Democracy and Trade Policy at the Product Level*

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Abstract

Despite the fact that trade policies vary significantly across products and trading partners, granular trade policy data is often inaccessible due to difficulties in linking data from multiple sources. We overcome these challenges and construct a dataset of 5.7 billion observations of tariffs and non-tariff barriers between all pairs from 136 countries over 20 years. Using this data, we offer the first product-level analysis of the impact of political regime type on trade liberalization. Our study shows significant variation across products even within the same industry, revealing, for example, that democracies are more likely than non-democracies to protect downstream goods.

Keywords: democracy, trade liberalization, tariff-line data, big data, heterogeneous effects, agricultural protection

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1 Introduction

A rich body of research on trade liberalization has identified numerous factors that affect countries' trade policies. Traditionally this literature has focused on the distributional consequences of trade *across* industries, in which domestic demands for liberalization are driven by factor endowments or sector-specific skills (e.g., Scheve and Slaughter, 2001; Lü, Scheve, and Slaughter, 2012). More recent firm-level studies of trade politics predict that political cleavages will arise across firms even *within* the same industry (e.g., Bombardini, 2008; Kim, 2017; Kim and Osgood, 2019). Relatedly, the question of whether and how these domestic trade preferences interact with political regime type has long been a source of controversy among social scientists (Rodrik, 1995; Morrow, Siverson, and Tabares, 1998; Mansfield, Milner, and Rosendorff, 2000, 2002; Milner and Kubota, 2005; Kono, 2006). In this paper, we conduct a novel empirical evaluation of the effects of political regime type on between-industry and within-industry domestic preferences for trade liberalization.

Although canonical political economy models often predict that complex interactions across domestic and foreign political actors will produce highly heterogeneous trade policies (e.g. Mayer, 1984; Grossman and Helpman, 1994), empirical analysis of trade policies across different regime types has been constrained by poor and noisy data, as researchers have been limited to using high-level, aggregate measures of trade policies when evaluating how domestic trade preferences are translated into policy outcomes. As we demonstrate below, this is due in large part to the enormous difficulties in collecting, linking, and structuring product-level trade policy data from multiple sources. Thus, despite the significant variations that exist in trade policy across products and trading partners, many studies often employ Most Favored Nation (MFN) applied tariff rates or non-tariff barrier "coverage ratios" that are averaged across products (Gawande and Hansen, 1999; Kono, 2006). Indeed, the resulting *single* number for a given importer-year observation has often been used to examine how trade policies differ across regime types (e.g. Milner and Kubota, 2005).

The first contribution of this paper is to address this need for better data by constructing a dataset of over 5.7 billion observations of product-level applied tariff rates that countries apply to their trading partners. While overall tariff rates have decreased substantially over the past decades through a slew of bilateral and multilateral trade agreements, tariffs are still a major component of a country's trade policy as evidenced by the enormous resources that countries spend on negotiating tariff rates. Tariffs also serve as an important foreign policy tool and revenue source for many countries, even among developed economies (Bastiaens and Rudra, 2016). For example, U.S tariff revenue was approximately $40 billion in 2015 (before a significant increase in applied tariffs under the Trump administration against many countries including China), which was similar to the revenue from the federal capital gains tax on corporations (Betz and Pond, 2020).[1] To be sure, many countries use non-tariff barriers (NTBs) as substitutes/complements to tariffs in order to restrict market access, while the incentives to use non-tariff barriers rather than tariffs may vary between regime types and across products (Mansfield and Busch, 1995; Kono, 2006; Anderson, Rausser, and Swinnen, 2013). Therefore, we also collect over 30,000 product-level NTBs covering sanitary and phytosanitary measures, technical barriers to trade, anti-dumping, countervailing duties, safeguards, quantitative restrictions, and tariff-rate quotas, and include these measures in our empirical analysis (See Section 3).[2]

We construct our database of tariff rates by incorporating the universe of preferential rates and the Generalized System of Preferences (GSP) at the *tariff-line* level—the level at which tariff policy is actually set. We develop a replicable automated procedure to (1) retrieve tariff data from multiple web sources, (2) identify the partner-specific tariff rates for each product, and (3) resolve any discrepancies that arise. We then combine our product-level tariff data for each directed dyad with numerous country-, dyad-, and directed dyad-level datasets available in the literature, such as measures of political institutions, GATT/WTO membership, and product-level bilateral trade volume at the Harmonized System (HS) 6-digit level. To the best of our knowledge, this is the first database that combines bilateral trade policies (encompassing both tariffs and non-tariff measures) and trade volume for 136 countries over 30 years at this level of granularity.

Our second contribution is to empirically examine how tariff policy varies by products for countries with different regime types. To exploit the rich structure of our massive dataset, we develop a Bayesian multilevel estimator that explicitly models the correlations in trade policy across industries while overcoming computational challenges in estimation and statistical inference with variational approximations (Jordan et al., 1999). To precisely estimate the effects of regime types

[1] In the U.S., about 60% of products are still subject to non-zero tariffs and the mean MFN tariff rate for these "dutiable goods" is approximately 7.3%. Under the Trump administration, the applied rates go up to 25% and higher across many products.

[2] Note that many countries have begun to replace these non-tariff measures with simplified bound tariffs based on a process known as "tariffication" in WTO.

on trade policies and to illustrate the severity of potential aggregation bias when researchers employ aggregated measures of trade policies, we estimate the proposed statistical model at three degrees of disaggregation: the Harmonized System 2-digit (HS2), 4-digit (HS4), and 6-digit (HS6) levels. In doing so, we depart from existing studies by offering the first granular estimates of trade liberalization across products and industries, which enables researchers to re-evaluate some of key assumptions in the literature about the relationships between domestic political institutions and trade policy-making.

We begin our analysis by comparing the MFN trade policies between democracies and non-democratic nations. We replicate the previous findings in the literature that democracies are associated with lower tariffs than non-democracies, *on average* (Milner and Kubota, 2005). However, we find a high level of heterogeneity across products even within narrowly defined industries. Specifically, we find that democracies are more likely to protect consumer goods such as food, textile, and manufactured products than are non-democracies (Naoi and Kume, 2011; Betz and Pond, 2019). In contrast, industries such as wood and metal as well as highly differentiated intermediate goods tend to get significantly lower tariff rates in democracies compared to non-democracies. Our findings have important implications for understanding how political regimes interact differently with underlying preferences of political actors. We find that democratic institutions, with larger selectorates than autocracies, do *not* necessarily empower consumers (i.e., voters), thereby calling into question the validity of the underlying assumption of many studies in the literature that individual trade preferences (e.g., given by their factoral or sectoral interests) are translated into actual trade policies (see Rho and Tomz, 2017, for this important debate). Furthermore, the high heterogeneity in the effects of political institutions on product-level trade policies also suggests that democratic political systems may interact differently with producers depending on the types of products that they produce as well as the collective actions across firms within industry (Kim, 2017).

Finally, we undertake a dyadic analysis to examine whether the regime types of trading partners affect the depth of trade liberalization. As Mansfield, Milner, and Rosendorff (2000) note, measures of bilateral trade barriers across all combinations of country-pairs are notoriously difficult to collect at the product level, thereby constraining researchers to use bilateral trade volume as a proxy measure for partner-specific trade policy. Using our novel dataset, we are able to conduct the most rigorous dyadic analysis of *preferential* tariff policies to date. We consider a total of 90 bilateral Free Trade Agreements (FTAs) that were signed between 1991 and 2012. We compute the differences in average applied tariff rates before and after each agreement at HS2 and HS4 levels. We then compare the difference-in-differences between dyads with different institutional combinations. We find little evidence that pairs of democratic nations tend to undergo deeper trade liberalization than mixed pairs. However, the regime type of the importer and the exporter in the dyadic relationship matter, which we describe as the *direction* of trade policy. We show that the deepest tariff reductions are granted by democratic importers to non-democratic partners while the shallowest reductions are given by non-democracies to their democratic partners. The reductions granted by democratic importers to other democracies fall in the middle. Overall, our findings shed new lights on the claim that democratic political institutions facilitate unilateral and bilateral trade liberalization.

The rest of the paper is organized as follows. In the next section, we provide a detailed description of our automated dataset compilation pipeline and how we address the computational challenges that arise. Specifically, we show that numerous discrepancies exist between two primary databases that have been widely used in the literature, and we explain how we construct a new dataset that resolves these discrepancies. Section 3 presents the empirical findings from the monadic and dyadic analyses. The final section concludes. The bilateral trade policy and volume data at the HS6 level will be made fully available via the Dataverse repository in a user friendly format. To facilitate future research, the source code for constructing the bilateral product-level tariffs database as well as the estimated product-varying effects of political institutions and their posterior distributions will also be made publicly available at `poltrade.github.io`.

2 New Bilateral Product-level Applied Tariffs Database

In this section, we introduce the new bilateral product-level tariffs database. We first illustrate the heterogeneity in trade policies across products and trading partners, which are obscured by aggregated tariff data. This database then becomes an important foundation for our empirical evaluation of the interaction between democratic political institutions and trade policy-making at the product level.

Variation in Tariffs Across Products and Trading Partners. The need for a dataset that captures bilateral tariffs at the product level stems from the substantial heterogeneity in trade polices, as Figure 1 shows. For example, the first row shows that across industries and over time, the MFN tariff rates applied by the U.S. on imports from China (both of whom are members of the WTO) are very different from the preferential rates the U.S. applies on imports from Mexico (both of whom are members of NAFTA). The columns show that exporters (in this example, China and Mexico) face markedly different tariffs on their products with different trading partners. This heterogeneity exists despite broad membership in the WTO because WTO members are permitted to enter regional trade agreements under Article XXIV of GATT, Enabling Clause, and to lower tariffs for least developed countries with the GSP. That is, the rule of "non-discrimination" does not hold in practice. For example, in 2013 the U.S. tariffs on cars (Harmonized Tariff Schedule subheading `87039000`) exported by FTA partner South Korea was 1.5% whereas it was 2.5% (the MFN rate) for cars originating from other WTO members. Moreover, even the GSP rate for specific products can vary across GSP beneficiaries for strategic reasons. As Carnegie (2015, 60) finds, Pakistan was *partially* suspended from the U.S. GSP program in 1996 due to its violations of workers' rights. Indeed, we find that the U.S. applied rates on gloves (HTS subheading `39262030`) from Pakistan was 3% (the MFN rate) in 1997 instead of the GSP rate of 0%, even though Pakistan remained a GSP beneficiary and still received benefits for many other products. To fully examine the political sources of such heterogeneity, researchers must use partner-specific tariff-line data rather than aggregate tariff measures.

Indeed, researchers may draw incomplete conclusions about trade politics if empirical studies are not done at the appropriate unit of analysis under the Harmonized System of hierarchical product classification. For instance, consider the HS 2-digit *chapter* code for Vegetables (`07`). The U.S. average applied MFN tariff rate for products in this chapter code is 4.35%, which looks comparable to the country-level average rate of 3.34% across all products from various industries. Scholars have used this fact to argue that the U.S. has mostly eliminated trade barriers in many industries, including the agricultural sector. Of course, if average tariff rates are falling, that does tell us that some products are receiving less protection than before. But this statistic elides important information about tariff rates across products, which reveals that protection is indeed alive and while for numerous agricultural products. The 2016 U.S. applied MFN tariff on Onions identified by a HS 6-digit *subheading* code `071220` is 25.6%, for example.[3] Compare this with Asparagus (`070920`) which receives roughly half the MFN duty at 13%. This more nuanced examination of tariff rates provides a clearer picture of the granular cleavages that emerge in trade politics.

[3] At the HS 4-digit *heading* level, onions are classified as Dried vegetables (`0712`), which has an average tariff rate of 6.51%.

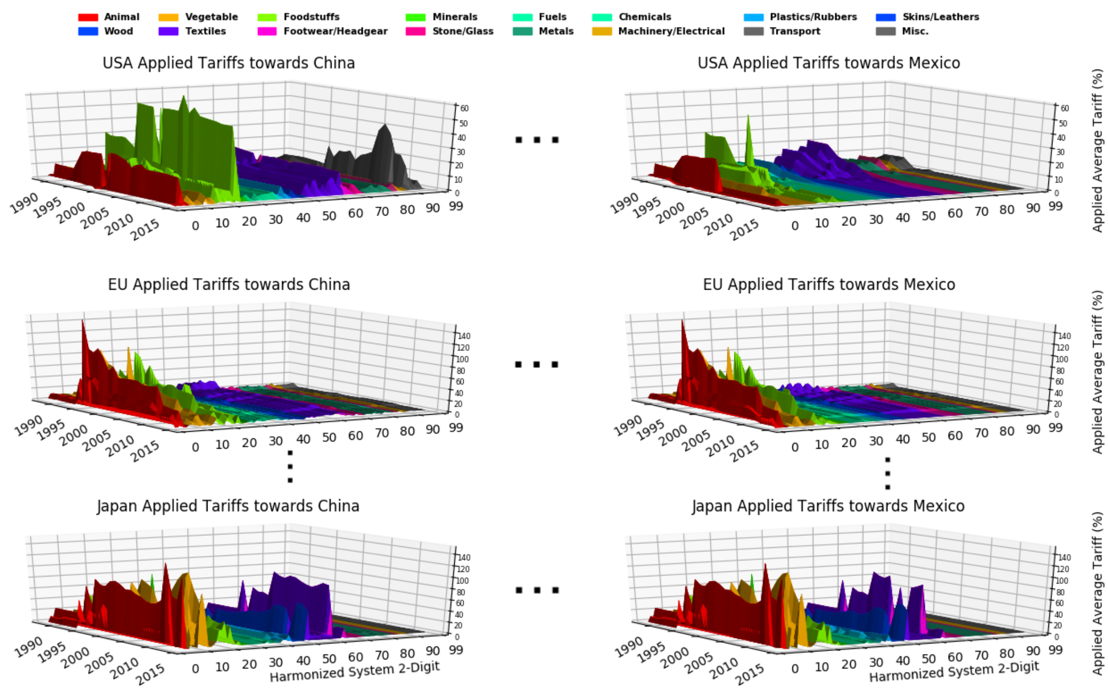


Figure 1: **Variations in Ad Valorem Applied Tariff Rates across Trading Partners and Industries.** This figure demonstrates how our data captures the variation in tariff policies across HS 2-digit industries and trading partners. Exporters are plotted down each column and importers are plotted across each row. For a given country and partner, our data distinguishes precise average tariff rates across HS 2-digit industries (colored within plot) from 1989 to 2015. Increases in applied tariff rates may be due to the conversion of specific tariff rates into ad valorem equivalents or actual temporary increases due to "binding overhang." Below, we will show that the variation across HS 6-digit products within an industry is even greater.

Automated Data Collection. We develop an automated procedure to create a dataset of bilateral trade policy for each tariff-line product and partner. To create our dataset, we begin with two data sources: (1) the WTO Integrated Database (IDB) and (2) UNCTAD Trade Analysis Information System (TRAINS). Both contain applied tariff rates on a variety of products for all WTO countries from 1996 to 2016. However, there are three challenges that limit the use of these databases by researchers in practice.

First, to download all product-level tariffs, both databases require users to submit queries to the system for each importer-year pair, which in our case amounts to more than 2,188 queries (**Step 1** in Figure A.1). To do this, we develop software that automates the data retrieval process, gathering more than 100 gigabytes of product-level tariff data.

