Political Cleavages over Supply Chains: Rules of Origin and Preferential Liberalization

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Abstract

Rules of origin are one of the core policy provisions used by governments to restrict the depth of liberalization in preferential trade agreements (PTAs). Despite the importance of rules of origin in global supply chains and PTA negotiations, scholars have a limited understanding of the political cleavages that emerge over these rules. This article provides a theory of firm preferences over rules of origin that underscores input customization and heterogeneity in firm networks. Customized inputs and differences in global sourcing strategies cause restrictive rules of origin to impose asymmetric costs on global firms. Heterogeneity in adjustment costs shifts profits toward firms with relatively strong production linkages in the PTA market and induces support for restrictive rules of origin. In short, some global firms support strict rules because they raise the price of preferential access for rivals in the PTA market. I provide support for this argument using a novel dataset on corporate position-taking over the rules of origin in eleven US PTAs. My findings imply that key political cleavages over rules of origin emerge between global firms within industries that intensively use customized inputs. This article highlights rules of origin as an underappreciated form of industrial policy with significant implications for global supply chains. Moreover, it illustrates how the proliferation of PTAs has created new fault lines over global production.

Preferential trade agreements (PTAs), such as the North American Free Trade Agreement (NAFTA), are a defining feature of the current era of globalization (Baccini, 2019). While multilateral negotiations at the World Trade Organization (WTO) have experienced prolonged gridlock since the 1994 Uruguay Round, governments have shifted toward PTAs as a core policy instrument to reduce tariffs and liberalize trade.[1]

What drives corporate support for PTAs? An emerging consensus in the political economy literature underscores the rapid fragmentation of production processes across countries and the emergence of global supply chains (Baccini, 2019).[2] Scholars argue that large global firms engaged in exporting, input sourcing, and offshoring reap the benefits of preferential liberalization (Baccini et al., 2017).[3] Such firms dominate trade politics and are the key actors behind the proliferation of PTAs (Osgood, 2019). In this sense, the globalization of the supply chain has fragmented protectionist forces (Osgood, 2017a,b) and shifted firm preferences in a pro-trade direction, which has encouraged further liberalization (Osgood, 2018). Rather than the traditional "protection for sale" framework, scholars suggest it is now "liberalization for sale" where core political cleavages emerge within industries between global and domestic firms (Plouffe, 2017; Blanga-Gubbay et al., 2018).

This article is motivated by the inherent tension that exists between the rapid proliferation of PTAs and the global structure of supply chains. That is, in order to function, PTAs must be able to distinguish between goods that originate within member countries from those that originate outside the PTA region. However, the growth in global sourcing makes it increasingly difficult to objectively define the origin of a good (Bhagwati, 1995). As Antras (2015, 5) notes, standard "Made in" labels are an archaic symbol of an older era. Today, most goods are "Made in the World." Nevertheless, the reliance on preferential liberalization means every good still requires a country of origin.

All PTAs include what are known as rules of origin to identify when a good originates in a member country. These rules specify the conditions that must be satisfied in order for the good to qualify for the lower preferential tariff rate. In principle, rules of origin ensure preferential access is only granted to goods that genuinely originate in the PTA market.[4] In practice, these rules are also a powerful form of protection because they constrain the sourcing options of firms and impose additional administrative burdens (Krueger, 1993).

A growing literature in economics underscores the importance of rules of origin for the

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[1] While PTAs cover a variety of issues, the liberalization of trade through lower tariffs remains a key objective.

[2] See also Chase (2003); Manger (2009); Blanchard and Matschke (2015); Osgood (2018); Zeng and Li (2021).

[3] See also Baccini (2019); Kim and Osgood (2019).

[4] This is important because PTA members do not share a common external tariff, which creates the potential for arbitrage. Firms in third-party countries can ship a good to the partner with the lowest external tariff and then transship the good across the now duty-free border to the member country with the higher tariff.

distributive effects of PTAs and their implications for global supply chains (Krishna and Krueger, 1995; Conconi et al., 2018). Additionally, recent negotiations for revisions to NAFTA and Britain's exit from the European Union suggest that governments and firms place significant value on the design of these rules. Yet, scholars have a limited understanding of the political cleavages that emerge over rules of origin. The existing political economy literature largely ignores rules of origin because of their arcane and technical nature.[5] While anecdotal evidence suggests that negotiations over rules of origin give rise to intensive lobbying campaigns by firms and associations, scholars know very little about *who* lobbies over these rules and *what* specific policy preferences they hold. This oversight is particularly problematic because rules of origin determine who can access lower tariffs and at what cost. Thus, these rules are intimately connected to the political economy of preferential liberalization. This article begins to address the gaps in the existing literature by examining corporate lobbying and political activity over rules of origin.

From an economic standpoint, restrictive rules of origin reduce the benefits of preferential access for global firms by increasing input prices and imposing additional bureaucratic costs (Krueger, 1993; Krishna, 2006). Previous research suggests that these rules allow intermediate suppliers to capture the gains of preferential liberalization by charging higher price markups (Chung and Perroni, 2021). In this sense, it is rare for global firms to gain from restrictive rules of origin (Belderbos and Sleuwaegen, 1997). Yet, a large number of firms engaged in international trade actively lobby *in favor* of sourcing restrictions on the goods they produce. Support for restrictive rules of origin can be found across a range of industries, from chemicals and textiles to transportation and electronics. For example, during NAFTA negotiations, Xerox - a producer of office equipment - lobbied extensively for a rule of origin on photocopiers that effectively imposed an 80 percent regional value content (RVC) requirement (Jensen-Moran, 1996). This support is especially puzzling since Xerox is a large multinational firm with global supply chains. Recent models of trade politics have difficulty explaining this support because such firms should be the core advocates for liberalization and should oppose policies that restrict trade (Kim and Osgood, 2019).

To be sure, robust corporate support for permissive rules of origin exists. In fact, a key feature underlying the politics of rules of origin is the relative divisiveness within industries compared to broader liberalization. For example, Canon - another large multinational firm that manufactures photocopiers - intensively lobbied against Xerox during NAFTA negotiations in favor of a more permissive rule (Jensen-Moran, 1996). These political cleavages between multinational firms differ markedly from the predictions of recent firm-centered

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[5]For example, in a recent article in the *Annual Review of Political Science* on the politics of PTAs (Baccini, 2019), rules of origin are not even mentioned.

models that argue trade liberalization creates political divisions between large global firms and small domestic firms (Osgood, 2017a, 2019).

Why do some global firms support restrictive rules of origin while others support more permissive rules? How does the globalization of the supply chain shape firm incentives to support sourcing restrictions in PTAs? I argue that large internationalized firms support restrictive rules of origin because they provide a competitive advantage in the PTA market by raising the price of preferential access for rival firms. In particular, this article provides a theory of firm preferences that underscores the importance of input customization and heterogeneity in firm networks. First, a key characteristic of international trade is the exchange of highly customized inputs, which require relationship-specific investments and involve costly searches for suppliers (Antras and Helpman, 2004). Input customization creates lock-in effects between buyers and sellers by increasing the costs to establish or alter supply chains (Antras and Chor, 2021). I argue that input customization prevents intermediate suppliers from using restrictive rules of origin to capture the benefits of preferential liberalization. In such settings, customized inputs exacerbate (reduce) the costs imposed by a restrictive rule when firms rely on supply chains located outside (inside) the PTA market.

Second, input customization also activates heterogeneity in firm networks. Specifically, firms leverage existing connections when selecting global sourcing strategies for customized inputs to minimize search frictions and market uncertainties (Rauch, 2001). As firm networks differ within an industry, firms gain sourcing advantages within particular markets and global supply chains are likely to vary. Indeed, this is a key facet of firm-heterogeneity in international trade (Jensen et al., 2015; Osgood, 2019). Similarly sized firms in the same industry can differ markedly in where they establish global supply chains (Eaton et al., 2011; Antras et al., 2017). For instance, while both Xerox and Canon source inputs from around the world, there is substantial variation in their design. Xerox has stronger production linkages in North America and Europe while Canon depends on connections in East Asia.

The key implication is that with input customization and heterogeneity in firm networks, a restrictive rule of origin imposes asymmetric costs on global firms within an industry. Thus, while the rule may directly increase costs on all exporters and reduce the gains of preferential liberalization across the board, it also has an indirect on firm profits by causing a shift of market share in the PTA region toward global firms with relatively low adjustment costs. When the shift in market share is large, it creates strong incentives for low-cost firms with a comparative sourcing advantage in the PTA market to support restrictive rules of origin. In short, my argument suggests that Xerox supports restrictive rules of origin during NAFTA negotiations because it raises the price of preferential access for rivals (Canon) and provides a competitive advantage in the PTA market. This account differs substantially compared to

existing models of trade politics. Specifically, support for trade liberalization is predicated on the inclusion of protectionist policies that alter the relative competitiveness of internationalized firms within the PTA market. The reliance on preferential liberalization and differences in global sourcing strategies can induce typically "pro-trade" firms to develop protectionist preferences. Broadly, my theory suggests that heterogeneity in firm networks and customized inputs cause political cleavages to emerge between global firms within industries.

To test this theory, I construct a novel dataset on corporate position-taking over the design of rules of origin in eleven US PTAs, ranging from NAFTA to the USMCA. The empirical evidence provides strong support that key political cleavages over rules of origin emerge between global firms in industries that intensively use customized inputs. Three results are worth noting. First, support for permissive rules of origin increases as production linkages extend beyond the PTA market and the degree of input customization increases. Second, global firms are more likely to support restrictive rules of origin when they have a competitive sourcing advantage for customized inputs within the PTA market relative to rivals. Finally, I show that industries are more likely to be internally divided over the design of rules of origin when they intensively use customized inputs in production processes and global sourcing strategies diverge.

This article provides several notable contributions. First, it adds to the nascent literature on the political economy of rules of origin by providing a theory that accounts for the complex production linkages between firms. Importantly, several studies argue along similar lines. For example, for North-South PTAs, Manger (2009) posits that firms are more likely to support restrictive rules of origin when they source inputs from member countries.[6] However, previous research suffers from several theoretical and empirical limitations. Theoretically, existing studies ignore how restrictive rules affect input prices and alter the bargaining dynamic between firms along the supply chain.[7] Scholars do not provide a clear mechanism for why upstream suppliers cannot simply leverage the rule to capture the gains from preferential liberalization through higher markups (Chung and Perroni, 2021).[8] In short, previous studies fail to identify the conditions under which global firms lobby for restrictive rules of origin. The theory developed in this article demonstrates how input customization severs the link between restrictive rules of origin and the incentives of upstream protection (Laaker, 2023).[9] Empirically, existing evidence primarily relies on case studies of

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[6]See also Chase (2008); Eckhardt and Lee (2018); Çınar and Gulotty (2022)

[7]Eckhardt and Lee (2018) provide a notable exception. They show that horizontal FDI in Mexico was crucial to driving firm preferences for restrictive rules of origin in the Tobacco industry.

[8]Moreover, these studies do not emphasize the importance of competition over market share and heterogeneity in global sourcing strategies as a key driver of support for restrictive rules.

[9]Further, my argument is substantially more general than previous accounts because it elucidates the strate-

specific industries and agreements. This project is the first to provide a systematic analysis of corporate position-taking over rules of origin across industries and PTAs.

Second, this article contributes to the literature on global supply chains and firm heterogeneity. On the one hand, studies that examine the political implications of global sourcing primarily focus on the extent that firms import or export intermediate inputs (Osgood, 2018), but scholars ignore substantial variation in firm-to-firm linkages. Some firms primarily rely on spot market transactions while others depend on close buyer-supplier relationships. This article demonstrates how variation in these production linkages alter the incentives for firms to pursue certain types of protection. On the other hand, while previous research underscores the political implications that result from differences between global and domestic firms (Kim and Osgood, 2019), this article focuses on variation between global firms engaged in international markets. It illustrates how intraindustry differences in global sourcing strategies and the reliance on preferential liberalization can cause some global firms to pursue restrictive rules of origin in order to capture market share from rivals in the PTA region. In this sense, this article relates to several studies which draw on the industrial organization literature and argue firms leverage regulatory policy to gain a competitive advantage (Gulotty, 2020; Kennard, 2020). However, these studies continue to emphasize differences between global and domestic firms. The key insight of this article is to illustrate political cleavages that emerge between global firms.

