# Readme File for the Replication Package for:
# The Long and Short (Run) of Trade Elasticities

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## 1 Overview

The replication package contains all replication files and original source data that can be shared publicly to replicate the results in the paper. Additionally, we provide detailed information on how to download all data, including data that cannot be shared publicly.

The replication package also contains the Excel document `sources_filetree.xlsx`, which provides further information on how the replication code is organized.

## 2 Replicating the analysis

### 2.1 General folder structure

All files to replicate the empirical analysis in Sections 1-5, model in Section 6 and Appendices A-D are located in the replication package. This package contains the following sub-folders:

- `code`: contains Stata code, and Matlab code to reproduce various figures, tables, and any results for additional statements contained in the text

- `data`: contains source data that can be publicly shared

- `output`: contains all figures and tables, as well as the results for various statements in the text as produced by the code in the `code` subfolder. All tables are saved in latex files and excel files and figures are saved as png files within this folder

- `temp_files`

- `bashfiles`

The `output` folder contains five sub-folders, which contain files as suggested by their names. These are

- `graphs`

- `tables`

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- reg_output_paper

- temp_files

- logs

In particular, the subfolder reg_output_paper contains all regression output in Stata and excel format, which are inputs to construct the figures and tables for users who do not want to rerun the entire replication code due to computing constraints (as we detail below). The data folder contains several sub-folders, which are organized by data source, each containing raw data files suggested by their names. These are

- BACI_2020

- CEPII

- HS_concordances

- OECD_ICIO

- OssaElasticities

- PWT

- TRAINS

- TTBD2020

- WIOD

- WTO_data

Some folders also contain additional documentation. The temp_files folder is exclusively to place intermediate files created while running the full replication code.

## 2.2 Data Availability and Provenance Statements

The analysis is based on a number of data sources, all of which are publicly available for download, although not all of them can be publicly shared in this repository due to license restrictions. We next discuss these sources and provide information how to obtain them and how we used them for our analysis. Note that for our main empirical analysis we only use data from 1995 to 2018. Some data sources below are available for a longer time period. The download dates for all data sources are provided in the reference list at the end of this document.

### 2.2.1 Statement about Rights

I certify that the author(s) of the manuscript have legitimate access to and permission to use the data used in this manuscript.

### 2.2.2 License for Data

Licenses for the data used are provided in the Licence.txt file in this replication package.

### 2.2.3 Summary of Availability

Some of the data used in this replication package cannot be made publicly available, but detailed instructions for downloading these data are provided in this package.

### 2.2.4 Details on each Data Source

- Bilateral trade flows data at the country- harmonized 6-digit product level from BACI for the years 1995-2018 (located in `\data\BACI_2020`).

    - These data have been downloaded from `http://www.cepii.fr/CEPII/en/bdd_modele/bdd_modele_item.asp?id=37`. The version used in the paper is the "January 2020 version" which was released on 01/2020 and downloaded in 04/2020 (see Gaulier and Zignago, 2010; Centre d'études prospectives et d'informations internationales, 2022a).
    The website has been modified since then as new versions of the BACI trade data are periodically released. The current version (11/2/2022 is V202201, which differs from the version used in the paper as the number of observations and country codes change across revisions. The dataset used in the paper can be downloaded by going to the page `http://www.cepii.fr/DATA_DOWNLOAD/baci/doc/LegacyVersions.html#january-2020` (Legacy Versions of BACI) and then clicking on the dataset listed under "January 2020", "Trade Flows". The files to download are called `HS92.zip`, `HS96.zip`,`HS02.zip`,`HS07.zip`,`HS12.zip` and `HS17.zip`. The list of country codes can be also downloaded under "January 2020", "Country Codes". Note that the legacy versions of the BACI data can be accessed from the main BACI page above by clicking on "Archives" followed by "Older legacy versions."

- TRAINS United Nations Conference on Trade and Development (UNCTAD) (1995-2018): The TRAINS data cannot be shared publicly without a license (for details see the License.txt file in this replication package). However, they can be downloaded by individual users. We provide instructions on how to download the data below.

