th>IV (4)</th>
<th>OLS (5)</th>
</tr>
</thead>
<tbody>
<tr>
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* $p \leq 0.05$, data from Limão (2006)

62 Pascal Lamy, 2012
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*p ≤ 0.05

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**URL:** [http://www.nber.org/papers/w17728](http://www.nber.org/papers/w17728)


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