The remainder of this article proceeds as follows. The first section highlights the political and economic importance of rules of origin in PTAs and then discusses the limits of existing studies. The second section develops a theory for how input customization and heterogeneity in firm networks alter the political economy of rules of origin. The following sections introduce the dataset on corporate position-taking over rules of origin, the research design, and the empirical results. The final section concludes with a discussion of the broader implications of rules of origin and preferential liberalization.

1   Rules of Origin and Gaps in Existing Models of Trade Politics

This section makes three arguments. First, alongside the growth in global supply chains, rules of origin have become increasingly granular and complex, which allows special interest groups to have substantial influence over their design. Second, rules of origin are critical to understanding the broader political economy of PTAs. Using data on the utilization of

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gic incentives to support restrictive rules of origin in any PTA.

preferential tariffs for US imports, I show that rules of origin generate substantial trade frictions. Further, contrary to canonical models, I find that not all exporters benefit from preferential liberalization. Finally, existing frameworks of trade politics are inadequate to explain the political economy of rules of origin because they ignore variation in the complex production linkages between firms.

1.1 Granularity and Complexity in the Design of Rules of Origin

The rapid proliferation of PTAs has dramatically increased the importance of rules of origin. Every PTA must include some form of these rules and they typically account for a substantial portion of the agreement's actual text (Alschner et al., 2018). These rules are at the very heart of PTAs because they ensure only goods that "originate" in member countries are granted preferential access to partner markets. Since PTAs allow members to maintain different most-favored nation (MFN) tariffs for non-member countries, it creates the potential for arbitrage or what is often referred to as trade deflection. Non-members can initially ship a good to the partner with the lowest MFN tariff and then transship the good across the now duty-free border to the member country with a higher MFN tariff.

In theory, rules of origin are included in PTAs to minimize the incentives for trade deflection. However, recent research demonstrates that the profitability of trade deflection is minimal because external tariffs between partner countries are similar and transportation costs are non-negligible (Felbermayr et al., 2019). There is also limited evidence that the design of negotiated rules of origin are influenced by the incentives of trade deflection (Laaker, 2020). Perhaps surprisingly, little consensus exists on the appropriate design of rules of origin. While the WTO has constrained the use of retaliatory tariffs and non-tariff remedies, international institutions have placed few limits on how governments can use and define rules of origin in PTAs (Inama, 2022). Furthermore, the growth in global sourcing makes it difficult to objectively define the origin of a good (Bhagwati, 1995). For example, in the 1950s, it was clear that the Boeing 707 was made in the US since only about 2 percent of the aircraft was built in other countries (Gapper, 2007). It is much more challenging to identify the origin of the Boeing 787 Dreamliner because offshore production accounts for over 70 percent of the parts used in assembly (Grossman and Rossi-Hansberg, 2011). Thus, it is hard to rationalize rules of origin as a purely objective and functional tool.

The emergence of global supply chains has been accompanied by increasing granularity and complexity in the design of rules of origin. For example, while the 1985 PTA between the US and Israel contains a single RVC requirement of 35 percent, subsequent US PTAs include thousands of detailed product-specific rules of origin that typically span hundreds of pages.

This shift toward product-specific rules extends beyond the US and other developed countries (Inama, 2022). The legal and technical complexity of rules of origin has also increased. Since the 1990s, governments have defined rules of origin using various combinations of RVC requirements, shifts in tariff classifications, and technical process requirements. An illustrative example is perhaps useful. When Canadian Trade Minister Michael Wilson was explaining key provisions in NAFTA before Parliament in 1993 he discussed complex areas such as financial services and investment with relative ease. However, when he came to the chapter on rules of origin, he simply made the following statement and moved on, *"Rules of Origin are very, very complex. You don't want to know about them. They're terrible things to deal with"* (Simpson, 1994, 33).

The granularity and complexity in the design of rules of origin raise fears that they allow for discretionary and protectionist practices under the guise of technical policies. As countries have shifted away from one-size-fits-all, across-the-board content requirements toward more complex and product-specific rules of origin, concerns have increased that these rules could be easily captured by special interest groups with rent-seeking motives and abused by governments (Inama, 2022, 400). The legal and technical complexity of these rules obscures their distributional consequences and perfectly satisfies the "principle of optimal of obfuscation" proposed by Magee et al. (1989). This suggests that special interest groups may have substantial influence over the design of these rules.

Differences in the design of rules of origin across products and PTAs demonstrates the discretionary and arbitrary nature of rules of origin. To illustrate these differences, Figure 1 shows the level of restrictiveness in the rules of origin across products for US PTAs using a measure developed by Harris (2007).[10] On the one hand, the rule of origin for computers (HS 8471.30) in NAFTA is relatively permissive and allows for all major components to be sourced from third-party countries (Jensen-Moran, 1996). On the other hand, the rule for injection molding machines for plastic (HS 8477.10) in the US PTA with Singapore imposes an RVC requirement of 65 percent. What is striking is the variation in the design of rules of origin for specific products across PTAs.[11] Consider the rule of origin for passenger vehicles (HS 8703.21-8703.90). The 1965 Auto Pact between the US and Canada included a RVC requirement of 50 percent, which was increased to 62.5 percent in NAFTA and 75 percent in the recent USMCA.[12] However, the RVC requirement in other US agreements is substantially lower (30-35 percent).[13]

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[10]As rules become more restrictive, they impose stricter criteria for determining the origin of a product.

[11]The average within-product variance in the measure from Harris (2007) equals 3.4 for the included PTAs.

[12]The rule in the USMCA also included a variety of additional requirements.

[13]The RVC requirements for CAFTA, Colombia, Peru, Panama, and South Korea are 35 percent; 30 percent for Singapore and Chile, 50 percent for Australia; and 45 percent for the TPP. Based on the net-cost

Figure 1: *The restrictiveness of rules of origin across products for US trade agreements.*
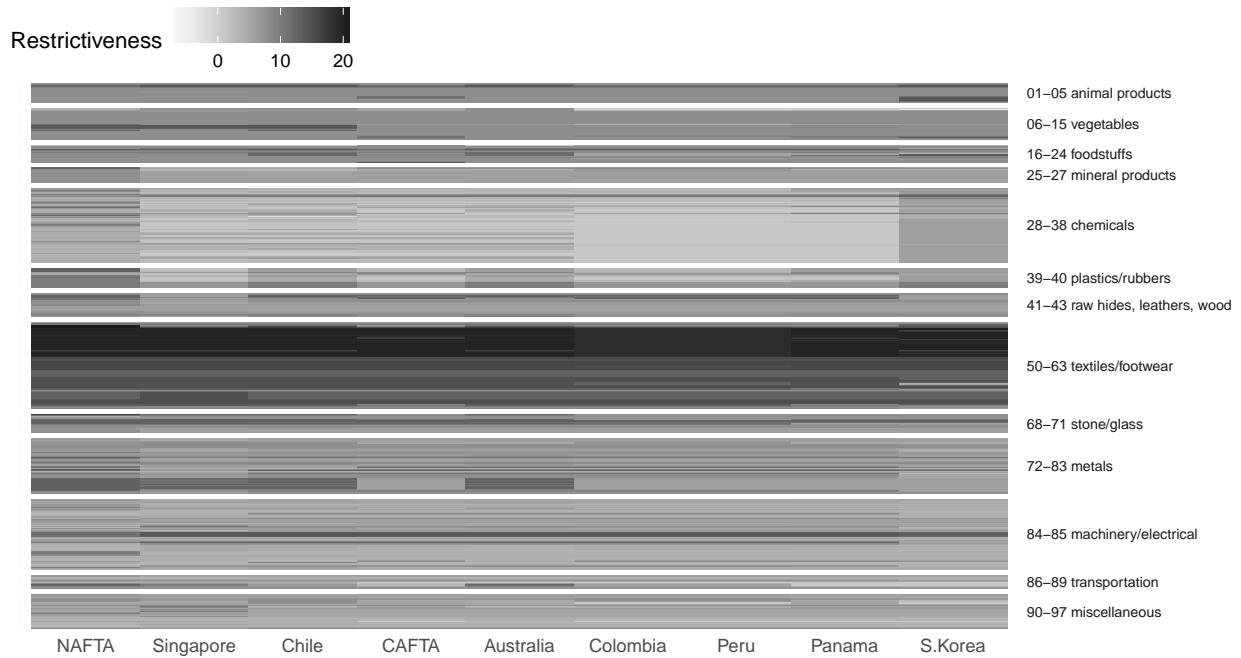
Based on coding developed in Harris (2007). The figure shows the level of restrictiveness for every product at the 6-digit level based on the 1992 HS nomenclature.

This discussion suggests that rules of origin provide ample opportunities for governments to use these rules as a form of industrial policy and for special interest groups to lobby for particular designs. Importantly, just because rules of origin *may* be used by governments and firms as a form of protection does not mean they are (Krishna, 2006). Below, I empirically examine how rules of origin alter the distributive effects of PTAs by analyzing the utilization of preferential tariffs.

1.2 The Distributional Effects of Preferential Liberalization and Rules of Origin

A vast literature shows that only a handful of firms export, source, or produce abroad - and an even smaller segment participate along multiple margins (Bernard et al., 2018). This inequality in global engagement is explained by differences in firm-level productivity and the costs associated with international trade (Melitz, 2003; Kim and Osgood, 2019). Specifically, engaging in foreign markets requires substantial investments and higher operating costs, limiting participation to the largest and most productive firms. When countries join PTAs,

method.

tariff cuts reduce trade costs and motivate firms to initiate or expand trade with partner countries. This increases competition between firms, benefiting a minority of large global firms while causing small domestic firms to lose market share (Baccini et al., 2017).

A key assumption throughout the political economy literature is that all firms in the PTA market have access to lower preferential tariffs when exporting. In other words, when a PTA exists, all exporting firms in the PTA market take advantage of the lower tariffs and invoke preferences at the border. This should especially be the case when the preferential margin is positive. However, previous studies largely ignore the presence of rules of origin. Existing models of trade assume that the frictions created by these rules are limited and, thus, do not alter the distributive effects of preferential liberalization. I examine the validity of this assumption by analyzing utilization rates of preferential tariffs for US imports from partner countries. Figure 2 shows for each product the percentage of imports from partner countries that use preferential tariffs during the first 5 years of an agreement.[14]

The evidence demonstrates that *de jure* preferential tariff cuts do not necessarily mean *de facto* liberalization. Two patterns are worth highlighting. First, even when the preferential margin is positive, a significant portion of imports do not invoke preferences at the border and opt to pay the higher MFN tariff instead. In only one third of the cases, where the preferential margin is positive and trade exists, do products utilize preferential tariffs for more than 95 percent of imports. Moreover, one fifth of the observations have a utilization rate of less than 5 percent. This evidence suggests that the compliance costs of rules of origin generate substantial trade frictions that reduce the benefits of PTAs. Broadly, this finding is consistent with arguments that political leaders design PTAs to treat sectors differently (Milner, 1997), which increases the political viability of the agreement (Grossman and Helpman, 1995).

Second, across industries and PTAs, there is a substantial number of products where some exporters invoke preferences while others do not. That is, for about 50 percent of the cases, only a portion of US imports for a specific product invoke preferences. This within partner-product variation in preference utilization demonstrates that only some exporters benefit from access to lower preferential tariffs, which is inconsistent with canonical models of trade. The results in Figure 2 suggest that the costs of rules of origin are asymmetric across exporting firms. Moreover, they cast doubt on recent studies that treat firms engaged in international trade as monolithic. Importantly, utilization rates underestimate the extent and variation of the frictions created by rules of origin because they do not account for firms

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[14]Products are defined at the 6-digit level based on the 1992 harmonized system. White spaces indicate that either no trade exists or the preferential margin was zero (no benefit to invoke preferences).

