**Replication package for “Back to the 1980s or Not? The Drivers of Inﬂation and Real Risks in Treasury Bonds” - Carolin Pflueger**

## Overview

The code in this replication package replicates the results in “Back to the 1980s or Not? The Drivers of Inﬂation and Real Risks in Treasury Bonds” using Stata and MATLAB. Empirical moments are computed in Stata, while the solution of the quantitative macro-finance model is in MATLAB. Almost all data inputs are publicly available and contained in DataTable\_2022.xlsx. One data set is proprietary (Blue Chip Financial Forecasts), which can be acquired from Blue Chip Financial Forecasts. However, almost all of the code can be run without this data. A pseudo-data set is provided instead.

## Data Availability and Provenance Statements:

Most of the data required for this paper is publicly available from sources, such as the St. Louis Fred website. Specific data sources are listed in the “Documentation” tab of DataTable\_2022.xls

### *Statement about Rights*

### I certify that the author(s) of the manuscript have legitimate access to and permission to use the data used in this manuscript.

### *Summary of Availability*

* Some data **cannot** be made publicly available. However, the data that is proprietary is not central to the paper. It concerns 2 numbers in Table 2 (empirical “Expected Bond Excess Return”).

## Computational requirements

*Software Requirements*

* + Matlab2019a
  + StataMP18 (64-bit)
  + Random seed is set at line 38 of program generateTablesFigures\_supply.m, line 7 of gridsearch\_demand.m, line 8 of gridsearch\_supply2.m, lines 14, 75 and 138 of generateTablesFigures\_JFE\_loop.m, and lines 14 and 78 of generateTablesFigures\_loop\_second\_period.
  + No random seed is set for the standard errors of calibration parameters (program gridsearch\_supply2.m starting line 63, and gridsearch\_demand.m, starting at line 65).

### *Memory, Runtime, Storage Requirements*

Processor Intel(R) Core(TM) i7-9700 CPU @ 3.00GHz 3.00 GHz

Installed RAM 32.0 GB (31.8 GB usable)

Device ID EE53238B-AB32-4637-9749-B82D79CAC376

Product ID 00330-80000-00000-AA309

System type 64-bit operating system, x64-based processor

Edition Windows 10 Enterprise

#### Summary

Approximate time needed to reproduce the analyses on the desktop machine specified above (computer purchased in 2019):

* <10m for generateTablesFigures\_supply.m up to line 785 (generates Tables 1 and 2 and Figures 2, 5, 6)
* <30 min for generateTablesFigures\_supply.m up to line 917 (generates Figures 4 and 7)
* 2 days to generate full results. In particular Figure 8 and Table 3 take longer to run than the other results.

*Directories*

MATLAB code is in root directory. Data and empirical code are contained in /replication\_empirical\_20250121. Figures are saved in ./figures. Results for Figure 8, Table 3 and Appendix Figure A5 are saved in ./results\_sensitivity.

## Matlab classes

The model code consists of three key MATLAB classes, listed below.

* macro\_dyn.m: Contains all parameters and methods for modeling macroeconomic dynamics.
* num\_set.m: Contains all settings for the numerical solution of asset prices.
* asset\_p.m: Contains all parameters and methods related to asset prices and their characteristics.

*Instructions to Replicator*

*Quick Start:* If you are interested in replicating the key model results, open and run the program generateTablesFigures\_supply.m. This program generates the majority of the paper’s results (Table 2 and Figures 2-7) and can be run without having to run any of the other file.

*Full Replication:* To fully replicate the paper, you will need to run 1. Empirical Code, 2. Calibration, 3. Central Model Results, 4. Slower Model Results in this order. The details for these groups of code are given below.

