The Political Origins of Rules of Origin*

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Abstract

Rules of Origin (RoO) have emerged as one of the primary policy instruments amid deepening global value chains. Despite their significance, the scholarly understanding of how RoO interact with other trade policies remains limited. We propose a theory that elucidates the political origins of RoO. Specifically, we argue that RoO enable governments to concurrently appeal to three distinct political constituencies by: (1) protecting downstream producers, (2) providing export subsidies for upstream producers, and (3) reinforcing the existing global production networks shaped by multinational corporations (MNCs). To empirically test this argument, we construct the first comprehensive dataset on RoO, encompassing 121 PTAs at the product level among 85 countries. We find that stringent RoO considerably attenuate the effects of trade liberalization and disrupt existing global production networks, especially for substitutable goods. By merging our data with Chinese Customs Data (2000-2013), we also demonstrate that MNCs can shape the formulation of RoO to maintain and expand their global production networks.

Key Words: Preferential trade agreement, global production, rules of origin, trade politics

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1 Introduction

Global production has become the primary mode of manufacturing in this era of globalization. Firms now routinely import semi-finished goods, process them, and then export the resulting products for subsequent production stages (Antràs and Chor, 2013; Neilson, Pritchard, and Yeung, 2014), diverging from the traditional model of organizing production chains within a single country while exporting final goods to global markets. International trade has accordingly transformed, with intermediate goods now constituting three-quarters of total trade (Kim and Rosendorff, 2021). As companies establish complex production linkages both within and across national borders, thereby forming global value chains (GVCs), traditional trade policies have also diminished in effectiveness (Antràs and Chor, 2013). Consequently, both developing and developed nations are increasingly adopting modern trade policies that directly address GVCs, as opposed to merely focusing on market access (Milner and Mansfield, 2012; Baccini, Pinto, and Weymouth, 2017). In effect, the focus of trade policy-making has shifted towards regulating the production processes of traded goods, rather than just the types of products crossing borders.[1]

Rules of Origin (RoO), the legal provisions delineating origin status in preferential trade agreements (PTAs), have become prominent policy tools with the expansion of GVCs. Nearly all contemporary PTAs feature a RoO section, with approximately two-thirds offering detailed, product-specific RoO at the Harmonized System (HS) six-digit level. Scholars generally agree that RoO have evolved into an independent policy instrument capable of distorting GVCs (Estevadeordal, 2000; Cadot, 2006; Felbermayr, Teti, and Yalcin, 2019), though divergent views exist regarding the political motives for establishing these complex, detailed rules (Conconi et al., 2018; Chase, 2008; Duttagupta and Panagariya, 2007; Anson et al., 2005). Empirically, as we demonstrate below, few studies probe the effects of RoO across countries with differing GVC participation, mainly due

[1]See rising discussions about deep trade integration such as `https://cepr.org/voxeu/columns/trade-and-welfare-benefits-deep-trade-agreements`.

to variations in rule types, formats, and languages. Consequently, most recent empirical work, largely constrained by data availability, focuses on analyzing one or a few PTAs involving a single country (Chase, 2008; Conconi et al., 2018; Laaker, 2019). This narrow scope hampers comprehensive understanding of conditions under which RoO would complement or substitute other trade policy measures, thereby leading to varying distributional consequences of trade.

This article contributes both theoretically and empirically to the burgeoning literature on the politics of global production (Zeng and Li, 2021; Gulotty and Li, 2020; Kim et al., 2019; Osgood, 2018; Johns and Wellhausen, 2016; Jensen, Quinn, and Weymouth, 2015). We offer a comprehensive theoretical framework that highlights the political motivations behind RoO. Unlike conventional trade policy instruments, which typically focus on either intensifying or removing market barriers, we show that RoO hold a unique political appeal to governments as it enables them to strike a balance between liberal and protectionist policies without incurring political repercussions. Specifically, we argue that governments utilize RoO to *simultaneously* achieve three distinct goals, each directed towards distinct political constituencies: (1) safeguarding downstream producers, (2) facilitating export subsidies for upstream producers, and (3) strengthening the existing global production networks established by GVC firms. Our theory not only clarifies the seemingly contradictory function that RoO are designed to serve at the same time, but also underscores the conditions and mechanisms that generate unique political divisions among firms along the GVCs.

To empirically test our theory, we construct the first comprehensive database on RoO. Our effort entails overcoming numerous challenges inherent in studying trade policy instruments that directly target at global production (Kim and Rosendorff, 2021). Specifically, we manually gather all available PTA texts encompassing product-specific RoO. We then develop a semi-automated pipeline to extract RoO, creating consistent measures to differentiate the stringency/leniency of RoO at the product level. In doing so, we focus on identifying systemic textual patterns within

RoO concerning all intermediate inputs required to be sourced within the PTA region. The result is a comprehensive RoO dataset spanning 121 PTAs at the HS six-digit level among 85 countries, accounting for over 83% of global trade from 1991 to 2018. Additionally, we integrate our unique RoO data with detailed global tariff and trade data, sourced from multiple online databases. This dataset, after matching RoO, tariff, and bilateral trade data at the HS six-digit level, allows us to systemically examine the impact of RoO on trade flows for all product types, whether upstream or downstream, differentiated or substitutable.

Our empirical analysis lends consistent support to our theory. First, we find that RoO considerably attenuate the effects of trade liberalization. This suggests that substantial tariff reductions do *not* boost bilateral trade when stringent RoO are in place, an effect that is most pronounced for downstream products where RoO effectively restrict input sourcing from third countries. Second, we also find that RoO subsidize input producers located in the PTA area, especially those producing substitutable goods. Meanwhile, RoO tend to disrupt existing global production networks outside of PTAs. Finally, we present first evidence that influential GVC firms can shape the formulation of RoO to maintain and expand their global production networks. To overcome the empirical challenge of identifying trade policies directly affecting GVC firms, we utilize Chinese Customs Data that records all trade transactions at the Chinese border reported by firms. More precisely, we extract detailed information about firm-level processing-trade based on individual firms' sourcing countries and exporting destinations (Ludema et al., 2019).

Our study conveys broader implications for the field of international political economy. Unlike numerous existing studies, which typically associate the elimination of market access barriers with political demands for trade liberalization (Milner and Mansfield, 2012; Milner and Kubota, 2005), we demonstrate that tariff reductions, when combined with stringent RoO at the product level, could reflect both liberalizing and protective trade policy intents. In other words, despite substantial tariff reductions, trade increases might be hampered by veiled protectionist measures

(Kono, 2006). Furthermore, we question the prevailing focus on tariff policy as the sole source of distributional conflict in the literature. Our study posits that RoO, in fact, induce new and more nuanced political cleavages among firms along GVCs, divisions that are not readily anticipated by existing research (Meckling and Hughes, 2017; Kim and Osgood, 2019; Zeng, Sebold, and Lu, 2020). Finally, our work suggests that GVCs can be endogenous to trade policies (Antràs and Chor, 2013). A prime example is the RoO, which epitomize the most systematic form of governmental intervention in global production.

Our data, encompassing all product-level RoO measures across 121 PTAs along with partner-specific tariffs and trade volume, will be made fully publicly available at the Dataverse repository. We hope that this large-scale dataset contributes to opening various new research agendas, allowing researchers to examine the political causes and consequences of deepening global production.

2 Theory

In this section, we explore the increasing prominence of RoO in contemporary trade policy formulation. RoO, present in nearly all modern PTAs, serve to differentiate products originating within the PTA region from those outside it. Products must satisfy RoO criteria to benefit from PTA-based preferential tariff rates. In principle, RoO are set up to prevent transshipment or trade deflection, i.e., a third country could export to one of the PTA members with lowest tariff and then quickly reexport to another member with reduced tariff rate under the PTA. However, recent research has revealed that "trade deflection is not profitable because external tariffs are rather similar and transportation costs are non-negligible" (Felbermayr, Teti, and Yalcin, 2019). Therefore, the origins of RoO are still under heated debates across the fields of Economics and Political Science.

To determine the original status of a product, RoO require substantial transformation of the product from external inputs (if any). The most dominant form of RoO, the tariff classification

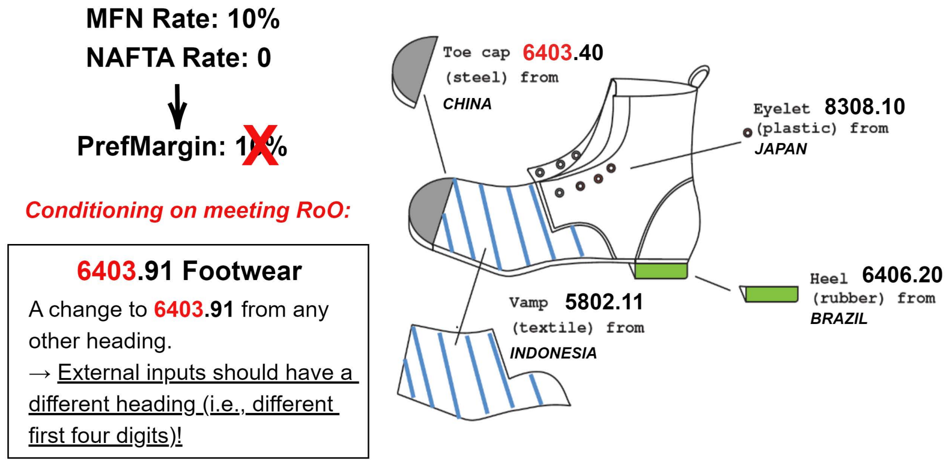


Figure 1: **Example of RoO.** This figure shows how RoO work using the example of shoes. RoO in NAFTA require that all inputs of exported shoes should undergo a heading change within NAFTA countries. However, the top cap is made in China and comes from the same heading as the shoe. This shoe therefore cannot enjoy the preferential margin of 10%.

change requirement, leverage the hierarchical structure of the HS to decide how "substantial" the transformation should be (see Appendix A for more information about the HS). The change from the external input to finished output can involve chapter (HS 2-digit), heading (HS 4-digit), or subheading (HS 6-digit) change, and it is essentially a political decision to call which level of change is sufficient. For instance, under NAFTA, all external inputs that make up Mexican shoes must undergo heading change, i.e., all of them should have a different heading from shoes. However, in other PTAs signed between Mexico and South American countries (e.g., Argentina and Brazil), no such requirement exists to grant preferential tariff to Mexican shoes.

