Replication guide for "Financial Constraints, Sectoral Heterogeneity, and the Cyclicality of Investment" by Cooper Howes

Programs: Empirical results were produced using R version 4.3.0. Model results were produced using Matlab 2022a and Dynare version 5.2. All results were created using a personal computer running Windows 10.

QFR data: One of the paper's main contributions is the production of a consistent time series from manually digitized income and balance sheet data from the Quarterly Financial Report for Manufacturing Corporations. The details of this cleaning process can be found in the "QFR_data_readme" file. The result of that cleaning process is the file "qfr_cleaned_data.csv" file in the "QFR data cleaning" folder.

Other data: In addition to the QFR data, the paper uses several macroeconomic and financial data series, as well as several measures of monetary policy shocks. These are found in the main data "Aggregate_data.csv". The descriptions for each variable and their sources are reported below.

1. *rr_shock*: Monetary shock series from Romer and Romer (2004) that was extended by Coibion (2012). Obtained from the replication materials here: https://www.aeaweb.org/articles?id=10.1257/mac.4.2.1.

2. *mar_shock*: Monetary shock series from Miranda-Agrippino and Ricco (2021). Obtained from the replication materials here: https://www.aeaweb.org/articles?id=10.1257/mac.20180124.

3. *brw_shock*: Monetary shock series from Bu, Rogers, and Wu (2022). Obtained from the author's website: https://sites.google.com/view/wenbinwu-ucsd/.

4. *gk_shock*: Monetary shock series from Gertler and Karadi (2015). Obtained from the replication materials here: https://www.aeaweb.org/articles?id=10.1257/mac.20130329.

5. *nonres_fixed_invest_price*: Nonresidential fixed investment price deflator from BEA. Obtained from FRED (series code: B008RG3Q086SBEA).

6. *GDP*: Real gross domestic product from the BEA. Obtained from FRED (series code: GDPC1).

7. *gdppi*: GDP price index from BEA. Obtained from FRED (series code: GDPCTPI).

8. *ffr*: Effective federal funds rate. Obtained from FRED (series code: FEDFUNDS).

9. *rnppe_all, rnppe_dur, rnppe_nondur, rsales_all, rsales_dur, rsales_nondur*: Real capital stocks and sales for the total, durable, and nondurable manufacturing sectors, respectively. These series are constructed from the manually digitized QFR data using the program "QFR_data_cleaner.R". More details can be found in the "QFR_data_readme" file.

10. *ppi*: Producer price index for all commodities from the BLS. Monthly series is averaged to obtain quarterly series. Obtained from FRED (series code: PPIACO).

11. *baa_yield*: Moody's BAA bond yields. Obtained from FRED (series codes: DBAA for data post-1986, RIMLPBAARNM for data prior to 1986).

12. *bea_deprec_all*: Depreciation rates for the total manufacturing sector calculated from the BEA by dividing total depreciation by the capital stock in each year. Data can be found here: https://www.bea.gov/itable/fixed-assets.

13. *adjusted_compustat_total_ir*: Total effective interest rates for the manufacturing sector calculated from Compustat (not included as part of replication package). Data can be obtained through Refinitiv here: https://www.refinitiv.com/en/financial-data/company-data/fundamentals-data/standardized-fundamentals/sp-compustat-database. See notes to Figure 4 for more details.

14. *divyield*: Dividend rates for the S&P500. Obtained from NASDAQ here: https://data.nasdaq.com/data/MULTPL/SP500_DIV_YIELD_MONTH-sp-500-dividend-yield-by-month.

15. *corptax*: Historical top marginal corporate tax rates. Data come from the Tax Foundation and can be found here: https://taxfoundation.org/historical-corporate-tax-rates-brackets/.

16. *recession*: NBER recession indicators. Obtained from FRED (series code: USRECQ).

17. *ur*: Unemployment rate from the BLS. Obtained from FRED (series code: UNRATE).

Figures: Running the programs named "FigureX.R" will generate the figures from the paper. The only exceptions are the right two panels in Figure 4, which use proprietary Compustat data. The details for each program can be found below

Figure 1:

Created by "Figure1.R". Uses data from "Aggregate_data.csv".

Figure 2:

Created by "Figure2.R". Uses data from "Aggregate_data.csv".

Figure 3:

Created by "Figure3.R". The ratios are created as part of the QFR data cleaning program and are saved in "qfr_cleaned_data.csv". The left panel of the figure shows the ratio of liabilities with maturity 1 year or less to total liabilities. The middle panel shows the ratio of post-tax income to the capital stock. The right panel shows the ratio of dividends to stockholders' equity.

Figure 4:

Created by "Figure4.R". Uses data from "Aggregate_data.csv". The user cost calculations are based on Chirinko et al (1999); detailed descriptions of the user cost and its components are in Section 3.2 of the main paper. *The series "adjusted_compustat_total_ir" is calculated from Compustat and thus excluded from the replication files. In "Aggregate_data.csv", I have replaced this series with zeros so that the program will still run, but this will cause the right panels of figure 4 to not match those shown in the paper.*

Figure 5:

The top panels are created by "Figure5_top_panels.R". The data come from the BEA fixed asset tables. The program uses the raw .csv files downloaded from the BEA, which can be downloaded manually here: https://www.bea.gov/itable/fixed-assets. The replication package also includes the version with data through 2021 (the most recent available vintage as of publication) in the folder "BEA fixed asset files".

The bottom panels are created by "Figure5_bottom_panels.R". The data come from the Census BDS, which are downloaded directly using the provided code. The details are found here: https://www.census.gov/data/datasets/time-series/econ/bds/bds-datasets.html. Because the BDS datasets are updated over time, the replication package also includes the .csv files for 2020 (the most recent available vintage as of publication) in the folder "Census BDS files".

Figure 6:

The model impulse responses are calculated from the Dynare program "baseline_model.mod" in the "Figure 6" folder. The Dynare program will save a .csv containing impulse responses to the "irfs" folder. These are combined with the impulse responses in the data, which are pulled from a separate .csv file in the "irfs" folder created by running the program "Figure2.R". Once these two .csv files have been created and placed in the "irfs" folder, Figure 6 can be generated by running "Figure6.R".

Figure 7:

Created by "Figure7.R". All of the model impulse responses come from the .csv file "shock_irfs_baseline", which located in the "irfs" folder and can be generated by running the Dynare program "baseline_model.mod" in the "Dynare files" folder.

Figure 8:

Created by "Figure8.R". All of the model impulse responses come from the .csv files in the "irfs" folder, generated by the Dynare program "Baseline_model.mod" in the "Dynare files" folder.

Figure 9:

Created by "Figure9.R". All of the model impulse responses come from the .csv files in the "irfs" folder, which are generated by the Dynare program "govspend_model.mod". This model differs slightly from the baseline model in that it also features a government that exogenously consumes a fixed fraction *g* of output.

Figure 10:

Created by "Figure10.R". All of the model impulse responses come from the .csv files in the "irfs" folder, which are generated by the programs in the "Dynare files" folder.