    - These data have been downloaded from `http://wits.worldbank.org/WITS/WITS/Default-A.aspx?Page=Default`. A simple registration process is needed to download the data from the WITS application, which requires some personal information of the applicant including name, country, email address and organization. To download the data:
        1. Login to the WITS application by clicking on "Login" button at the upper-right side of the website. Then, click "Advanced Query" - "Tariff and Trade Analysis" from the top panel.
        2. Generate a new query name/description and click "TRAINS" as a data source. Then click "Proceed". Now, choose the data samples.
        3. Importers/Reporters: click "Select" and choose i) all countries by clicking every country in the "Country List" (note that it is easier to click the first country, scroll down, and shift-click the last country) and ii) click "All countries All" in the "Predefined Country Groups"
        4. Products: click "Select" and choose "HS-combined" from Nomenclature. Then, choose "ALL3 (all 6-digit HS codes)" from "Clusters"

5. Exporters/Partners: click "Select" and choose i) all countries by clicking every country in the "Country List" (note that it is easier to click the first country, scroll down, and shift-click the last country) and ii) click "All countries All" in the "Predefined Country Groups"

6. Years: click "Select" and choose one year from 1995 to 2018.

7. Tariffs: click "Select" and choose "Not Selected" from "Use AVE".[1] Click all four types ("Include Effectively Applied rates", "Include MFN Applied rates", "Include MFN Bound rates", "Include Preferential rates") from "Duty Types"

8. Press "Submit" to submit the query for dataset. When the status turns into "completed", click the arrow at the "Download" column and select the format "STATA" and export all variables. Note, it is important to select all variables in this step as one of the variables in the analysis (`SpecificDutyImportsin1000USD` is not part of the automatically downloaded set of variables.)

9. Repeat the process for all years from 1995-2018. Note that while technically multiple years can be selected at once, there is an effective download file size constraint which implies that when multiple years are selected, there will be incomplete downloads. As of 12/2022, each individual year can be downloaded separately without the file size constraint binding.

10. Save the downloaded data in the replication folder as
    `\data\TRAINS\TRAINS'year'.zip`

– The data used in the paper was downloaded on 05/2020. The UNCTAD TRAINS database is updated frequently, the current online version differs slightly from what is used in the paper. Changes reflect some updates on product classifications, reporter countries and partner countries since our first download date. For instance in 2018, the data downloaded on 12/2022 includes Eswatini and North Macedonia but excludes Swaziland and Macedonia, FYR. It also excludes one product (HS121292–Locust beans). As of 12/2022, the data are otherwise very similar to the version from 05/2020 (with fewer than 35000 mismatches in the values that were greater than 0.001 out of a total dataset size of more than 100 million). However, we caution that this might change in the future. The detailed refresh log of UNCTAD TRAINS database can be found at `http://wits.worldbank.org/WITS/WITS/Support20Materials/TariffDataRefresh.aspx?Page=TariffDataRefresh`

– **Important note:** UNCTAD TRAINS provides ad-valorem equivalent tariffs for some non-ad valorem tariffs using a number of different approaches to compute these ad-valorem equivalents. We do **not** use any ad-valorem equivalent tariffs in our analysis, for reasons discussed in the paper. It is therefore very important that in step 7 of the download process above, users **do not** choose an ad-valorem equivalent method from the "Use AVE" tab of the tariff downloads.

– Note that the structure of the TRAINS database download procedure implies that users cannot directly download the version from 05/2020 by visiting internet archives, as the site requires registration. We are therefore maintaining our version of the data to assist any replication efforts upon request. We will maintain our data for a minimum of five years from publication and for as long as our operating systems permit.

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[1] "AVE" refers to ad-valorem equivalents, which are computed by UNCTAD. As discussed below and in the paper we do not use them in our analysis.

- Tariff data from the WTO. Comes from Integraded Database (IDB) and Consolidated tariff schedules (CTS). (World Trade Organization Integrated Database (IDB) and Consolidated Tariff Schedules (CTS) (WTO Stats), 1995-2018). These data are located in the \data\WTO_tariffs folder.

  – These data have been downloaded from http://stats.wto.org. The data can be downloaded using the following specifications on the site:

    1. Indicators: HS Pref - Best preferential simple average ad valorem duty (Percent)
    2. Reporting Economies: Select all
    3. Products / Sectors: Select all Subheadings (6-digit)
    4. Partner Economies: Select all
    5. Years: 1996, 1997, . . . , 2018 (one by one so that each year generates each csv file)
    6. Click apply and then click "csv" on the top right. Wait for a while until the data is generated and it will be downloaded automatically.

  – The data used in the paper was last downloaded on 11/2021. The current version as of 11/2022 is identical until 2008. For the years after 2008, the current version has been updated for a few countries (the European Economic community, Iceland, India, Laos and Niger).

