GOVERNING TRADE BEYOND TARIFFS:

THE POLITICS OF MULTINATIONAL PRODUCTION AND ITS

IMPLICATIONS FOR INTERNATIONAL COOPERATION

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Abstract

While tariffs have been effectively eliminated over the last 50 years, a number of regulatory barriers to commerce persist. This thesis explains this persistence as a consequence of the interests of firms and governments and the limits of existing international institutions. This thesis develops three general findings. First, unlike with tariffs, the elimination of regulatory barriers to trade is not in the competitive interests of the most internationalized firms. Second, governments have an interest in using regulations to attract investment and retain the profits of that investment. Third, the existing institutions that govern trade, while able to resolve tariffs, are ill suited to address the challenges of regulatory protection. These three findings, illustrated with formal and empirical analysis, explain why cooperation in the area of regulatory protection remains difficult.

Acknowledgements

I would like to thank Judith Goldstein, my doctoral supervisor, for providing me with intellectual grounding, personal support and feedback on every aspect of my dissertation. Her interest in international political economy is infectious, and convinced me that this field is worthy of a life-long pursuit. She introduced me to the community of political scientists, economists, and legal scholars that study the World Trade Organization, starting in my first year with a seminar on 'dispute resolution in the context of international trade,' with Robert Staiger and Alan Sykes. It was at that seminar that I first met Kyle Bagwell, who has become a tremendous source of knowledge and insight into the political economy of trade. I have also received significant help from Michael Tomz, who, besides providing expertise in international political economy and political science generally, ensures that there is always a higher bar of achievement. Phillip Lipscy has also provided excellent guidance on my dissertation and in how to become a professional political scientist.

With this community, there could not have been a better place to begin to study international politics. However, my partner of many years had come to Stanford to search for a particle in Switzerland. Luckily for me, I found a welcoming environment in the Economic Research and Statistics Division of the World Trade Organization in Geneva. Under the capable leadership of Patrick Low, a Spartan group of economists

and lawyers offered me the ideal place to learn about the problems facing the global trade system. Among this group, I would like to especially thank Michele Ruta for his support and feedback on the early stages of my dissertation.

Contents

List of Tables

List of Figures

Chapter 1

Global Supply Chains in International Trade

> [T]he future global trading system will have to take better account of global value chains. Their geographical fragmentation is leading to a structural change in international trade, moving from the old theory of "trade in goods" to a new "trade in tasks" paradigm. What we have dubbed "Made in the World". Old concepts such as "country of origin" or "resident versus non-resident" are losing some of their analytical relevance in international economics. - Pascal Lamy WTO Director-General, October 6, 2011

Global markets are more integrated today than in any earlier time in history. The opening of markets that began at the end of WWII has culminated in unprecedented levels of mobility of goods, services and capital. Concomitant with rising integration in the 20th century has been a plethora of political agreements on how to regulate that integration. Governments have agreed to expand market access by reducing tariffs and quotas and they continue to engage in a discussion on how to dismantle a number of remaining trade barriers: regulations, standards, licensing requirements and investment restrictions. As the world entered the 21st century, not only had governments adopted hundreds of bilateral, regional, and hemispheric preferential

trade agreements, but most nations had joined the multilateral WTO.

Despite these efforts, a surprising amount of protections remain and undermine the potential for mutually beneficial transactions. In 2010 alone, new restrictive measures introduced by WTO members reduced trade by an estimated 93 billion dollars.[1] While tariffs are at a historic low as a result of multilateral negotiations, attempts to forge agreement on regulatory barriers to trade, barriers to trade in services, and the liberalization of investment restrictions have stalled, both at the WTO and in the most prominent preferential deals: the Trans-Pacific Partnership and the Trans-Atlantic Partnership. In the absence of legislation to quell these non-tariff barriers, WTO members who face these barriers have increasingly turned to the judicial arm of the organization, dispute settlement, substituting the creation of new rules in multilateral negotiations for the pseudo-legislation of the dispute settlement system of the WTO Panels and Appellate Body.

The continuation, and often increase, in regulatory protection is puzzling given the level and form of economic integration we see today. The goods that appear worldwide are no longer produced in a single market, but rather are a result of the flow of intermediate inputs to foreign locales for processing, assembly and export into global supply chains. And these production location decisions are increasingly part of integrated ownership structures of multinational corporations (MNCs). These large multinational corporations rationalize production across numerous markets, and their revenue is equivalent to more than 25 percent of world GDP and over two thirds of world trade. In the U.S., for example firm-level data reveals that roughly 90 percent of U.S. exports and imports flow through multinational firms.[2]

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[1]See, Hufbauer et al. (2013).
[2]See, Bernard et al. (2009).

The concentration of ownership into a few large companies has political as well as economic implications. Many analysts have suggested that governments increasingly represent these companies whose interests lie in cheap inputs and easy access to foreign markets. Further, the spatial unbundling of the manufacturing process and attendant offshoring of tasks have changed the political economy of tariffs. The conventional wisdom on the relationship between international commerce and protectionist policymaking holds that economic integration facilitates political integration by creating constituencies for sustained cooperation (Haas (1958); Burley and Mattli (1993)). Helen Milner argues along these lines that the sustained openness in the face of the 1970s economic crises was a consequence of the interests of large corporations who valued high levels of economic integration. Specifically, she argued that as multinational corporations increasingly produced abroad, their interests shifted from demanding protection of the home market to the promotion of international markets and the universal elimination of trade barriers (1988*a*). Macro economic analysis of the relationship between increased international ownership and protectionism yields similar results. Emily Blanchard finds that foreign direct investment, international portfolio diversification, cross-country mergers, and multinational firms all reduce the incentive of governments to set high tariffs, a result of policy makers internalizing the interests of firms with foreign affiliates (2010). Given the level of international production and the increasing presence of large multinationals, the existence of regulatory protections is counter intuitive. If both international production and large corporations explain pro-trade attitudes in governments, why is there no interest in regulatory cooperation?

This thesis seeks to address this problem. In summary, I argue that the rules of

the multilateral trade system, which are based on reciprocal negotiations of market access, are inefficacious precisely because of the political interests generated by global production. Unlike with tariffs, the trade policy preferences of globalized firms can be for more, rather than less, restrictive regulations. This is because tariffs and non-tariff barriers have different effects on competition: the most productive globalized firms can actually *benefit* from closing markets. Thus, the conventional wisdom regarding the origins of trade policy cooperation in general, and in the GATT/WTO regime in particular, has miss-specified the micro-foundations of trade politics in the 21st century and as a result, may have overestimated the efficacy of reciprocity as a mechanism to enforce cooperation. I therefore conclude that the existence of long supply chains and the concentration of ownership has shifted the interests of firms and the nations in which they operate for international markets. I defend this argument in three steps, each of which is necessary to understand the implications of global production for international cooperation on commerce.

- The first is a claim about exporter interests. For the most productive firms, regulations may be a benefit that may outweigh their direct cost via decreasing competition and increasing profits. Regulation adds to the cost of production and less productive firms may be unable to cover these added costs.

- Second, I argue that governments want to maximize economic activity at home. Governments may adopt regulatory barriers to promote the interests of foreign multinationals that are engaged in local economic activity through their affiliates, rather than exporters that are wholly located in a foreign market. To the extent that multinationals are more productive than marginal exporters, a regulatory barrier can shift the composition of trade and investment toward firms

that are engaged in local research and development, hiring, and investment.

- Third, I show that these governments, when they interact with one another in the design and operation of the international trade regime, have been reticent to remove the regulations that benefit local affiliates of multinational corporations. The result is that the institutions that were effective in removing tariffs are ineffective at resolving the challenges posed by regulatory barriers to trade.

This introductory chapter lays the groundwork for the thesis by characterizing relevant features of the international trade system. Section 1 discusses the rationale and origins of the current multilateral trade rules. These institutions reflect a set of interests and resolve a set of problems that are fundamentally related to the way that tariffs limit market access. Section 2 turns toward domestic politics, to understand how coalitions form to promote or discourage the adoption of trade agreements. Section 3 highlights evidence for the rise of global production, which has been assumed to bolster the free trade coalitions domestically and reduce protectionist pressures. Section 4 establishes the persistence and growth of regulatory protection, presenting a puzzling disconnect between the rise in global producers whose direct interests are in liberalization and the lack of progress in multilateral treaty making. It is this disconnect which motivates my focus on the interests and activities of those global producers- multinational corporations. Section 5 gives an outline of the thesis.

1.1 The institutionalization of international trade liberalization

The current trade regime is characterized by two central norms: reciprocity and non-discrimination. Both are rooted in 19th century trade agreements but appear in their current form in the Reciprocal Trade Agreement Act (RTAA) treaties that the US concluded in the interwar years. Reciprocity requires that governments grant equal concessions in terms of import volume and that governments retain the right to withdraw concessions if their expectations of market access are not granted. The principle of non-discrimination, also called the unconditional most favored nation rule, requires that trade policies should be equally applied to all parties of the agreement, making negotiations fundamentally multilateral. Together these principles are the basis for nearly all cooperative agreements on trade.[3]

These principles, developed in a number of bilateral agreements under the RTAA program, were combined with a far-reaching agenda in the Havana Charter of the International Trade Organization. While the Charter was never ratified and the Organization was abandoned, elements of the agreement were retained in the General Agreement on Tariffs and Trade (GATT). The GATT began with the stated purpose of "raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, developing the full use of the resources of the world and expanding the production and exchange of goods." Although the ensuing liberalization of tariffs has made the GATT one of the most cited

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[3]There are important exceptions: Non-reciprocal agreements have been adopted by many developing countries particularly between former colonial relations, and all preferential agreements violate the principal of non-discrimination.

examples of successful international cooperation, scholars remain divided on the extent to which the GATT marks a substantive change in the nature of international politics.[4]

This skepticism of the role of international institutions in facilitating cooperation arises from the economic presumption that for most countries, national income is maximized with a unilateral shift to free trade (Krugman (1997)). Why then, is an international institution, such as the GATT, necessary? The dominant view holds that in absence of a cooperative institution, governments suffer from prisoner's dilemma incentives. Cooperation is difficult because governments want to use tariffs to competitively restrict the imports of foreign firms, protecting domestic industry at the expense of foreign exporters. Governments value their own national industry over consumers and producers abroad and so inefficiently raise tariffs to shift revenue into government coffers and promote domestic profits. However, the foreign government may respond in kind, raising its own tariffs. As a result the advantages initially afforded to local firms by raising tariffs are lost by similar restrictions in their destination markets. In equilibrium, trade volume is suppressed, welfare declines, and no government is better off for having engaged in protection, and faces no incentive to unilaterally liberalize.

Trade agreements offer a way for governments to escape this protectionist equilibrium. An agreement extends the 'shadow of the future' as governments lay out their obligations and their strategies to enforce those obligations in a way that provides for mutual tariff reductions. Because reductions in tariffs are reciprocal the agreements provide political incentives for export interests to promote lower tariffs at home. Kyle Bagwell and Robert Staiger argue that these provisions, as operant

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[4]See, Goldstein, Rivers and Tomz (2007).

in the GATT, work because as governments reduced tariffs in concert, neither party faced a loss in relative market access (1999). To enforce this arrangement, the GATT included provisions that allow governments to withdraw concessions in response to some failure to uphold the agreement. If a foreign state raises a barrier, the home state would be legally authorized to retaliate by imposing tariffs on the offending party's exports. This procedure enables governments to sustain cooperation in the face of incentives to leverage a terms of trade advantage.

Political scientists have identified other beneficial features of the GATT rules that facilitate cooperation. Robert Keohane argues that the formal rule of reciprocity would be unworkable by itself because of the difficulty of discerning equivalence among concessions and the problem of strategic incentives to impose ex ante barriers to trade for bargaining advantage (1986). Instead, Keohane argues that the Contracting Parties of the GATT practice a looser notion of reciprocity, so called 'diffuse' reciprocity. He argues that the non-discrimination norm underlying unconditional MFN, as practiced in the GATT, offers members the flexibility to share in the fruits of a negotiation, without requiring some tit-for-tat exchange of tariff concessions.[5] In addition, Barton et al. argue that the GATT offered its members a number of other diffuse benefits, including useful monitoring of violations of the agreement, information gathering mechanisms, and lower transaction costs for future negotiations (2007).

A complementary approach focuses on the use of trade agreements to resolve domestic institutional challenges. For example, trade agreements offer governments a mechanism to commit to domestic political actors when facing a time inconsistency

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[5]Bagwell and Staiger argue that, by contrast, unconditional MFN works to enhance the reciprocity provision, enabling a closer approximation to equivalent exchange. This is because the unconditional MFN provision avoids some of the bargaining externalities associated with multiparty tariff negotiations (Bagwell and Staiger (2010)).

problem. In contrast to the international externalities created by tariffs, the domestic account of trade agreements such as the GATT identifies an inefficiency in the policy making process: governments set policy after producers make irreversible investment decisions. Once producer choices are set, governments may have an incentive to lower tariffs to benefit consumers. Anticipating this, producers make investment decisions, say by lobbying, to ensure that governments do not liberalize ex post. Governments who are able to commit to a free trade policy scheme can prevent inefficient ex ante choices by domestic producers. International sanction, by retaliation, offers a way to bind the hands of the state, and ensure economically efficient policy. This domestic commitment story offers a substantive alternative to the original terms of trade externality mechanism underlying a trade agreement. Instead of allowing the mutual reduction of tariffs, a trade agreement offers an enforcement mechanism, which allows governments to overcome their own limitations in the face of powerful lobbies.

Both the international terms of trade explanation and the domestic commitment analysis depend on a set of domestic political pressures on governments. While in both cases sovereign states use trade agreements to resolve an externality, either an inability to commit to a policy or the incentive to engage in beggar-thy-neighbor tariffs, governments must also respond to domestic political dynamics. In the next section, I discuss how political coalitions divide on the issues of trade, before turning to ask how global production may affect these dynamics.

1.2 The distributional effects of international co-operation

E. E. Schattschneider argues that trade policy is primarily a function of the influence of domestic political pressures, specifically organized business groups (1935). In order to determine the conditions of success for international cooperation, it is important to ask how economic actors are expected to act when exposed to international competition. Whether a firm, worker, or industry is harmed or helped by trade explains the composition of political coalitions in favor and opposition to trade liberalization, and sets the stage to ask how global production will affect international cooperation.

According to the Stolper-Samuelson framework, material interests vary depending upon the relative scarcity of productive factors or inputs that go into the production of an internationally trade good. The free trade coalition includes individuals and producers who are employed in productive capacities that are abundant in their home economy relative to other economies. Opening trade leads each country to specialize in those goods that employ the relatively abundant factor, which in turn increases the wages or rents of the abundant factor. In relatively labor-abundant economies, workers should expect that the goods that are exported will raise their wages, and so free trade will directly benefit their interests. By contrast, capital owners in such an economy should expect imports of goods that are capital intensive, driving down their rents in absolute terms.[6] This assumes that workers can feasibly find employment in the exporting sector, an assumption known as factor mobility.

The Stolper-Samuelson framework does not speak directly to the question of how

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[6]The expression of the interests of one class over another may depend on their ability to organize, or how openness is changing the relative power of one class over another. See Rogowski (1989).

global production should affect political coalitions. The approach has at least three problems. First, the assumption of factor mobility limits the theory to making predictions about the very long run, a view that is fundamentally limiting for political analysis (Frieden (1991)). In the short run, workers that were employed in capital intensive sectors under autarky may be unable to find work in the expanding export industry. Second, the framework does not have a place for the firm, preventing any analytical distinction between fixed and variable costs of trade that I argue distinguish tariffs from non-tariff barriers. Instead, each factor is generally treated as an undifferentiated class interest. Third, Stolper-Samuelson theories assume that comparative advantage arises from relative factor abundance, and as a result, suggest that international factor mobility, such as with foreign direct investment and capital, should directly trade off with trade flows, rather than be part of a global production process. However, we know that investment and trade are extensively linked, and that the same firm may engage in export and offshore some production tasks.

The principal alternative theory from classic economics, the Ricardo-Viner framework, argues that comparative advantage arises from national and industry level variation in technological efficiency. Assuming that capital, labor, and other factors of production cannot move from less to more efficient industries, the economy divides into sectors in which some productive factor is more or less useful. The result is that the factors of production within that sector share an interest in trade or protection. For example, after opening up, an economy that is technologically advanced may see industries that engage in complex production processes and employ a particular set of high skilled laborers expand, bidding up the wages and rents for those laborers,

without similarly benefiting less high-tech producers (Frieden (1991)). These technological differences can also be found at the level of the firm. Very few firms engage in trade, and among those that do, the majority of trade is in the hands of multinational corporations.

A growing number of studies have identified ways in which firm level characteristics shape political preferences toward trade. For example, the firms that do export suffer from barriers to their trade in a way that domestically oriented firms do not. Consistent with this logic, these firms, particularly the largest and most productive firms, sought lower tariffs and cooperation with foreign trade parters.[7] In the US context, Milner found that multinationals, who rely on imports for intermediates and access to foreign markets for their affiliates, made up an important constituency for liberalization in the 1970s and 1980s, alongside more conditional advocacy by domestic exporting firms (1988). In general, export oriented firms, and the interests of multinationals in global production are said to be an important actor in most accounts of trade liberalization. And, the most striking conclusion of the work on the role of multinationals in promoting trade is that it predicts that liberalization will be self-reinforcing. As tariffs decline and investment restrictions are loosened, more firms will organize as multinationals and become an endogenous force for free trade.

In sum, theories of trade preferences that identify abundant factor owners, productive industries, or differences among firms as the source of political preferences on trade all identify trade with the expansion of market access. These interest-based theories are each consistent with the same rationale for trade agreements. The export orientation of the largest firms exacerbates the consequences of tariffs on individual firms, but governments are still motivated by the fundamental logic of using tariffs to

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[7]See, Ferguson (1984).

advantage exporters relative to foreign importers. Much of the existing work on the politics of trade focuses on the coalition dynamics within a market, whereas, as I will show below, global production introduces something new: an interest in *who* trades, and not just *how much*. Governments seek to exacerbate the spillovers associated with participating in the global value chain - increasing employment and upgraded technology, which in turn provides a political dimension to the concentration of trade within the hands of a small set of global producers. As a result, governments have a stake in the competitive dynamics among internationally oriented firms.

1.3   Reexamining Global Production

The world is extremely interconnected, especially for manufactured goods. The growth of global value chains has meant that the amount of production devoted exports has almost tripled in the last 50 years and the amount devoted to exported manufactures has almost quadrupled in the same time.[8] While trade has expanded, exports remain an elite activity from the perspective of firms. In 1914, the largest firms accounted for almost 90 percent of American manufactured exports; little has changed since.[9] Eighty years later, only 4 percent of U.S. plants reported any exports.[10] Today, the concentration and volume of economic activity is such that in the United States, the top 1% of trading firms in trade volume account for over 10% of employment and 70-80% of total trade.[11]

Trade has long involved a few of the largest firms. What is new about global

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[8]In 1972, 7% of the inputs used in manufacturing in the U.S. were imported.

[9]See, Becker (1983).

[10]See, Bernard et al. (2003).

[11]See, Bernard et al. (2009).

production besides volume? The difference is that now this trade occurs *within* firms. The share of intermediate goods exported from U.S. parents to their affiliates increased from 8% of total U.S. exports in 1977 to 15% in 1999.[12] This trade also plays an important role in domestic production, with imports of intermediate for use by local industry accounting for 63.5% of total trade.[13] Goods are now shipped from one market to another, not for final sale, but for processing and re-export.

While the spread of global value chains has been expanding since the 1970s, the structure of multinational production remained relatively constant through the 1980s in terms of the concentration of profits and the economic size of the top multinational firms. In 1914, U.S. direct investment was about $2.65 billion, equivalent to 7 percent of US GNP. By 1966, the value of US direct investments abroad totaled $54.6 billion, but still only amounted to 7 percent of US GNP.[14] Moreover, in 1974, the top 10 MNCs had a collective revenue of over $3 billion annually, or about 0.4% of US GNP.[15] It was under these conditions that Charles Kindleberger raised the alarm about the power of international corporations and the obsolescence of the nation state.

In the last decade of the 20th century, the situation began to change. Foreign direct investment (FDI) has become the main cross-border capital flow: by 2012, the value of US direct investments abroad totaled $5 trillion or about 30% of US GNP. This aggregate rise in the amount of investment reflects a rise in a particular form of cross border production and the expansion of multinational corporations. By 2012 the collective revenue of the top 10 MNCs totals $3.8 trillion, equivalent to approximately 24% of GNP. This translates to a nominal increase of over *1200%* since 1974.

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[12]See, Borga and Zeile (2004).

[13]See, Bems, Johnson and Yi (2011).

[14]The GNP of the US was $36.4 billion in 1914 and $739.5 billion in 1966, see Wilkins, The Emergence of Multinational Enterprise pg 201-202.

[15]In 1974, the GNP of the US was $821.1 billion.

One of the interesting features of trade today is that the share of intra-firm trade has not changed, even as multinationals production and FDI have risen so quickly. Thibault Fally argues that this may be a consequence of the importance of technologies that shift value added toward industries closer to final demand, particularly in rich countries (2011). R&D and marketing play an important role in this shift, decreasing the relative value of manufacturing inputs added upstream in the supply chain. Strikingly, the largest 700 MNCs make up half of world R&D spending. Additionally, complicated production processes are often difficult to coordinate across plants, or are extremely time sensitive, encouraging firms to keep high valued production tasks close to consumers. It is therefore important to distinguish trade in intermediates from the location of value added: declining trade costs promote offshoring, while technological changes may decrease the value-weighted length of the supply chain. This leads conventional measures of globalization to under report the changes in the value of global production processes. Therefore I emphasize the technical characteristics of production rather than the distribution of the value of goods to measure the extent of global production, an issue that will be readdressed in Chapter 3.

In summary, much of what we call global production is not particularly novel. What is new is the extent to which the trade and processing of intermediates is concentrated in the hands of a few producers.

Multinationals, contracts and foreign direct investment: The politics of investment and trade cannot be disconnected from the activities and interests of multinational corporations. In order to understand these activities and interests, it

is important to recognize the strategic rationale of economic organization as a MNC. Multinational production or "offshoring and insourcing" requires up-front investments to access foreign markets and find foreign production partners. These investments are necessary to configure products to meet local language, cultural, and legal requirements, locate clients and partners, and set up production and sales relationships. As a consequence, even in relatively competitive industries, the firms that engage in trade, and the firms that are organized as multinationals, can exert market power. Insofar as these fixed costs are subject to policy intervention, the interests of incumbent firms in general, and MNC in particular, balance the interests of profitability and competition.[16]

In addition to high fixed costs of organization, MNCs are formed by a contract between two or more economic actors, for example a headquarters and a manufacturing firm, whose interests may be opposed. Headquarter services, such as R&D, management, or marketing must be combined with other tasks, but those tasks need not occur within the same firm or even the same country. MNCs exist to coordinate these divergent interests across borders. As a result, the behavior of multinationals in organizing global trade can be understood as the consequence of bargaining among a subsidiary and a headquarter. MNCs organize trade differently than in a classic market and the prices relevant for the global market may not be relevant to decisions within a firm. For example, suppose a Bangladeshi textile factory can enter into a lucrative contract with Walmart. Ex ante, it is unlikely that the production decisions of any given Bangladeshi factory would be of interest to Walmart, but after Walmart invests effort in establishing the contract, providing the designs and establishing the network of suppliers and logistics, the factory manager may be able to both generate

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[16]See, Marshall and Stone (2013).

and extract rents that otherwise would be unavailable.

Because production depends on long run mutual investments in a relationship, governments have new levers to influence economic outcomes. While studies of globalization have long concluded that foreign investment empowers capital at the expense of national sovereignty and forces governments to debase themselves to attract investment, investors are only one side of an increasingly complicated, and mutually beneficial bargain.[17] Subsequent analysis of foreign direct investment has not been embedded in individual firm strategies and interests. That a subset of powerful firms may have interests opposed to that of their industry was a fundamental feature of MNC studies, but this feature did not play an important role in discussions of the relative power of international capital and government. Instead studies of MNCs were separated from trade, and left to studies of domestic politics.[18] Today, the role of multinational corporations in politics is primarily discussed in the context of foreign direct investment and its relationship to development.[19]

In the trade context, multinationals are often grouped with other export oriented firms and consumer interests. Recent work in economics focused on the interests of firms and developed novel analyses of the political economy of trade agreements. Ralph Ossa, for example, develops a rationalization of trade agreements as a solution to a competitive effort on the part of governments to use trade policy to attract foreign production from their neighbors (2010). Governments use tariffs to make imports more expensive, shifting domestic consumer expenditure toward local production and increasing the incentive for foreign investors to set up production in the

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[17]See Kindleberger (1969), Behrman (1972) and Hymer (1976). For a contemporaneous review and synthesis of this literature, see Keohane and Ooms (1972).

[18]See, Vernon (1971).

[19]See, Biglaiser, Li, Pinto, Pinto, Staats and Malesky (2012).

home market. In this analysis, the GATT/WTO principles of reciprocity and nondiscrimination make it possible for governments to internalize this externality by allowing them to negotiate rules that restrict their ability to engage production relocation efforts. Cooperative trade policymaking promotes international trade and investment, connecting trade and the globalization of production in the realm of tariffs and other border measures.[20]

The consequence of multinational production, on the other hand, suggests a reduced role for trade agreements. Blanchard (2010) modifies terms of trade theory to suggest that these international externalities are reduced in the presence of global sourcing. Interestingly, on this logic, a home government that seeks to take advantage of tariff revenue should prefer that foreign producers engage in export to serve the home market, so that goods are maximally exposed to tariffs. By contrast, in Chapter 2, I argue that governments are not only using tariffs to shift production from foreign firms into tariff coffers, but are also interested in promoting the share of investment and profits in their domestic market. In addition to whatever revenue concerns they have at the border, governments benefit from technology spillovers and employment brought by FDI. As a result, governments have incentives to engage and develop global production networks, attracting and retaining multinational producers and contributing to the global value chain.

In sum, trade and investment are fundamentally linked both in the activities and rationale of multinational corporations. However, this connection has not meant that governments are equally successful in regulating both: governments have managed to

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[20]Interestingly, this new logic of competition for foreign production alone does not fundamentally change the rationale of trade agreements (Bagwell and Staiger (2012)). Instead, even in the presence of profit shifting or other consequences of imperfect competition, the rationale for trade agreements remains the same, as the effects of the foreign policies on local prices can be offset by domestic policies.

create impressive institutional structures to govern trade, such as the WTO, while a similarly developed investment regime remains on the wish list of negotiators. But despite their complexity and apparent effectiveness in limiting tariffs, rules that were designed for a world of unaffiliated trade must now handle the outsized role that MNCs play in trade. I argue that these rules fail to meet the challenge and that the gaps in the rules inherited from the 1947 GATT fail to constrain governments, which seek to manipulate investment and production decisions by MNC. The history and development of regulatory protection, both in the historical development of the trade regime, and in the current period, is taken up below.

1.4   International cooperation on Non-Tariff Issues

In an anarchic world, governments are exposed to opportunism by their neighbors. Even if a government wishes to implement a regulatory barrier to trade for traditional protectionist reasons or to attract investment, other governments are similarly motivated, and the outcome of such competition is mutual immiseration. Below, I outline how governments have attempted to use international agreements to structure their economic engagement and promote cooperation.

The history of negotiation: While the *tariff* program embodied in the GATT and the WTO stands as one of the most successful instances of international economic cooperation, governments engage in a wide variety of trade restrictions beyond tariffs. Today, the principal barriers to trade take the form of non-tariff measures, such as licensing agreements, patent laws, and standards that interfere with the complex

network of business relationships that grew with global openness.

The issues of regulatory cooperation in the GATT/WTO are not new. Even the original International Trade Organization, in addition to covering the national treatment and most favored nation clauses now familiar in the GATT, proposed mechanisms for reducing the burden of regulation behind the border or non-tariff barriers.[21] This program suffered a setback when, during a rare period of Republican house control, the US Congress refused to ratify the ITO, and the world was left with a thin preliminary framework which focused on reciprocal tariff negotiations.[22] The failure of the ITO did not mean that non-tariff barriers are completely unconstrained. While the incumbent members of the GATT were not required to lower non-tariff barriers as part of the original formulation of the GATT, it became an issue of the accession process.

By the 1970s, the membership of the GATT has risen from the 23 original Contracting Parties to 102, including developing countries. In preparation for the Tokyo Round, GATT members created an agenda, which included non-tariff measures as well as provisions on sectors of interest to the new GATT members, in particular, agriculture and tropical products. This would allow existing members to offer non-tariff concessions to entice the new members to lower their tariff barriers. Despite the opportunity for significant mutual gain, these negotiations did not manage to generate substantive obligations on agriculture or investment, and these issues remain a

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[21]Section B, Article 20 2. (b) import and export prohibitions or restrictions necessary to the application of standards or regulation for the classification, grading or marketing of commodities in international trade; if, in the opinion of the Organization, the standards or regulations adopted by a Member under this sub-paragraph have an unduly restrictive effect on trade, the Organization may request the Member to revise the standards or regulations; provided that it shall not request the revision of standards internationally agreed pursuant to recommendation made under paragraph 7 of Article 39.

[22]See Goldstein and Gulotty (2014).

significant challenge for international cooperation today.[23]

Today, most international cooperation on regulatory barriers takes place in preferential trade agreements. Non-tariff issues are increasingly covered by regional and so-called mega-regional agreements. And almost every member of the WTO is also a member of a preferential agreement, many of those agreements cover forms of commercial exchange in which they are not constrained by GATT/WTO membership. While more agreements go beyond the GATT/WTO case, it is often the case that these regulatory provisions in preferential agreements are merely aspirational.

The extent of regulatory protection: Since the tariff peaks in the 1930s with ad valorem equivalents of over 50%, today's tariffs are low and consistently low. Figure 1.1 displays average applied tariffs over time for Germany, Japan and the US, suggesting that even through the post-2008 economic crisis, tariffs did not rise for the major trading powers. At the same time, regulatory barriers, here measured by complaints over regulatory barriers to trade submitted to the WTO TBT committee exhibit a marked increase after measurement begins in 1994.

Another measure of the rise of regulatory protection, the Global Trade Alert, finds evidence consistent with the reports to the TBT committee. Table 1.1 displays the use of Trade Restrictive Measures affecting commercial interests in each sector between 2008 and 2012. Since 2008, for example, 64 governments imposed regulatory barriers to trade on basic chemical products and 59 governments have enacted protectionist measures on other chemical products, suggesting that even important inputs into production processes are facing higher barriers post-crisis (Evenett (2013)).

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[23]See Keohane and Ooms (1972).

Table 1.1: Trade Restrictive Measures 2008-2012

CPC	Affected Sector Description	Measures	Jurisdictions
01	Agricultural products	207	78
34	Basic chemicals	202	64
49	Transport equipment	172	71
41	Basic metals	166	65
44	Special purpose machinery	154	64
21	Meat, fish, fruit, vegetables	137	69
81	Financial intermediation	136	40
42	Fabricated metal products	127	54
02	Live animals	120	61
43	General purpose machinery	115	34
23	Grain mill products	110	61
26	Textile fabrics	105	57
35	Other chemical products	105	59
37	Glass and glass products	98	64
36	Rubber and plastics products	96	55
46	Electrical machinery	91	32
38	Furniture	90	58
27	Textiles other than apparel	87	65
28	Knitted fabrics and apparel	86	60
22	Dairy products	75	53

Figure 1.1: Tariffs and Regulatory Barriers over Time
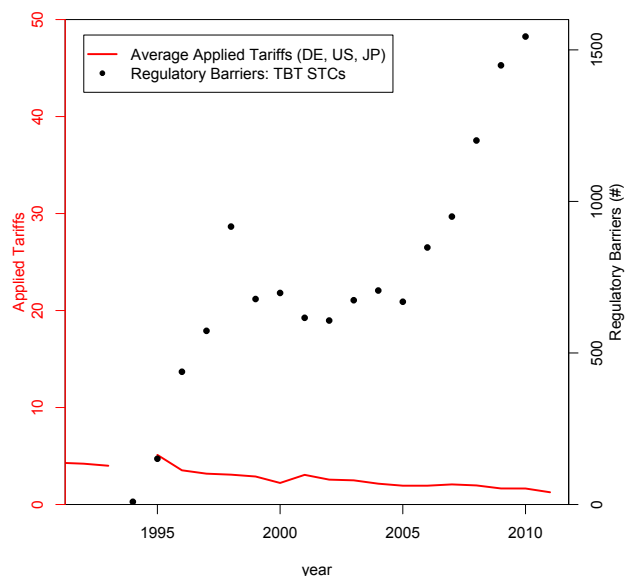
The Global Trade Alert data shows that it is the largest trading nations, including the G8 and the G20, that account for most of the protectionist measures. On the metric above, the G20 countries are responsible for 65% of all protectionist measures imposed since November 2008 (Evenett (2013)). The fact that the countries with the lowest tariffs are the ones with the highest non-tariff barriers suggests that non-tariff measures may be substituting for traditional forms of tariff protection. I offer two challenges to this explanation, one pertaining to the effects of these regulatory barriers, and a second pertaining to the success of the international system in addressing these barriers.

In business surveys, firms often identify regulatory barriers as the most restrictive feature of a destination market, and regulatory barriers are a major concern for governments. However, if these trade barriers are designed to protect domestic industry

and gain a terms of trade advantage, it stands to reason that these barriers should have measurable consequences for import volumes. One of the principal ways of evaluating the strength of a regulatory barrier to trade is to examine its "ad-valorem" equivalence, or to determine the level of a tariff that would exert the same level of restrictiveness on imports as a tariff.

However, using this measure, a recent analysis of sanitary and phytosanitary barriers to trade (SPS), find that import volumes *rise* in aggregate after the implementation of the barrier.[24] Moreover, in a detailed dataset of the universe of French firm export volume and participation from 1995-2005, 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.[25] These studies, and others, have found inconsistent correlations between the imposition of these barriers and aggregate trade volumes. This evidence suggests that these measures are not merely substitutes for tariff protection.

Another challenge to the policy substitution explanation for these barriers is that it assumes that the international system constrains tariffs but leaves non-tariff measures unregulated. But, if governments are actually unconstrained on non-tariff measures, it is not clear why they would be able to find any success on lowering tariffs, given that he enforcement mechanisms imagined in the GATT/WTO system relies on reciprocal market access concessions. Rather, what we find is that there is a great deal of heterogeneity in the success rate of tariff negotiations (see Chapter 3).

The challenges facing the multilateral trade system must be understood in the context of modern trade. Thus, in the chapters below, I treat regulatory barriers as a *new* way to shape the composition and practices of global producers, rather than

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[24]See, Crivelli and Gröschl (2012).
[25]See, Fontagné et al. (2012).

just providing a substitute policy instrument for traditional forms of market access protectionism.

1.5   Scope and outline of thesis

Subsequent chapters take up the new political preferences on the part of firms and governments and the consequences of these preferences on the prospects of international cooperation. The focus is on the largest and most powerful states and markets, where global production processes, and the multinationals which control this production are based. Where the United States, Europe and Japan have sophisticated processes to manipulate global production, their interests are juxtaposed against governments whose economies are still heavily reliant on agriculture or extractive industries and traditional forms of tariff protection.

In *Chapter 2: The Governance of Trade and Investment*, I use a formal analysis, to develop hypotheses on the relationship between the interests of global producers, the choices of governments over regulation, and the probability of international cooperation in trade policymaking. The key insight in the chapter is that firms that are engaged in global production benefit from regulatory barriers to trade in host markets. This is because unlike tariffs, regulatory barriers act as fixed costs, which shift market share toward large and productive MNCs. Furthermore, while looser regulations can encourage multinationals to set up a production chain, facing fewer regulations also reduces the need for foreign direct investment. As a result, governments can use regulations to advantage local MNCs and encourage defensive investments on the part of firms. The chapter argues that the persistence of regulatory protection is a consequence of international integration, rather than an exception to that integration.

Chapter 3: Regulatory protectionism, MNC profits, and the limits of international cooperation provides evidence for three theoretical expectations, developed in Chapter 2, that pertain to competition between multinationals and more marginal exporting firms. The empirical test focuses on a prominent class of regulatory barriers to trade, so called technical barriers to trade (TBT), through a case study of the chemical industry. Using a variety of data sources, including firm level data, national regulatory changes, as well as a new dataset of disputed measures at the WTO, I provide evidence that regulatory barriers are in the interests of productive firms and their host governments. Additionally, evidence from the GATT Uruguay Round negotiations suggests that these interests explain the limited reciprocation of American tariff negotiations. In short, reciprocal trade rules facing globalized production failed to balance the benefits of market access against the interest of multinational firms.

In *Chapter 4: Global Production Diversion and the Depth of Trade Agreements* I test the remaining three hypotheses that pertain to competition over profits *within* the global supply chain. As governments seek to promote the growth of global production chains, they have gone outside of the multilateral system toward alternatives such as bilateral and plurilateral arrangements. Using newly collected data on the regulatory provisions of these agreements, the chapter establishes how governments use preferential trade agreements (PTAs) to influence the organization of production and thereby retain a larger share of the profits of global production. The chapter argues that governments adopt provisions in PTAs to shift profits and investment from third parties toward member states. This empirical strategy reveals the conditions under which international economic cooperation can address profit-shifting externalities between two countries, and whether that cooperation promotes or hinders cooperation

among non-participants.

Having established that the current system is ill-equipped to address globalized production, in *Chapter 5: Optimal Delegation in Multilateral Standards Agreements*, explores alternative institutional designs that deal with regulatory cooperation. In particular, I identify two novel mechanisms adopted in the WTO standards agreements: the appeal to international standards and the use of scientific evidence. Regulatory protectionism is limited by delegating an optimal level of authority to member states. In contrast to economic mechanisms in which an uninformed principal offers her informed agent a schedule of payments, trade agreements cannot provide conditional payments to its members. In the absence of transfers, limiting regulatory protection is an optimal delegation problem whose solution takes the form of a cap or ceiling. International standards act as a de facto cap on regulatory activity. Furthermore, this optimal delegation model offers the first systematic rationalization of the design of the standards agreement. When political shocks are sufficiently likely, the requirement to produce scientific evidence can act as such a costly signal to realign incentives of errant member states, and protect the agreement in normal times.

Chapter 2

The Governance of Trade and Investment

The previous chapter began with the observation that there have been two significant changes to political and economic conditions since the formation of the multilateral trade regime. The first is that the rise of global production networks and the associated growth of intra-industry and intra-firm trade is concentrated in a small set of large multinational corporations. The second is that tariffs are no longer the primary impediment to commerce, leaving regulatory barriers to trade as the central problem for international cooperation. These regulatory barriers address a number of traditional protectionist goals, such as promoting domestic industry, as well as public policy concerns, such as protecting consumer safety. These regulations produce externalities, shifting profits across firms and across production networks within an industry, leading to fundamental changes in the calculations of firms' interests toward trade liberalization.