The second—and more crucial—challenge is to identify the correct partner-specific rates. Specifically, both databases specify only the "type" or category of tariff rate that a given importer applies to its partners. For example, IDB reports that in 1998 the United States applied a 3.8% tariff rate

Issue	Year–Importer–Exporter–HS (Product description)	WTO IDB report	UNCTAD TRAINS report ($\approx$ AVE)	Solution	N obs. (%)
Missing Report	2013–China–India–09041200 (Crushed or ground Piper pepper)	10% ✓	*none*	Use non-missing.	2.35 billion (41.8%)
	1991–Japan–Korea–140490499 (Cod fish)	*none*	10% ✓		
Conflicting Reports	1997–Australia–Singapore–22082010 (Grape wine)	3%	3% + $31.12/L ($\approx$ 127%) ✓	Use ad valorem equivalent (AVE) computed by UNCTAD.	0.24 billion (4.25%)
	2005–Canada–Australia–22084010 (Rum)	24.56¢/litre of alcohol	24.56¢/litre of alcohol ($\approx$ 1.43%) ✓		
	2004–Argentina–Paraguay–87083110 (Motor vehicle brakes)	0% ✓	14%	Use lower (preferential) rate.	
	1996–USA–Mexico–87033100 (Cars of $\leq$ 1,500 cc cylinder capacity)	2.5%	0% ✓		

Table 1: **Solutions to Tariff Data Inconsistencies.** This table illustrates examples of specific issues that arise when attempting to find the correct applied rate for a tariff-line using the IDB and TRAINS databases. In each example, our algorithm selects the source believed to be the more precise applied rate. For instance, for Australia's 1997 tariff on Grape wine from Singapore, IDB reports only a 3% ad valorem rate while TRAINS accounts for an additional $31.12 per litre of wine in its ad valorem equivalent (AVE) rate. We provide full details of the merging algorithm in Appendix A.2.

on Ginger, saffron, turmeric (curcuma), thyme, bay leaves, curry and other spices (HTS subheading 69120090) for all partners belonging to the United States Generalized System of Preferences, but does not specify which countries are included in that category. We use a mix of hand-coding from WTO and World Bank reference materials and string-matching algorithms applied to country names and regional trade agreement titles in order to map each unique "type" appearing in the original data to its corresponding set of disaggregated country ISO codes. Even when the tariff "type" clearly applies to one country, an additional step is needed to link the textual description to the relevant country code. **Step 2** in Figure A.1 illustrates this process using an example tariff-line. Appendix A.1 describes our data collection and processing in full detail.

Finally, there exist a number of inconsistencies between the two data sources. Table 1 illustrates three issues that we identify. First, we find significant differences in data coverage. This is problematic given that researchers tend to rely primarily on one of these widely used data sources for empirical research but usually not both. Data for 127 importer-years appear only in IDB (but not TRAINS), while data for about 842 importer-years appear only in TRAINS (but not IDB). As a result, we find that at least 2.35 billion observations are missing from one of the databases; we make sure to utilize the available data whenever possible. Second, IDB returns duties as they are originally reported (e.g. 24.56¢/litre of alcohol), while TRAINS uses a method to estimate an ad valorem equivalent (AVE) for any reported non-ad valorem rate (e.g. 24.56¢/litre of alcohol

$\approx$ 1.43%). TRAINS also uses this method to convert mixed or compound duties (e.g. 3% + \$31.12/L $\approx$ 127%).[4] In both cases, our algorithm chooses TRAINS, since it is the more precise and informative source to use. Third, preferential rates may be reported in only one source. As shown in the last row of Table 1, TRAINS shows the correct 1996 NAFTA duty-free rate for United States-Mexico trade in Cars of $\leq$ 1,500 cc cylinder capacity while IDB does not. Similarly, IDB shows Argentina's duty-free rate for Motor vehicle brakes imports from MERCOSUR trade bloc partner Paraguay while TRAINS does not. Our algorithm picks the correct partner-specific preferential rate for both tariff-lines. After resolving issues of missing data and discrepancies between the two sources, we create a dataset of over 5.7 billion observations of bilateral trade policy at the product level. Appendix A.2 details each step in our resolution algorithm. In total, our dataset covers 2,476 WTO importer-years (3,080 importer-years overall) from 1989 to 2015, including comprehensive policies for the top 50 trading countries beginning in 1995 (see Figure A.2).

3 The Effects of Regime Type on Trade Policy

In this section, we demonstrate the significance of employing our granular data. Specifically, we examine differences in import tariff policy between democracies and non-democracies. We begin by analyzing unilateral trade policies (monadic analysis) across countries, industries and products using MFN applied tariff rates. We then utilize our bilateral tariff data to investigate whether pairs of democracies engage in deeper trade liberalization than other pairs do (dyadic analysis).

3.1 Monadic Analysis

Do democratic political institutions facilitate unilateral trade liberalization? Applying the Stolper-Samuelson theorem, Milner and Kubota (2005) argue that democratization empowers the owners of factors with which their country is abundantly endowed, and therefore one should expect that trade liberalization will ensue, reflecting the median voter's preferences. Using MFN tariff rates averaged across products, they find that democratization in labor-abundant developing countries is associated with lower trade barriers. Other scholars have argued the reverse, however, suggesting that the need to win elections makes democratic politicians sensitive to the demands of interest

[4] For a given non-ad valorem tariff tariff, UNCTAD calculates an ad valorem equivalent (AVE) by estimating the unit value of a product using volume statistics. The type of statistics—either tariff-line level statistics from TRAINS, HS6 statistics from UN Comtrade, or HS6 statistics aggregated across OECD countries—depends on data availability for each product. The unit value is then used to approximate a (%) tariff rate. In cases where only an IDB report is available for a compound rate, we impute an AVE using only the ad valorem component of the duty rate.

groups who offer support in exchange for trade protection (Frieden and Rogowski, 1996). Autocracies, meanwhile, need appeal to only a very small segment of society to secure their power, and therefore they might be less susceptible to interest group pressures (Acemoglu and Robinson, 2005; Henisz and Mansfield, 2006).

We begin by examining whether trade policy varies between democracies and non-democracies across HS2 industries. Our industry-level analysis is motivated by the endogenous tariff literature in which competing economic interests across sectors determine industry-level trade policy (e.g. Mayer, 1984). Indeed, the Stolper-Samuelson theorem postulates that the distributional implications of trade liberalization will be asymmetric in capital-abundant and labor-abundant industries, resulting in trade policy heterogeneity across industries. Moreover, as Grossman and Helpman (1994) show, political activities of industries (such as lobbying) interact with economic heterogeneity in import-penetration and demand elasticity. Consequently, the canonical model predicts differences in trade policy across industries (see Proposition 2 in Grossman and Helpman, 1994).

We will then gradually disaggregate our units of analysis to the HS4 and HS6 levels to illustrate the severity of the ecological fallacy that occurs when researchers employ aggregated measures of trade policies. Our product-level analysis is also motivated by the possibility that preferences of various economic actors, such as firms, may interact differently with political institutions at the product-level, a prediction that is consistent with the firm-level theories in international political economy (Kim, 2017). The hierarchical structure of the Harmonized System of product classification facilitates aggregation and disaggregation at different levels of detail. For example, Brisket cuts, a product in the ANIMAL sector, can be classified broadly by its HS 2-digit *chapter* or *industry* code, `02` (Meat and edible meat offal), more specifically by its HS 4-digit *heading*, `0201` (Meat of bovine animals; fresh or chilled), or very specifically by its HS 6-digit *subheading*, `020120` (Meat; of bovine animals, cuts with bone in (excluding carcasses and half-carcasses), fresh or chilled). We find it valuable to disaggregate up to the HS6 level because it explains more variance in countries' MFN tariff profiles than the HS2 or HS4 levels. For example, in the United States, variance between HS2 groupings of products explained 38% of the variance in 2012 MFN applied tariffs, while variance between HS4 groupings of products explained 52% and variance between HS6 groupings of products explained 68%. Note that, while our full dataset captures trade policy for individual products at the *tariff-line* level, we do not disaggregate beyond the HS6 level because HS6 is the most fine-grained categorization that can be compared across countries as each country may set its own tariff lines using 8-digit or 10-digit codes independently.

3.1.1 Methodology

To estimate the effects of regime type on trade policy, we introduce the following hierarchical Tobit model of the observed MFN tariff rate τ_{ipt} for importer i and product group p in year t:

$$\begin{aligned}\tau^*_{ipt} &= \beta D_{it} + \gamma_p^\top \mathbf{X}_{it} + \delta^\top \mathbf{Z}_{it} + \lambda_1^\top \mathbf{V}_{ipt} + \lambda_2 W_{ih[p]t} + \eta_i + \theta_t + \epsilon_{ipt} \\ \tau_{ipt} &= \begin{cases} \tau^*_{ipt} & \text{if } \tau^*_{ipt} \geq 0 \\ 0 & \text{otherwise} \end{cases}\end{aligned} \tag{1}$$

where τ^*_{ipt} is a latent tariff that we observe if it is greater than zero and is censored at zero otherwise. We perform separate analyses in which we index p by its HS2 industry group, HS4 product group, and HS6 product group respectively. In each case, we compute the time-varying average tariff rate τ_{ipt} at the desired aggregation level from the new tariff-line dataset, described in Section 2, and use logged values to address the high skewness of tariffs. Following the literature, we use a binary measure of democracy where D_{it} is unity if importer i's Polity IV score is 6 or above in year t and zero otherwise (e.g. Mansfield, Milner, and Rosendorff, 2000; Milner and Kubota, 2005; Acemoglu et al., 2019). While we recognize that there exists substantial variation in political institutions even within democracies and autocracies (Rickard, 2015; Geddes, Wright, and Frantz, 2014), this measurement strategy not only helps compare our findings to existing studies, but also facilitates conceptually cleaner comparisons across numerous estimates, which is the primary objective of this section.

Although the results presented in this section should not be interpreted as the causal effect of democracy on trade policy as one cannot experimentally manipulate political institutions, we include a large number of covariates to account for potential selection and confounding in our empirical analysis. $\mathbf{X}_{it}$ is a set of country-level covariates—democracy (D_{it}), log GDP per capita, and an intercept—for which we estimate product-specific coefficients. Furthermore, we control for the presence of 30,327 product-level NTBs for each country covering sanitary and phytosanitary measures, technical barriers to trade, anti-dumping, countervailing duties, safeguards, quantitative restrictions, and tariff-rate quotas.[5] This allows us to account for (1) leaders' incentives to use

[5] We collect this information from WTO's I-TIP database available at `https://i-tip.wto.org/goods/Default.aspx`.

tariffs rather than NTBs may vary between regime types and across products, and the (2) substitutability/complementarity between tariffs and NTBs. $\mathbf{Z}_{it}$ represents a vector of country-level time-varying confounders of regime type and trade policy: log GDP per capita (PPP basis), log population, an indicator for GATT/WTO membership, and an intercept. $\mathbf{V}_{ipt}$ contains log import volume and an indicator for whether the importer imposes any non-tariff barriers on the product in the given year (at the same level of product aggregation as the tariff rate). All covariates are lagged by 1 year. To address missingness in covariate data, we create multiple imputed datasets and conduct estimation separately across them following Honaker, King, and Blackwell (2011).[6]

We also include the continuous Balassa index, $W_{ih[p]t}$, in order to control for countries' revealed comparative advantages, which captures technological differences across countries, industries h, and time t for product p.[7] This allows us to account for the possibility that developing and developed countries may use different production technologies even when they produce similar goods. Finally, η_i and θ_t are importer- and year-varying intercepts respectively, and ϵ_{ipt} is idiosyncratic error assumed to be drawn from a Normal distribution:

$$\eta_i \overset{\text{i.i.d.}}{\sim} \mathcal{N}(\mathbf{0}, \Sigma_\eta), \qquad \theta_t \overset{\text{i.i.d.}}{\sim} \mathcal{N}(\mathbf{0}, \Sigma_\theta), \qquad \epsilon_{ipt} \overset{\text{i.i.d.}}{\sim} \mathcal{N}(0, \sigma_\epsilon^2). \tag{2}$$

To be sure, countries may have various domestic institutions that aggregate trade preferences across some sectors, meaning that trade policies of certain sectors may be highly correlated. For example, the U.S. Congress has established advisory committees within the Department of Agriculture, such as the Agricultural Policy Advisory Committee (APAC), to provide advice on the administration and implementation of U.S. trade policy across various agricultural products. To account for heterogeneous political processes across products, therefore, we model the product-varying effects hierarchically. Specifically, we allow the effects of political processes to vary across products p (e.g., vegetables vs. fish) but incorporate the complex correlations within a broader sector k (e.g., food sector) that operates differently from other sectors (e.g., textile sector):

$$\gamma_p \sim \mathcal{N}(\phi_{k[p]}, \Sigma_\gamma), \qquad \phi_k \sim \mathcal{N}(\mathbf{0}, \Sigma_\phi). \tag{3}$$

[6] The greater granularity at the HS4 and HS6 levels may result in a greater number of missing observations in log trade volume for importers across all years. In that case, we performed linear extrapolation to impute missing trade volume for a given importer's products across years instead of using Amelia package, which is exceptionally computationally intensive at such scale.

[7] The Balassa index of a given industry in a given country is the ratio of the industry's share of the country's total exports to the industry's share of global exports. The most granular level at which this can be measured is the HS2 level.

where the effect γ_p for product p belonging to sector k is drawn from a multivariate-Normal distribution with a mean vector $\phi_{k[p]}$ and covariance matrix Σ_γ, and ϕ_k is drawn from a multivariate-Normal distribution with mean 0 and covariance matrix Σ_ϕ. This means that the product-specific coefficients vary based on the sector k to which the product belongs, which increases the plausibility of the exchangeability assumption for the product-specific effects.

Our analysis requires substantial computational resources. For example, in the HS2 analysis, we examine 218,903 MFN rates (including 18,199 duty-free rates) for 127 countries over 26 years (1990 to 2015). We overcome computational challenges by estimating the parameters of the HS2 and HS4 models using the Hamiltonian Monte Carlo (HMC) method implemented in the Stan program (Carpenter et al., 2016).[8] For each of four imputed datasets, we run four separate Markov chains. Our posterior sample combines the chains from the imputed datasets. While we focus specifically on the posterior means and credible intervals of our quantity of interest when we present our findings below, we also make the entire posterior samples publicly available. Finally, for faster computation in the HS6 case, we use Variational Bayes (VB) instead of HMC (Jordan et al., 1999). We verify convergence of our models using the Gelman-Rubin statistic. To the best of our knowledge, this is the first product-level study that examines the relationships between regime type and MFN trade policy covering both developing and developed nations.

3.1.2 Empirical Results

Our quantity of interest is the effect of democracy on trade policy across products. The model given in equation (1) decomposes this quantity into two parts: (1) the main effect β and (2) the product-specific partial effect of democracy $\gamma_p^{\texttt{DEM}}$ at the HS2, HS4, or HS6 level.[9]

Figure 2 reports the posterior distribution of our quantity of interest, $\beta + \gamma_p^{\texttt{DEM}}$. The mean of the posterior distribution of the main effect of democracy, β (marked by the dotted horizontal line), shows that across all industries, the MFN tariffs imposed by democracies are about 31% ($\approx \exp(0.27) - 1$) lower than the MFN tariffs imposed by non-democracies, replicating the findings from previous studies (Milner and Kubota, 2005; Chaudoin, Milner, and Pang, 2015).[10] Note

[8] HMC is an appropriate tool to deal with the complexity of our model, as the high dimensionality of the parameter space might result in inefficient mixing and severe autocorrelation if we used a Markov Chain Monte Carlo (MCMC) method (Betancourt, 2017). HMC explores the parameter space efficiently, making it possible to estimate parameter values with accuracy within a reasonable length of time.

[9] Note that γ_p is a vector of product-varying effects across covariates, and we denote the element corresponding to the democracy variable D_{it} by $\gamma_p^{\texttt{DEM}}$.

[10] We emphasize that the point estimate is almost identical: see Table 2 in Milner and Kubota (2005).

