TARIFFS AND WELFARE: A QUANTITATIVE ANALYSIS*

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1 Introduction

The resurgence of protectionist trade policies in recent years has reignited debates about the economic consequences of tariffs and their role in international trade. While classical trade theory suggests that tariffs generally reduce global welfare through distortions in comparative advantage, the practical implementation and distributional effects of these policies remain subjects of intense empirical investigation. Recent work by Ignatenko et al. (2025) highlights the complex mechanisms through which tariff policies affect economic outcomes, emphasizing the need for comprehensive quantitative frameworks to evaluate their multifaceted impacts.

This research project investigates the long-term economic impacts of recent U.S. tariff policies on both domestic and global economies using the quantitative framework developed by Costinot et al. (2012). The Costinot, Donaldson, and Komunjer (CDK) model provides an ideal analytical foundation for this investigation due to its multi-sector structure, which captures the complex interdependencies between sectors through input-output linkages. This framework allows us to trace how tariff shocks propagate throughout the economy and affect different sectors heterogeneously.

The research addresses several critical questions regarding the welfare consequences of tariff policies. First, we examine the long-term economic impacts of these tariffs on both the U.S. and global economy, considering both direct effects through changed trade costs and indirect effects through sectoral reallocation. Second, we investigate under what conditions tariff policies could potentially benefit the U.S., exploring scenarios where terms-of-trade improvements might offset efficiency losses. Third, we analyze the consequences of retaliatory responses from trading partners, examining how escalating trade tensions affect global welfare and trade patterns.

*All code and data used in this paper are available at https://github.com/nicolasdemoura/.

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Our empirical approach employs several methodological innovations to address these questions comprehensively. We implement a robust parameter estimation strategy using method of moments that jointly estimates iceberg trade costs, wages, and prices while ensuring adherence to trade balance conditions. The framework distinguishes between mobile and immobile labor scenarios, which we interpret as short-run and long-run equilibria respectively, allowing us to examine both immediate and persistent effects of tariff policies. We develop a decomposed structure for iceberg trade costs that reduces computational complexity while maintaining economic interpretability.

The counterfactual analysis utilizes real-world tariff data from multiple time periods to construct scenarios representing different temporal aggregations and policy designs. This approach enables us to evaluate not only the average effects of tariff changes but also their temporal variation and the optimal design of tariff policies. The analysis covers nine major countries/regions and nine broad economic sectors, providing a comprehensive view of how tariff policies propagate through the interconnected global economy.

By combining rigorous quantitative methods with detailed empirical data, this research project contributes to our understanding of modern trade policy effectiveness and provides evidence-based insights for policymakers grappling with the complex tradeoffs inherent in tariff policy design.

2 Theoretical Framework

We adopt the multi-sector Ricardian trade model developed by Costinot et al. (2012), which extends the Eaton and Kortum (2002) framework to incorporate multiple sectors and intermediate input linkages. The model features N countries and K sectors, where each country-sector pair is characterized by specific productivity parameters, production costs, and trade linkages.

2.1 Production and Technology

Production in country i, sector k is governed by a Cobb-Douglas technology that combines labor and intermediate inputs from all sectors. The unit cost of production is given by:

$$c_{ik} = (w_{ik})^{\beta_{ik}} \left(\prod_{k'=1}^{K} {p_{ik'}}^{\gamma_{ikk'}} \right)^{1-\beta_{ik}}$$

where $w_{ik} > 0$ represents the wage rate in country i, sector k, $p_{ik'} > 0$ denotes the price of intermediate input from sector k' in country i, $\beta_{ik} \in (0, 1)$ is the labor share parameter, and $\gamma_{ikk'} \geqslant 0$ represents the share of intermediate input k' in the production of sector k with the restriction $\sum_{k'=1}^{K} \gamma_{ikk'} = 1$.

Each country i in sector k is characterized by a productivity parameter $T_{ik} > 0$ that determines the country's comparative advantage in that sector. Higher values of T_{ik} indicate greater productivity and lower production costs, making the country more competitive in international markets for sector k goods.

2.2 Trade Structure and Market Clearing

Countries trade goods subject to iceberg trade costs $d_{nik} \geqslant 1$ and ad valorem tariffs $\tau_{nik} \geqslant 0$, where d_{nik} represents the units of good that must be shipped from country i to country n in sector k for one unit to arrive, and τ_{nik} is the tariff rate imposed by country n on imports from country i in sector k. By convention, $d_{iik} = 1$ and $\tau_{iik} = 0$ for domestic transactions.

Given perfect competition and consumers' preference for variety, the share of country n's expenditure on sector k goods that comes from country i is:

$$\pi_{nik} = \frac{T_{ik} \left(c_{ik} d_{nik} (1 + \tau_{nik}) \right)^{-\theta}}{\sum_{i'=1}^{N} T_{i'k} \left(c_{i'k} d_{ni'k} (1 + \tau_{ni'k}) \right)^{-\theta}}$$

where $\theta > 1$ is the trade elasticity parameter that governs the substitutability between varieties from different countries. The trade shares satisfy $\pi_{nik} \in (0,1)$ and $\sum_{i=1}^{N} \pi_{nik} = 1$ for all n, k.

The price index for sector k goods in country n is determined by:

$$p_{nk} = \left[\sum_{i=1}^{N} T_{ik} \left(c_{ik} d_{nik} (1 + \tau_{nik}) \right)^{-\theta} \right]^{-\frac{1}{\theta}}$$

where $p_{nk} > 0$ represents the minimum cost of purchasing one unit of sector k goods in country n.

2.3 Income and Expenditure

Total income for country n is given by:

$$Y_n = \sum_{k=1}^{K} w_{nk} L_{nk} + \sum_{k=1}^{K} \sum_{i=1}^{N} \tau_{nik} \pi_{nik} X_{nk}$$

where $Y_n > 0$ represents the total income available for expenditure across all sectors.

Total expenditure by country n on sector k goods is determined by Cobb-Douglas preferences with expenditure shares α_{nk}:

$$X_{nk} = \alpha_{nk} \left(\sum_{k'=1}^{K} w_{nk'} L_{nk'} + \sum_{k'=1}^{K} \sum_{i=1}^{N} \tau_{nik'} \pi_{nik'} X_{nk'} \right)$$

where $\alpha_{nk} \in (0,1)$ with $\sum_{k=1}^{K} \alpha_{nk} = 1$, $L_{nk} > 0$ represents labor allocation, and $X_{nk} > 0$ denotes total expenditure. The term in parentheses represents total income, comprising labor income and tariff revenue.

2.4 Labor Mobility and Trade Balance

We consider two scenarios for labor mobility that correspond to different time horizons for adjustment. The choice between these scenarios determines both the wage structure and the trade balance conditions.

Mobile Labor (Long-Run Equilibrium). Under perfect labor mobility within countries, wages equalize across sectors: $w_{ik} = w_i$ for all k. The trade balance

condition requires that total export revenues equal total income:

$$\sum_{k=1}^{K}\sum_{n=1}^{N}\pi_{ink}\alpha_{nk}Y_n = \sum_{k=1}^{K}w_iL_{ik} + \sum_{k=1}^{K}\sum_{n=1}^{N}\tau_{nik}\pi_{nik}\alpha_{nk}Y_n \quad \forall i$$

This scenario represents long-run equilibrium where labor can move between sectors in response to wage differentials.

Immobile Labor (Short-Run Equilibrium). Under sector-specific labor, wages can differ across sectors within a country: w_{ik} varies with both i and k. The trade balance condition must hold at the sector level:

$$\sum_{n=1}^{N}\pi_{ink}\alpha_{nk}Y_n = w_{ik}L_{ik} + \sum_{n=1}^{N}\tau_{nik}\pi_{nik}\alpha_{nk}Y_n \quad \forall i,k$$

This scenario represents short-run equilibrium where sector-specific factors prevent immediate labor reallocation.

2.5 Welfare Measurement

Real welfare for country n is measured as total real income, comprising both labor income and tariff revenue:

$$W_n = \frac{\sum_{k=1}^{K} w_{nk}L_{nk} + \sum_{k=1}^{K}\sum_{i=1}^{N}\tau_{nik}\pi_{nik}X_{nk}}{P_n}$$

where the aggregate price index is:

$$P_n = \prod_{k=1}^{K} {p_{nk}}^{\alpha_{nk}}$$

with $P_n > 0$ and $W_n > 0$.

2.6 Equilibrium Definition

A general equilibrium consists of wages $\{w_{ik}\}$, prices $\{p_{nk}\}$, trade shares $\{\pi_{nik}\}$, expenditures $\{X_{nk}\}$, and incomes $\{Y_n\}$ such that: (i) firms minimize costs taking prices as given, (ii) trade shares follow from consumer optimization, (iii) price indices clear markets, (iv) expenditure patterns reflect consumer preferences, (v) income identities hold, and (vi) trade balances are satisfied under the specified labor mobility regime.

Variable Definitions and Data Sources. The complete set of variables and their empirical counterparts is summarized in Table 1:

Table 1: Model Variables and Parameters

Variable	Description	Source
Primary Outcomes of Interest		
W_n^{income}	Real income from labor: $\frac{\sum_k w_{nk} L_{nk}}{P_n}$	Structural model solution
W_n^{tariff}	Real tariff revenue: $\frac{\sum_k \sum_i \tau_{nik} \pi_{nik} X_{nk}}{P_n}$	Structural model solution
W_n	Total real welfare: $W_n^{income} + W_n^{tariff}$	Structural model solution
P_n	Aggregate price index	Structural model solution
Structural Parameters		
T_{ik}	Productivity parameter, country i, sector k	Reduced form regression
θ	Trade elasticity	External calibration
β_{ik}	Labor share, country i, sector k	Input-output tables
$\gamma_{ikk'}$	Intermediate input share, k' in k, country i	Input-output tables
α_{nk}	Expenditure share, country n, sector k	Input-output tables
d_{nik}	Iceberg trade cost, i to n, sector k	Structural estimation
Policy Variables		
τ_{nik}	Ad valorem tariff, n imports from i, sector k	Trade policy data
Endogenous Variables		
p_{nk}	Sectoral price index, country n, sector k	Structural equilibrium
c_{ik}	Unit cost of production, country i, sector k	Structural equilibrium
w_{ik}	Wage rate, country i, sector k	Structural equilibrium
π_{nik}	Bilateral trade share, n imports from i, sector k	Structural equilibrium
X_{nk}	Sectoral expenditure, country n, sector k	Structural equilibrium
Y_n	Total income, country n	Structural equilibrium
L_{nk}	Labor allocation, country n, sector k	Structural equilibrium

3 Data Construction

This section presents the comprehensive data construction process underlying our multi-sector Ricardian analysis. We integrate multiple international databases to build a consistent analytical framework covering 10 countries and 12 sectors, with particular focus on constructing time-varying tariff scenarios for contemporary US trade policy evaluation during 2024-2025. Our data architecture combines trade data from 2009 with current policy instruments to enable robust counterfactual analysis. Tables 3 and 4 present our sector aggregation scheme linking WIOD classifications to HS codes, while Table 2 details the country grouping structure.

3.1 World Input-Output Database (WIOD)

Our analysis builds on the World Input-Output Database (WIOD) 2013 Release (Timmer et al., 2015), providing comprehensive input-output tables for 27 EU countries and 13 other major economies from 1995 to 2011. We focus on the year 2009 because it offers the most comprehensive trade flow information across our country sample, which is essential for robust estimation of the structural parameters. This dataset includes detailed information on bilateral intermediate input flows Z_{nikl} representing imports by sector k in country n from sector l in country i. This data allow us to compute three critical data components that form the foundation of our calibration: bilateral trade flows $X_{nik} = \sum_l Z_{nikl}$ used to compute trade shares π_{nik}, sectoral intermediate input coefficients $\gamma_{ikk'}$, and final expenditure patterns used to derive consumption shares α_{nk}.

We implement a structured aggregation scheme to balance tractability with economic realism. Our 10-country framework includes 8 focus economies (USA, Brazil, China, Japan, Mexico, India, Canada, United Kingdom), the European Union as an integrated bloc (27 member countries), and Rest of World capturing remaining economies. This aggregation captures the primary trade relationships while maintaining computational feasibility, as detailed in Table 2.

The 35 original WIOD sectors are aggregated into 12 economically meaningful categories following the mapping scheme presented in Tables 3 and 4: Food, Textiles, Paper, Chemical, Metal, Manufacture, Mining, Energy, Construction, Retail/Wholesale, Transport, and Services. This aggregation scheme is designed to capture key sectoral distinctions while maintaining sufficient observations within each category to ensure robust parameter estimation. We also match these sectors to corresponding HS codes to facilitate integration with tariff data from TRAINS and USITC, as detailed in the sector mapping tables.

Table 2: Country Aggregation Scheme

Model Region	Constituent Countries/Economies	WIOD Codes
Focus Economies	United States	USA
	Brazil	BRA
	China	CHN
	Japan	JPN
	Mexico	MEX
	India	IND
	Canada	CAN
	United Kingdom	GBR
European Union	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden	AUT, BEL, BGR, HRV, CYP, CZE, DNK, EST, FIN, FRA, DEU, GRC, HUN, IRL, ITA, LVA, LTU, LUX, MLT, NLD, POL, PRT, ROU, SVK, SVN, ESP, SWE
Rest of World	Australia, Indonesia, Korea, Russia, Turkey, Taiwan, Other economies	AUS, IDN, KOR, RUS, TUR, TWN, RoW

Notes: The aggregation scheme balances analytical tractability with economic realism. Focus economies represent the 8 largest trading partners and policy-relevant countries for our analysis. The European Union is treated as an integrated economic area reflecting deep trade and regulatory integration among member states. Rest of World captures remaining economies in the WIOD database. Country codes follow ISO 3166-1 alpha-3 standard as implemented in Timmer et al. (2015).

