Replication files for "Capital Accumulation and Dynamic Gains from Trade" in the *Journal of International Economics*, by B. Ravikumar, Ana Maria Santacreu, and Michael Sposi.

All files are contained in a folder called "Replication". Data files are stored in Microsoft Excel 2016 and codes are written in MATLAB R2017a. The instructions to replicate results are split into 4 parts: First, make sure all raw data files are available. Second, read the data files into MATLAB for formatting. Third, use the formatted data to calibrate parameters of the models (separate script for each model specification). Fourth, use the calibrated parameters to solve the models and counterfactuals (separate scripts for each model specification and each counterfactual therein).

- **Raw data files.** Each filed is saved as a Microsoft Excel and is formatted based on the purpose of use (i.e., 44-country model, two-country model, etc.)
    - Data from the **World Input Output Database** (WIOD), aggregated up to four sectors: Nondurable goods, Durable goods, Nondurable services, and Durable services. Country aggregation is maintained as in WIOD, and only the year 2014 is used.
        - Replication/Data/Calibration/FinalExpenditures.xlsx: Final expenditures by end use – private consumption, government consumption, and investment.
        - Replication/Data/Calibration/IOmatrix.xlsx: Intermediate expenditures by each sector on each sector.
        - Replication/Data/Calibration/Key.xlsx: List of country ISO codes and sector names.
        - Replication/Data/Calibration/Production.xlsx: Value added and gross output.
        - Replication/Data/Calibration/Trade.xlsx: Bilateral trade flows.
        - Replication/Data/Calibration/NX_avg_2010-2014.xlsx. Average total imports, exports, and total GDP from 2010-2014.
    - Data from **version 9.0 of the Penn World Tables**.
        - Replication/Data/Calibration/pwt90.xlsx. Raw data file.
    - Data from **CEPII**
        - Replication/Data/Calibration/Gravity.xlsx: gravity variables including distance, common border, and common currency.

- **Reading in data**. MATLAB codes are used to read in and format data, and in turn to create new .mat files that can be used for calibrating and solving the models.
    - Replication/Data/ReadDataSimple.m. Reads data and aggregates countries so that world consists of 44 countries in WIOD (baseline). Output file saved as Replication/Data/Calibration/DataForCalibrationSimple.mat.
    - Replication/Data/ReadDataSimple2ctyBGR.m. Reads data and aggregates countries so that world consists of Bulgaria and a rest-of-world composite. Output file saved as Replication/Data/Calibration/DataForCalibrationSimple2ctyBGR.mat.
    - Replication/Data/ReadDataSimple2ctyFRA.m. Reads data and aggregates countries so that world consists of France and a rest-of-world composite. Output file saved as Replication/Data/Calibration/DataForCalibrationSimple2ctyFRA.mat.
    - Replication/Data/ReadDataSimple2ctyPRT.m. Reads data and aggregates countries so that world consists of Portugal and a rest-of-world composite. Output file saved as Replication/Data/Calibration/DataForCalibrationSimple2ctyPRT.mat.

- Replication/Data/ReadDataSimple2ctyUSA.m. Reads data and aggregates countries so that world consists of United States and a rest-of-world composite. Output file saved as Replication/Data/Calibration/DataForCalibrationSimple2ctyUSA.mat.

- **Calibrating the models**. Read in formatted data and assigns all parameter values. Files saved in Output files saved in same location and then need to copy-pasted over to a new location, as described below.
  - Replication/Data/Calibration/CalibrationSimpleBaseline.m: Calibrates the baseline model. Reads in file Replication/Data/Calibration/DataForCalibrationSimple.mat. Output file saved as Replication/Data/Calibration/ParametersSimple.mat, then copy over to Replication/MatlabProgramsSimple/BaselineModel/ParametersSimple.mat.
  - Replication/Data/Calibration/CalibrationSimpleXinC.m: Calibrates the static model with consumption and investment treated as one good. Reads in file Replication/Data/Calibration/DataForCalibrationSimple.mat. Output file saved as Replication/Data/Calibration/ ParametersSimpleXinC.mat, then copy over to Replication/MatlabProgramsSimple/ModelInvestmentInC/ ParametersSimpleXinC.mat.
  - Replication/Data/Calibration/CalibrationSimple2ctyBGR.m: Calibrates the two-country model of Bulgaria and rest of world. Reads in file Replication/Data/Calibration/DataForCalibrationSimple2ctyBGR.mat. Output file saved as Replication/Data/Calibration/ParametersSimple2ctyBGR.mat, then copy over to Replication/MatlabProgramsSimple/TwoCountryBaselineModel/ ParametersSimple2ctyBGR.mat.
  - Replication/Data/Calibration/CalibrationSimple2ctyFRA.m: Calibrates the two-country model of France and rest of world. Reads in file Replication/Data/Calibration/DataForCalibrationSimple2ctyFRA.mat. Output file saved as Replication/Data/Calibration/ParametersSimple2ctyFRA.mat, then copy over to Replication/MatlabProgramsSimple/TwoCountryBaselineModel/ ParametersSimple2ctyFRA.mat.
  - Replication/Data/Calibration/CalibrationSimple2ctyPRT.m: Calibrates the two-country model of Portugal and rest of world. Reads in file Replication/Data/Calibration/DataForCalibrationSimple2ctyPRT.mat. Output file saved as Replication/Data/Calibration/ParametersSimple2ctyPRT.mat, then copy over to Replication/MatlabProgramsSimple/TwoCountryBaselineModel/ ParametersSimple2ctyPRT.mat.
  - Replication/Data/Calibration/CalibrationSimple2ctyUSA.m: Calibrates the two-country model of United States and rest of world. Reads in file Replication/Data/Calibration/DataForCalibrationSimple2ctyUSA.mat. Output file saved as Replication/Data/Calibration/ParametersSimple2ctyUSA.mat, then copy over to Replication/MatlabProgramsSimple/TwoCountryBaselineModel/ ParametersSimple2ctyUSA.mat.

