Trade Effects of the Trump II Tariffs: Technical Details[*]

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Abstract

This document details the methodology underlying the simulated trade, welfare, and wage effects of the Trump II tariffs reported on the **SMU Trade Dashboard** (https://economics.smu.edu.sg/soetrade/trade-dashboard), hosted by the SMU Center for Research on International Trade.

Keywords: Trump II Tariffs; Trade Effects; Wage Effects; Welfare Effects

JEL Classification: F13; F14; F15

1 Quantitative Model

The quantitative model follows that of Caliendo and Parro (2015), featuring a multi-country, multi-sector framework with input-output (IO) linkages, trade in intermediate goods, and sectoral heterogeneity in production. Each sector uses labor and intermediate goods from all sectors according to Cobb-Douglas technology, implying that cost and price changes propagate through the IO network. Countries are indexed by i and j, and sectors by k and l. In any pair of country indices, the first index denotes the exporting country and the second denotes the importing country. Similarly, in any pair of sector indices, the first index refers to the originating sector and the second the destination sector.

Define $\hat{x} \equiv x'/x$ as the ratio of the counterfactual value relative to the factual value of a variable x. Let $\tau_{ij,k} \equiv (1 + t_{ij,k})$ denote one plus the ad valorem tariff rate in sector k that importer j levies on exporter i. Consider a counterfactual tariff structure $\tau' \equiv \{1 + t_{ij,k}\}'_{ij,k}$ and the corresponding counterfactual equilibrium, relative to that under the factual tariff structure $\tau \equiv \{1 + t_{ij,k}\}_{ij,k}$.

Cost of the input bundles. Given the Cobb-Douglas production technology, the relative change in the unit cost of sector k in country j is given by:

$$\hat{c}_{j,k} = \hat{w}_j^{\gamma_{j,k}} \prod_l \hat{P}_{j,l}^{\gamma_{j,lk}}, \tag{1}$$

where $c_{j,k}$ denotes the unit cost of production in sector k in country j; w_j is the wage rate in country j; $P_{j,l}$ the price index for sector l in country j; $\gamma_{j,k}$ is the ratio of value added to gross output in sector k of country j; and $\gamma_{j,lk}$ is the cost share of sector k's spending on goods from sector l as intermediate inputs in country j. Note that $\sum_l \gamma_{j,lk} = 1 - \gamma_{j,k}$, given that the production follows a Cobb-Douglas technology with constant returns to scale using labour and materials from all sectors as intermediate inputs.

Price index. The relative change in the price index is given by:

$$\hat{P}_{j,k} = \left[\sum_i \pi_{ij,k} (\hat{c}_{i,k} \hat{\tau}_{ij,k})^{-\theta_k} \right]^{-1/\theta_k}, \tag{2}$$

where $\pi_{ij,k}$ is the share of country j's expenditure on goods from country i in sector k.

Bilateral trade shares. The relative change in bilateral trade shares is given by:

$$\hat{\pi}_{ij,k} = \left[\frac{\hat{c}_{i,k} \hat{\tau}_{ij,k}}{\hat{P}_{j,k}} \right]^{-\theta_k}, \tag{3}$$

where θ_k is the productivity dispersion (and trade elasticity) of sector k.

Total sectoral expenditure. The counterfactual expenditure on goods is given by:

$$X'_{j,k} = \sum_l \gamma_{j,kl} \sum_i \frac{\pi'_{ji,l}}{1 + t'_{ji,l}} X'_{i,l} + \alpha_{j,k} I'_j, \tag{4}$$

where $X_{j,k}$ refers to country j's aggregate expenditure on goods of sector k, including intermediate and final demand; $\alpha_{j,k}$ is the share of country j's final consumption expenditure on goods from sector k; and I_j refers to the final absorption of country j, which is given by the sum of labour income, tariff revenues, and trade deficit.

Disposable Income. Specifically, the counterfactual disposable income is given by:

$$I'_j = \hat{w}_j w_j L_j + \sum_k \sum_i t'_{ij,k} \frac{\pi'_{ij,k}}{1 + t'_{ij,k}} X'_{j,k} + D'_j. \tag{5}$$

Trade Deficit. Note that we assume that a country's trade deficit is a fixed share δ_j of the world gross output, which implies that:

$$D'_j = \delta_j \sum_{j'} \sum_k \sum_i \frac{\pi'_{ij',k}}{1 + t'_{ij',k}} X'_{j',k}. \tag{6}$$

Trade Balance. The model is closed by the trade balance condition:

$$\sum_k \sum_i \frac{\pi'_{ij,k}}{1 + t'_{ij,k}} X'_{j,k} - D'_j = \sum_k \sum_i \frac{\pi'_{ji,k}}{1 + t'_{ji,k}} X'_{i,k}. \tag{7}$$

where country j's import expenditure, net of trade deficit, equals its export revenues.