Figure 1 provides an illustrative example of how RoO operate in practice. Consider the case of Mexican shoe (HS 640391) exporters. Under NAFTA, they could achieve a 10% tariff reduction (i.e., duty free with 10% preferential margin). However, they must adhere to the RoO (outlined in the rectangular box), which necessitates a heading change from external inputs. An examination of the external inputs reveals that the toe cap sourced from China has the same 4-digit heading (i.e., 6403) as the shoe itself. Consequently, the use of Chinese toe cap would disqualify this Mexican shoe to be called "Made in Mexico" and thus leads to ineligibility for the 10% tariff cut. That is, the Mexican shoe exporters face two options: either (1) to switch their toe cap supplier from China to others within the PTA in order to benefit from duty free treatment, or (2) to continue with their existing supply chain partners and pay the 10% "most favored" nation tariff. There are other forms of RoO defined at the product level that can add on this RoO or work alone, such as wholly obtained requirements, value content requirements, and technical requirements, but the key idea is the same — to ensure that substantial changes take place within PTA partners. Again, the level of "substantial" is left to closed-door diplomatic negotiations, and we still know very little about why countries hammer out these complicated and granular provisions.

We offer the first unified theoretical framework about the political origins of RoO. Specifically, we argue that RoO enable governments to concurrently achieve three policy objectives targeting distinct political constituencies when combined with preferential tariffs: (1) protecting downstream producers, (2) providing export subsidies for upstream producers, and (3) reinforcing the existing global production networks shaped by GVC firms. In this regard, RoO, viewed as a type of content requirement, can be seen as equivalent to a combination of more traditional commercial policies (Grossman, 1981). Yet, what distinguishes the political attractiveness of RoO for governments from other policy alternatives—which might cater more to specific constituencies—is its mitigated likelihood of provoking political backlash as they can accomodate broader economic interests.

2.1 Protecting Downstream Products

RoO are essentially a form of non-tariff barriers that work closely with preferential tariff across PTAs. While countries agree to lower their bilateral tariff during PTA negotiations, they insert complex original requirements that specify the eligibility for tariff reduction. Furthermore, RoO are most effective in protecting downstream products, as they impose restrictions on the entire production process. In our motivating example, Mexican shoe exporters cannot really enjoy the 10% preferential margins because their shoes may contain specific external inputs (i.e., toe cap from China) that disqualify their original status. With the deepening of GVCs, RoO are able to exclude a wide range of products "made in the world" from preferential trade liberalization, while continuing to protect domestic downstream producers that may be harmed by import competition.

Indeed, firms and industries have been shown to shift their protectionist demand from tariff to RoO. In the 1993 congressional hearing on NAFTA, the peanut farmers were very explicit about their demand for RoO, "The rules of origin don't go far enough in protecting the American peanut industry, and non-NAFTA peanuts will be particularly difficult to catch at the border if they are processed into such products as peanut paste, peanut butter, peanut oil, and confectionery products." With the rise of pervasive and restrictive RoO, the US Association of Importers of Textile and Apparel commented in the 1995 House Hearing that "Regrettably, in the textile and apparel sector in the United States, rules of origin have become tools for protectionism, and that fact may come back to haunt us." The concern about the diffusion of RoO over textile and apparel products has been materialized, since most the PTAs nowadays reserve their most restrictive RoO for these products (see Figure 3 in the next section).

Perhaps a more explicit form of protectionist RoO may be the new labor value content (LVC) in the updated PTA between US, Canada, and Mexico (USMCA). Besides substantial transformation within North America, Mexican exporters are now required to ensure a production wage rate of at least US$16/hour. As per the OECD, the minimum hourly wage in Mexico stands at $3.82, rendering this requirement challenging, if not impossible, to meet.[2] Consequently, this new provision acts as a distinct form of protectionism, undermining Mexico's competitive edge in labor costs and favoring US domestic car producers who incur higher labor costs. Beyond USMCA, similarly, countries are also introducing intricate requirements for chemical products, often detailing specific chemical reactions and purification tests. These stipulations further elevate compliance costs for competitors in PTA partner countries.

[2] See https://stats.oecd.org/index.aspx?DataSetCode=RMW

Furthermore, these complex RoO are accompanied by considerable administrative costs that further lower the access to preferential tariff rates. Indeed, the administrative costs associated with RoO has been the most frequently cited reason for PTA underutilization (Zeng and Li, 2021). This can be aptly summarized by the Economist commentary, "Bilateral deals come laden with complicated rules about where products originate—rules which impose substantial costs of labelling and certification on firms. The more overlapping deals there are, the more complex the rules and the higher the costs."[3] It should come as no surprise that the PTA utilization rate can be as low as 20% to 30% for some PTAs based on multiple surveys cited in Zeng and Li (2021).

If RoO can really serve as a protectionist measure, we should be able to derive two observable implications. First, even when preferential margins are large, trade creation between PTA partners should still be small with the presence of restrictive RoO. In other words, RoO substitute tariff and mitigate the trade-increasing effect of preferential margins. Second, this mitigating effect of RoO should be particularly pronounced for downstream products, as those products are more subject to RoO that put specific requirements on the production process, especially the origins of inputs. That is, the longer the production chains, the more likely it is that RoO will be binding.

2.2 Subsidizing Upstream Products

While RoO can protect downstream producers in certain industries, they can also subsidize domestic upstream producers in other industries. The idea is simple: For exporters in PTA partner countries, they will need to source their inputs from the PTA area rather than a third country in order to qualify for original status and thus the preferential tariff rate. In our motivating example, it is obvious that the Mexican shoe exporters may consider sourcing toe caps from the NAFTA region rather than China. In doing so, RoO subsidize trade in toe caps within NAFTA at the expense of Chinese competitors.

[3] See https://www.economist.com/asia/2009/09/03/the-noodle-bowl.

The subsidizing effect of RoO has long been recognized by producers and policymakers. In a public hearing on USMCA organized by the US Trade Representative (USTR) in June 2016, Augustine Tantillo, President of the National Council of Textile Organizations called the goal of USMCA RoO as "to really nurture the part of the industry that exists here that is already strong and that is poised to take advantage of improvements to the agreement." Tesla also praised the USMCA RoO as a way to bolster North American industries, which is also consistent with the company's supply chain localization effort. More tellingly, the USTR Robert Lighthizer defended the USMCA RoO by commenting that:

> "The USMCA rules of origin will benefit U.S production and exports by incentivizing the production of more auto parts and other content in the United States. Based on auto producers' own information, we expect that the new rules will incentivize additional U.S. capital investments of $34 billion and U.S. automotive parts purchases of $23 billion, some of which will likely be exported. The rules make North American auto production more competitive as a region, and the United States in particular is poised to benefit by way of new jobs and investment."

There is, however, one important limitation on the subsidizing effect of RoO. Firms that wish to comply with RoO have to make sure that they *can* change their sourcing strategies. This is not always the case, as producers may rely on external suppliers that produce differentiated inputs. In our motivating example, it may be possible to find an alternative toe cap producer within North America, but it may not be so if the inputs are car parts of tailored configuration produced by a specific technology. The organization of GVCs is such that once the production linkages are formed, GVC partners often invest in relationship-specific materials and technologies for long-term transactions (Boehm, Flaaen, and Pandalai-Nayar, 2019; Carnegie, 2014). Therefore, we expect that the function of RoO as a means to subsidize upstream products depends on product-level characteristics. Specifically, RoO are effective in subsidizing substitutable products, but their effect will be relatively limited for differentiated goods.

2.3 Strengthening Existing GVCs

While RoO serve both protectionist and subsidy purposes, we don't see restrictive RoO applied to *every* product. We posit that this is likely due to their third function. Firms that have already established GVCs (hereafter termed "GVC firms") would be harmed by RoO, as their products are by definition not originated within the PTA area. Therefore, national governments have to appeal to their demand and secure more lenient provisions. Combined with preferential tariffs, lenient RoO would allow GVC firms to continue sourcing from external suppliers while taking advantage of lower tariffs. Furthermore, this allows GVC firms the opportunity to fortify their production networks extending beyond PTA regions. In essence, products exported by GVC firms are likely to benefit from more lenient RoO. It's worth noting that governments have the flexibility to apply lenient RoO selectively to specific products, because the complexity of RoO, when combined with product-specific tariffs, offers various avenues to implement targeted policies catering to the needs of specific firms and industries.

The demand for lower RoO is also well recognized among firms and industries. For instance, the 1995 hearing on NAFTA documented the testimonies from the National Coffee Association:

> [I]f we are forced to implement the rules as proposed, the consumer would derive no benefit from the information, but ultimately would bear the burden of industry's increased costs. Manufactured soluble coffee powder currently is imported from 24 countries, ranging from Brazil and Colombia to Japan and Switzerland. Depending on taste profiles, availability, and price, each producer purchases, mixes, and processes totes of power weighing as much as a thousand pounds from one or more of these sources to produce a commercially acceptable retail product.