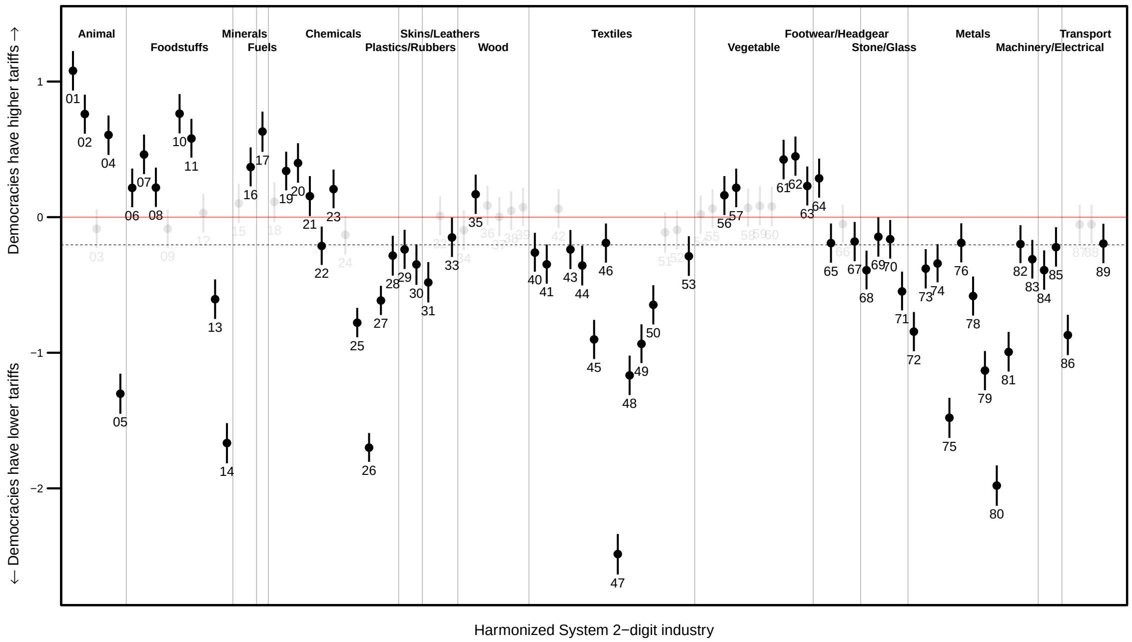


Figure 2: **Effect of Democracy on HS2 Log Tariffs.** This plot presents posterior means and 95% credible intervals for the estimated effect of democracy on tariff rates for each HS2 chapter. Across all industries, MFN tariffs are about 31% ($\approx \exp(0.27) - 1$) lower on average for democracies than non-democracies (the dotted horizontal line). However, there exists significant heterogeneity in the effect of democracy across industries. Democracies tend to have higher tariffs in agricultural sectors and lower tariffs in material sectors such as wood and metals. Industries with black (grey) lines are those in which the difference in MFN tariffs between democracies and non-democracies are statistically different (indistinguishable) from zero. The HS2 industry codes are given at the bottom of each estimate.

that, our study extend the previous studies that focus on developing countries by including a large number of developed countries. Thus, the conclusion that democracies impose lower tariffs *on average* than non-democracies does not hinge on the abundant supply of labor in developing countries. Rather, our finding accords well with the theoretical logic that the preferences of the median voter is generally in line with liberal trade policy in democracies. For comparability with Milner and Kubota (2005), we also conduct our analysis with only less-developed countries where we find similar results for the average effect of democracy across all products; see Figure C.1 in Appendix C.

The HS2 results reveal significant heterogeneity in the effect of democracy across industries. Visual inspection of Figure 2 showcases several industries for which the effect of democracy differs notably from the posterior mean of the main effect, β (the dotted line). ANIMAL, VEGETABLE, and FOODSTUFFS products have *positive* estimates; for the majority of industries in these sectors, the effects turn out to be statistically significant (marked by black vertical lines). That is, democracies are more protective of agricultural consumer goods than non-democracies are. We also find that democracies tend to protect TEXTILES industries. Conversely, MINERALS, CHEMICALS, WOOD, and METALS industries have estimates that are significantly lower than the main effect, suggesting that democracies engage in deeper liberalization of these industries than non-democracies do.

The finding about agricultural protection in democracies deserve an in-depth discussion as the sector has been identified as one of the most successful industries that obtained trade protection in the past 20 years (Park and Jensen, 2007; Naoi and Kume, 2011). The tariff rate on agriculture products is 22.56% on average, while non-agriculture products have an average tariff rate of 10.03%. As Anderson and Martin (2005, p.12) show, "food and agricultural policies are responsible for more than three-fifths of the global gain forgone because of merchandise trade distortions." This high level of protection has made agriculture a major point of contention in international trade negotiations, including the Doha Round of the World Trade Organization where countries were unable to agree to terms on market access, export subsidies, and domestic support. The political importance of agriculture is particularly intriguing when the sector's share of global gross domestic product has fallen to less than one-thirtieth (Anderson and Martin, 2005, 3).

Regime type offers a potentially powerful prism through which to view the agriculture industry's unusual status in trade policy. Specifically, "rural bias" exists in democracies because rural districts tend to be overrepresented in national legislatures (Anderson, Rausser, and Swinnen, 2013). Davis (2003) emphasizes the disproportionate political power that rural areas possess in many democratic countries, including the United States, Japan, and many countries in Europe. For example, the United States Senate has two senators from each state despite significant differences in population. The result: 50 percent of the U.S. population is represented by just 18 Senators. Furthermore, many of the voters in these overrepresented districts work in agriculture or have ties to the agricultural sector, for instance through extended family (Mulgan, 1997; Davis, 2003).[11] In contrast, "urban bias" exists in autocracies. The threat to autocratic survival from mass unrest is particularly significant in urban areas. This is because it is relatively easier to mobilize citizens for public protest in densely populated urban cities than in rural areas. Autocrats who are particularly vulnerable to the threat of civil opposition (Acemoglu and Robinson, 2005; Svolik, 2012), therefore, should favor policies that appeal to urban citizens (Bates, 2014). One such policy is maintaining low food prices with lower level of protection, as high food prices can lead to riots in

[11] Economically, agricultural producers are vulnerable to price changes due to the inelastic supply of agricultural products in general. Therefore, they are more likely to overcome collective action problems and concentrate their demands for protection, especially when the industry is declining due to foreign competition (Hillman, 1984).

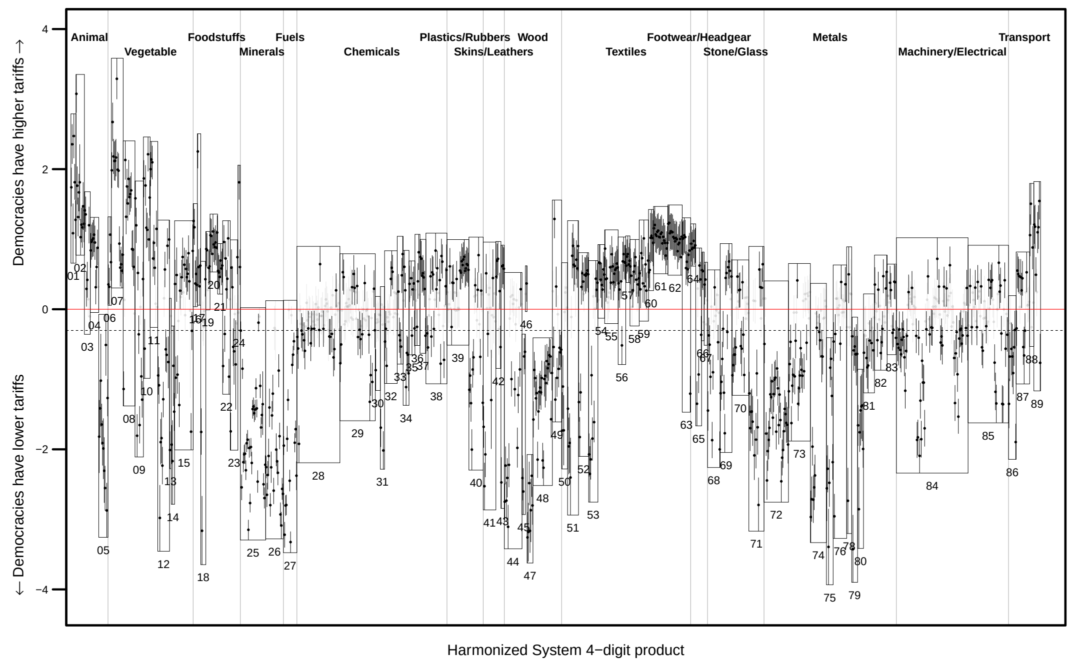
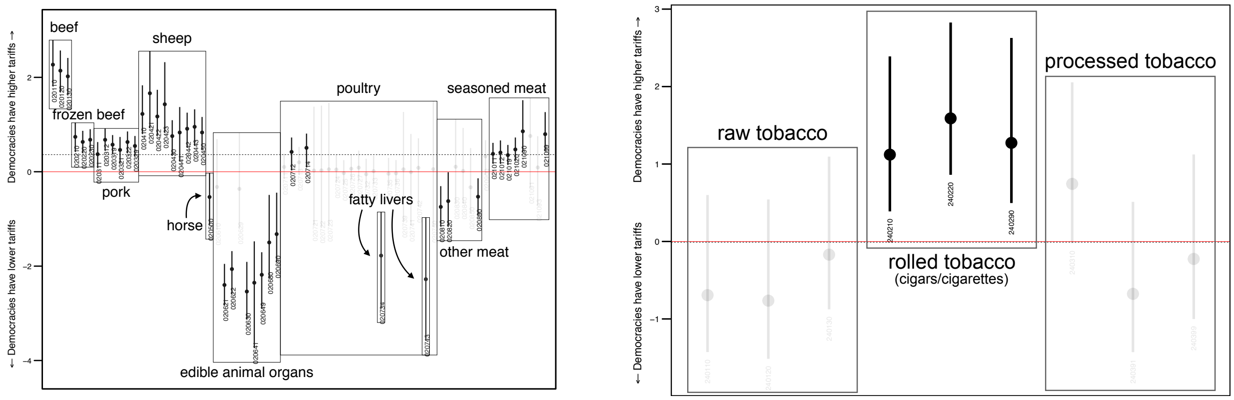


Figure 3: **Effect of Democracy on HS4 Log Tariffs:** This plot presents posterior means and 95% credible intervals for the estimated effect of democracy on tariff rates for each HS4 product group. Across all industries, MFN tariffs in democracies are about $8\%(\approx \exp(-0.08) - 1)$ lower on average than in non-democracies (the dotted horizontal line). Boxes group together products belonging to a common HS2 industry with the chapter code given at the bottom of each box.

cities (Bellemare, 2015; Thomson, 2017). Ballard-Rosa (2016, 314) finds that the "urban pressure" for cheap imported foods is so significant that autocracies might even risk default on sovereign debt during the times of fiscal crisis. He provides both quantitative and qualitative evidence for the importance of low food prices in hedging against potential revolutions in non-democracies. In fact, Walton and Seddon (2008) show that high food prices often result in mass unrest. Similarly, Lagi, Bertrand, and Bar-Yam (2011) highlight food price as a primary driving force behind the Arab Spring in North Africa and the Middle East. These studies consistently predict that autocracies are more likely to liberalize agricultural industries than democracies, holding other factors constant, as a way to make food readily available and affordable to denizens of their urban centers.

Next, our analysis at the HS4 level reveals further heterogeneities as we account for more nuanced product categories: for example, there are only two HS2 chapters for MACHINERY/ELECTRICAL goods, but they consist of 133 unique HS4 subheadings. Figure 3 shows that when we use HS4 product groups instead of HS2 groups, the estimated main effect of democracy (dotted line) becomes smaller (on average, MFN tariffs imposed by democracies are 8% lower than those imposed by non-democracies, i.e., much smaller effect size than the HS2 level analysis) while product-



(a) HS6 products in Meat industry (HS2: `02`) (b) HS6 products in Tobacco industry (HS2: `24`)

Figure 4: **Effect of Democracy on HS6 Log Tariffs, Meat and Tobacco Products.** This plot presents posterior means and 95% credible intervals for the estimated effect of democracy on tariff rates for HS6 products in the meat industry (panel a) and tobacco industry (panel b). Boxes indicate distinct product groupings. On average, MFN tariffs are about $43\%(\approx \exp(0.36) - 1)$ higher for democracies than non-democracies across meat products and while MFN tariffs exhibit no average difference between democracies and non-democracies across tobacco products.

specific heterogeneity substantially increases. We find stronger effects (roughly double) of democratic political institutions on agricultural protection at the HS4 level than at the HS2 level. Notably, the highest tariffs are imposed on Meat of bovine animals (`0201`) and Cucumbers, fresh or chilled (`0707`). We also find stronger evidence that democracies are more protective of textile products than are non-democracies, nearly 40% larger effects than the HS2-level effects. On the other hand, intermediate goods tend to have lower tariffs in democracies than in non-democracies, as shown by the smaller estimates for the products that belong to MINERALS, METALS, and MACHINERY/ELECTRICAL. This is consistent with Baccini, Dür, and Elsig (2018), who show that the increasing importance of global value chains and intra-industry trade makes it easier for countries to liberalize intermediate goods than finished products. Our findings add nuance to this claim by showing that such effects are more pronounced among democracies than non-democracies, holding economic size, comparative advantages, institutional memberships, and trade volumes constant.

Finally, we present the estimated effects of democracy on trade policy at the HS6 level. Figure 4 present the estimates from two distinct types of products: (1) meat and (2) tobacco (Appendix D presents a larger set of estimates from each Harmonized System Section). Panel (a) shows that there exists substantial variations in the estimated effect across similar HS 6-digit products in the meat industry.[12] Again, we find that consumer products such as beef, pork, and lamb tend to have higher tariffs whereas animal organs are likely to have lower tariffs in democracies than in non-democracies. Similarly in panel (b) we see that consumer goods in the tobacco industry like cigarettes, are chosen for protection by democracies relative to autocracies.

We conduct a systematic analysis of the differences in democratic protection between consumption goods and intermediate goods using two different product-level measures. First, we map each HS6 product to a discrete Broad Economic Category (BEC), which categorizes products based on their main end use (e.g., capital vs. consumption vs. intermediate). We find that the HS 6-level estimates of γ_p^{DEM} across all 3,950 products with available BEC mappings are significantly smaller for intermediate goods than consumer products even within the same industry (a univariate regression model reveals a statistically significant coefficient of 0.37 at the $\alpha = 0.01$ level; the result remains statistically significant after controlling for HS 2-level fixed effects across products). That is, we find that democracies are more likely than non-democracies to liberalize (protect) intermediate (consumer) goods. Second, we map each HS6 product to a continuous measure of its "downstreamness" in global value chains (GVCs) across all countries between 1995 and 2011 estimated by Antras and Chor (2018). This GVC-based measure confirms the directional result of the discrete measure: after adjusting for sector and industry, more downstream products are predicted to be more highly protected by democracies relative to non-democracies.[13]

Figure 5 illustrates this finding in the context of the steel industry. The negative effects of democracy are concentrated on intermediate goods (shaded in blue), whereas there exists statistical difference between the two regime types in trade policies over consumption goods such as steel appliances (shaded in red). Interestingly, we find that the set of steel products on which the Trump administration imposed high tariffs (boxes with bold boundaries) are tubes, pipes, and wires, which tend to otherwise have low tariffs in democracies.

Our findings underscore the fact that consumers incur dispersed costs of protection in contrast to concentrated benefits that import-competing producers may enjoy. Furthermore, our findings raise an important question for IPE scholarship as to why consumer interests do not get translated into trade policy-making. More generally, the results presented in this section call into question

[12] Estimates for HS 6-level product-varying coefficients are pooled at the industry rather than sector level. That is k is replaced with h in equation (3) for faster convergence and better Markov chain mixing.

[13] A nonparametric visualization of the differences is shown in Figure D.2; the parametric estimates of the differences described here are shown in Figure D.3.