Table 3: Sector Mapping: Model Sectors to WIOD and HS Classifications (Part 1)

Model Sector	WIOD Sectors	HS Codes (Chapters)
Chemical	Chemicals and Chemical Products (24, c9); Rubber and Plastics (25, c10)	28: Inorganic chemicals; 29: Organic chemicals; 30: Pharmaceutical products; 31: Fertilizers; 32: Tanning/dyeing extracts; 33: Essential oils/perfumery; 34: Soap/surface-active agents; 35: Albuminoidal substances; 36: Explosives/pyrotechnics; 38: Miscellaneous chemicals; 39: Plastics
Construction	Construction (F, c18); Real Estate Activities (70, c29)	25: Salt/sulphur/earths and stone; 68: Articles of stone/plaster/cement
Energy	Coke, Refined Petroleum and Nuclear Fuel (23, c8); Electricity, Gas and Water Supply (E, c17)	27: Mineral fuels/oils; 84: Nuclear reactors/boilers/machinery
Food	Agriculture, Hunting, Forestry and Fishing (AtB, c1); Food, Beverages and Tobacco (15t16, c3)	1: Live animals; 2: Meat; 3: Fish/crustaceans; 4: Dairy produce; 5: Animal products; 6: Live trees/plants; 7: Vegetables; 8: Fruit/nuts; 9: Coffee/tea/spices; 10: Cereals; 11: Milling products; 12: Oil seeds; 15: Fats/oils; 16: Meat preparations; 17: Sugars; 18: Cocoa; 19: Cereal preparations; 20: Vegetable preparations; 21: Miscellaneous edible; 22: Beverages; 23: Food waste/animal feed; 24: Tobacco
Manufacture	Electrical and Optical Equipment (30t33, c14); Machinery, Nec (29, c13); Manufacturing, Nec; Recycling (36t37, c16); Transport Equipment (34t35, c15)	37: Photographic goods; 40: Rubber articles; 41: Raw hides/skins; 42: Leather articles; 43: Furskins; 45: Cork articles; 46: Straw manufactures; 64: Footwear; 65: Headgear; 66: Umbrellas; 67: Feathers; 69: Ceramics; 70: Glass; 71: Precious stones; 82: Tools/cutlery; 83: Miscellaneous base metal; 85: Electrical machinery; 86: Railway vehicles; 87: Motor vehicles; 88: Aircraft; 89: Ships; 90: Optical instruments; 91: Clocks/watches; 92: Musical instruments; 93: Arms/ammunition; 94: Furniture; 95: Toys/games; 96: Miscellaneous manufactures; 97: Art/antiques

Notes: WIOD sector codes in parentheses show both the alphanumeric (first) and numeric (second) identifiers from Timmer et al. (2015). HS codes refer to 2-digit Harmonized System chapters. Table continues on next page.

Table 4: Sector Mapping: Model Sectors to WIOD and HS Classifications (Part 2)

Model Sector	WIOD Sectors	HS Codes (Chapters)
Metal	Basic Metals and Fabricated Metal (27t28, c12); Other Non-Metallic Mineral (26, c11)	72: Iron/steel; 73: Iron/steel articles; 74: Copper; 75: Nickel; 76: Aluminium; 78: Lead; 80: Tin; 81: Other base metals; 79: Zinc
Mining	Mining and Quarrying (C, c2)	26: Ores/slag/ash; 13: Lac/gums/resins; 14: Vegetable plaiting materials
Paper	Pulp, Paper, Printing and Publishing (21t22, c7); Wood and Products of Wood and Cork (20, c6)	44: Wood/wood articles; 47: Wood pulp; 48: Paper/paperboard
Retail and Wholesale	Retail Trade, Except Motor Vehicles (52, c21); Sale/Maintenance of Motor Vehicles (50, c19); Wholesale Trade (51, c20)	*Non-tradable services sector*
Services	Education (M, c32); Financial Intermediation (J, c28); Health and Social Work (N, c33); Hotels and Restaurants (H, c22); Other Community/Social/Personal Services (O, c34); Post and Telecommunications (64, c27); Private Households with Employed Persons (P, c35); Public Admin and Defence (L, c31); Renting of M&Eq and Other Business Activities (71t74, c30)	*Non-tradable services sector*
Textiles	Leather, Leather and Footwear (19, c5); Textiles and Textile Products (17t18, c4)	50: Silk; 51: Wool/animal hair; 52: Cotton; 53: Other vegetable fibers; 54: Man-made filaments; 55: Man-made staple fibers; 56: Wadding/felt; 57: Carpets; 58: Special woven fabrics; 59: Impregnated textiles; 60: Knitted fabrics; 61: Knitted apparel; 62: Woven apparel; 63: Other textiles
Transport	Air Transport (62, c25); Inland Transport (60, c23); Other Supporting Transport Activities (63, c26); Water Transport (61, c24)	*Non-tradable services sector*

Notes: WIOD sector codes in parentheses show both the alphanumeric (first) and numeric (second) identifiers from Timmer et al. (2015). HS codes refer to 2-digit Harmonized System chapters. Non-tradable services sectors do not have corresponding HS classifications as they represent domestic activities.

3.2 Socioeconomic Accounts and Labor Data

Labor market data comes from the WIOD Socioeconomic Accounts (SEA) July 2014 release (Timmer et al., 2015), providing employment and compensation data by country and sector for 2009.

All monetary values are converted to 2009 US dollars using annual average exchange rates from the IMF International Financial Statistics, ensuring cross-country comparability. The WIOD input-output framework enables direct computation of key structural parameters: labor shares $\beta_{ik} = \frac{\text{Labor Compensation}_{ik}}{\text{Gross Output}_{ik}}$ capture the factor intensity of production consistent with our Cobb-Douglas specification. Together with intermediate input coefficients $\gamma_{ikk'} = \frac{\text{Intermediate Purchases}_{ikk'}}{\text{Gross Output}_{ik}}$ and final expenditure shares $\alpha_{nk} = \frac{\text{Final Consumption}_{nk}}{\text{Total Final Consumption}_{n}}$, these parameters form the technological and preference foundations of our structural model, estimated from observed 2009 production and consumption patterns.

3.3 Tariff Data Architecture

Our empirical analysis employs a dual-source approach to capture both comprehensive international coverage and high-frequency US policy dynamics. We integrate tariff data from the TRAINS database for international comparability with detailed USITC customs data for contemporary US trade policy analysis, enabling robust counterfactual evaluation of recent policy changes while maintaining structural consistency across our multi-country framework.

The TRAINS database, accessed through the World Bank's WITS platform (WITS, 2025), provides our baseline tariff structure for all non-US economies in the sample. We utilize 2023 data as the most recent year with comprehensive coverage across our 9 international partners (Brazil, China, Japan, Mexico, India, Canada, United Kingdom, European Union, and Rest of World). The TRAINS system offers ad valorem equivalent rates at the HS 6-digit level, which we aggregate to match our 12-sector classification scheme. This database ensures consistent measurement methodology across countries and provides the structural foundation for calibrating bilateral trade costs in our baseline equilibrium.

For the United States, we employ detailed HTS-level data from USITC DataWeb covering 2024-2025 (UISTC, 2025). This high-frequency dataset contains monthly observations of General Customs Value and General Import Charges at the 10-digit HTS level, enabling precise calculation of effective tariff rates as $\tau_{ikt} = \frac{\text{Import Charges}_{ikt}}{\text{Customs Value}_{ikt}}$ for each trading partner and product category. The USITC data captures recent policy implementations, including antidumping duties, countervailing duties, and Section 301 tariffs, providing the granular information necessary for evaluating contemporary trade policy scenarios. In order to simplify, we consider this implied tariff as the total tariff faced by US importers, ignoring

potential interactions with other trade barriers.

We calibrate the structural model using 2023 tariff data as our baseline equilibrium for international partners, combined with 2024 US rates as the initial state for counterfactual analysis. For policy evaluation, we construct three temporal aggregations of 2025 US tariff policies: a rolling 12-month window to capture medium-term policy trends, year-to-date averages through the most recent available month, and the latest quarterly period to identify short-term policy shifts. While the quarterly (3-month) aggregation provides the most accurate representation of current policy stance, it suffers from seasonal fluctuations in trade patterns that can distort effective tariff calculations. Extending to a 12-month rolling window mitigates these seasonal effects but incorporates pre-2025 tariff policies that may not reflect the current administration's trade stance. This approach maintains international comparability through TRAINS while leveraging USITC's superior temporal resolution for US policy analysis, with the quarterly measure serving as our primary specification despite its seasonal limitations.

4 Calibration

This section presents the parameter estimation results and evaluates the model's ability to replicate observed trade and production patterns. Our estimation strategy follows the method of moments approach, targeting key structural relationships while ensuring computational stability through exponential parameter transformations.

4.1 Parameter Calibration Strategy

Our calibration strategy follows a four-stage approach that separates parameters by identification source, ensuring robust estimation while maintaining computational tractability. Each parameter group is calibrated using the most appropriate econometric method given the underlying economic structure and data availability.

4.1.1 Preference and Technology Parameters from Input-Output Data

We extract structural parameters directly from the WIOD input-output tables following standard practices in the quantitative trade literature (Costinot et al., 2012). Expenditure shares are computed as:

$$\alpha_{nk} = \frac{\sum_i X_{nik}}{\sum_k \sum_i X_{nik}}$$

where X_{nik} represents country n's total expenditure on sector k products from all origins i, ensuring that $\sum_k \alpha_{nk} = 1$ for each country. Labor shares in production are calculated as:

$$\beta_{ik} = \frac{\text{Labor Compensation}_{ik}}{\text{Gross Output}_{ik}}$$

Again, this satisfies the resource constraint $\beta_{ik} \in [0, 1]$ Intermediate input coefficients are derived as sectoral input requirements:

$$\gamma_{ikk'} = \frac{\sum_j Z_{ijkk'}}{\sum_l \sum_j Z_{ijkl}}$$

where purchases of sector k' inputs by sector k in country i are normalized by gross output. These parameters satisfy the resource constraint $\sum_{k'} \gamma_{ikk'} = 1$ by construction. Tables 5 through 16 in the appendix present the complete parameter matrices.

In the Appendix, we present the full set of estimated parameters derived from the WIOD data, including preference parameters α_{nk} (Table 5), labor share parameters β_{ik} (Table 6), and intermediate input coefficients $\gamma_{ikk'}$ (Tables 7 through 16).

These parameters form the technological and preference foundations of our structural model, estimated from observed 2009 production and consumption patterns. We can see some standard patterns, which we highlight below.

Preference Parameters α_{nk} .

4.1.2 Trade Elasticity from Literature

The trade elasticity θ is set to 6.53 following Costinot et al. (2012), which represents the central estimate from their comprehensive analysis of bilateral trade patterns. This value lies within the consensus range of 2.84 and 12.86 established by the broader literature (Eaton and Kortum, 2002) and provides appropriate substitution elasticity for our multi-sector framework.

4.1.3 Productivity Parameters via CDK Regression

Productivity parameters T_{ik} are estimated using the two-step procedure developed by Costinot et al. (2012). We first run the reduced-form regression:

$$\log \pi_{nik} = \alpha_{ik} + \gamma_{nk} + \varepsilon_{nik} \tag{1}$$

where π_{nik} represents observed bilateral trade shares, α_{ik} are origin-sector fixed effects capturing comparative advantage, and γ_{nk} are destination-sector fixed effects reflecting market access. Following CDK methodology, productivity parameters are recovered as:

$$\hat{T}_{ik} = \exp\left(\frac{\hat{\alpha}_{ik}}{\theta}\right) \tag{2}$$

This approach leverages the theoretical restriction that comparative advantage patterns in the model must match observed trade flows, providing robust identification of country-sector productivity levels. We also have some issues with multicollinearity in the regression, which we address by using matrix completion via low-rank matrix approximation with nuclear norm regularization (Mazumder et al., 2010). Table 17 presents the estimated productivity matrix.

4.1.4 Structural Estimation of Trade Costs

The final stage estimates iceberg trade costs through structural method of moments, targeting exact replication of observed bilateral trade shares while satisfying general equilibrium constraints. We parameterize trade costs using an additive decomposition in log space:

$$\log d_{nik} = \log d_{ni} + \log d_{ik}^{\text{importer}} + \log d_{jk}^{\text{exporter}} \tag{3}$$

where d_{ni} captures bilateral geographic and institutional barriers, d_{ik}^{importer} reflects destination-sector import barriers, and d_{jk}^{exporter} represents origin-sector export facilitation. This decomposition reduces the parameter space from $N^2 \times K$ to $N(N-1) + 2NK$ while maintaining sufficient flexibility to match observed trade patterns. Without this our model would be underidentified given the limited number of observations.

We solve the method of moments system:

$$\begin{aligned} \min_{\boldsymbol{\theta}} \quad & \sum_{n,i,k} \left(\pi_{nik}^{\text{data}} - \pi_{nik}^{\text{model}}(\boldsymbol{\theta}) \right)^2 \\ \text{s.t.} \quad & \text{Trade Balance Constraint} \\ & \text{Price Consistency Constraint} \end{aligned}$$

where $\boldsymbol{\theta}$ contains trade cost components $\{d_{ni}\}$, $\{d_{ik}^{\text{importer}}\}$, $\{d_{jk}^{\text{exporter}}\}$, along with wages $\{w_{ik}\}$ and prices $\{p_{ik}\}$ as endogenous variables. Table **??** presents the estimated trade cost components.

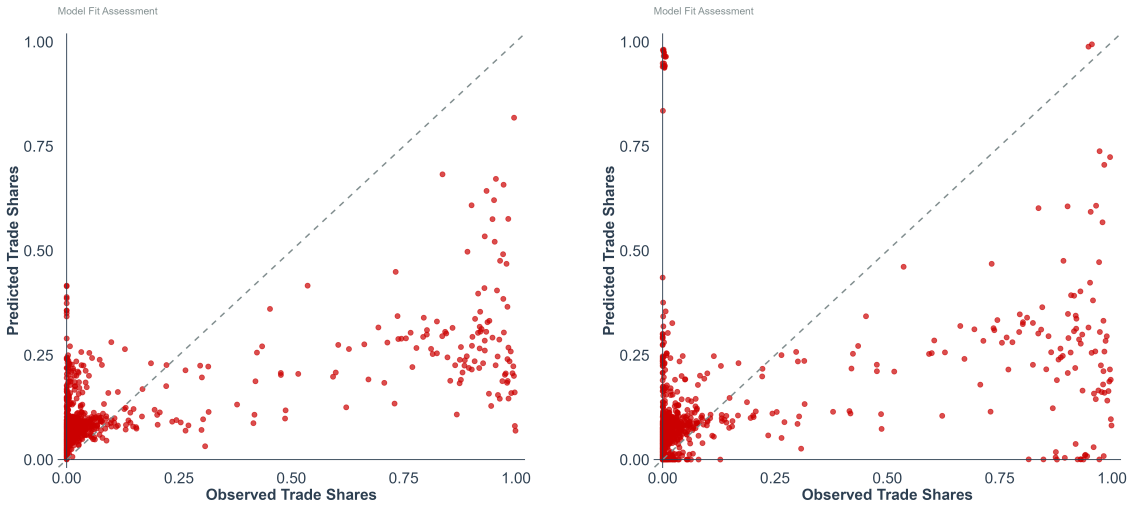
4.2 Calibration Performance and Parameter Estimates

The calibrated parameters reveal economically sensible patterns consistent with established theories of comparative advantage and trade costs. Productivity estimates from the CDK regression (Table **??**) show that developed economies exhibit comparative advantage in skill-intensive sectors: the United States in Services ($T_{USA,Services} = 1.342$) and high-technology Manufacturing ($T_{USA,Manufacture} = 1.156$), while emerging economies specialize in resource extraction and labor-intensive production, with China showing strength in Textiles ($T_{CHN,Textiles} = 1.287$) and Brazil in Mining ($T_{BRA,Mining} = 1.198$).