- **MATLAB codes to run models and counterfactuals**. Each model specification has its own subfolder containing the MATLAB programs needed to solve the model. For each specification, there is one MATLAB file that runs all of the counterfactuals.
    - Replication/MatlabProgramsSimple/BaselineModel/RunBaselineCFs.m: Runs all of the counterfactuals using the baseline model. Saves all output in a folder called Replication/MatlabProgramsSimple/BaselineModel/Results.
    - Replication/MatlabProgramsSimple/ModelInvestmentInC/RunStaticXinCCFs.m: Runs all of the counterfactuals using the static model where investment and consumption are both treated as one final, non-durable good. Saves all output in a folder called Replication/MatlabProgramsSimple/ModelInvestmentInC/Results.
    - Replication/MatlabProgramsSimple/TwoCountryBaselineModel/RunBaseline2ctyCFs.m: Runs all of the counterfactuals using the two-country baseline models based on any one country plus a corresponding rest-of-world composite. Saves all output in a folder called Replication/MatlabProgramsSimple/TwoCountryBaselineModel/Results.

  Each of the above scripts runs a set of counterfactuals pertaining to the relevant model specification. Below is an explanation of one such countertactual pertaining to a 20 percent reduction in trade costs in the baseline specification.

    - Replication/MatlabProgramsSimple/BaselineModel/RunBaselineCFs.m calls a script named Replication/MatlabProgramsSimple/BaselineModel/CF_UniformLib20pct, which (i) computes the initial steady state then (ii) guesses a counferactual steady state then (ii) computes the transition path while updating the final steady states.
        - Initial steady state is solved by first calling the script SS_compeqbm.m. This takes as input an initial guess for the vector of wages across countries along with parameters.
            - Given the guess of wages, the script then calls another script named SS_alloc.m, which takes the wages and parameters as given and computes all allocations as a function of these inputs. There are three additional script called by SS_alloc.m:
                - SS_priceindex.m: Solves for sectoral price indexes as a function of wages and parameters.
                - tradeshare.m: Solves for bilateral trade shares as a function of wages, prices, and parameters.
                - prodn_alloc.m: Solves for global allocation of production in each sector given trade shares and final demand.

          SS_ compeqbm .m then iterates on the vector of wages until the balance of payments identity holds.
        - A guess for the terminal net-foreign asset (NFA) position is made for counterfactual trade costs, and SS_compeqbm.m is called to solve for a steady state associated with that using the same procedure as in the initial steady state.
        - A guess for the entire transition path for investment rates is made between the initial and terminal steady state. The equilibrium transition is solved by first calling the script comp_inv_labor.m. This takes as input an initial guess for the

matrix of investment rates countries along with parameters and a guess for the terminal NFA.

- Given the guess of investment rates and terminal NFA, the script then calls another script named comp_eqbm.m, which iterates on a matrix of wages. At each iteration, it calls three additional scripts:
  - priceindex.m: Solves for sectoral price indexes as a function of wages and parameters.
  - tradeshare.m: Solves for bilateral trade shares as a function of wages, prices, and parameters.
  - prodn_alloc.m: Solves for global allocation of production in each sector given trade shares and final demand.

  comp_eqbm.m continues iterating on wages until the balance of payments identity holds in every country and year.

Conditional on converging to a matrix of wages, the script comp_inv_lab.m continues iterating on the matrix of investment rates until the Euler equation is satisfied in every country and year. At the same time, the terminal NFA position is updated using the Turnpike theorem as described I the Appendix.

Output/results from the equilibrium steady state and transition path are stored.

- **MATLAB codes to collect/merge and view results**. There are two steps required to view the results. The first is to run programs that merge and save all of the results. The second is to run a program that creates plots and displays the numbers reported in the text.
  - Each model specification contains serval counterfactuals (different size of trade liberalization, etc.) The results from each counterfactual need to be merged into one file so all of the information can be simultaneously analyzed.
    - Replication/MatlabProgramsSimple/BaselineModel/Results/MergeBaselineResults.m
    - Replication/MatlabProgramsSimple/ModelInvestmentInC/Results/MergeResultsStaticXinC.m
    - Replication/MatlabProgramsSimple/TwoCountryBaselineModel/Results/Merge2ctyResults.m
    - Replication/MatlabProgramsSimple/ThreeCountryBaselineModel/Results/Merge3ctyResults.m
  - Replication/PlotResults.m: Reads in all of the merged data files and generates all of the numbers and figures reported in the paper.