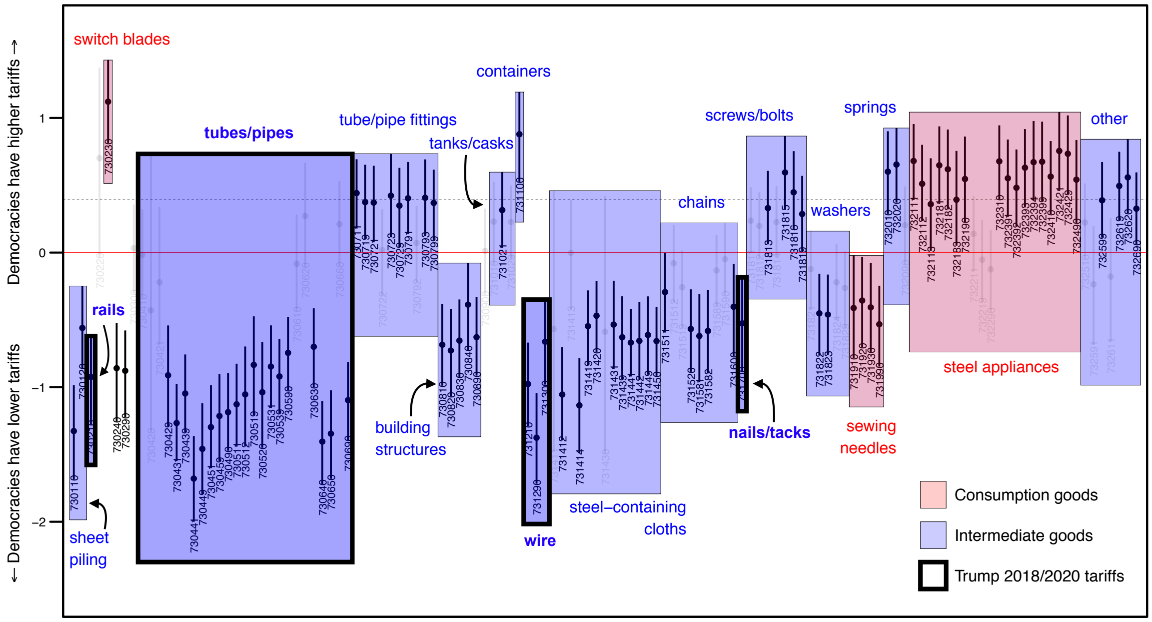


Figure 5: **Effect of Democracy on HS6 Log Tariffs, Steel Products.** This plot presents posterior means and 95% credible intervals for the estimated effect of democracy on tariff rates for HS6 goods classified as Steel products (HS2 chapter 73). Boxes indicate distinct product categories colored by Broad Economy Category (BEC). Boxes with thick black outlines indicate steel products targeted for protection in the United States by the Trump administration in 2018 and 2020. Across all products in this industry, MFN tariffs are about $40\%(\approx \exp(0.34) - 1)$ higher on average for democracies than non-democracies (the dotted horizontal line).

the validity of the key assumptions made in the literature when scholars study the channels through which political institutions affect trade policy-making. That is, regime security, party discipline, size of constituencies, and median voter's preferences may all interact differently with political institutions at the product-level. Taken together, the significant variability across products suggest that the current empirical understanding of how democratic regime type interacts with the preferences of actors in the economy is incomplete at best.

3.2 Dyadic Analysis

Do the regime types of trading partners affect the depth of trade liberalization that occurs? We make three contributions to the analysis of this question. First, we directly analyze trade *policies* between country-pairs rather than using a proxy measure such as trade volume. The standard gravity model of trade predicts that bilateral trade volume depends directly on the costs of trade, which includes barriers to market access between the trading partners. By using applied tariffs as the dependent variable, therefore, our analysis addresses the potential endogeneity bias and returns more direct estimates of the relationship between regime types and the choice of trade policy than analysis conducted using trade volumes. Second, we distinguish the *direction* of trade policy between two countries: what regime type is the importer and what regime type is the exporter? A direct test of the hypothesis that pairs of democracies are more likely to engage in liberalization requires researchers to examine two questions: (1) whether a democratic importer is more likely to liberalize when its export partner is a democracy rather than a non- democracy, and (2) whether a democratic exporter can achieve freer market access when its negotiating import partner is a democracy instead of a non-democracy. Finally, we estimate heterogeneous effects of political interactions on trade liberalization across industries. The findings from the monadic analysis in Section 3.1 confirm that unilateral incentives to liberalize are affected by the structure of political institutions as well as by political pressures that vary across interest groups. Consequently, we expect that bilateral trade negotiations will also be affected by trading partners' industry-specific political constraints. The bilateral tariff data that we introduced in Section 2 enables us to examine the complexity of preferential trade policy outcomes across industries.

We emphasize that the set up of our study presented in this section departs significantly from previous studies (e.g., Mansfield, Milner, and Rosendorff, 2000) as we focus our analysis on a much smaller set of country pairs with bilateral trade agreements. In this regard, the goal of this section is to leverage the novel identification strategy to go beyond correlational analyses, and to utilize the massive amounts of granular data to precisely estimate the interactive effects of political institutions on the depth of trade liberalization in preferential trade agreement negotiations.

3.2.1 Methodology

We employ a difference-in-differences identification strategy. Specifically, we examine the industry-specific interactive effects of regime type on the degree of trade liberalization that occurred following bilateral Free Trade Agreements (FTAs). We compare the magnitudes of tariff reductions before and after FTAs of dyads with different regime types.

Our proposed hierarchical linear model for the change in trade policy before and after an FTA between importer i and exporter j is given by

$$\begin{aligned}\Delta\tau_{ijpt} = \alpha &+ (\beta^{\texttt{DEM/NONDEM}} + \gamma_p^{\texttt{DEM/NONDEM}})D_{ijt}^{\texttt{DEM/NONDEM}} + (\beta^{\texttt{NONDEM/DEM}} + \gamma_p^{\texttt{NONDEM/DEM}})D_{ijt}^{\texttt{NONDEM/DEM}} \\ &+ (\beta^{\texttt{NONDEM/NONDEM}} + \gamma_p^{\texttt{NONDEM/NONDEM}})D_{ijt}^{\texttt{NONDEM/NONDEM}} + \delta_0^\top \mathbf{Z}_{it} + \delta_1^\top \mathbf{Z}_{jt} + \delta_2^\top \mathbf{Z}_{ijt} + \delta_3^\top \mathbf{Z}_{ipt} \\ &+ \lambda M_{ipt} + \xi_p + \epsilon_{ijpt}, \qquad (4)\end{aligned}$$

where p indexes products at the chosen level of disaggregation. The proposed model in equation (4) distinguishes the direction of trade liberalization: $D_{ijt}^{\texttt{DEM/NONDEM}}$ is an indicator equal to 1 if the Polity IV score for importer i is 6 or above and the score for exporting partner j is below 6; $D_{ijt}^{\texttt{NONDEM/DEM}}$ and $D_{ijt}^{\texttt{NONDEM/NONDEM}}$ are defined similarly.

For an FTA between i and j that goes into effect in year t^*, we compare the degree of tariff reduction between $t^* - L$ and $t^* + F$ where L and F denote the length of lags and leads, respectively. This accounts for the possibility of anticipation effects as well as phase-in periods that are prevalent in trade agreements. To minimize excessive extrapolation into the future, we focus on the comparison of tariff rates immediately before and after each trade agreement by setting $L = F = 1$.[14] To simplify the notation, we denote the year prior to the FTA taking effect by t, i.e., $t = t^* - L$. Then $\Delta\tau_{ijpt}$ represents the change in tariffs (logged) for product p between year $t^* - L$ and $t^* + F$. $\mathbf{Z}_{it}$ and $\mathbf{Z}_{jt}$ represent covariates for the importer and exporter, including their log population and log GDP in year t. $\mathbf{Z}_{ijt}$ represents dyad-level covariates, including logged total trade volume between the two countries, log of the partner-specific mean tariff imposed by the importer across all industries, whether at least one of the pair is a major power, whether both parties were GATT/WTO members, as well as logged distance (in kilometers) between the two countries. $\mathbf{Z}_{ipt}$ provides a binary indicator for non-tariff barriers by i on product p in year t. To account for the fact that democracies might have lower overall tariff rates to begin with, we control for pre-existing tariff levels by including the pre-FTA MFN rates M_{ipt} for each product p. Finally, ξ_p is a product-specific intercept. As in the monadic analysis, we model the prior distribution of the product-varying coefficient $\gamma_p = \left[\ \xi_p,\ \gamma_p^{\texttt{DEM/NONDEM}},\ \gamma_p^{\texttt{NONDEM/DEM}},\ \gamma_p^{\texttt{NONDEM/NONDEM}}\ \right]$ to be Normally distributed: $\gamma_p \sim \mathcal{N}(\phi_{k[p]}, \Sigma_\gamma)$ and $\phi_k \sim \mathcal{N}(\mathbf{0}, \Sigma_\phi)$.

The quantities of interest are the differences in the degree of trade liberalization between democratic pairs (i.e., dyads in which both parties are democracies) and mixed dyads (i.e., one party is a democracy and the other is not):

$$\mathbb{E}[\Delta\tau_{ijpt} \mid D_{ijt}^{\texttt{DEM/NONDEM}}] - \mathbb{E}[\Delta\tau_{ijpt} \mid D_{ijt}^{\texttt{DEM/DEM}}] = \beta^{\texttt{DEM/NONDEM}} + \gamma_p^{\texttt{DEM/NONDEM}} \tag{5}$$

$$\mathbb{E}[\Delta\tau_{ijpt} \mid D_{ijt}^{\texttt{NONDEM/DEM}}] - \mathbb{E}[\Delta\tau_{ijpt} \mid D_{ijt}^{\texttt{DEM/DEM}}] = \beta^{\texttt{NONDEM/DEM}} + \gamma_p^{\texttt{NONDEM/DEM}} \tag{6}$$

where equation (5) compares a dyad with two democracies to a mixed dyad where the *importer* is a democracy and the export partner is not, and equation (6) compares a dyad with two democracies

[14] To account for more extensive phase-in periods as well as anticipation effects in trade agreements, we also check the robustness of our findings by setting $L = F = 3$. We find that the direction of bilateral trade liberalization is significant in this analysis as well.

to a mixed dyad where the *exporter* is a democracy and the import partner is not. We estimate equation (4) at HS2 and HS4 levels with Stan, using a variational approximation method to efficiently fit the HS4-level model.[15]

3.2.2 Empirical Results

We obtain data on preferential trade agreements from the WTO's Regional Trade Agreements Information System database. To make the analysis conceptually clean, we focus on bilateral FTAs in which there are only two parties to the agreement and in which both parties are sovereign states. We therefore include agreements such as the USA-Australia FTA but exclude North American Free Trade Agreement, the EU-Canada FTA, and the FTA between the members of the European Free Trade Association and the Southern African Customs Union, for example. Our dataset consists of 90 unique bilateral FTAs, provided in in Appendix B.[16]. Of these, 44 are signed between democratic dyads, 38 are mixed dyads, and 8 are non-democratic dyads. There are 36 unique parties to these 90 FTAs, of which 26 are democracies and 10 are non-democracies.

Our emphasis on bilateral FTAs arises from our interest in understanding how democratic institutions relate to the outcomes of trade negotiations. Certainly, countries that enter into trade negotiations are not a random sample from the population of all possible dyads, and therefore we emphasize that our estimand is *not* the difference in tariff reductions between the population of democratic pairs and mixed pairs in general. Rather, we are interested in differences in tariff reductions between dyad types among those dyads that successfully negotiate bilateral FTAs. This interest in the "intensive margin" of negotiated outcomes is the same premise that motivates the formal model developed by Mansfield, Milner, and Rosendorff (2000).

In order to make a direct comparison between our analysis and prior research, we estimate an undirected version of equation (4) of the form

$$\begin{aligned}\Delta\tau_{ijpt} = \alpha &+ (\beta^{\texttt{MIXED}} + \gamma_p^{\texttt{MIXED}})D_{ijt}^{\texttt{MIXED}} + (\beta^{\texttt{NONDEM/NONDEM}} + \gamma_p^{\texttt{NONDEM/NONDEM}})D_{ijt}^{\texttt{NONDEM/NONDEM}} \\ &+ \delta_0^\top \mathbf{Z}_{it} + \delta_1^\top \mathbf{Z}_{jt} + \delta_2^\top \mathbf{Z}_{ijt} + \lambda M_{ipt} + \xi_p + \epsilon_{ijpt}, \end{aligned} \tag{7}$$

which produces a comparable quantity of interest $\mathbb{E}[\Delta\tau_{ijpt} \mid D_{ijt}^{\texttt{MIXED}}] - \mathbb{E}[\Delta\tau_{ijpt} \mid D_{ijt}^{\texttt{DEM/DEM}}] = \beta^{\texttt{MIXED}} + \gamma_p^{\texttt{MIXED}}$, which is the tariff reduction for product p by mixed dyads compared to tariff

[15] We perform various diagnostics to check the convergence. See Appendix C for a representative set of traceplots.

[16] As Table B.1 shows, 19 of the bilateral FTAs are fairly recent, taking effect on or after 2010. Importers sometimes revise the data they previously reported to the WTO and UNCTAD, including revisions to tariff schedules. We periodically check the underlying databases for changes, and will update our analysis as the data are refreshed.

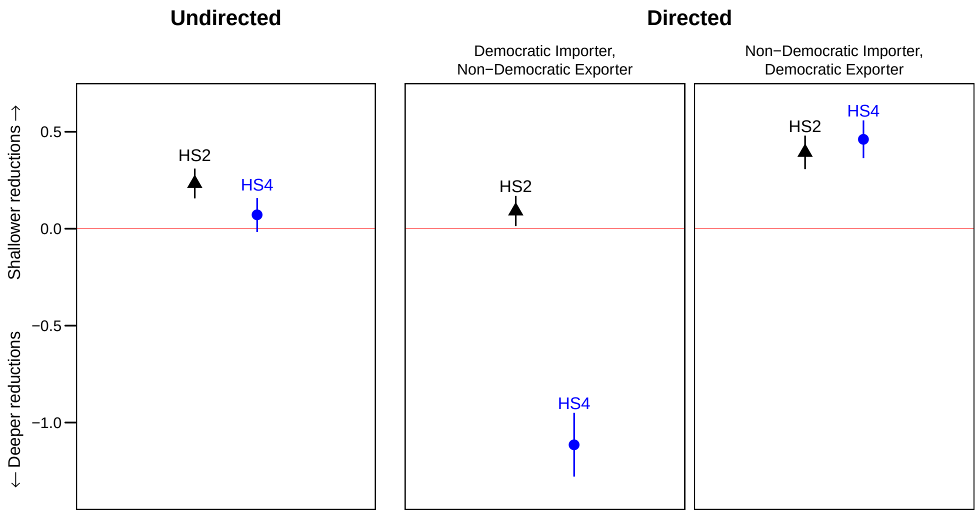


Figure 6: **Tariff Reductions by Dyad Type.** The left panel shows the difference in tariff reductions between mixed dyads (where one party to the FTA is a democracy and the other is a non-democracy) and democratic dyads. The right panel disaggregates mixed dyads into two types: one in which the importer is the democracy and one in which the exporter is the democracy. Black triangles indicate tariff reductions using HS2-level, and blue dots indicate tariff reductions using HS4-level tariff and volume measures (with 95% credible interval). The comparison is with a democratic dyad. The estimates suggest that the finding that mixed dyads achieve shallower tariff reductions than democratic dyads (far left panel) might be due to the fact that non-democratic importers give shallower concessions to democratic exporters than democratic importers give to democratic exporters (far right panel).

reduction by democratic dyads *without* distinguishing the direction of trade liberalization. The left panel in Figure 6 presents our estimates for the main effect $\beta^{\texttt{MIXED}}$ using HS2 and HS4 level data. Consistent with previous studies, we find that mixed dyads tend to give shower tariff reductions to each other than democratic dyads when they sign an FTA, although the difference is not statistically significant at the HS4 level, suggesting potential aggregation bias.[17]

To better understand this finding, we decompose the *direction* of trade liberalization among FTA partners. The right panel in Figure 6 ("Directed") reports the posterior mean and 95% credible intervals of the main effects $\beta^{\texttt{DEM/NONDEM}}$ and $\beta^{\texttt{NONDEM/DEM}}$ given in equations (5) and (6) using the HS2 and HS4 levels data. First, we examine whether democratic importers engage in deeper trade liberalization when their export partner is a democracy or a non-democracy. This corresponds to the estimates on the left-hand side ("Democratic Importer, Non-Democratic Exporter") in the panel. We find that, in fact, democratic importers tend to engage in deeper tariff reductions when their export partner is a non-democracy rather than a democracy when we analyze the data at

[17] Our model also allows us to compare pairs of non-democracies to pairs of democracies. We find that the former engages in deeper liberalization than the latter (-0.34 log points), although this estimate is likely to be noisy given the small number of FTAs involving non-democratic pairs in our data.

the HS4 level. Second, we consider whether democratic exporters achieve better market access when their import partner is a democracy or a non-democracy. As shown in the right-hand side ("Non-Democratic Importer, Democratic Exporter") in the panel, we find that tariff reductions are smaller when non-democratic importers partner with democratic exporters than when democratic importers partner with democratic exporters. The magnitude of the difference is larger with more granular tariff data at the HS4 level.