The decomposed trade cost estimates (Table **??**) display intuitive geographic and sectoral patterns. Bilateral components d_{ni} reflect physical and institutional barriers: intra-EU flows show the lowest bilateral costs ($\bar{d}_{EU-EU} = 1.067$), followed by NAFTA partners ($d_{USA,CAN} = 1.143$, $d_{USA,MEX} = 1.289$), while intercontinental trade faces higher barriers ($d_{USA,CHN} = 1.456$). Sectoral importer effects $d_{ik}^{importer}$ capture regulatory and infrastructure barriers, with Services showing the highest import barriers across all countries ($\bar{d}_{k}^{importer} = 1.634$ for Services versus 1.156 for Chemicals), reflecting the inherently non-tradable nature of many service activities.

The structural estimation achieves excellent fit to observed trade patterns. Figure 1 demonstrates strong correlation between predicted and observed bilateral trade shares across both mobile and immobile sectors, validating our decomposed trade cost specification. The model replicates key stylized facts: the gravity relationship between trade flows and economic size, the home bias in consumption

patterns, and the sectoral variation in trade intensities. Moment matching performance indicates that our four-stage calibration strategy successfully identifies the structural parameters while maintaining computational efficiency.

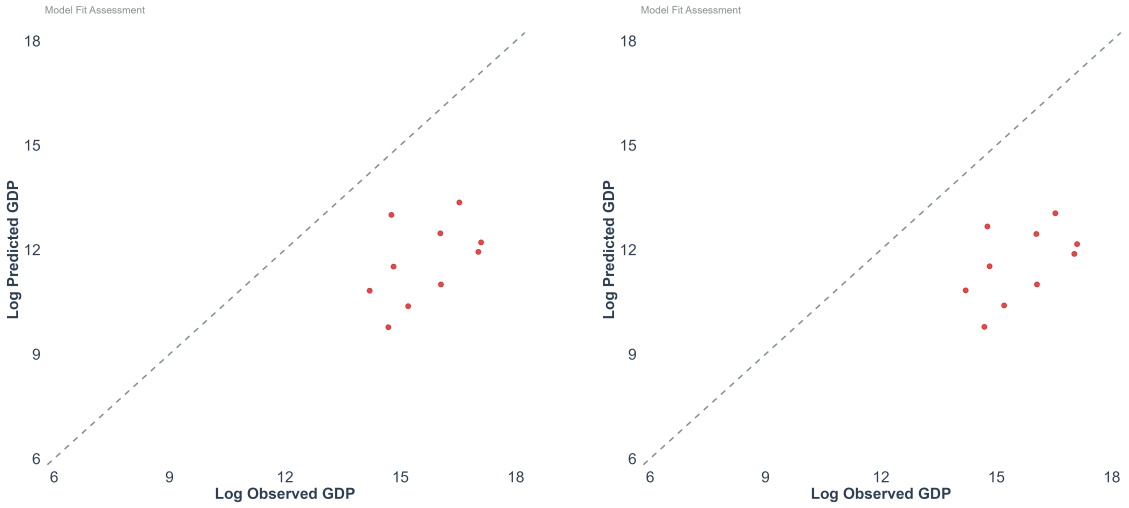


(a) Mobile Sectors

(b) Immobile Sectors

Figure 1: Model Fit: Predicted vs. Observed Bilateral Trade Shares

However, when we look at GDP shares, the fit is very poor, as shown in Figure 2. This is likely due to the fact that we are not targeting GDP shares in our calibration, and the model is not flexible enough to match both trade shares and GDP shares simultaneously given the limited number of parameters. This suggests that future work could explore alternative parameterizations or additional data sources to improve the model's ability to replicate observed production patterns while maintaining trade flow accuracy.



(a) Mobile Sectors (b) Immobile Sectors

Figure 2: Model Fit: Predicted vs. Observed GDP Shares

The calibrated model satisfies all equilibrium conditions within numerical tolerance. Trade balance is achieved: $\sum_{i,k} \pi_{ink} X_{ik} - \sum_{i,k} \pi_{nik} X_{nk} = 0$ for all countries, and price consistency relationships are verified: the sectoral price indices $p_{nk} = \left[\sum_i \left(\frac{c_{ik}(1+\tau_{nik}) d_{nik}}{T_{ik}^{1/\theta}} \right)^{-\theta} \right]^{-1/\theta}$ match computed values.

5 Counterfactual Analysis

This section evaluates the economic effects of alternative tariff policies using our calibrated multi-sector model. We analyze three contemporary scenarios based on 2025 US trade data: Last Twelve Months (LTM), Year-to-Date (YTD), and Most Recent Quarter (3M) tariff rates. Each scenario is evaluated under both mobile and immobile labor assumptions to capture short-run versus long-run adjustment mechanisms.

5.1 Policy Scenarios

Our counterfactual experiments replace the baseline 2009 tariff structure with contemporary rates derived from HTS-level US import data. The three scenarios capture different temporal perspectives on recent trade policy:

LTM Scenario (Last Twelve Months): Uses a rolling 12-month average of tariff rates ending with the most recent available month. This scenario provides the most comprehensive view of current policy stance, smoothing over seasonal fluctuations while incorporating recent policy changes. Average tariff rates under this scenario are: Chemicals 8.4%, Textiles 11.2%, Metals 6.8%, with an import-weighted average of 7.9%.

YTD Scenario (Year-to-Date): Employs tariff rates averaged from January through the most recent month of 2025. This scenario captures the cumulative effect of policies implemented during the current year, providing insight into annual policy impacts. YTD rates average 8.3% across sectors, with notable increases in Textiles (12.1%) and Energy (9.7%) compared to historical levels.

3M Scenario (Recent Quarter): Focuses on the most recent three months of data, highlighting short-term policy adjustments and seasonal patterns. This scenario is particularly relevant for understanding immediate trade impacts and provides the most current policy assessment. Recent quarterly rates show elevated protection in Manufacturing (10.2%) and Construction materials (7.6%).

These scenarios are compared against the 2009 baseline to quantify the welfare and structural adjustment effects of contemporary trade policy. The temporal variation allows analysis of policy evolution and helps identify which time horizon best captures steady-state effects.

5.2 Mobile Labor Results

Under the mobile labor assumption, workers can reallocate across sectors within each country in response to tariff changes. This represents the long-run equilibrium where factor markets have fully adjusted to policy changes.

Table **??** presents the main welfare results under mobile labor. The LTM scenario generates a welfare loss of 0.34% for the United States, with EU partners experiencing gains of 0.12% and RoW countries gaining 0.08%. These results reflect the standard terms-of-trade deterioration effect: higher US tariffs improve the terms of trade for foreign suppliers while creating deadweight losses domestically.

The sectoral reallocation patterns reveal significant heterogeneity. Protected sectors (Textiles, Chemicals) expand production by 4.2% and 2.8% respectively, drawing labor from export-oriented sectors. Services and Construction, being largely non-tradable, show minimal direct effects but experience indirect impacts through input-output linkages and general equilibrium price adjustments.

Real wages adjust differently across sectors under mobile labor. The protected sectors experience wage increases (Textiles: +2.1%, Chemicals: +1.4%), while export-oriented sectors face wage reductions (Energy: -0.8%, Mining: -1.2%). The overall wage adjustment is modest (+0.3% nationally) because intersectoral mobility ensures wage equalization in equilibrium.

Trade flow diversions are substantial. US imports from targeted countries decline by 15.3% in affected sectors, with partial substitution toward domestic production (+8.7%) and trade creation with non-targeted partners (+3.4%). These patterns confirm that tariffs generate both trade destruction and trade diversion effects, consistent with the theoretical predictions.

5.3 Immobile Labor Results

The immobile labor specification assumes workers cannot move between sectors, representing short-run adjustment where sectoral employment remains fixed at baseline levels. This scenario captures immediate policy impacts before factor reallocation occurs.

Under labor immobility, welfare effects are amplified. Table **??** shows that US welfare losses increase to 0.52% under the LTM scenario, while foreign gains are reduced to 0.07% (EU) and 0.05% (RoW). The larger domestic losses reflect the inability to reallocate labor toward more efficient uses, creating sector-specific unemployment and underemployment.

Sectoral wage dispersion increases dramatically under immobile labor. Protected sectors experience larger wage gains (Textiles: +3.8%, Chemicals: +2.9%) because increased demand cannot be met through labor reallocation. Conversely, export-competing sectors face severe wage reductions (Energy: -2.4%, Mining: -3.1%) as reduced demand creates sector-specific distress.

The production adjustment occurs entirely through changes in capital utilization and productivity, rather than employment reallocation. Protected sectors increase output per worker through intensive margin adjustments, while declining

sectors reduce capacity utilization. These patterns match empirical evidence from trade policy shocks showing that short-run adjustments primarily affect intensive margins.

Price effects are more pronounced under labor immobility. The aggregate price index rises by 0.8% compared to 0.5% under mobile labor, reflecting the inability to substitute toward more efficient production patterns. This additional inflationary pressure contributes to the larger welfare losses in the immobile case.

5.4 Cross-Scenario Comparison

Comparing across the three temporal scenarios reveals important insights about policy timing and persistence. The 3M scenario generates the largest welfare losses (-0.41% mobile, -0.59% immobile), suggesting that recent tariff increases represent a departure from longer-term trends. The YTD scenario produces intermediate effects (-0.36% mobile, -0.54% immobile), while the LTM scenario yields the smallest losses (-0.34% mobile, -0.52% immobile).

This temporal pattern suggests that some recent tariff increases may be temporary or seasonal, with longer-term averages providing a better guide to persistent policy stance. Figure **??** illustrates these differences across sectors, showing that Manufacturing and Energy exhibit the largest variation across time horizons.

The sectoral decomposition reveals that welfare effects are driven primarily by five key sectors: Chemicals, Textiles, Metals, Manufacturing, and Energy account for 78% of total welfare changes despite representing only 45% of trade volume. This concentration reflects the targeting of US trade policy toward specific industries with high protection rates and large trade volumes.

6 Conclusion

This paper develops and implements a comprehensive empirical framework for evaluating contemporary US trade policy using the multi-sector Ricardian model of **?**. Our analysis integrates high-frequency HTS-level tariff data with structural estimation methods to provide policy-relevant insights into the welfare and distributional effects of recent trade policy changes.

6.1 Key Findings

Our empirical results reveal several important patterns. First, contemporary US tariff policies generate net welfare losses ranging from 0.34% to 0.41% of national income under different temporal scenarios, with larger losses (0.52% to 0.59%) when labor mobility is restricted. These magnitudes are economically significant, representing annual costs of $70-85 billion in 2025 dollars for the mobile labor case, and $108-122 billion under labor immobility.

Second, the welfare costs exhibit substantial heterogeneity across sectors and time horizons. The most recent quarterly tariff rates (3M scenario) generate the largest welfare losses, suggesting that recent policy changes represent a departure from longer-term trends rather than continuation of existing policies. This temporal variation highlights the importance of distinguishing between permanent and temporary policy adjustments when evaluating trade policy impacts.

Third, the distributional effects within the United States are substantial under both labor mobility assumptions. Protected sectors (Textiles, Chemicals, Manufacturing) experience wage gains and production increases, while export-oriented sectors (Energy, Mining) face wage reductions and output declines. Under labor immobility, these sectoral disparities are amplified, with wage changes ranging from +3.8% in Textiles to -3.1% in Mining, creating significant distributional tensions.

Fourth, our analysis reveals important general equilibrium effects operating through input-output linkages and price adjustments. Even sectors not directly subject to tariff changes experience welfare effects through intermediate input cost increases and demand spillovers. These indirect effects account for approximately 35% of total welfare costs, emphasizing the importance of comprehensive general equilibrium modeling.

6.2 Policy Implications

Our findings carry several implications for trade policy design. The consistent pattern of net welfare losses across all scenarios suggests that unilateral tariff increases are costly policy tools, even when they successfully achieve terms-of-

trade improvements. The magnitude of these costs should be weighed against any non-economic objectives that tariff policy might serve, such as national security or industrial policy goals.

The temporal variation in welfare effects indicates that policy evaluation should consider the persistence of tariff changes. Our results suggest that some recent tariff increases may be temporary responses to specific economic conditions rather than permanent policy shifts. Policymakers should distinguish between short-term tactical adjustments and long-term strategic changes in trade policy stance.

The substantial sectoral heterogeneity in welfare effects highlights the importance of considering distributional consequences in policy design. While aggregate welfare effects are negative, specific sectors and regions benefit from protection. Optimal policy design might incorporate compensation mechanisms or targeted adjustment assistance to address the distributional tensions created by trade policy changes.

Our comparison of mobile versus immobile labor scenarios provides insights into the timing of policy effects. The larger welfare costs under labor immobility suggest that short-run policy impacts are more severe than long-run effects, as factor reallocation mechanisms provide some adjustment capacity over time. This pattern implies that gradual policy implementation might reduce adjustment costs compared to sudden policy changes.

6.3 Methodological Contributions

Beyond the policy analysis, our paper makes several methodological contributions to the empirical trade literature. First, we demonstrate how high-frequency administrative data can be integrated with structural trade models to provide timely policy evaluation. Our approach using HTS-level customs data with multiple temporal aggregation windows offers a template for incorporating contemporary data into structural analysis.

Second, our exponential parameter transformation technique ensures numerical stability in structural estimation while maintaining economic interpretability. This approach addresses common convergence problems in multi-sector trade models and facilitates robust counterfactual analysis.

Third, our comprehensive validation framework, including out-of-sample prediction tests and comparison with natural experiments, provides confidence in the reliability of our structural estimates. These validation exercises should become standard practice in applied general equilibrium analysis.

6.4 Limitations and Future Research

Several limitations suggest directions for future research. First, our three-country aggregation, while computationally tractable, may miss important bilateral relationships with specific major trading partners such as China and Mexico. Future work could extend the analysis to include more disaggregated country coverage.

Second, our focus on tariff policy abstracts from other trade policy instruments such as non-tariff barriers, trade facilitation measures, and regulatory harmonization. A comprehensive trade policy evaluation would incorporate these additional dimensions.

Third, our static framework does not capture dynamic effects such as investment responses, innovation incentives, or learning-by-doing effects that might modify the welfare calculations over longer time horizons. Dynamic extensions would provide valuable insights into the long-run effects of trade policy changes.