It is widely believed that multinational corporations favor international market

liberalization and will oppose regulatory protectionism.[1] I claim in this chapter, however, that an unregulated market is not their preferred outcome. While it is true that multinational corporations (MNCs) prefer the elimination of tariffs, MNCs are not averse to government use of non-tariff barriers. The reason is that regulatory barriers give large firms a competitive advantage over smaller firms that find it more difficult to meet regulatory standards. As a consequence of these differential effects of regulation, there are cases in which the competitive advantage which accrue to large firms from the regulation of actual and potential competition outweigh the costs. This deeper understanding of firm interests provides a new explanation for the adoption of regulatory protection by governments. If the largest firms prefer regulatory barriers, these interests are likely to drive governments to engage in regulatory protection to advantage local MNCs. By closing off a market to only the top foreign firms, governments can assure that some stage of production remains at home, albeit in the hands of globalized firms.

Further, in the course of organizing production, firms can choose to set up their supply chain either as an arms-length contract or by engaging in foreign direct investment.[2] That decision is related to regulatory choices: regulatory advantages afforded to foreign investors allow MNCs to avoid having to invest in control of their subsidiaries. Even if a firm is sufficiently productive as to be able to engage in global production, the decision to pay the costs associated with internalization of production is a response to bargaining over profits across the supply chain. By modeling the relationship between the nodes of the supply chain, the manufacturers and headquarters,

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[1] Export oriented firms and multinationals are thought to be responsible for sustained liberalization during economic shocks (Milner (1988*b*), Milner (1988*a*)). Given the prevalence of global production, these firms are thought to reinforce liberalization; see Blanchard (2007), Blanchard and Matschke (2012) and Hoekman and Jackson (2013).

[2] This is known in the literature on the boundaries of the firm as the 'make or buy' decision.

I suggest that the regulatory choices of governments shape firm production choices and thus the allocation of profits across the supply chain.

In addition to establishing the direct interests of firms and governments in regulatory protection, this chapter suggests two reasons why regulatory barriers blunt the use of existing international institutions to promote cooperation. First, market-access-based cooperative institutions are insensitive to the effects of regulatory barriers on competition, limiting the applicability of the existing multilateral framework. Second, efforts to address regulatory protection bilaterally or in other limited membership organizations are likely to be frustrated by the effort of excluded governments to attract and retain foreign investment. These shortcomings suggest a need to reexamine the rationale of the multilateral institutions that govern regulatory protection, a task taken up in Chapter 5.

The chapter proceeds as follows. Section 2.1 argues that MNCs benefit from the competitive consequences of regulatory protection. Section 2.1.1 distinguishes regulatory barriers to trade from tariffs and other traditional trade barriers, arguing that the former take the form of fixed costs. Section 2.1.2 formalizes how regulatory decisions alter a firm's calculation of whether and how they should serve the international market. Under certain conditions, the largest and most productive firms gain from regulatory barriers in the export market, a competitive externality to regulatory barriers to trade. Section 2.2 extends this analysis beyond inter-firm competition, arguing that regulatory choices affect the decision of firms to engage in foreign direct investment by altering the division of profits within the supply chain. Simply put, regulatory choices that shift profits toward MNC headquarters obviate the need to invest in control over subsidiaries, an allocative externality to regulations. Section 2.3 shows

how the firm level interests in competitive and allocative regulation can influence the adoption of regulatory protection by governments. I conclude by discussing how these results make multilateral cooperation difficult for governments whose economies are integrated in global supply chains.

2.1   Firm interests in anti-competitive regulations

2.1.1   Regulatory barriers to trade as entry barriers

The *World Trade Report 2012* notes that regulatory barriers to trade are among the most prominent from the perspective of business, and the most difficult to address using the traditional rules of the WTO.[3] There are three characteristics which distinguish regulatory barriers to trade from traditional forms of protection. The first, taken up in this section, is that the costs associated with regulatory compliance do not apply to every unit sold on an ad valorem basis. Tariffs and many subsidies change the marginal cost of each unit, meaning that to produce more products is to encounter a higher tariff or subsidy, whereas regulatory barriers often involve a fixed cost. The second, taken up in the latter half of this chapter, is that regulations affect the ability for firms to enter and enforce contracts, making cross-border production difficult. The third, taken up in Chapter 5, is that regulations have a dual use, their protectionist consequences are obscured by public policy goals. Unlike tariffs which are relatively well documented across countries and time, regulatory barriers are often underreported, or difficult to quantify when they are reported.

   The first feature of regulatory barriers to trade is that they act as fixed costs. Fixed

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[3]See WTO (2012).

costs are central to 'New trade' theories of scale economies and explain the geographic concentration of production at the level of industries and countries. To explain this concentration, scholars assume consumer behavior follows Dixit-Stiglitz preferences, in which consumers value varieties of goods, limiting competitive dynamics between firms.[4] This modeling convenience simplifies imperfect competition, but also makes firms irrelevant for equilibrium outcomes.[5] Theorists in the 'New New' trade tradition build upon Krugman (1980) to account for differences in firm decision making over trade and investment. Melitz (2003) models firm level entry and engagement in trade as a response to individual shocks to productivity, as well as industry wide fixed costs of production. This line of research reveals that the most productive firms are more likely to engage in trade, to trade at higher volumes, and are more sensitive to tariffs and other traditional forms of protection than are less productive firms.

In these heterogenous firm models of trade, aggregate trade patterns are determined by whether or not firms can cope with the fixed costs, both from regulation and from non-policy factors, as well as with variable costs, such as tariffs. Following the original formulation in Melitz (2003), much of the literature focuses on the latter. Lowering tariffs differentially advantages the most productive firms, leading to aggregate productivity gains. In the process, exporters' size increase and non-exporters' size shrink, multinationals become larger and less productive domestic firms close shop, freeing resources for more productive enterprises. At the same time, because these firms are of different productivities, trade exacerbates inequalities. For variable cost barriers to trade, an increase in tariffs lowers the profits the most for the largest firms, as increases in variable costs disproportionately affect high volume sellers. As

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[4]See Krugman (1980).

[5]See Helpman and Krugman 1985.

a consequence, these models are consistent with the political interests assumed in the majority of the political science literature.[6]

As I show below, regulatory barriers operate under a different logic than do tariffs and traditional forms of protectionism. To the first order, increasing a fixed cost will raise the costs of every firm, and economic intuition would suggest that the main effect of such a cost would be negative for firm profits. However, rather than uniformly reduce foreign market access in the ways described by classic, competitive benchmark models of trade, adjustments from changes to regulatory barriers arise by changing the entry decisions of marginal firms.[7] Small firms may choose not to enter the market. As a result, the second order effect of the fixed cost on competition overwhelms the first order effect of raising costs, benefiting firms that are sufficiently productive, and altering the composition of trade toward the most productive firms.

This logic offers a significant alternative to prior assumptions about national preferences over trade policy in the presence of global production. The framework developed by Blanchard (2014) implies that governments have straightforward preferences over the composition of imports. Governments ought to increase the number of unaffiliated firms. This is because a government that wishes to maximize consumer surplus, producer surplus, and tariff revenue can use tariffs to shift foreign export revenues into domestic tariff coffers. Insofar as those foreign firms are unaffiliated with any domestic constituents, the full burden of those tariffs are borne by foreign agents. A government that has no local nodes of foreign production, no local presence of multinational supply chains has a free hand to manipulate world prices and reap

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[6]However, for a different take on non-tariff measures as per-unit costs see Osgood (2012).

[7]The fact that some firms benefit from entry barriers does not depend on some sort of *second best* situation. Even in the absence of any demand by consumers or the general public for regulation, the largest firms will benefit from fixed cost style regulations that harm their competition.

the benefits. The spread of global production complicates the government's strategy, internalizing the externality caused by the trade barrier. A strategic, terms of trade motivated government would thereby benefit the most from a shift in the composition of their imports to just those firms that are *only* engaged in export.

The model I develop below contrasts to the existing economic work on the effects of regulatory barriers on competition and profits of firms. Rogerson (1984) developed a model with an incumbent leader and a fringe of competitors who decide to enter after the leader commits to a certain output. In that model, increasing fixed costs helps deter fringe entrants, increasing the profits of the leader. Below, I develop a similar insight in the absence of a first mover advantage, when the only difference between firms is their productivity. This has the advantage of being directly related to a powerful insight in recent trade economics that very few firms engage in trade, without relying on a particular model of competition.

The comparative statics of the model show how non-tariff barriers can play an important role in shifting the composition of imports from unaffiliated to affiliated firms. If firms might engage in global production, a government's terms of trade manipulation is undermined. To exacerbate the terms of trade externality, governments would *lower* regulatory barriers to trade and induce entry of marginal foreign exporters who are unlikely to be able to source production abroad. By contrast, if governments have preferences in favor of multinationals, in which they seek investment, they would be likely to *raise* regulatory barriers, inefficiently closing out their domestic markets to foreign exporters in favor of connected and productive multinational firms. The following discussion raises this second possibility, and shows how such a barrier to trade would operate differently than would a tariff.

2.1.2 Heterogenous firms in a closed economy

This section develops a modeling framework in which regulatory barriers act as fixed costs of production. To do so, I first derive the consumption and production decisions of a closed economy with monopolistic competition and firm level heterogeneity. I then consider a simple open economy model, with two countries, in which firms can profit by exporting their variety, but face a fixed cost of export. In that setting, a universal rise in regulatory protection increases the profits of the most productive firms in the economy. The last section discusses how firms may choose either to export or to serve the foreign market by engaging in FDI.

The economy consists of consumers, entrepreneurs, and firms, each of whom is acting optimally, but not strategically. While there are $L > 0$ consumers and a potentially unlimited number of entrepreneurs, the number of firms that attempt to enter the market, $M_e \geq 0$, is determined endogenously. Goods are freely differentiable so the overall number of producing firms is equal to the number of varieties $\Omega \subset \mathsf{R}$. The following two sections derive the parameterized form of demand and firm profits from the first order conditions of consumers and firms utility and profit maximization.

Consumer Maximization: Suppose the preferences of a representative consumer are governed by a constant elasticity of substitution $\sigma > 1$. This elasticity determines the 'love of variety' over all of the individual varieties of goods $\omega \in \Omega$. The following CES function aggregates the quantity consumed of each variety $q(\omega) > 0$, $\omega \in \Omega$, and $\rho = \frac{\sigma-1}{\sigma}$.

$$U = \left[\int_{\omega \in \Omega} q(\omega)^\rho d\omega \right]^{\frac{1}{\rho}}$$

Consumers can purchase goods of variety ω at price $p(\omega)$, and maximize their consumption subject to a budget constraint, which sets total expenditures to be no

more than nominal income $R \geq 0$.

$$\int_{\omega \in \Omega} p(\omega)q(\omega)d\omega \leq R$$

In the appendix, I show that the solution to the consumer's maximization decision, subject to an aggregate budget constraint, generates the demand for each variety $q(\omega)$, and the amount of money spent on each variety $r(\omega) \geq 0$, as a fraction of overall demand.

$$q(\omega) = \frac{R}{P}\left(\frac{p(\omega)}{P}\right)^{-\sigma} \tag{2.1}$$

$$r(\omega) = R\left(\frac{p(\omega)}{P}\right)^{1-\sigma} \tag{2.2}$$

Where P is an aggregate price index, used to characterize the weighted prices of all the varieties in the market:

$$P \equiv \left[\int_{\omega \in \Omega} p(\omega)^{1-\sigma}d\omega\right]^{\frac{1}{1-\sigma}}$$

Producer Maximization: Production decisions q are made by a continuum of firms, each producing a variety $\omega \in \Omega$. In this case, every firm produces exactly one variety. Regulations impose costs on producers that do not depend on the quantity sold. As a result, in order to sell domestically each firm must pay an additional fixed cost, which here is interpreted to consist of startup-costs c as well as a production standard η, so that the total fixed cost $f \equiv c + \eta$.[8] Each firm's total cost, TC, is a

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[8]Since 1947, the National Treatment provisions of the GATT require that the government must treat products uniformly upon entry into a domestic market. For the purposes of evaluating challenges beyond open protectionism, this chapter limits attention to regulation which impose costs equally. Formally, regulations imply some level of $\eta > 0$ which is added to both the foreign and

function of fixed costs, $f \geq 0$ and their productivity, $\varphi \in [\varphi_{min}, \infty)$.[9]

$$TC(q, \varphi) = f + \frac{q}{\varphi}$$

In the Appendix, I show that producer profit maximization generates prices that are a constant markup over marginal cost.

$$p(\omega) = \frac{1}{\rho\varphi} \tag{2.3}$$

From (2.3), and the fact that each firm produces exactly one variety, we can identify firms directly by their productivity. Plugging in these prices from the endogenous price equation (2.3) into the demand equations (2.1), (2.2), the revenue of each firm and the profits (π) of each firm can be written as a function of endogenous price indexes and each firm's productivity.

$$q(\varphi) = RP^{\sigma-1}(\rho\varphi)^{\sigma}$$

$$r(\varphi) = R(P\rho\varphi)^{\sigma-1}$$

$$\pi(\varphi) = \frac{r(\varphi)}{\sigma} - f \tag{2.4}$$

2.1.3 Equilibrium market forces

Having derived the prices and profits as a function of productivity and exogenous demand parameters, we can now turn to ask how market forces shape the distribution

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domestic firm's fixed costs, rather than independently choosing the level of regulations on domestic and foreign products f and f^*_{exp}.

[9]We assume that each country is symmetric, and that wages w, are set equal to 1: $w = w^* = 1$.

of participants by affecting the entry and exit decisions of entrepreneurs and firms.

Endogenous Entry: Assume an unbounded number of entrepreneurs. Upon paying a sunk entry cost, $f_e > 0$, an endogenous number of entrepreneurs ($M_e \geq 0$) start a firm. Each then draws a productivity φ from a known distribution $g(\varphi)$ that has positive support over $[\varphi_{min}, \infty)$ and with cdf $G(\varphi)$.[10] Firms may exit immediately after learning their productivity. Surviving firms may be exogenously forced to exit, independently of productivity, at a probability $\delta > 0$. This constant exit rate, while unrealistic, allows analysis to focus on the composition of entrants. An entrepreneur decides whether or not to pay a fixed cost of entry based on the expected value of the discounted stream of future profits, v.

$$v(\varphi) = \max\{0, \sum_{t=0}^{\infty}(1-\delta)^t \pi(\varphi)\} = \max\{0, \frac{1}{\delta}\pi(\varphi)\} \qquad (2.5)$$

The lowest productivity level that allows a firm to survive is $\varphi^* \equiv \inf\{\varphi : v(\varphi) > 0\}$. All firms with productivity below that cut point will exit. The number of surviving firms is $M \geq 0$.

The endogenous distribution of productivity in surviving firms is denoted $\mu(\varphi)$:

$$\mu(\varphi) = \begin{cases} \frac{g(\varphi)}{1-G(\varphi^*)} & \text{if } \varphi \geq \varphi^* \\ 0 & \text{if } \varphi < \varphi^* \end{cases}$$

Definition Let the endogenous productivity cut off for entry be φ^* and distribution of firm productivities follow $\mu(\sigma)$ from above. Then $\tilde{\varphi}(\varphi^*)$ is a weighted average of

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[10]In order to ensure that the marginal firm productivity is at least as productive as the minimum productivity, $\frac{f}{\delta f_e} \geq \frac{1+k-\sigma}{\sigma-1}$.

all firm productivities, and is only a function of the cut point.

$$\tilde{\varphi}(\varphi^*) = \left[\frac{1}{1 - G(\varphi^*)} \int_{\varphi^*}^{\infty} \varphi^{\sigma-1} g(\varphi) d\varphi \right]^{\frac{1}{\sigma-1}} \tag{2.6}$$

The fact that the average firm productivities are only a function of the cutoff productivity levels offers a simple characterization of a dynamic economy, and is the principle metric of performance improvements in the overall economy. Economies also vary by the number of varieties that are available for consumers. The following equilibrium concept adds this second consideration to the model.

Equilibrium Concept: Stationarity Following Melitz (2003), we focus on a *stationary* economy in which the volume of firms entry and exit are equal:

$$(1 - G(\varphi^*))M_e = \delta M$$

Rather than characterize the dynamics explicitly, equilibrium is fully characterized by the mass of entrants (M_e) and the cutoff productivity (φ^*), which determines the average productivity. These two parameters can be parameterized under relatively standard economic assumptions: φ^* is determined by a zero cutoff profit condition and a free entry condition, defined below, and M_e is determined by market clearing.

2.1.4 φ^* and M_e under Pareto Distribution

To simplify equation (2.6), we can make specific functional assumptions about the exogenous distribution of productivity. In particular, I follow Helpman, Melitz and Yeaple (2004) and Chaney (2008) in imposing the Pareto distribution to simplify and solve the model. On that basis, it is possible to generate the following lemma:

Lemma 2.1.1. *Let $\tilde{\varphi}(\varphi^*)$ be the average productivity as defined above. If φ is distributed* Pareto *with support over $[\varphi_{min}, \infty)$ and dispersion parameter $k+1 > \sigma$, then $\tilde{\varphi}(\varphi^*)$ is a fixed proportion of the cut off productivity φ^*.*

$$\tilde{\varphi}(\varphi^*) = \left[\frac{k}{1+k-\sigma}\right]^{\frac{1}{\sigma-1}} \varphi^* \qquad (2.7)$$

Proof in Appendix.

There are two features of the Pareto distribution can help justify this distributional assumption. The first is that a Pareto distribution has a long tail, which fits broad facts about the concentration of export activity in a few firms. As the dispersion parameter $k > 0$ approaches 0, the distribution approximates a uniform distribution. As k rises, more firms draw low productivities, typical of the sorts of inequality observed in productivity of firms. The second is that the Pareto distribution is mathematically convenient, generating simple characterizations

To determine the equilibrium cut point, we use two conditions, the zero cutoff profit condition and the free entry condition.

Definition The *zero cutoff profit* (ZCP) condition sets the cutoff to the level that sets the profits of the firm at the cutoff to 0. At the cutoff firms should be indifferent between producing and exiting the market.

$$\pi(\varphi^*) = \frac{r(\varphi^*)}{\sigma} - f = 0$$

Definition The *free entry* condition (FE) requires that entry should occur until the present value of average profits are set to the fixed cost of entry. Given the expected profits induced by the cutoff level of productivity, entrepreneurs should be indifferent between entering and paying the fixed cost and staying out of the market.

$$\int_0^\infty v(\varphi)g(\varphi)d\varphi - f_e = 0$$

The Appendix reports that it is possible to use the parameterized forms of ZCP (2.11) and FE (2.12), to determine a unique endogenous cut point and average profits ($\bar{\pi}$) as a function of exogenous cost parameters: the fixed costs of production (f) and the fixed cost of entry (f_e), along with the parameters of the distribution of productivity that identify the dispersion parameter (k) and the minimum level of productivity (φ_{min}).

The resulting cutoff productivity is:

$$\varphi^* = \left[\frac{f}{\delta f_e}\left(\frac{\sigma - 1}{1 + k - \sigma}\right)\right]^{\frac{1}{k}} \varphi_{min} \tag{2.8}$$

Having determined φ^* and $\bar{\pi}$ as functions of exogenous parameters, we have the average productivity and the profits and revenue of each firm.

To determine how many varieties are on the market, we can use the following assumption that available resources are employed.

Definition *Market clearing* requires that aggregate expenditure is equal to aggregate revenue: $L = R$.

In the Appendix, I describe how that we can use (2.14) to characterize the mass of entering entrepreneurs as a function of average profits.

$$M_e = \frac{\delta}{1 - G(\varphi^*)}M = \frac{\delta}{1 - G(\varphi^*)}\frac{L}{\sigma(\bar{\pi} + f)} \tag{2.9}$$

Equations (2.8) and (2.9) fully characterize the closed economy stationary equilibrium.

2.1.5 Closed economy comparative statics

In this section, I consider some of the ways in which the equilibrium responds to changes in the exogenous parameters, particularly the fixed costs. First, we can show that increasing the fixed cost increases average profits:

Unsurprisingly, the endogenous productivity cutoff increases in the fixed cost:

$$\frac{\partial \varphi^*}{\partial f} = \frac{1}{fk} \left[\frac{f}{\delta f_e} \left(\frac{\sigma - 1}{1 + k - \sigma} \right) \right]^{\frac{1}{k}} \varphi_{min} > 0 \tag{2.10}$$

In general, average productivity is increasing in the cut off φ^*:

$$\frac{\partial \tilde{\varphi}(\varphi^*)}{\partial \varphi^*} = \frac{1}{\sigma - 1} [\tilde{\varphi}(\varphi^*)]^{2-\sigma} \left[\frac{g(\varphi^*)(\int_{\varphi^*}^{\infty} \varphi^{\sigma-1} g(\varphi) d\varphi - \int_{\varphi^*}^{\infty} \varphi^{*\sigma-1} g(\varphi) d\varphi)}{(1 - G(\varphi^*))^2} \right] > 0$$

This is because, $\forall \varphi^* > 0$ and for any density function g:

$$\int_{\varphi^*}^{\infty} \left(\frac{\varphi}{\varphi^*} \right)^{\sigma-1} g(\varphi) d\varphi > \int_{\varphi^*}^{\infty} g(\varphi) d\varphi$$

$$\iff \frac{\partial \tilde{\varphi}(\varphi^*)}{\partial \varphi^*} > 0$$

Increasing the fixed cost increases the cutoff profit level, which in turn drives out low productivity firms, and increases average productivity. However, even with higher productivity on average, the following novel proposition relates the profits of individual firms and the fixed cost, arguing that surviving firms benefit from the

reduction in the extensive margin.

Proposition 2.1.1. *Given CES utility, a Pareto productivity distribution with dispersion parameter $k > \sigma - 1$ and Lemma 2.1.1, there exists a level of productivity $\hat{\varphi}$ such that all firms with higher productivity benefit from an increase in the fixed cost of production.*

Proof in Appendix

Figure 2.1 displays this effect graphically, showing the consequence of a change in the fixed cost on firm profits at various levels of productivity. On the x-axis is the productivity of the firm. The profits of such a firm are plotted on the y-axis. To the left of the critical threshold, $\hat{\varphi}$, we see that the profits of firms drop. Because $\varphi^{*\prime} > \varphi^{*}$, we know that some firms that would have produced profitably instead are forced to exit. Above $\hat{\varphi}$, we can see an increase in profits. Note that the higher the productivity, the larger the benefit to the rise in the regulatory barrier. In contrast to the conventional wisdom, it is the smallest, most marginal firms that should be most opposed to regulatory protectionism.[11]

In the Appendix, I extend these results to an open economy to show that in a model with two identical economies, a universal decline of the fixed cost of export similarly benefits the top exporting firms. Interestingly, this change in profits arises because increasing the fixed cost to exporting *lowers* the threshold for domestic entry. As f_x rises, new firms enter, but these new domestic entrants are inefficient relative

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[11]Taking the cross-partial, we can verify that most productive firms benefit the most from an increase in the fixed cost.

$$\frac{\partial^2 \pi(\varphi)}{\partial f \partial \varphi} = (\sigma - 1)\frac{1 + k - \sigma}{k} f^{\frac{1-\sigma}{k}} \varphi^{\sigma-2} \left[\left[\frac{1}{\delta f_e} \left(\frac{\sigma - 1}{1 + k - \sigma} \right) \right]^{\frac{1}{k}} \varphi_{min} \right]^{1-\sigma} > 0$$

Figure 2.1: Graphical representation of Proposition 2.1.1
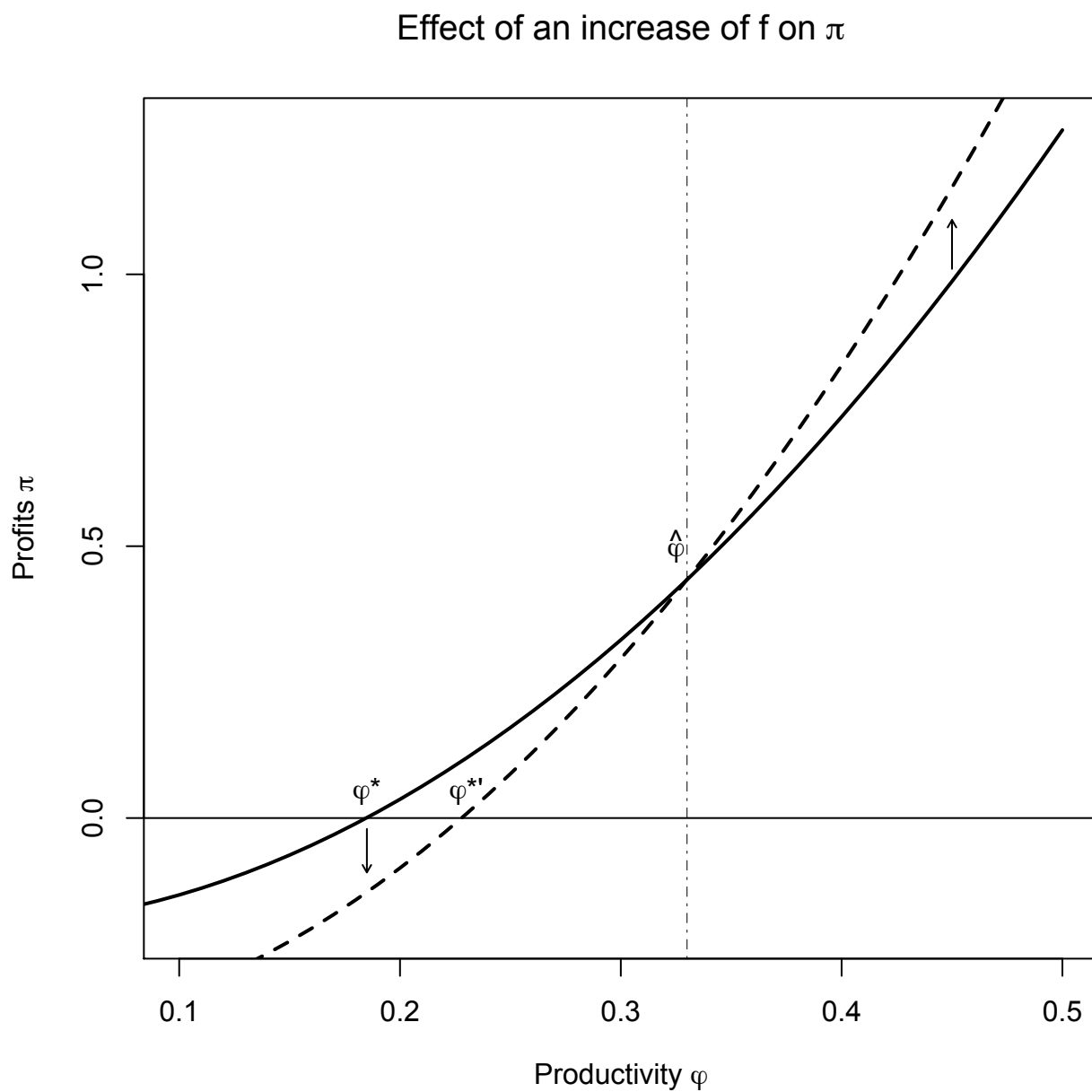
to those that were driven out from exporting, improving the profitability of the firms at the top of the productivity scale. Furthermore, I contrast these results to those of a tariff, and confirm that a tariff would in fact only lower the profits of the most internationally engaged firms.

Following the logic of Proposition 2.1.1, fixed costs may amplify the advantages of the largest firms by altering the conditions of competition, which I restate in the following claim.

C1: In industries with differentiated products and relatively dispersed productivities, the most productive firms benefit from regulations that act as entry barriers.

The claim is that the most internationally engaged firms would prefer regulatory barriers to trade, a significant revision to the political economy of trade. However, this claim is not without precedent in studies of firm interests in domestic regulation. Large, domestic incumbents influence the regulatory process to limit competition, resist price reductions, and restrict entry.[12] The domestic regulatory interests of firms leads Stigler (1971) to hypothesize that "every industry or occupation that has enough political power to utilize the state will seek to control entry."[13]

While the model presented above assumes firm specific productivity, the model could extend to a variety of firm specific assets and technologies to induce an interest in regulation. For example, in 1977, Congress passed controls on sulfur oxide emissions from power plants. Because of natural variation in the sulfur content of coal, regulation of the content of emissions advantages producers of low-sulfur content coal.

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[12]While government regulations are a principal target of anti-competitive strategy on the part of firms, other institutions, including unions, have been pressured to give one set of firms a leg up. A large literature explains that manipulating wage rates can be an effective barrier to entry, see Williamson 1968.

[13]See, Stigler (1971).

However, that coal is located in Western states. Eastern coal producers were able to lobby to ensure that the regulation, rather than requiring a level of air quality, instead required the installation of 'scrubbers' in the smokestacks of every plant. This alternative regulatory mechanism eliminates the advantages to low-sulfur, Western coal, leading Eastern coal producers and the United Mine Workers to join environmentalists in support the mandatory adoption of the scrubber technology.[14] Moreover, firms may advocate for regulations to improve the returns on unique technological assets. In the UK, for example, the National Association of Waste Disposal Contractors protested delays in the adoption of a new regulatory scheme. This scheme would drive the smallest, cheapest waste managers out of business, but allow the existing companies to take advantage in investments in environmentally friendly technology.[15] These examples suggest that firm specific assets can encourage the use of the regulatory process to limit competition. In light of this, some scholars argue that one should analyze new regulations "not as the result of a dialectic between consumers and producers, but at least in part as a result of (and a contributor to) the competitive balance within the industry."[16]

Finally, we may consider an extension to allow firms to serve foreign markets either by exporting or by engaging in foreign production, sometimes labeled horizontal FDI. The relative level of profits from each activity depend on the ordering of fixed costs. The first important and substantive assumption in this literature is that there is a strict ordering of the exogenous components of these fixed costs. Thus, following Antràs (2003), and Antràs and Helpman (2004), I assume that engaging in export requires an additional fixed cost to engaging in domestic production, and engaging in

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[14] Crandall 1982.

[15] The Economist January 8 1994 "Regulate Us Now Please".

[16] See Oster (1982).

foreign production requires an even higher fixed cost.

$$f < f_{exp} < f_I$$

In general, this ordering generates predictions that are broadly consistent with the productivity of firms engaged in export and foreign productions. Helpman, Melitz and Yeaple (2004) find that in 1996 U.S. firms that engaged in FDI had a 15% labor productivity advantage over exporters who did not engage in FDI, and the latter had a 39% labor productivity advantage over firms who engaged in neither export nor FDI.[17]

To summarize, a subset of firms find regulatory barriers to trade beneficial in terms of decreasing competition. The model presented in this chapter delineates conditions under which this competition effect outweighs the added costs of regulatory compliance, and identifies the general equilibrium dynamics for export and foreign production. These dynamics reveal that while businesses have many competing demands for their resources and attention, the use of government regulations as a barrier to entry is one of several non-market competition strategies open to firms. The discussion above focuses on how regulations generate market distorting externalities that benefit incumbent firms. These same regulations may also influence outcomes for actors within a given supply chain. The following section takes up this second externality to regulatory policy.

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[17]In future work, it would be interesting to show the applicability of Proposition 1 on these further forms of entry deterrence, not from exporting, but between modes of supply.

2.2 Contracting in Global Production

The previous section describes how regulations act as entry barriers to trade and investment for the establishment of domestic and multinational firms. But, this account obscures an important feature of global supply chains, the option to outsource production. As discussed in Chapter 1, not all firms engage in export, and the same is true of foreign production. Firms must choose where to produce and whether to attempt to export in response to their own fundamental productivity, as well as the costs of production such as the relative domestic and foreign wages and the ability to enforce contracts with suppliers. The analogy to trade frictions is that the inability to be able to monitor or enforce contracted production can lead to underinvestment in internationally supplied intermediate goods and services. Unlike a classic trade friction, the reason for this under-provision of investment is not that the value in the foreign sourced intermediates are lost to tariffs, or are otherwise excluded from full market access, but instead because of strategic hold-up by self-interested production partners. Production is tied into specific relationships that allow participants in the contract to extract rents by threatening to withhold investment in intermediate goods and services, a problem that arises because ex-ante contracts are incomplete.

Integrated multinational enterprises require the coordination of disparate nodes of the supply chain. Today, 60 million workers are employed in 3,500 processing zones spanning 130 countries. The investments necessary for these global value chains derive from two sources, the decisions of self-interested headquarters and manufacturer managers. Upon entry, each node of the supply chain invests in regulatory and non-regulatory fixed costs. These investments are subject to contracts which partially determine the division of costs and profits across the supply chain. The

contracts governing these relationship-specific investments are incomplete, allowing participants in the production network to hold-up final production. Scholars have pointed to the hold-up generated by incomplete contracts to explain why firms would pay the additional fixed costs associated with establishing an integrated multinational enterprise (Antràs (2003)). Because production contracts suffer from intra-firm externalities, firms make strategic decisions about investment, organization, and trade to substitute for enforcement of production contracts.[18] Much as entry barriers shift profits toward the most integrated firms, regulatory constraints on foreign investors can promote the use of foreign direct investment.

As a result, hold-up, if left unaddressed, can be a significant barrier to trade (Antràs and Staiger (2012)). Helpman (2006) illustrates this principle with a simple one sided hold-up model. Consider a headquarter firm that makes profits π_0 in the absence of a third party manufacturing contract, and profits π_1 when a specially manufactured input is provided by an input producer. The manufacture may also have an outside option, σ_0, either representing selling the input to another headquarters, or selling the material for scrap. The foreign produced input comes at cost c, but in the absence of contractual enforcement, there is no guarantee that the input is produced to specification. After the production and sale of the final good, the manufacturer and headquarters bargain over the ex-post profits. The solution to the game, both of the decision to use a manufactured input and then whether to invest in that input, is generated using backward induction.

To simplify the game, the final bargaining follows a Nash bargaining solution, which assumes an exogenous bargaining weight β, along with the outside options of

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[18]As a result, the regulatory reform found in trade agreements that expand the rights of headquarter firms to extract profits can end up *decreasing* FDI.

each agent. The outside options of the two actors (π_0 and σ_0) depend on where else the manufacturer could sell its intermediate products as well as the availability of other partners for the headquarters. The ex-post surplus is just the profits of successful contracting minus the opportunity costs; or $\pi_1 - \pi_0 - \sigma_0$ if inputs are successfully delivered, and $-\pi_0 - \sigma_0$ if the bargaining breaks down. Equilibrium payoffs in the bargaining stage for the headquarters (manufacturer) are just the outside option plus β, $(1 - \beta)$ share of the ex-post payoffs. If the manufacturer receives a payoff higher than c, then the supplier considers the relationship profitable and inputs are generated; if not, then hold up prevents a deal. These basic hold-up problem informs a literature on the effects of contracts and property rights in international trade. When both headquarters and manufacturing investment is required for final production, the extent of holdup depends on the relative intensity of each actor's input.

Following foundational work on the economics of contracting by Grossman and Hart, the allocation of ex-post profits from the successful completion of a contract can align incentives and avoid hold-up. Ex-post profits are allocated by ownership and managerial control (or independence), which can be matched to limit the ex-ante threat of hold-up. Multinational firms are formed to organize production in order to use ownership as a partial substitute for the limited capacity to enforce contracts (Antràs (2003)). This market mechanism is an explains why firms are willing to pay the additional costs associated with FDI, which is investment for the purpose of shifting management control toward the headquarter service producer.

An alternative mechanism, and the one at focus here, is that broader institutional arrangements, such as trade agreements, can shift the effective ex-post rents to accomplish a similar outcome, namely reducing the incentive to hold-up production.

On this account, regulatory barriers generate externalities for the ex-post realization of benefits from trade within the firm in trade partners, generating another rationale for regulatory cooperation. Moreover, unlike the externalities generated by entry barriers, which were limited to partner states, these barriers also impose externalities on third party markets. This is because the same conditions that improve the capacity for firms to produce in one partner's market undercut a third party's bargaining position. Global production undermines cooperative outcomes by generating network externalities across the international supply chain. This *contracting* view of international trade captures the fact that production and trade is increasingly concentrated in the hands of a few multinational firms. These contracting theories of the firm have been adapted to explain trade patterns and the variation in the extent of offshoring in the individual choices of firms, but these theories can also help explain the incentives behind regulatory liberalization and the consequence of regulatory liberalization on third parties.

Finally, in addition to trade agreements, the analysis proposed by Antràs and Staiger opens the door to consideration of other sources of bargaining strength, in this case the availability of outside options for production. Besides exercising ownership rights over manufacturing plants or ensuring better domestic contracting institutions, multinationals may threaten to shift production to third countries. On this account, trade agreements with provisions that set international property rights conditions are likely to improve headquarter bargaining position in third party markets.

2.2.1 The sourcing hypothesis of trade and investment

In the context of the theory discussed above, suppose that the headquarter must contribute an investment to obtain a product. This contribution introduces an opportunity for the headquarter to hold-up final production. Each input is somewhat complementary to the production process, an assumption usually characterized by a Cobb-Douglas utility function, in which each input provides some relative contribution of this service to final production. As a result profits would be a function of both the productivity of the firm, the foreign wages, and the headquarter investment.

The extent of hold-up depends on incentives of the headquarter to contribute to final production, which in turn depends on the proportion of ex-post revenue (β) that is retained from production. In the Antrãs (2003) framework, firms can use ownership contracts to choose an efficient β, either by engaging in FDI and taking full control of the foreign manufacturer (VI) or by engaging in an arms-length agreement (ALG). However, increasing levels of integration raises the startup costs associated with organization. Much as with export and the choice to produce abroad, engaging in complete integration comes with fixed costs, a portion of which depend on the regulatory environment. As with the decision to export or produce abroad, the relative level of profits from each activity depend on the ordering of fixed costs. Following Antràs (2003) and Antràs and Helpman (2004):

$$f < f_{exp} < f_{ALG} < f_{VI}$$

Firms are willing to pay the additional costs associated with ownership in order to limit the possibility of hold-up. In this case, the possibility of ownership would grant the headquarters the level of additional control necessary to justify investment.

This control allows the headquarter to threaten to fire the manager, and seize the production, at some cost. This threat is sufficient to leverage a larger share of the ex-post residuals, and ensures that the headquarter provides investment. In this framework, industries with high share of headquarter intensity are likely to require a higher β, or more assurances to the headquarters to ensure efficient investment.

These firm-level organizational remedies to hold-up substitute for contractual enforcement, but the usefulness of the strategy depends, in part, on the level of regulation. Generally the ability to enforce a contract is included under the general rubric of property rights. In this case, the relevant aspect of property rights are the rights individuals have to derive income from the good and service in question. Insofar as regulations alter the share of final goods that can be seized, or otherwise incentivize the headquarter to obtain a larger share of the ex-post revenue from production, these regulations will limit the incentives to pay the costs associated with foreign investment. Standards for production, investment restrictions, and even inspection programs can all influence the relative leeway that the headquarter and manufacturer have to retain profits, and thereby can incentivize deviations from the efficient level of investment. This leads to out second theoretical expectation.

C2: In headquarter intensive industries, regulatory changes in the host market that improve contractual completeness will encourage arms-length trade in place of foreign direct investment.