Finally, we explore the complex bilateral strategic incentives among FTA partners at a granular level. Figure 7 presents our estimates of the industry-varying effects: $\beta^{\texttt{DEM/NONDEM}} + \gamma_p^{\texttt{DEM/NONDEM}}$ in panel (a) and $\beta^{\texttt{NONDEM/DEM}} + \gamma_p^{\texttt{NONDEM/DEM}}$ in panel (b). Consistent with Figure 6, panel (a) of Figure 7 shows that mixed pairs with a democratic importer engage in *deeper* tariff reductions than pairs of democracies. At the HS2 level, the estimated effects are significant for the agriculture and metals industries, while other industries exhibit small but similar changes. This pattern is more prominent at the HS4-level, where most estimates are negative and statistically significant. Panel (b) at the bottom shows that mixed pairs with a non-democratic importer engage in *shallower* tariff reductions than pairs of democracies. Again, our findings are consistent across HS2 and HS4 industries.

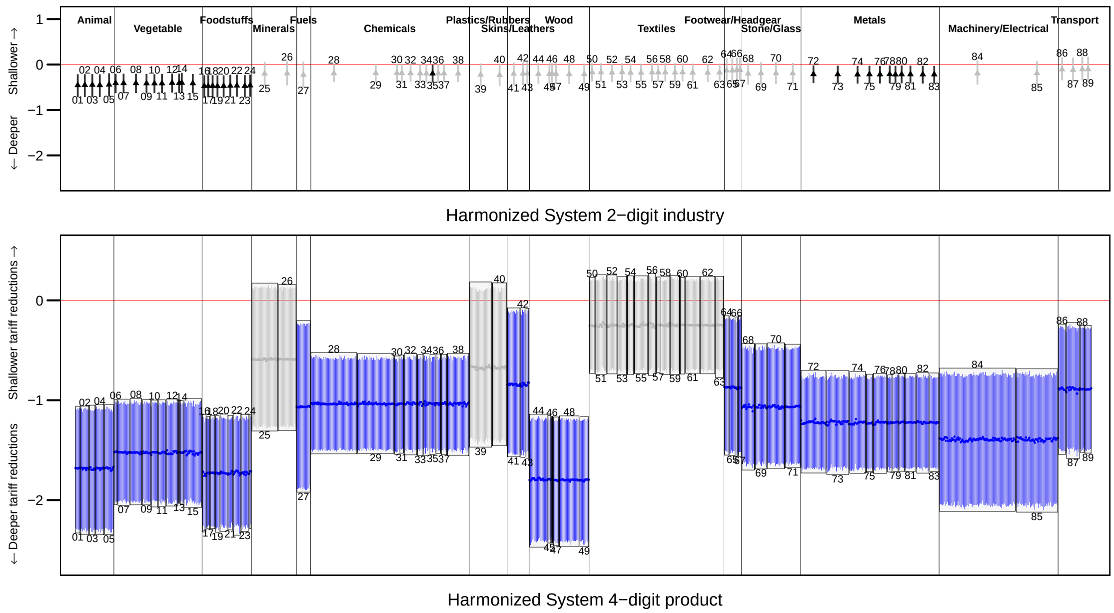
Differentiating capital, intermediate, and capital goods echoes the monadic finding: democracies engage in shallower cuts (deeper protectionism) of consumption and intermediate goods relative to capital goods, while non-democracies privilege capital goods. The same result holds when using the GVC-based measure of downstreamness.[18]

4 Concluding Remarks

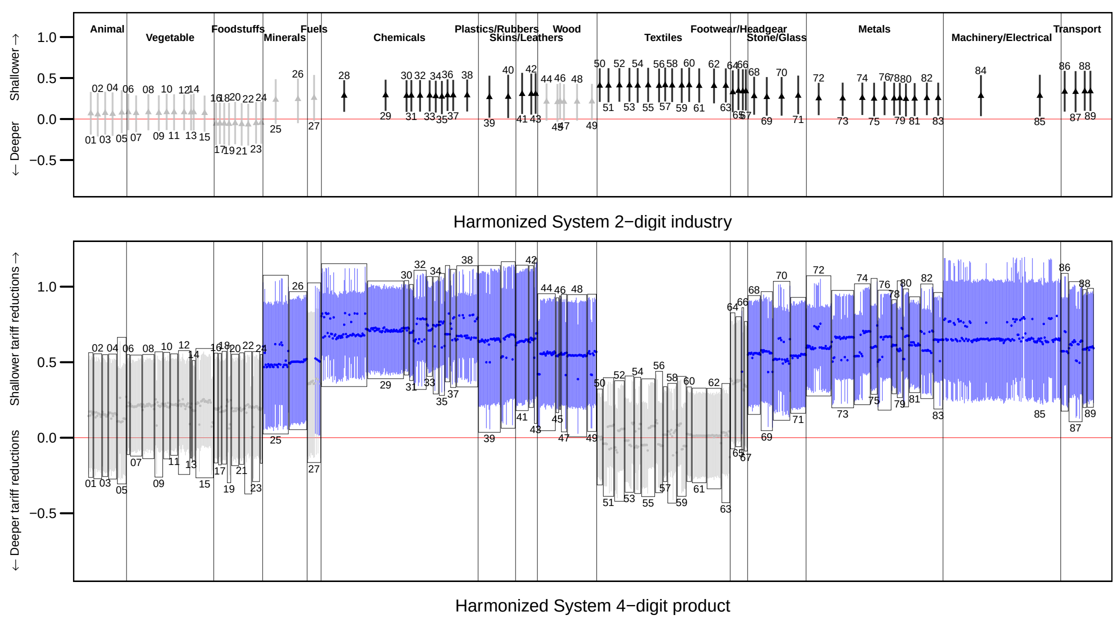
In this paper, we present a novel dataset with nearly 6 billion observations of product-level applied tariff rates that countries levy on their trading partners, incorporating the universe of preferential rates and the Generalized System of Preferences. To do so, we combine and augment existing datasets available from the WTO and UNCTAD, and we resolve conflicting information between the two. Our dataset lays an important empirical foundation for investigating trade politics at a much more granular level than has previously been done.

To illustrate the importance of product-specific policy measurement, we examine an enduring question in international political economy: are there systematic differences in trade policy in

[18]See Figure D.4 for coefficient estimates.



(a) Democratic Importer, Non-Democratic Exporter



(b) Non-Democratic Importer, Democratic Exporter

Figure 7: **Mixed Dyads Compared to Democratic Dyads.** Panel (a) shows that a democratic importer tends to give deeper tariff reductions to their non-democratic partners than they do to their democratic partners. We find significant effects in the agriculture and metals industries at the HS2 level, while most estimates achieve statistical significance at the HS4 level. Conversely, Panel (b) shows that a non-democratic importer tends to give shallower tariff reductions to a democratic export partner than a democratic importer gives to a democratic export partner.

countries with different regime types? We find that democracies do not have lower tariff rates than non-democracies consistently across all industries and products. That is, focusing on the country- or sector-level averages elides substantial heterogeneity. We document empirically that democracies are more protective than non-democracies for many industries, notably agriculture and textile. Furthermore, we offer the first product-level estimates of how political regimes affect trade liberalization, finding significant variations across products even within the same industry. Specifically, we show that democracies tend to impose higher tariffs on consumer products such as agricultural goods than non-democracies do, while democracies' tariffs on intermediate goods are lower than non-democracies'. Our findings demonstrate that analysis at the country or industry level can result in aggregation bias, a problem that the use of granular units of analysis remedies.

Our data also allows researchers in the fields of international and comparative political economy to track fine-grained temporal changes in partner-specific trade policy. In particular, we examine whether interactions between regime types at the dyad level result in differences in the degree of bilateral trade liberalization. Our analysis of 90 bilateral FTAs, based on a difference-in-differences design, partially confirms prior findings that democratic pairs achieve greater tariff reductions than mixed pairs with a democracy and a non-democracy. However, when we look more closely at who is the recipient of concessions, we find that the difference between democratic pairs and mixed pairs is due in large part to shallower concessions granted by non-democratic importers to democratic partners, but not vice-versa. Put another way, a democratic importer gives deeper concessions to a non-democratic partner than it would to a democratic partner. Future studies would benefit from investigating these empirical findings with a theoretical focus on the direction of trade liberalization.

To further explore linkages between political institutions and industry-level trade policies, our dataset can be combined with industry-level covariates, such as import and export concentration, as well as country-specific industry structures. It can also be used to study the increasing complexity of product-level trade policy, which affects the deepening of global supply chain and production networks. In addition, as other scholars have pointed out, there exists significant variation in institutional structures within democracies and non-democracies (Rickard, 2015; Geddes, Wright, and Frantz, 2014). Differences in the scale and scope of support coalitions that a government needs to assemble are likely to result in different configurations of demands for trade protection. Research into the relationships between political institutions and trade policies continues to be relevant as policymakers around the world re-evaluate the merits of trade liberalization and re-negotiate existing trade agreements in response to pressures from their constituents. The question is not so much whether there will be more or less liberalization, but rather which products and industries will be most exposed to a review of trade policies. This article presents findings that contribute to this research agenda.

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Appendix A Product-level Tariff Dataset

A.1 Bilateral Tariff Data Collection and Processing

A tariff-line is a numeric code that each importer uses to identify a unique product. For a given product, tariff-lines can differ from country to country; however, the first six digits of the tariff-line are internationally standardized under the Harmonized System.

There are two existing sources of tariff-line data: the WTO's Integrated Database (IDB), publicly accessible at the WTO's public Tariff Analysis Online (TAO) facility, and UNCTAD's Trade Analysis Information System (TRAINS), publicly accessible at the World Bank's World Integrated Trade Solution (WITS) website.[19] Together they form a comprehensive collection of ad valorem and non-ad valorem tariff rates across all WTO countries and Harmonized System products from 1988 to the present.

To compile this universe of tariffs, we first web-scrape tariff-lines for all available importers and years. An observation in this dataset is a tariff imposed in a given year by an importer on a product imported from a country (e.g. Republic of Korea) or a group of countries (e.g. NAFTA, Mercosur, WTO members). Where the tariff affects a group of countries, we identify the members of the group and expand the observation so that each new observation is a dyad with an importer and exporter. Finally, for each resulting (year, importer, exporter, tariff-line) we compare duties from IDB and TRAINS to select the most likely applied duty using the algorithm detailed in Appendix A.2.

Figure A.1 illustrates the data collection, processing, and merging steps in our tariff dataset creation using an example United States tariff-line. The next sections detail each of these steps for IDB and TRAINS respectively. To further clarify each step, we use a recurring example tariff-line: The United State's (USA) 2013 tariff on HS product `62011330` (Overcoats, raincoats, car-coats, capes, cloaks and similar articles) from South Africa (ZAF). Notably, this particular tariff-line is a beneficiary of the African Growth and Opportunity Act (AGOA) enacted by the U.S. in 2000.

A.1.1 WTO IDB Duty Collection and Processing

We perform the following steps to collect and process IDB duties:

> **Step 1. (Web scrape product-level duties)** For each year and importer, we scrape all IDB product-level applied tariffs available through WTO's public Tariff Analysis Online (TAO) facility. Each duty is identified by its year, importer, and Harmonized System product code and contains information on its specific beneficiary group as well as the rate applied. E.g.,
>
> We acquire two different reported duties from IDB for American imports of overcoat-like apparels from WTO countries (including South Africa) in 2013.
>
> **Step 2. (Parse compound and mixed tariff rates)** In IDB, all tariff-lines with compound or mixed rates (rates that have both an ad valorem and non ad valorem component) have a

[19] TAO's URL is `http://tao.wto.org`, and WITS's URL is `http://wits.worldbank.org`

Year	Imp.	Code	Full description	Type	Reported rate
2013	USA	`62011330`	"MFN applied duty rate"	02	49.7 cents/kg + 19.7%
2013	USA	`62011330`	"General duty rate"	80	52.9 cents/kg + 58.5%

`NULL` in the field for the numerical duty rate. Rather than discarding these complex tariffs, we parse the ad valorem component from the reported rate text and use it as a approximation of the full duty rate. E.g.,

Year	Imp.	Code	Full description	Type	Reported rate (≈ imputed AVE)
2013	USA	`62011330`	"MFN applied duty rate"	02	49.7 cents/kg + 19.7% (≈ **19.7**%)
2013	USA	`62011330`	"General duty rate"	80	52.9 cents/kg + 58.5% (≈ **58.5**%)

We now have an approximate 'ad valorem equivalent' rate imputed for these and all other IDB mixed/compound duty rates.

Step 3. (Disaggregate duty beneficiaries to countries) Each duty has a type field and description field that uniquely indicates its specific beneficiary which may be a country (e.g. `Preferential rate for Canada`), members of an agreement (e.g. `North-American Free Trade Agreement`), or a group of countries (e.g. `G16`). We use a mix of hand-coding from official materials and string matching with country names and regional trade agreement titles in order to map each duty type appearing in IDB data to its respective set of countries. [20] E.g.,

Year	Imp.	Exp.	Code	Full description	Type	Reported rate (≈ imputed AVE)
2013	USA	**ZAF**	`62011330`	"MFN applied duty rate"	02	49.7 cents/kg + 19.7% (≈ 19.7%)
2013	USA	**ZAF**	`62011330`	"General duty rate"	80	52.9 cents/kg + 58.5% (≈ 58.5%)

We find that both IDB duty types stipulate South Africa as a beneficiary.

A.1.2 UNCTAD TRAINS Duty Collection and Processing

Likewise, we perform the following corresponding steps for TRAINS tariffs:

Step 1. (Web scrape product-level duties) For each year, we scrape all TRAINS product-level tariffs available through the WITS web site. E.g.,

[20] We use official preference beneficiaries for many tariff measures from `https://wits.worldbank.org/WITS/WITS/Support+Materials/TrfMeasures.aspx?Page=TfMeasures`. We map beneficiaries of regional trade agreements from the Regional Trade Agreements Information System (RTA-IS) publicly accessible at `https://rtais.wto.org`.

Year	Imp.	Code	Full description	Type	Reported rate (≈ UNCTAD AVE)
2013	USA	`62011330`	"Most Favoured Nation duty rate treatment"	002	49.7 cents/kg + 19.7% (≈ 21.22%)
2013	USA	`62011330`	"AGOA preference on certain textiles and apparel for eligible countries"	051	0.0%

We find two different duties applicable to 2013 American imports of HS product `62011330` from South Africa. Unlike IDB however, TRAINS reports a preferential rate (AGOA). Also unlike IDB, TRAINS provides its own ad valorem equivalent (`21.22%`) for the compound MFN tariff (`49.7 cents/kg + 19.7%`).

Step 2. (Disaggregate duty beneficiaries to countries) Using a combination of a region-to-countries mapping and a type-to-countries mapping, both provided by the World Bank, we expand each beneficiary-level duty to its disaggregated partner-specific duties. E.g.,

Year	Imp.	Exp.	Code	Full description	Type	Reported rate (≈ UNCTAD AVE)
2013	USA	**ZAF**	`62011330`	"Most Favoured Nation duty rate treatment"	002	49.7 cents/kg + 19.7% (≈ 21.22%)
2013	USA	**ZAF**	`62011330`	"AGOA preference on certain textiles and apparel for eligible countries"	051	0.0%

Again, we find that both the duties found in TRAINS stipulate South Africa as a beneficiary.

Performing these procedures, we acquire 4.1 billion IDB and 4.7 billion TRAINS product-level partner-specific duties. However, as noted in our example, for each (year, importer, exporter, product) we may have multiple conflicting duties, of which only one is actually applied. In the next section, we describe the merging algorithm used to solve this problem.