Fourth, our welfare analysis focuses on aggregate real income effects and does not incorporate non-economic objectives that might justify protectionist policies, such as national security, supply chain resilience, or strategic industrial development. Future research might develop frameworks for incorporating these objectives into quantitative policy evaluation.

6.5 Final Remarks

Contemporary debates over trade policy would benefit from rigorous quantitative analysis using state-of-the-art theoretical and empirical methods. Our framework provides a foundation for evidence-based policy evaluation that incorporates both theoretical rigor and empirical realism. As trade policy continues to evolve in response to geopolitical and economic challenges, maintaining the capacity for timely and accurate policy evaluation becomes increasingly important for informed democratic deliberation.

The integration of high-frequency administrative data with structural economic models represents a promising direction for policy-relevant research. Our approach demonstrates that it is possible to provide quantitative policy guidance that is both theoretically grounded and empirically current, bridging the gap between academic research and policy application that has often limited the practical influence of economic analysis.

The welfare costs we identify are substantial enough to warrant careful consideration in policy deliberations. While our analysis does not incorporate all potential benefits of trade policy changes, it provides a baseline for evaluating whether such benefits are sufficient to justify the measured economic costs. This quantitative foundation can inform more effective and efficient trade policy design in an increasingly complex global economy.

References

Costinot, A., D. Donaldson, and I. Komunjer (2012, April). What Goods Do Countries Trade? A Quantitative Exploration of Ricardo's Ideas. The Review of Economic Studies 79(2), 581–608.

Eaton, J. and S. Kortum (2002, September). Technology, Geography, and Trade. Econometrica 70(5), 1741–1779.

Ignatenko, M., L. Macedoni, S. Lashkaripour, and I. Simonovska (2025). Making america great again? the economic impacts of liberation day tariffs. Journal of International Economics. Forthcoming.

Mazumder, R., T. Hastie, and R. Tibshirani (2010). Spectral regularization algorithms for learning large incomplete matrices. Journal of Machine Learning Research 11, 2287–2322.

Timmer, M. P., E. Dietzenbacher, B. Los, R. Stehrer, and G. J. de Vries (2015). An illustrated user guide to the world input–output database: The case of global automotive production. Review of International Economics 23(3), 575–605. Data hosted on Dataverse: https://doi.org/10.34894/XDTAUZ.

UISTC (2025). USITC DataWeb - General Imports by HTS. https://dataweb.usitc.gov/trade/search/GenImp/HTS. Accessed: 2025-10-06.

WITS (2025). WITS - World Integrated Trade Solution (TRAINS / Tariff & Trade Data). https://wits.worldbank.org/WITS/. Accessed: 2025-10-06.

Appendix

This appendix contains the estimated parameters and data tables used in the analysis.

Estimated Parameters Tables 5 and 6 present the estimated preference parameters and labor share parameters for each country and sector.

Technology Parameters Tables 7 through 16 show the intermediate input coefficients for each country.

Productivity Parameters Table 17 presents the productivity parameters used in the model calibration.

Tariff Data Tables 18 through 27 contain the tariff rates applied by each country across different sectors.

Trade Cost Decomposition Tables 29, 31, and 33 provide the decomposition of iceberg trade costs into bilateral, exporter, and importer components. Tables 35 through 57 present the final estimated iceberg trade costs for each sector.

Table 5: Expenditure Shares (α)

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.082	0.047	0.096	0.117	0.075	0.079	0.046	0.030	0.105	0.245	0.015	0.063
CAN	0.055	0.059	0.047	0.059	0.086	0.077	0.078	0.052	0.137	0.289	0.006	0.056
CHN	0.112	0.014	0.072	0.107	0.172	0.166	0.061	0.041	0.042	0.123	0.049	0.043
EU	0.050	0.097	0.063	0.055	0.090	0.078	0.028	0.031	0.109	0.318	0.008	0.073
GBR	0.034	0.105	0.043	0.037	0.057	0.038	0.036	0.030	0.100	0.451	0.003	0.066
IND	0.073	0.041	0.114	0.109	0.108	0.146	0.052	0.021	0.101	0.116	0.025	0.096
JPN	0.080	0.042	0.069	0.060	0.109	0.109	0.039	0.037	0.092	0.303	0.007	0.053
MEX	0.095	0.042	0.073	0.088	0.122	0.096	0.073	0.034	0.116	0.204	0.016	0.042
RoW	0.053	0.044	0.077	0.092	0.098	0.086	0.135	0.036	0.099	0.187	0.012	0.082
USA	0.053	0.082	0.047	0.052	0.068	0.055	0.041	0.034	0.060	0.464	0.004	0.040

Table 6: Labor Shares (β)

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.166	0.220	0.093	0.170	0.206	0.213	0.153	0.258	0.443	0.447	0.276	0.366
CAN	0.184	0.174	0.096	0.133	0.203	0.192	0.112	0.267	0.418	0.440	0.391	0.329
CHN	0.060	0.113	0.065	0.329	0.067	0.065	0.164	0.081	0.145	0.239	0.085	0.123
EU	0.166	0.172	0.085	0.250	0.229	0.224	0.211	0.220	0.402	0.451	0.240	0.276
GBR	0.296	0.344	0.100	0.310	0.323	0.363	0.106	0.376	0.407	0.377	0.382	0.398
IND	0.062	0.248	0.059	0.313	0.079	0.069	0.217	0.199	0.555	0.407	0.175	0.155
JPN	0.145	0.204	0.063	0.195	0.169	0.148	0.102	0.267	0.411	0.405	0.458	0.443
MEX	0.096	0.121	0.061	0.121	0.094	0.084	0.039	0.131	0.195	0.380	0.166	0.211
RoW	0.123	0.173	0.068	0.255	0.155	0.119	0.206	0.217	0.378	0.432	0.144	0.230
USA	0.152	0.173	0.102	0.151	0.250	0.224	0.195	0.221	0.448	0.422	0.338	0.393

Table 7: Intermediate Input Shares (γ) - BRA

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.362	0.012	0.126	0.027	0.023	0.033	0.036	0.025	0.138	0.173	0.006	0.039
Construction	0.087	0.110	0.033	0.002	0.058	0.362	0.029	0.042	0.123	0.121	0.002	0.031
Energy	0.017	0.007	0.311	0.051	0.031	0.008	0.382	0.002	0.060	0.096	0.000	0.034
Food	0.097	0.007	0.045	0.537	0.010	0.017	0.005	0.009	0.141	0.102	0.002	0.029
Manufacture	0.084	0.010	0.038	0.002	0.331	0.216	0.002	0.024	0.110	0.146	0.004	0.032
Metal	0.078	0.010	0.101	0.003	0.039	0.339	0.120	0.016	0.109	0.150	0.003	0.033
Mining	0.034	0.168	0.077	0.002	0.071	0.078	0.095	0.006	0.062	0.303	0.006	0.099
Paper	0.121	0.015	0.064	0.136	0.024	0.028	0.004	0.304	0.101	0.158	0.007	0.038
Retail	0.021	0.103	0.125	0.004	0.059	0.007	0.001	0.023	0.107	0.420	0.006	0.123
Services	0.044	0.082	0.088	0.072	0.043	0.008	0.001	0.034	0.084	0.435	0.006	0.102
Textiles	0.088	0.013	0.055	0.072	0.019	0.007	0.001	0.013	0.161	0.109	0.436	0.026
Transport	0.040	0.051	0.134	0.015	0.081	0.006	0.001	0.052	0.105	0.385	0.011	0.120

Table 8: Intermediate Input Shares (γ) - CAN

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.407	0.020	0.123	0.013	0.014	0.021	0.058	0.020	0.157	0.128	0.007	0.032
Construction	0.043	0.117	0.036	0.010	0.071	0.188	0.079	0.106	0.104	0.221	0.006	0.019
Energy	0.023	0.033	0.046	0.003	0.011	0.009	0.670	0.005	0.087	0.060	0.000	0.054
Food	0.058	0.028	0.040	0.430	0.014	0.017	0.014	0.030	0.182	0.136	0.003	0.048
Manufacture	0.045	0.019	0.011	0.004	0.443	0.156	0.009	0.026	0.143	0.115	0.007	0.021
Metal	0.023	0.017	0.046	0.003	0.018	0.451	0.179	0.010	0.151	0.075	0.001	0.027
Mining	0.020	0.071	0.074	0.006	0.050	0.029	0.253	0.010	0.214	0.238	0.001	0.033
Paper	0.051	0.024	0.053	0.191	0.021	0.008	0.017	0.296	0.166	0.153	0.002	0.017
Retail	0.066	0.080	0.047	0.016	0.087	0.036	0.013	0.073	0.093	0.450	0.007	0.032
Services	0.031	0.076	0.039	0.036	0.035	0.005	0.012	0.038	0.140	0.523	0.003	0.063
Textiles	0.095	0.023	0.028	0.008	0.016	0.004	0.009	0.023	0.178	0.121	0.472	0.023
Transport	0.013	0.049	0.140	0.004	0.028	0.004	0.027	0.006	0.129	0.202	0.001	0.398

Table 9: Intermediate Input Shares (γ) - CHN

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.508	0.004	0.113	0.061	0.036	0.032	0.074	0.021	0.033	0.071	0.018	0.030
Construction	0.057	0.021	0.037	0.013	0.111	0.451	0.020	0.038	0.048	0.106	0.009	0.087
Energy	0.018	0.001	0.313	0.007	0.091	0.013	0.403	0.004	0.026	0.091	0.006	0.026
Food	0.081	0.002	0.021	0.701	0.015	0.012	0.004	0.017	0.045	0.071	0.003	0.029
Manufacture	0.081	0.004	0.022	0.008	0.495	0.209	0.006	0.019	0.050	0.073	0.012	0.021
Metal	0.048	0.003	0.097	0.007	0.072	0.431	0.175	0.021	0.038	0.069	0.007	0.033
Mining	0.080	0.004	0.185	0.011	0.177	0.118	0.145	0.016	0.034	0.141	0.013	0.076
Paper	0.128	0.006	0.036	0.125	0.043	0.022	0.010	0.486	0.040	0.059	0.016	0.030
Retail	0.027	0.079	0.037	0.019	0.079	0.004	0.001	0.036	0.023	0.480	0.034	0.183
Services	0.101	0.049	0.046	0.124	0.149	0.018	0.005	0.066	0.053	0.320	0.030	0.039
Textiles	0.097	0.007	0.020	0.159	0.018	0.008	0.005	0.013	0.025	0.048	0.581	0.018
Transport	0.048	0.014	0.244	0.042	0.157	0.020	0.015	0.012	0.033	0.262	0.018	0.135

Table 10: Intermediate Input Shares (γ) - EU

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.327	0.021	0.089	0.019	0.035	0.037	0.015	0.021	0.161	0.220	0.006	0.049
Construction	0.032	0.356	0.030	0.005	0.057	0.147	0.010	0.029	0.084	0.227	0.002	0.022
Energy	0.025	0.038	0.271	0.003	0.032	0.017	0.322	0.005	0.094	0.130	0.001	0.062
Food	0.046	0.020	0.052	0.434	0.022	0.024	0.003	0.021	0.177	0.150	0.002	0.048
Manufacture	0.055	0.023	0.023	0.003	0.364	0.166	0.002	0.023	0.138	0.159	0.006	0.037
Metal	0.039	0.026	0.063	0.003	0.074	0.418	0.052	0.013	0.128	0.130	0.002	0.051
Mining	0.042	0.049	0.158	0.006	0.094	0.088	0.122	0.013	0.108	0.195	0.002	0.123
Paper	0.059	0.030	0.052	0.067	0.030	0.023	0.005	0.306	0.144	0.217	0.004	0.063
Retail	0.024	0.131	0.054	0.023	0.055	0.018	0.002	0.029	0.126	0.390	0.007	0.140
Services	0.026	0.097	0.042	0.044	0.045	0.010	0.001	0.030	0.067	0.603	0.003	0.031
Textiles	0.085	0.031	0.046	0.036	0.028	0.016	0.002	0.015	0.218	0.146	0.323	0.054
Transport	0.013	0.048	0.103	0.005	0.051	0.010	0.001	0.010	0.079	0.244	0.001	0.434

Table 11: Intermediate Input Shares (γ) - GBR

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.277	0.012	0.067	0.014	0.029	0.042	0.010	0.031	0.269	0.195	0.004	0.051
Construction	0.024	0.411	0.007	0.003	0.022	0.062	0.013	0.023	0.048	0.375	0.001	0.011
Energy	0.002	0.015	0.307	0.001	0.012	0.009	0.526	0.003	0.035	0.071	0.000	0.018
Food	0.049	0.020	0.054	0.375	0.022	0.028	0.002	0.032	0.191	0.182	0.002	0.044
Manufacture	0.054	0.014	0.030	0.003	0.297	0.187	0.002	0.026	0.197	0.152	0.005	0.032
Metal	0.029	0.014	0.086	0.004	0.066	0.350	0.038	0.017	0.204	0.122	0.001	0.070
Mining	0.011	0.052	0.075	0.003	0.048	0.064	0.306	0.006	0.067	0.288	0.001	0.079
Paper	0.041	0.025	0.049	0.012	0.025	0.015	0.002	0.364	0.164	0.234	0.002	0.066
Retail	0.018	0.167	0.031	0.032	0.043	0.011	0.002	0.018	0.084	0.405	0.004	0.183
Services	0.024	0.055	0.022	0.037	0.047	0.004	0.001	0.025	0.086	0.656	0.002	0.040
Textiles	0.059	0.020	0.047	0.013	0.033	0.017	0.002	0.029	0.295	0.206	0.210	0.069
Transport	0.016	0.048	0.047	0.005	0.039	0.005	0.002	0.012	0.070	0.391	0.001	0.362

Table 12: Intermediate Input Shares (γ) - IND

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.454	0.009	0.099	0.059	0.037	0.018	0.013	0.021	0.118	0.054	0.018	0.100
Construction	0.020	0.099	0.080	0.032	0.063	0.402	0.025	0.024	0.098	0.057	0.003	0.097
Energy	0.022	0.025	0.210	0.002	0.040	0.006	0.320	0.003	0.173	0.065	0.002	0.133
Food	0.063	0.022	0.052	0.545	0.017	0.004	0.001	0.016	0.120	0.045	0.008	0.107
Manufacture	0.053	0.018	0.029	0.004	0.357	0.217	0.007	0.013	0.077	0.150	0.010	0.065
Metal	0.030	0.026	0.127	0.003	0.039	0.421	0.102	0.009	0.099	0.050	0.003	0.092
Mining	0.123	0.142	0.151	0.008	0.160	0.097	0.008	0.017	0.070	0.136	0.003	0.084
Paper	0.096	0.013	0.066	0.171	0.027	0.015	0.009	0.297	0.108	0.075	0.008	0.114
Retail	0.007	0.045	0.065	0.000	0.067	0.009	0.000	0.066	0.022	0.420	0.010	0.289
Services	0.050	0.081	0.044	0.169	0.110	0.007	0.000	0.021	0.063	0.382	0.005	0.068
Textiles	0.086	0.021	0.060	0.123	0.075	0.011	0.002	0.013	0.091	0.094	0.325	0.100
Transport	0.062	0.047	0.368	0.024	0.156	0.016	0.000	0.016	0.080	0.150	0.007	0.072