Welfare. Finally, the relative change in the welfare of country j may be written as:

$$\widehat{W}_j = \frac{\hat{I}_j}{\prod_k \hat{P}_{j,k}^{\alpha_{j,k}}}, \tag{8}$$

Table 1 summarizes the definitions of the parameters and variables calibrated for the quantitative analyses.

2   Mapping the Model to Data

We obtain production and bilateral trade data (in intermediate and final goods) from the OECD-WTO Inter-Country Input-Output (ICIO) tables (OECD, 2025). The 2025 edition records trade flows for 80 economies (and a residual Rest of the World) in 50 sectors (based on ISIC Rev.4) for years 1995–2022.

We follow the sector grouping of Beshkar et al. (2025); in particular, service sectors are grouped into one combined sector. We also consider countries in the European Union (EU) as one combined entity in setting trade policy. This amounts to a total of 23 individual sectors (including the combined service sectors) and 55 economies/regions to be used in the equilibrium analysis. Tables 2 and 3 provide the list of economies and sectors used in the study.

The data on baseline tariffs for 2022 and 2023 are sourced from the TRAINS database, downloaded via the World Integrated Trade Solution (WITS) interface. Data on U.S. import tariffs effective from 2025 onward are manually collected from executive orders (EOs) published in the *U.S. Federal Register*. Further details on the compilation of the baseline tariffs and the Trump II tariffs are provided in Section 3.

We adopt the trade elasticity estimates of Beshkar, Chang and Song (2025) for non-service sectors, as reported in Table 3. For the combined service sector, we set the trade elasticity to 6. This choice is in line with the median estimates for service sectors reported by Ahmad and Schreiber (2024) and Freeman et al. (2025).

3   Simulation Design

We evaluate the effects of recent shifts in U.S. trade policy and the retaliatory tariffs imposed by Cambodia, Canada, China, India, the United Kingdom, and Zimbabwe, using the quantitative framework laid out in Section 1. The simulation quantifies how unilateral U.S. tariff changes and subsequent retaliations by the aforementioned trading partners in each episode of tariff escalation or de-escalation from 2025 onward affect international trade flows, factor incomes, and welfare.

Due to data limitation, as the latest OECD ICIO tables are available only up to 2022, we use the trade and production structure of the world economy in 2022 as the baseline. The baseline tariffs for 2022 are measured by the effectively applied tariff rates reported in TRAINS. Because TRAINS does not report Zimbabwe's tariffs as an importer for 2022, we use its 2023 tariff schedule instead to maintain consistent importer-exporter-product coverage.

The information on the U.S. tariff changes from 2025 onward are manually collected from executive orders (EOs) published in the *U.S. Federal Register*. Each EO specifies both the publication date and the effective date of the tariff changes. Throughout the exercises, all dates refer to the tariff *effective* dates. Retaliatory tariffs by Cambodia, Canada, China, India, the United Kingdom, and Zimbabwe are sourced from the WTO–IMF tariff tracker, with all reported tariff change dates referring to effective dates (World Trade Organization, 2025a).

Due to another data limitation, as the TRAINS tariff data are available only up to 2023, we use TRAINS 2023 tariff data and the data collected above on the 2025 tariff changes to construct the 2025 tariff schedule. The WTO Tariff Profiles indicate that tariff structures for both agricultural and non-agricultural goods changed very little between 2023 and 2024 (World Trade Organization, 2024, 2025b).

To conduct the simulation of tariff effects on trade and production, we aggregate the product-level tariff data to the 2-digit ISIC level, aligning the tariff measures with the sectoral structure of the OECD ICIO tables. The U.S. tariff changes specified in the EOs are reported at the HTS 8-digit or 10-digit level. We truncate these codes to the first six digits, which correspond to HS 6-digit product codes (United States International Trade Commission, 2025). Because the TRAINS database reports only goods that are actually traded, HS 6-digit records appear only for country-pair-product observations with positive trade flows. Using concordance tables from WITS and the United Nations, we map HS 6-digit codes to ISIC Rev.4 2-digit industries and compute trade-weighted tariffs. We retain the full set of ISIC Rev.4 2-digit industries for all country pairs; for country-industry pairs with no reported HS 6-digit trade, we assign zero trade values when aggregating tariffs from the HS 6-digit level to the ISIC Rev.4 2-digit level.

