Readme Public Replication Files – Antras, Fort, and Tintelnot May 2017

There are four subfolders in this folder containing the code to replicate the structural estimation and counterfactual results externally. The code is written for use at the UChicago RCC cluster. Adjustments to the job submission files may be necessary depending on the computing cluster at your university / institution.

The baseline model is estimated and counterfactual exercises are conducted in the folder T_17_Kappa_425. We describe the programs in this folder in more detail below.

The other subfolders are:

- sensitivity (varies kappa, theta, or sigma parameters),
- no_fixed_costs (the model shown in Panel D in Table 7: Universal importing), and
- fixed_cost_het_acr_firms_com_acr_countries (The model shown in Panel E of Table 7: Common fixed costs across countries model (heterogeneous across firms))

We next describe the programs inside folder T_17_Kappa_425 (the programs in the other folders have only minor changes to these programs).

Data input files:

- additional_param_and_mom.out
- emp2_data_for_matlab_v3.out

Both of these files contain moments and parameters disclosed from the US Census RDC and other country-level information like bilateral distance to the US, common language, etc.

Job submission files:

- first.sbatch
- second.sbatch

The first.sbatch file submits 10 parallel jobs to the UChicago research computing cluster. The second.sbatch file submits 1 job to the cluster. This file should be run after the 10 parallel first jobs are finished.

Matlab files:

- Main_search1.m

This is the main estimation file. first.sbatch submits this file for 10 different starting values. The files first execute the script setup_struct_aft.m. Then the code initializes the file statistics_jia_`d'.mat in which stores the cardinality of differences in bounds obtained by the Jia algorithm for run `d'.

- Main_stat_counter2

Second.sbatch submits this script. The script picks the estimation point with the lowest objective value among the 10 previously submitted estimation runs, executes the function est_outcomes.m and prints the key tables in the file print_estimation_results_to_latex.m. Finally the script counterfactual_run_script_reverse_shock.m is executed.

- gmm_objective.m

This file reads in the current parameter guess and calculates the objective value. The file consists of four main steps:

a. A (parallelized) loop to solve the firm-level problem [this is where the multiple cores are useful]

b. Calculating statistics on the Jia algorithm performance

c. Calculating the moments

d. Calculating the objective value

- lower_bound_iteration_optimized.m and upper_bound_iteration_optimized.m

A short and highly optimized function (in terms of computational speed) that calculates the lower and upper bound the firm's problem using the Jia algorithm described in the main text.

- est_outcomes.m

This file produces key model outcomes given an estimation parameter guess. The steps inside this file are very similar to gmm_objective.m, but instead of calculating the objective value at the end the function, it outputs various model outcomes.

- est_outcomes_fixed_sourcing_strategy.m

Very similar to est_outcomes.m. The only difference is that this file reads in the sourcing strategies obtained under the estimated parameter values (see line 26: Z_mat = m.Z_mat;) instead of using the Jia algorithm to solve the firms' problems. This enables us to calculate model outcomes for counterfactual parameter values but with fixed sourcing strategies.

- print_estimation_results_to_latex.m

Prints estimation results to latex tables and saves figures as .eps files.

The file ParameterEstimatesStep3.tex contains the estimation results in **Table 5** [note that to get exactly the numbers shown in Table 5 including the s.e. one needs to run the estimation files internally. There are very minor (3-digit) differences to the estimation results produced internally, because one of the moments used internally (number of firms importing by country) isn't rounded.] **Table 5** is produced exactly when running the files described in here at the Census RDC: RDC_Replication_Files\Programs\Section 5_3_estimation_and_bootstrap

The file mean_fc_versus_sourcing_potential.eps corresponds to **Figure 3**.