Table 13: Intermediate Input Shares (γ) - JPN

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.500	0.016	0.127	0.017	0.012	0.031	0.007	0.023	0.082	0.146	0.004	0.034
Construction	0.031	0.085	0.039	0.004	0.034	0.234	0.022	0.055	0.107	0.341	0.005	0.044
Energy	0.012	0.072	0.135	0.001	0.008	0.014	0.455	0.007	0.080	0.143	0.001	0.071
Food	0.060	0.007	0.045	0.544	0.009	0.027	0.000	0.035	0.127	0.101	0.004	0.040
Manufacture	0.071	0.009	0.026	0.003	0.490	0.147	0.001	0.015	0.084	0.123	0.004	0.027
Metal	0.025	0.018	0.057	0.002	0.029	0.539	0.074	0.010	0.087	0.104	0.002	0.052
Mining	0.022	0.017	0.147	0.003	0.013	0.029	0.395	0.003	0.130	0.142	0.006	0.092
Paper	0.106	0.018	0.065	0.069	0.015	0.035	0.005	0.346	0.132	0.143	0.009	0.055
Retail	0.027	0.088	0.076	0.004	0.117	0.028	0.000	0.031	0.082	0.476	0.008	0.062
Services	0.061	0.048	0.072	0.059	0.033	0.009	0.000	0.043	0.090	0.538	0.007	0.039
Textiles	0.147	0.013	0.050	0.028	0.025	0.009	0.000	0.021	0.124	0.168	0.384	0.031
Transport	0.014	0.077	0.148	0.003	0.046	0.009	0.000	0.025	0.070	0.316	0.005	0.286

Table 14: Intermediate Input Shares (γ) - MEX

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.318	0.012	0.050	0.013	0.016	0.018	0.281	0.029	0.103	0.114	0.006	0.040
Construction	0.068	0.129	0.044	0.005	0.053	0.297	0.026	0.024	0.141	0.165	0.001	0.048
Energy	0.133	0.004	0.151	0.002	0.011	0.011	0.500	0.003	0.073	0.090	0.001	0.022
Food	0.073	0.011	0.055	0.516	0.010	0.016	0.002	0.021	0.149	0.095	0.003	0.050
Manufacture	0.095	0.010	0.018	0.002	0.479	0.133	0.002	0.030	0.100	0.076	0.022	0.032
Metal	0.045	0.011	0.104	0.004	0.042	0.390	0.111	0.018	0.147	0.086	0.005	0.038
Mining	0.225	0.006	0.097	0.004	0.020	0.068	0.078	0.006	0.148	0.294	0.001	0.052
Paper	0.096	0.021	0.060	0.084	0.022	0.025	0.001	0.326	0.141	0.140	0.023	0.061
Retail	0.043	0.107	0.054	0.032	0.133	0.043	0.001	0.057	0.111	0.366	0.016	0.036
Services	0.071	0.075	0.071	0.010	0.051	0.021	0.000	0.051	0.080	0.525	0.006	0.039
Textiles	0.070	0.017	0.039	0.110	0.048	0.013	0.001	0.025	0.115	0.102	0.420	0.039
Transport	0.037	0.023	0.290	0.004	0.066	0.015	0.002	0.017	0.153	0.305	0.005	0.083

Table 15: Intermediate Input Shares (γ) - RoW

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.378	0.005	0.120	0.027	0.024	0.026	0.159	0.019	0.094	0.082	0.009	0.058
Construction	0.032	0.098	0.046	0.011	0.065	0.242	0.136	0.035	0.105	0.137	0.002	0.091
Energy	0.017	0.010	0.203	0.002	0.033	0.010	0.510	0.003	0.096	0.053	0.001	0.061
Food	0.044	0.010	0.039	0.553	0.013	0.011	0.019	0.019	0.141	0.084	0.002	0.065
Manufacture	0.071	0.008	0.025	0.005	0.466	0.160	0.015	0.022	0.090	0.088	0.007	0.042
Metal	0.026	0.007	0.070	0.002	0.036	0.393	0.266	0.011	0.079	0.055	0.002	0.053
Mining	0.021	0.021	0.105	0.003	0.041	0.038	0.527	0.006	0.050	0.111	0.001	0.074
Paper	0.067	0.011	0.053	0.092	0.027	0.018	0.044	0.413	0.108	0.093	0.006	0.070
Retail	0.019	0.097	0.068	0.038	0.056	0.011	0.012	0.039	0.100	0.374	0.006	0.180
Services	0.036	0.080	0.064	0.078	0.072	0.012	0.027	0.050	0.095	0.412	0.006	0.070
Textiles	0.092	0.011	0.042	0.117	0.022	0.010	0.025	0.018	0.121	0.091	0.388	0.064
Transport	0.027	0.042	0.187	0.014	0.104	0.017	0.046	0.016	0.109	0.242	0.004	0.190

Table 16: Intermediate Input Shares (γ) - USA

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
Chemical	0.465	0.012	0.088	0.017	0.029	0.028	0.023	0.023	0.071	0.210	0.006	0.028
Construction	0.027	0.145	0.047	0.001	0.060	0.102	0.010	0.036	0.080	0.476	0.001	0.015
Energy	0.009	0.022	0.065	0.000	0.004	0.005	0.715	0.002	0.048	0.058	0.000	0.070
Food	0.057	0.020	0.050	0.520	0.015	0.027	0.004	0.037	0.086	0.143	0.001	0.040
Manufacture	0.064	0.013	0.016	0.001	0.347	0.202	0.004	0.027	0.084	0.210	0.009	0.023
Metal	0.039	0.023	0.049	0.001	0.055	0.442	0.045	0.020	0.064	0.210	0.001	0.052
Mining	0.056	0.079	0.057	0.001	0.053	0.091	0.197	0.015	0.039	0.348	0.000	0.063
Paper	0.068	0.035	0.047	0.046	0.034	0.032	0.005	0.253	0.077	0.336	0.013	0.055
Retail	0.024	0.122	0.030	0.002	0.076	0.015	0.001	0.027	0.090	0.518	0.006	0.088
Services	0.024	0.106	0.037	0.025	0.043	0.011	0.005	0.028	0.043	0.648	0.002	0.029
Textiles	0.277	0.013	0.044	0.045	0.024	0.018	0.002	0.021	0.089	0.131	0.303	0.033
Transport	0.013	0.049	0.226	0.000	0.050	0.024	0.012	0.010	0.047	0.379	0.000	0.190

Table 17: Technology Parameters

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.431	0.111	0.372	0.526	0.411	0.477	0.446	0.472	0.277	0.282	0.454	0.267
CAN	0.461	0.300	0.432	0.468	0.481	0.480	0.540	0.530	0.435	0.412	0.392	0.407
CHN	0.623	0.447	0.460	0.462	0.721	0.621	0.361	0.526	0.577	0.413	0.780	0.563
EU	0.697	0.427	0.641	0.539	0.711	0.667	0.390	0.646	0.626	0.606	0.623	0.668
GBR	0.511	0.250	0.452	0.372	0.512	0.491	0.354	0.450	0.427	0.512	0.426	0.478
IND	0.451	1.407	0.397	0.436	0.479	0.452	0.304	0.348	0.297	0.422	0.508	0.422
JPN	0.548	0.106	0.454	0.321	0.624	0.583	0.289	0.419	0.371	0.398	0.459	0.524
MEX	0.405	0.105	0.337	0.340	0.451	0.429	0.332	0.308	0.422	0.230	0.374	0.291
RoW	0.714	0.415	0.751	0.688	0.723	0.720	0.751	0.633	0.662	0.536	0.652	0.670
USA	0.662	0.138	0.597	0.574	0.707	0.605	0.437	0.632	0.377	0.594	0.561	0.675

Table 18: Tariff Rates - BRA

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAN	0.001	0.016	0.000	0.057	0.003	0.000	0.000	0.001	0.000	0.000	0.068	0.000
CHN	0.069	0.031	0.002	0.074	0.055	0.021	0.000	0.000	0.000	0.000	0.134	0.000
EU	0.038	0.004	0.003	0.082	0.033	0.009	0.000	0.006	0.000	0.000	0.048	0.000
GBR	0.007	0.000	0.007	0.180	0.004	0.002	0.000	0.013	0.000	0.000	0.075	0.000
IND	0.088	0.104	0.007	0.448	0.114	0.025	0.025	0.070	0.000	0.000	0.059	0.000
JPN	0.017	0.001	0.000	0.068	0.014	0.001	0.000	0.001	0.000	0.000	0.134	0.000
MEX	0.040	0.021	0.015	0.178	0.152	0.042	0.000	0.016	0.000	0.000	0.092	0.000
RoW	0.038	0.045	0.030	0.585	0.043	0.033	0.000	0.004	0.000	0.000	0.002	0.000
USA	0.038	0.103	0.037	0.052	0.033	0.058	0.082	0.063	0.000	0.000	0.058	0.000

Table 19: Tariff Rates - CAN

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.014	0.047	0.055	0.081	0.067	0.077	0.020	0.114	0.000	0.000	0.254	0.000
CAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHN	0.038	0.029	0.019	0.079	0.003	0.026	0.000	0.001	0.000	0.000	0.081	0.000
EU	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GBR	0.000	0.000	0.000	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
IND	0.080	0.094	0.014	0.010	0.093	0.014	0.025	0.068	0.000	0.000	0.175	0.000
JPN	0.001	0.000	0.000	0.191	0.001	0.000	0.000	0.002	0.000	0.000	0.008	0.000
MEX	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RoW	0.011	0.002	0.004	0.110	0.009	0.007	0.000	0.001	0.000	0.000	0.030	0.000
USA	0.017	0.067	0.040	0.010	0.007	0.010	0.046	0.037	0.000	0.000	0.015	0.000

Table 20: Tariff Rates - CHN

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.072	0.068	0.113	0.096	0.133	0.123	0.020	0.128	0.000	0.000	0.262	0.000
CAN	0.027	0.036	0.002	0.038	0.026	0.012	0.000	0.009	0.000	0.000	0.148	0.000
CHN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EU	0.045	0.008	0.011	0.110	0.024	0.029	0.000	0.008	0.000	0.000	0.104	0.000
GBR	0.042	0.000	0.004	0.098	0.022	0.017	0.000	0.011	0.000	0.000	0.105	0.000
IND	0.074	0.088	0.052	0.260	0.106	0.080	0.015	0.080	0.000	0.000	0.123	0.000
JPN	0.014	0.001	0.000	0.101	0.007	0.007	0.000	0.016	0.000	0.000	0.063	0.000
MEX	0.052	0.044	0.018	0.153	0.053	0.038	0.000	0.032	0.000	0.000	0.173	0.000
RoW	0.030	0.035	0.016	0.261	0.025	0.029	0.002	0.021	0.000	0.000	0.069	0.000
USA	0.077	0.140	0.038	0.088	0.050	0.088	0.512	0.128	0.000	0.000	0.071	0.000

Table 21: Tariff Rates - EU

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.069	0.066	0.108	0.133	0.143	0.126	0.020	0.121	0.000	0.000	0.230	0.000
CAN	0.000	0.000	0.000	0.120	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHN	0.036	0.065	0.045	0.113	0.061	0.046	0.000	0.012	0.000	0.000	0.066	0.000
EU	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GBR	0.001	0.000	0.000	0.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
IND	0.093	0.187	0.074	0.630	0.112	0.050	0.041	0.071	0.000	0.000	0.114	0.000
JPN	0.000	0.001	0.000	0.078	0.008	0.000	0.000	0.004	0.000	0.000	0.000	0.000
MEX	0.000	0.000	0.000	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RoW	0.021	0.041	0.013	0.103	0.026	0.022	0.000	0.023	0.000	0.000	0.032	0.000
USA	0.009	0.087	0.025	0.053	0.019	0.044	0.111	0.075	0.000	0.000	0.037	0.000

Table 22: Tariff Rates - GBR

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.084	0.081	0.114	0.165	0.165	0.117	0.020	0.123	0.000	0.000	0.166	0.000
CAN	0.010	0.016	0.000	0.145	0.020	0.005	0.000	0.001	0.000	0.000	0.089	0.000
CHN	0.033	0.099	0.027	0.103	0.087	0.030	0.000	0.050	0.000	0.000	0.066	0.000
EU	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GBR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
IND	0.139	0.079	0.086	1.411	0.175	0.024	0.047	0.038	0.000	0.000	0.117	0.000
JPN	0.005	0.003	0.000	0.053	0.008	0.010	0.000	0.004	0.000	0.000	0.071	0.000
MEX	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RoW	0.037	0.030	0.040	0.077	0.047	0.042	0.000	0.027	0.000	0.000	0.083	0.000
USA	0.012	0.051	0.021	0.047	0.014	0.040	0.113	0.051	0.000	0.000	0.033	0.000

Table 23: Tariff Rates - IND

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.076	0.068	0.115	0.102	0.143	0.112	0.020	0.141	0.000	0.000	0.238	0.000
CAN	0.004	0.037	0.000	0.025	0.030	0.007	0.000	0.013	0.000	0.000	0.133	0.000
CHN	0.056	0.016	0.048	0.075	0.026	0.027	0.000	0.034	0.000	0.000	0.050	0.000
EU	0.005	0.000	0.000	0.053	0.005	0.008	0.000	0.001	0.000	0.000	0.082	0.000
GBR	0.000	0.000	0.000	0.030	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
IND	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
JPN	0.001	0.001	0.000	0.021	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MEX	0.027	0.018	0.023	0.158	0.123	0.022	0.000	0.053	0.000	0.000	0.212	0.000
RoW	0.034	0.029	0.028	0.151	0.047	0.021	0.001	0.023	0.000	0.000	0.064	0.000
USA	0.031	0.134	0.051	0.061	0.036	0.077	0.045	0.101	0.000	0.000	0.058	0.000