Figure 2: *Utilization Rates of US Preferential Tariffs by Partner Countries.*
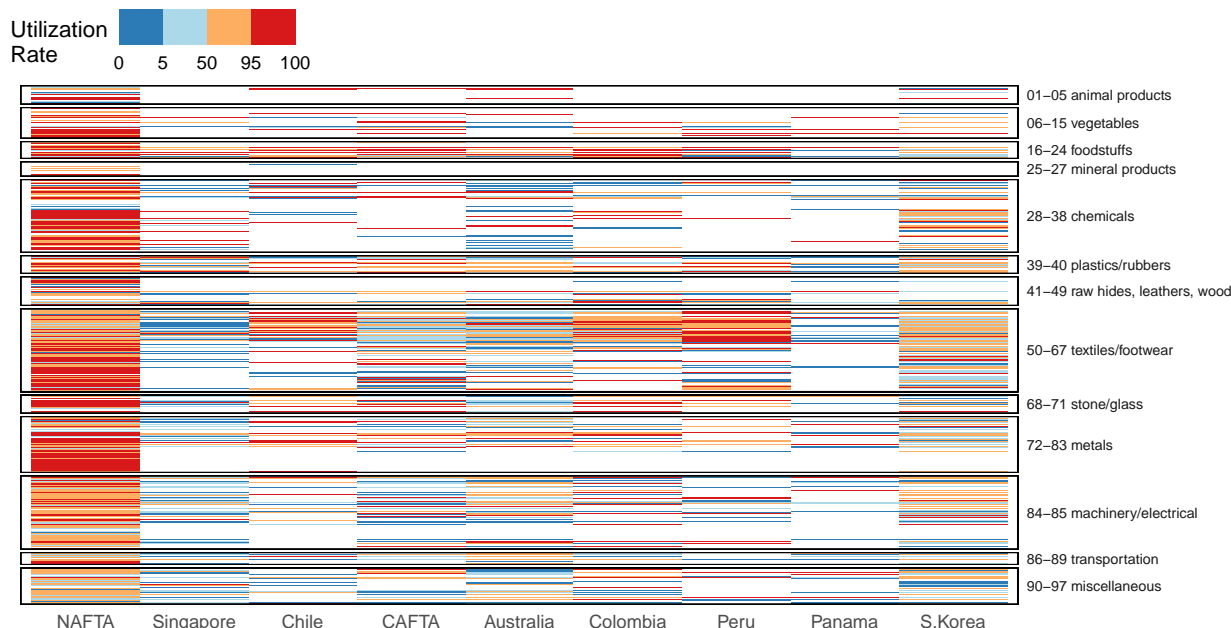
The figure shows the utilization rates of preferential tariffs for US imports from partner countries for products at the 6-digit level based on the 1992 Harmonized Tariff System nomenclature. Trade data is from the first five years after implementation of the PTA. White spaces indicate either no trade exists for the product or the US preferential margin is zero.

altering their supply chains prior to the implementation of the PTA.[15]

Overall, this evidence aligns with an extensive literature showing that rules of origin reduce the benefits of preferential liberalization and have substantial effects on trade flows.[16] The distortive effects of rules of origin are also evident in firm surveys. For instance, in large-scale surveys of manufacturing firms in developing countries, rules of origin were consistently cited as the most problematic non-tariff barrier (ITC, 2015). The key implication from this analysis is that rules of origin are critical to understanding the political economy of PTAs. Yet, these rules are largely ignored in the existing literature.

1.3 Production Linkages and Rules of Origin

Rules of origin are intimately connected to the design of global supply chains since they constrain the sourcing options of firms. However, existing frameworks of trade politics provide limited insights into the political economy of rules of origin because they overlook the

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[15]For example, research finds that firms outside of the PTA market are likely to anticipate the exclusionary effects of a PTA and adjust accordingly (Gulotty and Li, 2020).

[16]On the theory, see Grossman (1981); Krueger (1993); Krishna and Krueger (1995); Krishna (2006); Head et al. (2022). On the empirics, see Anson et al. (2005); Cadot et al. (2006); Carrére and de Melo (2006); Conconi et al. (2018); Sytsma (2022).

complex production linkages between factor owners, industries, and firms (Rogowski, 1987; Grossman and Helpman, 1994; Hiscox, 2002; Gawande et al., 2012; Kim and Osgood, 2019). While a growing literature underscores the importance of global supply chains in the political economy of trade, scholars primarily focus on the extent that firms import or export intermediate inputs and ignore the substantial variation in firm-to-firm relationships. Canonical models either implicitly or explicitly assume that firms use anonymously supplied inputs which are transformed into products and sold to consumers (Bernard and Moxnes, 2018). In such settings, the costs of switching to new partners within the market are low for all firms. Input prices are driven by market clearing conditions and firms are able to easily replace partners when presented with a better offer. Buyer-seller relationships are shallow because suppliers do not need to tailor parts or components to individual customers. Further, it is relatively easy for firms to find or sell inputs through anonymous markets, such as the Chicago Mercantile Exchange, or through intermediaries (Petropoulou, 2008).

Low switching costs between firms generate distinct distributive effects for the sourcing restrictions imposed by rules of origin. Specifically, a rule of origin increases the price of the restricted input sourced from the PTA market, which raises production costs and reduces the benefits of preferential liberalization for exporting firms (Sytsma, 2022). The price distortion caused by rules of origin operates through two channels. First, by conditioning access to lower tariffs on satisfying certain sourcing requirements, a rule of origin induces additional firms to use the PTA sourced input and causes its price to rise (Grossman, 1981; Krishna and Krueger, 1995).[17] Second, by limiting the outside options of firms, rules of origin also increase the market power and bargaining leverage of the upstream industry (Belderbos and Sleuwaegen, 1997; Chung and Perroni, 2021). This allows intermediate suppliers to charge higher price markups and capture the benefits of preferential liberalization. In short, rules of origin attach a price premium to inputs sourced from the PTA market which exporting firms are willing to pay because of access to lower preferential tariffs.[18]

The political implications are straightforward. As Belderbos and Sleuwaegen (1997) argue, it is rare for downstream firms engaged in exporting to ever profit from a restrictive rule of origin because the gains are captured by intermediate suppliers. Thus, key political cleavages over the design of rules of origin should emerge along the supply chain between upstream and downstream firms.[19] Indeed, recent research finds that, on average, firms in

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[17]Research also shows that this price increase may impose larger costs on firms without access to third-party inputs since the increase applies to a larger share of their input mix (Richardson, 1991).

[18]Broadly, these price effects align with a vast literature that demonstrates expanding access to intermediate inputs increases firm efficiency (Amiti and Konings, 2007; Goldberg et al., 2010; Gopinath and Neiman, 2014; Halpern et al., 2015). For rules of origin see (Bombarda and Gamberoni, 2013; Sytsma, 2022).

[19]Domestic firms that do not export may favor restrictive rules of origin as a substitute for high MFN tariffs

downstream industries are more likely to support permissive rules of origin while intermediate suppliers favor restrictive rules (Laaker, 2023).

Empirically, several studies demonstrate that the modal firm-to-firm relationship is short-lived, which suggests that firms quickly respond to changes in price. Using French data, Martin et al. (2022) find that roughly 40 percent of firm matches only last a month. Similarly, Monarch and Schmidt-Eisenlohr (2020) show for US importers, that 62 percent of firm relationships in given year are new. However, previous research neglects a prominent characteristic of input trade. That is, intermediate input purchases often entail the exchange of highly customized inputs that require relationship-specific investments and involve costly searches (Martin et al., 2022). These frictions vary substantially across markets, industries, and firms. For some, it is relatively easy to find suppliers because of low levels of input customization and the presence of large intermediaries. Though, for others, finding efficient and reliable partners in a global economy can be a costly and lengthy process because of search frictions and relational contracting.[20] The existing political economy literature provides limited insights into how input customization alters the political cleavages that emerge over trade policy (Antras and Helpman, 2004; Antràs and Staiger, 2012).[21]

The following sections develop a theory that underscores the importance of customized inputs in the political economy of rules of origin. Specifically, I argue that input customization fundamentally alters the distributive effects of rules of origin through two channels. First, input customization raises the costs to establish or alter supply chains by introducing search frictions and relational contracting. These costs generate a mutual dependence between buyers and sellers, which create lock-in effects that further tie firms together. In such settings, upstream firms in the PTA market cannot simply exploit restrictive rules of origin to capture the benefits of preferential liberalization. On the one hand, when production linkages are located in the PTA market, input customization reduces the costs of restrictive rules of origin. On the other hand, input customization exacerbates the adjustment costs imposed by restrictive rules when production linkages extend beyond the PTA market.

Second, input customization also activates heterogeneity in firm networks. Firms lever-

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which insulate the industry from the competitive effects of liberalization. While these firms may still face price increases, highly restrictive rules of origin are preferred to increased competition in the home market. Though, (Laaker, 2023) finds limited evidence that these incentives drive firms to support restrictive rules.

[20]While several studies examine the political importance of global supply chains (Johns and Wellhausen, 2016; Osgood, 2018, 2019), scholars overlook the substantial variation in their design.

[21]The fixed market-entry costs incorporated into existing models partly reflect these frictions (Kim and Osgood, 2019), but they miss critical features. In particular, firms reach individual suppliers and customers rather than the market in its entirety. While these costs are fixed with respect to production, they are variable in the optimization of expenditures by firms. Paying higher costs allows a firm to search longer, which results in finding more efficient partners and, thus, reduces marginal production costs (Bernard et al., 2019).

age existing connections in markets when establishing global supply chains for customized inputs to minimize search and contracting frictions. Differences in firm networks generate sourcing advantages for individual firms and cause intraindustry variation in global supply chains. Indeed, this is a key facet of firm-heterogeneity in international trade (Osgood, 2019). Similarly sized firms within the same industry can differ markedly in where they establish supply chains. Some firms minimize production costs by sourcing customized inputs from China or South Korea, while other firms in the same industry source from Europe.[22]

The key implication is that restrictive rules of origin impose asymmetric costs across global firms within an industry. I argue that these distributive effects are critical in explaining why some large productive firms lobby for restrictive rules of origin that constrain sourcing decisions and introduce red tape. Specifically, input customization and heterogeneity in firm networks cause rules of origin to also have an *indirect* effect on firm profits by shifting market share toward firms with strong production linkages in the PTA region. This competitive dynamic creates incentives for some global firms to support restrictive rules of origin because they impose greater costs on rival firms in the PTA market and raise the price of preferential access.

2 Input Customization, Firm Networks, and the Political Economy of Rules of Origin

This section develops a model of firm preferences over rules of origin that emphasizes the importance of customized inputs and heterogeneity in firm networks. In particular, I focus on the preferences of large firms engaged in international trade. This is because these firms have higher stakes (in absolute terms), have greater resources to lobby, and are more politically experienced and informed over trade issues (Osgood, 2018). In short, relative to small domestic firms, these firms have a larger incentive and ability to lobby. Indeed, previous research finds that large internationalized firms are more likely to lobby over trade policy than small domestic firms (Drope and Hansen, 2006; Weymouth, 2012; Kim, 2017; Osgood, 2019; Kim and Osgood, 2019; Blanga-Gubbay et al., 2018).

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[22]Formally, existing models assume that fixed entry costs to enter foreign markets are constant across firms within an industry, which implies a strict hierarchical structure or pecking order in the extensive margin of exporting, input sourcing, and multinational production. That is, as the productivity of a firm increases, it should enter more challenging markets. Empirically, this prediction is often violated (Eaton et al., 2011; Antras et al., 2017). Less productive firms frequently export, source, or produce in markets from which more productive firms do not. These fixed costs are firm-specific and driven by differences in firm networks.

