Bearing the cost of politics: Consumer prices and welfare in Russia

Instructions for replication

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These instructions detail how to replicate the results of the paper "Bearing the cost of politics: Consumer prices and welfare in Russia" by Julian Hinz and Evgenii Monastyrenko. There are two folders, "section 2 - Consumer prices in Russia" and "section 4 - Counterfactuals", each containing the code and data necessary to replicate all tables, figures and cited numbers in the text.

Note that some data required for the counterfactual simulation are proprietary and cannot be shared by the authors, namely GTAP version 8 (http://gtap.agecon.purdue.edu) and MacMap (https://www.macmap.org). However, many public institutions and universities already have applicapable licences, otherwise the data can be easily acquired.[1]

Section 2. Consumer prices in Russia

Code

All regressions outputs and figures are produced by executing just one `R` script, `code/plot_regressions.R`. The code is commented in detail and has RStudio section marks for every single figure or table that is produced for the paper. All required R packages will be installed automatically.

Data

The `data` folder contains all needed data sourced in the code:

- `concord_product_HS_GTAP.rds`
- `distances_to_ukraine.csv`
- `metadata.xlsx`
- `prices.rds`

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[1]We are happy to guide interested readers to licensing/acquiring the datasets.

- production.rds
- shapefile_RUS_adm1.rds
- share_imp_12months.rds
- trade.rds
- wholesales.rds

Each dataset is described in detail in the paper.

Results

The results folder contains all output generated by the script code/plot_regressions.R. Upon re-running the script, all files will be replaced.

Section 4. Counterfactuals

Code

All counterfactuals in the section 4 of this paper can be replicated by executing one file in Matlab, section4_counterfactuals.m. The code is adapted from Caliendo & Parro (2015). The computations are done automatically in the steps described below. All of the steps are extensively commented in the code. The corresponding scripts and functions are saved to the folder code.

0. Preparations step. Computing the post-embargo trade costs. At this step, the matrix of initial tariffs is combined with a vector indicating the embargo. This step is run with the code in trade_costs.m.
1. Computing the equilibrium in the base year (2013) with trade deficits. This step is run with the code in script1_base_year.m.
2. Re-computing the equilibrium in the base year (2013) without trade deficits. This step is run with the code in script2_eliminating_trade_surplus.m.
3. Computing counterfactual equilibrium (2013 with embargo) without aggregate trade deficits. This step is run with the code in script3_no_surplus.m.
4. Solving the model in differences for the Russian embargo. This step is run with the code in script4_counterfactuals.m.
5. Computing welfare effects and producing output tables. This step is run with the code of the function welfare_stats() (see file welfare_stats.m).

We further aim to compare obtained welfare predictions with predictions from a model without Input-output linkages. To do so, we repeat the same procedure while setting zeros to all elements of the IO matrix, except the unity diagonals. The corresponding steps 6 to 9 are below.

6. Computing the equilibrium in the base year (2013) with trade deficits. This step is run with the code in script5_base_year_no_io.m.

7. Re-computing the equilibrium in the base year (2013) without trade deficits. This step is run with the code in `script6_eliminating_trade_surplus_no_io.m`.
8. Computing counterfactual equilibrium (2013 with embargo) without aggregate trade deficits. This step is run with the code in `script7_no_surplus_no_io.m`.
9. Solving the model in differences for the Russian embargo and computing welfare effects. This step is run with the code in `script8_counterfactuals_no_io.m`. As the results of this step we obtain welfare effects of Russian embargo as predicted by a model without IO linkages.

Data

The original data needed to run the counterfactuals are located in the folder `data`. We run the simulations on the data for 38 countries and 52 sectors (39 tradable or embargoed and 13 non-tradable). We save these dimensions to the file `dimensions.mat` and repeatedly use them throughout calculations. We save the names of countries to a vector in `countries.mat`, and the identifiers of tradable sectors to a vector in `sectors.mat`.

All required data inputs are saved to the following files:

1. `embargo.csv` contains the list of all countries and sectors in the data. The columns `origins_embargo`, `destinations_embargo` and `sectors_embargo` contain the flags indicating the embargo status.
2. `T.mat` contains the sectoral trade elasticities sourced from Ossa (2014) and Imbs and Mejean (2015). This a 39x1 vector and the values exist only for tradable (or embargoed) sectors.
3. `TradeMatrix.mat` contains the bilateral trade matrices across sectors and countries for the base year 2013. This is a 1482x38 matrix where the first 38x38 submatrix is the bilateral trade matrix for the first tradable sector, the second 38x38 submatrix is the bilateral trade matrix for the second tradable sector, etc. On total, there are 39 submatrices (one for each tradable sector). Columns are the source countries and rows are the destination countries. The data originates from BACI (CEPII).

These aforementioned data files sourced from publicly available datasets are directly included in the folder. The code requires four more data files from standard datasets that, for licensing reasons, cannot be shared directly, namely GTAP version 8 (http://gtap.agecon.purdue.edu) and MacMap (https://www.macmap.org).

4. `B.mat` contains the share of value added in gross output across sectors and countries. This is a 52x38 matrix where rows are sectors and columns are countries. The data originates from GTAP version 8.
5. `GO.mat` contains gross output by sector and country. This is a 52x38 matrix where rows are sectors and columns are countries. The data originates from GTAP version 8.
6. `IO.mat` contains the input-output coefficients for each country. This is a 1976x52 matrix where the first 52x52 submatrix is the input-output matrix for the first country, the second 52x52 submatrix is the input-output matrix for the second country, etc. Columns are the destination sectors and rows are the source sectors. The data originates from GTAP version 8.

7. `Tariffs.mat` contains bilateral tariff data across sectors for the year 2013. This is a 1482x38 matrix where the first 38x38 submatrix is the bilateral trade matrix for the first tradable sector, the second 38x38 submatrix is the bilateral trade matrix for the second tradable sector, etc. On total, there are 39 submatrices (one for each tradable sector). Columns are the origin countries and rows are the destination countries. The data originates from MacMap.

Results

The results of all counterfactual simulations are saved to the folder `results`. The following four Excel files contain the output, which are directly used in the tables in this paper.

1. The principal predictions for the welfare and prices outcomes are in `welfare_effects.xlsx`. Based on this file, we produce tables 8 and 9.
2. The counterfactual welfare changes in a model without IO linkages are saved to `welfare_effects_no_io.xlsx`. Based on this file, we produce table D2 in the appendix.
3. The contribution of each sector to the welfare changes and the changes in sector-level prices in Russia are reported in Table 7. We construct this table using the output files `sectoral_contribution.xlsx` and `prices_countries_sectors.xlsx`. These files contain sector-level outcomes for each tradable sector across all included countries.