The influence of GVC firms should be particularly salient in the case of China, the "world factory" renown for its processing trade where Chinese firms process global inputs and then export to all over the world (Koopman, Wang, and Wei, 2012; Dai, Maitra, and Yu, 2016). Indeed, processing trade consistently takes up half of total trade for China, generating tremendous amount of government revenue and local employment. Hence, it is reasonable to expect that the Chinese government tends to favor lenient RoO when its processing export to PTA partners are particularly large.

One illustrative example is China's textile industry. The textile industry has contributed to China's trade growth since its opening up and reform, and the predominant trade mode is processing trade—Chinese firms import raw materials abroad and export finished textile products.[4] Even though RoO on textile products (HS Chapter 50-63) are on average most restrictive across Chinese PTAs, they display larger variation than any other product. This may reflect the interests of numerous textile processing companies in Jiangsu and Zhejiang. For instance, companies like Sinotex import yarn, twine, and cordage from Vietnam and then export clothing and clothing accessories to South Korea. They have reported to benefit from the China-Korea PTA with very lenient RoO on clothing and clothing accessories.[5] Multiple sources suggest that these Chinese firms take original certificates very seriously and call them "paper gold" or "passport" to PTAs.

RoO may also reflect the interests of large and monopolistic GVC firms. One best possible example is Weiqiao Textile, China's largest cotton manufacturer and also one of the Fortune 500 companies. Weiqiao imports cotton, not carded or combed (HS 520100), and exports processed twill and denim (HS 520524) to South Korea. Interestingly, the RoO on the product of HS 520524 only requires heading change, which is very lenient compared with other textile products. If the RoO asked for chapter change or had additional exceptions, Weiqiao would have lost preferential

[4]See http://chinawto.mofcom.gov.cn/article/ap/p/202201/20220103236583.shtml.

[5]See https://www.sinotex.cn/news/Html/waimao-info/2016-4-12/112438/andhttps://www.sohu.com/a/640040047_121406675.

access to South Korea.

Is this the result of Weiqiao's political demand? It is very likely. Weiqiao has received multiple leader visits from both central and provincial governments, and it has actively participated in consultations with the government.[6] Most tellingly, the Chinese customs office publicly issued the first certificate of original status to Weiqiao, so that the company can export to South Korea under preferential treatment.[7] This "public ceremony" is meant to showcase that Chinese firms can benefit from China-Korea PTA, but it would also indicate that firm has made considerable efforts to push the government on the negotiation over RoO.

Taken together, the discussion presented in this section suggests that RoO can serve three distinct functions simultaneously and that the formulation of RoO has political underpinnings. Notably, RoO can attract a broad spectrum of economic stakeholders. This includes domestic producers facing foreign competition, domestic input suppliers exploring new foreign markets, and GVC firms poised to enhance their market dominance by leveraging favorable RoO in conjunction with tariff reductions. The next section discusses our data collection efforts that will be important for empirical analysis.

3 Data

Existing research on RoO has faced with considerable empirical challenges. Early work relied on self-constructed categorical indices to approximate the restrictiveness of RoO (Cadot, 2006; Estevadeordal, 2000). But a seven-point scale is too rough to capture huge variation in RoO at the HS six-digit level. Furthermore, even though these indices might tell us about how hard it is for each exported product to meet the requirement, they do not identify all the intermediate inputs that must be sourced within the PTA region, a critical step to test our second hypothesis. More recent work does measure RoO by identifying and counting all the restricted inputs, but this approach is

[6] See http://www.weiqiaocy.com/cn/news.html.

[7] See https://m.binzhouw.com/detail/480440.

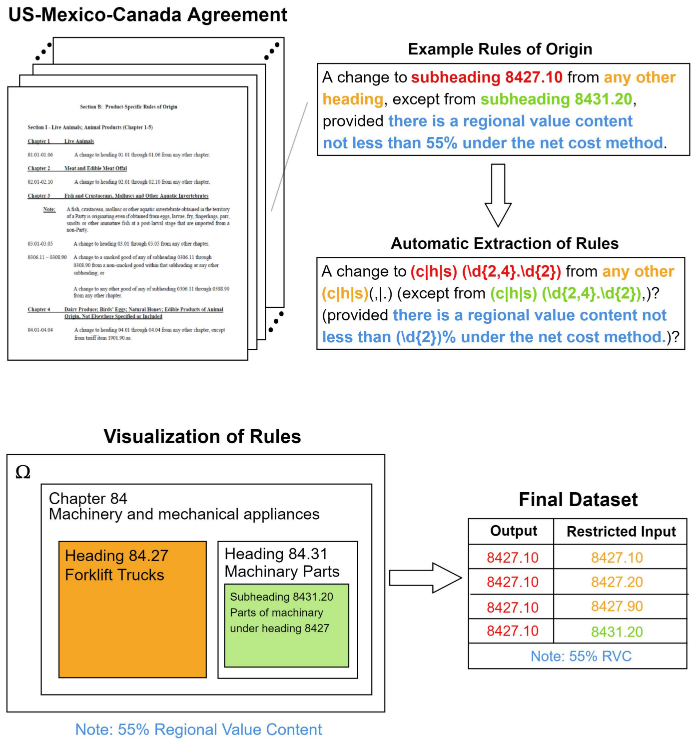


Figure 2: **Parsing Rules of Origin:** This figure demonstrates how our algorithm parses the RoO section and construct the final dataset. The example comes from Chapter 84 of the US-Mexico-Canada PTA (2020). The upper panel shows how the algorithm identifies outputs (red), restricted inputs (orange), exceptions (green), and value content requirement (blue). The lower panel visualizes the restricted inputs and build the final dataset.

hard to scale up, as it requires the researchers to manually go through lengthy and complex RoO sections written in different format and languages across PTAs. Unsurprisingly, existing empirical research has either focused exclusively on a single PTA, such as NAFTA (Conconi et al., 2018), or at most on PTAs ratified by a single country, such as the U.S. (Laaker, 2019).

We take on this challenge by applying and extending Conconi et al. (2018)'s approach to all available PTAs that include product-specific RoO. To the best of our knowledge, even in the most comprehensive PTA database like the Design of Trade Agreements (DESTA), the original RoO text in PTAs has not been examined. Specifically, we have developed a semi-automated pipeline to collect and measure RoO at the six-digit level of the HS (see Figure 2). As the first step, we collect existing PTA texts and identify their product-specific RoO sections. These RoO sections, if exist, can run over 1000 pages with the average of 103 pages. Second, we apply our original algorithm

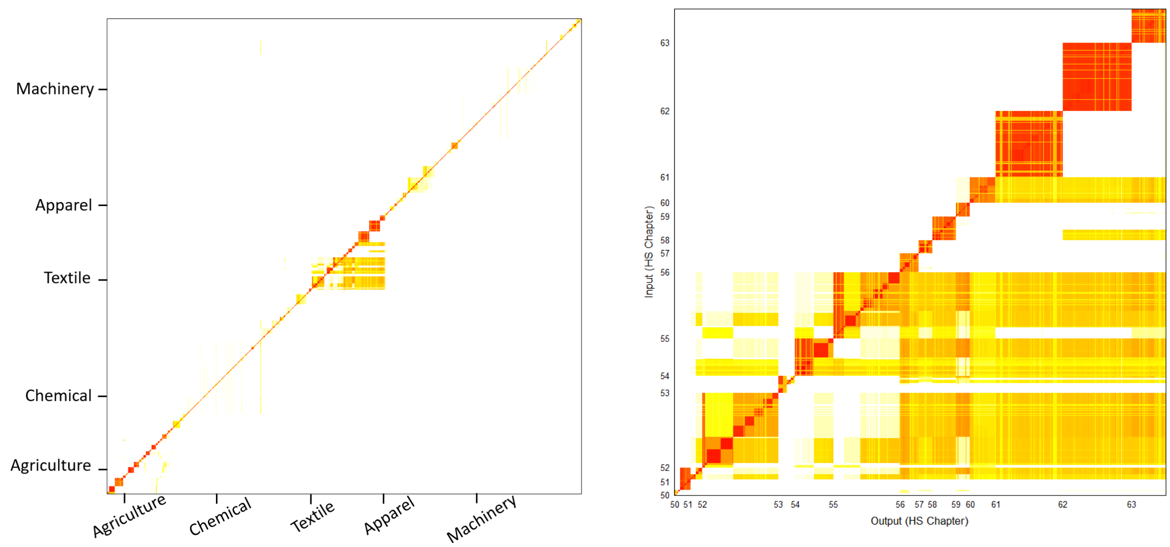


Figure 3: **RoO across PTAs.** The left panel illustrates RoO across all PTAs, excluding those of the EU. The x-axis represents outputs in 6-digit HS codes, while the y-axis displays the corresponding inputs, which are restricted to be sourced within PTA regions. Given space constraints, only a select number of product descriptions are shown. The right panel depicts RoO for textile products across all PTAs, again excluding EU ones. As with the left panel, the x-axis marks outputs in 6-digit HS codes, and the y-axis highlights the restricted inputs. Due to space limitations, only 2-digit chapter numbers are shown on both axes. A darker color indicates a higher number of PTAs imposing such restrictions.

that leverages highly regular patterns in the writing of RoO and extracts the key information from the rule. Next, we identify all the restricted inputs for each output along with exceptions and value content requirement. Finally, we organize and store the data in output-input pairs. Given that each RoO section may be written in different format and languages, we adapt our base algorithm to a large number of PTAs. The result is the first comprehensive dataset on RoO, encompassing 121 PTAs at the product level among 85 countries and accounting for over 83% of global trade from 1991 to 2018.[8] This dataset will be made publicly available at the journal's Dataverse repository.

Figure 3 presents our final RoO data. The left panel displays a product-pair dataset spanning all products.[9] The x-axis represents outputs in six-digit HS codes, and the y-axis indicates all

[8]Please refer to Appendix B for the list of PTAs.

