This folder contains the data and MATLAB programs for 'Welfare Effects of Trade Wars and Preferential Liberalization in a Multipolar World: The Role of Global Value Chain Reallocation', by Xinxin Wei, Kausik Chaudhuri, and Muhammad Ali Nasir.

Running the programs

MATLAB with Optimization Toolbox is required. The package was tested with MATLAB R2026a. Python and Stata are not required. Extract the package, set MATLAB's Current Folder to Supplementary Material, and enter:

run_replication

This runs the estimation, static counterfactuals, dynamic calculations, and table and figure exports in order. Files in Results and Diagnostics are regenerated; Data is unchanged. Keep a copy of the folder if earlier results are needed.

Data

Data/Model contains the inputs for 41 economies and 44 sectors. Country and sector order follows the labels in baseline_foreign_value_added.mat. The main inputs are:

- value_added_shares.csv contains value-added shares in gross output, as a 44 x 41 matrix with sectors in rows and economies in columns.
- gross_output.csv contains gross output in the same 44 x 41 order.
- input_output_coefficients.csv contains 41 stacked 44 x 44 country blocks. Rows within each block are supplying sectors and columns are using sectors.
- baseline_trade_flows.csv contains 22 stored sector blocks, each 41 x 41: 21 tradable goods sectors and mining support services (B09). Rows are importers and columns are exporters. Mining support services is treated as non-tradable, with zero cross-border trade flows; excluding it from tariff shocks leaves the welfare results unchanged.
- baseline_tariff_rates.csv contains 44 stacked 41 x 41 tariff blocks in the same importer-exporter order. Rates are percentages, so 25 denotes 25%.
- trade_elasticities.csv contains the 44 sectoral elasticities used by the trade model.
- baseline_foreign_value_added.mat contains the 44 x 41 foreign-value-added shares and the country and sector labels.
- dynamic_macro_inputs.csv contains the macroeconomic inputs. The dynamic calculations use GDP, capital stock, depreciation, and employment.
- sector_dictionary.csv contains sector codes and descriptions.

The data sources are UN Comtrade (2023), UNCTAD-TRAINS (2023), OECD Input-Output Tables (2020), OECD STAN (2023), OECD TiVA (2023 edition), and Penn World Table 11.0 (2023 observations). The Online Appendix describes their construction.

Equilibrium and counterfactual results

Code/Static_Model contains the equilibrium programs:

- construct_baseline.m reads the model inputs and constructs the baseline equilibrium.
- construct_tariff_scenarios.m constructs S1 to S4: US escalation, retaliation, unilateral Chinese liberalization, and reciprocal liberalization.
- equilibrium_at_wages.m solves prices, expenditure, and sourcing shares for given wages.
- solve_static_equilibrium.m adjusts wages to clear trade balances.

compute_static_models.m runs all four scenarios under NoGVC, IOOnly, FVAOnly, and FullGVC, switching the input-share and foreign-content adjustment channels off or on.

Dynamic results

In Code/Dynamic_Model, solve_transition_path.m computes consumption, capital, and output paths. compute_dynamic_welfare.m calculates lifetime consumption-equivalent welfare and changes in returns to capital. FullGVC uses 20-, 30-, and 50-year transitions; the NoGVC comparison uses 20 years.

Estimation of trade elasticities

Data/Elasticity contains the bilateral trade and tariff matrices, product identifiers, sector concordance, and country_sample_membership.csv.
Code/Elasticity/estimate_trade_elasticities.m uses these files to estimate the 21 sectoral elasticities for the full, 99%, and 97.5% samples. It reports no-intercept OLS estimates, HC1 standard errors, and observation counts in Table 2. The regression samples are saved in Results/Elasticity.

Tables and figures

Code/Reporting exports the numerical tables as CSV and LaTeX files in Results/Tables, with the following filenames:

- table_02_trade_elasticities: Table 2, trade elasticity estimates.
- table_03_static_welfare: Table 3, static welfare effects.
- table_04_sourcing_adjustment: Table 4, sourcing and GVC adjustments.
- table_05_dynamic_welfare: Table 5, dynamic welfare and returns.

The five figures are saved in Results/Figures:

- figure_01_dynamic_welfare.pdf: Figure 1, dynamic welfare.
- figure_02_transition_paths.pdf: Figure 2, transition paths.
- figure_03_vot_contributions.pdf: Figure 3, volume-of-trade contributions.
- figure_04_tot_contributions.pdf: Figure 4, terms-of-trade contributions.
- figure_05_sourcing_network.pdf: Figure 5, sourcing networks.

Detailed results are in Results/Country, Regional, Bilateral, Sectoral, Network, and Transitions. Scenario tariffs are in Results/Tariffs. Diagnostics contains run records and numerical checks; Data/Validation holds the comparison targets. Online_Appendix.pdf is supplied separately within the package and is not compiled by MATLAB.