We start the quantitative analysis by conducting two counterfactual simulations:

1. 2023 vs. 2022: This simulation evaluates the effects of any tariff changes of 2023, relative to the baseline tariff of 2022.

2. 2025 vs. 2022: This simulation evaluates the effects of the tariff changes of 2025 by a specified date (based on the U.S. EOs and the retaliatory tariffs effective by the specified date), relative to the baseline tariff of 2022.

In both simulations, the 2022 trade and production structure is used as the baseline with the structural parameters calibrated according to Table 1. By taking the ratio of the simulated outcomes for 2025 relative to 2022 and for 2023 relative to 2022, we net out the effects of tariff changes between 2022 and 2023, thereby isolating the effects of the Trump II tariffs

(and the associated retaliatory tariffs). The percentage changes in trade, welfare, and wages reported in the simulation graphs reflect the effects of the Trump II tariffs.

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Table 1: Calibration of Parameters and Measurement of Variables

Parameters/Variables	Description
$\gamma_{j,k} = VA_{j,k}/Y_{j,k}$	The ratio of value added $VA_{j,k}$ to gross output $Y_{j,k}$ in sector k of country j
$\gamma_{j,lk} = \frac{Z_{j,lk}}{\sum_{l'} Z_{j,l'k}} \times (1 - \gamma_{j,k})$	The cost share of sector k's spending $Z_{j,lk}$ on goods from sector l as intermediate inputs in country j
$\pi_{ij,k} = \frac{X_{ij,k}}{\sum_{i'} X_{i'j,k}}$	The share of country j's expenditure $X_{ij,k}$ in sector k on goods from country i
$D_j = \sum_k \sum_i \left(\frac{X_{ij,k}}{1+t_{ij,k}} - \frac{X_{ji,k}}{1+t_{ji,k}} \right)$	The trade deficit of country j
$\delta_j = \frac{D_j}{\sum_i \sum_k Y_{i,k}}$	The ratio of country j's trade deficit to world gross output
$R_j = \sum_k \sum_i t_{ij,k} \frac{X_{ij,k}}{1+t_{ij,k}}$	The tariff revenue of country j, imputed by tariff rates multiplied by import values
$I_j = w_j L_j + R_j + D_j = VA_j + R_j + D_j$	The final absorption of country j, imputed by the sum of value added, tariff revenue, and trade deficit
$\alpha_{j,k} = \left(\sum_i X_{ij,k} - \sum_l \gamma_{j,kl} Y_{j,l} \right) / I_j$	The share of country j's final consumption expenditure on goods from sector k
θ_k	Productivity dispersion (or trade elasticity) of sector k

Table 2: Country List

OECD Economies			Non-OECD Economies		
ISO	Country Name	Country Grouping	ISO	Country Name	Country Grouping
AUS	Australia		AGO	Angola	
AUT	Austria	European Union	ARG	Argentina	
BEL	Belgium	European Union	BGD	Bangladesh	
CAN	Canada		BLR	Belarus	
CHL	Chile		BRA	Brazil	
COL	Colombia		BRN	Brunei Darussalam	
CRI	Costa Rica		BGR	Bulgaria	European Union
HRV	Croatia	European Union	KHM	Cambodia	
CZE	Czech Republic	European Union	CMR	Cameroon	
DNK	Denmark	European Union	CHN	China	
EST	Estonia	European Union	CIV	Côte d'Ivoire	
FIN	Finland	European Union	HRV	Croatia	European Union
FRA	France	European Union	CYP	Cyprus	European Union
DEU	Germany	European Union	COD	Democratic Republic of the Congo	
GRC	Greece	European Union	EGY	Egypt	
HUN	Hungary	European Union	HKG	Hong Kong, China	
ISL	Iceland		IND	India	
IRL	Ireland	European Union	IDN	Indonesia	
ISR	Israel		JOR	Jordan	
ITA	Italy	European Union	KAZ	Kazakhstan	
JPN	Japan		LAO	Laos	
KOR	Korea		MYS	Malaysia	
LVA	Latvia	European Union	MLT	Malta	European Union
LTU	Lithuania	European Union	MAR	Morocco	
LUX	Luxembourg	European Union	MMR	Myanmar	
MEX	Mexico		NGA	Nigeria	
NLD	Netherlands	European Union	PAK	Pakistan	
NZL	New Zealand		PER	Peru	
NOR	Norway		PHL	Philippines	
POL	Poland	European Union	ROU	Romania	European Union
PRT	Portugal	European Union	RUS	Russian Federation	
SVK	Slovak Republic	European Union	STP	Saõ Tomé and Príncipe	
SVN	Slovenia	European Union	SAU	Saudi Arabia	
ESP	Spain	European Union	SEN	Senegal	
SWE	Sweden	European Union	SGP	Singapore	
CHE	Switzerland		ZAF	South Africa	
TUR	Turkey		TWN	Chinese Taipei	
GBR	United Kingdom	European Union	THA	Thailand	
USA	United States		TUN	Tunisia	
			ARE	United Arab Emirates	
			VNM	Viet Nam	
			ROW	Rest of the World	