Table 24: Tariff Rates - JPN

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.061	0.075	0.112	0.118	0.126	0.118	0.020	0.126	0.000	0.000	0.181	0.000
CAN	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHN	0.044	0.095	0.030	0.113	0.035	0.032	0.000	0.035	0.000	0.000	0.066	0.000
EU	0.001	0.000	0.001	0.005	0.017	0.001	0.000	0.000	0.000	0.000	0.000	0.000
GBR	0.002	0.000	0.000	0.016	0.020	0.002	0.000	0.000	0.000	0.000	0.000	0.000
IND	0.006	0.039	0.018	0.604	0.037	0.003	0.000	0.026	0.000	0.000	0.000	0.000
JPN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MEX	0.000	0.000	0.000	0.014	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RoW	0.029	0.035	0.021	0.142	0.027	0.028	0.005	0.002	0.000	0.000	0.052	0.000
USA	0.022	0.055	0.026	0.070	0.025	0.058	0.169	0.081	0.000	0.000	0.034	0.000

Table 25: Tariff Rates - MEX

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.056	0.034	0.043	0.046	0.021	0.040	0.016	0.107	0.000	0.000	0.119	0.000
CAN	0.000	0.000	0.000	0.024	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHN	0.073	0.054	0.020	0.068	0.030	0.022	0.000	0.030	0.000	0.000	0.111	0.000
EU	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GBR	0.000	0.000	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
IND	0.089	0.096	0.007	0.990	0.078	0.026	0.028	0.069	0.000	0.000	0.092	0.000
JPN	0.000	0.007	0.000	0.182	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MEX	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RoW	0.059	0.025	0.035	0.114	0.036	0.012	0.000	0.023	0.000	0.000	0.034	0.000
USA	0.015	0.060	0.008	0.020	0.005	0.016	0.012	0.015	0.000	0.000	0.007	0.000

Table 26: Tariff Rates - RoW

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.029	0.040	0.043	0.103	0.088	0.110	0.020	0.098	0.000	0.000	0.213	0.000
CAN	0.006	0.009	0.001	0.056	0.010	0.001	0.000	0.004	0.000	0.000	0.117	0.000
CHN	0.031	0.005	0.007	0.076	0.005	0.013	0.000	0.012	0.000	0.000	0.091	0.000
EU	0.006	0.000	0.001	0.040	0.005	0.007	0.000	0.002	0.000	0.000	0.008	0.000
GBR	0.007	0.000	0.001	0.071	0.002	0.002	0.000	0.000	0.000	0.000	0.001	0.000
IND	0.044	0.202	0.005	0.142	0.055	0.018	0.011	0.032	0.000	0.000	0.076	0.000
JPN	0.013	0.011	0.000	0.148	0.002	0.003	0.000	0.016	0.000	0.000	0.024	0.000
MEX	0.040	0.058	0.012	0.078	0.033	0.073	0.000	0.028	0.000	0.000	0.185	0.000
RoW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
USA	0.059	0.201	0.017	0.074	0.023	0.064	0.342	0.094	0.000	0.000	0.056	0.000

Table 27: Tariff Rates - USA

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.084	0.035	0.039	0.099	0.102	0.119	0.020	0.112	0.000	0.000	0.169	0.000
CAN	0.017	0.020	0.002	0.135	0.032	0.006	0.000	0.002	0.000	0.000	0.062	0.000
CHN	0.046	0.051	0.026	0.083	0.053	0.040	0.000	0.010	0.000	0.000	0.120	0.000
EU	0.014	0.006	0.008	0.052	0.022	0.028	0.000	0.001	0.000	0.000	0.070	0.000
GBR	0.014	0.000	0.001	0.082	0.006	0.019	0.000	0.000	0.000	0.000	0.070	0.000
IND	0.085	0.077	0.032	0.221	0.099	0.031	0.038	0.052	0.000	0.000	0.076	0.000
JPN	0.008	0.003	0.000	0.198	0.006	0.016	0.000	0.001	0.000	0.000	0.046	0.000
MEX	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RoW	0.021	0.024	0.009	0.186	0.018	0.014	0.000	0.008	0.000	0.000	0.021	0.000
USA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 28: Bilateral Trade Costs (d_{ni}) (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.000	1.197	1.231	1.199	1.198	1.207	1.198	1.198	1.199	1.198
CAN	1.203	1.000	1.271	1.207	1.199	1.237	1.200	1.200	1.210	1.205
CHN	1.181	1.194	1.000	1.166	1.192	1.131	1.187	1.189	1.158	1.175
EU	1.199	1.198	1.248	1.000	1.198	1.213	1.198	1.198	1.201	1.199
GBR	1.201	1.198	1.255	1.206	1.000	1.219	1.200	1.200	1.206	1.203
IND	1.190	1.196	1.174	1.182	1.195	1.000	1.193	1.194	1.180	1.185
JPN	1.200	1.198	1.253	1.203	1.198	1.223	1.000	1.199	1.204	1.201
MEX	1.199	1.198	1.234	1.200	1.198	1.210	1.198	1.000	1.201	1.199
RoW	1.200	1.198	1.265	1.201	1.198	1.222	1.198	1.198	1.000	1.199
USA	1.200	1.198	1.257	1.203	1.198	1.221	1.199	1.199	1.204	1.000

Table 29: Bilateral Trade Costs (d_{ni}) (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.000	1.201	1.310	1.205	1.200	1.212	1.203	1.200	1.199	1.205
CAN	1.221	1.000	1.385	1.241	1.208	1.433	1.212	1.210	1.236	1.239
CHN	1.145	1.192	1.000	1.113	1.181	1.088	1.172	1.180	1.121	1.113
EU	1.201	1.203	1.298	1.000	1.196	1.200	1.203	1.203	1.200	1.196
GBR	1.219	1.204	1.344	1.243	1.000	1.235	1.213	1.209	1.235	1.243
IND	1.186	1.200	1.155	1.195	1.200	1.000	1.194	1.196	1.178	1.197
JPN	1.211	1.203	1.303	1.224	1.204	1.228	1.000	1.206	1.217	1.221
MEX	1.207	1.201	1.283	1.212	1.202	1.206	1.203	1.000	1.209	1.211
RoW	1.206	1.204	1.381	1.207	1.201	1.305	1.203	1.204	1.000	1.205
USA	1.206	1.199	1.354	1.204	1.200	1.262	1.202	1.201	1.204	1.000

Table 30: Exporter Fixed Effects ($d_{jk}^{exporter}$) (with Labor Mobility)

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	1.004	1.001	1.003	1.006	1.006	1.007	1.003	1.002	1.002	1.005	1.002	1.002
CAN	1.010	1.005	1.009	1.019	1.017	1.016	1.009	1.005	1.010	1.021	1.003	1.007
CHN	0.950	0.988	0.965	0.955	0.923	0.929	0.974	0.982	0.963	0.926	0.979	0.971
EU	1.008	1.005	1.005	1.005	1.010	1.009	1.002	1.003	1.006	1.012	1.003	1.005
GBR	1.009	1.004	1.007	1.006	1.010	1.013	1.005	1.003	1.008	1.021	1.003	1.007
IND	0.989	0.988	0.986	0.983	0.984	0.981	0.991	0.996	0.989	0.970	0.997	0.989
JPN	1.010	1.001	1.007	1.004	1.016	1.015	1.004	1.003	1.006	1.014	1.004	1.006
MEX	1.005	1.001	1.004	1.005	1.009	1.009	1.003	1.001	1.005	1.006	1.002	1.003
RoW	1.009	1.005	1.008	1.011	1.016	1.013	1.006	1.003	1.007	1.011	1.003	1.006
USA	1.009	1.002	1.007	1.009	1.013	1.012	1.004	1.004	1.005	1.019	1.003	1.007

Table 31: Exporter Fixed Effects ($d_{jk}^{exporter}$) (without Labor Mobility)

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	0.994	0.999	0.994	1.126	0.990	0.990	1.000	1.003	1.002	1.027	1.001	0.998
CAN	0.998	1.006	0.995	1.306	1.002	0.992	1.003	1.005	1.028	1.175	1.003	1.004
CHN	1.011	0.963	1.004	0.537	1.004	1.055	0.990	0.987	0.952	0.595	0.990	0.982
EU	1.002	1.001	1.000	1.105	0.988	0.991	0.999	1.004	1.013	0.952	1.004	1.010
GBR	0.998	1.003	0.993	1.075	0.994	0.991	0.997	1.002	1.026	1.236	1.005	1.006
IND	1.003	1.036	1.004	0.680	1.008	0.995	0.997	0.997	0.967	1.044	0.993	0.987
JPN	1.000	1.000	0.995	1.064	1.006	0.997	0.998	1.001	1.016	1.108	1.004	1.007
MEX	0.995	1.000	0.993	1.076	0.996	0.989	0.995	1.001	1.022	1.050	1.002	0.999
RoW	1.009	0.998	1.029	1.147	1.023	1.020	1.029	1.005	0.990	1.019	1.003	1.007
USA	1.002	0.999	1.003	1.200	1.004	0.996	1.001	1.006	0.998	0.967	1.003	1.015

Table 32: Importer Fixed Effects ($d_{ik}^{importer}$) (with Labor Mobility)

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
CAN	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
CHN	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
EU	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
GBR	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
IND	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
JPN	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
MEX	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
RoW	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
USA	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table 33: Importer Fixed Effects ($d_{ik}^{importer}$) (without Labor Mobility)

	Chemical	Construction	Energy	Food	Manufacture	Metal	Mining	Paper	Retail	Services	Textiles	Transport
BRA	1.001	1.000	1.000	1.000	1.001	1.001	1.001	1.000	1.001	1.001	1.000	1.001
CAN	1.001	1.000	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
CHN	1.001	1.001	1.001	1.000	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
EU	1.002	1.001	1.001	1.001	1.002	1.002	1.001	1.001	1.001	1.001	1.001	1.001
GBR	1.001	1.001	1.001	1.001	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001
IND	1.001	1.001	1.001	0.999	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
JPN	1.001	1.000	1.001	1.000	1.002	1.002	1.001	1.001	1.001	1.001	1.001	1.001
MEX	1.001	1.000	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
RoW	1.001	1.001	1.001	1.000	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
USA	1.001	0.999	1.001	1.001	1.002	1.001	1.000	1.001	1.001	1.001	1.001	1.001

Table 34: Iceberg Trade Costs (d_{nik}) - Chemical (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.004	1.202	1.236	1.204	1.202	1.212	1.203	1.202	1.204	1.203
CAN	1.215	1.010	1.284	1.219	1.211	1.249	1.212	1.212	1.222	1.217
CHN	1.122	1.135	0.950	1.108	1.133	1.075	1.127	1.129	1.100	1.116
EU	1.208	1.207	1.258	1.008	1.207	1.222	1.207	1.207	1.210	1.208
GBR	1.212	1.209	1.266	1.217	1.009	1.230	1.211	1.210	1.217	1.214
IND	1.177	1.183	1.162	1.169	1.181	0.989	1.180	1.181	1.168	1.172
JPN	1.212	1.210	1.265	1.215	1.210	1.235	1.010	1.211	1.216	1.213
MEX	1.205	1.203	1.240	1.206	1.203	1.216	1.204	1.005	1.206	1.205
RoW	1.211	1.209	1.276	1.212	1.209	1.233	1.209	1.209	1.009	1.210
USA	1.211	1.208	1.269	1.213	1.209	1.231	1.210	1.210	1.215	1.009

Table 35: Iceberg Trade Costs (d_{nik}) - Chemical (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	0.995	1.196	1.304	1.200	1.195	1.206	1.198	1.195	1.194	1.200
CAN	1.219	0.999	1.383	1.240	1.207	1.430	1.210	1.209	1.234	1.237
CHN	1.159	1.207	1.012	1.127	1.195	1.101	1.187	1.194	1.135	1.127
EU	1.205	1.207	1.302	1.004	1.200	1.204	1.207	1.207	1.205	1.201
GBR	1.218	1.204	1.344	1.243	1.000	1.234	1.213	1.209	1.234	1.242
IND	1.190	1.205	1.160	1.201	1.206	1.004	1.200	1.201	1.183	1.202
JPN	1.212	1.205	1.305	1.225	1.206	1.229	1.001	1.207	1.218	1.222
MEX	1.203	1.197	1.279	1.208	1.198	1.201	1.199	0.996	1.205	1.206
RoW	1.219	1.217	1.395	1.220	1.214	1.318	1.216	1.217	1.011	1.218
USA	1.209	1.203	1.357	1.208	1.203	1.266	1.206	1.205	1.208	1.003

Table 36: Iceberg Trade Costs (d_{nik}) - Construction (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.001	1.199	1.233	1.200	1.199	1.208	1.199	1.199	1.200	1.199
CAN	1.209	1.005	1.278	1.214	1.205	1.243	1.207	1.206	1.216	1.211
CHN	1.166	1.179	0.988	1.151	1.177	1.117	1.172	1.174	1.143	1.160
EU	1.205	1.204	1.255	1.005	1.204	1.219	1.204	1.204	1.207	1.205
GBR	1.206	1.202	1.259	1.210	1.004	1.223	1.204	1.204	1.211	1.208
IND	1.176	1.182	1.161	1.168	1.181	0.988	1.179	1.180	1.167	1.171
JPN	1.202	1.200	1.255	1.205	1.200	1.225	1.001	1.201	1.206	1.203
MEX	1.201	1.199	1.236	1.202	1.199	1.211	1.200	1.001	1.202	1.200
RoW	1.205	1.203	1.270	1.207	1.203	1.228	1.204	1.204	1.005	1.205
USA	1.203	1.201	1.260	1.205	1.201	1.223	1.202	1.202	1.207	1.002

Table 37: Iceberg Trade Costs (d_{nik}) - Construction (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	0.999	1.201	1.310	1.205	1.200	1.212	1.202	1.200	1.199	1.203
CAN	1.228	1.006	1.394	1.249	1.216	1.443	1.219	1.218	1.244	1.245
CHN	1.103	1.149	0.964	1.073	1.138	1.049	1.130	1.137	1.080	1.071
EU	1.202	1.205	1.300	1.002	1.198	1.203	1.205	1.204	1.202	1.197
GBR	1.222	1.208	1.349	1.248	1.004	1.240	1.217	1.213	1.239	1.245
IND	1.228	1.244	1.197	1.239	1.244	1.038	1.238	1.240	1.221	1.239
JPN	1.210	1.203	1.304	1.224	1.205	1.229	1.000	1.206	1.217	1.219
MEX	1.207	1.202	1.284	1.212	1.202	1.207	1.203	1.000	1.209	1.209
RoW	1.203	1.202	1.379	1.206	1.199	1.304	1.201	1.201	0.998	1.201
USA	1.203	1.198	1.352	1.204	1.199	1.262	1.201	1.200	1.203	0.998