Firm interests in the share of overall profits should lead firms to substitute foreign direct investment for improved contract enforcement. In particular, by distinguishing between the interests of a MNC and the interests of the nodes of an MNC, we can see that regulations that affect contracts in favor of the headquarters of a company

may not promote investment. While all participants in a global supply chain have an interest in higher MNC profits, the allocation of those profits depend on intra-firm bargaining.

The previous two sections generate the main theoretical contributions of the thesis. The first section provides a lens to understand the competitive effects of regulation, by modeling regulatory costs as fixed costs. This section shows that regulation also affects competition within the firm. Given these firm level responses to governments, what are the implications for politics? To answer this question, the following section considers the *ex-ante* choice of governments to set regulatory barriers, balancing competitiveness concerns against traditional protectionist interests and public policy concerns.

2.3 Public policy and competition in regulatory decision making

How does the intra-industry and intra-firm consequences of regulatory protection affect the choices of national regulators? On the one hand regulations impose fixed costs that restrict entry. As was shown in section 2.1, these barriers benefit productive firms by reducing competition. As a consequence, governments balance the interests of public policy and large multinational firms that benefit from regulation against those of consumers and small to medium sized domestic firms that bear the costs of regulation - a competition externality. On the other hand, section 2.2 outlines how regulations also alter the ability for multinationals to effectively allocate

rents across the supply chain. In response, governments balance the interests of attracting investment and retaining a share of the profits - an allocation externality. This section takes up each of these effects in turn, asking how politically motivated governments, both in isolation, and then in an international environment will respond in this environment. The competition externality and the allocation externality both pose unique problems for international cooperation.

2.3.1 Competitive externalities

Unilateral Government Choice

What stake do governments have in consequences of regulation for the competitive environment of foreign firms? The above analysis suggests that regulatory protection has implications for competition that go beyond affecting the world price, allowing foreign firms that are very productive to take market share from marginal exporters and other less productive foreign firms. This section describes the economic conditions under which governments are likely to employ regulatory tools as barriers to trade.

Figure 2.4, in the back, describes the sequence of actions taken by domestic regulators and a foreign firm. Here a government regulator faces a choice of either a high or low fixed cost regulation and the firm faces a choice between exiting and producing abroad. As described in section 2.1, each firm receives a random endowment of productivity from nature, but the government is not aware of that outcome when making a regulatory choice.

Consider the *ex ante* decision of government regulators over two levels of regulation $\eta \in \{\eta_h, \ \eta_l\}$ in a single variety. This decision will be made in expectation of domestically located profits Π and public policy concerns ζ, each of which enters

government utility W. In the model described in section 2.1, the profits depend on a random realization of productivity on the part of the firm. Here we abstract from a full distribution of profits and consider two levels, high (ψ_h) and low (ψ_l), where high profits obtain with probability p_Π. Public policy concerns can take a large variety of forms, but here it is assumed that the extent of the regulatory demand is some function (ζ) of the products for sale on the domestic market, both those that are produced at home and those that are imported. This captures the notion that products made for export do not contribute to the extent of demand for domestic regulation. Finally, because public policy concern depends on the non-economic benefits of regulation, we allow an exogenous public policy shock, γ, which arrives with a probability p_γ.

$$W(\eta_r) = \Pi(\psi, \eta_r) + \zeta(f(\eta_r), f^*_{exp}(\eta_r), \gamma)$$

To maximize this utility governments will solve

$$\max_{\eta_r \in \{\eta_h, \eta_l\}} \mathrm{E}[W(\eta_r)] = \max_{\eta_r \in \{\eta_h, \eta_l\}} \mathrm{E}_\psi \Pi(\psi, \eta_r) + \mathrm{E}_\gamma \zeta(f(\eta_r), f^*_{exp}(\eta_r), \gamma)$$

Governments balance consumer and public policy concerns against the harm to producers. Because part of the consequence of regulation falls on foreign exporters, the η which would maximize joint surplus, $W(\eta) + W^*(\eta)$, will be lower than the level of regulation which would be unilaterally chosen by a government, for example engaging in 'green protectionism.'[19] As with tariffs and the now familiar manipulation of foreign market access, regulatory protection shifts profits from abroad toward domestic based firms. In contrast to that previous analysis, part of that shift occurs within

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[19]See an in depth discussion of policy substitution or green protection in WTO (2012).

the foreign market, as the composition of trade is shifted toward foreign firms that are engaged in global production. Governments share an interest in regulatory protection with foreign multinationals when those multinationals are engaged in some level of local production. In such a scenario, even if trade flows and overall market access remains the same, regulatory barriers to trade shift the composition and ownership of that trade toward varieties concentrated in MNCs. This finding is summarized in the following claim:

C3: Host governments will engage in regulatory protection in sectors characterized by globalized production in the local economy, hiring local workers, rather than exporting.

I expect that governments may not be equally opposed to all foreign commerce, and that there are reasons to prefer the products from productive MNCs over marginal exporters. This approach contrasts both with the market access based theories of protection, in which governments manipulate the terms of trade in order to expand exports and theories of dependence, in which governments oppose foreign investment to maintain national control and autonomy.[20]

International outcomes: undercutting reciprocal trade negotiation

To what extent does the competitive consequences of regulation pose a problem for international trade cooperation? In this section I consider two strategic governments with potential multinational activity, both of whom are members of the WTO. It is well established that in the absence of fixed cost considerations, countries do best by mutually reducing tariffs to a politically optimal level, while maintaining balance in concessions to avoid altering the relative price of each government's goods. Even

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[20]See Chapter 1.

when the governments manage to agree to bind their mutually 'politically optimal' level of market access in WTO negotiations, a measure which maintains that level of market access by shifting protection from variable cost tariffs to regulatory barriers to trade imposes an additional within-country externality. If a government has extra-territorial interest in the profits of multinational firms, it may purposefully use regulatory barriers to advantage one set of firms over another. In the following discussion, I provide a characterization of one such set of incentives, the desire to shift profits toward firms with local affiliates.[21]

Under the existing rules, if a regulatory barrier were to harm market access, it would provide the exporter the grounds for a case to submit to the WTO dispute resolution mechanism. Upon consideration of the evidence, the WTO Panelists and Appellate Body calculate the consequences for market access of exporting firms in the importing market. However, the WTO would not consider the additional concerns that the exporting government may have with the distributional consequences of the regulation, the relative capacity for large or small exporters firms to participate in trade. Should the WTO rule in the complainant's favor, the consequence could be that complainant may rescind its concessions in an equal amount as the harm, establishing a rough approximation of reciprocity. Again, in theory this mechanism would lower the price of the *importing countries* exports to a level that would advantage the harmed exporter. Insofar at that concession would fail to compensate the exporter for the distributional consequence in which firms could participate, the exporter would have had an ex ante incentive to not agree to the tariff agreement. The prospect for future regulatory barriers to trade, introduced by governments seeking to advantage

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[21]The analysis is similar to Blanchard (2007), except that the externality operates through the differential effects of the barrier, rather than through the reduced incidence of disruptions in the terms-of-trade.

multinational firms, will undermine the success of reciprocal negotiations for those products whose market participants benefit from the distributional consequences of regulatory barriers to trade.[22]

Government officials, seeking to maximize their chances of retaining office, craft economic policy to promote the interests of their electorate. In this case, some of those constituents may work for foreign firms and thereby share in the profits of international trade. These governments may employ non-tariff measures to shift profits toward these exporters in the foreign market, closing out the market for smaller unaffiliated firms. In response to these dual effects, foreign governments interests are in a complementary response, raising tariffs on those products. The resulting Nash equilibrium has both governments imposing barriers to trade in response to both market access considerations and profit shifting considerations. I characterize this expectation in the following claim.

C4: Host governments will be less likely to commit to concessions in trade agreements that do not offer compensation for regulatory protection.

The challenge for research is to ask what kinds of agreements, if any, might be able to resolve these joint externalities. The competitive externalities of regulations imply a confluence of interests between firms and the promotion of public policy goals. The exact nature of this baptist-bootlegger coalition is beyond the scope of this thesis, except to highlight the ways in which government regulatory choices have face validity as serving fundamental public policy needs. Governments are unlikely to enter into international arrangements that limit their capacity to address public policy concerns,

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[22]This threat of reneging has been an issue for theories of cooperation since Hobbes. However, the fact that an agreement might be difficult to enforce does not itself imply that cooperation is more difficult, bargaining can become more difficult if the final agreement is sure to be enforced (Fearon (1998)).

posing a challenge for international cooperation on regulatory matters.

2.3.2 Allocative externalities

Unilateral government choice

While the conflict of interest between the headquarters and the foreign manufacturer generates inefficiencies, host governments do not merely seek to eliminate those inefficiencies. Both home and host governments may not benefit from an efficient level of investment, because the contract which would ensure efficiency may shifts profits abroad. Host government regulators know that the ability for headquarter firms to retain profits is a necessary precondition for foreign investment and production, but the benefits of hosting global production depends on the extent to which investments and profits are retained by the local firm or affiliate. These preferences generate our fifth theoretical expectation.

C5: Host governments prefer regulations that promote inward investment but also limit the headquarter's bargaining position.

Governments do not have an unconditional incentive to advantage foreign direct investors, even when maximizing FDI is the goal.[23] FDI is costly to the individual firm, a cost that derives from the prospect of holdup by the foreign partner.[24] Host governments can and do use regulations to retain local control of production, such as requiring licenses or domestic partnerships, which improve the hold-up opportunities for subsidiary manufacturers. Instead of deterring foreign producers, these

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[23]See also, Gulotty (2011).

[24]Analysts often point to the preferences on the part of host governments for FDI over 'hot-money' to justify the use of aggregate FDI statistics as a metric of foreign production. While governments have reasons to value the fixed and substantive commitments associated with FDI, it is incorrect to assume that all investment is alike.

regulations promote the use of FDI to vertically integrate production. Thus, intra-firm bargaining determines global production contracts but it also gives firms and their host governments a strategic interest in the regulatory choices of their partner's governments.

As host governments become less interested in gaining a profit share of FDI and more interested in domestic growth or jobs, the outcome of this dynamic will change. Regulatory barriers are a mechanism to promote or deter FDI, independent although complementary of explanations which depend on particular political institutions or the ideological interests of government.[25]

International outcomes: third party bargaining

The tradeoffs between using regulatory barriers to induce foreign direct investment and the costs that such regulations impose on the overall producer surplus have created an incentive for governments to seek bilateral and multilateral arrangements on trade and investment rules. Negotiating these instruments again involves bargaining, no longer within a firm, but rather between host and home governments, over complex range of policy instruments. As discussed in Chapter 1, much of this negotiation occurs within the context of modern preferential trade agreements (PTAs). Below, I discuss how the allocative externality discussed above and governments interest in promoting their share of profits from global production, can lead to competition between host states. By offering better investment conditions than third markets, bilateral agreements advantage PTA members at the expense of third party host states.

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[25]See Marshall and Stone (2013) for an analysis of expropriation as a mechanism to promote investment, and Biglaiser, Li, Malesky, Pinto and Pinto (2012) for an in-depth and comprehensive analysis of the relative influence of MNCs on investment policies.

Consider three countries, one headquarter country H, and two potential manufacturing base countries, S1 and S2. In each, firms are engaged in several forms of trade and investment, with some portion of the firms organized as multinationals.[26] Examples may include Japan, Malaysia and Indonesia, the US, Taiwan and South Korea, or China, Peru, and Chile. While S1 and S2 may compete for investment, they may differ on other dimensions that can interact with their bargaining position. For example, S1 and S2 may vary by size and the productivity of their home market as well as their institutional protections for property rights, which not only improve the returns on a foreign investment, but also may generate differences in the size and importance of domestic firms. This second dimension, absent from the common property rights framework, allows government valuation of producer surplus in manufacturing countries to include the rents of local nodes of the global supply chains as well as solely domestically organized firms. For the purpose of discussion, we assume that S1 has a larger domestic economy, and more competitive domestic firms, than S2 does.

The following describes the bargaining process:

1. In the course of establishing a PTA, H and S1 bargain to set a level of property rights protection η_1, which is a function of attracting foreign manufacturing (offshoring) and the benefits of promoting local competition.

2. Firms set their expectations over profitability under a variety of organizational choices and decide whether to enter the market or not. Conditional on their choice and the decision to enter, firms pay an additional fixed cost for organizing abroad, increasing in the level of control sought over the subsidiary.

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[26]Note that this analysis focuses on host government competition. It is possible that headquarter states also compete for manufacturing markets, see (Manger (2009), Baccini and Dür (2010)).

Figure 2.2: Third party effects of bargaining over property rights
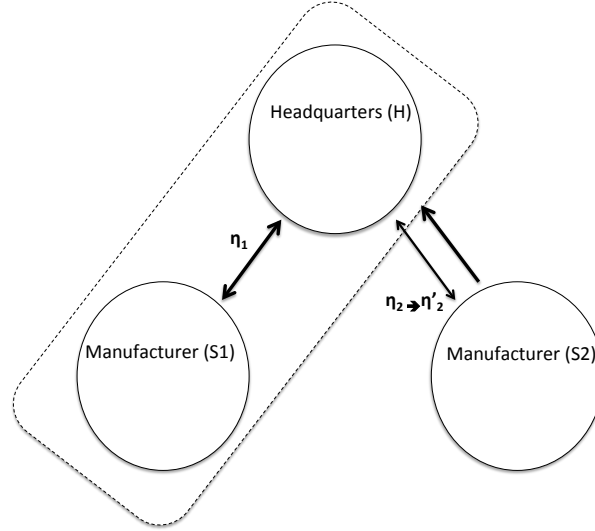
3. Manufacturers and Headquarters independently produce their inputs , subject to the ex-post control outlined by the contract decided in step 2.

4. Final good production occurs in H, and profits are realized and bargained over by the various manufacturers and headquarter plants. Some portion of profits are partially retained by governments.

The ex-post bargaining reflects the outside options of each firm. If the manufacturer fails to satisfy the contract, depending on the conditions of ownership, the headquarter firm may exert control over production and seize some part of the value of the production. The share that the headquarter firm is able to retain of the ex-post production depends on domestic conditions, here denoted δ_L, where $L \in \{H, S1, S2\}$ is the manufacturing location. In addition to the purely domestic factors, bargaining incorporates the protections agreed to in the PTA η as well as the choice of property

rights adopted in each of the other three locations.

The property rights regime embodied in a PTA enables headquarter firms to extract rents from the manufacturing plants, partially ameliorating underinvestment on the part of the headquarters. These property rights provisions may include investor protections, limits on inspections and standard setting, or intellectual property protections, each of which allows a greater degree of control on the part of the headquarter firm. The problem is that in the face of a PTA between H and S1, headquarter firms in H can demand a larger portion of the profits from their S2 subsidiary not only by firing the manager and receiving some residual production, but also by threatening to take their business to S1. In a sense, the relationship is not perfectly locked in when headquarters has the S1 outside option. This generates de facto bargaining power on the part of the headquarters and ensures a larger flow of profits H.[27] The threat to move production abroad is more credible, and the outside option more valuable, when the other partner has a PTA. The sources of bargaining power in the model are the sourcing regime (arm's length or outsourcing), and the location, where the location is not just at home or abroad, but a choice of two potential manufacturing bases.

This framework highlights the importance of star structures, or what is commonly referred to as a hub and spoke network structure. For example, figure 2.2 depicts a three country environment with one headquarter country and two manufacturers. Suppose that two countries commit to a set of property rights η_1 that divide rents

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[27]Although the principle works with symmetric manufacturing countries, in many cases there are asymmetries in the extent to which this third party effect would induce a PTA. For example, S1's preference over the choice of property rights, even in the absence of an agreement, would be higher than S2's because of the presence of domestic firms which would benefit from the better contracting environment. S2 would prefer a property rights regime that is less robust than S1 because they do not benefit from the prospect of building up domestic competition, and only lose out on the profits.

according to the relative inputs and power of the bargaining countries (Steinberg (2002)). Modern trade agreements, including the proposed Trans-Pacific Partnership (TPP) allow headquarter firms to consider production locations in third markets and make greater demands on existing partners. In the context of the TPP, the agreement has implications for the realization of benefits from existing agreements among the membership, such as the US-Chile FTA, which contained some commitments to property rights. In the diagram, the commitment made in the US-Chile agreement, η_2, will change as new potential manufacturing opportunities in Asia open up. The result is a decrease the bilateral bargaining strength of Chile at the expense of Chilean workers η_2'. In this sense the TPP will enhance the extractive nature of the US-Chile agreement.

If a PTA partner S1 expects H, he will be able to obtain a higher level of property rights in a subsequent agreement with S2; either the initial offer would reflect the expected loss in bargaining power, weakening the agreement, or the agreement would be initially deepened with the understanding that future negotiations would not be able to undercut the position. In the first scenario, the pro-investment effect of the agreement will be suppressed by the prospect of future negotiations. In the second scenario, the bargaining power associated with outside options contributes to a deeper agreement that is more favorable to H. In either case, the presence of potential third party partners shifts bargaining power, and provides headquarter governments with more leverage in negotiations.

These third party effects operate by raising the alternatives available to contracting parties across the supply chain, which implies that the externality is going to be most present when trade agreements are signed by alternative partner countries. Still,

the relevant pool of alternative countries depends on whether the trade agreement is designed to resolve a traditional market access concern or hold-up in an global production chain. A government may be a plausible future partner for vertical production relations if factor endowments and distance are favorable to the headquarter firm. If the trade relation is organized for horizontal and export platform trade then partners would be comparable in terms of their home market, or proximity to third markets. It is only the former that would exhibit holdup, and exert a negative externality on third parties. In either case, competition among host governments for the profits of global production suggests that the dyadic approach to studying PTA adoption is insufficient. I summarize this claim as follows.

C6: Host governments will compete for exclusive PTA relationships.

Third party externalities, such as the allocative externality above, arise across a number of contexts in international trade, not just when global producers are bargaining over profits, and not just when third parties are explicitly excluded. Even within classic accounts of WTO negotiations, the fact that a few countries sequentially negotiate tariffs can generate bargaining inefficiencies. Bagwell and Staiger show how the prospect of future negotiations among WTO members undercuts the willingness of WTO members to make significant concessions; ex ante, negotiators suffer from the possibility of being excluded from future gains. The adoption of a most favored nation clause, which assures future partners will get the same level of de jure trade policy, creates an incentive to limit initial concessions for the threat of later entrants enjoying the same market access.[28] However, because the principle problem facing third parties is the use of traditional trade barriers which limit their market access, renegotiation opportunities, including the *nullification and impairment* clause, are

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[28]See Bagwell and Staiger (2010).

sufficient to limit the consequences of sequential negotiations.

In the absence of renegotiation, the relationship between PTAs and multilateral arrangements depends on whether PTAs have positive or negative effects on non-members. Aghion, Antras and Helpman (2007) describe how a liberalization process with bilateral agreements is efficient in the face of *negative* externalities, while if PTAs induce positive externalities, one complete multilateral agreement is more efficient.[29] Accordingly, if modern PTAs shift investment from non-joiners, the competitive pressure to adopt bilateral arrangements will culminate in all governments being members of a grand global free trade coalition. This coalition structure assumes away how such a grand coalition would resolve the costs of multilateral bargaining. An alternative framework, developed in Furusawa and Konishi (2007), applies the network game theory in Jackson and Wolinsky (1996) to an international trade environment. Rather than adding members to a coalition, their analysis asks whether a global free trade network will grow from a sequence of bilateral ties. Compared with Aghion, Antras and Helpman, this model offers a pessimistic outlook for global free trade: while the conditions for stability of the complete free trade network are fairly permissive, the conditions for uniqueness end up being quite restrictive. If countries are asymmetric, plausible conditions exist in which the world splits into two or more blocks, and countries only establish PTAs within their respective block.

The substantive assumption behind the Bagwell and Staiger (2010), Aghion, Antras and Helpman (2007) and Furusawa and Konishi (2007) is that the principle goal of international economic cooperation is to enhance market access and limit

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[29]These counterfactual statements do not necessarily mean that states will adopt either strategy. Alternative formulations of the coalition problem endogenize the choice of between multilateralism and bilateralism, and find that the freedom to choose some forms of PTAs harms liberalization, as it allows reluctant, small, governments to exclude large countries (Saggi, Woodland and Yildiz (2013)). On this analysis, PTAs exacerbate the prior preferences of governments to engage in liberalization.

traditional tariff barriers. Under the allocative externality, however, trade is increasingly vertically integrated, and governments respond to the allocation of profits within multinationals.[30] This alternative goal of governments which focuses on the search for a large share of global profits, leads to the expectation that regulation would be designed to influence firm strategic decisions about investment, organization, and trade. In contrast to existing theories of PTA formation in which PTAs are a response to competition among exporters or potential investors, here competition occurs between manufacturers and host states. The same conditions that improve the capacity for firms to produce in a partner's market undercuts the bargaining position of firms in non-joining states. As a result, the interests of the multinational are not aligned with its component parts and governments are responsive to political conflict *within* the firm.

2.4   Theoretical Directions

This chapter focuses on the incentives generated by globalized producers interacting with host governments regarding entry barriers and organizational decisions as an explanation for the persistence of regulatory protection. Three claims are made. First, with regards to firm interests, the largest multinational firms benefit from anti-competitive regulations in destination markets. This implies a different coalition for and against liberalization of non-tariff measures than would operate for more traditional protectionist measures. Second, not only are regulatory barriers an important determinant of entry, regulatory decisions influence the endogenous choice

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[30]For other analysis of intra-firm motivations for trade policy, see Antràs and Staiger (2012) and Ossa (2010).

of the organization of production. Host governments can use regulatory policy to shift profits and investment across the supply chain, reducing the bargaining position of headquarter firms. The consequences of regulatory protection extend beyond the dyadic relationship to third parties, as improvements in extractive capacity by the headquarters in one host state can be used as leverage against other locations.

As discussed in Chapter 1, the existing rules of the multilateral trade system are designed to address distortions in market access. The fact that regulatory barriers to trade impose fixed costs means that trade barriers do not just limit trade volume, but rather affect the composition, and effective ownership of trade. As a result, governments will not be fully compensated if damages are measured in terms of national losses in trade volume or value. Beyond the problem this poses for measuring protectionism, monitoring compliance with trade deals, and calibrating enforcement, these compositional externalities can drive governments to enact regulatory protection. As the largest firms have an interest in using regulations as entry barriers, liberalization, and international cooperation, lose a prominent voice of support.

Examining the interests within a firm reveals a counter intuitive bargaining dynamic between headquarter and manufacturing nodes of the supply chain. The conflict of interest within the global supply chain offers a lens to understand why firms engage in FDI, and how the decision to organize production abroad is about more than taking advantage of low wages or proximity to markets. Focusing on the choices of global producers also helps explain the interests of host states, as they face a tradeoff between promoting efficient investment by the headquarters and retaining the profits of production locally.

This chapter focused on the interests of firms, governments and the challenges

this poses for international cooperation. Chapter 3 provides the evidence for these interests, focusing on a set of technical barriers to trade, while Chapter 4 establishes the third party consequences of preferential agreements. These two empirically oriented chapters illustrate the competitive and allocative externalities described above and provide a substantive justification to reevaluate the institutional design of the multilateral system.

2.5 Appendix

2.5.1 Melitz closed economy under Pareto Distribution

Derivation of CES consumer demand and expenditure

Consumer Maximization: Suppose the preferences of a representative consumer are governed by a constant elasticity of substitution $\sigma > 1$. This elasticity determines the 'love of variety' over all of the individual varieties of goods $\omega \in \Omega$. The following CES function aggregates the quantity consumed of each variety $q(\omega) > 0$, $\omega \in \Omega$, and $\rho = \frac{\sigma - 1}{\sigma}$.

$$U = \left[\int_{\omega \in \Omega} q(\omega)^\rho d\omega \right]^{\frac{1}{\rho}}$$

Consumers can purchase goods of variety ω at price $p(\omega)$, and maximize their consumption subject to a budget constraint, which sets total expenditures to be no more than nominal income $R \geq 0$.

$$\int_{\omega \in \Omega} p(\omega)q(\omega)d\omega \leq R$$

Demand is determined by solving the consumer's maximization decision, subject to an aggregate budget constraint. The following Lagrangian $\mathcal{L}$ defines the consumer's maximization problem:

$$\mathcal{L} = \left[\int_{\omega \in \Omega} q(\omega)^\rho d\omega \right]^{\frac{1}{\rho}} - \lambda[\int_{\omega \in \Omega} p(\omega)q(\omega)d\omega - R]$$

The consumer's first order condition:

$$\frac{\partial \mathcal{L}}{\partial q(\omega)} = U^{\frac{1}{\sigma}} q(\omega)^{\frac{-1}{\sigma}} - \lambda p(\omega) = 0$$

$$\Longleftrightarrow \quad q(\omega) = U\lambda^{-\sigma}p(\omega)^{-\sigma}$$

$$\Longleftrightarrow \quad p(\omega)q(\omega) = U\lambda^{-\sigma}p(\omega)^{1-\sigma}$$

Integrating, we can get the total nominal income R.

$$R = \int_{\omega \in \Omega} p(\omega)q(\omega)d\omega = U\lambda^{-\sigma}\int_{\omega \in \Omega} p(\omega)^{1-\sigma}d\omega$$

$$\Longleftrightarrow U\lambda^{-\sigma} = RP^{\sigma-1}$$

Where P is an aggregate price index:

$$P \equiv \left[\int_{\omega \in \Omega} p(\omega)^{1-\sigma}d\omega \right]^{\frac{1}{1-\sigma}}$$

Combining terms, we find that demand for each variety $q(\omega)$, and the amount of money spent on each variety $r(\omega) \geq 0$, is a fraction of overall demand.

$$q(\omega) = \frac{R}{P}\left(\frac{p(\omega)}{P}\right)^{-\sigma} \tag{2.1}$$

$$r(\omega) = p(\omega) * q(\omega) = R\left(\frac{p(\omega)}{P}\right)^{1-\sigma} \tag{2.2}$$

Derivation of prices: equation (2.3)

Producer Maximization: Prices are set for each variety by maximizing profit (π), subject to the demand function $q(\omega) = \left(\frac{p(\omega)}{P}\right)^{-\sigma}\frac{R}{P}$ and taking all other firms production decisions as given.

$$\pi(\omega) = p(\omega)q(\omega) - f - \frac{q(\omega)}{\varphi}$$

$$\pi(\omega) = p(\omega)^{1-\sigma} P^{\sigma-1} R - f - \frac{p(\omega)^{-\sigma} P^{\sigma-1} R}{\varphi}$$

$$\frac{\partial \pi(\omega)}{p(\omega)} = P^{\sigma-1} R \left[(1-\sigma)p(\omega)^{-\sigma} + \sigma\varphi^{-1}p(\omega)^{-\sigma-1} \right] = 0$$

$$p(\omega) = \frac{\sigma}{\sigma-1}\frac{1}{\varphi} = \frac{1}{\rho\varphi} \tag{2.3}$$

From (2.3), and the fact that each firm produces exactly one variety, we can identify firms directly by their productivity. Plugging in these prices from the first order condition (2.3) into the demand equations (2.1), (2.2), the revenue of each firm and the profits of each firm can be written as a function of endogenous price indexes and each firm's productivity.

$$q(\varphi) = R P^{\sigma-1}(\rho\varphi)^{\sigma}$$

$$r(\varphi) = R(P\rho\varphi)^{\sigma-1}$$

$$\pi(\varphi) = \frac{r(\varphi)}{\sigma} - f \tag{2.4}$$

Derivation of average productivity: lemma 2.1.1

Lemma 2.5.1. *Let $\tilde{\varphi}(\varphi^*)$ be the average productivity as defined above. If φ is distributed* Pareto *with support over $[\varphi_{min}, \infty)$ and dispersion parameter $k+1 > \sigma$, then $\tilde{\varphi}(\varphi^*)$ is a fixed proportion of the cut off productivity φ^*.*

Proof. Let CDF of the distribution G be distributed Pareto with a dispersion parameter k.

$$G(\varphi) = 1 - \left(\frac{\varphi_{min}}{\varphi} \right)^k$$

$$g(\varphi) = k(\varphi_{min})^k \varphi^{-(k+1)}$$

Plugging in these distributions into (2.6):

$$\tilde{\varphi}(\varphi^*) = \left[\left(\frac{\varphi^*}{\varphi_{min}} \right)^k \int_{\varphi^*}^\infty \varphi^{\sigma-1} k(\varphi_{min})^k \varphi^{-(k+1)} d\varphi \right]^{\frac{1}{\sigma-1}} \iff$$

$$\tilde{\varphi}(\varphi^*) = \left[k\varphi^{*k} \frac{\varphi^{*\sigma-k-1}}{1+k-\sigma} \right]^{\frac{1}{\sigma-1}} \iff$$

$$\tilde{\varphi}(\varphi^*) = \left[\frac{k}{1+k-\sigma} \right]^{\frac{1}{\sigma-1}} \varphi^*$$

$\square$

Derivation of the equilibrium productivities: φ^*

To determine the equilibrium cut point, we use two conditions, the zero cutoff profit condition and the free entry condition.

Definition The *zero cutoff profit* (ZCP) condition sets the cutoff to the level that sets the profits of the firm at the cutoff to 0. At the cutoff firms should be indifferent between producing and exiting the market.

$$\pi(\varphi^*) = \frac{r(\varphi^*)}{\sigma} - f = 0$$

Rewriting this condition with Lemma 2.1.1, combined with the fact that $\frac{r(\varphi_1)}{r(\varphi_2)} = \left(\frac{\varphi_1}{\varphi_2} \right)^{\sigma-1}$, we can characterize the ZCP as a simple function of exogenous parameters. The parameterization in (2.7) shows that average productivity only depends on the

cut off productivity. This allows us to write average profits ($\bar{\pi}$) as the profits of the average firm:

$$\bar{\pi} = \pi(\tilde{\varphi}(\varphi^*))$$

$$\bar{\pi} = \pi(\tilde{\varphi}) = \frac{r(\tilde{\varphi})}{\sigma} - f$$

$$\bar{\pi} = f\left(\left(\frac{\tilde{\varphi}(\varphi^*)}{\varphi^*}\right)^{\sigma-1} - 1\right)$$

$$\bar{\pi} = f\left(\frac{\sigma - 1}{1 + k - \sigma}\right) \tag{2.11}$$

Definition The *free entry* condition (FE) requires that entry should occur until the present value of average profits are set to the fixed cost of entry. Given the expected profits induced by the cutoff level of productivity, entrepreneurs should be indifferent between entering and paying the fixed cost and staying out of the market.

$$\int_0^\infty v(\varphi)g(\varphi)d\varphi - f_e = 0$$

Using (2.5) we can rewrite the FE condition as a function of the endogenous cut off profits:

$$\int_0^\infty v(\varphi)g(\varphi)d\varphi = [1 - G(\varphi^*)]\frac{1}{\delta}\int_{\varphi^*}^\infty \pi(\varphi)\mu(\varphi)d\varphi = [1 - G(\varphi^*)]\frac{1}{\delta}\bar{\pi}$$

$$\bar{\pi} = \frac{\delta f_e}{1 - G(\varphi^*)}$$

$$\bar{\pi} = \frac{\delta f_e}{\left(\frac{\varphi_{min}}{\varphi^*}\right)^k} \tag{2.12}$$

Finally, using the parameterized forms of ZCP (2.11) and FE (2.12), we determine a unique endogenous cut point as a function of exogenous parameters:

$$f\left(\left(\frac{\tilde{\varphi}(\varphi^*)}{\varphi^*}\right)^{\sigma-1} - 1\right) = \frac{\delta f_e}{1 - G(\varphi^*)}$$

$$f\left(\frac{\sigma - 1}{1 + k - \sigma}\right) = \delta f_e \left(\frac{\varphi_{min}}{\varphi^*}\right)^{-k}$$

$$\varphi^* = \left[\frac{f}{\delta f_e}\left(\frac{\sigma - 1}{1 + k - \sigma}\right)\right]^{\frac{1}{k}} \varphi_{min} \tag{2.13}$$

Definition *Market clearing* requires that aggregate expenditure is equal to aggregate revenue: $L = R$.

Noting that aggregate revenue is just M times the average revenue, we can rewrite the aggregate revenue, R, as a function of average revenue. From the formula for firm profits (2.4), we can rewrite average revenue as a function of average profits and the fixed cost.

$$L = R = M\bar{r} = M(\sigma(\bar{\pi} + f)) \tag{2.14}$$

From the definition of the stationarity equilibrium concept, we can use (2.14) to characterize the mass of entering entrepreneurs.

$$M_e = \frac{\delta}{1 - G(\varphi^*)} M = \frac{\delta}{1 - G(\varphi^*)} \frac{L}{\sigma(\bar{\pi} + f)} \tag{2.9}$$

Equations (2.8) and (2.9) fully characterize the closed economy stationary equilibrium.

2.5.2 Proof of Proposition 2.1.1

Proposition 2.5.1. *Given CES utility, a Pareto productivity distribution with dispersion parameter $k > \sigma - 1$ and Lemma 2.1.1, there exists a level of productivity $\hat{\varphi}$ such that all firms with higher productivity benefit from an increase in the fixed cost of production.*

Proof. Using the formulation of profits (2.4) the ZCP (2.11) and the endogenous cut point (2.8), we can write profits as a function of exogenous parameters:

$$\pi(\varphi) = \frac{r(\varphi)}{\sigma} - f$$

$$\pi(\varphi) = \left(\frac{\varphi}{\varphi^*}\right)^{\sigma-1} f - f \tag{2.15}$$

From (2.15) we can consider the effect of a change in the fixed cost of production:

$$\frac{\partial \pi(\varphi)}{\partial f} = \left(1 + f\varphi^*(f)^{-1}(1-\sigma)\frac{\partial \varphi^*(f)}{\partial f}\right)\left(\frac{\varphi}{\varphi^*(f)}\right)^{\sigma-1} - 1$$

Given the Pareto distribution and (2.10) this equation can be simplified:

$$\frac{\partial \pi(\varphi)}{\partial f} = \frac{1+k-\sigma}{k}\left(\frac{\varphi}{\varphi^*}\right)^{\sigma-1} - 1$$

Finally, $\frac{\partial \pi(\varphi)}{\partial f} > 0$ if the firm's productivity draw is higher than some productivity threshold $\hat{\varphi}$:

$$\varphi > \left(\frac{k}{1+k-\sigma}\right)^{\frac{1}{\sigma-1}} \varphi^* \equiv \hat{\varphi}$$

Because $k > 1 + k - \sigma > 0$, $\hat{\varphi}$ is *higher* than the cutoff profit level: $\hat{\varphi} > \varphi^*$. The firms with profit levels $\varphi \in [\varphi^*, \hat{\varphi}]$, will remain in the market but receive lower profits under a higher fixed cost. $\square$

2.5.3 Melitz open economy

Opening the economy to trade allows firms to profit from exporting on top of serving the domestic economy. Assuming that there are two identical economies, we can write profits as a linear function of revenue at home ($r_d(\varphi)$) and revenue from abroad ($r_x(\varphi)$). To sell abroad, assume there is a fixed cost $f_x \geq 0$ and a tariff $\tau \geq 1$. Following Melitz (2003), we can write the combined revenue of the firm, $r(\varphi)$, depending on the firm's export status:

$$r(\varphi) = \begin{cases} r_d(\varphi) = R(P\rho\varphi)^{\sigma-1} & \text{if the firm does not export.} \\ r_d(\varphi) + r_x(\varphi) = (1+\tau^{1-\sigma})r_d(\varphi) & \text{if the firm does export.} \end{cases}$$

Similarly, each exporting firm's profits can be divided into profits earned from domestic sales and export sales:

$$\pi_d(\varphi) = \frac{r_d(\varphi)}{\sigma} - f$$

$$\pi_x(\varphi) = \frac{r_x(\varphi)}{\sigma} - f_x$$

Again, the cutoff level of productivity is set by the ZCP and FE. There are two cutoffs, a cutoff for entry (φ_d^*), and a cutoff for export (φ_x^*). The ZCP condition sets the cutoff to the level that sets the profits of the firm at the point of participation to 0, but this will be a function of separate cutoffs for domestic sales and export activity.

$$\bar{\pi} = \pi_d(\tilde{\varphi}_d) + p_x \pi_x(\tilde{\varphi}_x)$$

$$= \frac{r_d(\tilde{\varphi}_d)}{\sigma} - f + p_x(\frac{r_x(\tilde{\varphi}_x)}{\sigma} - f_x)$$

$$= f((\frac{\tilde{\varphi}_d}{\varphi_d^*})^{\sigma-1} - 1) + p_x f_x((\frac{\tilde{\varphi}_x}{\varphi_x^*})^{\sigma-1} - 1)$$

Where p_x is the probability of export, conditional on having produced:

$$p_x = \frac{1 - G(\varphi_x^*)}{1 - G(\varphi_d^*)} = \left(\frac{\varphi_d^*}{\varphi_x^*}\right)^k$$

Using the ratios of the zero profit conditions, it is possible to show that the cutoff for export can be written as a function of the cutoff for domestic production, the fixed costs, and the tariff, which allows us to write the probability of export as just a function of fixed costs and tariffs.

$$\left(\frac{\varphi_x^*}{\varphi_d^*}\right)^{\sigma-1} = \tau^{\sigma-1}\frac{f_x}{f}$$

$$\frac{\varphi_x^*}{\varphi_d^*} = \tau \left(\frac{f_x}{f}\right)^{1/(\sigma-1)}$$

$$p_x = \tau^{-k} \left(\frac{f_x}{f}\right)^{-k/(\sigma-1)}$$

Finally, the average productivity of exporters is:

$$\tilde{\varphi}_x = \left[\frac{1}{1 - G(\varphi_x^*)} \int_{\varphi_x^*}^{\infty} \varphi^{\sigma-1} g(\varphi) d\varphi \right]^{1/(\sigma-1)}$$

$$\tilde{\varphi}_x = \left[\left(\frac{\varphi_x^*}{\varphi_{min}} \right)^k \int_{\varphi_x^*}^{\infty} \varphi^{\sigma-1} k (\varphi_{min})^k \varphi^{-(k+1)} d\varphi \right]^{1/(\sigma-1)}$$

$$\tilde{\varphi}_x = \left[k(\varphi_x^*)^k \int_{\varphi_x^*}^{\infty} \varphi^{\sigma-2-k} d\varphi \right]^{1/(\sigma-1)}$$

$$\tilde{\varphi}_x(\varphi_x^*) = \left[\frac{k}{1 + k - \sigma} \right]^{\frac{1}{\sigma-1}} \varphi_x^*$$

Putting it all together, we can rewrite the ZCP as follows:

$$\bar{\pi} = (f + \tau^{-k} \left(\frac{f_x}{f} \right)^{-k/(\sigma-1)} f_x)(\frac{k}{1 + k - \sigma} - 1)$$

Combining the ZCP condition with the FE condition, we can nail down the productivity threshold for the open economy:

$$(f + \tau^{-k} \left(\frac{f_x}{f} \right)^{-k/(\sigma-1)} f_x)(\frac{k}{1 + k - \sigma} - 1) = \delta f_e \left(\frac{\varphi_{min}}{\varphi_d^*} \right)^{-k}$$

$$\varphi_d^* = \left(\left(1 + \tau^{-k} \left(\frac{f}{f_x} \right)^{\frac{1+k-\sigma}{\sigma-1}} \right) \frac{f}{\delta f_e} \left(\frac{\sigma - 1}{1 + k - \sigma} \right) \right)^{\frac{1}{k}} \varphi_{min}$$

2.5.4   Open economy comparative statics

Melitz (2003) Appendix E.1 shows that, in contrast to the closed economy case, increasing the fixed cost to export *decreases* the domestic productivity cutoff.

$$\frac{\partial \varphi_d^*}{\partial f_x} = \frac{-1}{k}\left(\left(1 + \tau^{-k}\left(\frac{f}{f_x}\right)^{\frac{1+k-\sigma}{\sigma-1}}\right)\frac{f}{\delta f_e}\left(\frac{\sigma-1}{1+k-\sigma}\right)\right)^{\frac{1-k}{k}}\varphi_{min}\tau^{-k}\frac{1}{\delta f_e}\left(\frac{f}{f_x}\right)^{\frac{k}{\sigma-1}} < 0$$

The following figure (2.3) plots a discrete change in f_x for equilibrium domestic entry conditions. On the x-axis is a range of productivity draws, and on the y-axis is the subsequent average profits as determined by the free entry condition and the zero profit condition. The intersection of the FE condition and the ZPC condition determines the equilibrium domestic cutoff productivity. A rise in f_x for both countries leads to a fall in the ZPC line, which in turn lowers the threshold for domestic entry. This is because raising f_x decreases foreign competition in the home market, allowing weak domestic firms to stay in the market.

