Data and Program Documentation for "Endogenous Liquidity and Capital Reallocation"

Overview

This file describes the data[1] and codes used to obtain the results in the paper. The majority of the files are MATLAB codes and they end with the extension ".m". Files end with the extension ".do" are STATA files. The codes sometimes need to access directories that are different from the current working directory. The current path information is valid in MacOS but in order to run the codes in Windows, one may need to change "/" in the path information to "\". For a detailed description of every file, please see below.

File Description

There are three folders, which are named "data", "micro_level_evidence" and "codes_quantitative," respectively. We describe each of them below.

Folder Titled "data"

This folder contains files to obtain the macro-level evidence. The following is a detailed description of every file in this folder.

1. main_data_annual_final_submission.m
   Format: MATLAB m-file
   Brief description: Generates Table 1 and Figures 1-3 of the paper. It also saves variables such as the raw and detrended inflation, R share, P share in ".mat" files in this folder, which are used for quantitative analysis.

2. getDataOnline.m
   Format: MATLAB m-file
   Brief description: Retrieves macro-level time series data such as consumption, investment, and CPI from Fred database online and save the data in "FredData.mat".

[1] This paper uses Compustat data downloaded from Wharton Research Data Services (WRDS). Because accessing data requires subscription, we do not include the micro-level data but include the aggregated data.

3. getFredData.m
   Format: MATLAB m-file
   Brief description: It is called in "getDataOnline.m" to get time series data from Fred database online.

4. plotting_raw_trend_cycle_inflation.m
   Format: MATLAB m-file
   Brief description: Called in "main_data_annual_final_submission.m" to plot Figure 2 of the paper.

5. bpass.m
   Format: MATLAB m-file
   Brief description: Called in "main_data_annual_final_submission.m" to detrend data using the Band-Pass filter.

6. reallocation_measures_Wei.csv
   Format: csv file
   Brief description: Time series of annual R share and P share calculated from compustat. The same dataset used in Cui (JEEA, 2022).

7. participation.csv
   Format: csv file
   Brief description: Probability of participating in the used capital market, calculated from Compustat.

8. deposit_rates_reallocation.csv
   Format: csv file
   Brief description: Interest rates on transaction accounts calculated from the call report data.

9. Fernald_TFP_growth.csv
   Format: csv file
   Brief description: TFP growth data from John Fernald's website.

Folder Titled "micro_level_evidence"

Files in the folder are used to provide micro-level evidence on: (1) the relationship between cash holding and capital reallocation, i.e., Table 2 and Table 3 in the paper; (2) the relationship between inflation and cash holding, i.e., Table 4 in the paper. Please download the compustat data from WRDS, convert the data file into .dta and rename it as "compustat21.dta". Then put the data file into this folder. Codes in this folder are STATA .do files that are tested on STATA 16 in MacOS. The following is a description of all files.

1. compustat_final_log.do
   Format: STATA do file
   Brief description: This file generates Table 2 and the first two columns in Table 4. It saves three tables in the subfolder named "tables", each in a tex file and in a csv file: (1) The table named "aquisition_at_cpi_final_log_final_relative_size" is Table 2 in the paper; (2) Columns 2 and 5 in the table named "md_at_cpi_final_log_final" are the first two columns in Table 4. And other columns are under different specifications. In this table, inflation is detrended using the HP filter; (3) The table named "md_at_cpi_final_bk_log_final" is the same as "md_at_cpi_final_log_final" except that inflation is detrended using the Band-Pass Filter. Results are very similar.

2. acquisition_cash_log.do
   Format: STATA do file
   Brief description: File called in "compustat_final_log.do" to generate Table 2 in the paper.

3. cash_demand_HP_filter_log.do
   Format: STATA do file
   Brief description: File called in "compustat_final_log.do" to generate the first two columns in Table 4 of the paper.

4. cash_demand_BK_filter_log.do
   Format: STATA do file
   Brief description: File called in "compustat_final_log.do" to generate a version of first two columns in Table 4 of the paper but using the Band-Pass filter.