# Empirical Code

## Figure 1 (rolling bond-stock betas), Figure 2 (Local projections), data moments for Table 2 (Asset prices and macro vols, but not expected bond excess returns which are computed separately), data moments for Appendix Table A3 (Coibion-Gorodnichenko regressions)

## Code file:  EmpiricalMoments20250120CP.do

## Requires: DataTable\_2022.xlsx

* Macro and financial data quarterly, with sources listed in Readme tab

Output:

* BondBetas\_rolling\_Dec2023\_noCI\_Pflueger.pdf (Figure 1)
* Results for local projections are copied into empirical\_responses.xlsx in root directory
* Code prints quarterly asset pricing and macro summary statistics (Table 2)

## Data expected bond excess returns (Table 2)

* *Code file: subjective\_bonds20250205.do*

## Requires:

* + feds200628.csv: GSW nominal bond yields available here <https://www.federalreserve.gov/econres/feds/the-tips-yield-curve-and-inflation-compensation.htm>
  + us\_analyst\_estimates\_pseudo.csv: pseudo data set listing 12-month forecast of 10-year Treasury rate for every month (from the international section of the survey), starting in December 1982. Prior to January 1993, the consensus 4-quarter forecast is used. The proprietary data can be purchased from Blue Chip Financial Forecasters. The version used in this paper was acquired in March 2023.
  + Note that because the code runs with a pseudo data set, the expected bond excess returns do not replicate exactly.

*Post-pandemic bond-stock betas from daily data (Figure 10, Table 3), and post-pandemic inflation and policy rate (Figure 9)*

* Code file:  DailyMoments20250120.do

## Requires:

* + feds200805\_4.xlsx: GSW TIPS yields daily available here <https://www.federalreserve.gov/econres/feds/the-us-treasury-yield-curve-1961-to-the-present.htm>
  + feds200628\_4.xlsx: GSW nominal yields daily <https://www.federalreserve.gov/econres/feds/the-tips-yield-curve-and-inflation-compensation.htm>
  + SP500\_3.xlsx: daily S&P500 from St. Louis Fred (ticker SP500)
  + FEDFUNDS.xls: Fed funds rate from St. Louis Fred (ticker FEDFUNDS)
  + CPIAUCSL\_updated.xls: CPI for all urban consumers from St. Louis Fred (ticker CPIAUCSL)

Intermediate Output: gsw\_vwretd.dta (merged daily log bond and stock returns)

Output:

* + postcovid\_Pflueger.pdf (Figure 9)
  + plot\_breakeven\_postpandemic\_Feb2024\_Pflueger.pdf (Figure 10 – Panel A)
  + plot\_betas\_postpandemic\_Feb2024\_Pflueger.pdf (Figure 10 – Panel B)

# Calibration

1. *Empirical target moments*

* Code file: read\_empirical.m

Requires:

* + empirical\_responses.xlsx: empirical local projection regressions
  + The empirical moments in lines 36-82 are as listed in Table 2 of the paper, and are produced by EmpiricalMoments20250120CP.do. Standard errors of estimated standard deviations are computed as SD/sqrt(2\*Nobs).

Outputs:

* EmpiricalBase.mat

## Gridsearch for period 1 calibration (Table 1, period 1)

* Code file: gridsearch\_demand.m

Requires:

* Calibrationgridsearch\_demand2\_init.mat: Initial values for grid search
* EmpiricalBase.mat: Empirical target moments
  + getParametersSE.m: function to compute standard errors

Output: Calibrationgridsearch\_demand2.mat

* + calibrated parameters with standard errors for period 1, as reported in Table 1; simulation noise may lead to slight deviations in standard errors. These do not affect any of the subsequent results.

## Gridsearch for period 2 calibration (Table 1, period 2)

* Code file: gridsearch\_supply2.m

Requires:

* Calibrationgridsearch\_supply2\_init.mat: Initial values for grid search
* EmpiricalBase.mat: Empirical target moments
  + getParametersSE.m: function to compute standard errors

Output: Calibrationgridsearch\_supply2.mat

* + calibrated parameters with standard errors for period 2, as reported in Table 1; simulation noise may lead to slight deviations in standard errors. These do not affect any of the subsequent results.