Using this formulation of the endogenous cut point and the symmetry of the two economies, we can write profits as a function of exogenous parameters:

$$\pi(\varphi) = \pi_d(\varphi) + \pi_x(\varphi)$$

$$= \frac{r_d(\varphi)}{\sigma} + \tau^{1-\sigma}\frac{r_d(\varphi)}{\sigma} - f - f_x$$

$$= (1 + \tau^{1-\sigma})f(\frac{\varphi}{\varphi_d^*})^{\sigma-1} - f - f_x$$

Given the endogenous cut point, it is possible to take direct comparative statics with regard to the fixed costs of export:

$$\frac{\partial \pi(\varphi)}{\partial f_x} = (1 - \sigma)(1 + \tau^{\sigma-1})f(\varphi)^{\sigma-1}\varphi_d^{*-\sigma}\frac{\partial \varphi_d^*}{\partial f_x} - 1$$

Figure 2.3: Effect of Regulatory Barriers on Equilibrium φ_d^*

Effect of an increase of f_x on φ_d*
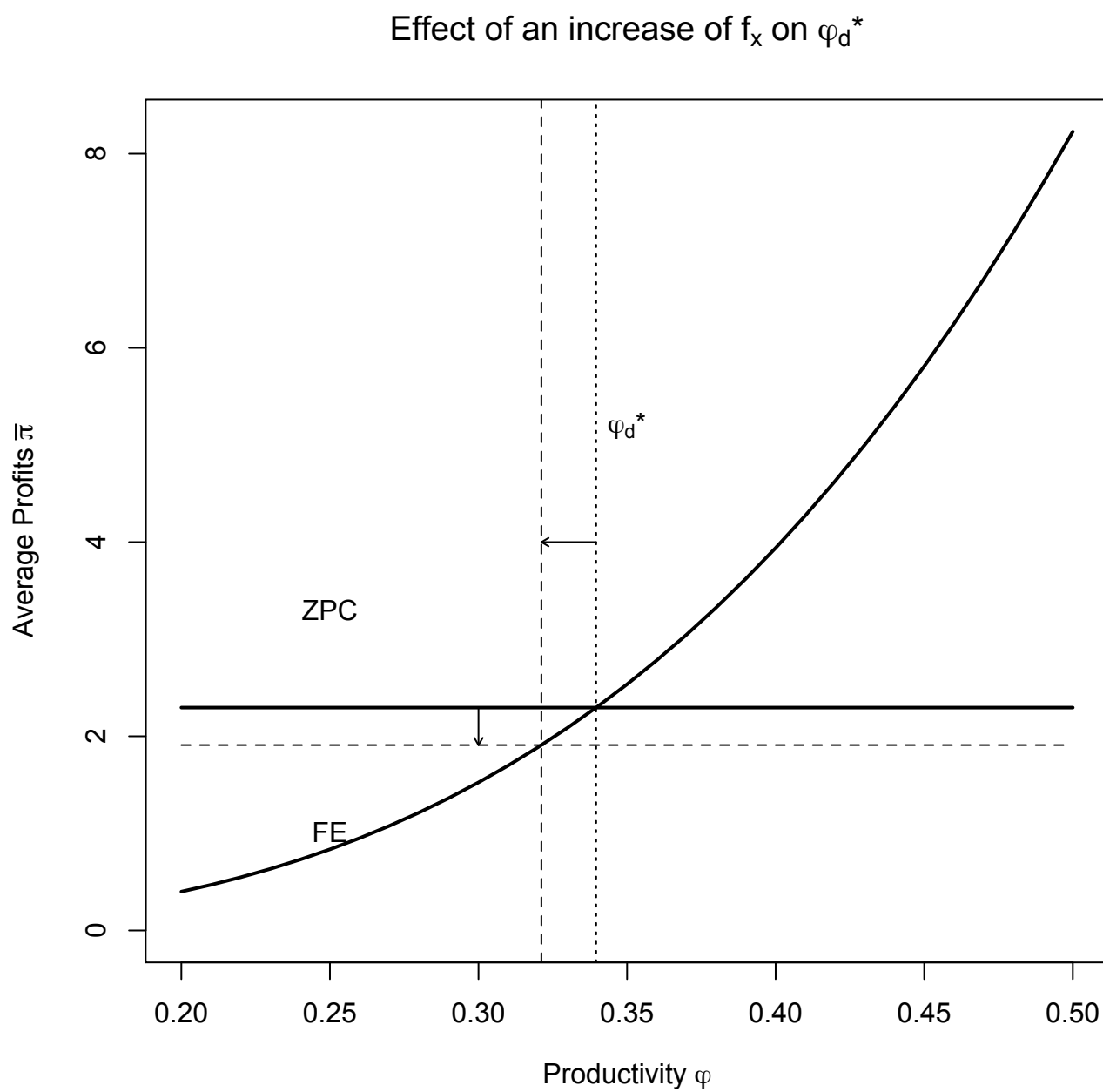
Note that in this case, $\frac{\partial \varphi_d^*}{\partial f_x} < 0$. Again, $\frac{\partial \pi(\varphi)}{\partial f_x} > 0$ if the firm's productivity draw is sufficiently high:

$$\varphi > \left((1-\sigma)(1+\tau^{\sigma-1}) f \varphi_d^{*-\sigma} \frac{\partial \varphi_d^*}{\partial f_x} \right)^{\frac{-1}{\sigma-1}}$$

This suggests that the top producers in an economy are able to directly benefit from an increase in the fixed cost to export to a destination market. Interestingly, this change in profits arises because increasing the fixed cost to exporting *lowers* the threshold for domestic entry. These new domestic entrants are inefficient relative to those that were driven out from exporting, improving the profitability of the firms at the top of the productivity scale.[31]

Finally, considering a change in the tariff, we can see that the change in profits does not depend on productivity. Moreover, as is well known in these models, an increase in any tariff $\tau > 1$ will lower *all* exporting firm profits so long as there are at least some firms for whom exporting is more costly than producing domestically. So long as at least some firms do not export, tariffs harm the profits of all exporting firms.[32]

Proof. From the equation for profits, we can take the partial derivative with respect to the tariff τ.

$$\pi(\varphi) = (1+\tau^{1-\sigma}) f \left(\frac{\varphi}{\varphi_d^*} \right)^{\sigma-1} - f - f_x$$

$$\frac{\partial \pi(\varphi)}{\partial \tau} = (1-\sigma) f \varphi^{\sigma-1} \varphi_d^{*-\sigma} \left(\tau^{-\sigma} \varphi_d^* + \tau^{1-\sigma} \frac{\partial \varphi_d^*}{\partial \tau} + \frac{\partial \varphi_d^*}{\partial \tau} \right) < 0 \iff$$

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[31] In addition, the top producers also benefit increasingly from fixed cost to export: $\frac{\partial^2 \pi(\varphi)}{\partial f_x \partial \varphi} > 0$.

[32] See also, Melitz and Redding (2015).

$$\tau^{-\sigma} \varphi_d^* > -(1 + \tau^{1-\sigma}) \frac{\partial \varphi_d^*}{\partial \tau}$$

Note that raising tariffs does in fact lower the threshold to domestic entry:

$$\frac{\partial \varphi_d^*}{\partial \tau} = - \left(\left(1 + \tau^{-k} \left(\frac{f}{f_x} \right)^{\frac{1+k-\sigma}{\sigma-1}} \right) \frac{f}{\delta f_e} \left(\frac{\sigma-1}{1+k-\sigma} \right) \right)^{\frac{1-k}{k}} \varphi_{min} \tau^{-k-1} \frac{f}{\delta f_e} \left(\frac{f}{f_x} \right)^{\frac{1+k-\sigma}{\sigma-1}}$$

Plugging in the partial derivative with respect to τ, we find sufficient conditions for a negative marginal effect of the tariff.

$$\tau^{1-\sigma+k} \varphi_d^* >$$

$$(1+\tau^{1-\sigma}) \left(\left(1 + \tau^{-k} \left(\frac{f}{f_x} \right)^{\frac{1+k-\sigma}{\sigma-1}} \right) \frac{f}{\delta f_e} \left(\frac{\sigma-1}{1+k-\sigma} \right) \right)^{\frac{1-k}{k}} \varphi_{min} \frac{f}{\delta f_e} \left(\frac{\sigma-1}{1+k-\sigma} \right) \left(\frac{f}{f_x} \right)^{\frac{1+k-\sigma}{\sigma-1}}$$

$$\iff \tau > \left(\frac{f}{f_x} \right)^{\frac{1}{\sigma-1}}$$

$\square$

Figure 2.4: Regulatory Game
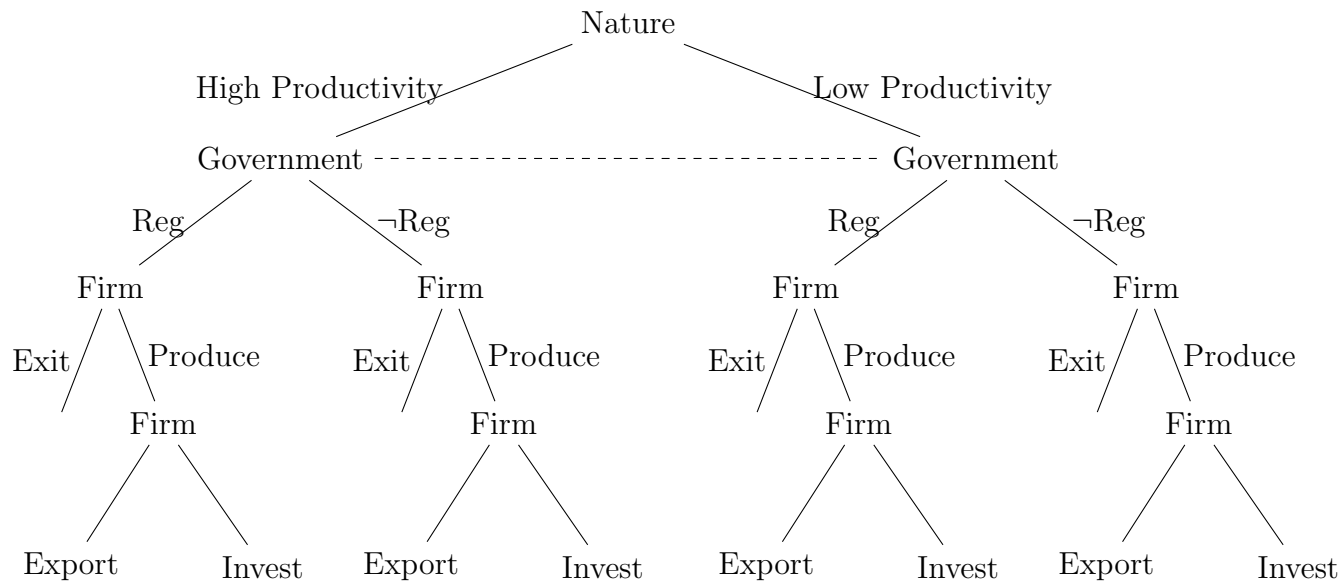
Chapter 3

Regulatory Protection and Cooperation

The previous chapter posited a relationship between the interests of global producers, the choices of governments, and outcomes for international cooperation. This chapter takes up three 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 in the context of preferential agreements.

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 regulation, 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.[1] 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 negations.[2] 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 of 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 order to examine the interests of firms regarding regulatory barriers to trade, I

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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.

first develop 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 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.[3] 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:

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[3]Pascal Lamy, the Director General of the WTO (Lamy (2012)).

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. 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.[4] 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.[5] 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 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

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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.

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.[6] 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 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

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[6]See WTO (2012), pg. 120.

Figure 3.1: Language of Technical Barriers
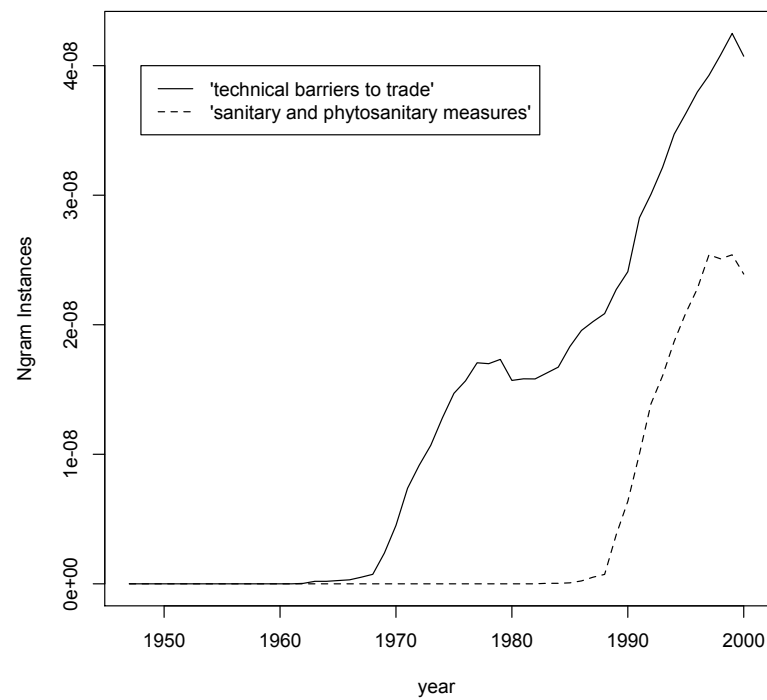
Data derived from the Google Books Ngram Viewer using the English corpus (Michel et al. (2011)).

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.[7]

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

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[7]See WTO (2012).

Figure 3.2: TBT Notifications
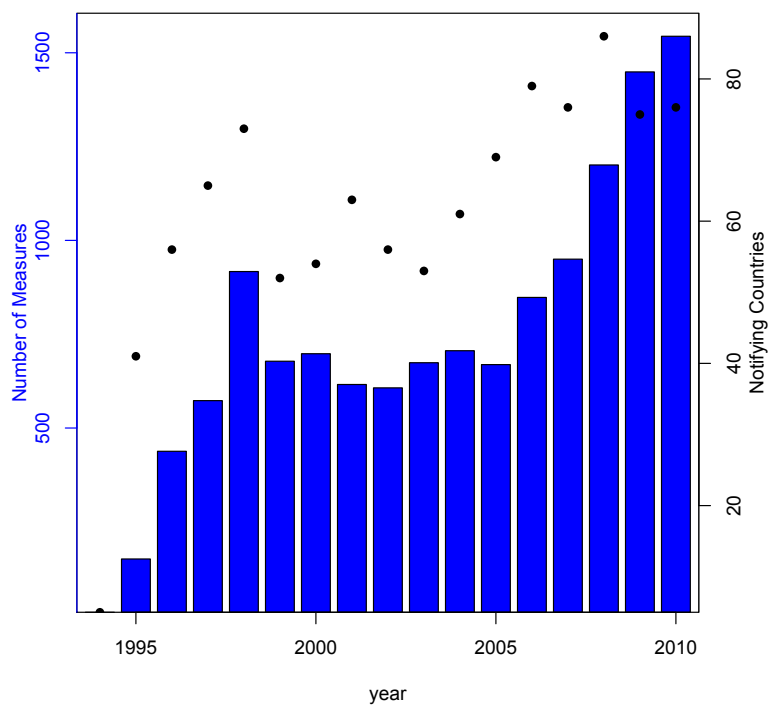
TBT notifications obtained from the World Trade Report 2012, WTO (2012). The blue bars represent the number of measures (left axis) while the black dots represent the number of notifying countries (right axis).

threat, many governments do notify regulatory changes. Figure 3.3 organizes each of these notifications into the top 25 governments from 2012-2013.

Figure 3.3: NIST Notifying Governments
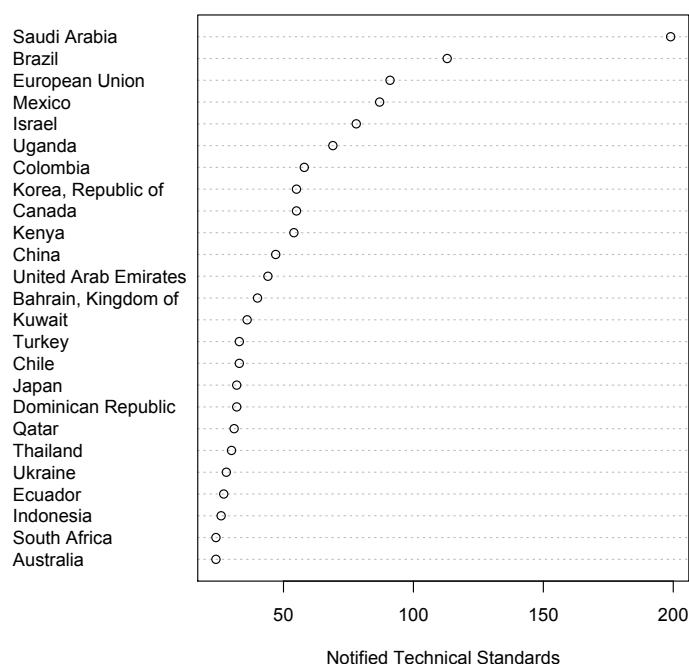
Data aggregated from the US National Center for Standards and Certification Information in the National Institute of Standards and Technology (NIST) from 2012-2013. Note the NIST does not distribute US notifications.

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

Figure 3.4: ITC Burdensome Measures

Average Measure

Percentage

Trade Weighted Average

Percentage
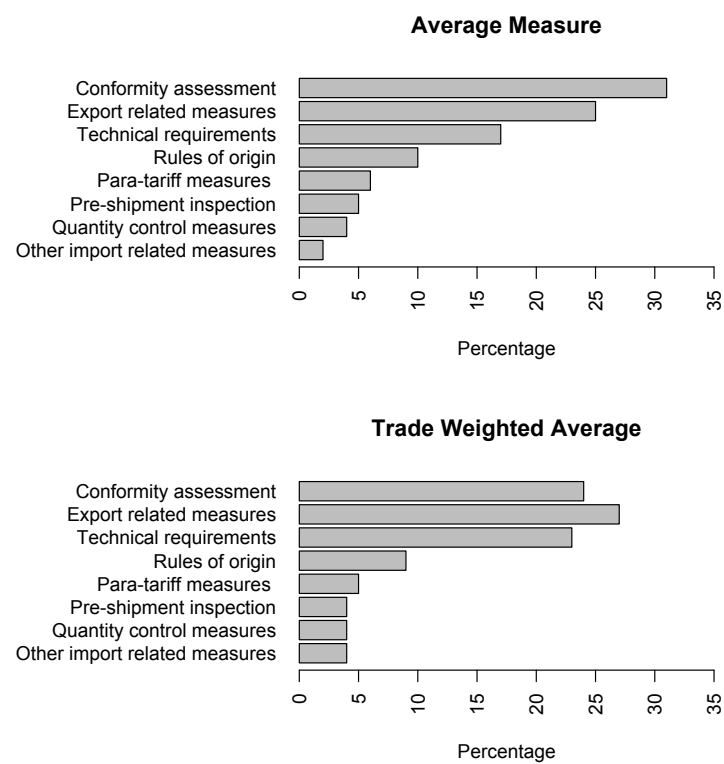
ITC measures reported in the World Trade Report 2012, WTO (2012)

which are easily communicated. For 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
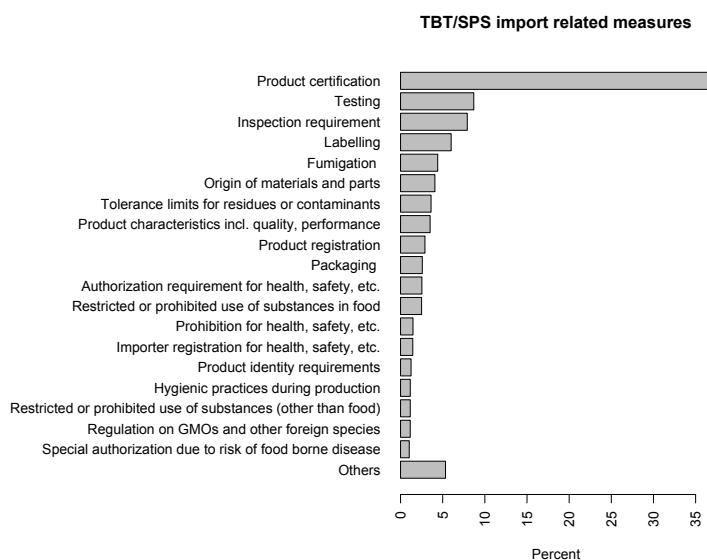
ITC measures cited in the World Trade Report 2012, WTO (2012)

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. Figure 3.6 displays the coverage of these concerns by the government responsible for the measure.

Figure 3.6 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 3.7 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

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[8]See, Crivelli and Gröschl (2012).

Figure 3.6: TBT Notification Coverage

TBT coverage
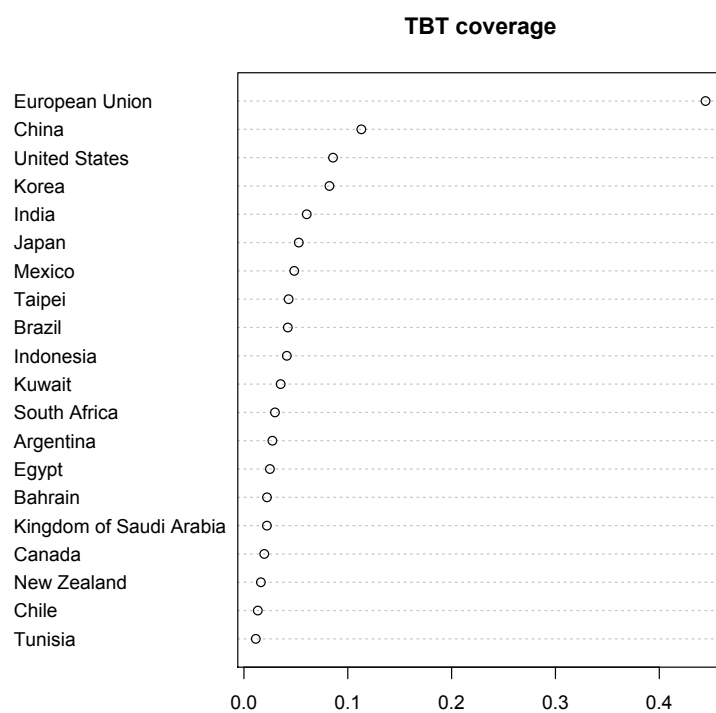
TBT notifications are available on the WTO website, and analyzed for the World Trade Report 2012 (WTO (2012)).

Figure 3.7: TBT Specific Trade Concerns
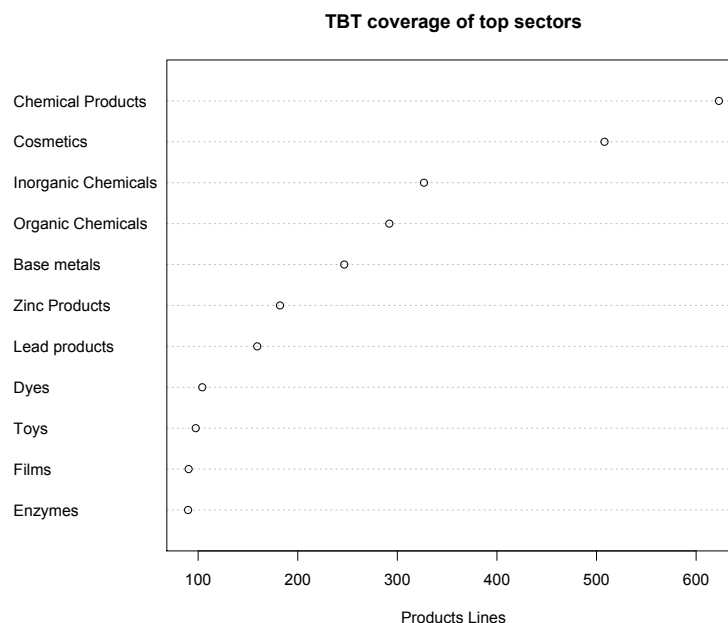
Sector labels taken from the US tariff schedule (WTO (2012)).

China.

The next sections examine one prominent European TBT in depth: the reform of the European chemical industry.

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. Identifying the effects of particularistic interests is also difficult in the case of regulatory issues, in which the bureaucracy plays an outsized role. 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.[9] 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.[10] 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.[11]

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

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[9]Regulation (EC) No. 1907/ 2006

[10]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.

[11]For an analysis of how REACH began amidst widespread opposition from the European chemical industry, see Selin (2007).

industry reveals significant opposition to the legislation, even after years of heavy and arguably successful lobbying in Brussels.[12] The Society of the Plastics Industry (SPI), an industry group that represents both small and large firms, voiced fierce opposition.[13] 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."[14]

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."[15] While BASF is a SPI member, it called for full REACH implementation as early as 2006.

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[12]Initially, even the most productive chemical firms voiced opposition to parts of the proposed REACH 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.

[13]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.

[14]Pratt (2009)

[15]Quote taken from the Dow Corporate Website.

Afterward, BASF voluntarily committed to go beyond the REACH reporting requirements for all of their chemical products, joining Dow Chemical and other industrial leaders.[16]

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 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."[17] Smaller firms, particularly in North America, are expected to suffer significant business disruptions.[18]

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

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[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.

[17]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)

[18]Scott (2008)

even upon launching, slowing down innovation.[19] 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 other-
wise."[20] In terms of numbers, as of 2010, 86 percent of REACH registrations were
submitted by large companies rather than small and medium enterprises.[21] These
experiences indicate that smaller companies are finding it difficult to handle the in-
creased 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 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.[22]

While these concerns would explain general resistance of incumbent firms to ap-
pear 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.[23] In the same cable which described the acceptance on the part of incum-
bent Czech firms, Ksandrova expresses 'great concern' about the effect of the REACH

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[19]According to the company website, Equinox Chemicals has approximately 25 employees.

[20]Testimony for Mark Grimaldi (2012)

[21]Janez Potocnik, European Commission, remarks at REACH Registration Conference, Brussels,
Belgium, September 23, 2011

[22]Scoop.co.nz "Cablegate: Czech Republic on EU Chemicals Policy"

[23]See the Waxman Report (2004) and Selin (2007).

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.[24]

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 the one of the largest US chemical firms responded that:

> The nuanced view stems from the fact that REACH often works to the advantage or (sic) 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 anti-trust laws were designed to prevent — giving a competitive advantage to large companies.[25]

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 oligopolistic firms.

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

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[24]Scoop.co.nz "Cablegate: Czech Republic on EU Chemicals Policy"
[25]Email correspondence, 1-23-13.

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.[26] 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 the 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.[27] Aggregating patents filed under the International Patent Classification for chemistry or polymer science, I match products by the the prefix on the patent number and generate 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 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

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[26]Patents represent an investment in future economic activity in a market, but are available to firms of all sizes.

[27]See, Derwent Innovations Index on the Thomson Reuters Web of Knowledge research platform, Thomson-Reuters (2013).

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.[28]

Figure 3.8: US Patent Filings in EPO and JPO 2000 vs 2009
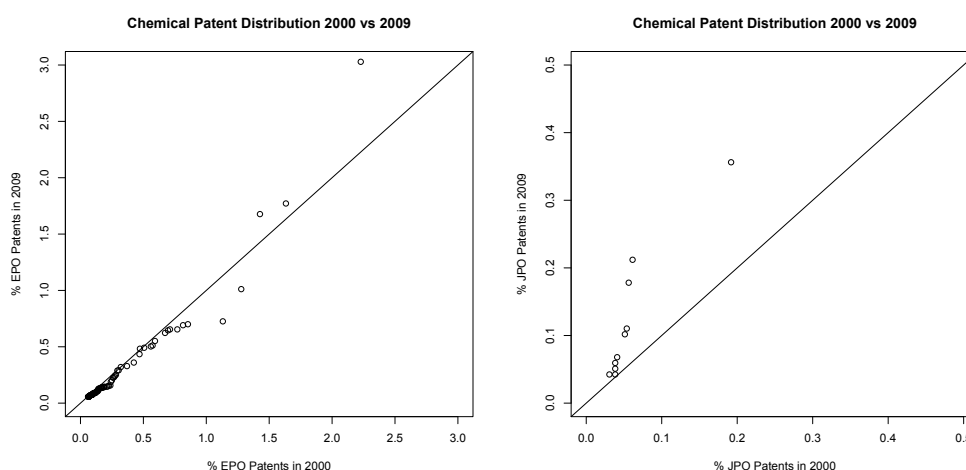
Between 1995 and 1997, the top five percent of American patenting firms together contributed 5.6 percent of all chemical industry patents in the European Patent office. Between 2004 and 2006, this measure rose to 8.2 percent of all European Patents. The bottom 50 percent of American patenting firms in the sample contributed 17 percent and 16 percent in the 1995-97 and 2004-06 periods respectively. While the majority of American firms either retained their share of patent activity or declined,

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[28]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 top firms expanded patent activity. Figure 3.8 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 with 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.[29] One alternative measure of these phenomena, or the extent of extreme values in a population is the kurtosis of a distribution.[30] 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

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[29]The Kolmogorov-Smirnov test in the JPO case fails to reject the null.

[30]Kurtosis(X)=E$[(\frac{X-\mu_X}{\sigma_X})^4]$

Table 3.1: Kurtosis of Patent Filings Among Top US Chemical Firms

Year	EU	Japan
1995-1997	9.5	1.9
1998-2000	7.6	2.8
2001-2003	11.9	2.8
2004-2006	15.1	1.4
2007-2009	15.8	2.8
2010-2012	6.4	1.2

the necessary resources to deal with the current complexity. Such agencies report that micro enterprises in particular were easily dissuaded from engaging in cross-border activities."[31]

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.

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[31]European Commission, 2002, Report from the Commission to the Council and the European Parliament on the State of the Internal Market for Services, Brussels.

3.3 Specific Trade Concerns and Global Production

Above, we examined the incidence of regulatory protection, showing that large firms 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.[32] 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.[33]

In order to determine the nature of production networks, I employ a measure of contract intensity developed by Nunn (2007).[34] Building on Rauch (1999), Nunn uses the proportion of an industry's inputs, weighted by value, that require relationship-specic investments in their production. Rauch coded each input as sold on an exchange, reference priced, or neither.[35] This process provides data on the fraction of

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[32] A detailed discussion of these measures is available in the 2012 World Trade Report (WTO (2012).

[33] 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)).

[34] This measure has become common in the economics and political science literature, see Feenstra et al. (2012) and Carnegie (2013).

[35] Using industry concordances from Feenstra (1996), the BEA, and Jon Haveman, Nunn was able

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 direct 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

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to aggregate Rauch's measure to a 4-digit SITC industry code.

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 is 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.

<div align="center">Descriptive Statistics</div>

	Range	Median	Mean
TBT	[0, 1]	0	.104
Contract Intensity	[.02, .09]	.38	.43
ln(Royalty Receipts)	[9, 25]	19.2	19.9

The joint presence of multinational activity and contract intense production should result in TBT adoption by host governments (see Chapter 2). 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).[36] 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).[37] 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

	Low Royalty Receipts		High Royalty Receipts
Low CI	A	<	B
	∨	⋘	∧
High CI	C	<	D

Table 3.3 presents the percentage of country-products with a specific trade concern regarding 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.[38] While this result is highly significant, the small proportions

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[36]For an in depth theory and motivation for similar predictions for per-unit costs of trade, see Osgood (2012).

[37]See Hoekman and Jackson (2013).

[38]$\chi^2_{df=1} = 1702$

of actual TBT adoption in cells A and C may make the Gaussian approximation
underlying this statistical test inappropriate.

Table 3.3: % of Country-Products with TBT in 2001 (%)

	Low Royalty Receipts	High Royalty Receipts
Low CI	3	11
High CI	1	25

An alternative to an asymptotic analysis of differences in proportions is to ap-
proach 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 provides the following differences:

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

Figure 3.9 displays the differences of these updated Beta distributions using the
pooled data (1997-2012). The first three histograms in the figure 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 3.9 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 of TBT use.

Confirming the above analysis, the same pattern appears in a probit regression,

Figure 3.9: Differences in Posterior distributions
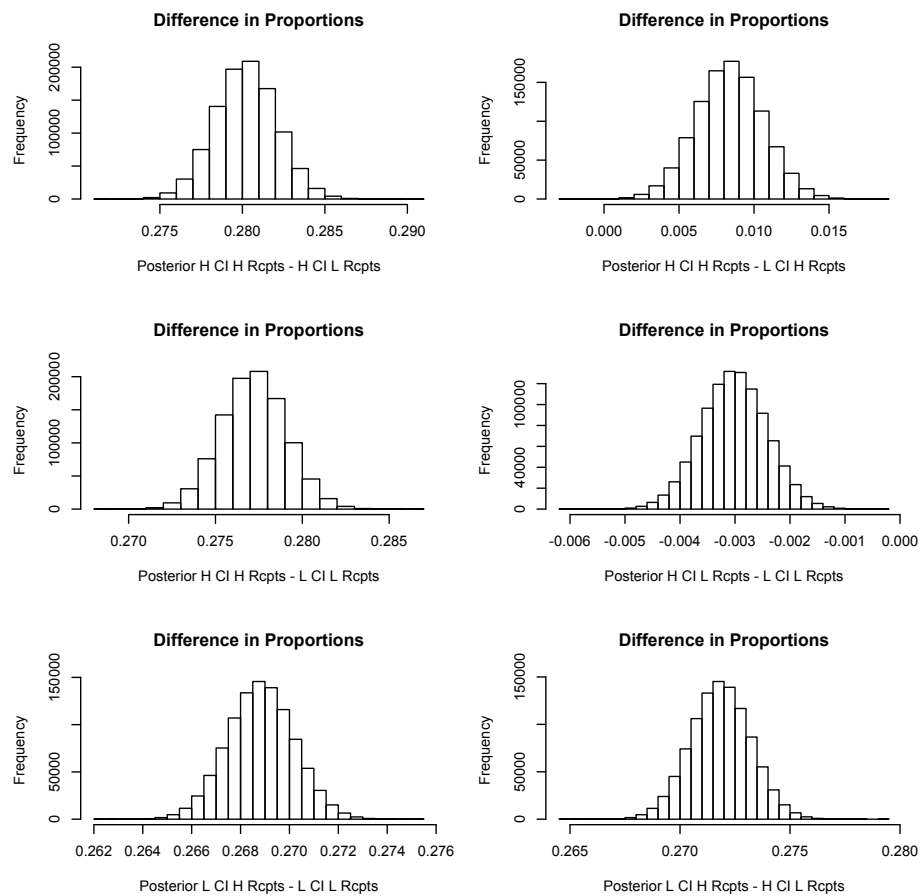
displayed in table 3.4. The coefficients in model (1) suggest that headquarter countries (those with high levels of royalty receipts) impose TBT measures more often on products that are contract intense. Moreover, this correlation is robust to the inclusion of fixed effects at the country and industry 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

TBT Adoption	(1) Estimate (S.E.)	(2) Estimate (S.E.)
Contract Intense	-3.25* (0.14)	-3.15* (0.15)
Year	0.115* (0.001)	0.168* (0.002)
ln(receipts)	0.2* (0.003)	0.08* (0.012)
Contract Intense×ln(receipts)	0.158* (0.006)	0.145* (0.007)
(Intercept)	-235* (1.39)	-340* (3.06)
Country Fixed Effects		(included)
Industry Fixed Effects		(included)
N	461057	461057
Deviance	246248.089	188513.282
$-2LLR(Model\chi^2)$	128779.301*	186514.107*

* $p \leq 0.05$

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.[39] 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

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[39]cf. Regan (2010).

of reciprocity. In an influential analysis, Keohane distinguished "specific" reciprocity from "diffuse" reciprocity.[40] 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 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.[41] Further, the theory of negotiation in the GATT/WTO system has been characterized as a form of reciprocal mercantilism.[42] 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.[43] This principle was incorporated into the international system by the U.S. RTAA program, and further promoted under the GATT.[44]

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[40]See Keohane (1986).

[41]See Axelrod (1984).

[42]See, Krugman (1997), pg. 114.

[43]This notion of reciprocity has the distinct advantage of being clearly operationalized in a general equilibrium framework. Under a trade balance condition, a change in a pair of tariffs, $\tau^0 = \{\tau_H^0 \tau_F^0\}$ to $\tau^1 = \{\tau_H^1 \tau_F^1\}$ is reciprocal if $[p^w(\tau^1) - p^w(\tau^0)]M(p_H^1, p^w(\tau^1)) = 0$, Bagwell and Staiger (1999)

[44]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

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 trade 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 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.[45] 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.[46] In this framework, MFN agreements ensure that the

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into the founding of the GATT. Each tariff reduction is enacted jointly with another government's decision to reduce tariffs.

[45]Keohane notes that in practice negotiations are designed to limit free riding by requiring concessions from all principal suppliers (Keohane (1986)).

[46]See Bagwell and Staiger (2002)

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.[47] 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 reciprocilty.

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 (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 (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.

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[47]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.