- HS concordances: concordance tables among revisions of HS products at six-digit level produced by the UN statistics division
(United Nations Statistics Division, 1992-2017) (located in \data\HS_concordances)

  – These data have been downloaded from https://unstats.un.org/unsd/trade/classifications/correspondence-tables.asp. The tables are located under the Tab "HS 1992 - 2022", which is observable when scrolling down at the above link. Each concordance table can be downloaded by clicking the "xls" link next to the appropriate combination of years (e.g. HS96HS92.xls can be downloaded by clicking on the excel tab for row HS 1996 and column HS 1992). Since our main dataset covers until 2018, we don't use the concordance table for HS 2022.

  – The format of the excel sheets has slightly changed since our download on 11/2019. The current version in 11/2022 has additional row "ex." on the first tab of the excel file and the variable names take first two rows, instead of one. The data in the excel sheets have not changed as of 11/2022.

- Temporary trade barriers database for countervailing duties antidumping duties and safeguard duties (located in \data\TTBD2020). (Bown, 2011; World Bank, 2021)

  – These data were originally constructed by Chad Bown and are now maintained by the World Bank. They have been downloaded from https://www.worldbank.org/en/data/interactive/2021/03/02/temporary-trade-barriers-database. The steps to download the data are:

    1. Scroll down to the middle of the website and click "All Underlying data" under "Downloads" tab to download the zipfile that contains the data for three measures of temporary trade barriers.
    2. Once downloaded, the zipfile should contain the following three files. The first is "GSGD-WTO.xls", which contain the data on Global Safeguard Duties. The second is "CVD (2020).zip", which is another zipfile that contains the data on the Countervailing Duties at country level. Once unzipped, we get the excel files for each country, named for each

country as "GCVD-*countryiso*.xls". The last is "GAD (2020).zip", which is the zipfile that has the information on the Antidumping Duties at country level. Similarly, after unzipping, we get the excel files for each country, named as "CVD-*countryiso*.xls"

- Country codes are obtained from WITS (World Integraded Trade Solutions by the World Bank, 1995-2018)

  - These data have been downloaded from `https://wits.worldbank.org/referencedata.html`. From the website above, click "Countries" Tab and download the "Country List" excel file under the "List of Reporters and Partners".

- European Union Membership: constructed manually using information on EU accession dates from Wikipedia `https://en.wikipedia.org/wiki/Member_state_of_the_European_Union` (Wikipedia, 1995-2018)

  - The country ISO code and the accession year is collected to construct the variable "country" and the variable "entry year". The accession year for EU founder countries follows the establishment year of European Economic Community, which is the immediate predecessor to the EU.

  - Note that our data run only through 2018, so the United Kingdom is classified as an EU member in our data.

- Geographic Variables: geographic variables for country-pairs such as bilateral distances, common border, or common language (Mayer and Zignago, 2011; Centre d'études prospectives et d'informations internationales, 2022b) (located in \data\CEPII)

  - These data have been downloaded from `http://www.cepii.fr/CEPII/en/bdd_modele/bdd_modele.asp`. The data can be accessed by navigating to "GeoDist" under "Legacy" tab on the left and clicking the right arrow next to "Download" for the dyadic file.

- Penn World Tables: Country-level database between 1950 and 2017 including real GDP. (Feenstra, Inklaar, and Timmer, 2015; Groningen Growth and Development Centre, 2019) (located in \data\PWT)

  - These data have been downloaded from `https://www.rug.nl/ggdc/productivity/pwt/?lang=en`.

  - Our dataset, the PWT 9.1, can be download at the following link `https://www.rug.nl/ggdc/productivity/pwt/pwt-releases/pwt9.1`.

  - The most recent version is the PWT 10.0, which covers an extended period up to 2019. The detailed information on changes can be found here `https://www.rug.nl/ggdc/docs/pwt100-whatsnew.pdf`

- World Input Output Database (WIOD): Input-output table for import shares (Timmer et al., 2015; Groningen Growth and Development Centre, 2016)

  - These data have been downloaded from `https://www.rug.nl/ggdc/valuechain/wiod/?lang=en`.

– The data in our paper comes from the WIOD 2016 release. Go to the "WIOD 2016 Release" tab and download the World Input Output Tables (WIOT) in Stata format. The zipped file contains the Stata file (.dta) for each year. The file that we use in the paper is "WIOT2006_Nov16_ROW.dta", which is for the year 2006.

- KLEMS: Integrated Industry-Level Production Account (World KLEMS, 2010)

  – These data have been collected from many sources for different countries.