The file agg_importer_model_data_share_of_total_sourcing.eps corresponds to **Figure 4b**

The file share_importers_by_country.eps corresponds to **Figure 4a** (note, again the Figure produced with these files externally has minor differences to the Figure shown in the paper due to rounding of the number of firms importing by country to the nearest 100). **Figure 4a** can be reproduced exactly as in the paper when running the files described in here at the Census RDC: RDC_Replication_Files\Programs\Section 5_3_estimation_and_bootstrap

The file Table4replica.tex corresponds to **Table 6**

The file Table1replica.tex corresponds to the information shown in columns 2 and 5 of Appendix **Table A.2**

- counterfactual_run_script_reverse_shock.m

This script executes the counterfactual exercise in the paper. The first step is to calibrate the magnitude of the counterfactual change of the Chinese sourcing potential. Given the change to the Chinese sourcing potential, the remainder of the script calculates various counterfactual outcomes either with fixed or flexible sourcing strategies.

- calibration_objective.m

This function yields the objective value of the calibration of the counterfactual change to the Chinese sourcing potential (the squared difference between the increase in the import share from China in data and model)

- eqm_system_free_entry.m / eqm_system_free_entry_fixed_sourcing_strategy

These functions contain the free entry condition. The difference between the two functions is that one calls est_outcomes.m, the other est_outcomes_fixed_sourcing_strategy.m

-    eqm_system_fixed_entry

(not used for any published results) Allows for a fixed mass of firms and is used to solve for a fixed point in B.

- get_fixed_point_for_B.m / local_optimality_check.m / anneal.m

(not used for any published results)

- print_counterfactual_results_to_latex.m

This script is used to print latex files of tables and .eps figures related to the counterfactual

The file sales_growth_dist.eps corresponds to **Figure 5a**

The file sales_growth_dist_fixed_sourcing.eps corresponds to **Figure 5b**

The file third_country_effects_table.tex corresponds to **Table 7, Panel A**

The file third_country_effects_table_fixed_sourcing.tex corresponds to **Table 7, Panel B**

The files US_sourcing_outcomes.tex and US_sourcing_outcomes_fixed_sourcing.tex contain the output shown in **Table 8**

(for Appendix and Online Appendix tables see the public replication files)

- net_versus_gross.m

This script calculates net and gross changes in US sourcing

Auxiliary files:

- fminsearchbnd.m

This file is an optimization file that uses fminsearch.m but with bounds on the eligible parameters. Author: John D'Errico

- lscatter.m

This file produces a scatter plot with labels instead of uniform markers. Author: Yvan Lengwiler

- histwc.m

Weighted histogram count given number of bins. Author: mehmet.suzen

-corput.m

Calculates van der Corput sequence of numbers

Table 7, Panel C is replicated when running the code in Public_Replication_Files\Programs\Section_5_3_to_Section6_3_and_selected_Appendix_tables\sensitivity\T_285_Kappa_425 and corresponds to third_country_effects_table.tex generated by that code.

Table 7, Panel D is replicated when running the code in Public_Replication_Files\Programs\Section_5_3_to_Section6_3_and_selected_Appendix_tables\ no_fixed_costs and corresponds to third_country_effects_table.tex generated by that code.

Table 7, Panel E is replicated when running the code in Public_Replication_Files\Programs\Section_5_3_to_Section6_3_and_selected_Appendix_tables\ fixed_costs_het_acr_firms_com_acr_countries and corresponds to third_country_effects_table.tex generated by that code.

Columns 3 and 6 of Appendix **Table A.2** are replicated by running the code in fixed_costs_het_acr_firms_com_acr_countries and correspond to the information saved in Table1replica.tex .

Appendix **Table A.3** corresponds to the information saved in ParameterEstimatesStep3.tex, US_sourcing_outcomes.tex, third_countr_effects_table.tex, when running the code stored in the sensitivity subfolder.

Appendix **Table A.4** corresponds to the information saved in jia_stat_table.tex, when running the code stored in the sensitivity subfolder.

Online Appendix **Table C.6** and **Table C.7** are replicated when running the code in the main T_17_Kappa_425 , no_fixed_costs , fixed_costs_het_acr_firms_com_acr_countries , and sensitivity\T_285_Kappa_425 folders and obtaining the listed objects from moments_for_table.mat and est_output_smm.mat

Online Appendix **Table C.8** is replicated when running the code in \Public_Replication_Files\Programs\Section_5_3_to_Section6_3_and_selected_Appendix_tables\T_17_ Kappa_425\higher_fc_counterfactual and corresponds to third_country_effects_table.tex generated by that code.