Figure 3.10: Reciprocity in the Bilateral Period

Change in US Trade Volume after RTAA Negotiation

$ Millions
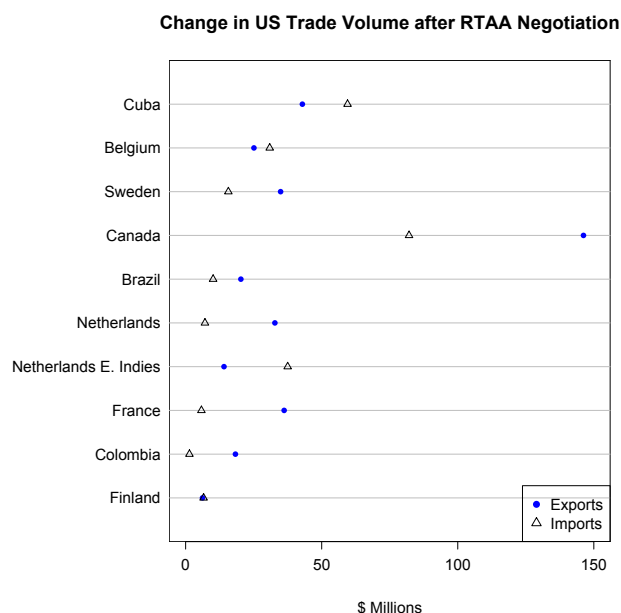
3.4.1 Regulatory protection, contract intensity, and reciprocity

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, while controlling for political and economic confounding factors.[48] The study offers a statistical analysis of pre and

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[48]Limão (2006).

post Uruguay Round tariff policy negotiations between the US and its partners that does not rely on trade volumes.[49] 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 $\Delta ma_t^k = \sum_j (-\Delta \tau_{jt}^k) w_{jt}^k$, where $\Delta \tau_{jt}^k$ 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.[50] 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, Limão (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.[51] Although TRAINS database is the most complete collection of publicly

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

[50]Germany imported 867 million dollars worth of soybeans from the US in 2012.

[51]To distinguish the TRAINS measure from the TBT concepts used in the rest of the chapter, I

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 presence of a global value chain.

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 concessions. 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 the total liberalization in that product (1986-1995). This assumes that the choice of unilateral liberalization occurred without regard to the possibility that the US will reciprocate eventually, and that no third factor drives both unilateral liberalization and the US response.[52]

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relabel TRAINS-NTMs NTBs.

[52]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.

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 3.11. 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.[53] 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.[54] 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 may lead the foreign governments to respond negatively to tariff concessions on those products.

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[53]The Limão (2006) result is robust to 2 digit industry level controls, as well as a battery of alternative specifications.

[54]For an extensive analysis of NTM policy substitution, see the World Trade Report 2012.

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 3.11 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 3.11 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.[55] 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.

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[55]See Staiger (2012). However, recent empirical work finds that TBT and SPS measures are no more prevalent on intermediate products (World Trade Report (2012)).

Figure 3.11: Coefficient Estimates
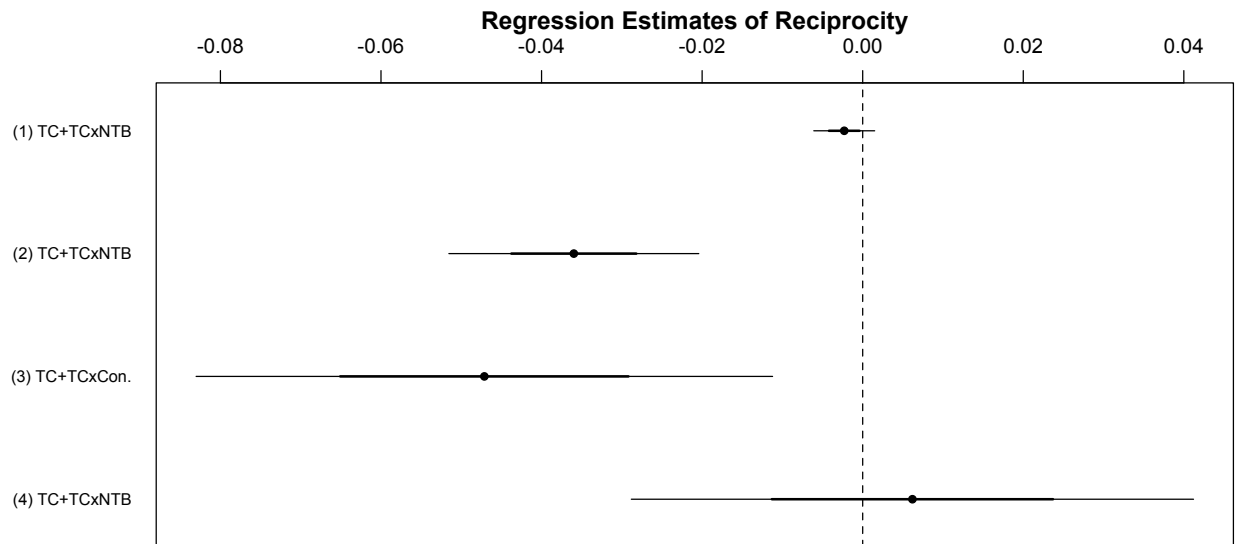
3.5   Discussion

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 pro-
tection. 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 regula-
tory protection. As host governments enact regulation, they reduce competition in
favor of MNCs' local affiliates.[56]

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.

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[56]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.

The evidence developed in this chapter also helps to resolves an outstanding puzzle in the welfare and market access implications of regulatory measures.[57] A survey of econometric studies of technical barriers to trade finds that regulatory barriers do not have a consistent effect on trade flows.[58] 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.[59] The willingness on the part of governments to voice concerns about measures which increase exports implies that trade volume does not track interests, which 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 firms highlight shortcomings in the way that aggregate, sector, or even product level trade data is used to address questions of development and growth.[60] 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.

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[57]From an efficiency perspective, any use of non-tariff measures poses a puzzle, especially when tariffs are unbound (Limão 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.

[58]See, Swann (2010).

[59]See, Crivelli and Gröschl (2012).

[60]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).

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."[61]

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[61]Pascal Lamy, 2012

Table 3.5: Analysis of Reciprocity

Tariff Concessions	OLS (1) (S.E.)	IV (2) (S.E.)	IV (3) (S.E.)	IV (4) (S.E.)	OLS (5) (S.E.)
Tariff Concessions	-0.001 (0.005)	0.018* (0.006)	0.037* (0.015)	0.052* (0.016)	0.034* (0.013)
NTM	-0.571 (0.405)	-3.246* (0.526)	-	-2.487* (0.656)	-0.404 (0.515)
NTM X Concessions	-0.001 (0.008)	-0.054* (0.01)	-	-0.046* (0.013)	-0.006 (0.01)
Contract Intense	-	-	-3.861* (1.697)	-3.924* (1.701)	-3.727* (1.365)
Contract X Concessions	-	-	-0.084* (0.032)	-0.086* (0.032)	-0.081* (0.025)
PTA	1.127* (0.14)	1.167* (0.141)	0.952* (0.163)	0.967* (0.164)	0.949* (0.164)
Bargaining Power	0.009* (0.002)	0.01* (0.002)	0.007* (0.002)	0.008* (0.002)	0.007* (0.002)
I(Multi HS8)	-0.81* (0.205)	-0.848* (0.206)	-0.741* (0.246)	-0.778* (0.247)	-0.758* (0.246)
(Intercept)	-3.498* (0.304)	-2.516* (0.347)	-1.812* (0.852)	-0.991 (0.884)	-1.966* (0.731)
N	5386	5386	3890	3890	3890
$RMSE$	3.156	3.169	3.214	3.221	3.214
R^2	0.026	0.018	0.019	0.015	0.019

* $p \leq 0.05$, data from Limão (2006)

Table 3.6: First Stage Regressions

	S1 (2) Estimate (S.E.)	S1 (3) Estimate (S.E.)	S1 (4) Estimate (S.E.)
(Intercept)	-25.418*	-27.929*	-28.353*
	(0.449)	(0.658)	(0.658)
Barg. Power	0.232*	0.208*	0.209*
	(0.004)	(0.005)	(0.005)
Any NTB	-0.593	-	-0.404
	(2.914)		(2.763)
TRAINS NTB	2.691*	-	2.503*
	(0.351)		(0.404)
I(Multi HS8)	-0.595	-0.754	-0.694
	(0.379)	(0.423)	(0.422)
PTA	0.988*	0.8*	0.8*
	(0.26)	(0.283)	(0.283)
NTBxExp	3.452	1.763*	3.102
	(3.016)	(0.735)	(2.861)
ΔTariff	0.106	3.726	-1.169
	(5.929)	(6.321)	(6.483)
ΔTariff^2	-13.335	-24.815	-8.634
	(32.916)	(34.549)	(34.959)
ΔTariffCB	30.147	38.451	27.796
	(43.557)	(44.629)	(44.88)
Unilateral Reduction	0.7*	0.637*	0.613*
	(0.007)	(0.014)	(0.015)
NTB Red.	0.093*	-	0.082*
	(0.011)		(0.012)
Contract Intense	-	3.69*	3.654*
		(1.027)	(1.022)
unicontract	-	0.136*	0.142*
		(0.03)	(0.03)
N	5386	3890	3890
$RMSE$	5.799	5.517	5.488
R^2	0.743	0.751	0.754

* $p \leq 0.05$

Chapter 4

Global Production Diversion and PTAs

Governments have developed an alternative to the multilateral trade regime, forming an uncoordinated network of trade and investment agreements to meet the demands for regulatory cooperation.[1] In the course of two decades, the share of world trade governed by preferential trade agreements (PTAs) rose from 18 percent to 35 percent. Today, all 159 member states of the World Trade Organization participate in at least one PTA, often agreeing to commitments beyond tariff liberalization.[2] In the same two decades, the global economy saw the development of unprecedented levels of global ownership of production: the amount of foreign direct investment has risen more than sevenfold - an unprecedented integration of ownership in global value

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[1]See, Baldwin (2011).

[2]The share of world trade covered by PTAs is calculated excluding intra-European Community trade (WTO (2011)). The only holdout, Mongolia, is in negotiations with Japan.

chains.[3] This chapter argues that the bilateral and regional character of trade agreements are a result of the economic incentives created by global production. Modern PTAs enable governments to shape the formation and activity of global value chains, but have negative consequences for third parties. The rise of global production generates new incentives for governments to adopt provisions in PTAs to attract and retain the profits of global production by affecting the conditions of competition *within* the global value chain.

As argued in Chapter 2, Global value chains involve the development of cross-national business relationships among producers with potentially opposed economic interests. The efficiency of these relationships depends on the development and enforcement of contracts, which specify the timing, quality, and quantity of production in exchange for payment. Tariffs, licensing requirements, and other border restrictions affect the conditions of final sale, and indirectly affect the distribution of profits of the overall enterprise. Firms can also engage in contracting to directly affect the division of profits across the nodes of the global value chain. Different forms of ownership enable firms to retain a higher share of the profits of global production - either vertically integrating or outsourcing production. Where the overall level of profits available to the firm depends on the conditions of sale of the final good, the share retained by a given worker, manager, or plant depends on the nature of the production contract and the property rights institutions that govern such a contract.

Whether and how firms engage in local investment and production is of direct interest to host governments. Global production involves contracts which allocate profits across the supply chain, either shifting more of the gains of trade toward the

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[3]FDI occurs when an agent purchases more than a 10% stake in a foreign enterprise, granting some control over management decisions. This activity rose from ∼ 200 billion dollars in 1990 to ∼ 1.4 trillion dollars in 2010.

headquarter, the manufacturer, the distributor, or some other node of the production network. Governments may influence these transaction-level decisions through the adoption and enforcement of local economic institutions - they may set investment restrictions, intellectual property laws, safety standards and inspection rules to affect the efficacy of production contracts, the mode of organization within the firm, and the bargaining over profits that occurs across the global value chain. Local policies which affect the profits and returns to investment can alter the decisions of firms to engage in local production. These policies may encourage the creation of global supply chains, or divert investments from less attractive locations, benefiting at the expense of third parties.

The extent that global commerce can rely on local enforcement of property rights is a function of the international economic policies of governments. Local economic institutions can interact with international treaties, including trade and investment agreements, to affect the organizational and investment decisions of individual firms. These treaties affect trade, which is relevant for firm purchases and sales, as well as direct protections for investors and procedures for harmonizing regulations. Modern PTAs affect the ability to spread production across borders by affecting the *contractual* conditions within the supply chain and the costs associated with sourcing intermediate goods and exporting final products. The design of trade agreements therefore affects the profit share of investors, workers and managers by affecting the expected returns and enforceability of international production contracts (Antràs and Staiger (2012)). Governments with an interest in the profits of production, can use trade agreements to compete for a larger share of the global value chain. To the extent that PTAs improve a countries relative competitiveness, the success or failure

of PTAs in promoting local economic activity depends on the adoption of similar strategies by their competitors. The effort to improve local profit share by altering the environment could be undercut by PTAs among third-party countries with equivalent levels of domestic contractual rights. These third party effects suggest limits to the contagion of PTAs across the international system.

Competition over the profits of global production also affects the relationship between PTAs and the multilateral trade system. The conventional account of PTAs distinguishes between bilateral and multilateral trade negotiations on the ground that in the former, market access concessions are selective: preferential market access provisions liberalize tariffs only for products produced by members of the agreement and are enforced by strict rules of origin provisions. As a result, the presence of preferential tariff provisions in agreements can undercut multilateral negotiations by locking in competing blocks of trade partners. In this environment, *regulatory* liberalization is significantly less problematic on a bilateral basis than are tariffs (Deardorff (2014)). PTAs with regulatory provisions reduce the differences between national standards, lower switching costs and otherwise offer advantages on a non-preferential basis, rather than discriminating against non-participants. On the conventional account, even if regulatory protection is the principal problem facing governments, multilateral negotiation on regulatory barriers may offer little advantage over preferential agreements.

While preferential regulatory liberalization may not directly discriminate on a national basis, changes in regulatory environments can be discriminatory on a firm by firm basis, and indirectly harm third parties. Insofar as regulatory activity can differentially affect producers across the supply chain, 'deep' PTAs can alter the export

and organizational decisions of individual firms, increasing the ability for participating states to attract global producers at the expense of third parties. This explains why the efforts at regulatory cooperation in modern PTAs have generated competitive pressures on non-joining governments. It is these third party consequences that determine whether modern PTAs will eventually lead to more inclusive multilateral deals, or what Bagwhati calls the "dynamic time-path question" (Bhagwati (1993)). Analyzing the effects of regulatory provisions between PTA members on non-member states provides insight into whether the spread of modern PTAs are a harbinger of more multilateral rules or whether they will undermine future multilateral arrangements.

To determine the empirical validity of this *contracting theory* of trade agreements, I analyze novel data on the domestic property rights conditions and the adoption of various forms of regulatory provisions in PTAs. This data, covering the aggregate experience of firms and citizens in their contractual behavior, allows more fine-grained analysis of property rights conditions than previous measures which have relied on coding of indexes of regime characteristics or business surveys. I use variation in domestic property rights protections to explain the adoption of PTAs across time, and the extent or depth of regulatory cooperation. My analysis of the combined property rights and PTA provision data finds that governments with relatively low domestic property rights, both in terms of political constraints and actual long run economic contracts, are more likely to adopt modern PTAs.

To determine the third party consequences of PTAs, I estimate models of PTA contagion. The *contracting* theory of trade agreements predicts that the adoption of PTAs by governments with equivalent levels of domestic contractual rights would

lead to lower rates of PTA adoption. I compare this with an alternative theory of contagion, the *strategic* theory, which suggests that partners at equivalent levels of *development* should have lower rates of PTA adoption. The data presented finds a lower use of PTA adoption among states with similar levels of contractual protections and a higher PTA adoption rate among countries with similar levels of development, consistent with a competitive externality as suggested by the *contracting* theory.

This chapter proceeds as follows. Section 4.1 describes how PTAs are increasingly including provisions on regulatory cooperation. Section 4.2 discusses theoretical work on the relationship between PTAs and multilateral cooperation. Section 4.3 develops an empirical strategy to examine these effects, using data on PTA adoption and domestic contracting environments to show how domestic conditions drive the adoption of deeper PTAs. Section 4.4 goes beyond dyadic analysis, to determine whether host states competitively adopt preferential trade agreements to get a leg up on their neighbors. I show that patterns in PTA adoption are subject to contagion effects, consistent with competitive pressures to develop better domestic property rights conditions. Section 4.5 concludes.

4.1 The Development of Modern PTAs

The structure and spread of modern preferential trade agreements originate in exceptions to the multilateral system. In the United States, the 1934 Reciprocal Trade Agreements Act (RTAA) enabled the creation of dozens of bilateral agreements with developing and developed trade partners, reducing tariffs on principally supplied goods in exchange for equivalent concessions by partner states. After 1923, the conventional economic agreement included 'most favored nation' (MFN) provisions

which required that any concession be extended to third party members. The success of these early agreements led to the development of the multilateral rules that structure subsequent traded negotiations. Below, I focus on the evolution of negotiating norms from a regime of bilateral deals with a multilateral component to a multilateral regime with bilateral exceptions. The RTAA agreements, and the GATT itself, include 'most favored nation' (MFN) obligations toward all members but subsequent GATT/WTO rules included an exception to the MFN norm - Article XXIV, that allowed exclusive preferential trade agreements (PTAs) with negative third-party trade effects.

The RTAA treaties enabled governments to exchange tariff concessions on a product by product basis in the face of opposition by protectionist interests. The preferential nature of the RTAA agreements enabled the US to select partners whose products would limit the domestic costs of adjustment and avoid congressional backlash (Goldstein and Gulotty (2014)). The ability to sequence agreements allowed the president to target liberalization to politically inefficacious industries and time partnerships to avoid sensitive preselection periods. However, the flexibility afforded by piecemeal and sequential negotiations came with a cost - each foreign partner needed to be reassured that their concessions would not be undercut by further, deeper concessions to later partners. An offer to reduce tariffs on a good by 50% is only valuable if later partners are not given an even more attractive rate. Counteracting this potential 'backward stealing,' economic agreements included provisions that promised unconditional most favored nation (MFN) status for members. Any negotiated tariff cut would be extended to past bilateral partners. Upon making any concession to a third party, an MFN provision required the extension of that concession back to

past treaty partners without further concession. Both the flexibility of selecting partners, and MFN rules, worked to limit domestic opposition and promote international cooperation.

The success of these early agreements led the negotiating norms - sequential negotiations and the MFN rule - to be embedded in the International Trade Organization and its longer lived trade apparatus, the 1947 General Agreements on Tariffs and Trade (GATT). The GATT MFN provision had the effect of making the outcome of any bilateral negotiations under the auspices of the GATT apply to the entire membership, further multilateralizing the tariff negotiations among the GATT membership. The only exception in the ITO-GATT system to the general MFN rule was that governments were not required to extend concessions made in preferential trade agreements. The difference between the bilateral agreements developed before the GATT and the preferential trade agreements that fall under Article XXIV is that, in the latter, negotiations would not be limited to principally supplied products or limited tariff concessions. PTAs would not have to extend the same concessions to all existing trading partners, an exception to MFN. In order to qualify for this exception, bilateral preferential agreements must eliminate tariffs on 'substantially all' traded goods. This exception had the consequence of establishing a non-multilateral alternative to the multilateral trade system allowing governments to develop deals outside of the GATT with regional partners without having to make concessions to the general membership.[4] The World Trade Organization reports that WTO members have adopted more than 300 preferential agreements, with each member having on average 13 PTAs. Analysis of these PTAs suggest that the growth of preferential

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[4]A second, analogous exception was afforded to the system of imperial preferences used by the United Kingdom, see Barton et al. (2007).

agreements may in part substitute for progress in multilateral deal making (2012). However, there has yet to be a successful challenge of a PTA by a GATT/WTO member on Article XXIV grounds, suggesting that the tariff provisions of PTAs may not be a significant challenge for the multilateral system.[5]

The crafters of Article XXIV only specified conditions on the tariff features of PTAs, excluding other trade relevant obligations - services, investment, intellectual property and technical barriers to trade. Regulatory liberalization, lowering the costs of licensing, standards, or testing can be more significant for market access than a complete elimination of a tariff, which could in turn exacerbate the trade diverting effects of a PTA. However, these regulatory provisions do not offer the same exclusivity as do preferential tariff provisions. Low tariffs under a PTA only apply to goods originating in a PTA member. PTA members each have border regulations - rules of origin - that assign nationality to each good. Without such requirements, there would be no added value to a preferential agreement. PTA provisions that pertain to regulatory liberalization lack rules of origin as easing regulatory burdens by streamlining licensing or improving testing procedures do not apply on a national basis. As a result, some scholars have suggested that regulatory provisions in PTAs pose little threat to third parties, and are likely to enhance multilateral efforts (Baldwin, Evenett and Low (2009)). I examine the effects of these provisions on the subsequent adoption of PTAs empirically, and find evidence consistent with competition over regulatory policy.

Data collection strategy: There is little consensus on measures of the variation and

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[5]Furthermore, estimates of tariff preferences suggest that only 2% of world trade is eligible for preference margins above 10% (WTO (2011)).

scope of PTAs. To gain the most complete listing of PTA membership and provisions I collected data from the WTO, the World Bank and UNESCAP, the Organization of American States and McGill University.[6] Combining each of these data sets produces 524 unique agreements. In order to distinguish those agreements that are in force from those that are defunct, I focused on the 376 agreements that have a negotiated text.

In order to enter the dataset, each agreement with a text is identified with a year of entering into force, which ranged from 1958 (the original EC treaty of Rome) to 2013. Each agreement is then listed with its membership, to enable country level analysis. In 78 agreements, the membership included some part of the European Union or European Community, necessitating either a year-specific membership list, or a simplification of the EC into one member. In the following analysis, the EC, and all its historical predecessors, are treated as a single customs union that can enter into agreements with non-EC members. Other members were determined by reading the signatory sections of each agreement. In sum, there are 220 unique members in the data.

To determine the depth of each PTA, every agreement was read and coded by hand. The WTO coding scheme for notified agreements include competition policy [cooperation over small and medium sized enterprises, antitrust enforcement and rules governing state owned enterprises], technical barriers to trade [technical standards, consumer protection and health measures], sanitary and phytosanitary measures as well as environmental laws, investment [trade related investment measures, capital movement and services commitments] and intellectual property [intellectual property

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[6]See, http://ptas.mcgill.ca/

protections, cooperation over innovation promotion, and research and technology provisions]. I include labor provisions, environmental provisions, investment and financial services. I then merge this data with coding of those agreements that were notified by the WTO which were developed by the Economic Research Division of the WTO WTO (2011), Orefice and Rocha (2011). Below I compare these specific provisions against indexes of PTA provisions developed by Dür, Baccini and Elsig (2013).

‘Deep’ PTA provisions: Non-tariff provisions in PTAs are a relatively recent phenomena. In figure 4.1, I plot the average indexed depth of PTAs, both globally across time and averaged over time in ten countries, suggesting a great deal of cross country variation in issue coverage. The figure suggests a marked increase in the depth of PTAs after 1991 and then a continuing rise for 20 years.[7] This average depth score suggests that prior to 1985, very few agreements covered provisions on regulatory forms of protection. The pattern of rising PTA adoption coincides with the conclusion of the Uruguay Round and the end of the Cold War, but there is significant variation across governments in their enthusiasm for these agreements. In Figure 4.1 (b), I plot this index by country, showing how the distribution of these agreements does not straightforwardly follow developmental lines, with open and developed countries such as Canada lagging relatively autarkic countries such as Turkey.

While most recent PTAs go beyond tariff commitments, Figure 4.2 indicates that until the start of the Doha round in 2003, the European Union was responsible for

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[7]This coding is an additive index, asking whether the agreement has more than a partial scope, or substantive provisions on services, investments, standards, public procurement, competition or intellectual property rights Dür, Baccini and Elsig (2013).

Figure 4.1: Non-Tariff Provisions in PTAs
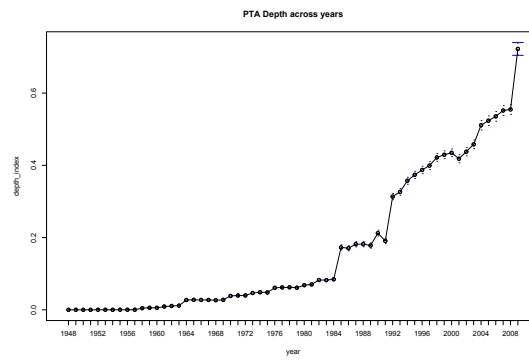
(a) Average PTA Regulatory Provisions
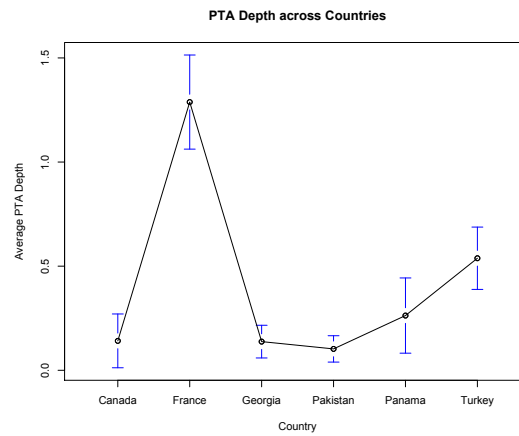
(b) Data aggregated from Dür, Baccini and Elsig (2013)

a majority of these provisions. This imbalance is partially a consequence of the EU's enthusiasm for PTAs: of the over 200 PTAs in force and notified to the WTO, 35 involved the EU. As a result, by 2010 only 43.9% of EU trade arrived from a country that does *not* enjoy a preference of some sort (Ahearn (2011)). However, EU PTAs exhibit a wide range of content and enforceability, and the other governments have caught up to the EU in the adoption of non-tariff provisions (Horn, Mavroidis and Sapir (2010)). These index based measures suggest that most PTAs address a broad set of economic issues, what Richard Baldwin calls the trade-investment-services nexus.

One of the principal barriers to studying the coverage of non-tariff issues is the heterogeneity in the depth and effectiveness of a PTA provision. Measuring depth using indexes of issue coverage, with more issue coverage implying greater depth, does not capture variation in levels of commitment within a given provision. Variation in the effectiveness of a provision may be independent of the process which generated the agreement. However, it is likely that any provision in an agreement is more liberalizing than no coverage, explaining the focus in public press and media on the scope of negotiations rather than negotiated outcomes. More of a concern is, that some issue areas may be more or less of a politically sensitive issue, depending on the context. In table 4.1 I report the correlation between the presence of the coded issue areas in PTAs. Interestingly, the presence of competition provisions are only substantively correlated with labor provisions.

Competition provisions in these agreements generally enable governments to take actions to limit the ability for companies, or in the parlance of these agreements

Figure 4.2: Adoption of PTA and PTA provisions
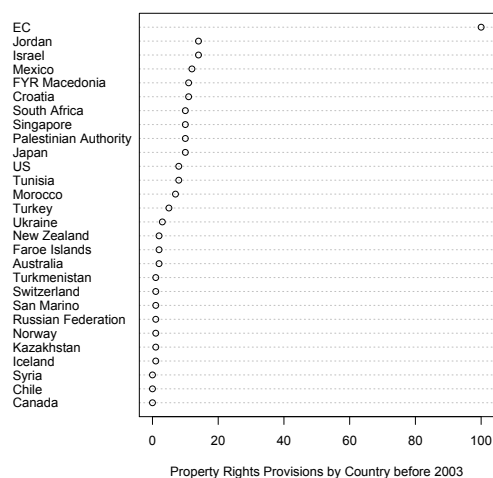
(a) Total PTA provisions before 2003
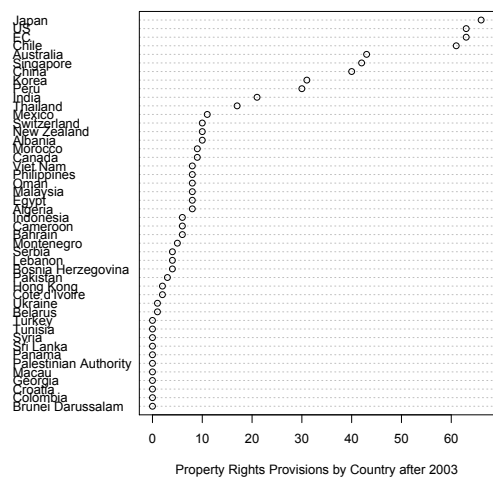
(b) Total PTA provisions after 2003

Table 4.1: Correlation Matrix of PTA provisions

	TBT	Fin. Serv.	Investment	Labor	Competition	Environment
TBT	1.00	0.24	0.46	0.24	-0.02	0.26
Fin. Serv.	0.24	1.00	0.56	0.37	0.03	0.09
Investment	0.46	0.56	1.00	0.30	0.04	0.23
Labor	0.24	0.37	0.30	1.00	0.12	0.28
Competition	-0.02	0.03	0.04	0.12	1.00	0.03
Environment	0.26	0.09	0.23	0.28	0.03	1.00

'undertakings' to collude. For example, a competition provision is present in 30 of 33 PTAs concluded by the European Free Trade Association, an organization of four European States with a competition authority similar to that in the European Union.[8] The text of the competition provision finds that the agreement is inconsistent with:

> all agreements between undertakings, decisions by associations of under-
> takings and concerted practices between undertakings which have as their
> object or effect the prevention, restriction or distortion of competition;

These competition provisions recognize the possibility that a PTA can lead foreign exporters to engage in collusive market segmentation, price fixing arrangements, or other practices long recognized in a domestic context to reduce competition and hurt consumers. However, these provisions may be more symbolic than substantive, as the competition chapter is explicitly excluded from dispute settlement procedures. This exclusion may be a consequence of interests of the targets of anti-competitive laws: the incumbent or monopolistic firm. Unlike provisions on the environment, labor, financial services, and technical barriers to trade, competition laws invariably aim to promote entry, as opposed to affect the share profits across firms that are engaged in

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[8]Two FTAs without such provisions, EFTA-Mexico and Canada-EFTA, follow NAFTA provisions on competition.

parts of a supply chain.

Figure 4.3 focuses on provisions covering investment and technical barriers, plotted by the year of agreement ratification. The aggregate patterns for specific provisions follows the aggregate indexes closely, suggesting that governments are responding to the same pressures when they adopt PTA provisions in a number of different issue areas (excluding competition).

Figure 4.3: Adoption of Specific PTA provisions

(a) Investment Provisions   (b) TBT Provisions
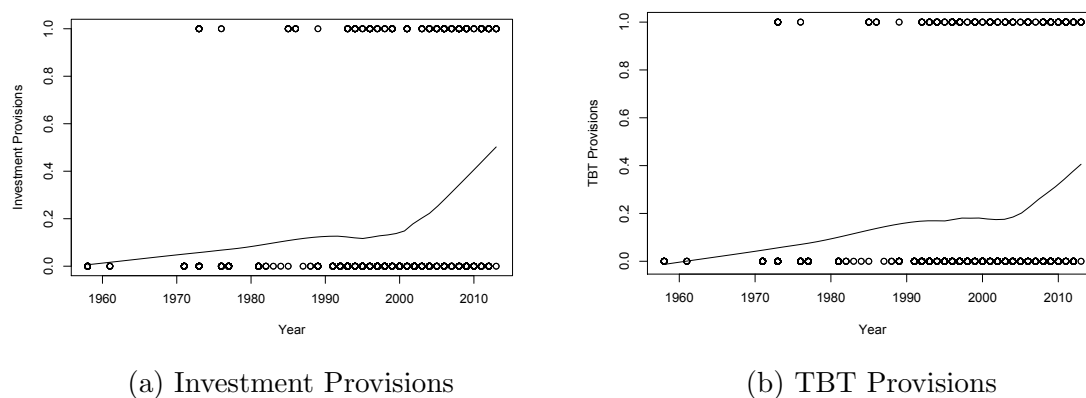
The main pattern that comes out of this descriptive analysis is the apparent cascade of deep PTAs that were adopted in the last decade of the 20th century, and the high variability among countries of similar development level. While agreements vary in the number of issue areas covered, there are less clear distinctions between regulatory issues areas, except for competition law. The following section asks how the incorporation of regulatory provisions in PTAs may affect multilateral negotiations. Whether or not regulatory provisions in PTAs promote or delay multilateral progress

depends on the effect these agreements have on third parties. Below, I describe a theory of how regulatory protection can lead host states to compete for international investment, a *contracting* theory of trade agreements.

4.2 The consequences of preferential trade liberalization for multilateral negotiation

Much of the theoretical work on PTAs focuses on potential spillover effects on non-joining members that would distinguish a preferential deal from a multilateral agreement. Without such spillovers a group of nations would then always be better off with a PTA, and so the spread of PTAs would be unproblematic (Kemp and Wan (1976)). To establish some negative third party effect of PTAs and explain actual patterns of liberalization, scholars point to game theoretic coalition formation problems, non-economic objectives, ignorance or inertia.[9] In this section, I focus principally on market failures, which may be exacerbated in the presence of global production. In particular, I compare a spillover that occurs via shifting *contracting* rights against one that affects the *strategic* choices of exporters for third party markets.

The explanation for PTA adoption depends on the nature of the market failure. For example, if the problem facing governments is a domestic commitment problem, governments, especially democratic governments, may be unable to sustain liberalization in the face of economic shocks.[10] PTAs reassure domestic pro-trade interests

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[9]Ignorance and inertia are plausible but under-theorized explanations for international policy-making, see Krasner (1976).

[10]See Staiger and Tabellini (1999) and Brou and Ruta (2012).

such as exporters and MNCs, as well as foreign actors with an interest in domestic economic policy, such as international investors, that pro-trade policies will not be reversed (Büthe and Milner (2011) and Büthe and Milner (2012)). Also using a commitment framework, Hicks and Kim examine the content of PTAs to show that variation in the amount of discretion available to governments predicts the effect of PTAs on trade flows (Hicks and Kim (2012)). This literature leaves open the question as to the differences between liberalization in a PTA as opposed to multilateral mechanisms, or whether PTAs will undercut or support multilateral liberalization. For that, we must turn to international externalities.

The study of international externalities generally focuses on the way that tariff liberalization among some partners can harm excluded states. For example, Bagwell and Staiger (2004) show that PTAs generate bargaining inefficiencies because the prospect of future coalitions undercuts the willingness of PTA members to make significant concessions. Ex ante negotiations suffer from the possibility of being excluded from future gains. Aghion, Antràs and Helpman take up these coalition dynamics, aiming to identify the conditions in which PTAs facilitate or hinder reaching global free trade, independent of detailed negotiations structure (Aghion, Antras and Helpman (2007)). The key insight is that under certain conditions it is possible to determine the long run effect of PTAs on multilateral arrangements even when the formation of a PTA has positive or negative effects on non-members. This result relies on the assumption that free trade is optimal in the sense that each government's payoffs under a final agreement of global free trade are greater than under any possible alternative arrangement of bilateral or unilateral tariff policies. Under this condition, global free trade maximizes welfare, and a liberalization process with

bilateral agreements is optimal to address negative coalition externalities. Positive coalition externalities, by contrast, are optimally addressed by a single multilateral negotiation. These conditions show that the relative utility of a bilateral or multilateral approach depends strongly on the third party consequences of liberalization.[11] This theoretical literature raises the stakes to identifying the effects of PTAs on nonjoiners as this will not only determine the welfare implications of an individual PTA, but also whether cooperation will be most successful under bilateral or multilateral arrangements.

One third party effect of PTAs that has been underestimated is how trade policy alters the terms of relationship-specific production contracts, shifting profits within multinationals (see Chapter 2). This *contracting theory* previously described, predicts that governments will adopt PTAs in order to encourage investments by headquarter firms, and limit the possibility of holdup by their partner manufacturers. A *contracting* account of PTAs depends on domestic property rights conditions which enable a headquarter to extract rents from a foreign subsidiary. Below, I operationalize these domestic property rights conditions using a behavioral measure *"Contract Intense Money"*, derived from IMF statistics. The following section describes this measure, and compares it to existing theories of domestic institutional conditions. I then estimate the ways in which governments behave under various levels of this measure in the adoption of PTA provisions. After showing that PTAs substitute for domestic contracting conditions, I develop a contagion model of PTA adoption in which the

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[11]These counterfactual statements do not necessarily mean that states will adopt either strategy. Alternative formulations of the coalition problem endogenize the choice of between multilateralism and bilateralism, and find that the freedom to choose some forms of PTAs harms liberalization, as it allows reluctant, small, governments to exclude large countries (Saggi, Woodland and Yildiz (2013)). On this analysis, PTAs exacerbate the prior preferences of governments to engage in liberalization.

likelihood of adopting a PTA is affected by the adoption of PTAs by other governments with similar levels of domestic property protections.

4.3   PTA adoption and Domestic Property Rights

The *contracting* theory of PTA adoption predicts that the property rights conditions in states affects the likelihood of adopting modern PTAs. To determine these conditions, I turn to a measure that characterizes the depth of private commercial contracts, such as those used by multinational firms and other traders in their dealings with domestic private parties. This measure, Contract Intensive Money (CIM), is the ratio of the amount of money held in banks or other financial institutions to the amount of hard currency in national circulation, which can be calculated from national accounts statistics to the IMF (Clague et al. (1999)).[12] In contrast to measures of institutional quality, this measure evaluates how citizens and firms decide to hold their financial assets. This measure is advantageous over formal legal protections because while the state is essential to enforce contracts, states may not value all contracts equally and other institutions can play an important role in promoting non-simultaneous transactions, such as counter-party insurance or even generalized social trust. This measure aggregates these conditions, capturing the considerations relevant to governments in whether or not to adopt a PTA.

I use the CIM measure to determine whether governments adopt PTAs to substitute for weak domestic property rights protections. Strong domestic property rights conditions would affect the ability for headquarters to extract resources from their

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[12]The data were downloaded from the IMF and merged with PTA data for each of the two pairs of states. CIM=(M2-M1)/M2

subsidiaries, much in the same way that domestic contract law protects investments. Independent of the presence of international competitive pressures, the presence of efficient domestic contracting regimes may obviate the need for a PTA with property rights provisions. Domestic property rights, as measured by CIM, are strongly associated with trade, especially among GATT/WTO members.[13]

In figure 4.4, I plot the mean of the CIM measure from 1970 to 2009. This data, unfortunately, does not have full coverage over the time period and the average declines as the IMF data coverage expands. Subsetting the data to just those countries for whom there is full coverage reveals that while, on average, there was significant growth from 1970 to 1990, there is no aggregate trend for the latter half of the time period.

In addition to being relatively stable over the time period of interest, the contract intensive money measure has several advantages over alternative measures of institutional quality. One prominent alternative measure of institutional quality, developed in the Polity IV dataset, consists of expert characterization of "key qualities of executive recruitment, constraints on executive authority, and political competition," which only indirectly bears on the expectations of firms to be able to profitably invest and produce in a market (Marshall and Jaggers (2002)). The overall correlation between the executive constraints measure (Polity2) and the contract intensive money (CIM) measure is about .07, suggesting that these broad measures of political institutions cover more than the local contacting environment. Figure 4.5 plots the CIM for four countries, Ukraine, Venezuela, China, and Indonesia along with their

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[13]See, Souva, Smith and Rowan (2008), Johnson, Souva and Smith (2013).

