README file for replication package of "Market-Based Monetary Policy Uncertainty" by Bauer, Lakdawala and Mueller

The code in this replication package is written in MATLAB and R, and generates the 3 figures and 4 tables in the main text, as well as the 4 figures and 14 tables in the online appendix. The replicator should expect the code to run for about 5 minutes.

Data Availability and Provenance Statements

All data can be made publicly available, with the exception of the CME data on Eurodollar option and futures prices. For the CME data, only derived data, including short-rate uncertainty and straddle returns, are included in the replication package.

Data file	Source	Notes
`data/fomc_tight.csv`	Board of Governors	FOMC monetary policy surprises (30min intraday)
`data/bloomberg_uncertainty.RData`	Bloomberg	
`data/mpu10.RData`, `data/mpu.RData`, `data/mpu.csv`	Derived	Daily short-rate uncertainty measures derived from CME data, interpolated to one-year horizon
`data/mpu_contracts.RData`	Derived	Same, but for individual contracts
`data/bundick.csv`	Brent Bundick	Uncertainty measure used in Bundick et al. (2017)
`data/swanson.txt`	Eric Swanson	Uncertainty measure used in Swanson and Williams (2014)
`data/tiv.csv`	Philippe Mueller (website)	Treasury Implied Volatility from Choi, Mueller, Vedolin (2017)
`data/libor_ois.csv`	Bloomberg	
`data/MacroUncertainty_JLN.csv`	Serena Ng (website)	Macroeconomic uncertainty measure of Jurado et al. (2015)
`data/real_time_MU_RX.csv`	John Rogers	Macroeconomic uncertainty measure of Rogers and Xu (2019)
`data/SPF_Dispersion_PGDP_D2.csv`	Survey of Professional Forecasters	Dispersion of forecasts for PGDP inflation
`data/straddle_returns_fomc.RData`	Derived	At-the-money straddle returns around FOMC announcements, based on Eurodollar option prices

data/2019-09-24 FOMC Drift FOMC Dates.csv	Derived	S&P 500 returns for various windows on FOMC announcement dates
data/fomc_actions_clean.csv	Board of Governors (website)	Dates of FOMC meetings with details on press conference & SEP
data/gss_af.csv	Derived	Estimates of Gürkaynak et al (2005) target/path factors and Andrade & Ferroni (2020) target/Delphic/odyssean factors
data/mps_incl_unsched_and_crisis.csv	Derived	Estimate of first-moment monetary policy surprise including unscheduled meetings and crisis period
data/mpu_speech.csv	Board of Governors (website)	Dates of speeches by FOMC members and regional Fed presidents
data/news_reg_data.csv	Money Market Services	Dates and surprise component of macro news releases
data/tab4data.csv	Gürkaynak et al. (2007) for nominal yields, Gürkaynak et al. (2010) for real yields, CBOE for VIX (link), FRED for S&P 500 (link), dollar index derived using Datastream exchange rates as in Lustig et al. (2011).	Data used in Table 4 regressions
data/tabe1_data.csv	Same sources as for tab4data.csv	Data used in Table E.1 regressions
data/tabe2_data.csv	Same sources as for tab4data.csv	Data used in Table E.2 regressions
data/tabe3_data.csv	Adrian et al. (2013) and Kim & Wright (2005)	Estimates of bond term premia
data/tabf1_data.csv	Same sources as for tab4data.csv	Data used in Table F.1
data/vix_archive.csv	CBOE (link)	VIX data up to 2003
data/vixcurrent_oct2020.csv	CBOE (link)	VIX data from 2004

Computational requirements

Software Requirements

- Matlab (version 9.10.0.1684407 (R2021a) Update 3)

  - requires “econometrics_toolbox” and “statistics_toolbox”

- R (version 4.1.0)
  - `tidyr` (1.1.3)
  - `dplyr` (1.0.6)
  - `lubridate` (1.7.10)
  - `xtable` (1.8-4)
  - `ggplot2` (3.3.3)
  - `sandwich` (3.0-1)
  - the file “`setup.R`” will install all dependencies (latest version), and should be run once prior to running other programs.

Memory and Runtime Requirements

The code can be run on a standard (2021) desktop machine in less than 5 minutes.

Description of code and instructions for replication

The R and MATLAB files containing all the code necessary for producing the tables and figures in the table are in the root folder of the replication package.

R code:

- Run `setup.R` once on a new system to install required R packages.
- `measures.R` compares market-based interest rate uncertainty measures and produces the following output:
  - Table 1 (`output/table_1.tex`)
  - Figure A.2 (`output/figure_A2.pdf`)
- `fomc.R` analyzes changes in uncertainty around FOMC meetings and produces the following output:
  - Table C.1 (`output/table_C1.tex`)
  - Table C.2 (`output/table_C2.tex`)
  - Table D.5 (`output/table_D5.tex`)
- `libor_ois.R` analyzes the spread between LIBOR and OIS and produces the following output:
  - Table A.1 (`output/table_A1.tex`)
  - Figure A.1 (`output/figure_A1.pdf`)

- `macro_uncertainty.R` analyzes the relationship between interest rate uncertainty and macroeconomic uncertainty, and produces Table B.1 (`output/table_B1.tex`)
- `straddles.R` calculates summary statistics for straddle returns around FOMC announcements and produces Table C.3 (`output/table_C3.tex`)

MATLAB code:

- Each corresponding file creates the table/figure in the paper and can be run independently. For example, Matlab file "tab2.m" recreates the numbers in Table 2 and Matlab file "figs_1_2.m" recreates Figure 1 and Figure 2, see below for details on each particular table/figure and corresponding file.
- Fodler "aux_files" folder contains auxiliary functions used to create the tables/figures.