2.1 Customized Inputs, Global Production, and the Prohibitive Costs of Restrictive Rules of Origin

Previous studies on the distributive effects of rules of origin overlook the importance of input customization. When firms intensively rely on inputs that are highly customized to individual production processes, the costs to establish and alter supply chains increase. This creates lock-in effects between firms and causes production linkages to be relatively sticky. I emphasize two features of customized inputs. On the one hand, input customization introduces search and information frictions. Firms must invest resources to gather information about the technical capabilities of potential suppliers, past business conduct, the legal system, and general market conditions. Research finds that firms frequently face challenges in establishing initial contacts in new foreign markets (Benguria, 2021).

On the other hand, input customization also requires firms to make relationship-specific investments in physical assets and technology that are tailored to the specific product. In an environment with imperfect contracting, this exposes both firms to substantial risks. Firms can guard against these risks by writing contracts, but it is infeasible to predict every potential problem that may arise during the course of the relationship. The nature of imperfect contracting requires firms to invest in relational capital to reduce contractual insecurities between participants. Firms rely on repeated interactions with one another to establish a form of governance that provides implicit contract enforcement (Antràs, 2020).

The costly process of finding efficient and reliable partners in a global economy increases the value of long-term relationships (Antras and Chor, 2021). This is for two reasons. First, search frictions and relationship-specific investments are sunk in nature, meaning they are likely forfeited when a firm decides to abandon an existing relationship. Second, establishing efficient supply chains for customized inputs takes significant time. For example, for Sea Eagle Boats Inc., who produces inflatable kayaks, canoes, and fishing boats, it took 20 years to fully build up its supply chain with various contract manufacturers in China (Hufford and Tita, 2019). Research demonstrates that with customized inputs firm relationships become more efficient overtime as trust increases and uncertainty over reliability decreases (Egan and Mody, 1992; Monarch and Schmidt-Eisenlohr, 2020). Indeed, while most firm-to-firm matches in a given year are new, the value of trade is driven by long-term relationships. Monarch and Schmidt-Eisenlohr (2020) find that 80 percent of the value of US imports occur in preexisting firm-to-firm matches. These insights suggest that with high levels of input customization, supply chains are relatively sticky (Monarch, 2022; Martin et al., 2022). In such settings, firms cannot easily substitute partners without incurring substantial costs.

The lock-in effects of input customization have two key implications for the distributive

effects of rules of origin. First, input customization increases the adjustment costs imposed by restrictive rules of origin when supply chains are located outside the PTA market. In the short term, firms are unlikely to comply with the rule of origin because input customization increases the time required to establish reliable and efficient supply chains (Lim, 2020). This logic is consistent with evidence that shows compliance with rules of origin increases overtime (Krishna et al., 2021). In the long-term, firms will find suitable suppliers in the PTA market as investment in upstream industries increases. However, marginal production costs are likely still higher compared to more permissive rules of origin. This is because the efficiency of supply networks increases overtime for customized inputs (Monarch and Schmidt-Eisenlohr, 2020). Further, firms are unlikely to recreate the level of efficiency of previous supply chains in different markets (Mair et al., 1988).

Second, input customization limits the leverage rules of origin provide to upstream industries in the PTA market. This is because customized inputs increase the costs to abandon existing connections, which creates lock-in effects between firms within a production network. The price of the input is determined by bilateral bargaining between firms instead of market clearing conditions (Antràs and Staiger, 2012). Thus, the gains from preferential liberalization are divided depending on the outside options of each firm (Antras, 2015, 98-106). While sourcing restrictions increase the bargaining leverage of the upstream firm, its outside options are still limited in the short-term.[23] In other words, input customization aligns the interests of firms within a production network over the design of rules of origin. The simple upshot is that input customization decreases the costs imposed by restrictive rules of origin when firms and industries depend on supply chains within the PTA market.

The political implications of are straightforward. Firms engaged in international trade should be more likely to lobby in favor of permissive rules of origin as production linkages extend beyond the PTA market and the degree of input customization increases. The key benefit of PTAs for global firms is expanded market-access through lower tariffs. Existing models suggest these firms support liberalization because lower tariffs allow them to gain market share in member countries at the cost of smaller less competitive firms. However, these gains depend on global firms qualifying for preferential access, which is only possible with relatively lax rules of origin. Sourcing restrictions would disrupt long global supply chains where products cross multiple borders (Baldwin, 2006; Chase, 2008). Moreover, these firms favor policies with flexibility which allow them to alter sourcing decisions in response

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[23]The bargaining advantage rules of origin provide upstream firms may actually increase aggregate profits for the downstream firm to the extent it alleviates the hold-up problem and ex-ante underinvestment by the upstream firm (Thoenig and Verdier, 2006).

to demand shocks and currency fluctuations.[24] Overall, global firms have strong incentives to maintain current supplier relationships and avoid the costs of either reorganizing supply chains or forfeiting preferential access. This discussion suggests the following hypothesis:

Hypothesis 1: *A firm with a greater amount of production linkages outside the PTA market should be more likely to express support for permissive rules of origin, especially when inputs are customized.*

Large firms with multinational supply chains vigorously protect their interests during negotiations for rules of origin. For example, US negotiators originally proposed a rule in NAFTA for computers, an industry with a high degree of input customization, that required two of three key components (motherboard, flat panel display, and hard disc drive) to be sourced from member countries (Jensen-Moran, 1996). The rule was equivalent to a 60 percent RVC requirement. The International Business Machine Corporation (IBM) strongly opposed the rule because it would require a complete reorientation of its supply chain for the North American market (half of its total sales). As an IBM spokesperson put it, *"to use the rule of origin as an instrument of industrial policy for flat panels is a misuse of the rules"* (Davis, 1992, 1). In the end, IBM successfully lobbied the US, Canada, and Mexico to dramatically alter the rule. The final version only required the motherboard to be made in member countries and only for the first 10 years.

Broadly, this discussion suggests the political implications of input customization for rules of origin align with recent studies which argue global supply chains shift firm preferences in a pro-trade direction (Osgood, 2018). Importantly, this section focuses on how customized inputs and global sourcing strategies alter the adjustment costs imposed by restrictive rules of origin on individual firms. In other words, it emphasizes the *direct* effect of rules of origin on firm profits by decreasing the benefits of preferential liberalization.

2.2 Heterogeneity in Firm Networks and the Asymmetric Costs of Restrictive Rules of Origin

Input customization also activates heterogeneity in firm networks and generates intraindustry variation in firms' global sourcing strategies. Specifically, when establishing global supply chains for customized inputs, firms leverage existing connections in markets to minimize search and contracting frictions (Rauch, 2001). These contacts emerge from a variety

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[24]See Kogut and Kulatilaka (1994); Bernard et al. (2009).

of sources, such as management, employees, trade associations, previous transactions, or neighboring firms. Existing connections can provide reliable information about trading opportunities, potential suppliers, and market structure, which reduces the costs to establish or expand linkages within particular countries (Combes et al., 2005). Further, firm networks can reduce opportunism and contracting frictions by providing information on the history and reliability of suppliers (Greif, 1989; Greif et al., 1994; Gulati et al., 2000).[25]

A vast literature in economics finds that firms' existing social and business networks reduce search and information frictions, decrease contractual insecurities, and lead to larger productivity gains - especially for customized products (McMillan and Woodruff, 1999; Rauch and Trindade, 2002; Garmendia et al., 2012; Chaney, 2014). Further, research demonstrates that reducing these frictions allows firms to find more efficient partners within a market and, thus, decreases marginal production costs (Bernard et al., 2019). Importantly, firm networks are also critical in facilitating trade and developing global supply chains (Antràs et al., 2022; Conconi et al., 2022). For example, studies find that firms are more likely to enter foreign markets when neighboring firms or members in business groups are already present (Belderbos and Sleuwaegen, 1998; Head and Ries, 2001; Kamal and Sundaram, 2016; Bisztray et al., 2018).[26] The key upshot is that when inputs are highly customized, firms leverage existing connections when developing sourcing strategies to minimize costs.

As firm networks differ within an industry, global supply chains are likely to vary. Indeed, a growing body of evidence indicates substantial differences exist between firms' global sourcing strategies within the same industry (Eaton et al., 2011; Antras et al., 2017).[27] This intraindustry variation in supply chains is clearly evident in the automotive sector and firms' sourcing decisions for engines and transmissions. Table 1 uses 2011 data published under the American Automobile Labeling Act and shows for each manufacturer the percentage of vehicle models assembled in NAFTA that source engines or transmissions from within the region. There are stark differences between vehicle manufacturers. For example, 78 (11) percent of Volkswagen-Audi's models assembled in NAFTA use engines (transmissions) sourced from member countries. For Hyundai Motor Company, 67 percent of models assembled in NAFTA either use a transmission or engine sourced from NAFTA countries.

Intraindustry differences in global sourcing strategies for customized inputs have crit-

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[25]Reducing informational asymmetries amplifies the reputational effects of opportunistic behavior and increases the likelihood firms are punished for such behavior.

[26]See also (Rauch, 1999; Burchardi and Hassan, 2013; Cohen et al., 2017; Bailey et al., 2021).

[27]See also Munch and Nguyen (2014); Bernard et al. (2011). Previous studies demonstrate that sourcing differences can be caused by variation in quality (Fieler et al., 2018), multinational activity (Hanson et al., 2005), capital intensities (Schott, 2004), product quality Bastos et al. (2018), and destination of exports (De Gortari, 2019).

Table 1: Sourcing Decisions of Vehicle Manufacturers in NAFTA Region for 2011.

Manufacturer	Proportion of Models with NAFTA Sourced Engines	Proportion of Models with NAFTA Sourced Transmissions	Number of Models
Ford Motor	0.84	0.63	43
General Motors	0.97	0.97	32
Chrysler LLC	1.00	1.00	20
Toyota Motor	1.00	0.69	13
American Honda	1.00	0.64	11
Nissan North America	0.55	0.18	11
Volkswagen-Audi	0.78	0.11	9
Mazda Motor Corp.	0.80	0.40	5
BMW AG	0.00	0.00	3
Fuji Heavy Industries	0.00	0.00	3
Hyundai Motor Co.	0.67	0.67	3
Mercedes Benz	0.00	0.00	3
Mitsubishi Motors	0.00	0.00	3
American Suzuki	1.00	0.00	1
Kia Motors Corp.	1.00	1.00	1
Think	0.00	0.00	1
Wheego	1.00	0.00	1

ical implications for the distributive effects of rules of origin. As discussed above, input customization either mitigates or exacerbates the adjustment costs imposed by a restrictive rule, depending on the location of global supply chains. However, differences in global sourcing strategies for customized inputs within an industry indicate that the costs imposed by a restrictive rule of origin are asymmetric across internationalized firms within the PTA market. On the one hand, firms with strong production linkages in the PTA market face minimal adjustment costs when complying with a relatively strict rule and can easily access lower preferential tariffs on imported inputs and exports (low-cost firms). On the other hand, the costs of compliance with a restrictive rule are substantially larger when firms have weak production linkages in the PTA market and depend on suppliers located in third-party countries (high-cost firms). The price of preferential access is higher for these firms because compliance requires altering existing supply chains and searching for new linkages.

Heterogeneity in adjustment costs between global firms within an industry causes a restrictive rule of origin to also have an *indirect* effect on firm profits by shifting market share toward low-cost firms that enjoy a comparative sourcing advantage within the PTA region (Salop and Scheffman, 1983, 1987; Kennard, 2020). When the shift in market share is large, it compensates for the direct effect of a restrictive rule of origin on production costs. My central claim is that this competitive dynamic creates a strategic incentive for a global firm with relatively low adjustment costs to lobby in favor of restrictive rules of origin because

it raises the price of preferential access for rivals and provides a competitive advantage in the PTA market. In short, while a strict rule may increase production costs on all exporting firms and reduce the benefits of lower tariffs, a firm may still support the rule because it imposes larger costs on rivals and allows the firm to capture market share.