Figure 4.4: Average CIM by Year
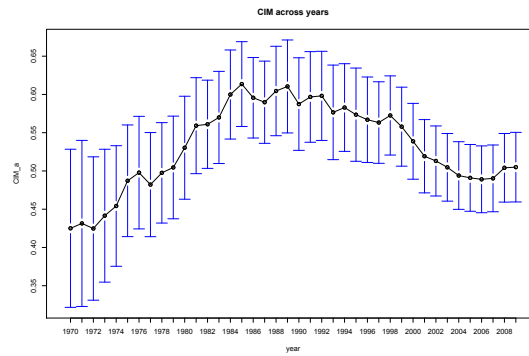
(a) Average CIM across all Countries
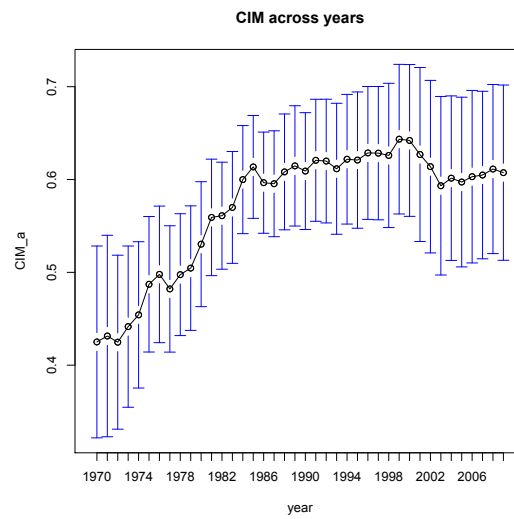
(b) Average CIM across high coverage Countries

respective Polity2 score. Where Polity2 is slow to change, it enables cross country comparisons of institutional quality. CIM represents a more continuous measure of the economic environment, but is not comparable across countries. To account for cross-country variation in levels, I normalize the measure to the mean of each country in the sample.

Figure 4.5: CIM vs Polity IV

CIM (+) vs Polity IV score (Δ)
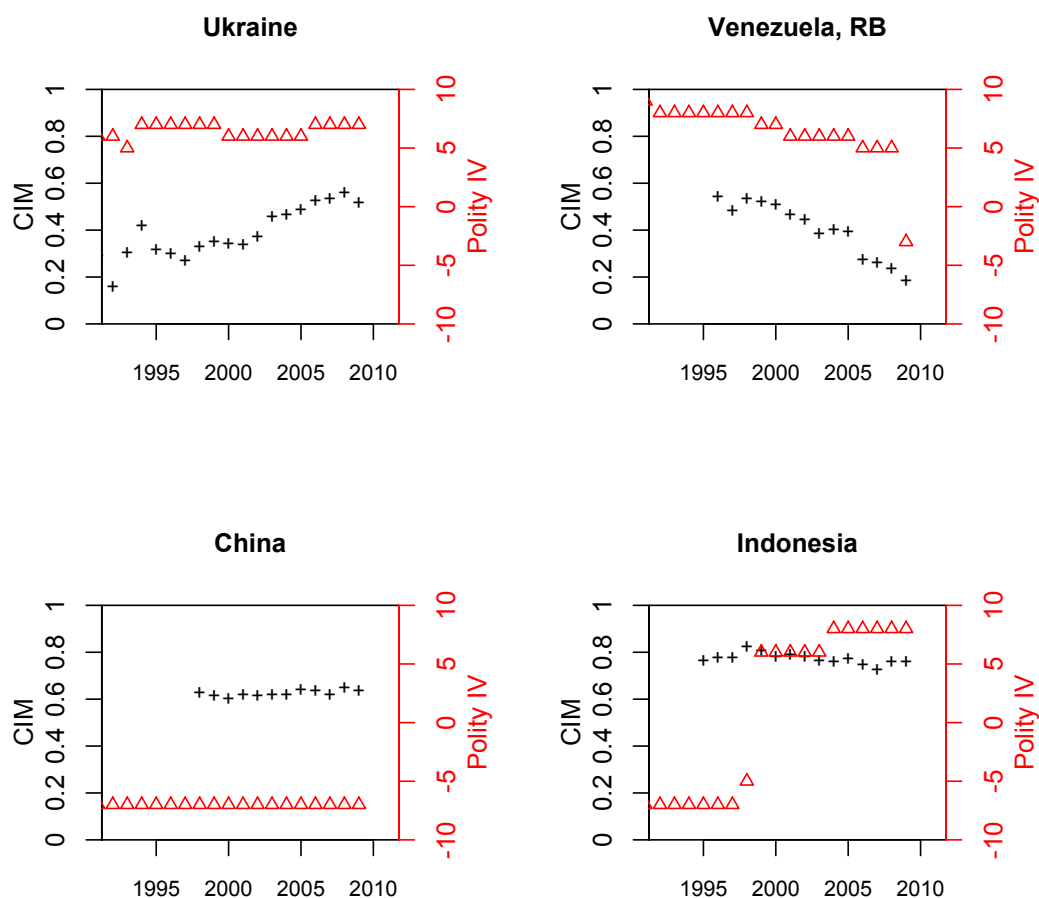
Table 4.2: Dyadic PTA Depth

	PTA Depth		
	Fixed Effects	Random Effects	Fixed Effects
CIM_a	0.157***	−0.136***	−0.013
	(0.059)	(0.051)	(0.059)
CIM_b	0.158***	−0.127**	0.022
	(0.059)	(0.051)	(0.058)
CIM_a×CIM_b	−0.267***	0.143*	−0.286***
	(0.095)	(0.085)	(0.094)
ln(GDP_a)			0.164***
			(0.007)
ln(GDP_b)			0.173***
			(0.007)
Observations	128,909	128,909	128,743
Note:			*p<0.1; **p<0.05; ***p<0.01

Property rights and PTA adoption: Governments with low levels of contractual enforcement may benefit from adopting provisions in preferential trade agreements. However, even if a government would benefit from a PTA, it is necessary to find a willing partner. To account for the bilateral nature of PTAs, I examine patterns among directed dyads of countries for the years 1981-2006.[14] The main dependent

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[14]To compare with existing literature, I use the definition of PTA onset used by Mansfield and Milner (2012).

variable of interest, *PTA Onset*, is an indicator variable for the presence of an existing PTA in the dyad. A binary indicator does not capture the depth of agreements, or the structural differences among PTAs with regulatory provisions. However, as with any appropriation of data for uses not intended, there are several limitations when using dyadic data. In addition to the standard problems with cross-country panel data, the theories of competition described above entail non-independence of varying kinds. In particular, because any model will omit important domestic factors in the over time selection of PTAs, the regressions suffer from autocorrelation, which is partially addressed by including the lag of the dependent variable, labeled *PTA* as a predictor.

Besides the measure of contractual enforcement proxies by CIM, the independent variables include controls for institutional features which may affect the representation of commercial interests. The institutional variables include measures of regime type, ranging from 1 to 21, adopted from the Polity III measure, and political constraints. These measures consider the ability of government to capriciously interfere with the lives of it citizens, and as such, may importantly interact with the international property rights theory laid out above. When governments are more responsive to constituents, they may be more likely to attempt to correct failures in property rights regimes by adopting PTAs. Also, dyad specific economic measures are included to capture the extent to which trade cooperation is of value to the dyad, including the level of trade and the natural logs of GDP and physical distance. Although the data is dyadic, previous analysis by Mansfield and Milner (2012) assumes that the decision to adopt a PTA is independent of its partner. Instead, non-independence is captured by a variable measuring *contagion* which measures the share of exports from the reporter to the dyad partner, multiplied by the share of all other trade partners' trade flows

which have signed a PTA with that partner (Baldwin and Jaimovich 2010). Mansfield and Milner find that this contagion measure is nonlinearly related to PTA onset, but find that the nature of the non-linearity depends on the presence of controls for trade and distance.

In Table 4.2, I examine the correlation between CIM in each of the two countries in the dyad and an index of depth of PTAs adopted within dyads of states (Dür, Baccini and Elsig. (2014)). Controlling for economic size, it appears that two countries with high property rights are unlikely to adopt a "deep" preferential agreement. These models, using ordinary least squares, are likely inappropriate for this form of data, as only a few dyads have PTAs, and it is among those PTAs for whom depth is a potential issue. To examine the prior question of when a PTA is adopted, I instead turn to examine PTA onset.

Coefficient estimates of a probit regression of PTA onset on the lag of the listed variables are provided in columns 5-7 of Table 4.4.[15] Consistent with prior work, democratic regimes are more likely to adopt PTAs and constrained regimes are less likely to adopt PTAs. Similarly, the non-linearity in the contagion measure suggest that high exposure to well connected trade parters is associated with PTA adoption.

Column 6 of Table 4.4 indicates that having a high level of the CIM measure (strong contract enforcement) is significantly associated with a lower predicted probability of PTA onset, indicating some relationship between domestic property rights regimes and the adoption of PTAs. Holding other variables at their means, an increase in the CIM measure from -.2 to .2 lowers the predicted probability of PTA onset from .0044 (s.e. = .0005) to .0029 (s.e. = .0004). That is, countries that experience

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[15]PTA onset is sufficiently rare in this dyadic dataset that a probit model may be inappropriate. However, alternative specifications reach similar conclusions.

relatively high reliance on cash for transactions are 50 percent more likely to adopt a PTA than those countries with stronger domestic contracting. To compare, Mansfield and Milner predict that full democracies are 65 percent more likely to adopt a PTA than full autocracies.[16]

While PTAs are one possible mechanism to alter the contracting environment, whether they serve that role will depend on the presence of political institutions that are sensitive to the property rights needs of their constituents. The negative coefficient on the interaction term in model 7 of Table 4.4 between regime type and the CIM measure suggests that more democratic governments with low levels of contract enforcement are particularly likely to enact a PTA. Similarly, conditional on having significant confidence in property rights institutions, democratization marginally *decreases* the likelihood of adopting a PTA. These estimates are consistent with the possibility that PTAs substitute for domestic contracting institutions. To explore this relationship further column 9 of table 4.5 displays OLS regression coefficients of CIM on similar covariates, including the interaction of the number of PTA provisions and the regime index. It appears that democratic states have lower use of contract intense money, especially when they sign onto modern PTAs. Consistent with the literature on political constraints, more political constraints are strongly associated with CIM. Modern PTAs improve the economic contracting environment, particularly in undemocratic states. Each of these results suggest that domestic political and economic institutions are important predictors of PTA adoption, and that effective property rights for international commerce depend on both domestic and

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[16]In regression estimated in column 6 the effect of regime type is somewhat smaller, probably because the sample is restricted to post 1980. The predicted effect of a change from an autocracy (Regime type = 3) to a democracy (Regime type = 19) is to shift the predicted probabilities of PTA onset from .0032 (s.e. = .00034) to .0039 (.0003), a 20 percent rise.

international economic policies.

Using the coding of depth of PTAs developed by the WTO we can additionally ask whether these patterns hold for modern PTAs. Column 8 of table 4.5 displays coefficients from an OLS regression for the number of provisions in PTAs, indicating that the same patterns of correlations for the presence of PTA generally predict the number of provisions agreed to in PTAs, although the functional form of the regression precludes direct comparison of the coefficients. One interesting difference between the two regressions is that unlike for the adoption of PTAs, the number of provisions in a PTA is positively associated with distance. This is likely a consequence of the late adoption of modern PTAs as governments are reaching more distant partners.

Strategic MNC competition and 'deep' PTAs*: The regression analysis of PTA onset suggests that domestic contracting institutions matter for the adoption of a PTA, but the attractiveness of a host state also depends on the available alternatives. The statistical analysis, however, assumes away any effects from third parties, including those predicted by the *contracting* theory. Contagion effects are an important example of third party effect that can be generated by competition among governments. *Strategic* theories of trade agreements predict that governments will use policy to shift profits from foreign exporters to domestic exporters by establishing monopoly rights over some third market.[17] These strategic forces are exacerbated by the presence of global investors. For example, assume that two countries have MNC headquarters that are each engaged in market-seeking FDI in a third country. They each source inputs in their respective host market, and then export them into

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[17]While often not formalized, these theories are similar to the *strategic trade theory* developed by Spencer and Brander (1983).

the host country at an MFN tariff. A PTA between one of the two states and the host state would put investors from the second state at a competitive disadvantage, as their inputs would be more expensive, and the foreign investment would obtain lower returns.

Such an intra-industry motivation for preferential liberalization underlies research by Marc Manger on the discriminatory effects of PTAs (2009). Manger finds that MNCs in various developed economies compete with one another for access to developing country markets, and prefer preferential agreements to close out their similarly positioned developed country competition. Similarly, analysis of investment provisions in PTAs suggests that governments compete with one another for investment, finding that when a PTA is adopted, governments with similar wealth respond defensively, leading to PTA contagion (Baccini and Dür (2010)).

The mechanism underlying these strategic theories of PTAs predict that parts and components trade should lead to more and deeper preferential agreements. Data on global production and trade agreements exhibit a positive corrleation, consistent with a production facilitating role for trade agreements. Table 4.3 lists the coefficients of a statistical model of trade in parts and components and the content of PTAs (WTO 2011). The results show that the adoption of a preferential trade agreement is associated with a 35% rise in trade in parts and components. For every additional provision in a trade agreement, including competition, investment, cooperation over regulations and non-economic provisions, trade in parts and components rises by 2 percentage points. Additionally, holding fixed economic factors at the country level, the amount of trade in parts and components predicts the adoption of PTA provisions. These findings support the substantive importance of global production

in the formation and consequences of modern PTAs, but the regressions used to establish these findings assume a strong form of independence among member states and is unable to adjudicate between competing theories of preferential liberalization.

Existing evidence for the *strategic* theory, which argues that PTAs are designed to advantage one, presumably northern headquarter firm against another, remains anecdotal. The most prominent examples come from the response by Latin American and Asian countries to the formation of NAFTA. Using these cases, Manger finds that strong rules of origin requirements limit the benefits of liberalization to partner countries because PTAs shift the destination of intermediate products toward PTA partners (Manger (2009)). However, the extent to which this sort of competitive preferential liberalization actually affect headquarter states is less clear.[18] The U.S. and EU both attempted to negotiate and implement PTAs with Chile, Israel, Jordan, Mexico and Morocco, but ex-post market share analysis indicates that neither gained a competitive advantage (Ahearn (2011)). The *strategic* theory indicates that the adoption of PTAs by states with similar levels of wealth should lower the value of subsequent agreements. We take this up below.

4.4 Competitive Determinants of Deep Integration

While interdependence features prominently in a number of theories of trade cooperation, incorporated third party effects, contagion or competition into a statistical analysis requires strong assumptions. This section develops a simple econometric

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[18]Given the asymmetry of actors in this sort of environment, it is not clear that rules of origin requirements should have that great of a negative effect on headquarter states. In general, manufacturing states tariffs will only have limited consequences for the terms of trade of headquarter firms. The following section proposes a theory that does not depend on changes to global terms of trade.

model to compare the various pathways of competition imagined by the contracting theory and the strategic trade theories of deep PTA formation. I find that although PTAs may be part of a broader strategy by host states to improve their domestic contracting environment and attract investment, adopting a PTA decreases the propensity for similar states to adopt such an agreement. Below I discuss substantive and methodological issues associated with measuring these third party effects.

Including an autoregressive component to a time series model allows outcomes to affect one another within a unit; similarly, it is possible to relax the independence assumptions across units in a given period of time. These models use spatial lags to capture forces such as coercion, competition, learning, emulation or migration.[19] In a prominent application, Elkins and Simmons study the channels of spillover effects in globalization by comparing different specifications of a weighting matrix $\mathbf{W}$ (Simmons and Elkins (2004)). Each element $w_{ij} \in \mathbf{W}$ is a distance between subjects i and j. These distances may be symmetric, such as geographic distance, or asymmetric, such as with exports. In this case, $\mathbf{W}$ varies with time, forming an $N \times N \times T$ dimensional matrix. Each row i of the matrix then represents some distance between subject i and every other subject. If this row is normalized to sum to one, the interpretation of $\mathbf{W}y$ is the spatially weighted average of y_j for all $j \neq i$, allowing the interpretation of the coefficient ρ in terms of the units of the dependent variable. However, row normalization comes at the cost of cross-time comparability, and may magnify the effect of measurement error. Furthermore, the estimates of the competition effects without row normalization take into account the relative importance of different channels of competition over time.

In addition to the substantive issues in specifying a $\mathbf{W}$, spatial lags can suffer

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[19]Elkins and Simmons 2005, Simmons, Dobbin, and Garrett 2006, Franzese and Hayes (2008).

from endogeneity, inducing simultaneity bias that can provide misleading estimates. Without an appropriate instrument, a one-period lag can partially address the simultaneity issue, but at a substantive cost. If the purpose of the spatial lag is to correct for spatial autocorrelation, a one-period lag would fail to control for instantaneous forces that operate across units, or depend on the expectations about future behavior (Franzese and Hayes (2008)). The following models use a one-period temporal lag, which limits the interpretation of the coefficient on the spatial matrix to be only unanticipated effects.[20]

$$y_t = \rho \mathbf{W} y_{t-1} + X_t \beta + \epsilon$$

For the purpose of the estimation, the residuals are assumed to be follow the Poisson family of distributions, in particular a negative binomial, which allows for over-dispersion.[21] The model regresses the adoption of PTA provisions on the weighted lag, as well as a number of covariates, including country level indicator variables. The estimated coefficients predicting within country variation, controlling for unobserved, cross-country variation.[22] This estimation strategy, while partially addressing the network structure of the data, cannot account for the changes in the networks structure generated by the adoption of PTAs, or other dynamic, country level variation.

Tables 4.6 and 4.7 present three specifications of $\mathbf{W}$, each corresponding to a

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[20]Manger (2009) argues that American negotiators did not anticipate a European and Japanese response to NAFTA, and European negotiators did not anticipate a Japanese response to an EU-Mexico FTA. However, the affected multinational firms may have been aware of these possibilities in ways that their representatives were not, and competition for manufacturing locations may be more salient than conflict between headquarters.

[21]A negative binomial regression uses a two-stage model to allow the rate to vary. The conditional on an unobserved random variable E, the outcome variable Y is distributed Poisson (μE). This unobserved random variable times θ is distributed gamma, with a shape parameter θ set to .5.

[22]The fixed effects negative binomial regression has been shown to perform fairly well in controlling for stable covariates, see Allison and Waterman (2002).

different channel of competitive pressure from third parties in the adoption of PTAs without row normalization. Column 10 uses the euclidean distance of CIM measures per year, which measures the extent to which the adoption of PTA provisions by countries with similar property rights affects the adoption of PTAs. Columns 11 and 12 provided estimates for a weight matrix generated by euclidean distances between GDP and GDP per capita respectively.[23]

The adoption of a PTA provision by a state with similar property right outcomes is negatively associated with the adoption of additional PTA provisions. However, as displayed in column 13, the lagged adoption of PTA provisions by countries with similar GDP or GDP per capita are not robustly correlated with the adoption of PTA provisions. Direct comparison of the effect sizes is ruled out by the lack of normalization, but a similar pattern holds for the cumulative number of PTA provisions adopted, displayed in 4.7. This analysis is consistent with the theory that third party adoption of PTAs decreases the value to entering into binding agreements for states with similar levels of property rights protection.

In order to directly evaluate the relative importance of each channel of competition, Tables 4.8 and 4.9 display the coefficients from row normalized weight matrices. Columns 18 and 21 indicate that while the CIM based weights retain their substantive and statistical relationship to the adoption of PTAs, the GDP and GDP per capita based weighted lags are *positively* associated with the adoption of PTA provisions.[24]

The results of the spatial weight models of contagion suggest that there are significant third party effects to modern PTAs. While including regulatory provisions in

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[23]These matrices are measured with error which may affect the results. GDP and GDP per capita are each reported in 2000 U.S. dollars, taken from IMF statistics.

[24]Network analysis of world trade flows consistently find that highly integrated countries tend to trade with with poorly connected countries (Serrano and Boguná (2003)).

a PTA may be part of a strategy which improves contracting conditions and attracts investments, the statistical evidence suggests that such a strategy has negative consequences for other potential host states. The fact that these agreements negatively affect the prospects for subsequent agreements bodes poorly for modern PTAs to serve as a substitute for the multilateral trade regime.

4.5 Conclusion

This chapter argues that modern PTAs enable host states to affect the investment and production decisions of global producers. In particular, the adoption of PTAs can establish attractive conditions for headquarter investment and shift the negotiating position of firms in non-joining states. These international production practices rely on domestic institutions as well as international arrangements outlined in modern PTAs to allocate the benefits of production across the supply chain. By altering the incentives for participants in global production by adopting PTAs with more robust protections for headquarter firms, governments improve their competitive position relative to non-joining states. These competitive pressures are strongest among countries with similar levels of contract enforcement. On the contracting theory, PTAs are a strategic choice by host states to compete with other upstream manufacturing economies, rather than competition among developed governments over exclusive access to upstream manufacturing economies.

This chapter used specifications of similarity matrices that approximate the consequences of PTA adoption by competitor states. The results suggest that countries with similar contracting conditions suffer from a similar level of holdup ex-ante and are the relevant competitor group for the adoption of modern PTA provisions. The

negative correlation revealed in the data suggest that as modern PTAs expand, we should see more PTAs adopted to attract manufacturing contracts. On the other hand, governments with similar factor endowments and home market size exhibit a positive relationship with the adoption of modern PTAs. These results suggest that third party consequences of PTAs accrue primarily among states with a similar comparative advantage (or disadvantage) in contractual institutions, consistent with a *contracting* theory of trade. These results are sensitive to the modeling strategy chosen. The regression models estimated in this chapter are not ideal for identifying the consequences of trade agreements for non-joiners. As a result, explicit consideration of the network nature of global trade relations is necessary to address the dynamic relationship between PTA adoption and multilateral arrangements. The kind of static spatial approach taken here is a first step toward understanding the broader network implications of global production.

Substantively, this chapter identifies problems with the shift away from the multilateral system. While modern PTAs can have attractive non-tariff provisions, these provisions may have consequences for non-joiners that could frustrate future progress on regulatory cooperation. Regulatory provisions may not have explicit rules of origin or other means to exclude parties, but their effect is to reinforce the market positions of headquarter firms, undercutting third party markets. As a result, the non-market access considerations in PTAs may be more of a threat to progress on multilateral negotiations than traditional trade diversion, and a reason to refocus attention and effort toward fixing the problems with the multilateral trade system.

Table 4.3: Parts and Components Trade and 'Deep PTAs'

	Dependent variable:			
	Trade in parts and Components			
	(1)	(2)	(3)	(4)
PTA_{ij}	0.299**			
	(0.020)			
PTA_{ij}*Number of Provisions		0.165***		
		(0.001)		
PTA_{ij}*Number of WTO-X Provisions			0.0265***	
			(0.002)	
PTA_{ij}*Number of WTO+ Provisions				0.0310***
				(0.002)
Observations	60,473	60,473	60,473	60,473
R-squared	0.328	0.328	0.327	0.327
Country Pairs	3,485	3,485	3,485	3,485

Standard errors in parentheses $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Analysis includes country-pair and country-time fixed effects, table reproduced from WTO (2011).

Table 4.4: PTA onset with CIM measure

	Dependent variable:		
	PTA Onset		
	(5)	(6)	(7)
PTA	1.555***	1.530***	1.533***
	(0.091)	(0.093)	(0.093)
Regime Type	0.001	0.004	0.008**
	(0.003)	(0.003)	(0.003)
Political Constraints	−0.058	−0.075	−0.176*
	(0.094)	(0.096)	(0.098)
CIM		−0.338*	5.001***
		(0.195)	(0.537)
CIMxRegime			−0.340***
			(0.032)
M2		0.00000***	0.00000***
		(0.00000)	(0.00000)
ln(trade)	0.024***	0.025***	0.027***
	(0.003)	(0.003)	(0.003)
ln(GDP)	−0.036***	−0.040***	−0.033***
	(0.008)	(0.009)	(0.009)
Contagion	−3.500**	−4.540***	−4.626***
	(1.569)	(1.577)	(1.563)
Contagion (sq)	12.952**	16.499***	16.481***
	(6.399)	(6.302)	(6.160)
ln(Distance)	−0.533***	−0.561***	−0.574***
	(0.014)	(0.014)	(0.014)
Year	0.027***	0.023***	0.021***
	(0.002)	(0.002)	(0.002)
Constant	−51.147***	−43.695***	−39.869***
	(4.389)	(4.714)	(4.753)
Observations	166,350	156,214	156,214
Log likelihood	−5,479.181	−5,186.418	−5,131.507
Akaike Inf. Crit.	10,978.360	10,396.840	10,289.010

Note: *p<0.1; **p<0.05; ***p<0.01
   Data (except for CIM) taken from Mansfield and Milner (2012).

Table 4.5: Depth of PTAs and contagion effects

	Dependent variable:	
	PTA Depth	CIM
	(8)	(9)
PTA	−0.045	0.015***
	(0.098)	(0.005)
Regime Type	0.004***	−0.001***
	(0.001)	(0.00004)
CIM	−0.723***	
	(0.053)	
Depth		0.007***
		(0.0004)
Depth×Regime		−0.0005***
		(0.00002)
Political Constraints	−0.541***	0.061***
	(0.028)	(0.001)
M2	0.00000***	0.000***
	(0.000)	(0.000)
year	0.029***	−0.001***
	(0.001)	(0.00003)
ln(trade)	0.002*	0.0003***
	(0.001)	(0.00004)
ln(GDP)	0.112***	0.007***
	(0.002)	(0.0001)
ln(distance)	0.074***	0.009***
	(0.006)	(0.0003)
Contagion	1.076	0.065*
	(0.717)	(0.034)
Contagion sq	−6.328*	0.092
	(3.538)	(0.169)
Constant	−59.671***	0.864***
	(1.186)	(0.057)
Observations	156, 146	156, 214
R^2	0.033	0.075
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 4.6: Adoption of PTA provisions

		Dependent variable:		
		Adoption of PTA provisions		
	(10)	(11)	(12)	(13)
$\rho_{CIM(t-1)}$	−0.004			−0.069***
	(0.005)			(0.017)
$\rho_{GDP(t-1)}$		0.002***		0.001***
		(0.0003)		(0.0005)
$\rho_{GDPp.c.(t-1)}$			0.001**	0.006***
			(0.0004)	(0.002)
$Depth_{t-1}$	0.029**	0.057***	0.027*	0.050**
	(0.014)	(0.020)	(0.015)	(0.021)
GDP_{t-1}		−0.233***		−0.301***
		(0.071)		(0.083)
$GDPp.c._{t-1}$			−0.195	0.551**
			(0.165)	(0.249)
CIM_{t-1}	−3.397***	1.988	−3.367***	1.950
	(0.927)	(1.282)	(1.024)	(1.496)
year	0.149***	0.115***	0.145***	0.060**
	(0.010)	(0.020)	(0.016)	(0.029)
Constant	−320.983	−245.877	−311.693	−139.600
	(7,588.944)	(18,606.460)	(8,182.302)	(19,505.600)
Observations	2,721	2,025	2,475	1,805
Log likelihood	−586.214	−326.976	−585.046	−323.779
Akaike Inf. Crit.	1,594.428	1,077.952	1,594.093	1,077.558

Note: *Country fixed effects omitted.*   *p<0.1; **p<0.05; ***p<0.01

Table 4.7: Cumulative adoption of PTA provisions

	Dependent variable:			
	Cumulative adoption of PTA provisions			
	(14)	(15)	(16)	(17)
$\rho_{CIM(t-1)}$	0.00003			−0.003***
	(0.0003)			(0.001)
$\rho_{GDP(t-1)}$		0.00004*		
		(0.00002)		
$\rho_{GDPp.c.(t-1)}$			0.0001***	0.0003***
			(0.00004)	(0.0001)
$Depth_{t-1}$	1.033***	1.000***	1.029***	1.031***
	(0.004)	(0.006)	(0.004)	(0.004)
GDP_{t-1}		0.006		
		(0.008)		
$GDPp.c._{t-1}$			0.016	0.028
			(0.022)	(0.022)
CIM_{t-1}	−0.829*	0.184	−1.017**	−0.927*
	(0.441)	(0.364)	(0.487)	(0.485)
Constant	−0.006	0.000	−0.204	0.090
	(0.639)	(1.105)	(0.675)	(0.674)
Observations	2,721	2,025	2,475	2,475
R^2	0.983	0.970	0.983	0.983
Adjusted R^2	0.982	0.966	0.981	0.982
Note:	*Country fixed effects not shown.*		*p<0.1; **p<0.05; ***p<0.01	

Table 4.8: Row Normalized **W**

	Dependent variable:			
	Adoption of PTA provisions			
	(18)	(19)	(20)	(21)
$\rho_{CIM(t-1)}$	−0.005*			−0.006**
	(0.003)			(0.003)
$\rho_{GDP(t-1)}$		−0.011***		
		(0.002)		
$\rho_{GDPp.c.(t-1)}$			0.002	0.004
			(0.003)	(0.003)
$GDPp.c._{t-1}$			−0.220	−0.226
			(0.164)	(0.150)
$Depth_{t-1}$	0.019	0.043**	0.032**	0.023
	(0.015)	(0.020)	(0.015)	(0.016)
GDP_{t-1}		−0.188***		
		(0.072)		
CIM_{t-1}	−3.416***	1.778	−3.300***	−3.239***
	(0.922)	(1.259)	(1.008)	(1.000)
year	0.139***	0.105***	0.155***	0.144***
	(0.010)	(0.020)	(0.016)	(0.016)
Constant	−300.834	−227.061	−332.500	−309.873
	(7, 615.448)	(18, 647.170)	(8, 000.964)	(8, 107.803)
Observations	2, 721	2, 025	2, 475	2, 475
Log likelihood	−585.653	−326.099	−585.557	−584.565
Akaike Inf. Crit.	1, 593.307	1, 076.197	1, 595.114	1, 595.130
Note:	*Country fixed effects omitted.*		*p<0.1; **p<0.05; ***p<0.01	

Table 4.9: Row Normalized **W**

	Dependent variable:			
	Cumulative adoption of PTA provisions			
	(22)	(23)	(24)	(25)
$\rho_{CIM(t-1)}$	−0.001***			−0.001***
	(0.0004)			(0.0005)
$\rho_{GDP(t-1)}$		−0.001***		
		(0.0002)		
$\rho_{GDPp.c.(t-1)}$			0.001***	0.001**
			(0.0003)	(0.0003)
$Depth_{t-1}$	1.028***	0.998***	1.028***	1.026***
	(0.004)	(0.006)	(0.004)	(0.004)
GDP_{t-1}		−0.002		
		(0.013)		
$GDPp.c._{t-1}$			−0.089**	−0.093**
			(0.042)	(0.042)
CIM_{t-1}	−1.241***	0.192	−1.061**	−1.253**
	(0.447)	(0.363)	(0.492)	(0.497)
year	0.011***	0.0001	0.020***	0.022***
	(0.003)	(0.004)	(0.006)	(0.006)
Constant	−22.638***	−0.134	−40.020***	−44.086***
	(5.497)	(8.284)	(12.680)	(12.762)
Observations	2,721	2,025	2,475	2,475
R^2	0.983	0.970	0.983	0.983
Adjusted R^2	0.982	0.967	0.982	0.982
Note:	*Country fixed effects omitted.*		*p<0.1; **p<0.05; ***p<0.01	

Chapter 5

Multilateral Standards Agreements

What international arrangements are appropriate for the rise in global production and challenges posed by regulatory protectionism? To answer that question, this chapter examines the development of the GATT/WTO standards agreements, in order to develop principles for multilateral cooperation. In contrast to the GATT/WTO rules governing tariffs, the standards agreements address a form of protectionism that is difficult to distinguish from other public policy goals. Rather than enumerate allowable regulations, standards agreements require governments to evaluate the necessity of trade restrictive measures. This general mandate includes flexibilities that allow trade restrictive measures that comply with international standards or have a rationale which is supported by scientific evidence. I argue below that these exceptions help resolve a fundamental information problem in regulatory cooperation - the inability to observe regulatory intent. Unlike theories of *ex post* flexibilities that soften punishments of violation of agreements, this form of *ex ante flexibility* provides leeway in what counts as cooperation. *Ex ante* flexibility I argue, enables governments to limit regulatory protection while maintaining regulatory autonomy when regulatory

177

needs are not publicly observable.

Regulatory barriers are both essential to achieving public policy goals and the principal barrier to international trade. The same measure can both limit the entry of a marginal foreign firm, *and* be necessary to achieve a level of safety or health desired by the public. Unlike the protectionist interests that motivate tariffs, the political pressures which lead governments to advance regulatory protectionism are often difficult to directly observe, complicating international cooperation.[1] The problem for an agreement is to design an instrument that distinguishes between measures that satisfy some public policy demand and those that are principally aimed at disrupting global commerce. Unfortunately, governments have incentives to mischaracterize domestic pressures to gain advantage in treaty negotiations. As a result, uncertainty over foreign domestic pressures can limit or even prevent cooperation between governments. To resolve this problem, governments may adopt international institutions that allow governments to deviate from rules when necessary. In the context of the multilateral trade regime, exit and escape clauses, the listed exceptions in GATT Article XX, and WTO Dispute Settlement rulings can enable governments to temporarily abrogate their agreement, introducing flexibility that may facilitate liberalization.[2] On this account, flexibility reduces the costs associated with periods of punishment, enabling deeper tariff commitments.[3]

In this chapter, I take up the issue of flexibility in the design of a successful international regulatory cooperation: the GATT/WTO standards agreements. Based on

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[1] Interestingly, in the WTO monitoring of national trade policymaking, the Trade Policy Reviews, exclude regulatory measures in order to avoid having to make any judgment as to whether such measures are justified on public policy grounds.

[2] See, Sykes (2001); Koremenos et al. (2001); 2001; 2005

[3] See, Rosendorff and Milner (2001); Kucik and Reinhardt (2008); Johns and Pelc (Forthcoming).

the 'plurilateral' side agreements negotiated in the Tokyo Round, the current Technical Barriers to Trade (TBT) and the Sanitary and Phytosanitary (SPS) agreements stand as exceptions to the general lack of progress on regulatory protection. Upon the creation of the WTO in 1994, all 128 member states joined the SPS and TBT agreements in the *single undertaking*, requiring that *all* regulatory measures be no more trade restrictive than necessary, opening the WTO membership up to challenges to their domestic regulatory regimes. The intent of these agreements is to resolve the uncertainty over the intent of a regulatory measure by punishing 'disguised protectionism.' To do so, both agreements introduce substantive provisions to promote the harmonization of regulatory measures to prevailing international standards. These standards include those developed by the Codex Alimentarius Commission, the World Organization for Animal Health and the Secretariat of the International Plant Protection Convention, as well as provisions for the recognition of regulatory practices among the membership. These international standards are not mandatory, but rather are given a legal presumption against challenge.

The provisions on disguised protectionism and the promotion of international standards do not lower the penalty associated with violating the agreement. Rather the conventional theory of international institutional design predicts that *ex post* flexibility enables governments to replace inefficient punishment strategies with carefully tuned retaliation. But, escape clauses, dispute settlement, and other qualifications to violations of the agreement, while common in the tariff context, have little bearing on the development of the standards agreements. From the beginning, the GATT lacked specified punishments and the standards agreement in the Tokyo Round did little to change the situation. The new agreements did not increase (or decrease) the costs

of non-compliance, either from unilateral sanction or from more robust multilateral sanction. Furthermore, the Standards Code, TBT and SPS agreements lacked explicit side payments that could substitute for punishments, or even a substantial monitoring authority. Finally, the agreements did not set specific standards of regulatory conduct.

I argue that instead, the use of international standards in the SPS and TBT agreements incorporated a form of flexibility which enabled governments to respond to privately observed political pressures and signal their interest in public policy. These agreements were designed in such a way as to flexibly delegate regulatory autonomy to individual governments while retaining the ability for governments to meet regulatory demands. Recognizing that governments are biased in favor of protection, but also have information about their regulatory needs, agreements need to balance the tradeoff between discretion and the depth of cooperation. These agreements did this by offering a form of *ex ante* flexibility consistent with the predictions of models of optimal delegation - enabling governments to choose their preferred level of protection subject to a maximal level of trade restriction. This sort of flexibility in the initial terms of an agreement allows a range of behavior that incentivizes governments to join the agreement, but insures bindings that are restrictive enough that members are able to reveal their interest in cooperative behavior.

In addition to promoting harmonization to international standards, the TBT and SPS agreements have an explicit role for scientific evidence. A large literature in international relations identifies a tight connection between global civil society and cooperation, particularly in technical areas such as international standards agreements that pertain to the core competencies of international scientific bodies. As

a result, the incorporation of scientific principles and discourse is predicted to promote cooperation. Against this ideational account, Daniel Drezner argues that such scientific consensus is often ignored when geopolitically inconvenient, finding that scientific evidence played little or no role in the US-EU GMO disputes (2007). I take a middle position, that is that the role of scientific evidence in the TBT and SPS agreements is not to introduce a scientific consensus, or as a shield for more crude forms of power. Instead, scientific evidence requirements in international cooperative agreements serve as a costly means to credibly signal political pressures for regulatory protection. Commissioning a study or publicly announcing a scientific rationale for a public policy measure raises the costs of regulatory protection. While not guaranteeing an efficient or scientifically legitimate policy, there are cases under which requiring a costly procedure improves the extent of cooperation.

The need to incorporate both *ex ante* and *ex post* flexibility will be necessary for future economic agreements. In contrast to models where a principal incentivizes an agent with a schedule of payments, future trade agreements cannot provide conditional payments to its members. Additionally, since many agreements lack explicit or tuned punishment strategies, incentives are not aligned via ex-post punishments. And as Amador and Bagwell (2012) show, in the absence of such transfers or tuned punishments, limiting tariff protection can be characterized as an optimal delegation problem. It may be that international standards and scientific evidence provisions enable an efficient standards agreement, but rather than flexibility to handle demands for protection, the requirement would be to produce scientific evidence as a costly signal to realign incentives of errant member states.

The analysis of the two standards agreements below sheds light on how governments must balance domestic autonomy against the gains from international cooperation. In these agreements, negotiators in Geneva and at home are concerned not only with tariff negotiations but also with the liberalization of investment, intellectual property, environment, health, and social standards that require addressing regulatory norms and standards. Each of these issues covers a wide array of policy instruments, requiring complicated negotiations and tradeoffs.

This chapter proceeds as follows. The first half of the chapter highlights the role of flexibility in the design of the multilateral standards agreements and patterns of notifications of trade restrictive measures. I then argue that the current approach to international institutional design only emphasizes the utility of flexibility in the punishment regime but pays insufficient attention to ex ante flexibility. The second half of the chapter takes up this ex ante flexibility and develops an alternative framework for the design of regulatory agreements.

5.1 Design in Practice

Regulatory protection has been an issue for trade negotiators well before the creation of the GATT, falling under the general rubric of internal discrimination. Considerations for internal discrimination, or assurances of 'national treatment,' have their roots in the early development of long distance commercial relations. During the Commercial Revolution of the Middle Ages, Italian guilds sought to organize restrictions on the quality and characteristics of goods that could be sold, and failing that, to assure equal treatment by local merchants (Richardson (2008)). These agreements

among guilds and across markets enabled incumbents to effectively divide or monopolize markets, excluding their competitors. In subsequent economic relations, such as the period of bilateral trade agreement cooperation before the 1947 GATT, governments similarly incorporated assurances of general economic policy openness in their agreements. These international trade agreements extended equal treatment at the border to include domestic conditions, obligating governments to treat foreign products at least as favorably as "like" domestic products. National treatment required that any internal tax or regulation not discriminate between domestic and foreign sources of supply, or be applied in a manner "so as to afford protection." Such obligations were then incorporated into Article III of the GATT:

> GATT Article III 4. The products of the territory of any contracting party imported into the territory of any other contracting party shall be accorded treatment no less favourable than that accorded to like products of national origin in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, purchase, transportation, distribution or use.