5. compustat_final_log_sppe_state_level.do
   Format: STATA do file
   Brief description: It generates the table called "state_sppe_ratio_all_at_cpi_log_final_v1" in the subfolder named "tables". The first two columns and the last two columns constitute Table 3 of the paper. We also report results on the R share in the middle two columns and the results are consistent with theory.

6. cross_sectional_inflation.do
   Format: STATA do file
   Brief description: This file generates the table called "md_at_micro_log_final" in subfolder named "tables". This Table is the last two columns in Table 4 of the paper, which are the effects of state level inflation on firm cash holdings.

7. elasticity_exploration.do
   Format: STATA do file

Brief description: This file calculates the elasticity of acquisition spending with respect to inflation, which is used in calibration. It should be run after running "compustat_final_log.do". A couple of specifications are considered and we use the result from the last specification, which yields an elasticity of -0.64. Under other specifications, this elasticity ranges between around -0.31 to around -0.98. Therefore, -0.64 is more or less the middle point.

8. liquidity_costs.dta
   Format: STATA data file
   Brief description: This file contains a couple of time series on the cost of holding money, including inflation rates, T-bill rates, AAA bond rates, etc. These series are obtained from FRED.

9. statecpi_annual.dta
   Format: STATA data file
   Brief description: This file contains state-level inflation data from Hazell et al. (2022).

Folder Titled "codes_quantitative"

Codes in this folder generate results in the quantitative part of the paper, including Figures 6-11 and Tables 6-8. Files are written in MATLAB and tested on the Apple Silicone version of MATLAB 2023b in macOS Sonoma 14.3.1. Programs for short-run dynamics use Dynare and are tested on Dynare 6.0. This folder contains a subfolder named "dynamics_iid", which contains the files needed for using Dynare .mod files. The following is a description of all files in this folder.

Files in the Folder

1. Main_iid_calibration.m
   Format: MATLAB m-file
   Brief description: This file calibrates the model parameters when the idiosyncratic productivity shocks are i.i.d. across time. The calibrated parameter valued are reported in Table 6 of the paper. This file also saves the calibrated parameter values and the corresponding equilibrium outcomes in files named "param_calibrated.mat" and "eqm_calibrated.mat", respectively.

2. do_calibration_main_model.m
   Format: MATLAB m-file
   Brief description: This file is called by "Main_iid_calibration.m" to calibrate the parameters.

3. Figure_6_inflation_impact.m
   Format: MATLAB m-file
   Brief description: Calculates the comparative statics of the model with respect to inflation and generates Figure 6 of the paper.

4. Figure_7_Pred_long_run.m
   Format: MATLAB m-file
   Brief description: Compares the long-run prediction of the model and the data. It generates Figure 7 of the paper.

5. Figure_8_Pred_medium_run.m
   Format: MATLAB m-file
   Brief description: Compares the medium-run prediction of the model and the data. It generates Figure 8 of the paper.

6. Figure_9_iid_comp_static.m
   Format: MATLAB m-file
   Brief description: Calculates the comparative statics with respect to search frictions under three setups: (1) perfect credit; (2) imperfect credit and no money; (3) imperfect credit and money. It generates Figure 9 of the paper.

7. Figure_10_capital_taxation.m
   Format: MATLAB m-file
   Brief description: Calculates the comparative statics with respect to capital tax and compute the optimal tax rate. It generates Figure 10 of the paper.

8. Figure_11_persistent_comp_static.m
   Format: MATLAB m-file
   Brief description: Calculates the comparative statics in the model with persistent idiosyncratic productivity shocks and generates Figure 10 of the paper.

9. Tables_7_Main_iid_IRFs.m
   Format: MATLAB m-file
   Brief description: Calculates the business cycle statistics of the model and generates Tables 7 of the paper.

10. Tables_8_Main_iid_IRFs.m
    Format: MATLAB m-file
    Brief description: Calculates the business cycle statistics of the model without money and generates Tables 8 of the paper. Because this version of model does not have money, it does not predict the elasticity of acquisition spending with respect to inflation and

we lose one target in the calibration. To address this problem, we fix μ_γ to the value calibrated under our full model and recalibrate all the other parameters. This generates Table 8 of the paper. For robustness, we also did a version where we fix σ_γ to its value calibrated under the full model and recalibrate all other parameters. One can set the variable "cali_c_sig" to 0 in line 17 to obtain results under this alternative calibration. The results and the main message are robust.