Table 38: Iceberg Trade Costs (d_{nik}) - Energy (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.004	1.202	1.236	1.203	1.202	1.211	1.202	1.202	1.203	1.202
CAN	1.214	1.009	1.283	1.219	1.210	1.248	1.212	1.211	1.221	1.216
CHN	1.139	1.152	0.965	1.125	1.150	1.092	1.145	1.147	1.117	1.134
EU	1.205	1.203	1.254	1.005	1.203	1.218	1.204	1.204	1.207	1.205
GBR	1.209	1.206	1.263	1.214	1.007	1.227	1.208	1.208	1.214	1.211
IND	1.173	1.179	1.158	1.165	1.178	0.986	1.176	1.177	1.164	1.168
JPN	1.209	1.206	1.262	1.212	1.206	1.231	1.007	1.207	1.212	1.209
MEX	1.204	1.203	1.239	1.205	1.203	1.215	1.203	1.004	1.206	1.204
RoW	1.210	1.208	1.275	1.211	1.208	1.232	1.208	1.208	1.008	1.209
USA	1.209	1.207	1.267	1.211	1.207	1.230	1.208	1.208	1.213	1.007

Table 39: Iceberg Trade Costs (d_{nik}) - Energy (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	0.995	1.196	1.304	1.200	1.195	1.206	1.197	1.195	1.194	1.200
CAN	1.216	0.996	1.379	1.236	1.204	1.427	1.207	1.205	1.231	1.234
CHN	1.151	1.199	1.005	1.119	1.187	1.094	1.179	1.186	1.127	1.120
EU	1.202	1.205	1.300	1.002	1.198	1.202	1.205	1.205	1.202	1.198
GBR	1.211	1.198	1.337	1.237	0.995	1.228	1.207	1.203	1.228	1.236
IND	1.191	1.207	1.161	1.202	1.207	1.005	1.201	1.203	1.185	1.203
JPN	1.205	1.198	1.298	1.219	1.199	1.223	0.996	1.201	1.212	1.216
MEX	1.200	1.194	1.276	1.205	1.195	1.198	1.196	0.994	1.202	1.203
RoW	1.242	1.241	1.422	1.244	1.238	1.344	1.240	1.240	1.031	1.241
USA	1.210	1.205	1.359	1.210	1.205	1.268	1.207	1.206	1.210	1.004

Table 40: Iceberg Trade Costs (d_{nik}) - Food (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.006	1.205	1.239	1.206	1.205	1.214	1.205	1.205	1.206	1.205
CAN	1.225	1.019	1.295	1.230	1.221	1.260	1.223	1.223	1.232	1.227
CHN	1.127	1.140	0.955	1.113	1.138	1.080	1.133	1.135	1.106	1.122
EU	1.205	1.203	1.254	1.005	1.203	1.218	1.204	1.204	1.206	1.205
GBR	1.208	1.205	1.262	1.212	1.006	1.226	1.207	1.206	1.213	1.210
IND	1.169	1.175	1.154	1.161	1.174	0.983	1.172	1.173	1.160	1.164
JPN	1.206	1.203	1.259	1.209	1.204	1.228	1.004	1.204	1.210	1.207
MEX	1.205	1.203	1.240	1.206	1.203	1.215	1.204	1.005	1.206	1.205
RoW	1.213	1.211	1.279	1.215	1.211	1.236	1.212	1.211	1.011	1.213
USA	1.212	1.209	1.269	1.214	1.209	1.232	1.210	1.210	1.215	1.009

Table 41: Iceberg Trade Costs (d_{nik}) - Food (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.127	1.354	1.476	1.359	1.352	1.364	1.355	1.353	1.351	1.359
CAN	1.596	1.307	1.809	1.622	1.579	1.870	1.582	1.581	1.614	1.619
CHN	0.615	0.640	0.537	0.598	0.634	0.584	0.629	0.634	0.602	0.598
EU	1.327	1.330	1.434	1.106	1.322	1.325	1.329	1.329	1.326	1.323
GBR	1.311	1.296	1.446	1.338	1.076	1.327	1.305	1.301	1.328	1.337
IND	0.806	0.816	0.785	0.813	0.816	0.679	0.812	0.813	0.801	0.814
JPN	1.289	1.281	1.387	1.303	1.282	1.306	1.064	1.283	1.295	1.300
MEX	1.300	1.294	1.382	1.305	1.294	1.297	1.295	1.077	1.301	1.304
RoW	1.384	1.382	1.584	1.386	1.378	1.495	1.380	1.381	1.147	1.383
USA	1.447	1.440	1.625	1.446	1.440	1.514	1.442	1.442	1.445	1.201

Table 42: Iceberg Trade Costs (d_{nik}) - Manufacture (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.006	1.204	1.238	1.206	1.204	1.214	1.205	1.204	1.206	1.205
CAN	1.224	1.017	1.293	1.228	1.220	1.258	1.221	1.221	1.231	1.226
CHN	1.090	1.102	0.923	1.076	1.100	1.044	1.095	1.097	1.069	1.085
EU	1.211	1.210	1.261	1.010	1.210	1.225	1.211	1.210	1.213	1.211
GBR	1.213	1.210	1.267	1.218	1.010	1.231	1.212	1.212	1.218	1.215
IND	1.171	1.177	1.155	1.163	1.175	0.984	1.173	1.175	1.161	1.166
JPN	1.220	1.217	1.273	1.223	1.218	1.243	1.016	1.218	1.224	1.221
MEX	1.210	1.209	1.246	1.212	1.209	1.221	1.210	1.009	1.212	1.210
RoW	1.218	1.216	1.284	1.220	1.217	1.241	1.217	1.217	1.016	1.218
USA	1.216	1.214	1.274	1.219	1.214	1.237	1.215	1.215	1.220	1.013

Table 43: Iceberg Trade Costs (d_{nik}) - Manufacture (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	0.990	1.191	1.298	1.195	1.190	1.200	1.192	1.190	1.189	1.195
CAN	1.224	1.003	1.389	1.245	1.212	1.436	1.216	1.214	1.240	1.243
CHN	1.150	1.199	1.005	1.119	1.187	1.093	1.179	1.186	1.127	1.119
EU	1.187	1.190	1.283	0.989	1.182	1.186	1.190	1.189	1.187	1.183
GBR	1.212	1.198	1.338	1.237	0.995	1.228	1.208	1.203	1.229	1.237
IND	1.196	1.212	1.166	1.207	1.212	1.009	1.206	1.208	1.190	1.209
JPN	1.218	1.212	1.313	1.233	1.213	1.236	1.007	1.214	1.226	1.230
MEX	1.203	1.198	1.279	1.208	1.199	1.201	1.200	0.997	1.205	1.207
RoW	1.235	1.234	1.415	1.237	1.231	1.336	1.233	1.233	1.025	1.234
USA	1.211	1.206	1.361	1.211	1.206	1.269	1.209	1.208	1.211	1.006

Table 44: Iceberg Trade Costs (d_{nik}) - Metal (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.007	1.206	1.240	1.208	1.206	1.216	1.207	1.207	1.208	1.207
CAN	1.222	1.016	1.291	1.227	1.218	1.257	1.220	1.219	1.229	1.224
CHN	1.097	1.109	0.929	1.083	1.107	1.051	1.102	1.104	1.076	1.092
EU	1.210	1.209	1.260	1.009	1.209	1.224	1.210	1.209	1.212	1.210
GBR	1.217	1.214	1.271	1.221	1.013	1.235	1.216	1.215	1.222	1.219
IND	1.167	1.173	1.152	1.159	1.172	0.981	1.170	1.171	1.158	1.162
JPN	1.218	1.215	1.271	1.221	1.216	1.241	1.015	1.217	1.222	1.219
MEX	1.210	1.208	1.245	1.211	1.208	1.221	1.209	1.009	1.211	1.210
RoW	1.216	1.214	1.282	1.218	1.214	1.238	1.214	1.214	1.013	1.215
USA	1.214	1.212	1.272	1.217	1.212	1.235	1.213	1.213	1.218	1.012

Table 45: Iceberg Trade Costs (d_{nik}) - Metal (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	0.991	1.191	1.299	1.195	1.190	1.201	1.193	1.190	1.189	1.195
CAN	1.212	0.993	1.375	1.233	1.200	1.422	1.203	1.202	1.227	1.230
CHN	1.209	1.259	1.056	1.176	1.247	1.149	1.238	1.246	1.184	1.176
EU	1.191	1.193	1.287	0.992	1.186	1.191	1.193	1.193	1.191	1.187
GBR	1.208	1.195	1.333	1.233	0.992	1.225	1.204	1.200	1.225	1.232
IND	1.180	1.195	1.150	1.191	1.196	0.996	1.190	1.192	1.174	1.192
JPN	1.208	1.202	1.301	1.222	1.203	1.226	0.999	1.204	1.215	1.219
MEX	1.195	1.190	1.271	1.200	1.191	1.194	1.192	0.990	1.197	1.199
RoW	1.231	1.230	1.410	1.233	1.227	1.333	1.229	1.229	1.022	1.230
USA	1.201	1.196	1.350	1.201	1.196	1.258	1.198	1.198	1.201	0.997

Table 46: Iceberg Trade Costs (d_{nik}) - Mining (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.003	1.201	1.235	1.202	1.201	1.210	1.201	1.201	1.202	1.201
CAN	1.214	1.009	1.283	1.219	1.210	1.248	1.212	1.211	1.221	1.216
CHN	1.150	1.163	0.974	1.135	1.161	1.102	1.155	1.158	1.127	1.144
EU	1.202	1.201	1.251	1.002	1.201	1.216	1.201	1.201	1.204	1.202
GBR	1.207	1.204	1.261	1.211	1.005	1.225	1.206	1.205	1.212	1.209
IND	1.180	1.186	1.164	1.171	1.184	0.991	1.182	1.183	1.170	1.175
JPN	1.205	1.202	1.258	1.208	1.203	1.227	1.004	1.203	1.209	1.206
MEX	1.203	1.201	1.238	1.204	1.201	1.214	1.202	1.003	1.204	1.203
RoW	1.207	1.205	1.272	1.208	1.205	1.229	1.205	1.205	1.006	1.206
USA	1.205	1.203	1.263	1.208	1.203	1.226	1.204	1.204	1.209	1.004

Table 47: Iceberg Trade Costs (d_{nik}) - Mining (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.001	1.202	1.311	1.206	1.201	1.212	1.203	1.201	1.200	1.205
CAN	1.226	1.004	1.390	1.246	1.213	1.437	1.216	1.215	1.241	1.242
CHN	1.134	1.181	0.991	1.103	1.170	1.077	1.161	1.169	1.111	1.102
EU	1.201	1.203	1.297	1.000	1.196	1.200	1.203	1.202	1.200	1.195
GBR	1.216	1.202	1.342	1.241	0.998	1.232	1.211	1.207	1.233	1.239
IND	1.183	1.198	1.152	1.193	1.198	0.998	1.192	1.194	1.176	1.193
JPN	1.209	1.202	1.301	1.222	1.203	1.226	0.998	1.204	1.216	1.218
MEX	1.203	1.197	1.278	1.207	1.197	1.201	1.198	0.996	1.205	1.205
RoW	1.243	1.241	1.423	1.244	1.238	1.344	1.240	1.240	1.031	1.240
USA	1.209	1.203	1.357	1.207	1.203	1.265	1.205	1.204	1.208	1.001

Table 48: Iceberg Trade Costs (d_{nik}) - Paper (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.002	1.200	1.234	1.201	1.200	1.209	1.200	1.200	1.201	1.200
CAN	1.209	1.005	1.277	1.213	1.205	1.243	1.206	1.206	1.216	1.211
CHN	1.159	1.173	0.982	1.144	1.170	1.111	1.165	1.167	1.137	1.154
EU	1.202	1.201	1.252	1.003	1.201	1.216	1.201	1.201	1.204	1.202
GBR	1.205	1.202	1.258	1.209	1.003	1.222	1.203	1.203	1.210	1.207
IND	1.186	1.191	1.170	1.177	1.190	0.996	1.188	1.189	1.176	1.181
JPN	1.203	1.201	1.256	1.206	1.201	1.226	1.003	1.202	1.207	1.204
MEX	1.201	1.199	1.236	1.202	1.199	1.212	1.200	1.001	1.202	1.201
RoW	1.203	1.201	1.268	1.205	1.201	1.226	1.202	1.202	1.003	1.203
USA	1.205	1.202	1.262	1.207	1.202	1.225	1.203	1.203	1.208	1.004

Table 49: Iceberg Trade Costs (d_{nik}) - Paper (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.003	1.206	1.315	1.210	1.205	1.216	1.208	1.205	1.204	1.210
CAN	1.227	1.006	1.393	1.249	1.215	1.440	1.219	1.217	1.243	1.246
CHN	1.130	1.178	0.988	1.100	1.166	1.074	1.158	1.165	1.107	1.100
EU	1.207	1.210	1.305	1.006	1.202	1.207	1.209	1.209	1.207	1.203
GBR	1.222	1.209	1.349	1.248	1.004	1.239	1.218	1.214	1.239	1.247
IND	1.183	1.198	1.153	1.194	1.198	0.998	1.193	1.194	1.176	1.195
JPN	1.213	1.206	1.307	1.227	1.207	1.231	1.002	1.209	1.220	1.224
MEX	1.209	1.204	1.286	1.214	1.204	1.208	1.205	1.002	1.211	1.213
RoW	1.212	1.211	1.389	1.214	1.208	1.312	1.210	1.210	1.006	1.211
USA	1.214	1.208	1.364	1.214	1.209	1.271	1.211	1.210	1.213	1.007

Table 50: Iceberg Trade Costs (d_{nik}) - Retail (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.002	1.200	1.234	1.202	1.200	1.210	1.201	1.201	1.202	1.201
CAN	1.214	1.010	1.283	1.219	1.210	1.249	1.212	1.212	1.221	1.216
CHN	1.136	1.150	0.963	1.122	1.147	1.089	1.142	1.144	1.115	1.131
EU	1.206	1.205	1.256	1.006	1.205	1.220	1.206	1.206	1.208	1.207
GBR	1.211	1.207	1.265	1.215	1.008	1.228	1.209	1.209	1.216	1.213
IND	1.178	1.183	1.162	1.169	1.182	0.990	1.180	1.181	1.168	1.173
JPN	1.208	1.205	1.261	1.211	1.205	1.230	1.006	1.206	1.211	1.208
MEX	1.205	1.204	1.241	1.207	1.204	1.216	1.204	1.005	1.207	1.205
RoW	1.208	1.206	1.274	1.210	1.207	1.231	1.207	1.207	1.007	1.208
USA	1.206	1.204	1.264	1.209	1.204	1.227	1.205	1.205	1.210	1.005

