ReadMe for “The Life Cycle of Products: Evidence and Implications”

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Overview

This replication package contains Stata and Matlab codes to replicate Figure 1-10 and Table 1-7 in the paper. Note that all codes generating Figure 1-6, 8c, 8d and Table 1-4 are under the EMPIRICS folder and all codes generating Figure 7-10 and Table 5-7 are under the MODEL folder.

Data Availability

1. Nielsen Retail Scanner Data

   This data is proprietary. Academic researchers can purchase a subscription to the Nielsen Retail Scanner Data from the Chicago Booth Kilts Center for Marketing: https://www.chicagobooth.edu/research/kilts/datasets/nielsenIQ-nielsen

   Once you have access, you can download Nielsen Retail Scanner Data from the Kilts and locate RAW folder.

2. GS1 data

   This data is proprietary. The data can be purchased through GS1 US data hub. https://www.gs1us.org/tools/gs1-us-data-hub

   Once you have access, merge the name of manufacturers for each UPC.

Statement about Rights

We certify that the authors of the manuscript have legitimate access to and permission to use the data used in this manuscript.

The authors don’t have permission to redistribute or publish the raw or aggregated data beyond the six Stata dta files provided.

1. cpi.dta under EMPIRICS/INPUT folder: consumer price index

2. units_per_module_after_standardization.dta under EMPIRICS/INPUT folder: major units for each product module
3. units_per_module.dta under EMPIRICS/INPUT folder: the number of different units measured in each product module
4. modcode_trip_frequency.dta under EMPIRICS/INPUT folder: the number of shopping trip frequencies for each product module
5. Elasticities.dta under EMPIRICS/INPUT folder: elasticities of substitution for each product group
6. size_distribution_data.dta under MODEL/STATA/INPUT folder: size distribution in the data to be compared to the model

EMPIRICS folder

Figure 1-6, 8c, 8d and Table 1-4 can be produced by adding input, intermediate, output, and raw folders to the path and running the following 11 codes sequentially. All output figures and tables are saved under the Output folder.

1. Data_Cleaning_Step1.do
    a. This code cleans and aggregates the raw data at the barcode level.
    b. This code uses:
        i. Nielsen Retail Scanner Data under RAW folder

2. Data_Cleaning_Step2.do
    a. This code defines alternative brand definitions we use.

3. Data_Cleaning_Step3.do
    a. This code aggregates the raw data at the brand level, firm-group level and firm level.

4. Figure 1
    a. This code generates Figure 1 in the paper.

5. Figure 2
    a. This code generates Figure 2 in the paper.

6. Figure 3
    a. This code generates Figure 3 in the paper.

7. Figure 4
    a. This code generates Figure 4 in the paper.

8. Figure 5
    a. This code runs the decomposition of product sales using structural approach and generates Figure 5 in the paper.

9. Figure 6
    a. This code generates Figure 6 in the paper.

10. Figure 8cd
    a. This code generates Figure8c and 8d in the paper.

11. Table 1
    a. This code generates Table 1 in the paper.

12. Table 2
    a. This code generates Table 2 in the paper.

13. Table 3
    a. This code generates Table 3 in the paper.

14. Table 4
    a. This code generates Table 4 in the paper.

MODEL folder

Figure 7-10 and Table 5-7 can be produced by adding input, output, subcode folders to the path and running the following nine codes sequentially. All output figures and tables are saved under the Output folder. We used the Matlab R2022a under the Windows OS for final replication.

Codes

- The following codes should be run sequentially.

1. calibration.m under MODEL/MATLAB folder
    a. This code calibrates 8 parameters to match 8 moments.
    b. This code calls:
        i. calibration_function.m
        ii. equation_difference.m
        iii. fminsearchbnd.m
    c. This code generates:
        i. calibration_outcome.mat

    d. Table 5 in the paper reports information on moments calculated from the calibrated model. It is contained in moments variable under calibration_outcome.mat. Table 6 in the paper reports calibrated model parameters. It is contained in xx_cal variable under calibration_outcome.mat.

2. simulation.m under MODEL/MATLAB folder
    a. This code simulates the model under calibrated parameters for 110 years and keep the last 10 years. The simulation results differ slightly by seeds. We simulated the model for three different seeds (300, 500, 700) and averaged the outcomes. The code runs a loop over those three seeds.
    b. This code calls:
        i. simulation_function.m
        ii. calibration_outcome.mat
    c. This code generates:
        i. data_for_Stata_seed300.xlsx, data_for_Stata_seed500.xlsx, data_for_Stata_seed700.xlsx under MODEL/STATA/INPUT folder

3. Figure9.m under MODEL/MATLAB folder
    a. This code generates Figure 9 in the paper.
    b. This code calls:
        i. calibration_outcome.mat
        ii. calibration_function_f0.m
    c. This code generates:
        i. calibration_outcome_f0.mat
        ii. Figure9.eps under MODEL/MATLAB/OUTPUT folder

4. simulation_f0.m under MODEL/MATLAB folder
    a. This code simulates the model under calibrated parameters when f=0 for 110 years and keep the last 10 years. The simulation results differ slightly by seeds. We simulated the model for three different seeds (300, 500, 700) and averaged the outcomes. The code runs a loop over those three seeds.
    b. This code calls:
        i. simulation_function.m
        ii. calibration_outcome_f0.mat
    c. This code generates:
        i. data_for_Stata_seed300_f0.xlsx, data_for_Stata_seed500_f0.xlsx, data_for_Stata_seed700_f0.xlsx under MODEL/STATA/INPUT folder

5. Table7.m under MODEL/MATLAB folder
    a. This code generates Table 7 in the paper.
    b. This code calls:

        i. calibration_outcome.mat
        ii. calibration_outcome_f0.mat
    c. This code reports:
        i. all numbers in Table 7

6. Figure7.do under MODEL/STATA folder
    a. This code generates Figure 7 in the paper.
    b. The code uses:
        i. size_distribution_data.dta under INPUT folder
    c. This code generates:
        i. Figure7.eps under OUTPUT folder

7. Figure8.do under MODEL/STATA folder
    a. This code generates Figure 8 in the paper.
    b. The code uses:
        i. Excel files generated from MATLAB
    c. This code generates:
        i. Several intermediate files under INTERMEDIATE folder
        ii. Figure8a.eps and Figure8b.eps under OUTPUT folder

8. Figure10a.do under MODEL/STATA folder
    a. This code generates a left panel of Figure 10 in the paper.
    b. The code uses:
        i. Excel files generated from MATLAB
    c. This code generates:
        i. Several intermediate files under INTERMEDIATE folder
        ii. Figure10a.eps under OUTPUT folder

9. Figure10b.do under MODEL/STATA folder
    a. This code generates a right panel of Figure 10 in the paper.
    b. This code uses:
        i. Several intermediate files generated from Figure10a.do
    c. This code generates:
        i. Several intermediate files under INTERMEDIATE folder
        ii. Figure10b.eps under OUTPUT folder