Importantly, support for restrictive rules of origin emerges only if there exists significant heterogeneity in adjustment costs. The costs imposed by restrictive rules of origin are likely to differ between global firms within an industry when inputs are highly customized and global sourcing strategies vary. On the one hand, if firm networks and global supply chains are similar, the adjustment costs imposed by a restrictive rule of origin do not differ. In such settings, the *direct* effect of the restrictive rule on a firm's production costs dominates the *indirect* effect since the shift in market share is relatively small. On the other hand, this competitive dynamic also is unlikely to exist when the degree of input customization is low. This is because switching costs are minimal, which reduces the variation in input prices between firms. In sum, heterogeneity in firm networks and customized inputs cause restrictive rules of origin to impose asymmetric adjustment costs on global firms within an industry. This discussion suggests the following hypothesis:

Hypothesis 2: *A firm with a comparative sourcing advantage within the PTA market, relative to competitors, should be more likely to express support for restrictive rules of origin, especially when inputs are customized.*

The logic of my argument also suggests that input customization and heterogeneity in firm networks have empirical implications for internal divisions that emerge within an industry over the design of rules of origin. Specifically, industries are more likely to be divided over rules of origin as global sourcing strategies diverge and the degree of input customization increases.

Hypothesis 3: *A industry is more likely to be internally divided over the design of rules of origin when firms' global sourcing strategies within and outside the PTA market diverge, especially when inputs are customized.*

2.3 An Illustrative Example: Televisions, Variation in Global Supply Chains, and Rules of Origin

To understand this logic in action, consider the rules of origin for color televisions in NAFTA. At the time, major TV producers that operated in the US market also had assembly plants

located in northern Mexico.[28] However, the structure of their supply chains for cathode-ray (picture) tubes, which accounted for about 40 percent of component costs, differed significantly (OTA, 1992). Sanyo, Hitachi, and Matsushita primarily relied on sourcing materials from Asian suppliers while Zenith had consolidated most of its production to Mexico and the US during the 1980s (OTA, 1992). Prior to NAFTA, special border programs allowed an Asian picture tube to be incorporated duty-free into televisions produced in Mexico. When shipped to the US, the tubes only faced a 5 percent duty derived from the rate charged on the value-added in Mexico for completed TVs. The special border programs allowed firms to avoid paying the 15 percent tariff typically imposed by the US.

During NAFTA negotiations, Zenith and its suppliers secured a rule of origin that restricted the use of non-member picture tubes in color televisions. A firm that sourced Asian picture tubes would have to pay the 15 percent tariff or reorient supply chains toward North America. Both would substantially raise costs. In the low-margin consumer electronics industry, this dramatically affected a firm's bottom-line. Estimates suggested the rule would increase costs by 11 to 14 percent (Consumer Electronics, 1993). Zenith wanted the rule to gain a competitive advantage against its rivals. As Jerry Pearlman, the chairman of Zenith, put it *"television sets using foreign tubes will get clobbered under NAFTA"* and *"we'll pick up market share"* (Davis, 1992, 1). Indeed, surprising industry analysts, Zenith turned a $9.4 million profit during the third quarter in 1994 (Dishneau, 1994). For the same period in the previous year, Zenith recorded a $14.1 million loss. It was the first time since 1988 that Zenith had turned a profit and Pearlman attributed the gains directly to the rules of origin in NAFTA (Dishneau, 1994).

Altering supply networks also proved challenging for firms. Picture tubes required different specifications depending on the type of television. Further, production required highly skilled workers because of the complexity of equipment and the need to constantly tune machine components (OTA, 1992). In other words, picture tubes are highly customized inputs. Industry analysts predicted the rule would cause a severe picture tube shortage as firms tried to switch to North American suppliers (Consumer Electronics, 1993). Furthermore, in interviews, managers emphasized the difficulty of finding suppliers in Mexico that were comparable to those in Asia.[29] They eventually started to encourage their Asian suppliers to setup plants in Mexico, but many were reluctant (OTA, 1992). New picture tube plants could cost upwards of $200 million.

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[28]They were part of the maquiladora industry, which exempted firms from duties on imported materials used to assemble products or sub-assemblies for export. Additionally, these plants benefited from the US's outward-processing programs that only imposed duties on the value-added in Mexico.

[29]They pointed to a poorly qualified workforce, poor infrastructure, and language barriers.

Existing models of trade politics would explain Zenith's support for NAFTA by emphasizing the firm's size and its engagement in international markets (Osgood, 2018). Specifically, NAFTA would decrease the tariffs on televisions Zenith exported to the US from Mexico and also decrease the tariffs on the inputs Zenith imported to Mexico from the US. This allows Zenith to reduce marginal production costs and capture market share from smaller domestic firms in the PTA region unable to engage in international trade. However, this story ignores the rules of origin within NAFTA that determine which goods qualify for preferential access. Absent rules of origin, all television exporters in Mexico would gain from NAFTA with minimal costs. Zenith leveraged differences in the sourcing of highly customized inputs and used the rules of origin in NAFTA to prevent its rivals from cheaply accessing lower tariffs. In other words, the rules of origin in the agreement raised the price for rival firms to gain preferential access and provided Zenith with a competitive advantage that allowed it to capture market share within the PTA region.

This account differs substantially compared to existing models of trade politics. Specifically, support for trade liberalization is predicated on the inclusion of protectionist policies that alter the relative competitiveness of exporting firms within the PTA market. Further, political differences that emerge are between large and global firms. My theory emphasizes how the reliance on preferential liberalization and the globalization of supply chains can induce typically "pro-trade" firms to develop protectionist preferences. Thus, the political economy of rules of origin and PTAs are driven by cleavages over firms' supply chains. By ignoring rules of origin, scholars overlook a key policy provision included in all trade agreements that firms can exploit to extract rents.

The underlying logic of my argument also applies even if all existing supply chains are global, so long as there is sufficient variation in the adjustment costs to comply with the rules of origin. The rule for battery powered electric vehicles (EVs) in the recent EU-UK trade agreement demonstrates this idea. The specific rule requires that 55 percent of the value of EVs be created in the PTA market by 2027. On face value, this rule does not appear particularly restrictive when comparing to the rules for vehicles in NAFTA and the USMCA; however, the batteries make up between 50 to 60 percent of the total value of a car. This is particularly challenging for automotive firms because European battery production is limited and many rely on sourcing batteries from Asia and the US. For example, in 2018 only 1 percent of the demand for these batteries was supplied by European companies (Lowe, 2020). While investment has substantially increased in recent years, UK firms have lagged behind.

Support for these rules largely depended on the ability of firms to satisfy the rule by 2027. Broadly, automotive firms in the UK opposed the rule of origin because they had

not invested in battery production within the EU market. However, Nissan provided an exception. Nissan, who produces its Leaf model in Sunderland, UK, reacted positively to the new rule. While the firm currently sources batteries from the US, it could easily alter its supply network because of strong connections with Envision, a battery producer that was previously owned by Nissan and is located right next to their plant in Sunderland (Bailey, 2021). Nissan was able to reach an exclusive deal with Envision to produce batteries for the Leaf model. This partnership allows Nissan to easily meet the new rules of origin requirements in the EU-UK trade deal. Ashwani Gupta, the Chief Operating Officer at Nissan, noted that the rules of origin created a competitive environment for their Sunderland plant (Hancke and Mathei, 2021). Industry analysts contributed this competitive edge to the rules having a larger negative impact on rival firms and expected Nissan to capture market share as a result (Bailey, 2021).

3   A Dataset on Corporate Position-Taking over Rules of Origin

This section discusses the approach and sources used to construct a new dataset on corporate support for restrictive and permissive rules of origin in US trade agreements, ranging from NAFTA to the USMCA.[30] I use this underlying data to test the theoretical implications of my argument at the firm (Hypothesis 1 and 2) and industry-level (Hypothesis 3).

The ideal empirical test would collect data on firm and association preferences over value content requirements or specific input restrictions across trade agreements that are then matched with formal lobbying reports. However, there are several limitations which suggest collecting data at this level of detail is infeasible. First, negotiations over rules of origin are done in secret behind closed doors. While officials provide general updates throughout the negotiation process, the specifics on the individual rules are usually not released until the final text of the agreement is made public. Further, specific positions and the influence of key stakeholders in negotiations are not made public by negotiators unless done so by the firm or organization. Second, survey methods are unlikely to adequately measure preferences at a highly detailed level because of the complexity of rules of origin. Understanding the economic implications of rules of origin requires in-depth knowledge of complex and long

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[30]The US provides an important and ideal empirical setting for several reasons. First, the US is commonly used as a testing ground for the trade politics literature. Second, the US simply provides better data on lobbying activities and trade (Bombardini and Trebbi, 2020). Finally, the political strategy pursued by US officials and firms toward the design of rules of origin in the early 1990s was quickly adopted by other countries after NAFTA in a domino like effect (Inama, 2022, 400).

supply chains, which most managers and officials do not know or easily able to express in a survey response. This is further complicated when differentiating preferred designs of rules of origin across various agreements. Third, this information is unlikely to exist in official firm and association lobbying reports. These disclosures typically only identify whether the entity lobbied on rules of origin and do not provide details on specific policy preferences or the direction of lobbying. Moreover, formal lobbying disclosures do not capture the various ways firms and associations can influence negotiations over rules of origin.

Given these constraints, I follow previous studies and collect data on *public* position-taking of firms and associations over the design of rules of origin across US agreements.[31] Specifically, I focus on public statements of trade associations and individual firms concerning rules of origin. In this sense, I treat public expressions by firms and associations as a form of outside lobbying intended to (1) influence policy and public perceptions over rules of origin and (2) to inform policymakers about the stakes and potential economic consequences of specific rules. The core assumption being made is that private and public preferences over rules of origin are closely linked.

There are a variety of reasons why this assumption holds. Public statements from firms and associations are generally based on an internal process of deliberation on the economic effects of the specific rules and, thus, are likely to reflect meaningful discussions and the actual interests at stake. These statements are also present within many industries and across US trade agreements. Moreover, the US government spends significant resources to provide a forum for firms and industries to express their views and concerns over rules of origin. Specifically, they have established Industry Trade Advisory Committees (ITAC) to receive feedback and positions from firms on a variety of issues in trade agreements, including rules of origin. They also invite firms and associations to testify and publicly comment during hearings in Congress and the US International Trade Commission (ITC). Recall, rules of origin are very complex and technical. These opportunities to testify and publicly comment serve as a critical juncture to inform policymakers about firm and industry stakes and the intricate economic effects of specific rules of origin.

Additionally, on-the-record statements can be costly if there is intraindustry disagreement or if interests are misapprehended. Thus, it is unlikely that they will made in haste or erroneously formulated. For example, during CAFTA negotiations when a report mistakenly stated that Parkdale Mills supported a compromise agreement that included more permissive textile rules of origin, the CEO of the company quickly went on record to indicate it opposed the compromise agreement and supported a more restrictive set of rules (WWD, 2003).[32] In

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[31]See Chase (2003); Osgood (2017a,b, 2018, 2019) for similar approaches to trade policy.

[32]While it is possible public positions can generate unwanted attention and firms may face social constraints

sum, these public positions on the design of rules of origin are good proxies for the private interests and ultimate stakes and consistent with previous studies on trade policy (Chase, 2003; Osgood, 2017a,b, 2018, 2019).

To code firm and association positions, I rely on a variety of sources: Congressional and ITC testimony and submissions, USTR comments, ITAC reports, press releases and website statements, and news media reports. Importantly, positions had to be clear and concrete. These sources require careful reading to determine if an unambiguous position was taken on the rules of origin in a particular trade agreement. Many firm and association expressions of support are repeated across multiple venues, improving confidence that public expressions are meaningful and accurately measured.