11. eqm_ss_iid_case_6.m
    Format: MATLAB m-file
    Brief description: Given a set of parameter values, this file computes the equilibrium under i.i.d. idiosyncratic productivity shocks, together with the distance between calibration targets and their model counterparts of our full model with money. It is used for calibration and equilibrium calculations.

12. eqm_ss_persistent_case_6_log_normal.m
    Format: MATLAB m-file
    Brief description: Given a set of parameter values, this file computes the equilibrium of our full model with persistent idiosyncratic productivity shocks.

13. eqm_ss_iid_cases_2_to_5.m
    Format: MATLAB m-file
    Brief description: Given a set of parameter values, this file computes the equilibrium of the Hansen (1985) model, the model with perfect credit and no money, and the model with imperfect credit and no money. It is also used to calibrate the parameters used for Table 8 of the paper.

14. do_model_1_and_2.m
    Format: MATLAB m-file
    Brief description: Called in "Figure_9_iid_comp_static.m" to calculate the comparative statics under the Hansen model.

15. do_model_4.m
    Format: MATLAB m-file
    Brief description: Called in "Figure_9_iid_comp_static.m" to calculate the comparative statics with perfect credit, which are reported in Figure 9 of the paper.

16. do_model_5.m
    Format: MATLAB m-file
    Brief description: Called in "Figure_9_iid_comp_static.m" to calculate the comparative statics with imperfect credit and no money, which are reported in Figure 9 of the paper.

17. do_model_6.m
    Format: MATLAB m-file
    Brief description: It is called in "Figure_6_inflation_impact.m" and "Figure_9_iid_comp_static.m" to calculate the comparative statics of our full model with i.i.d. idiosyncratic productivity shocks, which are reported in Figure 6 and Figure 9 of the paper. It also saves the comparative statics with respect to inflation in the file called "model_long_run_raw.mat", which is used in "Figure_7_Pred_long_run.m" and "Figure_8_Pred_medium_run.m".

18. define_function_fun.m
    Format: MATLAB m-file
    Brief description: For certain given parameters, the file defines a set of functions used for calibration, computing equilibrium, and comparative statics.

19. getFredData.m
    Format: MATLAB m-file
    Brief description: Connect to FRED database and retrieves data series such as CPI. It is called, for example, in "Figure_8_Pred_medium_run.m".

20. average_log_normal.m
    Format: MATLAB m-file
    Brief description: Compute the expected value of a random variable that follows a log normal distribution.

Files in the Subfolder Named 'dynamics_iid'

1. model_5_IRFs.mod
   Format: Dynare mod file
   Brief description: This file is used in "Tables_8_Main_iid_IRFs.m" to generate Table 8.

2. model_6_IRFs.mod
   Format: Dynare mod file
   Brief description: This file is used in "Tables_7_Main_iid_IRFs.m" to generate Table 7.

3. model_spec.mod
   Format: Dynare mod file
   Brief description: This file defines the model in Dynare and is used in "model_5_IRFs.mod" and "model_6_IRFs.mod" to generate Table 7 and Table 8.

4. model_dec.mod
   Format: Dynare mod file
   Brief description: This file defines the model parameters and variables in Dynare and is used in "model_5_IRFs.mod" and "model_6_IRFs.mod" to generate Table 7 and Table 8.

5. model_ini_val.mod
   Format: Dynare mod file
   Brief description: This file gives Dynare the initial values (loaded in model_dec.mod) to run dynamic analysis.

6. int_acquisition.m, int_liq.m, int_surplus.m, int_partial.m, int_capital.m, int_profit.m, int_capital.m, int_capital.m, int_money.m, int_2nd_price.m, int_prod_disp.m
   Format: MATLAB m-file
   Brief description: These files calculate the integrals in the Euler equations, the entry decision as well as market clearing conditions. "int_2nd_price.m" and "int_prod_disp.m" calculate the average price in the used capital market and the dispersion of the productivity. These files are used in "model_spec.mod" as external functions.

7. average_log_normal.m
   Format: MATLAB m-file
   Brief description: Compute the expected value of a random variable that follows a log normal distribution.