RESTAT MS-23478 replication files
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"Time-varying uncertainty of the Federal Reserve's output gap estimate"
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This readme file describes the data and replication codes.

**I. Software**

- Model estimation, figures, and tables are produced using R version 4.0.3 and MacOS 11.4.

**II. Folders**

- There are four folders in the replication files, “Code,” “Data,” “Figures,” and “Output.” “Figures” and “Output” contain files that are produced from running the scripts contained in “Code.” The folder “Data” contains various data input files; see below and Appendix A1 of the paper for details.

**III. Data folder**

Within the Data folder, there are three .R files that produce the .Rda files used in the code files described below.

- “State space prep.R” produces the file “SS-tb-input.Rda”, the input file to the FSV model.
- “State space uni prep.R” produces the file “SS-uni-input.Rda”, the input file to the FSV models estimated on output gaps produced by the HP or Hamilton filters.
- “VAR data prep.R” produces the file “var-data.Rda”, which contains the macroeconomic data (from FRED) used in the estimation of the VARs. It also produces the file “all-shocks.Rda”, which contains the various outside macroeconomic shocks used when estimating the VAR models.

The folder “CBO” contains the various vintage data used to produce real-time vintages of output gap estimates from the CBO. (See online appendix A3.)

- The file “CBO data.R” produces the “SS-CBO-input.Rda”, from which the FSV model can be estimated.

The various source raw data files used in the R scripts are described in turn below.

- GB-gaps-all.csv contains the entire vintage history of the Federal Reserve’s output gap estimates. Rows denote quarters and columns are Tealbook vintage dates. The data is obtained from the Federal Reserve Bank of Philadelphia.
- Edge-Rudd-GB-Gap.csv contains all “nowcast” Tealbook output gap estimates. It is obtained from the ReStat data repository for Edge & Rudd (2016).
- Tb-dates.csv contains the dates of each Tealbook publication from 1984—2014. The column “first” denotes whether a date is the first in the quarter.

- RGDP-vintages.xlsx contains real-time vintages of real GDP estimates, obtained from the Federal Reserve Bank of Philadelphia.
- WuXiaShadowRate.xlsx contains the Wu-Xia shadow rate estimate, obtained from the Federal Reserve Bank of Atlanta.
- ^GSPC.csv contains daily data for the S&P 500, obtained from Yahoo Finance.
- US_Policy_Uncertainty_Data.xlsx contains the Baker, Bloom and Davis Economic Policy Uncertainty measure.
- quarterly_tfp.xlsx contains the Fernald (2012) measure of total factor productivity.
- ebp.csv contains the GZ (2012) measure of excess bond premium.
- Rameynews.xlsx contains the Ramey (2011) fiscal policy shock. The data is available in the replication files for Ramey & Zubairy (2018), on Professor Ramey's website.
- The folder "RomerRomer" contains the various Greenbook forecasts required to produce an update of the Romer and Romer (2004) monetary surprise. The data are obtained from the Federal Reserve Bank of Philadelphia's Greenbook database.

**IV. Code folder**

- MCMC functions.R contains functions used in the MCMC sampler, as described in the appendix of the paper.

- "Estimate FSV.R" estimates the baseline factor stochastic volatility model. "Estimate FSV xxx.R" estimates other FSV models described in the paper. For example, "Estimate FSV CBO.R" estimates the FSV model using the CBO data. These models differ as described in the paper; the primary difference being the source output gap estimate data. Finally, "FSV diagonstics.R" produces the diagnostics reported in the appendix for the baseline FSV model.

*Production of tables and figures.* Tables and figures are produced within .R files that correspond to sections of the paper. (The files are most easily followed by collapsing all code, then expanding as needed.)

- Section 2.R produces:
    - Table 1
    - Figure 1
    - Table A4

- Section 4.R produces:
    - Figures 2-6 and A5
    - Table 2

- Section 5.R produces:
    - Tables 3, 4, and A6
    - Figures 7-11
    - Figures A1-A4, A6-A12

- To run the .R files, the working directory must be set to the relevant local directory (set to ~/Desktop/ currently). The following R packages are required:

- xts, tis, lubridate, readxl, mFilter, stargazer, MCMCpack, MASS, truncnorm, mvtnorm, parallel, quantmod, sandwich, lmtest, VAR.etp