Guidelines for the replication package of
"Trade, Technology, and Agricultural Productivity" for the publication in the Journal of Political Economy

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The codes that replicate the results in this paper are divided into three folders:

- Folder "data" that contains the data.
- Folder "empirical" for the replication of empirical patterns in Section 2 of the paper.
- Folder "quantitative" for the replication of structural estimation and quantitative results in Sections 6 and 7 of the paper.

Our results can be replicated in two ways:

(i) By running a bash file that executes all the replication files in a proper order—for this option, a UNIX operating system is required (MacOS or LINUX).

(ii) By running individual replication files manually in Stata and MATLAB.

Replication of empirical patterns — Section 2

General organization of the folder

- Codes that replicate results of Section 2 in the paper are in sub-folder "/globaltradeag_replication/empirical/code/".
- All codes use Stata only.
- Codes read data from "/globaltradeag_replication/data/output/".
- Results are saved in "/globaltradeag_replication/empirical/output/".
- Each file assumes that the working directory is at the location of the executable—therefore, to run any individual code, make sure to set the working directory to "/globaltradeag_replication/empirical/code/".

Producing results for Section 2

- Run the entire folder using the bash file as follows:
  1. Set the working directory in terminal to "/globaltradeag_replication/empirical/code/"
  2. Execute "run_all.sh".
- Alternatively, run each individual code in the following order:
  1. "data_check_1_summary_statistics.do" to produce Appendix Table A.3.
  2. "data_check_2_table_countries_by_quartile.do" to produce Appendix Table A.2.
  3. "fact_1_import_share_table.do" to produce Table 1.
  4. "fact_1_summary_statistics.do" to produce Appendix Table A.1
  5. "fact_2_inputs_per_land.do" to produce Figure 2.
  6. "fact_2_labor_share_consumption_exports.do" to produce Appendix Figure A.1.
  7. "fact_2_trade_liberalization_cases_all.do" to produce Figure 3.
  8. "fact_2_va_per_worker_cost_share.do" to produce Figure 2.
  9. "fact_2_yields_cost_share.do" to produce Appendix Figure A.1 and Appendix Figure A.2.
  10. "fact_3_corr_with_premium.do" to produce Appendix Figure A.3.

11. "fact_3_FAO_yields_analysis.do" to produce Appendix A.2.
12. "fact_4_intgeo_tech_main_table.do" to produce Table 2.

- After running the above codes, run:
  1. "fact_extra_1_patterns_tcost.do" to produce Appendix Figure A.9
  2. "fact_extra_2_1_compare_TFP.do" to produce Appendix Figure A.11.
  3. "fact_extra_2_2_compare_TFP_bar_figure.do" to produce Appendix Figure A.10.

Replication of the estimation and quantitative results of the structural model — Sections 6 and 7

General organization of the folder

- Codes that replicate results in Sections 6 and 7 are in sub-folder "/globaltradeag_replication/quantitative/code/".
- Codes use Stata and MATLAB.
- Codes read data from "/globaltradeag_replication/quantitative/input/" and "/globaltradeag_replication/data/output/".
- Results are saved in "/globaltradeag_replication/quantitative/results/".
- Each file assumes that the working directory is at the location of the executable—therefore, to run any individual code, make sure to set the working directory to "/globaltradeag_replication/quantitative/code/".
- In cases where the codes take a considerable amount of time to run, we report that in parenthesis below. This includes the estimation and the bootstrap file. Since we have used high-performance computing in those steps, they may take more time on a personal computer.

Producing results for Sections 6 and 7—excluding extensions and robustness checks of Section 7.3

- Run the entire folder using the bash file as follows:
  1. Set the working directory in terminal to "/globaltradeag_replication/quantitative/code/"
  2. Execute "run_all.sh".
- Alternatively, run each individual code in the following order:
  1- "estimate_demand.do" , "productivity_reg.do" , "tradecost_reg.do" to generate estimates of substitution elasticities, productivity shifters, and trade costs. (These results are saved at "/globaltradeag_replication/quantitative/input/")
  2- "calibration.m" to generate an initial guess for the general equilibrium of the model s.t. calibration constraints.
  3- "construct_moments.do" to create moments from the data for the estimation.
  4- "main_estimation.m" to estimate theta1 and theta2. (11 hours)
  5- "main_bs.m" to estimate the bootstrap standard errors. (4 days and 8 hours)
  6- "calibration_final.m" to get final calibration of the general equilibrium of the model at estimated theta1 and theta2.
  7- "simulation_baseline.m" to simulate the baseline general equilibrium of the model.
  8- "model_fit.m" to produce figures for the model fit and predictions.
  9- "Decomposition.do" to run the decomposition exercise for sources of technology choices.
  10- "changes_1980_2007.m" to calculate changes to trade cost and productivity between 2007 and 1980.
  11- "simulation_cf_tradecosts.m" to simulate the counterfactual equilibrium outcomes in which trade costs of agricultural inputs and/or outputs are set to their 1980 levels.
  12- "simulation_cf_productivity.m" to simulate the counterfactual equilibrium outcomes in which productivity values of agricultural inputs are set at their 1980 levels.
  13- "analysis_cf_tradecost.m" to produce tables and figures in which we compare the baseline economy with the counterfactuals in which we change trade costs.

14- "analysis_cf_productivity.m" to produce tables and figures in which we compare the baseline economy with the counterfactuals in which we change productivities.
15- "make_figure.do" and "make_table.do" to generate additional tables and figures.

Producing results for Sections 7.3 for extensions and robustness results:

- Run the entire folder using the bash file as follows:
  1. Set the working directory in terminal to "/globaltradeag_replication/quantitative/code/"
  2. Execute "run_all_extensions.sh".
- Alternatively, run each individual code in the following order:
  1. Extension 1—that allows for imperfect labor mobility between traditional and modern technology within agriculture.
     - 1.a) "calibration_final_ext1.m" to produce initial guesses for
     - 1.b) "simulation_baseline_ext1.m" to produce baseline equilibrium of extension 1.
     - 1.c) "simulation_cf_tradecost_ext1.m" to produce counterfactual outcomes for extension 1.
  2. Extension 2—that allows for imperfect labor mobility between fields within each country and also for prices of final goods to vary across fields within each country.
     - 2.a) "calibration_final_ext2.m" to produce initial guesses for
     - 2.b) "simulation_baseline_ext2.m" to produce equilibrium of extension 2.
     - 2.c) "simulation_cf_tradecost_ext2.m" to produce counterfactual outcomes for extension 2.
  3. Robustness 1—that experiments with an alternative parametrization of trade elasticities.
     - 3.a) "calibration_final_sigma.m" to produce initial guesses for
     - 3.b) "simulation_baseline_sigma.m" to produce extension 3.
     - 3.c) "simulation_cf_tradecost_sigma.m" to produce counterfactual outcomes for extension 3.
  4. Robustness 2—that experiments with a higher value of the sectoral labor elasticity than the main parametrization.
     - 4.a) "calibration_final_psi.m" to produce initial guesses for high psi.
     - 4.b) "simulation_baseline_psi.m" to produce baseline in which
     - 4.c) "simulation_cf_tradecost_psi.m" to produce counterfactuals for the extension above.
  5. "analysis_cf_tradecost_extension.m" to produce Appendix Tables A.15 and A.16.