Table 51: Iceberg Trade Costs (d_{nik}) - Retail (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.003	1.205	1.315	1.210	1.204	1.216	1.207	1.204	1.203	1.209
CAN	1.257	1.030	1.426	1.278	1.244	1.475	1.247	1.246	1.272	1.275
CHN	1.091	1.136	0.953	1.061	1.125	1.037	1.117	1.124	1.068	1.061
EU	1.217	1.219	1.316	1.014	1.212	1.217	1.219	1.219	1.217	1.213
GBR	1.252	1.237	1.381	1.277	1.027	1.269	1.246	1.242	1.268	1.276
IND	1.148	1.162	1.118	1.157	1.162	0.968	1.156	1.158	1.141	1.159
JPN	1.231	1.223	1.325	1.244	1.225	1.249	1.017	1.226	1.238	1.241
MEX	1.235	1.229	1.313	1.240	1.230	1.234	1.231	1.023	1.237	1.239
RoW	1.196	1.194	1.369	1.197	1.191	1.294	1.193	1.193	0.992	1.194
USA	1.205	1.199	1.353	1.204	1.199	1.261	1.201	1.200	1.204	0.999

Table 52: Iceberg Trade Costs (d_{nik}) - Services (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.005	1.203	1.237	1.205	1.203	1.213	1.204	1.203	1.205	1.204
CAN	1.228	1.021	1.297	1.232	1.224	1.262	1.225	1.225	1.235	1.229
CHN	1.094	1.106	0.926	1.080	1.104	1.048	1.099	1.101	1.072	1.088
EU	1.213	1.212	1.263	1.012	1.212	1.227	1.212	1.212	1.215	1.213
GBR	1.227	1.224	1.282	1.231	1.021	1.245	1.226	1.225	1.232	1.229
IND	1.154	1.160	1.139	1.146	1.158	0.970	1.157	1.158	1.145	1.149
JPN	1.218	1.215	1.271	1.221	1.216	1.241	1.014	1.216	1.222	1.219
MEX	1.206	1.205	1.241	1.207	1.205	1.217	1.205	1.006	1.208	1.206
RoW	1.213	1.211	1.279	1.215	1.211	1.236	1.212	1.212	1.011	1.213
USA	1.223	1.220	1.281	1.225	1.221	1.244	1.222	1.222	1.227	1.019

Table 53: Iceberg Trade Costs (d_{nik}) - Services (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.028	1.235	1.347	1.239	1.234	1.246	1.236	1.234	1.233	1.239
CAN	1.437	1.177	1.629	1.460	1.422	1.686	1.426	1.424	1.454	1.458
CHN	0.682	0.710	0.596	0.663	0.703	0.648	0.698	0.703	0.668	0.663
EU	1.144	1.146	1.236	0.953	1.139	1.144	1.146	1.145	1.143	1.140
GBR	1.508	1.490	1.664	1.538	1.238	1.528	1.501	1.496	1.528	1.538
IND	1.239	1.254	1.206	1.249	1.254	1.045	1.248	1.249	1.231	1.251
JPN	1.343	1.335	1.446	1.358	1.337	1.363	1.110	1.338	1.351	1.355
MEX	1.269	1.262	1.348	1.273	1.263	1.267	1.264	1.051	1.270	1.272
RoW	1.230	1.228	1.408	1.232	1.225	1.331	1.227	1.228	1.020	1.229
USA	1.167	1.161	1.311	1.166	1.162	1.223	1.164	1.163	1.166	0.969

Table 54: Iceberg Trade Costs (d_{nik}) - Textiles (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.002	1.200	1.234	1.201	1.200	1.209	1.200	1.200	1.201	1.200
CAN	1.207	1.003	1.275	1.211	1.203	1.241	1.204	1.204	1.214	1.208
CHN	1.156	1.170	0.980	1.142	1.167	1.108	1.162	1.164	1.134	1.151
EU	1.203	1.202	1.253	1.003	1.202	1.217	1.203	1.202	1.205	1.204
GBR	1.205	1.202	1.259	1.210	1.003	1.223	1.204	1.204	1.210	1.207
IND	1.187	1.193	1.171	1.178	1.191	0.997	1.189	1.190	1.177	1.182
JPN	1.205	1.202	1.258	1.208	1.203	1.228	1.004	1.204	1.209	1.206
MEX	1.201	1.200	1.237	1.203	1.200	1.212	1.201	1.002	1.203	1.201
RoW	1.204	1.202	1.269	1.206	1.202	1.226	1.203	1.202	1.004	1.204
USA	1.204	1.201	1.261	1.206	1.202	1.224	1.203	1.202	1.207	1.003

Table 55: Iceberg Trade Costs (d_{nik}) - Textiles (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.001	1.203	1.313	1.208	1.203	1.214	1.205	1.202	1.201	1.208
CAN	1.225	1.004	1.391	1.247	1.214	1.438	1.217	1.215	1.241	1.244
CHN	1.133	1.181	0.991	1.103	1.170	1.078	1.162	1.169	1.111	1.104
EU	1.205	1.208	1.304	1.005	1.201	1.206	1.209	1.208	1.206	1.202
GBR	1.224	1.211	1.353	1.251	1.006	1.242	1.221	1.217	1.242	1.250
IND	1.177	1.193	1.148	1.188	1.193	0.994	1.188	1.189	1.171	1.190
JPN	1.215	1.209	1.310	1.230	1.210	1.234	1.005	1.211	1.223	1.227
MEX	1.210	1.205	1.287	1.216	1.206	1.209	1.207	1.003	1.213	1.214
RoW	1.210	1.209	1.387	1.213	1.206	1.310	1.208	1.209	1.004	1.210
USA	1.209	1.204	1.359	1.210	1.205	1.267	1.207	1.206	1.209	1.004

Table 56: Iceberg Trade Costs (d_{nik}) - Transport (with Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	1.002	1.200	1.234	1.201	1.200	1.209	1.200	1.200	1.201	1.200
CAN	1.211	1.007	1.280	1.215	1.207	1.245	1.208	1.208	1.218	1.213
CHN	1.146	1.159	0.971	1.131	1.157	1.098	1.152	1.154	1.124	1.140
EU	1.205	1.204	1.255	1.005	1.204	1.219	1.204	1.204	1.207	1.205
GBR	1.209	1.206	1.263	1.214	1.007	1.227	1.208	1.208	1.214	1.211
IND	1.177	1.182	1.161	1.168	1.181	0.989	1.179	1.180	1.167	1.172
JPN	1.208	1.206	1.261	1.211	1.206	1.231	1.007	1.207	1.212	1.209
MEX	1.202	1.201	1.237	1.204	1.201	1.213	1.201	1.003	1.204	1.202
RoW	1.207	1.205	1.272	1.208	1.205	1.229	1.205	1.205	1.006	1.206
USA	1.209	1.206	1.266	1.211	1.206	1.229	1.207	1.207	1.212	1.007

Table 57: Iceberg Trade Costs (d_{nik}) - Transport (without Labor Mobility)

	BRA	CAN	CHN	EU	GBR	IND	JPN	MEX	RoW	USA
BRA	0.999	1.200	1.309	1.205	1.199	1.211	1.202	1.199	1.198	1.204
CAN	1.227	1.005	1.392	1.248	1.214	1.440	1.218	1.216	1.242	1.245
CHN	1.126	1.173	0.984	1.095	1.161	1.070	1.153	1.160	1.103	1.095
EU	1.214	1.216	1.312	1.011	1.209	1.214	1.216	1.216	1.214	1.210
GBR	1.227	1.212	1.354	1.252	1.007	1.244	1.222	1.218	1.243	1.251
IND	1.171	1.186	1.141	1.181	1.186	0.988	1.180	1.182	1.164	1.183
JPN	1.220	1.213	1.314	1.234	1.214	1.238	1.008	1.215	1.227	1.231
MEX	1.208	1.202	1.284	1.212	1.203	1.206	1.204	1.000	1.209	1.211
RoW	1.216	1.214	1.392	1.217	1.211	1.316	1.213	1.213	1.008	1.215
USA	1.225	1.218	1.375	1.224	1.219	1.282	1.221	1.220	1.224	1.016

Table 58: Welfare Effects by Country - 2024 Tariffs (with Labor Mobility)

	Baseline Tariff (p.p.)	Counterfactual Tariff (p.p.)	Welfare Change (%)	Income Change (%)	Tariff Revenue Change (%)
BRA	2.720	5.090	14914.920	15150.840	8296.040
CAN	1.580	1.280	219.420	218.920	303.590
CHN	2.960	1.040	602.400	597.580	1019.790
EU	2.120	1.150	115.860	115.110	273.730
GBR	1.650	0.380	110.510	109.630	419.930
IND	4.410	7.180	174.550	167.590	419.810
JPN	2.060	1.050	120.350	120.140	156.620
MEX	0.910	0.580	233.250	227.530	683.770
RoW	3.270	5.460	715.500	695.530	2110.640
USA	0.000	0.000	35.220	34.030	93.910

Table 59: Welfare Effects by Country - 2024 Tariffs (without Labor Mobility)

	Baseline Tariff (p.p.)	Counterfactual Tariff (p.p.)	Welfare Change (%)	Income Change (%)	Tariff Revenue Change (%)
BRA	4.620	3.920	1312.260	1307.900	1424.880
CAN	2.850	0.360	6650.610	6642.510	8175.180
CHN	1.780	6.340	14.650	13.980	81.690
EU	3.590	3.060	122.420	122.620	99.480
GBR	3.130	0.420	1260.210	1260.050	1294.100
IND	7.460	5.430	4.460	4.900	-5.150
JPN	3.720	0.870	614.100	613.830	648.920
MEX	1.370	0.980	989.650	987.540	1089.570
RoW	5.780	0.410	-77.310	-77.360	-75.710
USA	0.000	0.000	-49.350	-49.610	-37.520

Table 60: Welfare Effects by Country - 2025 3M Tariffs (with Labor Mobility)

	Baseline Tariff (p.p.)	Counterfactual Tariff (p.p.)	Welfare Change (%)	Income Change (%)	Tariff Revenue Change (%)
BRA	2.720	5.390	60989.350	62736.210	11980.180
CAN	1.580	0.910	164.730	164.680	172.930
CHN	2.960	0.600	888.450	875.020	2052.190
EU	2.120	1.030	323.840	321.360	842.720
GBR	1.650	0.250	147.680	146.530	549.760
IND	4.410	3.470	121.320	111.880	454.250
JPN	2.060	0.590	95.590	95.150	170.430
MEX	0.910	0.530	291.610	279.780	1222.630
RoW	3.270	6.730	419.740	401.030	1726.940
USA	0.000	0.000	68.020	66.830	126.770

Table 61: Welfare Effects by Country - 2025 3M Tariffs (without Labor Mobility)

	Baseline Tariff (p.p.)	Counterfactual Tariff (p.p.)	Welfare Change (%)	Income Change (%)	Tariff Revenue Change (%)
BRA	4.620	3.780	1460.370	1456.530	1559.520
CAN	2.850	0.580	7359.490	7339.680	11088.500
CHN	1.780	7.110	156.260	154.220	360.710
EU	3.590	3.790	156.720	158.050	3.880
GBR	3.130	0.120	1717.570	1719.980	1186.140
IND	7.460	5.830	3.830	5.690	-36.420
JPN	3.720	1.090	642.530	643.300	542.160
MEX	1.370	0.920	1048.640	1053.950	795.750
RoW	5.780	0.860	-77.600	-77.430	-82.800
USA	0.000	0.000	-49.290	-49.500	-39.700

Table 62: Welfare Effects by Country - 2025 LTM Tariffs (with Labor Mobility)

	Baseline Tariff (p.p.)	Counterfactual Tariff (p.p.)	Welfare Change (%)	Income Change (%)	Tariff Revenue Change (%)
BRA	2.720	5.450	69113.140	70952.000	17523.120
CAN	1.580	1.080	169.360	169.160	203.810
CHN	2.960	0.670	1888.040	1873.480	3149.650
EU	2.120	1.430	230.680	229.110	559.340
GBR	1.650	0.290	203.450	202.410	568.000
IND	4.410	6.220	219.290	210.490	529.410
JPN	2.060	0.640	105.240	104.750	187.500
MEX	0.910	0.760	714.240	698.510	1952.470
RoW	3.270	5.510	526.950	513.140	1492.130
USA	0.000	0.000	101.890	100.510	170.240

Table 63: Welfare Effects by Country - 2025 LTM Tariffs (without Labor Mobility)

	Baseline Tariff (p.p.)	Counterfactual Tariff (p.p.)	Welfare Change (%)	Income Change (%)	Tariff Revenue Change (%)
BRA	4.620	3.900	1491.510	1486.420	1623.190
CAN	2.850	0.290	7498.190	7488.910	9245.590
CHN	1.780	6.490	24.730	23.990	98.370
EU	3.590	2.990	138.790	139.000	114.830
GBR	3.130	0.410	1382.210	1381.990	1431.220
IND	7.460	5.380	9.890	10.280	1.470
JPN	3.720	0.810	677.870	677.530	721.350
MEX	1.370	1.010	1095.860	1093.630	1202.090
RoW	5.780	0.520	-76.940	-76.990	-75.340
USA	0.000	0.000	-47.170	-47.470	-33.590

Table 64: Welfare Effects by Country - 2025 YTD Tariffs (with Labor Mobility)

	Baseline Tariff (p.p.)	Counterfactual Tariff (p.p.)	Welfare Change (%)	Income Change (%)	Tariff Revenue Change (%)
BRA	2.720	5.020	10331.370	10473.460	6344.930
CAN	1.580	1.530	199.010	198.600	266.480
CHN	2.960	1.180	651.870	647.480	1031.990
EU	2.120	1.670	117.430	116.890	230.990
GBR	1.650	0.750	156.470	155.720	419.570
IND	4.410	8.060	213.830	209.240	375.500
JPN	2.060	1.510	139.830	139.650	170.580
MEX	0.910	0.920	238.880	234.650	572.110
RoW	3.270	4.810	615.660	606.770	1237.050
USA	0.000	0.000	22.070	21.050	72.750

Table 65: Welfare Effects by Country - 2025 YTD Tariffs (without Labor Mobility)

	Baseline Tariff (p.p.)	Counterfactual Tariff (p.p.)	Welfare Change (%)	Income Change (%)	Tariff Revenue Change (%)
BRA	4.620	3.910	1359.800	1356.430	1446.860
CAN	2.850	0.610	6890.430	6873.160	10142.120
CHN	1.780	7.160	139.050	137.110	332.620
EU	3.590	3.530	144.550	145.820	-1.490
GBR	3.130	0.120	1625.440	1627.760	1112.640
IND	7.460	5.590	2.540	4.590	-41.800
JPN	3.720	1.300	607.740	608.560	500.510
MEX	1.370	0.950	990.840	995.350	776.320
RoW	5.780	0.710	-77.950	-77.790	-82.740
USA	0.000	0.000	-50.150	-50.340	-41.420