A.2 Tariff Merging Algorithm

A given (year, importer, exporter, industry) query may return multiple possible duties from the WTO IDB database and the UNCTAD TRAINS database. In some cases, both sources agree on an ad valorem rate, but TRAINS provides a more informative specific duty rate. In other cases, TRAINS correctly accounts for a compound or mixed rate while IDB does not. Moreover, for some years, one source correctly retrieves a newly enforced preferential rate while the other mistakenly reports previous years' Most Favored Nation (MFN) duty rate. Finally, for all non-ad valorem tariffs, TRAINS provides an ad valorem equivalent (AVE) rate using a custom statistical method that allows comparisons to be made between products with ad valorem and non-ad valorem rates. For such tariffs, IDB only provides the original non-ad valorem rate which is typically less informative for trade researchers.

The goal of the merging algorithm is to account for all of these cases in order to select the single most accurate and informative duty that an importer applies to a industry and partner in a given year. We illustrate how this is done using the previous example of United States' 2013 tariff on HS product `62011330` from South Africa. In this case, it is clear that United States, in practice, applies the preferential AGOA duty rate over the Most Favored Nation duty rate. Our algorithm correctly picks this rate in three steps:

Step 1. (Pick IDB candidate) If there are any preferential IDB duties for the given tariff-line, pick the preferential duty with the lowest rate. Otherwise, pick the non-preferential duty with the lowest rate. When picking from either set, sort duties using the ad valorem rate (or the imputed AVE in the case of mixed/compound tariffs); if no duties in the set have an ad valorem component, sort using the parsed specific rate. E.g.

Year	Imp.	Exp.	Code	Full description	Type	Reported rate (≈ imputed AVE)
2013	USA	ZAF	`62011330`	"MFN applied duty rates"	02	49.7 cents/kg + 19.7% (≈ 19.7%)
2013	USA	ZAF	`62011330`	"General duty rate"	80	52.9 cents/kg + 58.5% (≈ 58.5%)

In this case, since there are no preferential duties reported by IDB, we pick the lower of the non-preferential duties using the imputed AVE values.

Step 2. (Pick TRAINS candidate) If there are any preferential TRAINS duties for the given tariff-line, pick the preferential duty with the lowest rate. Otherwise, pick the non-preferential duty with the lowest rate. When picking from either set, sort duties using the ad valorem rate (either the reported ad valorem rate or the AVE imputed by UNCTAD). E.g.,

Year	Imp.	Exp.	Code	Full description	Type	Reported rate (≈ UNCTAD AVE)
2013	USA	ZAF	`62011330`	"Most Favoured Nation duty rate treatment"	002	49.7 cents/kg + 19.7% (≈ 21.22%)
2013	USA	ZAF	`62011330`	"AGOA preference on certain textiles and apparel for eligible countries"	051	0.0%

Since there is only a single preferential duty, we select it as the best TRAINS candidate.

Step 3. (Select between candidates) Given the best IDB and TRAINS candidate duties, if one is preferential and the other is not, select the duty that is preferential. If both are either

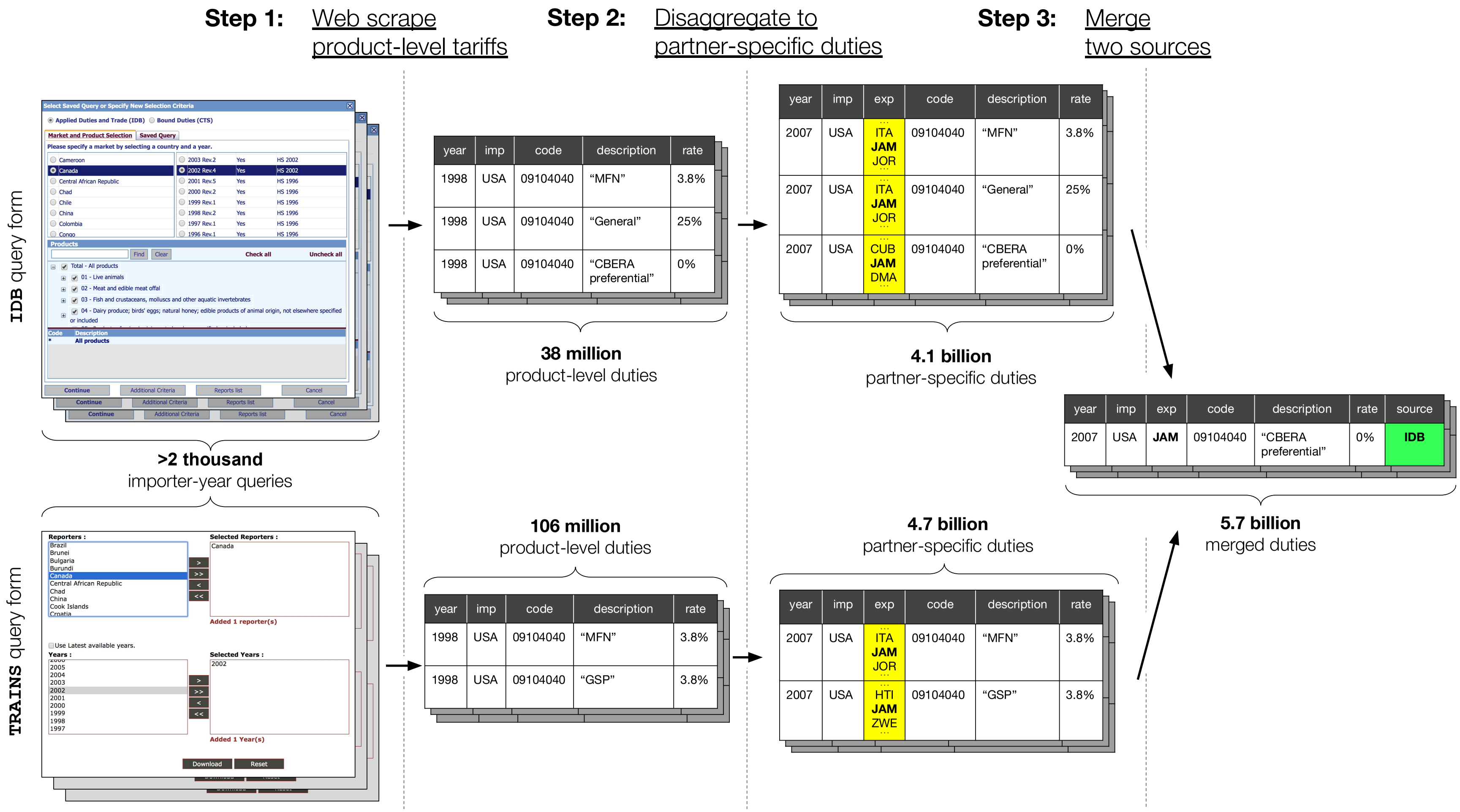


Figure A.1: **Tariff-line Dataset Creation.** This figure illustrates the process of creating our industry-level partner-specific tariff dataset. As an example, we show how we produce the 1998 U.S. duty on Jamaican imports of Ginger, saffron, turmeric (curcuma), thyme, bay leaves, curry and other spices (HTS subheading `09104040`). First, we scrape tariffs across all available importers and years using the public web forms for IDB and TRAINS. Then, we use the tariff beneficiary description (shown as `description`) to find all tariffs whose beneficiary group includes Jamaica. As shown, each database is missing a duty that the other contains. IDB contains an MFN duty, a general duty, and a preferential duty, but not the GSP duty; TRAINS contains a MFN duty and a GSP duty, but not the preferential duty. Finally, to select the duty among these candidates that is most likely applied in practice, we use a custom merging algorithm described in Appendix A.2. In this case, Jamaica enjoys a zero tariff due to a preferential Caribbean Basin Economic Recovery Act (CBERA) duty, which supersedes both the MFN and GSP rates.

non-preferential or preferential and the TRAINS candidate has an imputed AVE, select the TRAINS candidate. Otherwise, select the candidate with the lowest ad valorem rate. If either a TRAINS or IDB candidate could not be found, select the candidate that is available. E.g.,

Year	**Imp.**	**Exp.**	**Code**	**Original description**	**Final applied rate**	**Source**
2013	USA	ZAF	`62011330`	"MFN applied duty rates"	49.7 cents/kg + 19.7% (≈ 19.7%)	IDB
2013	USA	ZAF	`62011330`	"AGOA preference on certain textiles and apparel for eligible countries"	0.0%	TRAINS

Since TRAINS provides a preferential rate and IDB does not, we select the TRAINS candidate as the applied duty for this tariff-line.

The result is a unique tariff for each (year, importer, exporter, product) query. In sum, this procedure merges 4.1 billion IDB duties with 4.7 billion TRAINS duties to produce 5.7 billion 'resolved' bilateral tariffs.[21] Figure A.2 summarizes the coverage of the resulting tariff-line dataset for each WTO importer and year.

[21] We implement this procedure as a distributed SQL operation on the Hadoop big data ecosystem. Overall, this operation takes more than 72 hours to complete on a 10 node computing cluster (256 GB RAM per node, 24 CPU per node) and the resulting un-indexed dataset is more than 900 GB in size.

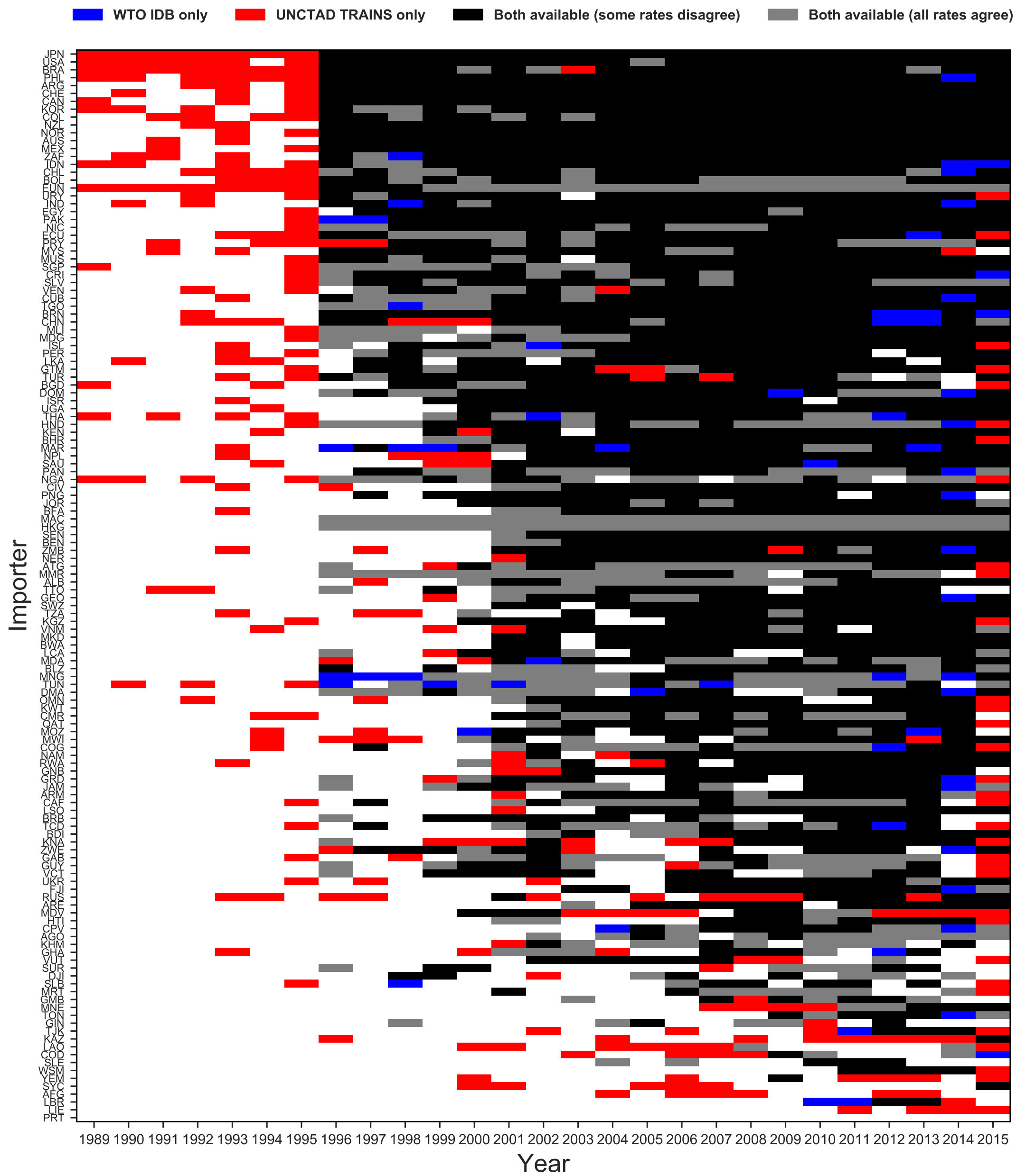


Figure A.2: **Data Availability across Importers and Years.** This figure summarizes the availability of our data for each WTO importer and year. Although the large number of missing import-year observations from both primary sources (white cells) prevents our dataset from being fully comprehensive, it shows that our dataset covers tariff policies for all major participants of global trade (top 50 trading countries in volume) starting in 1995. Moreover, we make several improvements by combining data from the two available sources (red and blue cells) and resolving various discrepancies where the sources may conflict (black cells). Altogether, we compile 2,476 WTO importer-year tariff profiles (3,080 importer-year profiles overall) from the WTO Integrated Database (IDB) and the UNCTAD Trade Analysis Information System (TRAINS). As illustrated in this figure, less than 50% of these observations are available from both sources where the reported duty rates agree. Appendix A.1 explains data collection and processing in detail.

Appendix B List of Bilateral FTAs

Table B.1: List of Bilateral Free Trade Agreements

Panel A: Non-Democratic Pairs		
Armenia	Ukraine	1994
Azerbaijan	Ukraine	1994
Ukraine	Uzbekistan	1994
Jordan	Singapore	2003
Morocco	Turkey	2004
Egypt	Turkey	2005
China	Singapore	2007
Jordan	Turkey	2009

Panel B: Mixed Pairs		
Georgia	Ukraine	1994
Israel	Turkey	1995
Georgia	Turkmenistan	1998
Macedonia	Turkey	1998
Jordan	United States	1999
New Zealand	Singapore	1999
Japan	Singapore	2000
Australia	Singapore	2001
Singapore	United States	2002
Australia	Thailand	2003
Moldova	Ukraine	2003
New Zealand	Thailand	2003
Tunisia	Turkey	2003
Bahrain	United States	2004
Chile	China	2004
Japan	Malaysia	2004
South Korea	Singapore	2004
Morocco	United States	2004
Panama	Singapore	2004
China	Pakistan	2005
Japan	Thailand	2005
Albania	Turkey	2006
China	New Zealand	2006
Georgia	Turkey	2006
Malaysia	Pakistan	2006
Peru	Singapore	2007
Oman	United States	2007

Table B.1: Continued on next page

Table B.1 – *Continued from previous page*

China	Peru	2008
Montenegro	Turkey	2008
China	Costa Rica	2009
Canada	Jordan	2010
Chile	Malaysia	2010
Australia	Malaysia	2011
Costa Rica	Singapore	2011
South Korea	Turkey	2011
Montenegro	Ukraine	2011
Mauritius	Turkey	2011
Switzerland	China	2012
Panel C: Democratic Pairs		
Colombia	Mexico	1993
Canada	Chile	1995
Canada	Israel	1995
Chile	Mexico	1997
Israel	Mexico	1998
Canada	Costa Rica	2000
Chile	Costa Rica	2000
Chile	El Salvador	2000
Panama	El Salvador	2001
Chile	South Korea	2002
Mexico	Uruguay	2002
Chile	United States	2002
Australia	United States	2003
Japan	Mexico	2003
Sri Lanka	Pakistan	2003
Chile	Japan	2005
Mauritius	Pakistan	2005
Costa Rica	Panama	2006
Indonesia	Japan	2006
Japan	Philippines	2006
Chile	Panama	2006
Australia	Chile	2007
Canada	Peru	2007
Switzerland	Japan	2007
Chile	Colombia	2007
Guatemala	Panama	2007
Honduras	Panama	2007
Nicaragua	Panama	2007
Chile	Peru	2007
Peru	United States	2007