[9]The RoO across EU PTAs are notably irregular and challenging to quantify. As such, our primary analysis omits EU PTAs but integrates them into our robustness checks in the Appendix. Succinctly, incorporating EU PTAs doesn't change our results.

potential inputs. The intensity of restrictions a particular PTA places on a specific input for a designated output is depicted by color intensity; a darker shade signifies more stringent RoO. As expected, input-output restrictions in RoO generally cluster within industries, evidenced by the prominent 45-degree line's darker shade. We observe significant restrictions especially in agriculture (bottom-left) and textile products (center). To underscore the granularity and intricacy of our data, we provide a more detailed view of the extensive variations in textile products on the figure's right panel. It is worth noting that we see horizontal bars extending across diverse outputs (indicating that certain inputs are restricted across a broad spectrum of outputs) and vertical bars spanning multiple inputs (signifying that specific outputs often correlate with various input restrictions).

We also collect tariff data from a new dataset of over 5.7 billion observations of product-level applied tariff rates between all pairs of 136 countries over 20 years (Barari and Kim, 2020). The tariff rates are at the *tariff-line* level — the level at which tariff policy is actually set. While this new tariff data offers a comprehensive coverage of MFN rate, we discover notable inconsistencies in countries' reporting of preferential tariff rates applied to their PTA partners. For instance, India did not report its preferential tariff rates to Malaysia until five years after the PTA went into effect. South Korea stopped reporting any PTA rates from 2008 to 2013. Singapore reported preferential tariff rates for only a very small set of products under multiple PTAs. To ensure consistency, we carefully determine the accurate preferential rates by manually searching for the first year these rates become available for each PTA. To the best of our knowledge, our data is the first to encompass partner-specific tariff data, reflecting all current PTAs at the tariff-line level. This comprehensive directed dyad-level dataset, which combines RoO and tariffs at the tariff-line level, will also be made publicly accessible through our replication repository.

Next, we gather bilateral trade data from UN Comtrade.[10] These data are suitable for testing

[10]Note that for a couple of multilateral PTAs (e.g., The Central America-Dominican Republic Free Trade Agree-

our first and second hypotheses about the effect of RoO on trade flow. However, for our third hypothesis, we will need to identify the underlying firms that are trading specific products and their sourcing countries. To overcome these challenges, we leverage the Chinese Customs Data (CCD) that covers the universe of customs transactions across Chinese borders reported by Chinese firms. Furthermore, CCD identifies the percentage of processing trade where Chinese firms import global inputs and export processed outputs. These granular data enable us to conduct one of the first tests of firms' GVC positions and their political demand for trade policy.

Finally, we collect product-specific characteristics, such as product differentiation (Broda and Weinstein, 2006; Rauch, 1999) and upstreamness/downstreamness (Antràs et al., 2012a,b). Specifically for the latter, we replicate Antràs et al. (2012a)'s algorithm to calculate the product upstreamness index at the fine-grained industry level in the years of 2007 and 2012 in the US. These new estimates are also made public through our R package, `concordance` in order to facilitate future research.

4 Empirical Findings

This section discusses our empirical analysis and findings. We proceed by testing the three functions of RoO as outlined in Section 2, using our unique RoO measure, detailed tariff and trade data, along with product-specific attributes. Our results indicate that RoO acts as a distinct trade policy tool, capable of addressing a broad spectrum of political needs concurrently.

4.1 RoO Substitute Tariff and Mitigate Trade Liberalization

We first posit that RoO can act as a substitute for tariff protection, counteracting the trade-promoting effects of tariff reductions. Our contention is that even significant tariff reductions may *not* result in considerable trade expansion between PTA partners if accompanying RoO are

ment (CAFTA)), we focus on the largest and the smallest partner. When the EU enters a PTA with another country (e.g., EU-South Korea PTA), we treat EU as one "country." Our results are robust with or without these multilateral PTAs.

restrictive. If validated, this viewpoint would challenge the common practice of equating tariff reduction with trade liberalization, without considering the intricacies of RoO restrictiveness. In other words, deep tariff cuts, when paired with stringent RoO, might stem from *protectionist demands* rather than the demand for open trade, as commonly interpreted in the literature. Moreover, we undertake separate analyses for upstream and downstream products. We hypothesize that the dampening effect of RoO might be most pronounced for downstream products. This stems from our expectation that RoO, as a unique tool potentially replacing other trade barriers like tariffs, might be viable only for downstream goods due to its inherent design of regulating upstream input usages.

To investigate the potential substitutive effect of RoO, we focus on the interaction term between RoO and preferential margins, while accounting for various other factors that may influence both trade volume and trade policies. To construct our outcome of interest, we calculate the logged change in imports between PTA partners (%) after the given PTA enters into force. This quantity is calculated for each PTA (a) and HS 6-digit product code (j).[11] To account for both short-term and long-term adjustments in trade while addressing any potential measurement issues, we compare the change in imports one to three years before and seven to nine years after each PTA, averaging the trade volume in each of the three-year periods.[12]

For our primary treatment variable, RoO restrictiveness, we sum the number of restricted inputs for each product j as our measure. Generally, when more inputs need to be sourced from within the PTA area, it becomes increasingly challenging for producers to meet the RoO requirement. However, a notable challenge arises from the classification of products within the HS system. For instance, Chapter 1 (live animals) comprises 34 six-digit product lines, while Chapter 44 (wood products) encompasses 76. Furthermore, even within a single chapter, different

[11]Since RoO are hammered out by both partners, we consider imports from both ways.
[12]We also explore different years in Appendix C.6

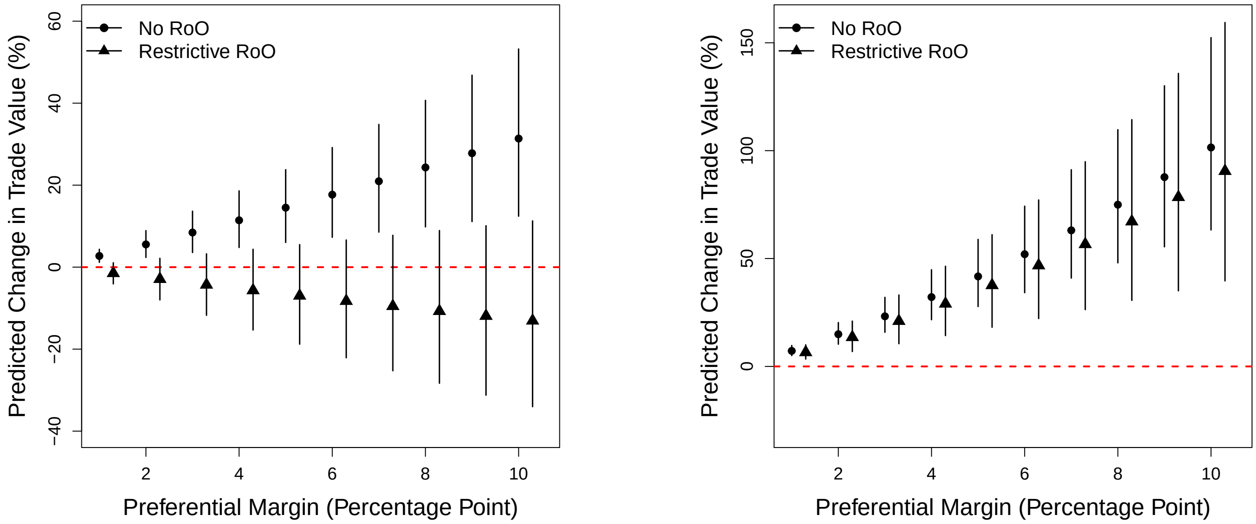
headings can have varying quantities of product lines. Thus, identical requirements across chapters or headings can translate into distinct levels of restrictiveness. This variance is a byproduct of the difficulties inherent in comparing products from different chapters or headings. To mitigate this issue, our analyses include heading fixed effects (α_h), maintaining a more or less constant total number of product lines. This approach ensures more accurate comparisons by considering any heading-specific heterogeneity.

We calculate preferential margins as the percentage point difference between MFN rates and preferential tariff rates.[13] We then control for MFN rates and product characteristics that may affect both trade volume and trade policies, including downstreamness and differentiation (X). Finally, we also add PTA fixed effects (γ_a) to allow for varying intercepts for each PTA. All standard errors are clustered at the heading-level. In sum, our model specification is:

$$\Delta Import_{aj} = \beta RoO_{aj} * PrefMargin_{aj} + X_{aj}^{\top}\Omega + \alpha_h + \gamma_a + \epsilon_{aj}. \quad (1)$$

Figure 4 presents our findings for downstream (left panel) and upstream (right panel) goods, respectively. Specifically, we visualize the predicted changes in trade volume (vertical axis) as a result of a wide range of preferential margins (horizontal axis) based on a series of Monte Carlo simulations. Consistent with our expectations, there are marked differences in the estimated effects for downstream products with no RoO compared to those with restrictive RoO. Panel (a) shows that, even with substantial tariff reductions (for instance, a 10 percentage point decrease in applied tariff), trade volume remains stable when paired with strict RoO (as indicated by the triangle estimates). This contrasts with a marked increase in trade for products without RoO (as indicated by the solid circle estimates). Notably, the estimated effects, though not statistically significant, trend negatively, suggesting that bilateral trade might *decrease* even with a significant

[13] Our main analysis excludes 2% of product lines that have preferential margins over 25%, because these product lines tend to report extreme values. But our results hold when we include the full sample (see Appendix C.4).