I measure position-taking using a simple dichotomy: firms and associations either support permissive or restrictive rules of origin. This strategy is preferable because firms and associations vary in the level of detail in their stated positions. While some are very specific about the products, inputs, and restrictions they prefer, others provide less detail and discuss rules of origin in a broader context of trade strategy and supply chains. I rely on common phrasing used by firms and associations to code position-taking over rules of origin. Specifically, I code firms and associations as supporting permissive rules of origin if statements included support for flexible or simple rules, the use of multiple tests to prove origin, diagonal cumulation, rules that acknowledge the global nature of industry supply chains, and/or the importance of global sourcing for certain inputs and opposition to rules that prevent or hinder liberalization. For example, consider the comments submitted the USTR by the Toy Association during the USMCA negotiations.

> "The current NAFTA product-specific rule of origin on toys, which applies to HS subheadings 9503.00 through 9505.90, is the result of an industry proposal to amend the original NAFTA origin rules for toys. Considered in the 2003-2005 trilateral review of the NAFTA's product-specific rules of origin and supported by the U.S., Canadian and Mexican toy associations, the proposed amendment was adopted at a trilateral meeting of trade ministers in July 2004. It took effect on July 15, 2005, following the completion of each country's domestic ratification procedures. The amended NAFTA rule of origin on toys has proven satisfactory to the toy industry. Nonetheless, we would support a further liberalization in the product-specific rule of origin on toys such as that adopted in the TPP agreement as a further improvement on the existing NAFTA rule. Any tightening of regional content requirements or other increased rule of origin restrictions will undermine U.S. toy companies' ability to utilize the NAFTA." - **The Toy Association**

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that influence their preferences or whether they publicly take a position, these concerns are limited, especially as the stakes grow larger.

Not only did the Toy Association support liberalization of the rule of origin for toys in 2004, it makes clear that the organization also supports further liberalization of the rules in the USMCA. Thus, I code the Toy Association as supporting permissive rules of origin for the USMCA in the dataset. I code firms and associations as supporting restrictive rules of origin if statements supported rules that prevented screwdriver plants, rules that only benefited PTA members, rules that benefited firms invested in the PTA market, strong or strict rules of origin, rules with high regional content requirements, rules that only allowed regional inputs, or rules that restricted specific inputs. For example, consider the Congressional testimony of a representative from the Whirlpool Corporation during NAFTA negotiations.

> "NAFTA provides many positive provisions which will enhance the business opportunities of U.S. companies against global competition. For example, significant appliance rules of origin would require major investment in North America by foreign competitors planning to set up manufacturing operations." - **Whirlpool Corporation**

The testimony makes clear that Whirlpool views the rule of origin as beneficial because it requires substantial regional content and forces competitors to make major investments in the US, Canada, or Mexico in order to qualify for preferential access. Thus, I code Whirlpool as supporting restrictive rules of origin for NAFTA in the dataset. Table 2 provides additional excerpts taken from firm and association statements over rules of origin for various agreements. Across the examples, it is clear that firms and associations carefully craft their positions over rules of origin and view them as economically important.

Table 3 shows the number of firms and associations that supported permissive or restrictive rules of origin for each US agreement and the average number of sources used to document each position. These descriptive statistics underscore several important patterns. First, rules of origin are politically important. Across agreements, *both* firms and associations appear to spend substantial resources in an attempt to influence the design of rules of origin. Moreover, for larger agreements, the number of associations and firms that stake out positions increase. Second, there is substantial support for restrictive rules of origin across agreements from firms and associations. This pattern is in stark contrast to Osgood (2018) who finds that pro-trade firms dominate the politics of trade policy and few lobby against preferential liberalization. The relative support for restrictive rules of origin suggests that firms and associations may actively try to use these rules as a form of protection. Overall, while trade experts regularly emphasize the political importance of rules of origin, this is the first study to empirically document the frequency and intensity of this political activity.

Finally, it is worth noting that a substantial portion of associations publicly comment on the design of rules of origin. This is perhaps surprising because previous evidence demon-

Table 2: Examples of firm and association position-taking over the design of rules of origin in various US trade agreements.

"We are writing to encourage your team to work to modify the rules of origin (ROOs) in the NAFTA renegotiations for products classified under Harmonized Tariff System (HTS) subheading 3921.19.00, which includes many of our breathable, waterproof membranes. NAFTA's ROOs require goods classified under HTS Subheading 3921.19.00, which includes our breathable, waterproof membranes to be made entirely from materials that originate in one of the three countries, or, to meet a 60 or 50 percent regional value content threshold to be eligible for preferential treatment. The raw material inputs are for these membranes are classified primarily in Chapters 39 and 27, and are not produced or available from a NAFTA country, and thus must be imported into the United States for further processing. Once in its final form, we are unable to qualify the product because of this restrictive rule of origin."   **- Comments submitted to the USTR from W.L. Gore & Associates Inc. during USMCA negotiations. Coded as support for permissive rules of origin.**
"The current rule of origin to receive tariff preferences for U.S. preferential trade agreements is a chapter shift from any chapter into Chapter HTS 2204. Japanese regulations allow wine producers to import bulk wine in HS Chapter 2204.29 and 2204.30 to blend with Japanese wine and claim Japanese origin. Such wine should not receive any tariff preference if it is shipped to the U.S. See the import substitution discussion above under tariff elimination."   **- Comments submitted to the USTR from the Wine Institute during TPP negotiations. Coded as support for restrictive rules of origin.**
"Implement one set of commercially viable preferential rules of origin for products of Chapter 18 for all members of the TPP including Malaysia to ensure that intermediate cocoa inputs, chocolate and chocolate confectionery will benefit fully from tariff preferences, and allow for regional cumulation among all countries of the TPP."   **- Comments submitted to the USTR from the National Confectioners Association during TPP negotiations. Coded as support for permissive rules of origin.**
"Regarding other textile issues concerning Japan, NCTO would like to reiterate that a yarn forward rule of origin is essential for textiles, apparel, and other finished products made of textiles. Such a rule requires that textile inputs originate in the U.S. or partner countries. The U.S. has incorporated this rule for the last two decades to the tremendous benefit of the U.S. textile industry and to the nearly two million textile and apparel workers in the Western Hemisphere."   **- Comments submitted to the USTR from the National Council of Textile Organizations during TPP negotiations. Coded as support for restrictive rules of origin.**
"But American businesses, many of which advocate unrestricted free trade in all but their own industries, said they were pleased. "One man's wart is another man's beauty mark," said Timothy Regan, a trade official at Corning Inc., a glass manufacturer based in Corning, N.Y. The company said it hoped to sell more glass for use in television sets when manufacturers have an incentive to use North American television screens, and has been lobbying strenuously for passage of the pact. "We are contributing money and we are contributing time and energy – we are probably contributing as much as anybody," Mr. Regan said. The strict rules of origin have helped the Bush and Clinton Administrations win broad corporate backing for the agreement."   **- Public comments from the Corning Corporation in the New York Times during NAFTA negotiations. Coded as support for restrictive rules of origin.**

Table 3: Counts of firm and association position-taking on US agreements.

Agreement	# of assoc. that support		# of firms that support		Total	Avg. # Sources
	Permissive Rules	Restrictive Rules	Permissive Rules	Restrictive Rules		
NAFTA	21	71	64	60	216	1.31
Singapore	27	38	30	24	119	1.02
Chile	30	34	30	22	116	1.03
CAFTA	38	33	50	26	147	1.35
Australia	36	29	41	22	128	1.02
Colombia	36	31	57	40	164	1.07
Peru	22	31	49	36	138	1.05
Panama	26	35	50	39	150	1.05
South Korea	31	36	57	38	162	1.21
TPP	39	48	60	31	180	1.61
USMCA	54	40	67	44	206	1.30

strates the prevalence of firm-level lobbying. Due to space considerations this article does not examine why firms may opt to lobby by themselves or through associations. However, the emphasis placed on input customization and firm networks provides some theoretical insights. That is, input customization increases the importance of long-term relationships and the tacit sharing of information. Thus, firms with similar production networks for customized inputs may find it profitable to collectively lobby over trade policy. Indeed, associations typically form over supply chains. On the one hand, the American Automotive Policy Council is a trade association for the Big Three (Ford, General Motors, and Stellantis), which have strong production linkages in North America. On the other hand, automotive firms with stronger global connections have analogous associations, such as the International Organization of Motor Vehicle Manufacturers and the Association of Global Automakers. The idea that input customization and firm networks may reduce the costs of collective action connects to an older literature on strategic groups within industries where firms are grouped based on similar competitive strategies (Newman, 1978; Porter, 1979; Milner and Yoffie, 1989). Importantly, while this dynamic cannot be captured in a firm-level analysis since data on the historical membership of associations is lacking, the analysis at the industry-level does account for the possibility that some global firms lobby over rules of origin through associations.

4   Firm-Level Support for Restrictive and Permissive Rules of Origin

This section presents the main empirical results that establish the effects of input customization and global sourcing strategies on firm-level position-taking over rules of origin (Hypotheses 1 and 2). I begin with a description of the research design and measurement of key concepts. I then present the empirical finding connecting input customization and the structure of global supply networks to firm support for permissive and restrictive rules of origin.

4.1   Data and Measurement of Concepts

To test Hypotheses 1 and 2, I match by hand firms that have publicly stated a position over rules of origin with firm-level characteristics. This data comes from Orbis, a database produced by Bureau Van Dijk, which provides financial information for both public and private corporations worldwide. The key benefit of Orbis over other databases, such as Compustat, is that it has the most comprehensive data on private firms. This is particularly important since many firms that stake out positions are not publicly traded.

To build a comparison set of firms that do not take a position on rules of origin, I follow the approach in Cory et al. (2021); Osgood (2019); Lee and Osgood (2022). Specifically, for firms in goods-producing industries (NAICS codes 11, 21, 31-33), I include all firms that Orbis categorizes as medium, large, or very large (roughly 200,00 firms) and then take a stratified random sample of 100,000 US firms that Orbis classifies as small.[33] I then construct sampling weights using the complete Orbis population of firms by size. All reported results weight the sampled non-position-taking firms using the true population size distribution. Firms that stake out a position are given a weight of 1 since that population is observed (Osgood, 2019). The unit of analysis is at the firm-agreement level. The main outcome is $Position_{fp}$ which equals 1 if the firm f expressed support for restrictive rules of origin for agreement p, 0 if the firm took no position, and -1 if the firm expressed support for permissive rules. For all firms, I also identify their main (6-digit NAICS) industry, which is denoted by i.

The measure for input customization for each industry i is based on Nunn (2007). Specifically, using input-output tables from the Bureau of Economic Analysis, I calculate the proportion of inputs used in the production processes for industry i that are differentiated. $Input\ Customization_{fpi}$ ranges from 0 to 1, where larger values indicate a higher degree of

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[33]Firms that either support permissive or restrictive rules of origin are removed from this random sample.

input customization.[34]

I measure a firm's production linkages using data on foreign subsidiaries. This approach is advantageous for several reasons. First, while several datasets on firm-to-firm transactions exist, they are typically limited in scope and geographic coverage. For instance, using US customs data excludes transactions within the domestic market and does not capture trade between partner and third-party countries. Further, while Compustat and FACSET provide data on supplier connections for publicly traded firms, the coverage of private firms is severely limited. Second, subsidiaries provide a useful proxy for the latent underlying production network of a firm in a particular market. A firm with a greater number of subsidiaries in a country not only has deeper connections, contacts, and suppliers but also can easily shift production in response to demand shocks or policy changes. Recall, Nissan did not source electric batteries from the EU prior to Brexit but still supported the restrictive rule on EVs because it had existing connections in the market that reduced adjustment costs relative to rivals. A measure that used firm-to-firm transactions would fail to capture these latent production linkages.