List of tables and programs

The provided code reproduces all the tables and figures in the paper.

Figure/Table #	Program
Table 1	measures.R
Table 2	tab2.m
Table 3	tab3.m
Table 4	tab4.m
Figure 1	figs_1_2.m
Figure 2	figs_1_2.m
Figure 3	fig3.m
Appendix:	
Table A.1	libor_ois.R
Table B.1	macro_uncertainty.R
Table C.1	fomc.R
Table C.2	fomc.R
Table C.3	straddles.R
Table D.1	tabD1.m
Table D.2	tabD2.m
Table D.3	tabD3.m
Table D.4	tabD4.m
Table D.5	fomc.R
Table E.1	tabE1.m
Table E.2	tabE2.m
Table E.3	tabE3.m
Table F.1	tabF1.m
Figure A.1	libor_ois.R

Figure A.2	measures.R
Figure D.1	fig_D1.m
Figure D.2	fig_D2.m

References

Adrian, Tobias, Richard Crump, and Emanuel Moench (2013) "Pricing the term structure with linear regressions – Treasury term premia," data available from the New York Fed, https://www.newyorkfed.org/research/data_indicators/term_premia.html, (last accessed: 25 September 2021).

Andrade, Philippe and Filippo Ferroni (2021) "Delphic and odyssean monetary policy shocks: evidence from the euro area," Journal of Monetary Economics, Vol. 117, 816–832.

Board of Governors (2021), "Speeches by Federal Reserve official, FOMC announcements," https://www.federalreserve.gov/default.htm, (last accessed: 25 September 2021).

Bundick, Brent and Trenton Herriford (2017) "How do FOMC projections affect policy uncertainty?" Economic Review, 102 (2), 5–23. Data available upon request from Brent Bundick.

Choi, Hoyong, Philippe Mueller, and Andrea Vedolin (2017) "Bond variance risk premiums," Review of Finance, 21 (3), 987–1022, data available from the author's website, https://sites.google.com/site/philippebmueller/, (last accessed: 25 September 2021).

Gürkaynak, Refet S., Brian P. Sack, and Eric T. Swanson (2005) "Do actions speak louder than words? The response of asset prices to monetary policy actions and statements," International Journal of Central Banking, Vol. 1, 55–93.

Gürkaynak, Refet S., Brian P. Sack, and Jonathan H. Wright (2007) "The U.S. Treasury yield curve: 1961 to the present," Journal of Monetary Economics, 54, 2291–2304, data available from the Board of Governors, https://www.federalreserve.gov/data/nominal-yield-curve.htm, (last accessed: 25 September 2021).

Gürkaynak, Refet S., Brian P. Sack, and Jonathan H. Wright (2010) "The TIPS yield curve and inflation compensation," American Economic Journal: Macroeconomics, 2, 70–92, data available from the Board of Governors, https://www.federalreserve.gov/data/tips-yield-curve-and-inflation-compensation.htm, (last accessed: 25 September 2021).

Jurado, Kyle, Sidney C. Ludvigson, and Serena Ng (2015) "Measuring uncertainty," American Economic Review, Vol. 105, 1177–1216, data available from the author's website, https://www.sydneyludvigson.com/macro-and-financial-uncertainty-indexes, (last accessed: 25 September 2021).

Kim, Don H. and Jonathan H. Wright (2005) "An arbitrage-free three-factor term structure model and the recent behavior of long-term yields and distant-horizon forward rates," Finance and Economics Discussion Series 2005-33, Board of Governors of the Federal Reserve System, data available from the Board of Governors, https://www.federalreserve.gov/data/three-factor-nominal-term-structure-model.htm, (last accessed: 25 September 2021).

Lustig, Hanno, Nikolai Roussanov, and Adrien Verdelhan (2011) "Common risk factors in currency markets," Review of Financial Studies, 24 (11), 3731-3777.

Rogers, John H. and Jiawen Xu (2019) "How well does economic uncertainty forecast economic activity?" FEDS Working Paper 2019-085, Federal Reserve Board of Governors, data available upon request from John Rogers.

Survey of Professional Forecasters (SPF) (2021) "Cross-sectional forecast dispersion," https://www.philadelphiafed.org/surveys-and-data/real-time-data-research/survey-of-professional-forecasters, (last accessed: 25 September 2021).

Swanson, Eric T. and John C. Williams (2014) "Measuring the effect of the zero lower bound on medium-and longer-term interest rates," American Economic Review, 104 (10), 3154–85, data available upon request from Eric Swanson.