(a) **Downstream Product**

(b) **Upstream Product**

Figure 4: **RoO mitigate the trade-increasing effect of preferential margin for downstream products.** This figure shows the predicted increase in trade for products with no RoO versus restrictive RoO across various levels of preferential margins. We note that only for downstream products, RoO lead to substantial difference in trade increase. Specifically, products without RoO are predicted to have much larger increase in trade than those with restrictive RoO.

tariff reduction. This implies that governments might implement symbolic tariff cuts, yet still manage to shield sensitive downstream products through the use of RoO. Conversely, Panel (b) indicates minimal variation in trade for upstream products regardless of RoO presence—with preferential margins leading to significant trade increases post-PTA with deeper tariff cuts. These findings underscore the importance for researchers to consider RoO to accurately gauge the extent of trade liberalization in contemporary PTAs. Detailed regression results and robustness checks can be found in Appendix C.2.

4.2 RoO Subsidize Input Trade Between PTA Partners

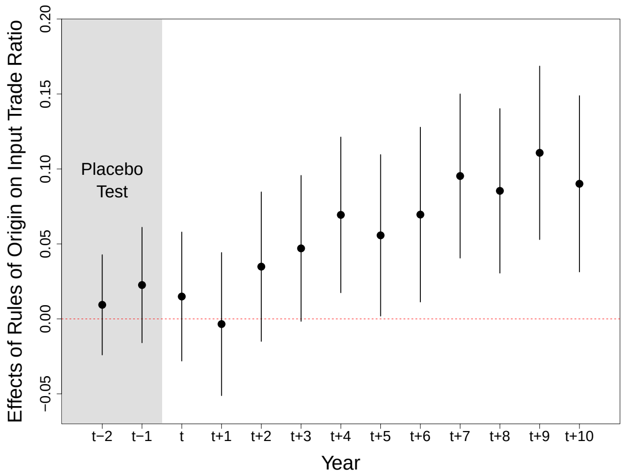
In Section 4.1, we investigated how RoO can act as a safeguard for downstream goods, especially when paired with seemingly deep tariff reductions. Our second hypothesis states that RoO can serve as input subsidies for upstream goods. Specifically, downstream producers within the PTA would now consider cutting of their supply chain with external partners while forming new one with PTA partners. This implies that governments can employ RoO to manipulate GVCs to cater for their domestic upstream producers. More broadly, we contend that firms' organization of GVCs is often endogenous to the politics of RoO.

This hypothesis also specifies the policy mechanism of trade diversion under PTAs. While numerous studies have observed that PTAs lead to both trade creation and trade diversion since the distinction was first presented by Viner (1950), we argue that this PTA effect is not uniform across all products. This is because RoO's role as an export subsidy should hinge on the substitutability of goods. Often, exporters within the PTA must shift their input suppliers from a third country to a PTA member to meet the original requirements. Consequently, input suppliers within the PTA receive an effective subsidy to produce and export, whereas external input suppliers are sidelined from the advantages of preferential trade liberalization. We assert that this is only feasible when products are substitutable and when companies have yet to solidify their relation-specific investments, which we delve into further in the subsequent section.

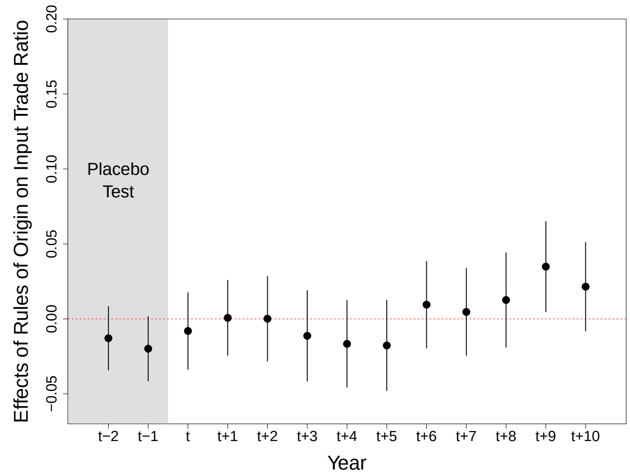
To test this function of RoO, we first construct our outcome variable that measures the change in input trade within PTAs. To be consistent with the previous analysis, we collect bilateral trade data for upstream products between PTA partners from three years before the PTA to ten years after the PTA. We then calculate input trade with the PTA partner as a percentage of total trade for a given country and a given product i—input trade ratio.[14] Finally, we calculate the logged change in input trade ratio for each year compared with the baseline level, which is set to be three years before the PTA.

There is one important note about this measurement. In theory, RoO may subsidize all input suppliers within PTAs, but in practice, only those that enjoy comparative advantages may demonstrate increased production and export. To distinguish which PTA partner will truly benefit from RoO as input subsidies, we rely on the classical concept of "revealed comparative advantage"

[14] We denote a given upstream product as i here to differentiate from our first analysis.



(a) **Substitutable Product**



(b) **Differentiated Product**

Figure 5: **RoO subsidize trade in substitutable inputs within PTAs.** This figure shows the effect of RoO on input trade within PTAs. Among upstream products, substitutable ones tend to see more significant increase in trade than differentiated ones.

(Balassa, 1965). The key idea is that the country enjoying higher level of input trade ratio before the PTA enforcement reveals its comparative advantage and therefore tend to experience expansion in input supplies. For each PTA and for each product, we keep the country with "revealed comparative advantage" in our regression analysis.

To construct our RoO treatment, we sum the number of outputs that would restrict the use of a given input. This makes sense, because the more outputs that impose originating restrictions, the more likely it is that the given inputs will be in fact sourced within the PTA region. Again, we account for the same set of control variables and fixed effects and cluster our standard errors at headings as in Conconi et al. (2018). Therefore, our model specification is:

$$\Delta Input\_Trade\_Ratio_{ai} = \beta RoO_{ai} + X_{ai}^{\top}\Omega + \alpha_h + \gamma_a + \epsilon_{ai}. \tag{2}$$

We visualize the effect of RoO on the change in input trade ratio in Figure 5. We show that the effect is positive and significant for substitutable products (Panel (a)), but not so much for differentiated products (Panel (b)). Hence, we do observe that RoO result in larger increase in input trade ratio within the PTA at the expense of external suppliers. However, switching of input suppliers is mostly taking place for substitutable products. Substantially, 10% increase in RoO restrictiveness leads to 1% increase in input trade ratio six years after the PTA relative to that before the PTA. These results are robust when we control for VA requirements or include EU PTAs (see Appendix D.2). Finally, to assess whether companies might foresee the implications of a PTA or influence the RoO based on their existing supply chain linkages, we conducted a placebo test. As expected, our results indicate no evidence that RoO ratified at time t influence trade patterns before the agreement's enactment.

4.3 GVC Firms Demand Lenient RoO

In the previous sections, we found that RoO function both as import protection for downstream producers and as an export subsidy for upstream producers. In this section, we explore whether RoO reflect the political demands of GVC firms. Our theory suggests that lenient RoO, when combined with preferential tariffs, would bolster firms' global production networks. In contrast, stringent RoO would exclude GVC firms from the benefits of preferential trade liberalization. This is because GVC firms, which rely on global inputs outside of PTA and supply finished products to PTA partner countries, would inherently breach RoO provisions. As such, one might expect these GVC firms to demand more lenient RoO. However, empirically validating this hypothesis at the firm level poses a greater challenge than the preceding two hypotheses. This is because the standard trade data available to researchers captures only the aggregate trade volume at the country level, obscuring the value added from global inputs on an individual company basis and making it particularly challenging to identify GVC firms engaged in processing trade.

We overcome this empirical challenge by leveraging the Chinese Customs Data (CCD). The CCD not only documents all trade transactions across Chinese borders as reported by firms, but it also distinguishes processing trade, wherein GVC firms import global inputs and export the completed products as described by Figure 6. As we discussed above, therefore, we expect

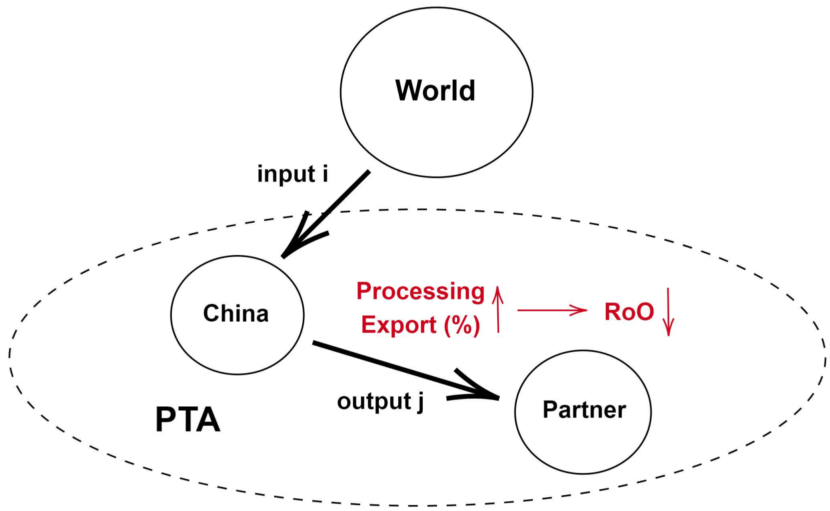


Figure 6: **Processing Trade and Demand for Lenient RoO.** This figure shows how processing trade works—Chinese GVC firms import global inputs and export processed outputs. Since these processing exports are by definition not originated in the PTA region, GVC firms would demand lenient to no RoO if they dominate the export.

that GVC firms that have made any relation-specific investments outside of PTA would benefit from relatively lenient RoO. Given that processing trade has consistently accounted for half of China's total trade, serving as a vital source of government revenue and local employment, there's a compelling reason to expect that when GVC firms dominate exports to PTA partners (i.e., a higher proportion of processing export within total exports), their demand for more lenient RoO would become more politically important.