To capture the extent of a firm's production linkages that extend beyond the PTA market I use $Global\ Network_{fpi}$, which equals the number of subsidiaries for firm f that are not located in the PTA region for agreement p. Firms with a greater amount of production linkages in third-party countries should experience larger adjustment costs when faced with a restrictive rule of origin. This should be the case even when the firm has relatively strong connections in the PTA market because the restrictive rule of origin constrains the firm's ability to use production linkages inside third-party countries in response to demand shocks or currency fluctuations. Thus, the expectation is that a firm with greater connections outside the PTA market should be more likely to express support for permissive rules during PTA negotiations. In this sense, $Global\ Network_{fpi}$ captures how a restrictive rule of origin *directly* affects the potential benefits of preferential liberalization for the individual firm. The final measure is logged.

Importantly, the key theoretical mechanism driving support for restrictive rules of origin is the competitive sourcing advantage within the PTA market relative to rival firms. I operationalize this concept with $PTA\ Advantage_{fpi}$ which equals the number of subsidiaries firm f has in the PTA market minus the median number of subsidiaries in the PTA market for competitors classified as large or very large in the same industry i.[35] By using large and

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[34]Formally, $Input\ Customization_{fpi} = \frac{1}{u_i} \sum_j u_{ij} I_j$, where u_{ij} is the value of input j used to produce goods in industry i; u_i is the total value of all inputs used in industry i, and I_j is an indicator variable that equals 1 if the input j is classified as differentiated by Rauch (1999) and 0 otherwise.

[35]Both measures are logged.

very large firms, the measure focuses on the relative competitiveness of a firm compared to top rivals. This ensures that the median is not skewed toward zero by a large segment of small firms that have no subsidiaries or that the measure is capturing the incentives to support restrictive rules of origin as a substitute for external protection. The resulting measure varies between firms within industries and across PTAs for individual firms. Values greater than zero suggest that firm f has a comparative sourcing advantage relative to its competitors within the PTA market. Both $Global\ Network_{fpi}$ and $PTA\ Advantage_{fpi}$ are constructed only using subsidiaries incorporated prior to the implementation of the PTA.[36]

The baseline specification also includes several control variables to account for confounding explanations. At the firm-level, I include a measure of vertical integration following the approach in Alfaro et al. (2016). This is particularly important because firms with higher levels of vertical integration may support restrictive rules of origin because they have control over input production (Belderbos and Sleuwaegen, 1997). This should alleviate concerns that the main independent variables are simply capturing the incentives to support restrictive rules of origin because of vertical integration. I also include controls for firm size using indicator variables for whether the firm is classified as small, medium, large, or very large by Orbis. Firms larger in size should be more likely to stake out a position over trade policy. I include a measure for whether the firm is listed, delisted, or unlisted. At the industry level, I include the average US and partner MFN tariff for products in industry i. This measure captures the extent of benefits provided by preferential liberalization. I also include a measure to control for capital intensive industries. This helps account for the incentives of using restrictive rules of origin to prevent market-entry that may dilute the benefits of preferential access. Further, I include measures that account the upstreamness of the industry and the level of imports and exports. Finally, I include industry (NAICS 3-digit) and agreement fixed effects to account for unobservable time-invariant confounders.

4.2   Results

Table 4 reports the main results for the firm-level analysis when using weighted least squares regressions. Standard errors are clustered at the level of the firm. Estimates for the control variables are excluded for brevity. Broadly, the results provide strong evidence for the proposed hypotheses. First, firms with greater production linkages outside the PTA market are more likely to support permissive rules of origin, and this effect increases as the degree

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[36]To reduce potential problems of missingness, I also draw on mergers and acquisition data from Thomas Reuters. I also use this data to remove any subsidiaries that incorporated prior to the PTA but acquired by the firm after implementation.

Table 4: Firm-Level Support for Restrictive and Permissive Rules of Origin

|	Dependent Variable: Firm Position			
	1	2	3	4
Input Customization	−0.008	0.087	−0.090	0.005
	(0.056)	(0.070)	(0.072)	(0.082)
Global Network	−0.140***	−0.043	−0.129***	−0.041
	(0.015)	(0.042)	(0.012)	(0.045)
PTA Advantage	0.039**	0.034**	−0.048	−0.047
	(0.014)	(0.016)	(0.046)	(0.046)
Input Customization x Global Network		−0.184**		−0.183*
		(0.081)		(0.080)
Input Customization x PTA Advantage			0.166*	0.164*
			(0.081)	(0.083)
Control Variables	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Agreement FE	Yes	Yes	Yes	Yes
Observations	3,265,328	3,265,328	3,265,328	3,265,328

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. Estimated coefficients are from weighted least squares regressions with standard errors clustered at the firm-level.

of input customization increases (Hypothesis 1). Second, a firm is more likely to support restrictive rules of origin when it intensively uses customized inputs and it has stronger production linkages in the PTA market relative to rivals (Hypothesis 2). Importantly, when input customization is low, firms with stronger production linkages in members markets are not more likely to support restrictive rules during negotiations.

To focus on the quantity of interests for Hypothesis 1, the left panel of Figure 3 shows the marginal effect of a one standard deviation increase in *Global Network* on firm position-taking toward rules of origin at different levels of *Input Customization* (Model 4 of Table 4). The Figure demonstrates that at low levels of input customization, the extent of a firm's global production linkages has a limited effect on support for permissive rules of origin. However, this effect increases as the degree of input customization increases. The estimated effects are also meaningful. At high levels of input customization, a one standard deviation increase in the *Global Network* measure causes roughly a 7 percent shift toward support for permissive rules of origin.

Overall, this result aligns with the expectation that the direct effect of a restrictive rule on a firm's profits increases as supply chains for customized inputs extend beyond the borders of member countries and, thus, creates strong incentives for firms to support permissive rules of origin during PTA negotiations. More broadly, this result is consistent with the emerging

Figure 3: *Marginal effect of Global Network and PTA Advantage on firm-level preferences for rules of origin at different levels of input customization.*
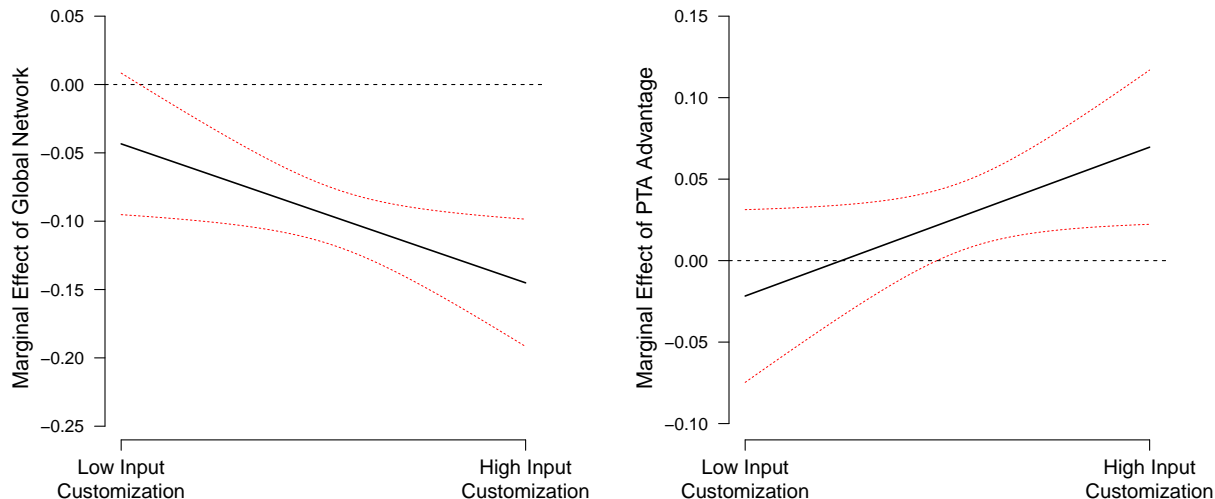
Estimated effects are for a one standard deviation increase in *Global Network* and *PTA Advantage* on a firm's position over rules of origin. Estimates based on model 4 in Table 4. Red lines are 95 percent confidence intervals based on standard errors clustered at the firm level.

consensus in the political economy literature that the globalization of the supply chain has shifted firm preferences toward liberalization (Osgood, 2018; Kim and Osgood, 2019). As firms rely on supply chains for customized inputs that extend around the world, they are more likely to favor lax rules of origin in PTAs that account for these global linkages.

The right panel of Figure 3 examines Hypothesis 2. Specifically, it shows the marginal effect of a one standard deviation increase in *PTA Advantage* on firm position-taking toward rules of origin at different levels of *Input Customization* (Model 4 of Table 4). The results align with the expectation that relatively strong connections in the PTA market do not matter when the degree of input customization is low. Though, as inputs become more customized, the marginal effect of *PTA Advantage* increases. When the degree of input customization is high, a one standard deviation increase in *PTA Advantage* causes about a 4.5 percent shift toward support for restrictive rules of origin. These results provide strong support for Hypothesis 2.

It is important to underscore how this result differs substantially from recent research on trade politics that highlights the pro-trade nature of global firms and how global supply chains liberalize preferences. Specifically, this finding demonstrates that global firms lobby for individual carve outs in order to gain a competitive advantage in the PTA market by

raising the price of preferential access for rival firms. In the conclusion, I discuss how this profit-shifting effect of restrictive rules of origin may alter firm preferences over broader liberalization and create stumbling blocs to multilateral negotiations at the WTO. Additionally, this finding suggests that in certain contexts, global supply chains can shift corporate preferences in a protectionist direction and create political cleavages between large global firms. Broadly, these results provide strong evidence that while the form of protection has substantially changed since the early 1990s, it is still very much for sale. In the following section, I directly examine the political cleavages that emerge within industries between global firms.

5 Intraindustry Divisions over the Design of Rules of Origin

An important limitation of the analysis in the previous section is that it does not directly demonstrate that political cleavages over rules of origin emerge within industries between large global firms. Further, it cannot capture firms who select to lobby through associations. As noted above, the costs of collective action may be lower for firms within an industry who rely on similar production networks for customized inputs. Since there is limited availability of membership data and contributions to association budgets, it is nearly impossible to identify firms who lobby collectively through an association. To overcome these limitations, I test an additional implication of my argument at the industry-level. Specifically, divisions within industries should be more likely to occur over the design of rules of origin when inputs are customized and differences in firms' global production networks exist (Hypothesis 3).

5.1 Data and Measurement of Concepts

I focus on 404 good-producing industries in the agriculture, mining, and manufacturing sectors (NAICS 11, 21, 31-33). I match every firm and association that took a position over rules of origin to individual 6-digit NAICS industries.[37] For associations, I primarily rely on previous NAICS codings identified in Cory et al. (2021). For firms, I use the NAICS codings from Osgood (2018), FACTSET, and Orbis.[38] For any associations or firms where I could not find previous NAICS codings, I carefully match them to industries by hand based on the evidence used to document their position, company and association websites, and public knowledge sources. Approximately 80 percent of firms and associations are matched

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[37]Based on the 2012 nomenclature.
[38]Specifically, the FACTSET edm_standard_entity_naics_rank table provided through Wharton Research Data Services.

to NAICS industries using the codings from FACTSET, Orbis, Osgood (2018), and Cory et al. (2021).

Importantly, the 6-digit NAICS industry is a relatively fine-grained level of aggregation. Each industry is unlikely to be mixed with downstream customers or upstream suppliers. This level of aggregation for industries is useful because it reflects meaningful product and organization differences. A higher level of aggregation would likely conflate upstream and downstream industries. For example, 3-digit NAICS codes differentiate sectors by broad categories, such as Transportation Equipment (NAICS 336). Moreover, 6-digit codes are the most commonly used level of disaggregation in previous research and likely correspond best to the descriptions of individual firms and associations (Osgood, 2017a, 203).