Table B.1: Continued on next page

Table B.1 – *Continued from previous page*

Chile	Guatemala	2008
Canada	Colombia	2009
South Korea	Peru	2009
Colombia	United States	2010
Japan	Peru	2010
South Korea	United States	2010
Mexico	Peru	2010
Chile	Nicaragua	2010
Panama	Peru	2010
Panama	United States	2010
Canada	Panama	2011
Costa Rica	Peru	2011
Canada	Honduras	2012
Australia	South Korea	2012

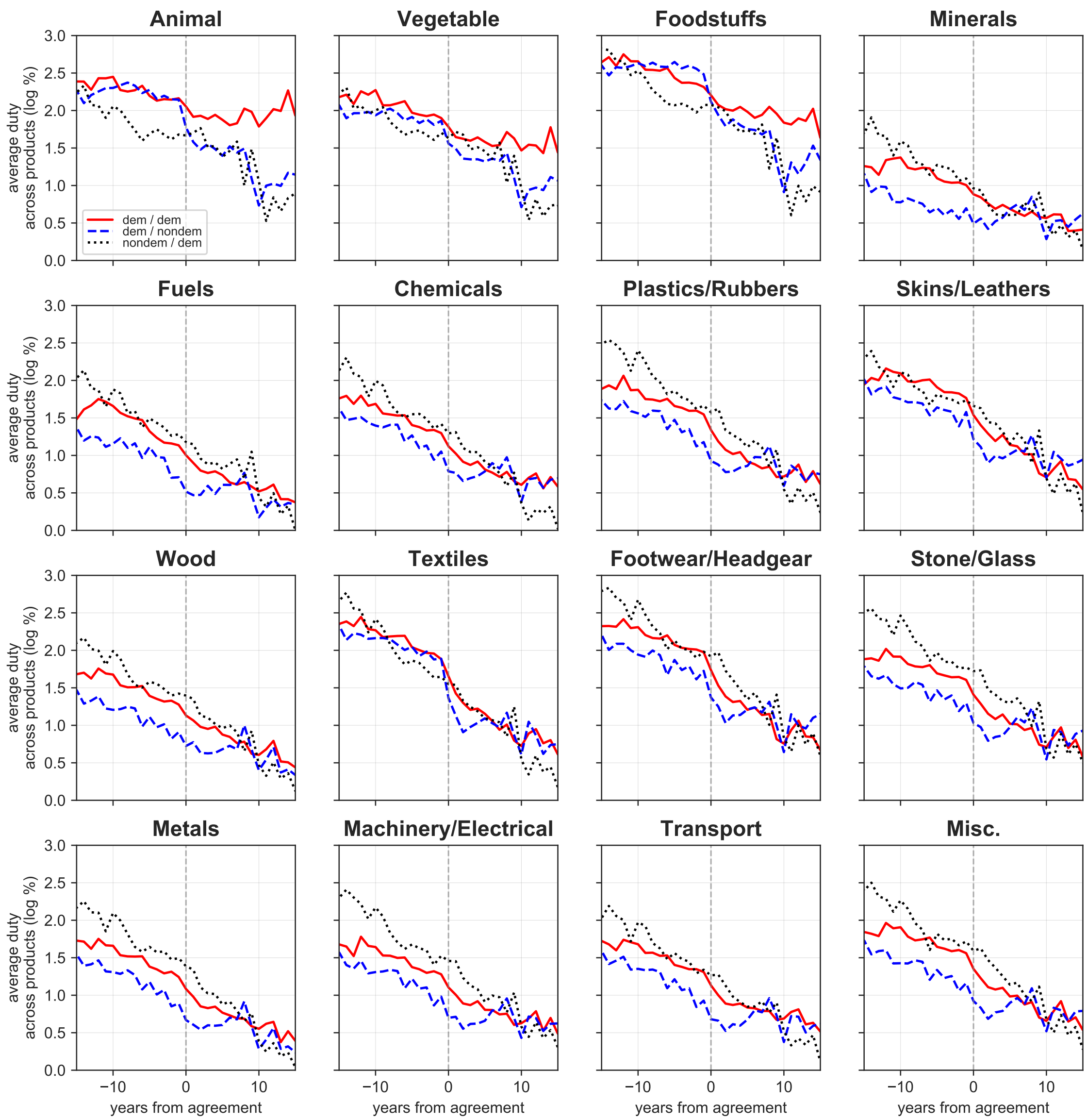


Figure B.1: **Tariff Reduction Trajectories by Industry and Dyad Type.** This plot shows the average logged HS 4-digit level tariffs between FTA partners over time across different industries (HS 2-digit) and dyad type. For instance, the solid red line indicates average industry-specific tariffs before and after an FTA when both FTA partners are democracies, while the blue dashed line summarizes agreements where the importer is a democracy and the exporter is a non-democracy. Due to the relative sparsity of free trade agreements between non-democracy pairs, we exclude them from the set of dyads in this figure.

Appendix C Alternative Specifications and Diagnostics

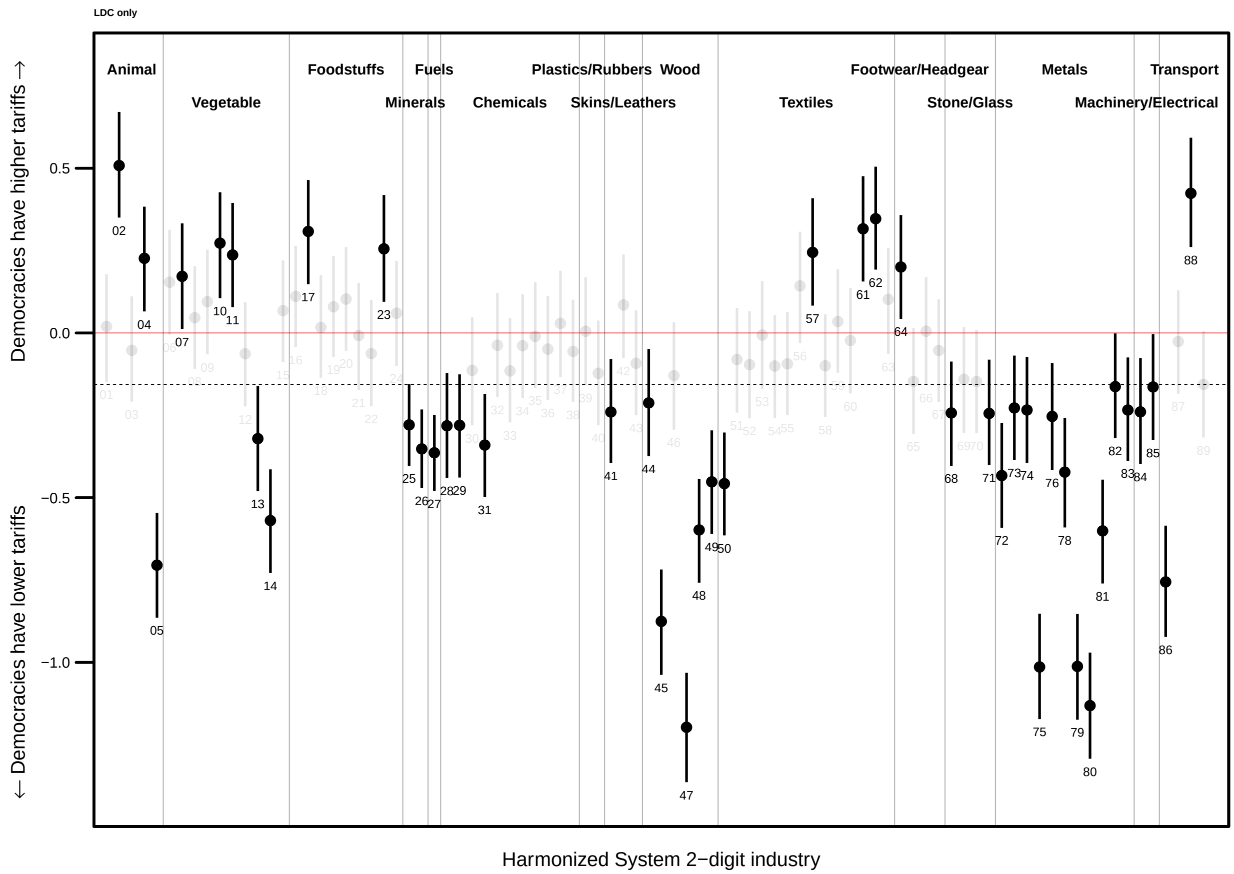
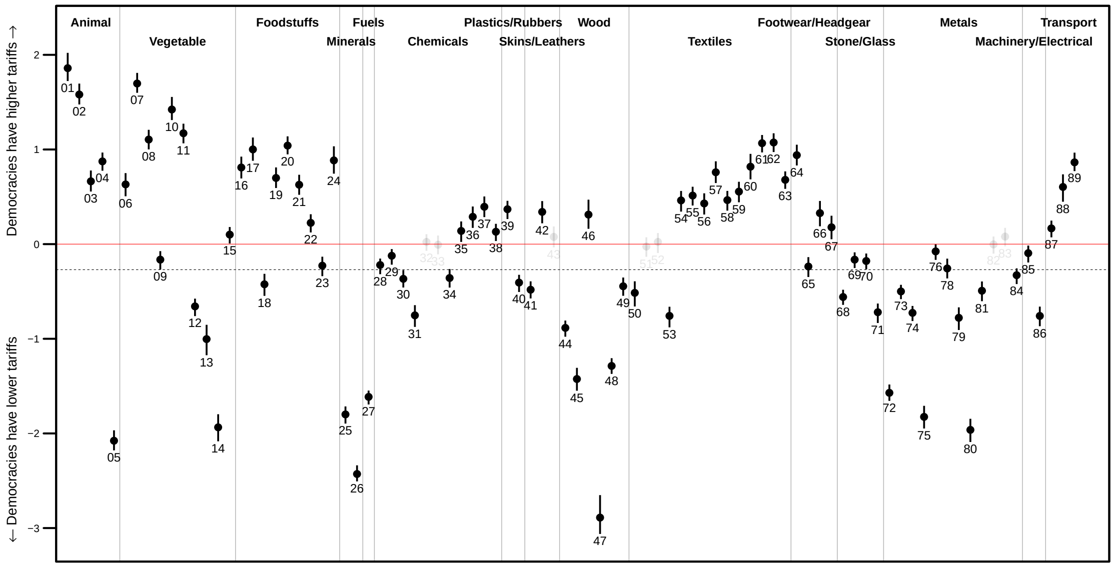
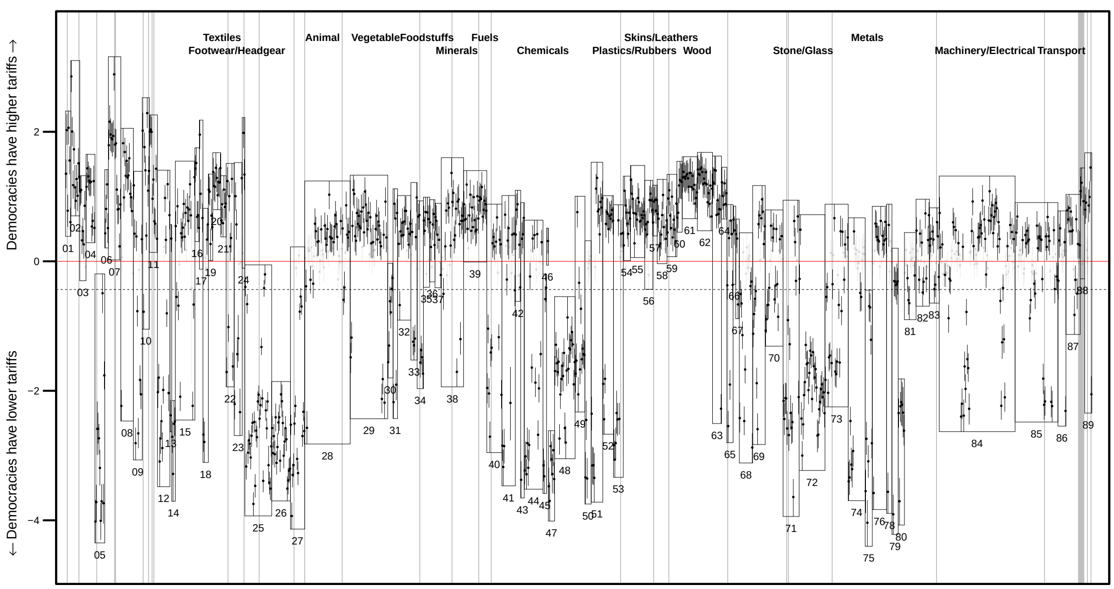


Figure C.1: **Effect of Democracy on Log Tariffs, Less-Developed Countries.** This plot presents posterior means and 95% credible intervals for the estimated effects of democracy on trade policy for each HS2 industry. The Harmonized System 2-digit chapter codes are given at the bottom of each estimate.

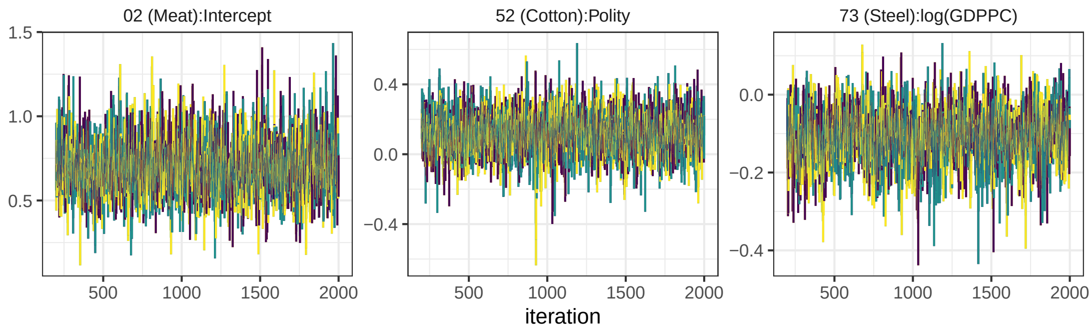


(a) HS 2-digit level

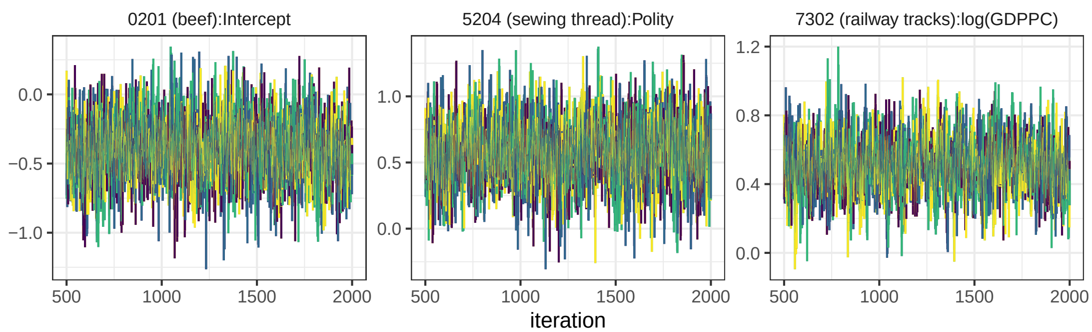


(b) HS 4-digit level

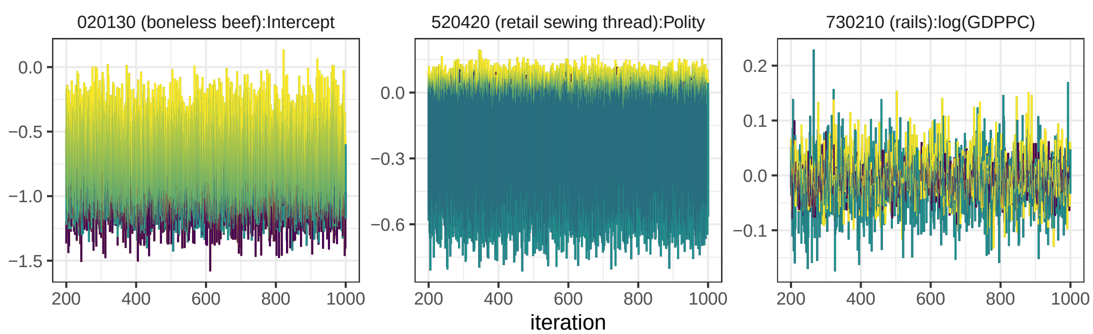
Figure C.2: **Effect of Democracy on Log Tariffs, Variational Bayes Results.** This plot presents posterior means and 95% credible intervals for the estimated effects of democracy on tariff rates for all HS2 chapters and HS4 headings using Variational Bayes (VB) rather than Hamiltonian Monte Carlo (HMC). The advantage of VB over HMC is a significant gain in computational speed which facilitates easier replicability: VB takes approximately 20 minutes to converge for both the HS2 and HS4 monadic models, while HMC takes 1 day and approximately 3 weeks for the HS2 and HS4 monadic models respectively. The disadvantage is that there no exact convergence guarantees. A comparison with Figures 2 and 3 shows that our substantive findings do not significantly change, however the magnitude of effect sizes does.