To conduct our empirical analysis, we focus on product-level RoO for Chinese PTAs as our outcome of interest. There are nine China-involved PTAs that have extensive RoO and fall into our period of study, covering Australia, Chile, Costa Rica, Iceland, New Zealand, Peru, Singapore, South Korea, and Switzerland. We follow the strategy in our first analysis to construct protectionist RoO measures—these RoO are most detrimental to Chinese GVC firms, that organized their supply chains outside of PTA, and should face the strongest opposition when Chinese processing export dominates. To obtain our primary variable of interest, we identify all Chinese GVC firms that import global inputs and export final outputs to PTA partner countries three years prior to

	Dependent variable:			
	RoO Restrictiveness			
	(1)	(2)	(3)	(4)
Processing Export (%)	−0.113***	−0.101***	−0.134***	−0.150***
	(0.037)	(0.036)	(0.045)	(0.046)
Controls		✓		✓
PTA FE	✓	✓	✓	✓
Head FE	✓	✓	✓	✓
Observations	15,318	15,144	6,898	6,827
Adjusted R^2	0.735	0.736	0.795	0.795

Note: Cluster-robust standard errors at headings. *p<0.1; **p<0.05; ***p<0.01

Table 1: **Processing Export and RoO Restrictiveness**: This table shows that products exported by GVC firms that process more foreign inputs *outside* of PTAs get more lenient RoO.

PTA enforcement.[15] We then calculate these firms' processing export as a percentage of total export at the HS six-digit product level as our treatment. For control variables, we add preferential margins, baseline MFN rates, product characteristics, total export volume, as well as PTA and heading fixed effects.

In Table 1, we present our findings separately for all product lines (Model (1) and (2)) and only for those where processing export takes place (Model (3) and (4)). The results clearly demonstrate that when Chinese processing export exists and dominates, RoO become much more lenient. Our findings have important implications for understanding political cleavages *even among MNCs*, depending on their established global value chain structures. Specifically, firms with GVCs organized outside PTAs would resist stringent RoO, as these could disrupt their existing supply chain partnerships. In contrast, firms with GVCs centered on a narrower regional scope might either advocate for forming PTAs with specific countries or become staunch proponents of stringent RoO. In fact, such a distinct political divide emerges due to the complexity and specificity of RoO.

Finally, we further explore what types of products are more likely to reflect the demand of GVC firms in China. Figure 7 indicates that downstream products experience the most pronounced

[15] We have also tried different number of years in Appendix E.2.

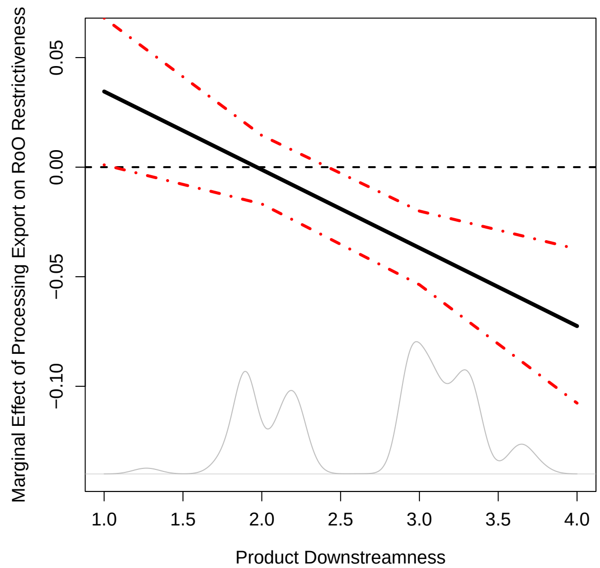


Figure 7: **GVC Firms Demand Lenient RoO for Downstream Products.** This figure indicates that larger portion of processing export leads to more lenient RoO, especially for downstream products where RoO are most binding.

influence of GVCs. This is consistent with our earlier discussion that RoO are most effective in protecting downstream products (Section 4.1). This is because they can impose restrictions on as many inputs as possible, effectively disqualifying products labeled as "made in the world." Given that these RoO pose particular constraints for processing trade, we anticipated that GVC firms will especially seek more lenient RoO when exporting downstream goods. Indeed, we find a distinct trend: as a product's downstreamness increases, the impact of processing export on RoO restrictiveness becomes more evident.

5 Concluding Remarks

Many scholars have contributed to our understanding of trade policy and its distributional consequences. But with the rise of global production, traditional policy measures have proved to be much less effective with complicated and even counterproductive implications. For instance, tariffs set to protect domestic industries may end up hurting domestic firms that rely on the import of cheap inputs. Nowadays, countries have increasingly resorted to more carefully designed policy instrument to reshape GVCs to their favor. This has resulted in the expansion of non-tariff barriers that is aimed to govern the formation of GVCs.

Our paper examines the primary policy tool that govern global production—RoO. We show that when combined with preferential tariffs, RoO can enable national governments to achieve three policy objectives simultaneously: (1) to protect domestic downstream producers, (2) to subsidize domestic upstream producers, and (3) to reinforce existing GVCs. We construct the first comprehensive dataset on RoO, create original and appropriate measures, and combine them with granular tariff and trade data. This offers the opportunity to conduct the first systematic test of how national governments intervene in global production based on their political interests.

Future research should continue our efforts to explore new policy tools and underlying political interests with the deepening of GVCs. This will contribute to our understanding of how governments have done and should do to manage increasingly complex interdependencies. Specifically, will policy tools like RoO further divide countries into different trading blocs? Or will the proliferation of RoO eventually push countries to harmonize these complex and often inconsistent provisions? On the other hand, what are the responses of firms that organize global production but occupy different positions along the GVCs? These will become important questions for the field of international relations and political science in general.

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Supplementary Appendix

A The Harmonized System and RoO

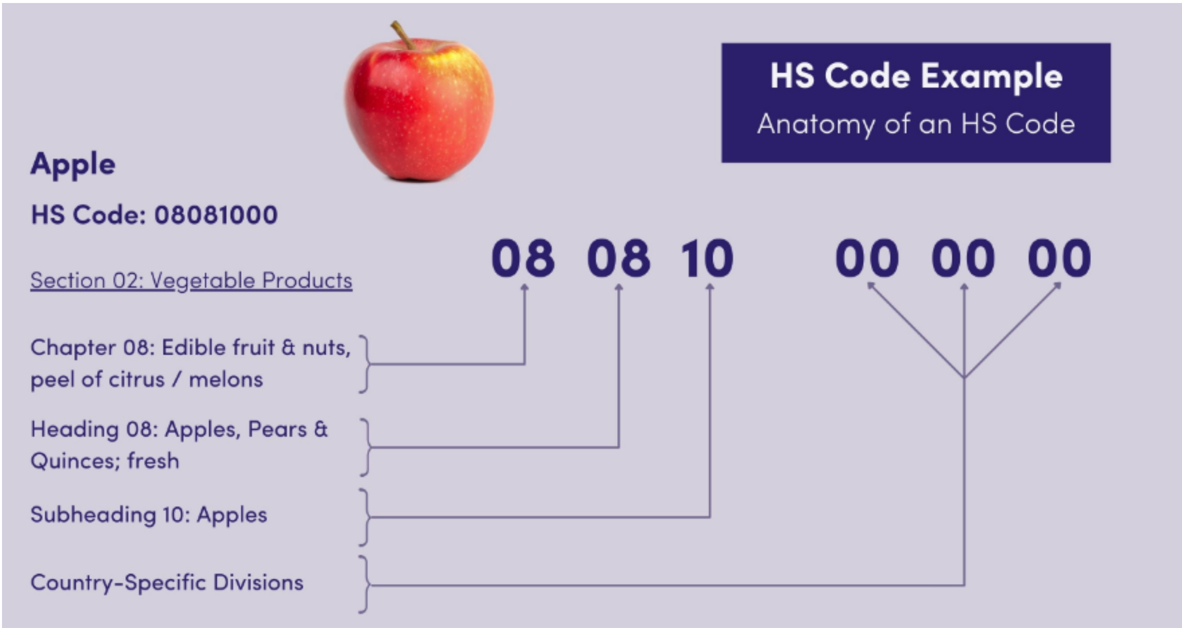


Figure A1: **The Harmonized System and RoO.** This figure shows the anatomy of the HS codes, based on which RoO are formulated. The HS codes follow a hierarchical structure where the first two digits refer to the broadest category called *chapter*, the second two digits further specify the good into *heading*, and the third two digits determine the *subheading*. Almost all product-specific RoO are written at HS six-digit level where the HS codes are standardized across countries. Essentially, tariff classification requirement of the RoO require that inputs sourced from a third country must under go either chapter, heading, or subheading change in the PTA regions. The chapter change requirement will be the most restrictive as very substantial transformation must be made. There may be additional requirements to tariff classification changes, such as exceptions, wholly obtained requirements, value content requirements, and technical requirements that further complicate the rules.

B List of PTAs

We have processed the following 121 PTAs to construct the product-specific RoO measures. We now list them below by country and country bloc in ISO codes. Note that some PTAs are repeated.