The national treatment provision aims to ensure that border measures are not merely replaced with equivalent instruments of regulatory protection. For example, suppose that a party to a trade agreement offered to reduce tariffs on paint products for some valuable market access in a partner state. In the absence of a national treatment provision, a government could attempt to use a health warning label to limit the import of foreign paint, surreptitiously increasing the sales of domestic paint manufacturers. A national treatment provision requires that the label on foreign products would have to be the same as those found on domestic products. Since

the label would no longer distribute competitive benefits, the government could be dissuaded from using the health measure for protectionist reasons. As a result, only tariffs would be left to restrict trade, and are thereby subject to the obligations in the original agreement.

National treatment helps enforce obligations in the GATT/WTO system that pertain to total trade volume. Specifically, the legal analysis of a national treatment provision asks whether a regulation differentially advantages some "like" domestic product over a foreign product and that the foreign sales decline in response to the measure. There are two challenges to establishing this legal claim. First, there may be no domestic production of the good. Consider a restriction that states that paints sold in a market could not contain toxic lead. If there are no domestic paint manufacturers, it is difficult to establish that the regulation is not evenly applied to all goods in the market, and thereby do not establish a discriminatory effect (Horn (2006)). In the absence of evidence of a discriminatory effect, governments can still appeal to national treatment to counter *de facto* discriminatory measures. Winning such a case depends on showing that some harm has occurred to market access, as determined by trade volume. However, if regulatory barriers take the form of a fixed cost, the main effect of the barrier may be to induce exit, rather than harm aggregate trade volume. In the earlier study of the Uruguay Round tariff negotiations, the presence of interests in suppressing entry lead governments to limit their tariff concessions, especially when forms of regulatory protection were at issue. As a result of these limitations, the rigid application of the national treatment rule may do little to address the challenges posed by regulatory cooperation.

These limitations to the operation of the original GATT rules, such as national treatment, may be partially addressed by the judicial apparatus of the agreement. The dispute settlement procedure provides rulings on complaints by the members over violations of the GATT/WTO rules. With a ruling, the GATT/WTO's Dispute Settlement Mechanism can lower the costs of using rigid national treatment rules while still addressing potential policy substitution by GATT members. While panelists and Appellate Body Members may be less informed about the regulatory needs and protectionist interests on the part of member states than the members themselves, the presence of an arbitrator can substitute for an explicit contract in the law. For example, considering the example of paint above, if a foreign manufacturer of paint switches to a lead intensive manufacturing process, a rigidly applied national treatment provision might not allow governments to respond to the change, as the manufacturing process was not explicitly included in the tariff schedule. In this way, a dispute settlement process can rule that the national treatment provisions need not apply and that the lead in the manufacturing process distinguishes the goods from a regulatory standpoint.[4] The availability of a dispute settlement process can fill in incomplete agreements. However, relying on individual rulings is highly inefficient

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[4]One stark example of the question of national treatment flexibility was at issue in the Canada-EC Asbestos dispute. As GATT/WTO members, Canada and the European Community member states are mutually obligated to provide equal treatment to imports as domestic goods. On these grounds, Canada challenged a 1996 French ban on imported cement construction materials containing asbestos, which came, in part, from Canada. Canada argued that cement construction material that contained asbestos is 'like' other domestically produced substitutes from the perspective of the market - consumers did not distinguish between asbestos and other cement additives. While the WTO panel ruled in favor of the EC, upholding the ban, it was on the grounds that despite the fact that the EC violated national treatment, this violation was justified under Article XX(b) of the GATT as "necessary" for the protection of human health. By contrast, the Appellate Body ruled that the health concerns of the government could be used as a basis for determining whether two products were 'like' but did not allow the health concern to be directly considered (Howse and Tuerk (2001)). The tension between the Appellate Body and the panel reveals one of the serious issues with the national treatment provisions in the GATT and one of the grounds for introducing supplementary codes and rules as the institution matured.

and the Appellate Body has been hesitant to fill out the obligations of the agreement to new products.[5]

Given the difficulties with the Uruguay Round negotiations and the limited success in enacting rules on regulatory protectionism, it is instructive to take up the examples of successful agreements. Below I outline the progress in the GATT on regulatory issues related to technical, health and safety standards. These regulatory issues are taken up in three agreements, the Tokyo Round agreement on Technical Barriers to Trade (the 'Standards Code') and the Uruguay Round agreements: The Technical Barriers to Trade Agreement (TBT Agreement) and the Sanitary and Phytosanitary Agreement (SPS Agreement).

5.1.1 The Tokyo Round Agreement on Technical Barriers to Trade

In the course of the implementation of GATT agreements, it became clear that the national treatment rule was insufficient to handle the use of regulatory protection. The GATT had little to say about measures that could arguably promote some public policy objective and did not explicitly discriminate against imports (Sykes (1995)). This dissatisfaction led governments to seek rules beyond national treatment, developing new multilateral obligations. The first successful efforts to develop such rules on regulatory protection occurred during the 1973 Tokyo Round on a plurilateral basis. The Tokyo Round began as an effort to address the variation in domestic practices of members, in part reflecting a vast increase in the membership of the GATT to 102 diverse members. As a result, the agenda included new items of interest to the

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[5]For a formalization of this logic, see Battigalli and Maggi (2003).

expanded membership, including safeguards for workers and firms and the expansion of the GATT into new sectors, in particular agriculture and tropical products. The prior Kennedy Round had introduced the use of 'plurilateral' negotiations in the Antidumping Code, i.e. dumping was negotiated in a separate agreement. Based on this model, the Tokyo Declaration set out to apply this procedure to regulatory issues. As the Round progressed, however, it became apparent that negotiating each issue in isolation limited the range of trade offs at the bargaining table. Thus, when it came time to extend the deals beyond the main negotiating countries, few countries were willing to join on.

The Tokyo Round Standards Code did little to change the obligations under the national treatment provision, except in the narrow field of technical regulation. The Standards Code covered technical regulations defined as "A specification contained in a document which lays down characteristics of a product such as levels of quality, performance, safety or dimensions," excluding measures relating to production and processing standards common for agricultural products. The codes did offer a number of new obligations; the 33 signatories are asked to refer to international standards in the development of their regulations and if there was a dispute, provide "detailed scientific judgments" on the formulation of the regulation. In addition, regulations were to be transparent, offering the opportunity for trade partners to comply or complain. While these provisions went well beyond tariff schedules, these obligations did not come with substantive or well defined enforcement procedures.

Given the lack of new substantive obligations beyond national treatment, how can we understand the institutional design changes made in the Tokyo Round? The rise in membership during the Tokyo Round expanded the potential space of regulatory

demands. The institutional approach taken during the Tokyo Round addressed this expansion in two ways. First, making the Standards Code optional allowed governments to opt into the agreement. This opt-in provision did not necessarily mean as much in the GATT system, which had rules that allowed any member to block a panel report. However, governments were offered flexibility short of blocking a dispute. Governments were encouraged to provide scientific evidence for the necessity of a trade restrictive measure.[6] Thus, without changing the severity or cost of punishments, this provision introduced a mechanism that may have provided *ex ante* flexibility on the part of the signatories. As a result, the Standards Code has had some success in formalizing limits to regulatory protection.

Analysis of the cases brought under the Standards Code reveals some of the limits of the regulatory agreement. The Standards Code was the basis of only a few disputes that resulted in a public report, the most important involving Japanese technical standards. In a dispute about a safety standard set by a Japanese industry group, the US and several alpine countries challenged the safety standard on the grounds that it was unique to Japan, rather than the existing international standard. To receive the Japanese Consumer Product Safety marking, skis had to be a certain thickness, rather than have a particular adherence of bindings. Japanese officials made an aborted attempt to defend their unique standard by appeal to scientific evidence on the unique characteristics of Japanese snow. In a second case, the US alleged that the Japanese practice of "lot" inspections was discriminatory. Japan allowed domestic producers to be approved to sell a "type" of product but foreign shipments had to be analyzed on a shipment by shipment basis. Following consolations, Japan changed the

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[6]Previous to the Tokyo Round, there were no GATT provisions that included an appeal to scientific evidence. Even as late as 1970, a working group on Standards Acting as Barriers to Trade made no mention of scientific evidence.

law rather than offer any scientific evidence that such inspections were more effective than the alternative "type" inspection technique (Edelman (1987)). In some sense, this is a success, suggesting that the costs of defending the measure were sufficiently prohibitive, but Japan was also subject to a number of coercive efforts by the United States that did not depend on the findings or rules of the Standards Code.[7]

The flexibility provisions of the Standards Code were considerably strengthened through the automatic adoption of dispute settlement proceedings after the Uruguay Round. Among the Uruguay Round agreements was the General Agreement on Trade in Services, an agreement on trade and investment (TRIMS), an agreement on intellectual property (TRIPS), the agreement on technical barriers to trade (TBT) and on sanitary and phytosanitary measures (SPS). Like all agreements post 1995, rulings under the TBT and SPS agreements can no longer be blocked by the losing party. This change increases the formal legal sanctions associated with violating the agreement, which would suggest a decrease in *ex post* flexibility and therefore a decrease in the likelihood of deep agreements. In addition to changing the institutionalization of *ex post* sanction, the TBT and SPS Agreements clarified and consolidated the design principles of the Tokyo Standards Code.

In particular, the revamped TBT agreement reiterates the national treatment obligation from the GATT, requiring members to ensure that technical regulations are "not prepared, adopted or applied with a view to or with the effect of creating unnecessary obstacles to international trade." The interpretation of necessity requires that regulatory measures are no more trade-restrictive than other available regulatory

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[7]While there are no public documents on this subject, the Committee on Technical Barriers releases an annual report on the development of Technical Barriers to Trade. These reports do not include the identities of disputants, and regulatory barriers are only available from self reports (Sykes (1995)). However, analysis of these committee reports may shed light on the problems that led to the revamping of the Standard Code during the Uruguay Round.

policies which reach the same public policy objective. Those public policy objectives are left unspecified, allowing governments to determine their own level of acceptable risk. This regulatory autonomy limits the need for the WTO dispute settlement system to infer intent. Instead, governments are free to pick a public policy goal that demands robust regulatory measures without regard to the trade consequences.

Rather than determining the intent of governments, the TBT and SPS contain two features which help align incentives: provisions for harmonization of regulatory barriers to international standards, and failing that, a requirement to produce scientific evidence. Specifically, the agreements says that WTO Member States "shall" use international standards as the basis for their technical regulation. The SPS agreement enforces this requirement by providing a legal incentive. Those measures which conform to international standards "shall be deemed to be necessary to protect human, animal or plant life or health, and presumed to be consistent" with the obligations under the GATT/WTO. This presumption rules out challenges to regulatory protectionist measures that reach, or are less than, the level of restriction induced by the adoption of international standards. This presumption removes the burden on governments to show that their regulatory choices are the least trade restrictive measures that are available to achieve their public policy goal.[8]

The SPS agreement also increased the *ex ante* flexibility to adopt regulations more restrictive than an international standard. To go beyond the international standard, however, entails a cost: the requirement to develop and publicly report a scientific justification for the regulation. This cost was proposed by the United States toward the beginning of the Uruguay Round in the form of a requirement that measures be

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[8]Note, that all measures which result in a level of sanitary or phytosanitary protection different from that which would be achieved by measures based on international standards, guidelines or recommendations shall not be inconsistent with any other provision of this Agreement.

based on 'sound and verifiable scientific evidence.'[9] While not going as far as the US proposal, subsequent GATT/WTO jurisprudence defines 'scientific justification' as an examination and evaluation of available scientific information, a determination, based on scientific inquiry, as to the use of the regulatory barrier. The dispute in question, *Japan-Varietals*, pertained to a Japan Ministry of Agriculture, Forestry and Fisheries procedure that sought to prevent the introduction of an invasive species transported via fruit. The Japanese rule was that any proposed treatment must be proven to not only kill the invasive species, but kill the invasive species in each variety of agricultural product. To import apples, cherries, peaches, walnuts, apricots, pears, plums and quinces would each require a separate test. The United States argued that the demand to test each product was not supported by the scientific evidence, and further that Japan made no effort to obtain such scientific evidence. In that case, the WTO Appellate Body found that the existence of a scientific justification for regulatory measures depends on there being a 'rational' relationship between the SPS measure and the available scientific information.[10]

The institutional history of multilateral agreements on standards suggests that governments have appealed to international standards as a sort of cap for their regulatory activity and that scientific evidence requirements provide some reassurance to governments concerned about the limitations of international standards standards. After the Uruguay Round, these limits on governments appear to have had positive effects. The need to provide scientific evidence, for example, led to some progress in a number of cases involving Japanese protectionist measures. At the same time,

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[9] MTN.GNG/NG5/W/44 22 (1988) Group of Negotiations on Goods Negotiating Group on Agriculture "A Discussion Paper on Issues Related to the Negotiations Submitted by the United States."

[10]Finding a rational relationship is a low barrier, but seems to have helped deter the arbitrary nature of many severe regulatory responses.

the number of announced, potentially trade restrictive measures has not declined in the face of these requirements. Under the flexible rules of the WTO TBT and SPS agreements, the number of regulations have gone up under the Uruguay Round.

Figure 5.1: TBT Notifications
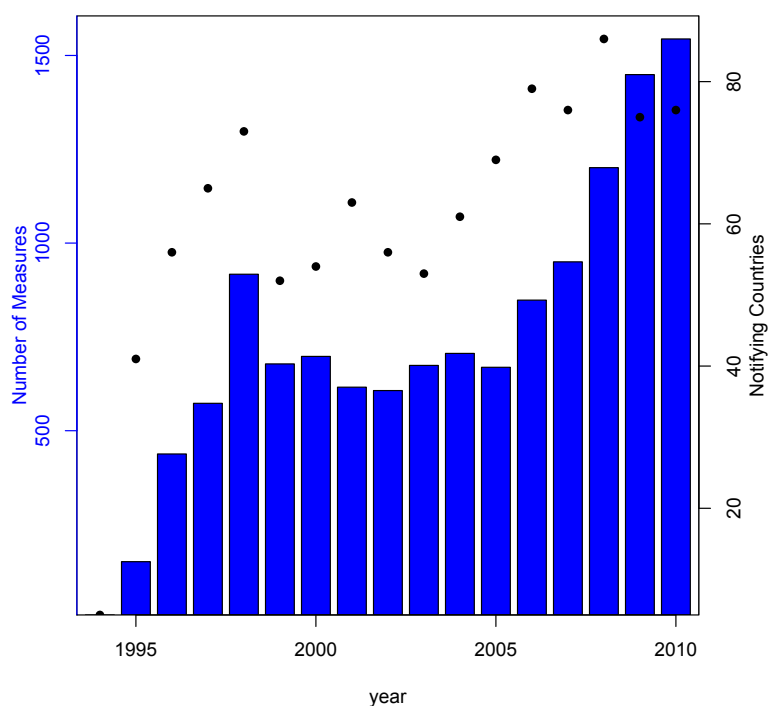
TBT notifications obtained from the World Trade Organization WTO (2012). The blue bars represent the number of measures (left axis) while the black dots represent the number of notifying countries (right axis).

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 5.1 displays these measures across the history of the agreement through 2010. While it may appear that the agreement has failed to constrain protectionism, it is important to note that to date, none of these notified measures have resulted in an authorization of retaliation. Rather than being temporary abrogations of the agreement, these notifications are a feature of cooperation involving flexible regulatory obligations.

The success of the TBT and SPS agreements lies in their appeal to international standards. In the next section, I describe how these provisions pertain to the need to incorporate flexibility in obligations surrounding regulatory cooperation. In particular, I distinguish between two forms of flexibility that are characteristic of the formal literature on international cooperation- *ex ante* and *ex post* flexibility. I argue that the provisions in the standards agreements enable governments to optimally incorporate a form of *ex ante* flexibility, suggesting that these agreements offer an example of optimal delegation. Interestingly, the optimal delegation framework can be extended to consider the role of scientific evidence in aligning the incentives of governments in the face of public policy pressures.

5.2   Flexibility in International Agreements

In this section, I describe conditions under which flexibility encourages governments to adopt an international economic agreement, and the role of punishment in sustaining that cooperation. I then describe two theories of the relationship between flexibility and the depth of cooperation. The first centers on *ex post* flexibility and how a high certainty of costly punishments may be inefficient to produce cooperation. Increasing flexibility enhances the depth of cooperation to which governments

are willing to obligate themselves. The second centers on *ex ante* flexibility, predicting that flexibility in the range of behavior that counts as cooperation in the course of the agreement may not improve the depth of the agreement, but governments benefit by being able to meet their domestic regulatory needs. This latter form of flexibility is consistent with the design features of the standards agreements.

Flexibility in the provisions of an agreement is only necessary insofar as an agreement binds behavior. These international legal commitments enable governments to offer credible commitment to a particular policy stance because the other members of the agreement subject the members to some cost. Such costs may include specific punishments within the agreement or from the reputation costs of reneging on publicly stated commitments. For example, in context of international cooperation in monetary policy, the adoption of Article VIII Commitments under the International Monetary Fund is associated with a lower likelihood of government adoption of restrictive monetary policy (Simmons (2000)). The evidence for a behavioral effect of the institution is not, however, a result of a direct punishment by a central decision maker: Governments that borrow directly from the IMF, and presumably are more exposed to direct punishment, are less likely to comply with the IMF rules. Similarly, research on sovereign debt and default finds that defaulters are excluded from international capital markets and pay higher interest rates (Tomz and Wright (2008)). These findings suggest that in repeated settings, withdrawal of cooperation can sustain cooperation.

Existing theories of flexibility in international institutions predict that *ex post* flexibility is necessary to limit the use of socially inefficient market-based punishments. If governments are unable to perfectly observe defection on the part of their partners,

permanently defecting after observing a bad outcome can lead to unintentional war. An agreement can offer a strategy to 'tune' punishment, including reversion strategies, the use of sanctions, and the loss of prestige as mechanisms that can maintain cooperation in the face of incomplete information. In the context of trade cooperation, the need to absorb international terms of trade shocks also leads governments to allow periods of temporary protection (Bagwell and Staiger (1990)). The problem of design is to choose some level of deviation from an agreement in response to the extent of the domestic shock, the rigidity cost of returning to a cooperative equilibrium, as well as the initial tariff commitment.[11] The challenge is to balance the extent of the tariff obligation (the binding) and the fine or punishment for returning to good graces, finding that more flexibility can be optimal from the perspective of promoting deeper commitments. Flexibility limits the extent to which involuntary defection, or the uncooperative outcomes driven by facts outside government control, lead to punishment (Putnam (1988)).

However, even with flexibility, there is certainty that play will eventually result in punishment (Downs and Rocke (1995)). This is despite the fact that that in equilibrium all players correctly forecast that their opponents will never deviate. Once the inevitable involuntary defection occurs, punishment follows as a self-reinforcing reaction to the observed deviation. If this punishment did not occur, cooperation would not be sustained in good periods. Flexibility merely delays the eventual failure of the agreement, a disheartening result for those hoping to retain regulatory autonomy.

In addition, as an empirical characterization of institutional design, the emphasis on flexibility as tuning the compensation or payment is uncharacteristic of actual

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[11]This theory has been well developed in the formal literature in international cooperation. See, Downs and Rocke (1995); Rosendorff and Milner (2001); Rosendorff (2005), Johns and Pelc (Forthcoming).

international negotiation over regulatory barriers to trade.[12] Rather than emphasize the size of the punishment, negotiators appear to focus on the range of policies that are counted as cooperation. The challenge being that given a inch, regulators can take a mile.[13]

The key dilemma in regulatory cooperation, therefore, is not inferring whether a barrier has been put in place or not, but rather whether that barrier is being used in the correct situation. Rather than seeking just to avoid excessive or undeserved punishment, governments would prefer to allow regulation, even if it restricts trade, to serve public policy interests. However, even if governments can observe foreign behavior directly, governments may still not know what the interests or intent of their partner is, leading to an adverse-selection problem (Athey, Bagwell and Sanchirico (2004)).

Rather than multiplying the challenges to cooperation, problems with adverse selection can facilitate a match between the preferences of governments and the obligations of the agreement. Rather than treating all defection alike and permanently retaliating with a grim trigger, agreements can include flexibilities that allow temporary damaging activities. As a result, successful cooperation must satisfy two kinds of incentive constraints. First, as before, governments must be sufficiently patient so that they prefer not to take actions 'off-schedule' in the short term that are viewed as clear deviations, for fear of the punishment. Second, conduct must be such that

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[12]In a study of the Tokyo Round Standards Code, Grieco (1990) argues that cheating and fear of cheating, the fundamental impediments to cooperation in the "neoinstitutionalist theory" described above, did not drive the success or failure of individual provisions of the codes. Rather, support for the Standards Code depended on the belief that the provisions of the agreement would generate relative gains, which would in turn bolster their own likelihood of survival or sustain the sovereignty of the state.

[13]Jackson (1989) provides a list of striking examples, including a French requirement that French inspectors inspect the source factory of any pharmaceutical sold in France, and a restriction that French inspectors do not travel abroad.

the private type of information selects actions appropriate for their type and so governments must be incentivized not to act as if they are some other type. These 'on-schedule' deviations are prevented by on the equilibrium path punishments. For example, retaliation under the WTO does not imply that the WTO agreement has failed, but it is rather a mechanism to ensure cooperation.

Below I briefly introduce the fundamental features of partial equilibrium models of hidden information and adverse selection. Adverse selection can be a source of international inefficiency when governments face privately observed domestic political shocks. Adverse selection occurs when an agent's decision to cooperate or not depends on private information, such as the value of cooperation, or their type. An agreement requires that governments must pay some optimal price to enact restrictionist policy - an price set by the availability of escape clauses. This formal logic predicts that increasing flexibility should facilitate deeper cooperation.

Adverse selection and ex post flexibility In these models, there are two governments, home and foreign that are engaged in a repeated interaction over tariff policy t and t^*. In the basic Baldwin (1987) framework, Governments value producer surplus $\Pi(t, t^*)$, consumer surplus, $CS(t)$, and tariff revenue $tM(t)$. Following Rosendorff and Milner (2001), let γ denote the weight that the home government attaches to producer surplus, and γ^* be the weight associated with the foreign governments preference for foreign producers. These weights are the privately observed information, or state, and can range in $[\underline{\gamma}, \bar{\gamma}]$. The home government's utility function is then $W(t, t^*, \gamma) = CS(t) + \gamma\Pi(t, t^*) + tM(t)$, while the foreign government has a utility of $W(t, t^*, \gamma^*) = CS(t^*) + \gamma^*\Pi(t, t^*) + t^*M^*(t^*)$.

In the absence of any agreement, self-interested governments enact policies that are socially inefficient, either imposing excessive tariff barriers or regulating in such a way that harms their partner. These 'Nash' tariffs $(\tau^N(\gamma), \tau^{*N}(\gamma^*))$ arise from the unilateral choice of each government to maximize domestic welfare W, and for each country, only depend on the value of the domestic political economy weight.[14] By contrast the internationally efficient tariffs maximize $W(\tau, \gamma) + W^*(\tau)$, generating $\tau^E(\gamma)$. Because the tariffs of one country negatively affect her partner, the efficient tariff is lower than the 'Nash' tariff.

In each repeated interaction, governments observe political economy weights γ and γ^* which are randomly and independently drawn from a distribution F. In a repeated game, sustaining cooperation requires incentivizing governments under the worst realization of this process. However, governments may hope to do better, negotiating agreements that allow a government's policies to vary with their realized level of political pressure. Efficiency can be improved if a government can place higher tariffs under bad times and lower tariffs in good times. Again, the problem is that governments might be tempted to enact restrictive policies to take advantage of their flexibility.

Formally, we can characterize this temptation in terms of incentives. Suppose that $\tilde{W}(\hat{\gamma}, \gamma)$ is the domestic government welfare that is enjoyed when political pressure is γ and the domestic government applies the tariff $\tau(\hat{\gamma})$. $\tilde{W}(\gamma, \gamma)$ denotes the welfare of a government that is following the schedule, while $\tilde{W}(\hat{\gamma}, \gamma)$ represents governments that are engaging in an on-schedule deviation. A tariff function is *incentive compatible* if and only if, for all γ and $\hat{\gamma}$, $\tilde{W}(\gamma, \gamma) \geq \tilde{W}(\hat{\gamma}, \gamma)$

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[14]Bagwell and Staiger (2005) show that the restriction that the choices of τ only depend on domestic political economy parameters follows from assumptions that countries specialize in a product.

Rosendorff and Milner (2001) compare two stylized games in this framework, considering how decreasing *ex post* punishments can facilitate flexibility and deeper agreements. The first is a two by two prisoners dilemma game. In this game, there exists a Grim Trigger equilibrium in which tariffs do not vary with the observed political economy shock. Rather, the value to the future is high enough that the threat of perpetual punishments leads governments to play the same strategy - cooperate - irrespective of their private information. The introduction of a public, costly mechanism to temporarily defect - an escape clause, improves the situation, enabling governments to match the political economy shock with a period of defection. So long as the cost to using the escape clause is not worse than permanent defection, there is no incentive for a government facing moderate pressure to outright defect. Furthermore, because the using the escape clause is 'self-enforcing' in the sense that the cost is immediately and publicly observed, a government facing little to no political pressure would not opt to use the escape clause.[15] In summary, decreasing the cost to temporarily defect (increasing *ex post* flexibility) facilitates deeper cooperation under uncertainty.

Even when *ex post* flexibility is available, ensuring that flexibility is incentive compatible only if there is some cost to engaging in the less cooperative behavior. As a consequence, the period of defection remains suboptimal from the perspective of the defecting government. We might ask whether agreements could do better by enabling forms of *ex ante* flexibility. Below, I describe how the optimal delegation framework offers one way to characterize such optimal flexibility. Similar to the literature on escape clauses, a government balances flexibility and the depth of the agreement, but in this case, the goal is to allow governments to match the domestic political pressures

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[15]This escape clause remains highly inefficient, as the cost paid does not depend on the political demands for protection. By contrast, Bagwell and Staiger (2005) suggest that given a set of tariffs and transfers, there exists ranges of patience that reach full efficiency.

with actions. This *ex ante* flexibility could allow governments to satisfy temporary political concerns more than a strict tariff commitment. Interestingly, as I explain below, ex ante flexibility does not promote depth in applied tariffs: the expected applied tariff under a flexible agreement is higher than under an inflexible binding (Bagwell (2009)). This is because when agreements are inflexible and governments behave optimally, a fixed obligation generates a lower average level of protection to reducing the international externality. When agreements are flexible, cooperation is shallower, but governments benefit from being able to shift policy to meet domestic political demands. It turns out that the form of flexibility matters for the operation of the agreement, and what kinds of problems agreements are designed to resolve.

Ex ante Flexibility in International Standards Agreements To characterize the optimal solution to the imperfect information problems in the design of standards agreements, it is useful to adopt a set of techniques from principal agent models. Principal agent models are concerned with the design of contracts that motivate a biased but informed agent to act in the principal's interest. Politics is rife with examples of division between authority and information: congressional committees, representative governments, and bureaucracies.[16] In the international relations context, scholars have used the principal agent model to characterize relations between citizens and international relations. This framework forms a chain of delegation, from the citizen to their elected officials, to international negotiators, to the formation of an international organization (Vaubel (2006)).

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[16]For examples in American politics, see Gilligan and Krehbiel (1987); Gilligan and Krehbiel (1989); Krishna and Morgan (2001).

The optimal delegation framework reverses this logic to examine a contract between a collectivity and an individual. The collectivity is characterized by an objective function which seeks to maximize aggregate welfare of the membership of the agreement. This abstracts away from inefficient bargaining in the contracting stage, focusing attention on the opportunities for efficient design. The contract is a delegation of some decisions to an informed but biased government. Governments are informed about the public policy demand for regulation in their own society, but are unable to observe similar pressures on the other members of the agreement. Governments are biased to the extent that they do not internalize the full costs of satisfying domestic political pressures, part of the cost of a regulation is borne by the other members of the agreement.

In this setup, the standards agreement represents the set of actions or the range of regulatory behavior that is acceptable under the agreement. This range of acceptable behavior is called a 'delegation set' and may only contain a single choice. The question is what options the agreement should offer the individual members of the agreement, conditional on the nature of the information (the state), the extent of the bias of the agent, and the value to the principal of cooperative behavior. If an agreement were able to pay agents, then full discretion would be optimal. In the absence of a payment scheme, there is a tradeoff between the size of the delegation set and the incentives of the agent to cooperate. The delegation set determines the optimal rule, or institutional design, rather than the specific content or level of cooperation.

The first systematic study of the optimal delegation problem by Holmström (1977) developed two intuitive findings for the extent of delegation: principals benefit by giving more discretion to a less biased agent and to agents that have more information.

These results, known as the Ally Principle and the Uncertainty Principle, generate a general relationship between flexibility and the underlying uncertainty. Unfortunately, these results are sensitive to the form of flexibility offered to the agent. The question being how bias and the underlying distribution of possible states affects the set of options offered to governments.[17] The following section describes results from a model of optimal delegation derived by Amador and Bagwell (2013). While this model has been used to study scenarios in which governments face private political pressures from protectionist industry or have private information about their own fiscal capacity or need for tariff revenue, they have yet to be applied to questions about the design of a standards agreement.

Optimal Standards Agreements: Suppose that there are two governments who may choose a regulation f from the real line. Instead of weighing producer surplus, governments privately observe regulatory demands γ, which is a continuous distribution over a bounded interval on the real line $\Gamma = [\underline{\gamma}, \bar{\gamma}]$ and continuous distribution G. The joint membership of the standards agreement, the principal, calculates welfare as a continuous function of the regulation and the regulatory demand. The government has a welfare that is twice differentiable and strictly concave in the regulation. Moreover, the government is biased in favor of socially inefficient levels of regulation. The home government's utility function is then $\gamma f + b(f) - t$ where b is the sum of consumer surplus, the cost of the regulation, and the benefit to top producers, and t is

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[17]In some cases, a principal can do better to exclude intermediate decisions, and force the agent to choose between a high and low action, breaking the predictions of the Uncertainty Principal (Alonso and Matouschek (2008)). Amador and Bagwell (2013) provide conditions under which that set of actions takes the form of an interval. The conditions depend on the nature of the principal and agent's welfare function as well as the distribution of regulatory needs.

the cost associated with obtaining scientific evidence. The foreign government utility is $v(f)$, where v is the sum of consumer surplus and producer surplus in the foreign country. Assume that $v'(f) < 0$, or that the foreign state loses from the imposition of a regulatory barrier, and that $b''(f) < 0$.

A standards agreement sets the range of behavior that counts as cooperation, or the delegation set. In addition, an agreement may provide that governments must produce scientific evidence that their action is necessary, a costly bureaucratic procedure. A standard agreement is a pair $(\mathbf{f}(\gamma), \mathbf{t}(\gamma))$, the regulation and the cost of scientific evidence. Shifting notation, let $W(\gamma, f(\gamma)) \equiv \gamma \mathbf{f}(\gamma) + b(\mathbf{f}(\gamma)) + v(\mathbf{f}(\gamma))$ be the combined utility of the two trade partners, which serves as the Principal. The optimal standards agreement solves:

$$\max_{\mathbf{f}(\gamma), \mathbf{t}(\gamma)} \left\{ \int_{\gamma \in \Gamma} (W(\gamma, f(\gamma)) - \mathbf{t}(\gamma)) dG(\gamma) \right\}$$

such that the incentive compatibility constraint holds:

$$\gamma \mathbf{f}(\gamma) + b(\mathbf{f}(\gamma)) - \mathbf{t}(\gamma) \geq \gamma \mathbf{f}(\tilde{\gamma}) + b(\mathbf{f}(\tilde{\gamma})) - \mathbf{t}(\tilde{\gamma}); \ \forall \gamma, \ \tilde{\gamma} \in \Gamma$$

and that the costs of obtaining scientific evidence is nonnegative:

$$\mathbf{t}(\gamma) \geq 0 \quad \forall \gamma \in \Gamma$$

The results from Amador and Bagwell (2013) show that we can define a particular set of solutions to this maximization problem in which the solution takes the form of an interval. Given that $f_r \in \operatorname{argmax}_f \{\gamma f + b(f)\}$ is the optimal flexible choice, an interval allocation is an allocation $(\mathbf{f}, \mathbf{t})$ with bounds a, b if $a, \ b \in \Gamma; \ a < b;$

$\mathbf{t}(\gamma) = 0 \; \forall \gamma \in \Gamma$ and

$$
\mathbf{f}(\gamma) = \begin{cases} f_r(a) & \text{if } \gamma \in [\underline{\gamma}, \; a] \\[2mm] f_r(\gamma), & \text{if } \gamma \in (a, \; b) \\[2mm] f_r(b), & \text{if } \gamma \in (b, \; \bar{\gamma}] \end{cases}
$$

From this definition and Lemma 1 from Amador and Bagwell 2013, an interval allocation with bounds γ_L, γ_H is optimal among interval allocations if and only if:

(i) if $\gamma_H = \bar{\gamma}$ then $W_f(\bar{\gamma}, f_r(\bar{\gamma})) \geq 0$;

(ii) if $\gamma_H < \bar{\gamma}$ then $\int_{\gamma_H}^{\bar{\gamma}} W_f(\gamma, \; f_r(\bar{\gamma}))g(\gamma)d\gamma = 0$;

(iii) if $\gamma_L = \underline{\gamma}$ then $W_f(\underline{\gamma}, \; f_r(\underline{\gamma})) \leq 0$;

(iv) if $\gamma_L > \underline{\gamma}$ then $\int_{\underline{\gamma}}^{\gamma_L} W_f(\gamma, \; f_r(\underline{\gamma}))g(\gamma)d\gamma = 0$;

Here $W_f(\gamma, f_r(\gamma))$ is the derivative of the principal's welfare when the agent receives a political shock γ and selects her best flexible response. Amador and Bagwell (2013) note that this indicates the direction of the bias of the agent with type γ. In conditions (i) and (iii) the upper and lower bounds offered by the interval do not bind respectively. In each of these cases, it must be the case that the principal prefers an even more extreme action than what is chosen by the agent. For example, under condition (iii) to be the case, governments with the lowest type must be biased upward (wants to regulate inefficiently). Conditions (ii) and (iv) show that among agents that are forced up against one of the intervals, the binding provides an on average unbiased policy. Otherwise the principal would do better by rising or lowering the boundary to benefit the agent's bias.

By Proposition 3 of Amador and Bagwell (2013), an optimal interval allocation $\mathbf{f}^*(\gamma)$ that is also a cap ($\gamma_L = \underline{\gamma}$) is the optimal trade agreement in the standards setting if all of the following conditions hold:

1. $b''(f) < 0$, $v''(f) + b''(f) \leq 0$

2.
$$\min\left\{\min_{f\in[0,\bar{f}]}\left\{\frac{v''(f) + b''(f)}{b''(f)}\right\}, 1\right\} \geq 1/2$$

3. $\gamma_H \in (\underline{\gamma}, \bar{\gamma})$ solves:

$$v'(f_r(\gamma_H)) + \mathrm{E}[\gamma|\gamma \geq \gamma_H] - \gamma_H = 0$$

4. g is non-decreasing.

Conditions 1 and 2 are satisfied whenever the effect of the regulatory barrier on the foreign state is not excessively convex. To determine this requires taking a stance on the nature of the foreign losses to regulatory protection. The third condition requires balancing the benefits of shifting the cap upward against the losses to the foreign state. Namely, that the optimal cap on regulatory behavior is such that the average political economy demands above the cap are equal to the losses in the foreign state at the cap.

These four conditions are sufficient for an optimal agreement to take the form of an upper bounded interval. That is, the agreement offers some maximal level of regulation or protection, but allows governments to apply regulations below the maximal level. This has the advantage that governments can use flexibility to apply moderate levels of regulatory restrictions when political pressures are low, while retaining the

ability to clamp down if a crisis arises. Governments with high levels of political demands for protections are forced to 'pool' at the maximal regulation. The reason that delegating an interval is incentive compatible is that the favored level of regulation is chosen by all governments whose political demands are for low to moderate levels of regulation, and high levels of political demand are ignored. As a result, on average, flexibility, or the availability of a cap, does not decrease the average applied policy relative to a fixed, rigid policy. Were there to be a single fixed level, while not optimal, the regulatory limit would be lower (Bagwell (2009)). Increasing the delegated range (increasing *ex ante flexibility*) decreases the average applied level of cooperation under uncertainty.

The difference between the theories of *ex post* and *ex ante* flexibility arises in part from the nature of the flexibility, but also in part from the assumed level of optimal behavior on the part of governments. The former derives from a comparative exercise between cooperation under the threat of complete and permanent defection and cooperation in which governments can publicly pay to defect. The latter theory considers the *best* governments can do, arguing that they suffer from rigidity because they are unable to defect what it would be in the best interest of the joint membership of the organization.

A further advantage of the optimal delegation framework is that it sheds light on 'money burning' mechanisms. The optimality of a cap, rather than one or more fixed levels or no restriction, depends formally on the relative concavity of the governments' welfare functions. Particularly, it turns out that the negative spillover effect of the regulation must be at least half as concave as the direct benefit of the regulation. Intuitively, if the foreign state has a particularly convex reaction to the regulation, no

cap is likely to be optimal. In this environment, money burning, or inefficient actions by the agent that do not produce any direct benefit to the agent or the principal, can realign incentives. Examples include the way that costs are associated with the use of an escape clause in Rosendorff and Milner (2001), or a bureaucratic process that wastes money. In the absence of incentive problems, a efficient contract would not require any agents to burn money, but the availability of the money burning mechanism can ensure that the agent does not select a level of regulation intended for a higher state.

The cooperation described above speaks to the assumption of optimal behavior, either in terms of encouraging participation in an agreement or in terms of limiting on-schedule deviations. In practice, however, the design of these institutions does not occur in a vacuum or without constraints. Any institutional change is likely to rub against those that benefit from the previous institutional and political arrangements. Explaining the development and choice of institutions, including those of international regulatory agreements, therefore depends not only on what the best governments could do in any given environment, but what the environmental constraints are that may have let to suboptimal choices in institutional design.

5.3 Conclusion

Multilateral efforts to constrain regulatory protection, began with the Havana Charter of the International Trade Organization, but did not come into force until the GATT/WTO standards agreements. The Tokyo Round Standards Code and the followup SPS and TBT agreements offer examples of the use of positive incentives to choose efficient regulatory measures. Both use international standards and measures

supported by scientific evidence, helping balance periodic and temporary regulatory needs against the value to limiting regulatory protection.

The history of the standards agreements reveal substantive deviations from previous tariff negotiations. In contrast to a tariff schedule, standards agreements neither lay out substantive regulations on a product-by-product basis nor set an acceptable range of public policy goals of national regulation. These agreements do not ban trade restrictive measures or specify a penalty schedule for adopting regulations inconsistent with the agreement. Rather, the standards agreements include requirements to choose regulatory measures that do not harm trade in excess of that necessary to achieve some public policy goal.