The unit of analysis is at the industry-agreement level. The main outcome is $Divided_{ip}$ which equals 1 if industry i has support for both restrictive and permissive rules of origin for PTA p and 0 otherwise. The measure for input customization is based on Nunn (2007) and analogous to the firm-level analysis. In order to capture the differences of global sourcing strategies between firms within an industry, I rely on two measures. First, $Network\ Divergence_{ip}$, uses the Jaccard Similarity Distance based on data from Orbis on the number of subsidiaries of large and very large firms in industry i that are located inside and outside the PTA market p. Specifically, for every unique pair of firms in industry i, I calculate the Jaccard Similarity distance, $J(X_1, X_2) = 1 - \frac{min(X_{1r}, X_{2r}) + min(X_{1g}, X_{2g})}{max(X_{1r}, X_{2r}) + max(X_{1g}, X_{1g})}$. Where X_r (X_g) equals the number of subsidiaries located inside (outside) the PTA market for the respective firm. I then take the average across all pairs for industry i in agreement p. The intuition behind the measure is straightforward. Values closer to 0 indicate that the production linkages of large and very large firms are similar inside and outside the PTA market. As the measure increases and approaches 1, differences in the production linkages between these firms increase. This approach is useful because it captures the underlying differences in production networks for the largest firms in the PTA market.

Second, I follow Osgood (2017b, 2018) and estimate the total import dependence of a given industry from partners and third-party countries. Specifically, this measure combines input-output tables, along with data on sales and imports, to construct estimates of the quantity of an industry's inputs that are attributable to imports from partners and the rest of world. I use these measures to create a dissimilarity index for the global supply chain of an industry, $GSC\ Fragmentation_{ip} = 1 - \frac{|InputsP_{ip} - InputsW_{ip}|}{InputsP_{ip} + InputsW_{ip}}$, where $InputsP_{ip}$ ($InputsW_{ip}$) is the value of imported inputs for industry i from partner (third-party) countries for agreement p. The intuition behind the measure is that values closer to 0 suggest that an industry sources inputs exclusively from either partners or from countries outside the PTA market while values closer to 1 indicate that the industry sources an equal amount from each. The expectation is

Table 5: Intraindustry Cleavages over the Design of Rules of Origin

	Dependent Variable: Divided Industry					
	1	2	3	4	5	6
Input Customization	0.044	0.045	−0.425**	−0.502*	−0.629*	−0.741*
	(0.046)	(0.046)	(0.181)	(0.225)	(0.303)	(0.375)
Network Divergence	−0.038		−0.106		−0.141	
	(0.126)		(0.133)		(0.243)	
GSC Fragmentation		0.155		−0.025		0.017
		(0.115)		(0.140)		(0.224)
Input Customization x Network Divergence			0.557**		0.796*	
			(0.224)		(0.357)	
Input Customization x GSC Fragmentation				0.635**		0.911*
				(0.269)		(0.428)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Agreement FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,444	4,444	4,444	4,444	2,462	2,462

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. Columns 5 and 6 report the results when excluding observations where no position was recorded. Standard errors are clustered at the industry level.

that an industry is more likely to be internally divided as $GSC\ Fragmentation_{ip}$ increases.

The baseline specification includes several control variables to account for potential confounding explanations. First, I include the average US and partner MFN tariffs on goods produced in industry i. Second, I include measures that capture related party trade between partner countries. Third, I include a measure of vertical integration at the industry level following the approach detailed in Alfaro et al. (2016).[39] Fourth, I control for industry revenue, the degree of upstreamness, the number of US establishments within the industry, and the number of 6-digit harmonized system codes that are matched to each industry. Finally, all models include agreement and industry (3-digit NAICS) fixed effects.

5.2 Results

The results are reported in Table 5 and based on ordinary least squared regressions with standard errors clustered at the industry (6-digit NAICS) level. I exclude the estimated coefficients of the controls for brevity. Broadly, the results provide support for Hypothesis 3. Intraindustry disagreement over the design of rules of origin increases as global sourcing strategies differ within industries and when inputs are highly customized. Columns 3 and 4

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[39]To construct this measure I use data from FACTSET and Orbis that links firms to specific NAICS industry codes.

Figure 4: *Marginal effect of Network Divergence and GSC Fragmentation on intraindustry divisions over rules of origin at different levels of input customization.*
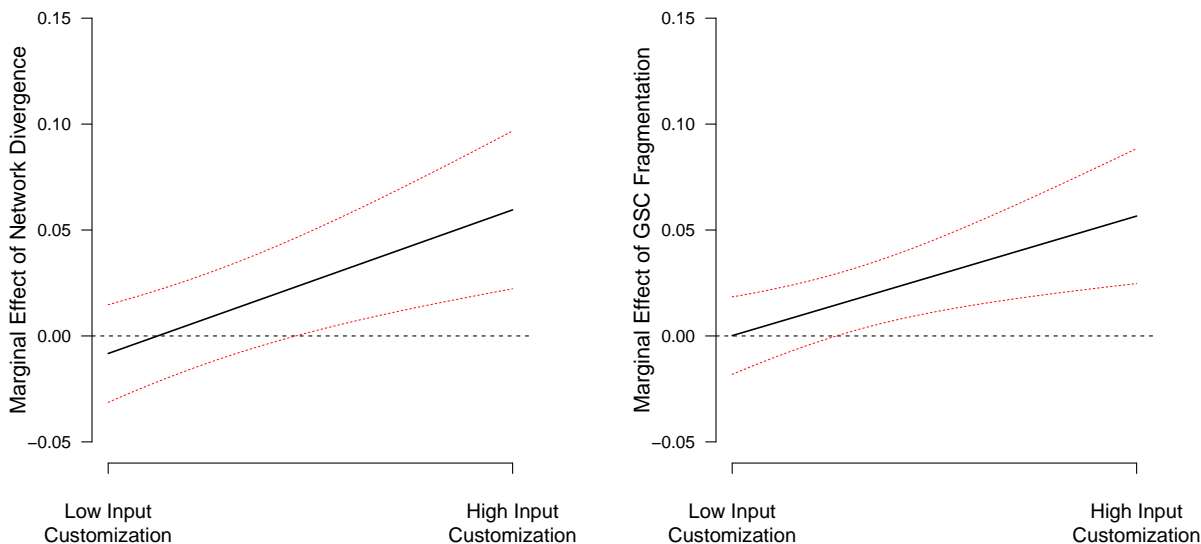
Estimated effects are for a standard deviation increase in *Network Divergence* and *GSC Fragmentation* on industry divisions. Based on models 3 and 4 in Table 5. Red lines are 95 percent confidence intervals. Standard errors clustered at the industry level.

in Table 5 report the main results when including the interactions term between *Input Customization* and *Network Divergence* and *GSC Fragmentation*. The estimated coefficient for the interaction terms in both models are positive and statistically significant, which suggests that the probability of intraindustry divisions over rules of origin increases as both input customization and differences in global sourcing strategies increase. To focus on the quantity of interests, Figure 4 reports the marginal effects of a one standard deviation increase for *Network Divergence* and *GSC Fragmentation* on industry divisions at different levels of input customization. Consistent with the theoretical argument, the effects of *Network Divergence* and *GSC Fragmentation* increase at higher levels of input customization. The estimated effects are meaningful. For example, at high levels of input customization, a one standard deviation increase in *Network Divergence* increases the probability that an industry is internally divided by about 5 percentage points.

Overall, these results provide strong evidence that divisions within industries over the design of rules of origin are driven by the degree of input customization and heterogeneity in global sourcing strategies. Recent insights suggest that intraindustry divisions over trade liberalization should exist between large global firms and small domestic firms (Kim and Osgood, 2019). The findings in this article illustrate how the structure of global supply

chains and the importance of input customization can cause large internationalized firms to develop distinct preferences over the particular design of trade liberalization.

6   Conclusion

The shift toward preferential liberalization and the emergence of global supply chains has drastically increased the importance of rules of origin. Yet, scholars have a limited understanding of the political economy behind these regulations. In this article, I have attempted to alleviate the dearth of theoretical and empirical research by examining corporate lobbying and the political behavior of global firms over rules of origin.

Drawing on recent advances in industrial organization and international trade, I argue that core political cleavages over rules of origin emerge within industries between global firms. While these firms are often viewed as the key advocates of liberalization that should favor permissive rules, I show that input customization and heterogeneity in firm networks induce different political incentives among global firms within the same industry. Establishing supply chains for customized inputs is costly because of search frictions and relational contracting. These costs vary between firms within an industry because of differences in firms' international social networks. The key implication is that while a restrictive rule of origin imposes costs on all exporting firms in the PTA market, these adjustment costs differ among firms, even within the same industry, due to each firm's distinct sourcing advantage. When the preferential margin is large, restrictive rules provide a competitive advantage to firms with relatively low adjustment costs and cause a shift in PTA market share. If this shift is substantial, it creates strong incentives for firms with extensive linkages inside (outside) the PTA market to lobby for restrictive (permissive) rules of origin.

I test these predictions using a novel dataset on corporate position-taking over rules of origin in eleven US PTAs, ranging from NAFTA to the USMCA. The results of my analysis reveal three key findings. First, as the level of input customization increases and production linkages extend beyond the boundaries of the PTA market, firms are more likely to express support for permissive rules of origin. Second, firms are more likely to support restrictive rules of origin when they have a competitive sourcing advantage for customized inputs within the PTA market compared to rival firms. Finally, I show that industries are more likely to be internally divided over the design of rules of origin as input customization increases and global sourcing strategies diverge.

This article has several important implications for the broader politics of trade policy. First, it provides theoretical insights on whether PTAs facilitate or undermine multilateral liberalization. While existing empirical evidence on this question is mixed (Limão, 2006;

Estevadeordal et al., 2008), previous research has solely focused on preferential tariff cuts and ignored rules of origin as an alternative mechanism. My argument suggests that restrictive rules of origin can shift firm preferences away from multilateral liberalization by allowing firms to capture market share in the PTA region that would be lost through lower MFN tariffs. In this sense, restrictive rules of origin serve as a distinct channel in which PTAs are stumbling blocs that undermine multilateral liberalization.

Second, this article provides insights on the political implications of global supply chains. An emerging consensus in the trade politics literature argues that the globalization of supply chains has fragmented traditional protectionist interests and privileged a new pro-trade coalition of global firms (Osgood, 2018, 2019). Rather than the traditional "protection for sale" framework, research suggests it is now "liberalization for sale" (Blanga-Gubbay et al., 2018). While support for standard forms of protection has certainly dissipated in recent decades, protectionism is not dead. This article illustrates how the shift toward preferential liberalization has given rise to novel and more obscure forms of protection. Moreover, it demonstrates how the emergence of global supply chains has created new fault lines over trade policy within this coalition of global firms. Future research should further examine how intraindustry differences in global sourcing strategies alter the political economy of trade.

Finally, this article highlights the potential implications stemming from scholars' tendency to equate PTAs with the idea of free trade (Rodrik, 2018). Despite mixed empirical evidence (Caliendo and Parro, 2015), PTAs are often assumed to enhance aggregate welfare because they counter the influence of protectionist interests and improve economic efficiency. Firms that lobby in favor of these agreements are characterized as "vanguards of globalization" and the "resistance to protectionism" because they pressure political leaders to commit to freer trade (Milner, 1988; Osgood, 2019). However, the results in this article demonstrate that global firms actively lobby for protectionist provisions during PTA negotiations. This finding aligns with several recent studies examining how global firms leverage different types of trade barriers and information advantages to extract rents (Gulotty, 2020; Perlman, 2023). In this sense, these firms are not defenders of globalization but rather just another set of special interests that engage in self-interested and rent-seeking behavior. Broadly, the conflation between PTAs and free trade provides firms cover to increase rents at the expense of the general interest. These incentives are especially prevalent considering that governments rely on firms' knowledge and expertise when designing trade policy (Rodrik, 2018).

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