- **CHN:** CHL-CHN, CRI-CHN, ISL-CHN, KOR-CHN, NZL-CHN, PER-CHN, SGP-CHN, CHE-CHN, ASEAN-CHN, AUS-CHN
- **USA:** AUS-USA, BHR-USA, CHL-USA, COL-USA, KOR-USA, MAR-USA, OMN-USA, PAN-USA, PER-USA, CAFTA, SGP-USA, NAFTA, USMCA
- **EU:** BIH-EU, EGY-EU, ESA-EU, EU-FRO, EU-GEO, EU-ISR, EU-JOR, EU-KOR, EU-LBN, EU-MKD, EU-MDA, EU-MNE, EU-MAR, ALB-EU, DZA-EU, EU-PSE, EU-SRB, EU-SADC
- **JPN:** AUS-JPN, BRN-JPN, IND-JPN, IDN-JPN, JPN-MYS, JPN-MEX, JPN-PER, JPN-PHL, JPN-SGP, CHE-JPN, JPN-THA, JPN-VNM, ASEAN-JPN
- **KOR:** AUS-KOR, CAN-KOR, CHL-KOR, CHN-KOR, COL-KOR, EU-KOR, IND-KOR, KOR-PER, KOR-SGP, KOR-TUR, KOR-USA, ASEAN-KOR, VNM-KOR
- **CAN:** CAN-CHL, CAN-COL, CAN-CRI, CAN-HND, CAN-ISR, CAN-JOR, CAN-KOR, CAN-PAN, CAN-PER, NAFTA, USMCA
- **IND:** IND-JPN, IND-KOR, IND-MYS, IND-SGP
- **SGP:** IND-SGP, JPN-SGP, KOR-SGP, NZL-SGP, PAN-SGP, PER-SGP, SGP-TWN, SGP-USA, AUS-SGP, CHN-SGP, CRI-SGP, TUR-SGP
- **MEX:** JPN-MEX, MEX-PAN, MEX-PER, MEX-URG, ARG-MEX, ISR-MEX, BOL-MEX, BRA-MEX, CHL-MEX, MEX-TRIANGLE, COL-MEX, NAFTA, USMCA
- **CHE:** CHE-JPN, CHE-CHN
- **TWN:** NZL-TWN, NIC-TWN, PAN-TWN, SGP-TWN, HND-TWN, GTM-TWN
- **THA:** AUS-THA, THA-NZL, PER-THA, JPN-THA
- **MYS:** PAK-MYS, CHL-MYS, NZL-MYS, NZL-MYS, TUR-MYS, AUS-MYS, JPN-MYS
- **AUS:** AUS-IDN, AUS-PER, AUS-MYS, AUS-CHL, AUS-THA, AUS-USA, AUS-CHN, AUS-JPN, AUS-KOR, AUS-SGP
- **VNM:** VNM-KOR, VNM-CHL, VNM-JPN
- **IDN:** IDN-CHL, IDN-EFTA, AUS-IDN, IDN-CHL
- **TUR:** TUR-CHL, TUR-EGY, TUR-FRO, TUR-GEO, TUR-MYS, TUR-MUS, TUR-MDA, TUR-MNE, TUR-MAR, TUR-MKD, TUR-SRB, TUR-SGP, TUR-TUN, TUR-KOR

C Protectionist RoO

C.1 Summary Statistics

Table A1: Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Import Increase	206,136	−1.488	6.851	−22.774	20.536
PrefMargin	385,700	5.106	4.140	0.002	25.000
RoO (logged)	385,700	1.727	1.720	0.000	6.969
MFN (logged)	385,700	1.854	0.696	0.002	7.401
Downstreamness	376,151	3.461	0.911	1.000	4.831
Differentation	361,656	0.456	0.201	0.009	0.871

C.2 Main Regression Results

Table A2: Substitution/Protectionist Effect of RoO

	Dependent variable:			
	Import Increase			
	(1) All	(2) All	(3) Upstream	(4) Downstream
PrefMargin	0.023***	0.035***	0.065***	0.025***
	(0.007)	(0.007)	(0.012)	(0.009)
RoO		−0.163***	−0.240***	−0.113***
		(0.023)	(0.031)	(0.027)
Prefmargin:RoO		−0.004*	0.001	−0.007***
		(0.002)	(0.004)	(0.003)
MFN	0.035***	0.034***	0.019***	0.045***
	(0.004)	(0.004)	(0.005)	(0.005)
Downstreamness			−0.087	0.147
			(0.165)	(0.115)
Differentiation			1.320	−0.219
			(2.488)	(1.326)
PTA FE	✓	✓	✓	✓
Head FE	✓	✓	✓	✓
Observations	206,136	206,136	90,472	102,095
Adjusted R^2	0.463	0.464	0.463	0.516

Note: Cluster-robust standard errors at headings.
*p<0.1; **p<0.05; ***p<0.01

C.3 Marginal Effect Plot

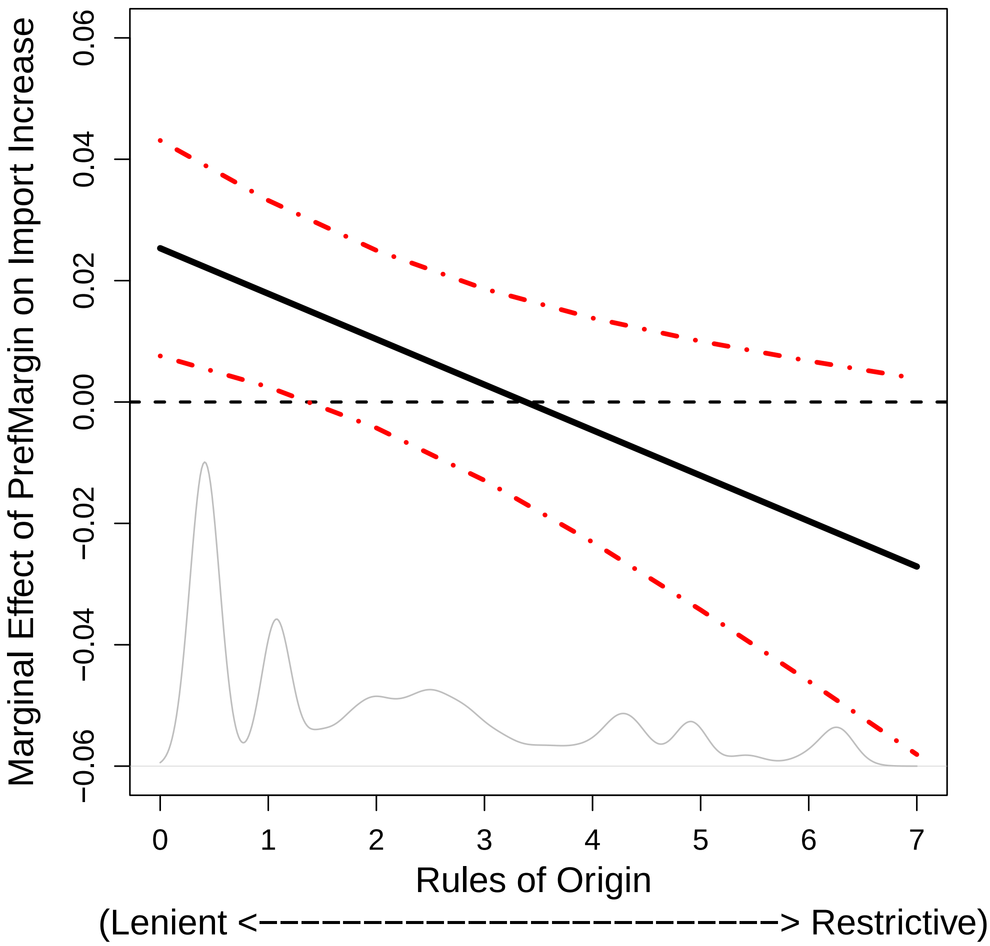


Figure A2: **Marginal Effect of PrefMargin on Import Increase across RoO for Downstream Products.** This figure shows the marginal effect of preferential margins on import increase across RoO, based on the regression results in Table A2, Model 4. For downstream products, preferential tariff cuts lead to large increase in import between PTA partners, but only when RoO are lenient. When RoO become more restrictive, the marginal effect of preferential margins decreases to a negative level which is statistically indistinguishable from zero.

C.4 Regression Results for Full Sample

Compared with Table A2, we report the regression results that include the full sample, i.e., all product lines that have preferential margins larger or smaller than 25%. Our results still hold, as the interaction between preferential margins and RoO are negative and statistically significant at the conventional level.

Table A3: Substitution/Protectionist Effect of RoO (Full Sample)

	Dependent variable:			
	Import Increase			
	(1) All	(2) All	(3) Upstream	(4) Downstream
PrefMargin	0.016***	0.026***	0.059***	0.009
	(0.005)	(0.006)	(0.010)	(0.009)
RoO		−0.165***	−0.215***	−0.132***
		(0.018)	(0.029)	(0.021)
PrefMargin:RoO		−0.003**	−0.003	−0.003**
		(0.001)	(0.004)	(0.002)
MFN	0.013***	0.013***	0.001	0.022***
	(0.004)	(0.003)	(0.003)	(0.007)
Downstreamness			−0.112	0.145
			(0.163)	(0.114)
Differentiation			1.276	−0.433
			(2.507)	(1.426)
PTA FE	✓	✓	✓	✓
Head FE	✓	✓	✓	✓
Observations	210,116	210,116	92,814	104,945
Adjusted R^2	0.461	0.462	0.464	0.511

Note: Cluster-robust standard errors at headings.
*p<0.1; **p<0.05; ***p<0.01

C.5 Regression Results with EU PTAs

We include EU PTAs in our sample and conduct robustness checks below. All our results appear similar even with EU PTAs.

Table A4: Substitution/Protectionist Effect of RoO (EU PTAs)

	Dependent variable:			
	Trade Increase			
	(1) All	(2) All	(3) Upstream	(4) Downstream
PrefMargin	0.011*	0.015**	0.052***	−0.00004
	(0.006)	(0.007)	(0.011)	(0.009)
RoO		−0.152***	−0.230***	−0.089***
		(0.019)	(0.025)	(0.024)
PrefMargin:RoO		−0.002	−0.003	−0.004**
		(0.002)	(0.004)	(0.002)
MFN	0.027***	0.026***	0.015***	0.035***
	(0.003)	(0.003)	(0.005)	(0.005)
Downstreamness			−0.112	0.136
			(0.153)	(0.107)
Differentiation			2.245	0.630
			(3.201)	(0.795)
PTA FE	✓	✓	✓	✓
Head FE	✓	✓	✓	✓
Observations	267,066	267,066	117,262	130,733
Adjusted R^2	0.457	0.458	0.466	0.511

Note: Cluster-robust standard errors at headings.
*p<0.1; **p<0.05; ***p<0.01

C.6 Regression Results for Earlier Years

While the main results calculate import increase based on the trade data seven to nine years after the PTA. We recalculate the quantity by using earlier years and reestimate our regressions. Our main results still hold for these earlier years.