1. *Appendix Figure A1 (Newspaper search)*

* Code file: Proquest\_search.xlsx

Requires:

* + Access to historical ProQuest newspaper data base

# Central Model Results (Table 2, Figures 2-7 and various appendix results)

1. *Table 2 and Figures 2, 5, 6, and Appendix Figure A4 and Table A4*

* Code file: generateTablesFigures\_supply.m

Requires:

* Calibrationgridsearch\_supply2.mat: period 1 calibration
* Calibrationgridsearch\_demand2.mat: period 2 calibration

Output:

* The model results for Table 2 are saved as Table3demand and Table3supply
* Results for Figure 2 are saved in ./figures/LeadLag\_XXX.png
* Figure 5 is saved as ./figures/IRFmacro\_supply\_demand\_units\_Pflueger.png
* Figure 6 is saved as ./figures/IRF\_BondsRP\_Pflueger.png
* Figure A4 is saved in ./figures/IRF\_CS\_combined\_Pflueger.png
* Table A4 (robustness) results are saved as Table3\_base\_robust and Table3\_demand\_robust

1. *Figure 3 in the paper and standard error zeta (reported in Table 1)*

* Code file: /figures/Figure3.xlsx

Requires:

* Campbell-Shiller regression coefficient in the data for each subperiod, with Newey-West standard errors (EmpiricalMoments20250120CP.do, lines 175-176)
* Table3\_demand\_zeta and Table3\_base\_zeta generated by generateTablesFigures\_supply.m

Output:

* Print with adobe pdf printer to ./figures/Figure3\_Pflueger.pdf

1. *Figure 4*

* Code file: /figures/Figure4.xlsx

Requires:

* Table3\_base\_comparative\_new and Table3\_demand\_comparative\_new generated by generateTablesFigures\_supply.m

Output:

* Print with adobe pdf printer to ./figures/Figure4\_Pflueger.pdf

1. *Figure 7*

* Code file: /figures/Figure7.xlsx

Requires:

* Counterfactuals\_prevalent generated by generateTablesFigures\_supply.m

Output:

* Print with adobe pdf printer to ./figures/Figure7\_Pflueger.pdf

1. *Figure A7*

* Code file: /figures/FigureA7.xlsx

Requires:

* Table3\_base\_robust and Table3\_demand\_robust generated by generateTablesFigures\_supply.m

Output:

* Print with adobe pdf to ./figures/Comparative\_statics\_sigmap\_Pflueger.pdf

1. *Results with richer price-wage dynamics (Appendix Table A5, and Appendix Figure A7)*

* Set price\_wage\_shock=1 in line 41 of generateTablesFigures\_supply.m and follow instructions to generate Table 2 and Figure 4

1. *Covariance decomposition (Appendix Tables A1 and A2)*

* Appendix Table A1 and Table A2 results are saved as asset\_base.crossAsset.cov\_nom, asset\_base.crossAsset.cov\_real, asset\_demand.crossAsset.cov\_nom, asset\_demand.crossAsset.cov\_real

1. *Model Coibion-Gorodnichenko results (Appendix Table A3)*

* Model results for Appendix Table A3 are saved as macro\_base.coeff\_CG and macro\_demand.coeff\_CG

# Slower Model Results

1. *Figures 8 and A6*

Code:

* + generateTablesFigures\_loop\_second\_period.m: computes model moments at different parameter values
  + plot\_counterfactuals\_second\_period.m: makes Figure 8 and Appendix Figure A6

Requires:

* Calibrationgridsearch\_demand2.mat: period 2 calibration, generated by gridsearch\_demand.m

Output:

* ./figures/scatter\_gamma\_pi\_Pflueger\_XXX.png
* ./figures/scatter\_gamma\_x\_Pflueger\_XXX.png

1. *Model moments underlying Appendix Figure A5 and Table 3*

Code:

* generateTablesFigures\_JFE\_loop.m
* plot\_counterfactuals\_CP.m. Set line 7 to name='Demand' or name='MP' to obtain Panels B and C of Appendix Figure A5. This also generates the best-fit monetary policy parameters conditional on the volatilities from the period 2 calibration, or the calibration with exclusively MP shocks.
* The command window shows DistanceSupply, DistanceDemand and DistanceMP, from which we can infer which configuration of shocks allows for the smallest distance between the model and the data.

Requires:

* Calibrationgridsearch\_demand2.mat

Output:

* Results for Table 3 are printed to output window
* ./figures/Demand\_counterfactuals\_gamma\_pi\_Pflueger.png, ./figures/ Supply\_counterfactuals\_gamma\_pi\_Pflueger.png, and ./figures/ MP\_counterfactuals\_gamma\_pi\_Pflueger.png