Table 3: Sector Classification and Trade Elasticity Estimates

Sector	ICIO Industry Code	ISIC Rev.4	Sector Description	Trade Elasticity
1	A01-A02	01-02	Agriculture and hunting; Forestry and logging	8.11*
2	A03	03	Fishing and aquaculture	8.11*
3	B05-B06	05-06	Mining of coal and lignite; Extraction of crude petroleum and natural gas	15.72*
4	B07-B08	07-08	Mining of metal ores; Other mining and quarrying	15.72*
5	B09	09	Mining support service activities	15.72*
6	C10T12	10-12	Manufacture of food products; beverages and tobacco products	$1.72^{\dagger}$
7	C13T15	13-15	Manufacture of textiles, wearing apparel, leather and related products	1.26
8	C16	16	Manufacture of wood and of products of wood and cork	2.66
9	C17T18	17-18	Manufacture of paper and paper products; Printing and reproduction of recorded media	2.29
10	C19	19	Manufacture of coke and refined petroleum products	$1.72^{\dagger}$
11	C20-C21	20-21	Manufacture of chemicals and chemical products; Manufacture of basic pharmaceutical products and pharmaceutical preparations	2.59
12	C22	22	Manufacture of rubber and plastic products	1.25
13	C23	23	Manufacture of other non-metallic mineral products	0.48
14	C24A-C24B	241, 2431, 242, 2432	Manufacture of basic iron and steel; Manufacture of basic precious and other non-ferrous metals	2.59
15	C25	25	Manufacture of fabricated metal products	$1.72^{\dagger}$
16	C26	26	Manufacture of computer, electronic and optical products	$1.72^{\dagger}$
17	C27	27	Manufacture of electrical equipment	$1.72^{\dagger}$
18	C28	28	Manufacture of machinery and equipment n.e.c.	0.44
19	C29	29	Manufacture of motor vehicles, trailers and semi-trailers	$1.72^{\dagger}$
20	C301-C302T309	301-309	Building of ships and boats; Manufacture of other transport equipment	1.93
21	C31T33	31-33	Manufacture of furniture; other manufacturing; repair and installation of machinery and equipment	$1.72^{\dagger}$
22	D	35	Electricity, gas, steam and air conditioning supply	$10.00^{\ddagger}$
23	E, ..., T	36-39, ..., 97-98	Service sectors combined	$6^{\S}$

Note: The table reports the list of sectors used in the study. We adopt the trade elasticity estimates of Beshkar, Chang and Song (2025) for non-service sectors.

* The elasticity estimates for these agriculture and mining sectors are negative, and are replaced by the estimate from Caliendo and Parro (2015).

$\dagger$ The elasticity estimates for these manufacturing sectors are negative, and are replaced by the mean across the manufacturing sectors with positive elasticity estimates.

$\ddagger$ The elasticity estimate for this sector is negative, and is replaced by a large number (10). The choice is based on the consideration that trade flows and tariffs are sparse in this sector. Using a large elasticity value mutes the optimal tariff consideration in this sector and neutralizes its role in the analysis.

$\S$ We choose a trade elasticity of 6 for the combined service sector, in line with the median estimates for the service sectors reported by Ahmad and Schreiber (2024) and Freeman et al. (2025).