(a) HS 2-digit (HMC)



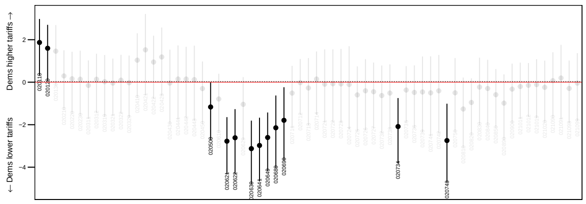
(b) HS 4-digit (HMC)



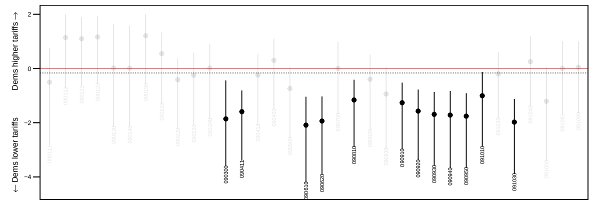
(c) HS 6-digit (VB)

Figure C.3: **Effect of Democracy on Log Tariffs, Model Traceplots.** Panels show the four Markov chain traces of all three product-specific coefficients estimated for a set of representative products p (γ_p in equation 1). Panel (a) corresponds to a subset of model results in Figure 2, panel (b) corresponds to Figure 3, and panel (c) corresponds to Figures D.1 and 5. Thus, each row shows the same product-specific coefficient at varying levels of Harmonized System classification.

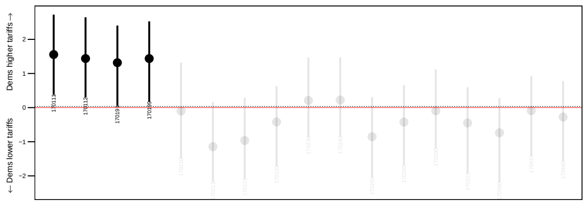
Appendix D Harmonized System 6-digit Analysis



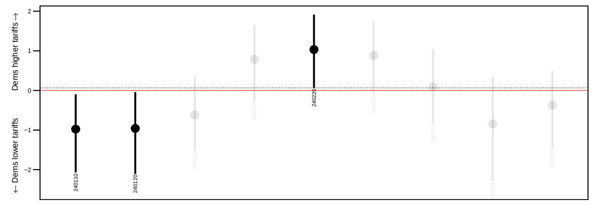
(a) Meat products (HS2: `02`)



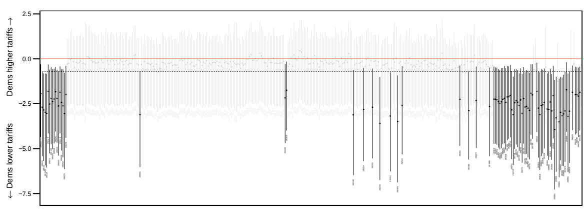
(b) Coffee/tea products (HS2: `09`)



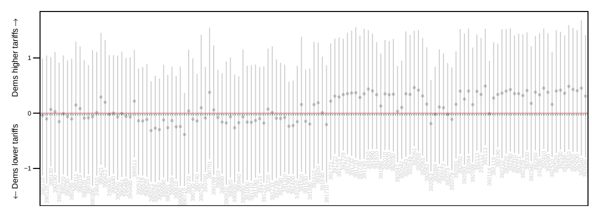
(c) Sugar products (HS2: `17`)



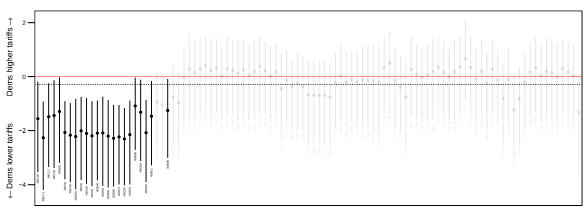
(d) Tobacco products (HS2: `24`)



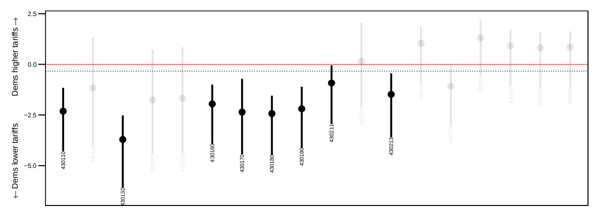
(e) Organic chemical products (HS2: `29`)



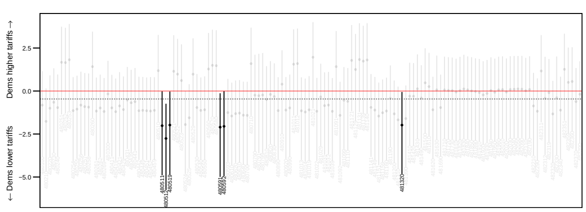
(f) Plastic products (HS2: `39`)



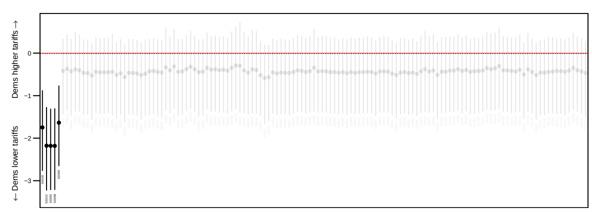
(g) Rubber products (HS2: `40`)



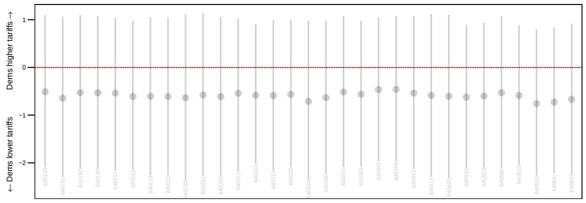
(h) Furskin products (HS2: `43`)



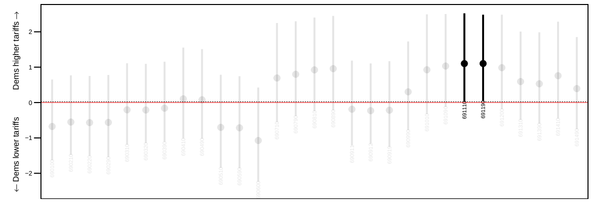
(i) Paper products (HS2: `48`)



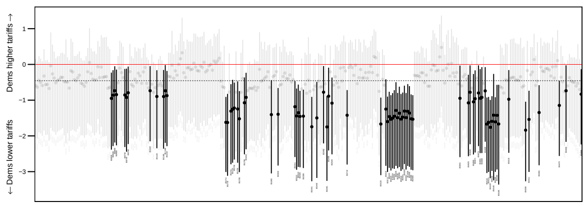
(j) Cotton products (HS2: `52`)



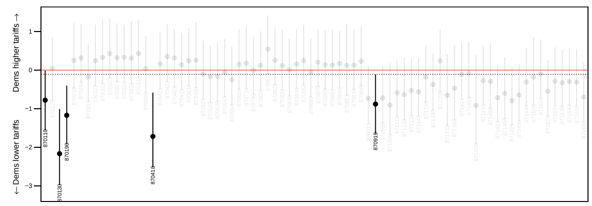
(k) Footwear products (HS2: 64)



(l) Ceramic products (HS2: 69)



(m) Electrical machinery products (HS2: 85)



(n) Vehicle products (HS2: 87)

Figure D.1: **Effect of Democracy on HS6 Log Tariffs, Controlling for NTBs.** This plot presents posterior means and 95% credible intervals for the estimated effect of democracy on tariff rates for HS6 products in a representative set of HS2 industries across various Harmonized System Sections. The replication material includes all the estimates as well as their posterior samples for each HS6 product.

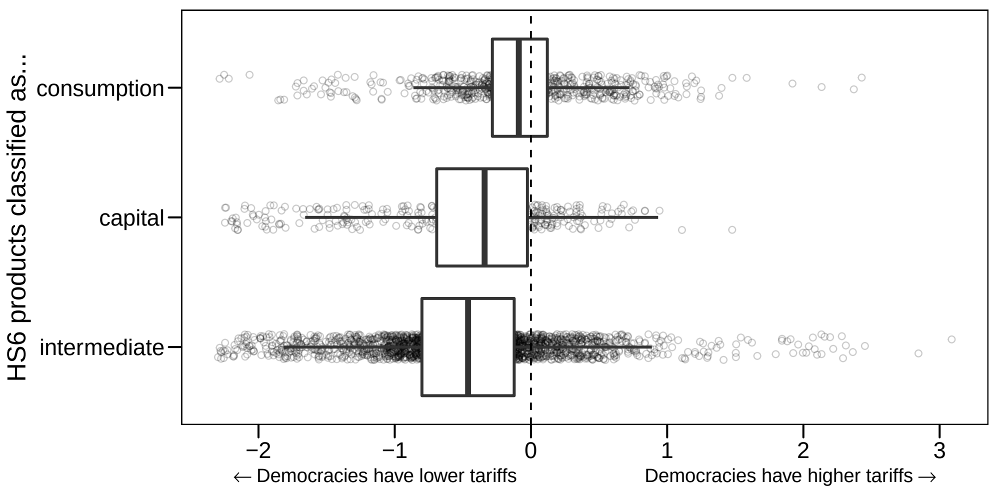
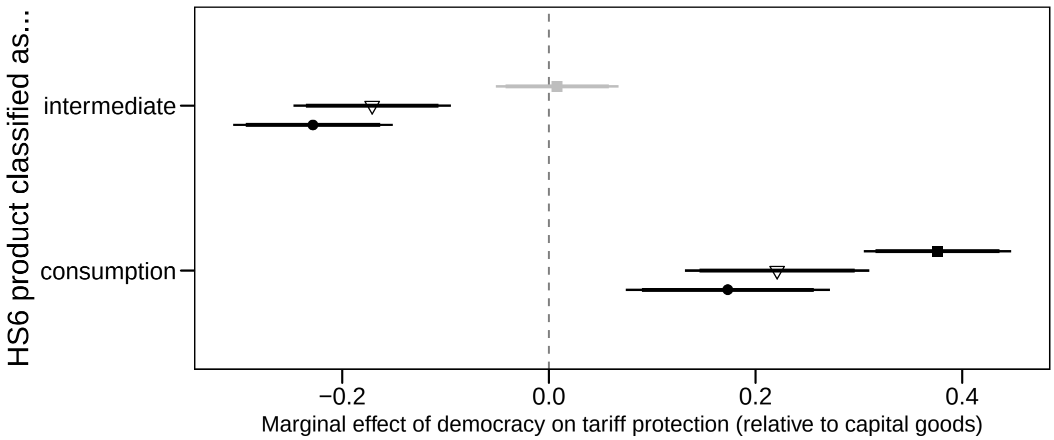
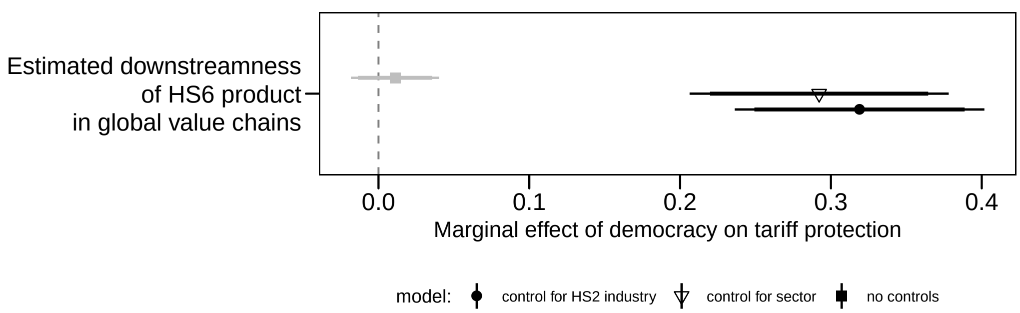


Figure D.2: **Effect of Democracy on HS6 Log Tariffs, Products Grouped by BEC.** This plot describes the posterior means of estimated effects of democracy on trade policy for all HS6 products across all HS2 industries (a more complete set than Figure D.1) where each HS6 product is categorized into its Broad Economic Category (BEC). Approximately 16% or 946 out of 4,896 HS6 products are missing BEC categorizations.

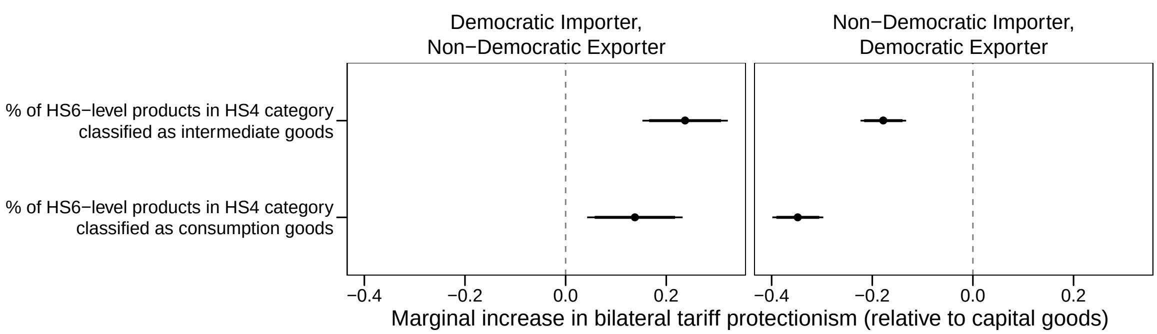


(a)

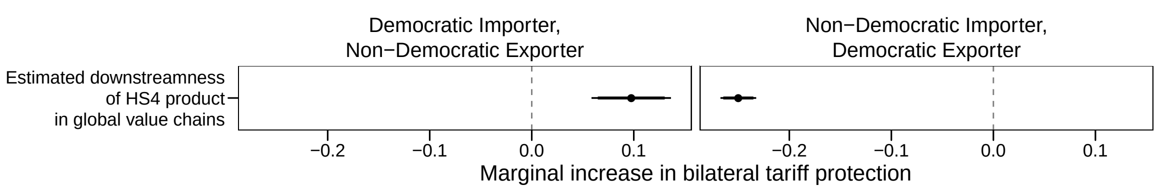


(b)

Figure D.3: **HS 6-level Predictors of Democratic Protection.** We regress the HS 6-level posterior mean estimates of the monadic parameter γ_p^{DEM} shown in Figure D.2 (where p is an HS 6-level index) on HS 6-level product characteristics including (a) its BEC classification as either capital, intermediate, or consumption and (b) a continuous measure of its "downstreamness" in global value chains across all countries between 1995 and 2011 as estimated by Antras and Chor (2018). For both measures, we estimate a univariate linear regression model, a linear regression adjusting for the HS2 industry classification, and a regression model adjusting for the sector. These controlled models are necessary since the HS 6-level monadic estimates are fit separately at the industry level for computational purposes.



(a)



(b)

Figure D.4: **HS 4-level Predictors of Democratic Protectionism in Bilateral FTAs.** We regress the HS4-level posterior mean estimates of the dyadic parameter γ_p^d for $d \in \{\texttt{DEM/NONDEM}, \texttt{NONDEM/DEM}\}$ shown in Figure 7 (where p is an HS4-level index) on HS4-level product characteristics including (a) the proportion of its' HS6 tariff-lines classified as either capital, intermediate, or consumption and (b) the average of its' HS6 tariff-lines "downstreamness" in global value chains across for all countries between 1995 and 2011 as estimated by Antras and Chor (2018).