The design of the GATT/WTO standards agreements enable governments to resolve problems that arise when public policy demands are not directly observable. In general, it is difficult to determine whether a given measure is necessary to achieve some legitimate public policy goal, or is more restrictive to advantage certain producers. The flexible demands of the standards agreements can enable governments to adopt regulations when necessary by either choosing an international standard or providing costly scientific evidence. On average, these restraints will generate moderate levels of incidental regulatory protection.

This explanation contrasts with much of the existing theories of the role of flexibility and science in international cooperation. Flexibility is not just a mechanism to lower the cost of deviation, but rather is a way to enable deviation in times of need. The focus on flexibility offers an alternative to approaches which emphasize the benefits of science standards as promoting particular epistemic communities. Scientific evidence serves as a costly signal of the underlying political demands for regulatory

protection. The argument in this chapter provides a new interpretation of the history of the multilateral standards agreement, finding that cooperation need not mean giving up policy autonomy.

Chapter 6

Conclusion

Global production - the rise of global value chains and the concentration of that growth in the hands of a small number of multinational firms - shifts economic activity across borders, changing the nature of international trade and investment. This global production is not new, as a small number of firms have engaged in outsourcing and offshoring of production for centuries. Today, however, an unprecedented share of production depends on the choices and investments of foreign firms. The result is a set of powerful economic actors - multinational headquarters and their affiliates - whose interests in economic policy differ from that of firms that are not large or productive enough to engage in global production. The politics of trade and investment, long thought to involve an alliance of exporters in favor of enhanced market access and low tariffs, pits the interests of firms that are internationally organized against those of firms whose operations are limited by national borders. These divisions among firms undermine the ability of states to cooperate on new regulatory measures and raising standards. The lack of government cooperation, then, is a consequence of the ability for a few firms to import, enter, and profit more when barriers to trade are higher.

This thesis develops this counterintuitive finding in the context of multilateral rule-making, using changes in the interests of firms and governments to explain recent patterns in cooperation. On the conventional account, the unprecedented growth in foreign direct investment, the completion of the European Market and the closure of the Uruguay Round was evidence that the rise in global value chains and multinationals would continue to promote and sustain trade and investment liberalization and limit the regulatory autonomy of the state. The conventional account predicts that global production is in part responsible for the success of the 20th century rules of international commercial relations.

However, the rise of footloose capital and demands from multinationals have not led to the expected greater economic cooperation, let alone a decline in the regulatory activity. Instead, it appears that political efforts for cooperation have stalled, with little or no multilateral progress in the decades following the creation of the World Trade Organization, and regulatory barriers are on the rise. This disconnect between the level of economic integration and the rise in multinational ownership on the one hand, and the amount of cooperation between governments on the other, is a consequence of the new interests on the part of firms and governments to oppose liberalization to leverage a greater share of the profits of global production. The history of GATT/WTO success in opening markets to trade and investment may have depended on the fact that the economic actors that profit from openness were interested in further market liberalization. Further progress in liberalization demands addressing forms of protection which generate new coalitions, ones that pit productive multinationals against further liberalization.

The evidence for these changes in the politics of global production are drawn

from data on trade treaties. First, I collected and analyzed data on the use of the General Agreement on Tariffs and Trade (GATT) rules in the face of varying levels of multinational activity. I found that the presence of global producers was associated with less successful trade negotiations during the Uruguay Round. Second, I used a novel database of these bilateral agreements, adopted after the GATT Contracting Parties joined World Trade Organization. These agreements introduced new forms of competition for trade and investment across nodes of the global supply chain. Where the multilateral efforts fell short, bilateral efforts also struggle in the face of global production. Finally, I examined new forms of multilateral cooperation found in the Technical Barriers to Trade and Sanitary and Phytosanitary agreements. There, I show governments did not depend on reciprocal market access concessions, but instead referenced independent limits of behavior, based on mutually acceptable international standards, corrected by available forms of scientific evidence. In examining past trade negotiations, the emerging forms of bilateral negotiation, and the still nascent rules, I draw a picture of contemporary economic cooperation. What is striking is that the existing rules fail to promote cooperation on protectionist measures, enabling opportunism that reduces trade, harming consumers and producers. In the case of regulatory barriers and other fixed cost measures, this harm is concentrated on small and medium sized firms: the top firms benefit from regulatory protection. The smaller, marginal firms are forced out of the market, reducing competition, raising prices, and harming the consumer, their home economy, and the average worker.

This thesis argues that rise of global production limits the possibilities for international regulatory cooperation for two, related, reasons. The first is that global production introduces new dimensions of political competition. Global production

brings with it a form of firm organization, multinational firms, whose interests diverge from smaller firms. The multinational firms thought to support, or even explain, liberalization in tariffs may oppose regulatory reform. The second is that the tools of international cooperation, the GATT/WTO framework, depends on the ability of governments to exchange equal concessions in market access. In practice, the measurement of that market access obscures the compositional affects of regulatory protectionism, enabling governments to distort intra-industry and intra-firm competition to gain a competitive advantage.

The politics of regulatory protection The key political conflict described in this thesis occurs within industries, as firms vie for a better position in the global production network. These political dynamics are consistent with 'New New' trade theory: regulatory protection highlights the challenges facing individual firms and producers of individual products. As a result, this thesis reaffirms the recent focus in the political economy of trade that suggests firm level differences in productivity and organization can help explain political outcomes, especially in differentiated markets. Whether an individual firm is a winner or loser from trade liberalization is not only a consequence of whether the firm happens to be in a productive sector or employs an abundant factor, but rather is a function of an idiosyncratic characteristic of firms - their productivity. However, much of the existing firm level theories of politics have assumed the conventional wisdom, that in the same way that export oriented industries advocate for lower tariffs, large, productive, export oriented firms will advocate for liberalization. By contrast, this thesis finds that while some export oriented industries are likely to oppose regulatory protection, this is not true of every firm in

the industry. In fact the top exporters may oppose deeper agreements.

The difference between the analysis presented here and previous efforts to account for firm level political behavior is the integration of the interaction between these competitive dynamics and the nature of the policy instrument. Tariffs and regulatory barriers are similar in that they specify a given product, are applied at the border, and can be an important restriction to trade. The difference lies in the way that these barriers impose costs on firms. In much of applied trade economics, trade barriers, quotas, tariffs, antidumping duties and regulations are transformed into an *ad valorem* equivalent, a tax that takes up some percentage of the value of the good. This thesis demonstrates that this simplifying assumption obscures important political dynamics. Unlike a tariff or tax, regulatory measures or standards determine product characteristics, including labels, a license or registration, or a safety configuration which require up-front investment, a fixed cost.

To account for the effect of these fixed costs, I analyzed international trade policy-making in the context of imperfectly competitive markets. Firms enter markets only if they expect to be sufficiently profitable that they can cover the fixed costs; those that are unprofitable, exit. In expectation, dynamic entry and exit decisions create a distribution of firms that survive and profit, and a set of firms that are forced to exit. This divergence depends on the cost associated with the regulation in the destination market and the competitive environment, pitting firms that are successful, productive and profitable against the marginal producers. Where the former lack in number, they make up in organization, with affiliates in foreign markets and production networks that span borders.

Part of the innovation of this thesis is that it brings concepts well understood in

the domestic context into an analysis of international governance. The same forces that disadvantage smaller firms in foreign markets can also occur via domestic regulatory changes. This sort of regulatory capture, characterized by Stigler (1971), has been a constant feature of government industrial relations. An implication of this study is that we should expect the problems associated with regulatory capture to become a prominent part of discussion in international governance on regulatory matters. However, the international context is not merely an extension of domestic regulatory politics, in this context, the actors that are harmed are constituents of foreign governments. In the explanations provided above, I have assumed that small firms are less able to affect foreign governments, as they lack local affiliates or a commercial presence. As foreign sales make up a smaller portion of overall sales for small firms, the costs to form an organization can be high. To overcome these costs, firms can form organizations, industry groups, and associations, but their influence is often limited to national jurisdictions, as shown in the case study of the chemical industry surrounding REACH, complaints can be ignored.

Global production requires the coordination of economic actors within the firm, manufacturing plants, assembly plants, export facilities, and headquarters service providers. Connecting these nodes are production contracts, which in turn depend on local political institutions, especially domestic property rights institutions, for their enforcement. In this environment governments can use trade agreements to influence the choices that firms make in those contracts: the level of investment and the distribution of profits. Governments face a tradeoff in setting the rules surrounding investment and production, improving foreign property rights to attract investment, or retaining the profits of production by bolstering local actors in their

bargains with their foreign affiliates. Deep trade agreements can serve to attract foreign investors, or undercut local businesses whose bargaining position depends on their ability to threaten holdup. Again, there is a complementarity between host government regulatory autonomy and the competitive interests of MNCs, in this case, within the firm.

Limits and progress in international cooperation Following the success of the GATT/ WTO and bilateral agreements in reducing tariffs throughout the 20th century, expectations were high that these institutions would handle regulatory protectionism as well. They have not. I argue that the problem associated with regulatory protection raises different challenges than did tariffs. In addition to creating interests that favor regulatory protection, global production poses a direct challenge to the legal institutions used to govern international trade by undermining enforcement.

Global production limits enforcement of the any trade rules that depend on trade value to measure compliance. Contemporary trade agreements use reciprocity and MFN to guarantee equal market access, and then measure that guarantee in trade volume. Regulatory barriers can distort trade, forcing some firms to exit, while still raising prices and profits of the few firms that remain. For example, in the case of the EU chemical regulation, the increase in fixed costs drove down the number of firms that were able to enter Europe and raised prices for European consumers thereby increasing the profits of the top US exporters. Were the U.S. to complain, they would not be able to cite a drop in overall chemical sales in Europe, and so lack grounds on the existing WTO rules for redress.

Still, while making little progress on multilateral negotiations, governments have

introduced regulatory provisions into hundreds of bilateral and plurilateral agreements outside the WTO. But these too have failed to quell regulatory protection. As a result, the regulatory considerations in PTAs threaten progress on multilateral negotiations. The consequence has been the formation of a hub and spoke network of preferential agreements, placing headquarter intensive economies at the center of a disconnected set of partner states. While both parties benefit from these agreements, the regulatory provisions in preferential agreements benefit 'hub' states at the expense of potential 'host' states. This pattern is consistent with competition over investment in production facilities, a negative spillover from bilateral negotiations.

While tariff negotiations continue to adhere to the principles of reciprocity and MFN, these principles can not be the basis of regulatory cooperation. During the Uruguay Round, governments failed to make much progress liberalizing regulatory barriers on a reciprocal basis. Instead of enumerating specific changes in standards along the line of tariff schedules, the Uruguay Round agreements include general appeals to unspecified international standards and unnamed levels of scientific evidence. The contrast between the certainty of the tariff schedule and the flexibility of these provisions might suggest that regulatory agreements are aspirational or hortatory, or that cooperation is more about coordination than resolving fundamental conflicts of interest. I argue that these provisions are functional in that they provide flexibility, an important tool for distinguishing between public policy oriented regulation and those that aim to exclude certain producers. These agreements can enable governments to align incentives and limit trade barriers to incidental regulatory protection.

This is not to suggest that the TBT and SPS agreements are likely to be a model for future cooperative institutions. The need for regulatory cooperation depends,

in part, on whether the benefits of an increasingly interconnected and developing world continue to accrue to a small set of global producers with an interest in anti-competitive regulatory measures. If the success of the multilateral system was a consequence of the interest and support of large exporters in expanding market access, the GATT/WTO will likely not see similar success in governing beyond tariffs.

Interests in Open Economy Politics The analytic and policy conclusions of this thesis follow from an empirical and theoretical approach that assumes that politics is tightly connected to the operations of the market. This analysis builds on an analytic approach typical of political science studies of trade, economics and investment that founds political phenomena in economic behavior. Policy preferences derive from how individuals and groups expect policy to affect their material interests. Each actor's expectations are assumed to be consistent with an economic model of material interest. Much of the international political economy scholarship relies on this logic, using classic economic models, such as the Ricardo-Viner or the Heckscher-Ohlin-Stolper-Samuelson, to predict the relevant material coalitions across sectors or factors. Rather than determining whether or not such interests motivate individual economic actors, in general aggregate data is used to identify correlations between policy outcomes and economic endowments.[1] This thesis builds upon this general approach, focusing on the micro-foundations of international cooperation.

This thesis goes beyond the generic approach, developing both an economic theory of the interests of firms and governments and providing micro-evidence for these economic interests. By examining the interactions and behavior of firms, governments

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[1]Experimental survey work has yet to find evidence of public opinion on trade consistent with standard economic theories of trade. See, Rho and Tomz (2014).

and entrepreneurs, I find that extending the neoclassical economic model by incorporating firm entry and exit and the international organization of production helps explain what we should expect of international cooperation. By focusing on entry and exit and firm organization, each of these theoretical considerations follow from features of global production, and help explain patterns in international cooperation:

First, the winners and losers of protectionist policies depend on their effects on firm decision-making. To show this, I model entry and exit decisions and the organization of production, rather than fixing the share of producers that engage in production or trade exogenously. Requiring a firm to reconfigure a product or obtain some license to sell abroad are fixed costs, and while fixed costs affect every firm on the market, they are disproportionately borne by marginal firms. The indirect effect of harming competitors makes a regulation not only bearable, but beneficial, for the top producers. These indirect effects have important implications for the ability of small firms to survive in the face of regulatory protection. As a result, consumers face a lower variety of products at higher prices, while large firms and their host governments can gain competitive advantage from the lack of regulatory cooperation. This finding is counterintuitive given the literature on the interests of multinationals and regulatory barriers, and reversed from what would be expected from a class or factor based theory.

Second, global production connects trade and investment. Besides being a source of rents, international investment is used to organize production across borders. Firms engage in international investment to control their foreign trade partners, importing and exporting intermediate products for assembly, manufacture, and sale within the firm. Competition over firm profits, between headquarters and manufacturers, are

resolved through contracts that establish the terms of ownership and affiliation. These foreign owners and local affiliates each depend on local contracting institutions as well as protections and guarantees written into international economic agreements. Governments, in turn, set their policies, and adopt economic agreements, not only to attract investments and production contracts, but also improve the local share of profits from the global value chain.

6.1   Conclusion

Rather than facilitate international cooperation, the rise of global production is likely to pose a barrier to multilateral governance. This is both because the interests associated with global production - those of multinational firms - favor regulatory protection, and because the institutions that are available to promote trade cooperation - the GATT/WTO and preferential agreements - are ill suited for the problems posed by regulatory protection. These interests and institutions, combined with the fact that governments are unlikely to account for the interests of foreign firms, workers, or consumers, can help explain the lack of international cooperation on regulatory matters. While global production networks establish local presence for some foreign firms, those firms may have an interest in reducing competition, rather than opening markets. Today, the presence of multinational firms in regulatory politics is compatible with national regulatory autonomy, but when large firms embrace regulation intended to promote health or safety, it may be more because of their interest in profits than a new found magnanimity.

Bibliography

Aghion, Philippe, Pol Antras and Elhanan Helpman. 2007. "Negotiating free trade."
Journal of International Economics 73(1):1–30.
URL: *http://ideas.repec.org/a/eee/inecon/v73y2007i1p1-30.html*

Ahearn, Raymond J. 2011. "US-EU Trade and Economic Relations: Key Policy Issues
for the 112th Congress." *International Trade, March* 1.

Allison, Paul D. and Richard Waterman. 2002. Fixed-Effects Negative Binomial
Regression Models. In *Sociological Methodology*, ed. R. Stolzenberg. Basil Blackwell,
Boston.

Alonso, Ricardo and Niko Matouschek. 2008. "Optimal Delegation." *The Review of
Economic Studies* 75(1):259–293.

Amador, Manuel and Kyle Bagwell. 2013. "The theory of optimal delegation with an
application to tariff caps." *Econometrica* 81(4):1541–1599.

Antràs, Pol. 2003. "Firms, Contracts, and Trade Structure." *The Quarterly Journal
of Economics* 118(4):pp. 1375–1418.
URL: *http://www.jstor.org/stable/25053942*

Antràs, Pol and Elhanan Helpman. 2004. "Global Sourcing." *The Journal of Political
Economy* 112(3):pp. 552–580.
URL: *http://www.jstor.org/stable/3555183*

Antràs, Pol and Robert W. Staiger. 2012. "Offshoring and the Role of Trade Agree-
ments." *American Economic Review* 102(7):3140–83.
URL: *http://ideas.repec.org/a/aea/aecrev/v102y2012i7p3140-83.html*

Athey, Susan, Kyle Bagwell and Chris Sanchirico. 2004. "Collusion and price rigidity."
The Review of Economic Studies 71(2):317–349.

Axelrod, Robert. 1984. *The Evolution of Cooperation.* Basic Books, New York.

Baccini, Leonardo and Andreas Dür. 2010. "Investment Discrimination and the Proliferation of Preferential Trade Agreements." *Presented at International Political Economy Society* November 12-13.

Bagwell, Kyle. 2009. Self-enforcing trade agreements and private information. Technical report National Bureau of Economic Research.

Bagwell, Kyle and Robert W. Staiger. 1990. "A Theory of Managed Trade." *The American Economic Review* 80(4):pp. 779–795.
URL: *http://www.jstor.org/stable/2006707*

Bagwell, Kyle and Robert W. Staiger. 1999. "An Economic Theory of GATT." *The American Economic Review* 89(1):pp. 215–248.
URL: *http://www.jstor.org/stable/116986*

Bagwell, Kyle and Robert W. Staiger. 2002. *The Economics of the World Trading System.* MIT Press.

Bagwell, Kyle and Robert W Staiger. 2004. "Multilateral trade negotiations, bilateral opportunism and the rules of GATT/WTO." *Journal of International Economics* 63(1):1–29.

Bagwell, Kyle and Robert W. Staiger. 2005. "Enforcement, Private Political Pressure, and the General Agreement on Tariffs and Trade/World Trade Organization Escape Clause." *Journal of Legal Studies* 34:471–513.

Bagwell, Kyle and Robert W. Staiger. 2010. "Backward stealing and forward manipulation in the WTO." *Journal of International Economics* 82(1):49–62.
URL: *http://ideas.repec.org/a/eee/inecon/v82y2010i1p49-62.html*

Bagwell, Kyle and Robert W. Staiger. 2012. "Profit Shifting And Trade Agreements In Imperfectly Competitive Markets." *International Economic Review* 53(4):1067–1104.
URL: *http://ideas.repec.org/a/wly/iecrev/v53y2012i4p1067-1104.html*

Baldwin, Richard E. 2011. "21st Century Regionalism: Filling the Gap between 21st Century Trade and 20th Century Trade Rules." *CEPR* Policy Insight 56.

Baldwin, Richard E., Simon J. Evenett and Patrick Low. 2009. Beyond tariffs: multilateralizing non-tariffs RTA commitments. In *Multilateralizing Regionalism: Challenges for the Global Trading System.*

Barton, John H, Judith L Goldstein, Timothy E Josling and Richard H Steinberg. 2007. "The Evolution of the Trade Regime: Politics, Law, and Economics of the GATT and the WTO." *Estados Unidos: Princeton University Press. págs* pp. 169–170.

Battigalli, Pierpaolo and Giovanni Maggi. 2003. International agreements on product standard: an incomplete contracting theory. Technical report National Bureau of Economic Research.

Becker, Gary S. 1983. "A theory of competition among pressure groups for political influence." *The Quarterly Journal of Economics* 98(3):371–400.

Behrman, Jack N. 1972. "The role of international companies in Latin American integration." *The International Executive* 14(3):18–20.

Bems, Rudolfs, Robert C Johnson and Kei-Mu Yi. 2011. "Vertical linkages and the collapse of global trade." *The American Economic Review* 101(3):308–317.

Bernard, Andrew B, J Bradford Jensen, Stephen J Redding and Peter K Schott. 2009. "The margins of US trade." *The American Economic Review* 99(2):487–493.

Bernard, Andrew B., Jonathan Eaton, J. Bradford Jensen and Samuel Kortum. 2003. "Plants and Productivity in International Trade." *American Economic Review* 93(4):1268–1290.
URL: *http://ideas.repec.org/a/aea/aecrev/v93y2003i4p1268-1290.html*

Bhagwati, Jagdish. 1991. *The World Trading System at Risk.* Princeton University Press.

Bhagwati, Jagdish. 1993. "Regionalism and multilateralism: an overview." *New dimensions in regional integration* 22:51.

Biglaiser, Glen, Quan Li, Edmund Malesky, Pablo Pinto and Santiago Pinto. 2012. *Politics and Foreign Direct Investment.* University of Michigan Press.

Biglaiser, Glen, Quan Li, Pablo M. Pinto, Santiago M. Pinto, Joseph L. Staats and Edmund Malesky. 2012. *Politics and Foreign Direct Investment.* University of Michigan Press.

Blanchard, Emily J. 2007. "Foreign Direct Investment, Endogenous Tariffs, and Preferential Trade Agreements." *The B.E. Journal of Economic Analysis and Policy* 7(1):1–52.
URL: *http://EconPapers.repec.org/RePEc:bpj:bejeap:v:7:y:2007:i:1:n:54*

Blanchard, Emily J. 2010. "Reevaluating the role of trade agreements: Does investment globalization make the WTO obsolete?" *Journal of International Economics* 82(1):63–72.

Blanchard, Emily J. 2014. "What Global Fragmentation Means for the WTO." *WTO working paper ERSD-2014-03* .

Blanchard, Emily J. and Xenia Matschke. 2012. "U.S. Multinationals and Preferential Market Access." *SSRN* CESifo Working Paper Series No. 3847.

Borga, Maria and William J Zeile. 2004. "International fragmentation of production and the intrafirm trade of US multinational companies." *Bureau of Economic Analysis Working Paper WP2004-02* .

Brou, Daniel and Michele Ruta. 2012. "A Commitment Theory of Subsidy Agreements." *CESifo Group Munich* CESifo Working Paper Series 3945.

Burley, Anne-Marie and Walter Mattli. 1993. "Europe before the Court: a political theory of legal integration." *International organization* 47:41–41.

Büthe, Tim and Helen Milner. 2011. Institutional Diversity in Trade Agreements and Foreign Direct Investment: Credibility, Commitment, and Economic Flows in the Developing World, 1971-2007. In *APSA 2011 Annual Meetings Paper*.

Büthe, Tim and Helen Milner. 2012. The Interaction of International and Domestic Institutions: Preferential Trade Agreements, Democracy, and Foreign Direct Investment. In *APSA 2012 Annual Meeting Paper*.

Carnegie, Allison. 2013. "States Held Hostage: Political Hold-up Problems and the Effects of International Institutions." *Working Paper* .

Chaney, Thomas. 2008. "Distorted gravity: the intensive and extensive margins of international trade." *The American Economic Review* 98(4):1707–1721.

Clague, Christopher, Philip Keefer, Stephen Knack and Mancur Olson. 1999. "Contract-Intensive Money: Contract Enforcement, Property Rights, and Economic Performance." *Journal of Economic Growth* 4:185–211.
  URL: *http://dx.doi.org/10.1023/A3A1009854405184*

Crivelli, Pramila and Jasmin Gröschl. 2012. The Impact of Sanitary and Phytosanitary Measures on Market Entry and Trade Flows. Ifo Working Paper 136 Ifo Institute for Economic Research at the University of Munich.

Deardorff, Alan. 2014. Trade Implications of the EU-US TTIP for Neighboring Countries. In *Europe Center*.

Downs, George W and David M Rocke. 1995. *Optimal imperfection?: Domestic uncertainty and institutions in international relations.* Princeton University Press Princeton, NJ.

Drezner, Daniel W. 2007. *All Politics Is Global: Explaining International Regulatory Regimes.* Princeton University Press.

Dür, Andreas, Leonardo Baccini and Manfred Elsig. 2013. "The design of international trade agreements: Introducing a new dataset." *The Review of International Organizations* pp. 1–23.
URL: *http://dx.doi.org/10.1007/s11558-013-9179-8*

Dür, Andreas, Leonardo Baccini and Manfred Elsig. 2014. *The Design of International Trade Agreements: Introducing a New Database.*

Edelman, Peter B. 1987. "Japanese product standards as non-tariff trade barriers: When regulatory policy becomes a trade issue." *Stan. J. Int'l L.* 24:389.

Evenett, Simon J. 2013. "Protectionism's Quiet Return." *Centre for Economic Policy Research* .

Fearon, James D. 1998. "Bargaining, Enforcement, and International Cooperation." *International Organization* 52(2):pp. 269–305.
URL: *http://www.jstor.org/stable/2601276*

Feenstra, Robert C., Chang Hong, Hong Ma and Barbara J. Spencer. 2012. "Contractual Versus Non-Contractual Trade: The Role of Institutions in China." *National Bureau of Economic Research* 17728.
URL: *http://www.nber.org/papers/w17728*

Ferguson, Thomas. 1984. "From Normalcy to New Deal: Industrial Structure, Party Competition, and American Public Policy in the Great Depression." *International Organization* 38(1).

Finger, J. Michael, Ulrich Reincke and Adriana Castro. 2002. Market Access Bargaining in the Uruguay Round: How Tightly Does Reciprocity Constrain. In *Going Alone*, ed. Jagdish Bhagwati.

Fontagné, Lionel, Gianluca Orefice, Roberta Piermartini and Nadi Rocha. 2012. "Product Standards and Margins of Trade: Firm Level Evidence." *Working paper* .

Franzese, Robert J. and Jude C. Hayes. 2008. "Interdependence in Comparative Politics: Substance, Theory, Empirics, Substance." *Comparative Political Studies* 41(724).

Frieden, Jeffry A. 1991. "Invested Interests: The Politics of National Economic Policies in a World of Global Finance." *International Organization* 45(4):425–51.
URL: *http://ideas.repec.org/a/tpr/intorg/v45y1991i4p425-51.html*

Furusawa, Taiji and Hideo Konishi. 2007. "Free trade networks." *Journal of International Economics* 72(2):310–335.

Gilligan, Thomas W and Keith Krehbiel. 1987. "Collective decisionmaking and standing committees: An informational rationale for restrictive amendment procedures." *JL Econ. & Org.* 3:287.

Gilligan, Thomas W and Keith Krehbiel. 1989. "Asymmetric information and legislative rules with a heterogeneous committee." *American Journal of Political Science* 33(2):459–490.

Goldstein, Judith, Douglas Rivers and Michael Tomz. 2007. "Institutions in International Relations: Understanding the Effects of the GATT and the WTO on World Trade." *International Organization* .

Goldstein, Judith L. and Robert Gulotty. 2014. The Limits of Institutional Reform: America, Trade Liberalization and the GATT/WTO. In *Oxford Handbook on Historical Institutionalism.*

Grieco, Joseph. 1990. *Cooperation Among Nations: Europe, America, and Non-tariff Barriers to Trade.* Cornell University Press.

Gulotty, Robert. 2011. "Managing Offshoring and Outsourcing by Intellectual Property Regulation." *Working Paper, Presented at Stanford International Relations Workshop* .

Haas, Ernst B. 1958. *The uniting of Europe.* Stanford University Press Stanford, CA.

Helpman, Elhanan. 2006. "Trade, FDI, and the Organization of Firms." *Journal of Economic Literature* 44(3):589–630.
URL: *http://ideas.repec.org/a/aea/jeclit/v44y2006i3p589-630.html*

Helpman, Elhanan, Marc J. Melitz and Stephen R. Yeaple. 2004. "Export versus FDI with Heterogeneous Firms." *The American Economic Review* 94(1):pp. 300–316.
URL: *http://www.jstor.org/stable/3592780*

Hicks, Raymond and Soo Yeon Kim. 2012. "Reciprocal Trade Agreements in Asia: Credible Commitment to Trade Liberalization or Paper Tigers." *Journal of East Asian Studies* 12:1–29.

Hoekman, Bernard and Selina Jackson. 2013. "Reinvigorating the trade policy agenda: Think supply chain!" *VoxEU* .
URL: *http://www.voxeu.org/article/reinvigorating-trade-policy-agenda-think-supply-chain*

Holmström, Bengt Robert. 1977. *On incentives and control in organizations.* Stanford University.

Horn, Henrik. 2006. "National Treatment in the GATT." *The American economic review* pp. 394–404.

Horn, Henrik, Petros C Mavroidis and André Sapir. 2010. "Beyond the WTO? An anatomy of EU and US preferential trade agreements." *The World Economy* 33(11):1565–1588.

Howse, Robert and Elisabeth Tuerk. 2001. "The WTO impact on internal regulations- a case study of the Canada-EC Asbestos Dispute." *The EU and the WTO: legal and constitutional issues* 283.

Hufbauer, Gary Clyde, Jeffrey J Schott, Cathleen Cimino, Martin Vieiro and Erika Wada. 2013. "Local Content Requirements: A Global Problem." *Peterson Institute Press: All Books* .

Hymer, Stephen. 1976. *The international operations of national firms: A study of direct foreign investment.* Vol. 14 MIT press Cambridge, MA.

Jackson, John H. 1989. "National treatment obligations and non-tariff barriers." *Mich. J. Int'l L.* 10:207.

Jackson, Matthew O and Asher Wolinsky. 1996. "A strategic model of social and economic networks." *Journal of economic theory* 71(1):44–74.

Johns, Leslie and Krzysztof J. Pelc. Forthcoming. "Depth versus rigidity in the design of international trade agreements." *Journal of Theoretical Politics* .

Johnson, Jesse C., Mark Souva and Dale L. Smith. 2013. "Market-Protecting Institutions and the World Trade Organization's Ability to Promote Trade." *International Studies Quarterly* 57(2):410–417.
URL: *http://dx.doi.org/10.1111/isqu.12077*

Kemp, Murray C and Henry Wan. 1976. "An elementary proposition concerning the formation of customs unions." *Journal of International Economics* 6(1):95–97.

Keohane, Robert O. 1986. "Reciprocity in International Relations." *International Organization* 40(1):pp. 1–27.
URL: *http://www.jstor.org/stable/2706740*

Keohane, Robert O. and Van Doorn Ooms. 1972. "The Multinational Enterprise and World Political Economy." *International Organization* 26(1):pp. 84–120.
URL: *http://www.jstor.org/stable/2705955*

Kindleberger, Charles P. 1969. "American business abroad." *The International Executive* 11(2):11–12.

Kono, Daniel Y. 2006. "Optimal obfuscation: Democracy and trade policy transparency." *American Political Science Review* 100(3):369.

Koremenos, Barbara. 2001. "Loosening the ties that bind: A learning model of agreement flexibility." *International Organization* 55(2):289–325.

Koremenos, Barbara. 2005. "Contracting around international uncertainty." *American Political Science Review* 99(4):549.

Koremenos, Barbara, Charles Lipson, Duncan Snidal and Andrew Kydd. 2001. *The Rational Design of International Institutions.* Cambridge Univ Press.

Krasner, Stephen D. 1976. "State Power and the Structure of International Trade." *World Politics* 28(3):pp. 317–347.
URL: *http://www.jstor.org/stable/2009974*

Krishna, Vijay and John Morgan. 2001. "A model of expertise." *The Quarterly Journal of Economics* 116(2):747–775.

Krugman, Paul. 1980. "Scale economies, product differentiation, and the pattern of trade." *The American Economic Review* 70(5):950–959.

Krugman, Paul R. 1997. "What should Trade Negotiators Negotiate About." *Journal of Economic Literature* 35:113–120.

Kucik, Jeffrey and Eric Reinhardt. 2008. "Does flexibility promote cooperation? An application to the global trade regime." *International Organization* 62(3):477–505.

Lamy, Pascal. 2012. "The multilateral trading system and regional economic cooperation." Speech at Univesity of International Business and Economics in Beijing.

Limão, Nuno. 2006. "Preferential Trade Agreements as Stumbling Blocks for Multilateral Trade Liberalization: Evidence for the United States." *American Economic Review* 96(3):896–914.

Limão, Nuno and Patrica Tovar. 2009. "Policy Choice: Theory and Evidence from Commitment Via International Trade Agreements." *National Bureau of Economic Research Working Paper Series* .

Manger, Mark S. 2009. *Investing in protection: the politics of preferential trade agreements between north and south.* Cambridge University Press, Cambridge.

Mansfield, Edward D and Helen V Milner. 2012. *Votes, Vetoes, and the Political Economy of International Trade Agreements.* Princeton University Press.

Marcoux, Christopher and Johannes Urpelainen. 2011. "Profitable Participation: Technology Innovation as an Influence on the Ratification of Regulatory Treaties." *British Journal of Political Science* pp. 1–34.

Marshall, Jeffrey B. and Randall W Stone. 2013. "Expropriation risk and strategic entry decisions in foreign direct investment." *Presented at International Political Economy Society at the University of Virginia* .

Marshall, Monty G and Keith Jaggers. 2002. "Polity IV project: Political regime characteristics and transitions, 1800-2002.".

Melitz, Marc J. 2003. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity." *Econometrica* 71(6):pp. 1695–1725.
URL: *http://www.jstor.org/stable/1555536*

Melitz, Marc J. and Stephen J Redding. 2015. "Heterogeneous Firms and Trade." *Handbook of International Economics* 4:1.

Michel, Jean-Baptiste, Yuan Kui Shen, Aviva Presser Aiden, Adrian Veres, Matthew K Gray, Joseph P Pickett, Dale Hoiberg, Dan Clancy, Peter Norvig, Jon Orwant et al. 2011. "Quantitative analysis of culture using millions of digitized books." *Science* 331(6014):176–182.

Milner, Helen V. 1988*a. Resisting protectionism: Global industries and the politics of international trade.* Princeton University Press Princeton, NJ.

Milner, Helen V. 1988*b.* "Trading Places: Industries for Free Trade." *World Politics* 40(3):pp. 350–376.
URL: *http://www.jstor.org/stable/2010217*

Orefice, Gianluca and Nadia Rocha. 2011. "Deep integration and production networks: an empirical analysis." *WTO working paper* .

Osgood, Iain. 2012. Differentiated Products, Divided Industries: A Theory of Firm Preferences over Trade Liberalization PhD thesis Harvard University.

Ossa, Ralph. 2010. A 'New Trade' Theory of GATT/WTO Negotiations. Working Paper 16388 National Bureau of Economic Research.
URL: *http://www.nber.org/papers/w16388*

Oster, Sharon. 1982. "Intraindustry structure and the ease of strategic change." *The Review of Economics and Statistics* 64(3):376–383.

Pratt, Neil. 2009. Comments on Standards-Related Foreign Trade Barriers in the European Union (USTR-2009-0032). Technical report Society of the Plastics Industry.

Putnam, Robert. 1988. "Diplomacy and Domestic Politics: The Logic of Two-Level Games." *International Organization* 42.

Regan, Donald. 2010. "Trade Agreements and Trade Politics." *Working Paper University of Michigan* .

Rho, Sungmin and Michael Tomz. 2014. "Why don't trade preferences reflect economic self-interest?" *Working paper* .

Richardson, Gary. 2008. "Brand Names Before the Industrial Revolution." *NBER Working Paper No. 13930* .

Rogerson, William P. 1984. "A Note on the Incentive for a Monopolist to Increase Fixed Costs as a Barrier to Entry." *The Quarterly Journal of Economics* 99(2):399–402.

Rogowski, Ronald. 1989. "Commerce and coalitions: How trade affects domestic political alignments." *Princeton, NJ* .

Rosendorff, B Peter. 2005. "Stability and rigidity: politics and design of the WTO's dispute settlement procedure." *American Political Science Review* 99(03):389–400.

Rosendorff, B Peter and Helen V Milner. 2001. "The optimal design of international trade institutions: Uncertainty and escape." *International Organization* 55(4):829–857.

Saggi, Kamal, Alan Woodland and Halis Murat Yildiz. 2013. "On the Relationship between Preferential and Multilateral Trade Liberalization: The Case of Customs Unions." *American Economic Journal: Microeconomics* 5(1):63–99.
URL: *http://ideas.repec.org/a/aea/aejmic/v5y2013i1p63-99.html*

Schattschneider, Elmer Eric. 1935. "Politics, pressures and the tariff.".

Scott, Alex. 2008. "Survey: North Americans Are Least Prepared for Reach." *Chemical Week* March 17.

Scott, Alex. 2009. "A New Response to Regulation." *Chemical Week* October 26/ November 2.

Selin, Henrik. 2007. "Coalition politics and chemicals management in a regulatory ambitious Europe." *Global Environmental Politics* 7(3):63–93.

Serrano, Ma Angeles and Marián Boguná. 2003. "Topology of the world trade web." *Physical Review E* 68(1):015101.

Simmons, Beth A. 2000. "International Law and State Behavior: Commitment and Compliance in International Monetary Affairs." *The American Political Science Review* 94(4).

Simmons, Beth A. and Zachary Elkins. 2004. "The Globalization of Liberalization: Policy Diffusion in the International Political Economy." *American Political Science Review* 98(1).

Souva, Mark, Dale L Smith and Shawn Rowan. 2008. "Promoting trade: The importance of market protecting institutions." *The Journal of Politics* 70(02):383–392.

Spencer, Barbara J and James A Brander. 1983. "International r & d rivalry and industrial strategy." *The Review of Economic Studies* 50(4):707–722.

Staiger, Robert and Guido Tabellini. 1999. "Do Gatt Rules Help Governments Make Domestic Commitments?" *Economics and Politics* 11(2):109–144.

Staiger, Robert W. 2012. Non-tariff Measures and the WTO. Technical Report ERSD-2012-01 World Trade Organization.

Steinberg, R. H. 2002. "In the Shadow of Law or Power? Consensus-Based Bargaining and Outcomes in the GATT/WTO." *International Organization* 56.

Stigler, George J. 1971. "The theory of economic regulation." *The Bell journal of economics and management science* pp. 3–21.

Swann, G.M. Peter. 2010. International Standards and Trade: A Review of the Empirical Literature. OECD Trade Policy Papers 97 OECD Publishing.
URL: *http://ideas.repec.org/p/oec/traaab/97-en.html*

Sykes, Alan O. 1995. *Product Standards for Internationally Integrated Goods Markets.* Brookings.

Sykes, Alan O. 2001. *"Efficient Protection" Through WTO Rulemaking.* Washington: Brookings Institution pp. 114–41.

Thomson-Reuters. 2013. "Derwent Innovation Index." *Web of Knowledge Patent Database* .
 URL: *http://thomsonreuters.com/derwent-innovations-index/*

Tomz, Michael and Mark L. J. Wright. 2008. Sovereign Theft: Theory And Evidence About Sovereign Default And Expropriation. Technical Report 2008-07.
 URL: *http://ideas.repec.org/p/acb/camaaa/2008-07.html*

Vaubel, Roland. 2006. "Principal-agent problems in international organizations." *The Review of International Organizations* 1(2):125–138.

Vernon, Raymond. 1971. "Multinational Business and National Economic Goals." *International Organization* 25(3):pp. 693–705.
 URL: *http://www.jstor.org/stable/2706064*

Westervelt, Robert. 2007. "An Opportunity to Reach Out." *Chemical Week* May 30/ June 6.

WTO. 2011. *World Trade Report 2011.* World Trade Organization, Geneva.

WTO, World Trade Organization. 2012. *World Trade Report 2012.* WTO, Geneva.