  – European countries, Japan, and US (`https://euklems-intanprod-llee.luiss.it/download`). The dataset we download is the "National Accounts" Stata file for "All Countries from 1995", under the "Variable Description" tab. The Stata file can be downloaded by clicking "Stata" among three formats, "CSV" "Stata" or "R".

  – Canada and Russia (`https://www.worldklems.net/wkanalytical`): Under the "Data hosted on WorldKLEMS" tab, search for Canada or Russia. For Canada, click the "Basic file" for July 2012 Release and download the excel file. For Russia, click the "Basic Output File" for March 2017 Release and download the excel file.

  – Taiwan (`http://www.asiaklems.net/data/archive.asp`): Click "TAIWAN-Basic File_2013.xlsx" at the middle of the website and download the excel file.

  – South Korea (`https://www.worldklems.net/data.htm`) : Scroll down and go to "Korea, Released 2014" at the middle. Click "Output and Labour file" to download the excel file.

  – Latin America Countries (`http://laklems.net/stats/result`) : The data we download are the "Basic File(BF)" for each country. We download a separate file for each country, which is the file located at each row for the column "Basic File (BF)". Click "CL_AB_2021-07_ESP" for Chile. Click "CO_AB_2021-07_ESP" for Colombia. Click "CR_AB_2021-07_ESP" for Costa Rica. Click "ES_AB_2021-07_ESP" for El Salvador. Click "HO_AB_2021-07_ESP" for Honduras. Click "MX_AB_2021-07_ESP" for Mexico. Click "PE_AB_2021-07_ESP" for Peru. Click "RD_AB_2021-07_ESP" for Republica Dominica.

  – China (`https://www.rieti.go.jp/en/database/CIP2015/index.html`) : Scroll down and go to "Data download" to download the following three files. The first file is located at the first line in the Section "1.Input-output tables". The file can be downloaded by clicking the hyperlink "XLSX:51KB" next to "a) Gross value of output and b) intermediate input by industry in ml. current yuan". The second file is located at the fifth line in the Section "1.Input-output tables". The file can be downloaded by clicking the hyperlink "XLSX:43KB" next to "Distribution of gross value added in ml. current yuan: a) consumption of fixed capital; b) employee compensation; c) operating surplus; d) net production tax". The third file is located at the second line in the Section "3.Labor input data". The file can be downloaded by clicking the hyperlink "XLSX:22KB" next to "Hours worked by industry of all enterprises in millions"

- Nominal exchange rates (Databank by the World Bank, 2006)

  – These data have been downloaded from
  `https://databank.worldbank.org/source/global-economic-monitor-(gem)`.

  – Under the "Variables" tab on the left, the Worldbank Databank allows us to choose "Database", "Country", "Series", and "Time" for the data to be downloaded.

- Database: select Global Economic Monitor (GEM) - the provided link would pre-select this by default.

- Country: select all by clicking the check mark below "Country", which will add 220 countries at once.

- Series: select "GDP, current LCU, millions, seas. adj.,"

- Time: select "2006"

- After making these adjustments, click "Apply Changes" in the middle. Then, download the data by clicking "Download options" on the right and choose "Excel" for the format.

- Ossa elasticities: obtained from Table 1 of Ossa (2014)

- GTAP-HS concordance (Aguiar, 2016; Global Trade Analysis Project, 2016): concordance table between GTAP sectors and HS code products. The data can be directly downloaded at `https://www.gtap.agecon.purdue.edu/resources/download/8171.xls`

- HS-ISIC concordance (OECD, 2015): concordance table between HS code products and ISIC sectors. The data can be directly accessed at `https://www.oecd.org/sti/ind/ConversionKeyBTDIxE4PUB.xlsx`

### 2.2.5 Dataset List

A summary of the dataset lists is provided in the excel file sources_filetree in this replication package.

## 2.3 Replication code

### 2.3.1 Computational Requirements

**Software** All of the code has been run using Stata/MP 17 and Matlab 2022b Update 1 (the `version` command returns `9.13.0.2080170 (R2022b) Update 1`). The Stata code uses additional packages (`reghdfe`, `ivreghdfe`, `xsvmat`, `ftools`, `ranktest`, `estout`), which are automatically installed when running the replication code from the beginning using the command `ssc install` *package*.

**Note:** In particular, we use the following version of `reghdfe` - ver 6.12.2 (02Nov2021) and `ivreghdfe` - ver 1.1.1 (14Dec2021). If the installed versions are different in the local directory, they can be reinstalled using the commands below.