Table A5: Substitution/Protectionist Effect of RoO (Earlier Years)

	Dependent variable:			
	Import Increase (5-7 Years After PTA)			
	(1) All	(2) All	(3) Upstream	(4) Downstream
PrefMargin	0.019***	0.060***	0.085***	0.050***
	(0.007)	(0.008)	(0.014)	(0.010)
RoO		0.035	−0.059*	0.083***
		(0.023)	(0.034)	(0.028)
PrefMargin:RoO		−0.008***	−0.0002	−0.010***
		(0.002)	(0.005)	(0.003)
Controls			✓	✓
PTA FE	✓	✓	✓	✓
Head FE	✓	✓	✓	✓
Observations	206,136	146,471	64,835	72,973
Adjusted R^2	0.385	0.442	0.443	0.479

	Dependent variable:			
	Import Increase (3-5 Years After PTA)			
	(1) All	(2) All	(3) Upstream	(4) Downstream
PrefMargin	0.022***	0.053***	0.061***	0.048***
	(0.006)	(0.007)	(0.012)	(0.009)
RoO		0.035*	−0.058**	0.061**
		(0.021)	(0.028)	(0.027)
PrefMargin:RoO		−0.005**	0.005	−0.007**
		(0.003)	(0.004)	(0.003)
Controls			✓	✓
PTA FE	✓	✓	✓	✓
Head FE	✓	✓	✓	✓
Observations	206,136	146,471	64,835	72,973
Adjusted R^2	0.058	0.061	0.057	0.063

Note: Cluster-robust standard errors at headings.
*p<0.1; **p<0.05; ***p<0.01

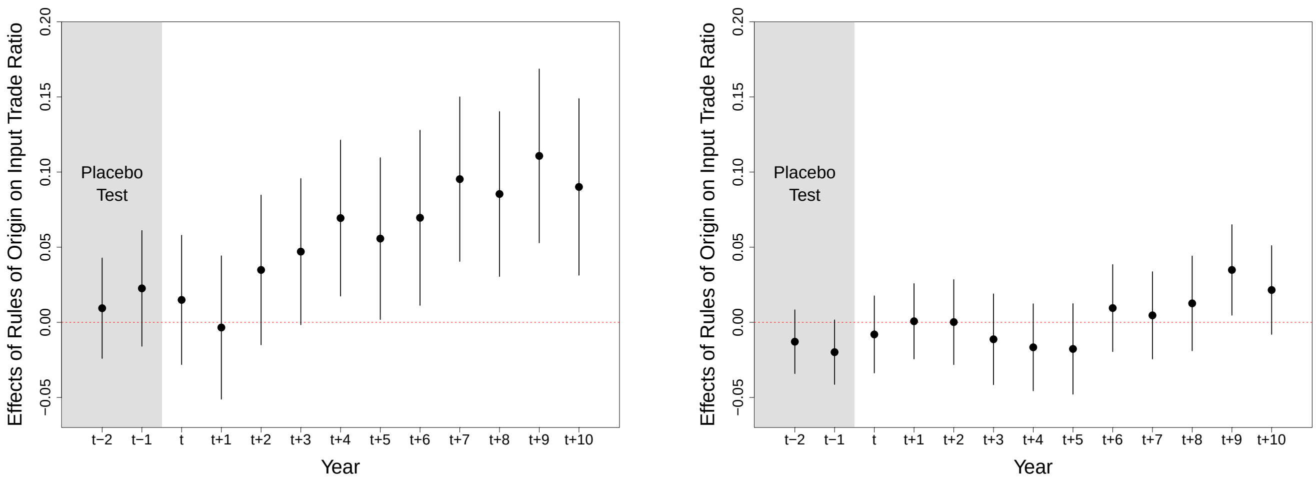
D Subsidizing RoO

D.1 Summary Statistics

Table A6: Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Export to Partner (logged)	1,358,043	11.038	3.174	0.000	22.953
Export to World (logged)	1,358,043	14.583	2.494	0.693	26.258
PrefMargin (logged)	1,358,043	0.840	0.916	0.000	8.641
RoO (logged)	2,659,956	1.774	1.668	0.000	7.430
Differentiation	2,553,865	0.346	0.177	0.005	0.931
Differentiated Product	2,555,607	0.651	0.469	0.000	1.000
Downstreamness	2,631,280	3.285	0.624	1.000	4.602

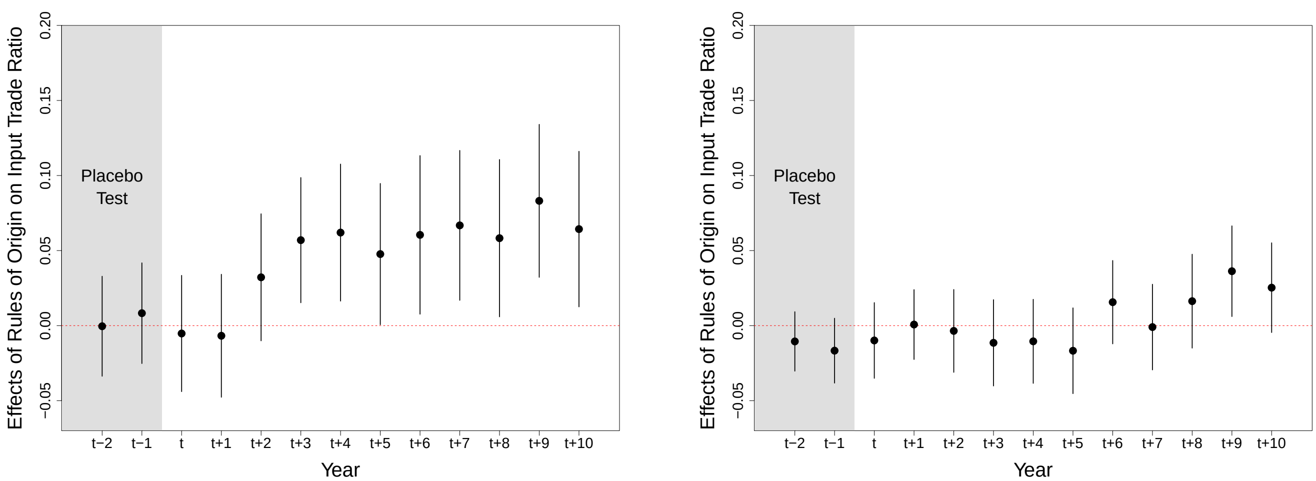
D.2 Dynamic Effect with VA Requirements



(a) **Substitutable Product** (b) **Differentiated Product**

Figure A3: **RoO subsidize trade in substitutable inputs within PTAs, even after controlling for VA requirements.**

D.3 Dynamic Effect with EU PTAs



(a) **Substitutable Product** (b) **Differentiated Product**

Figure A4: **RoO subsidize trade in substitutable inputs within PTAs, even after including EU PTAs whose RoO are more irregular and difficult to measure.**

E RoO and GVC Firms

E.1 Summary Statistics

Table A7: Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Processing Export	11,561	0.266	0.313	0.000	1.000
PrefMargin (logged)	10,421	1.219	0.724	0.000	3.157
RoO (logged)	6,898	2.048	1.522	0.000	5.670
MFN (logged)	10,421	2.302	0.695	0.000	4.190
Downstreamness	10,410	2.593	0.585	1.003	3.569
Differentiation	10,288	0.300	0.149	0.009	0.746
Export (logged)	11,561	13.955	2.611	0.693	24.621

E.2 Regression Results for Earlier Years

While the main results construct the variable of processing export three years before the PTA enforcement, we reconstruct the measure by using different number of years below. As in the main text, Model (1) and (2) include all products, while Model (3) and (4) only have product lines where processing export is present. Our results are robust across these specifications.

Table A8: Processing Export and RoO Restrictiveness (Earlier Years)

	Dependent variable:			
	RoO Restrictiveness			
	(1)	(2)	(3)	(4)
Processing Export $(t-4)$	-0.149^{***}	-0.133^{***}	-0.162^{***}	-0.148^{***}
	(0.037)	(0.037)	(0.045)	(0.046)
Controls		✓		✓
Head & PTA FE	✓	✓	✓	✓
Observations	14,617	14,450	6,599	6,529

	Dependent variable:			
	RoO Restrictiveness			
	(1)	(2)	(3)	(4)
Processing Export $(t-5)$	-0.150^{***}	-0.137^{***}	-0.159^{***}	-0.163^{***}
	(0.037)	(0.037)	(0.042)	(0.042)
Controls		✓		✓
Head & PTA FE	✓	✓	✓	✓
Observations	14,237	14,073	6,307	6,243

	Dependent variable:			
	RoO Restrictiveness			
	(1)	(2)	(3)	(4)
Processing Export $(t-6)$	-0.145^{***}	-0.124^{***}	-0.163^{***}	-0.159^{***}
	(0.037)	(0.037)	(0.044)	(0.045)
Controls		✓		✓
Head & PTA FE	✓	✓	✓	✓
Observations	13,786	13,616	6,156	6,089

Note: Cluster-robust standard errors at headings. *p<0.1; **p<0.05; ***p<0.01