*cap ado uninstall reghdfe*

*net install reghdfe, from(https://raw.githubusercontent.com/sergiocorreia/reghdfe/master/src)*

*cap ado uninstall ivreghdfe*

*net install ivreghdfe, from(https://raw.githubusercontent.com/sergiocorreia/ivreghdfe/master/src)*

Other versions of these Stata packages can occasionally lead to minor differences in some results. These are not substantively important for our results, but we cannot guarantee other versions of these Stata packages will exactly replicate the numbers in the paper.

### 2.3.2 Memory and Runtime Requirements

We have run this code on a computer with the following specifications: OS Name: CentOS 7 Linux, Processor: 2x 3.0 GHz Intel Xeon Gold 6154, 16 Core(s) for each node, Installed Physical Memory (RAM): 180 GB for each node. The required disc space for this entire replication package is approximately 650

GB. With these specifications, the total run time is approximately **494 hours 22 minutes**. We provide a detailed breakdown of the runtime for each file in the companion excel file sources_filetree.

**Description of Programs/Code**   The sheet `file_tree` in the file `sources_filetree.xlsx` provides information on the code. This sheet contains the following columns:

- Folder: Contains the folder in which the file is located.

- Order of running code: Indicates in which order the code needs to be run (from level 0 to 9).

- File: Contains the file name.

- Inputs: Lists the locations and file names of the data that the code calls.

- Subroutines: Lists the locations and file names of subroutines that the code calls (if any).

- Outputs: Lists the locations and file names of output that the code produces.

- Notes: Provides additional information.

- Time start, Time end, Time spent: These contain for some of the codes that were run off the server the run-time information.

## 2.4   Instructions to Replicators

To run the entire replication code for the empirical analysis, change the directory in the file

- `code\a00_run_all.do` line 4

to the relevant directory on your computer.

Then run the file `code\a00_run_all.do`. This file calls all other files to set up the regression dataset from raw data and to run the analysis. Depending on the speed of your computer, it can take a very long time to run.

The code for the model in Section 6 is also run through `code\a00_run_all.do`. This section is clearly delineated in the main file. In contrast to the remaining empirical analysis, the code for the model can also be run separately, without first running the codes for the rest of the paper.

Note that the model calibration files which use data from the `data` folder are in the main `code` folder, while the model matlab code and subroutines are in three subfolders `code\dynamic_GFT`, `code\IRFs` and `code\model_subroutines` which are called from `code\a00_run_all.do`.

**Our processing specifications**   As noted above, we have run this code on a computer with the following specifications: OS Name: CentOS 7 Linux, Processor: 2x 3.0 GHz Intel Xeon Gold 6154, 16 Core(s) for each node, Installed Physical Memory (RAM): 180 GB for each node. The required disc space for this entire replication package is approximately 650 GB. With these specifications, the total run time is approximately **494 hours 22 minutes**.

**Parallelization**  Note that we have 13 dofiles for data cleaning (d01-d13) and 20 dofiles for regressions and analysis (g01a-g02b, r01-r07c). We begin with sequentially running the data cleaning codes (d01-d13), which takes 14 hours and 30 minutes. Having prepared the final datasets for analysis, we parallelize the regression tasks and utilize multiple nodes (up to 8) simultaneously in the server to expedite the run time. Each node is an individual computer with 16 cores CPU and 180 GB memory. We divide 20 dofiles into 8 groups and write 8 bash files which sequentially run each set of dofiles. When the amount of tasks are equally distributed across nodes, the parallelization can reduce the total run time by the number of nodes. In our case, it takes approximately 60 hours to run each bashfile. When 8 nodes are fully utilized for parallelization, the total run time reduces to 74 hours and 30 minutes. *For convenience, we provide our bashfiles 'as-is' in \bashfiles to illustrate the process, but for users to implement the same approach these will have to be individually customized to the computing systems users have access to.*

All output is written into the folder `output`.

### 2.4.1   List of tables/figures

As not all data can be made public, we provide all intermediate regression output in Stata format as well as part of the replication package in subfolder `output\Reg_output_paper`, which allows users to run the tables and figures creation code (codes t01-t04, f01-f07) without rerunning every step of the analysis prior to that. These files will recreate all the tables and figures in the paper. The specific tables and figures created in each file are listed in sources_filetree

Any step of the analysis that is rerun will simply write the relevant regression output Stata file to the output subfolder `TemporaryFiles`, from where it will be an input into creating figures or tables. Any step that is not rerun will write the author-provided regression output into the subfolder `TemporaryFiles` so that the figures and tables code can be run. The master do file `code\a00_run_all.do` contains options for selecting which portions of the regression analysis users which to rerun.

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