This note explains how to replicate estimation results in the paper titled "Sentimental Business Cycles"

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Summary

The following codes replicate our estimation results:

1. "main_file.m" replicates the main tables and figures in the paper using Matlab.

2. "Map\map_plotter.Rmd" replicates the map (Figure 2) using R version R-4.2.0 executed with RStudio.

3. "reg_subnational.do" replicates the subnational analysis (Tables 2 and 3) using Stata.

Main Files, Programs, and Software Requirements

1. "main_file.m"

This file replicates the main tables and figures in the paper using Matlab (code was run with Matlab Release 2018b). It draws on codes and data contained in the following folders:

- Folder "Data" contains the main dataset used in estimations, programs to reformat the dataset, and data plots.
- Programs in "SVAR" estimate SVARs using Proxy and Cholesky methods (using auxiliary files in "auxfiles" and "VAT_Toolbox").
- Programs in "aux_LPIV" estimate local projections with instrumental variables.
- Programs in "Aux_Plagborg2019" estimate forecast variance ratio statistics proposed by Plagborg-Moller and Wolf (2019).

Running this file does not require any additional Matlab toolboxes. The relevant files from Ambrogio Cesa-Bianchi's VAR Toolbox and Plagborg-Møller and Wolf's (forthcoming) codes for Instrumental Variable Identification of Dynamic Variance Decompositions are contained in the folder. The programs also make use of codes developed by Mertens and Ravn (2019) and Fieldhouse et al (2018).

Output figures are saved in folder "Figures".

2. "Map\map_plotter.Rmd"

This file replicates the map (Figure 2) in RStudio (code was run with R version R-4.2.0 using RStudio).

It draws on the dataset of mass shootings constructed by the authors "Mass shootings - public dataset.xlsx".

3. "reg_subnational.do"

This file replicates Tables 2 and 3 in the paper using Stata (code was run with Stata/MP 16.0 for Windows). Running this file requires installing Stata package outreg2. The following subnational datasets are used in estimations:

- "Data/RESTUD_mass_shootings_county" is the county-level dataset of mass shootings used in Table 2. The dataset is not provided due to size constraints.
- "Data/RESTUD_mass_shootings_indiv" is the individual-level dataset used in Table 3. It is not publicly available due to confidential survey data.

Output tables are saved in folder "Tables".

Memory and Runtime Required

The code was last run on an Intel-based laptop with Windows 10 Enterprise.

Computation took approximately 75 minutes.

Data Description and Data Availability Statement

The Online Appendix describes the data in detail. The following datasets are used to replicate our empirical results:

- "Map/Mass shootings - public dataset.xlsx" is the dataset of mass shootings constructed and provided by the authors. It contains detailed information on the shooting date, location, data source, shooting description, number of victims and fatalities, and shooter.
- "Data/DATASET.xslx" is the main dataset used in estimations. The dataset makes use of publicly available data and is provided as part of the replication files. The Online Appendix provides a detailed description of data sources and data transformations. The dataset combines the database we provide on mass shootings “Map/Mass shootings - public dataset.xlsx" (described above) with macroeconomic data series available from the Federal Reserve Economic Data (FRED) database on industrial production, unemployment rate, consumer price index, federal funds rate, stock prices, consumption of durables and non durables, and stock price options volatility index (VIX). It also makes use of data on macroeconomic uncertainty obtained from Jurado et al (2015), economic policy uncertainty obtained from Baker et al. (2016), TFP obtained from Fernald and Wang (2016), vacancy postings obtained from Stock and Watson (2012), and consumer confidence indicators obtained from the University of Michigan Surveys of Consumers.
- "Data/RESTUD_mass_shootings_county" is the county-level dataset of mass shootings and unemployment rates used to produce Table 2. The dataset makes use of publicly available data and is provided as part of the replication files. The dataset combines the database we provide on mass shootings “Map/Mass shootings - public dataset.xlsx" (described above) with county-level

unemployment rates obtained from the U.S. Bureau of Labor Statistics' on Local Area Unemployment Statistics (available on www.bls.gov/lau/).

- "Data/RESTUD_mass_shootings_indiv" is the individual-level dataset used to produce Table 3. It is not publicly available due to confidential and proprietary microdata from the University of Michigan's Survey of Consumers. The dataset combines the database we provide on mass shootings "Map/Mass shootings - public dataset.xlsx" (described above) with individual-level data on consumer confidence and personal finances, and county-level unemployment rates. The individual-level data can be purchased from the Michigan Survey of Consumers by contacting umsurvey@umich.edu.

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Table 1 - run Matlab lines 31-67 in "main_file.m".

Table 2 "reg_mass_exog_LPM" (reg_subnational.do)

Table 3 "reg_mass" (reg_subnational.do)

Citations

The programs make use of codes obtained from the following sources:

Ambrogio Cesa-Bianchi's VAR Toolbox available on: https://github.com/ambropo/VAR-Toolbox

Mertens, K. and M. O. Ravn. 2019. “The Dynamic Effects of Personal and Corporate Income Tax Changes in the United States: Reply”, *American Economic Review*, American Economic Association, Vol. 109(7), p. 2679-2691.

Fieldhouse, A., K. Mertens, and M. O. Ravn. (2018). “The Macroeconomic Effects of Government Asset Purchases: Evidence from Postwar US Housing Credit Policy”, *The Quarterly Journal of Economics*, Oxford University Press, Vol. 133(3), p. 1503-1560.

Plagborg-Møller, M. and C. K. Wolf. Forthcoming. "Instrumental Variable Identification of Dynamic Variance Decompositions." *Journal of Political Economy*. Available on: https://scholar.princeton.edu/mikkelpm/decomp_iv

The datasets makes use of data obtained from the following sources:

Baker, S. R., N. Bloom, and S. J. Davis. (2016). “Measuring Economic Policy Uncertainty”. *The Quarterly Journal of Economics*, Oxford University Press, Vol. 131(4), p. 1593-1636. Retrieved from: http://www.policyuncertainty.com

Bureau of Labor Statistics. (2020). *Local Area Unemployment Statistics*. Retrieved from https://www.bls.gov/lau/

Duwe, G. (2007). *Mass Murder in the United States: A History*. MacFarland and Co.

Federal Reserve Bank of St. Louis. (2018). *Federal Reserve Economic Data*. Retrieved from https://fred.stlouisfed.org/

Fernald, J. G. and Wang, J. C. (2016). “Why Has the Cyclicality of Productivity Changed? What Does It Mean?”, *Annual Review of Economics*, 8 (1), 465–496. Retrieved from https://www.johnfernald.net/TFP

Jurado, K., Ludvigson, S. and Ng, S. (2015). “Measuring Uncertainty”. *American Economic Review*, 105 (3), 1177–1216. Retrieved from https://www.sydneyludvigson.com/macro-and-financial-uncertainty-indexes

MotherJones. (2020). “Mother Jones’ Investigation: US Mass Shootings, 1982-2020 Data from Mother Jones’ Investigation”. Retrieved from https://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data/

Stock, J. H. and Watson, M. W. (2012). “Disentangling the Channels of the 2007-09 Recession”. *Brookings Papers on Economic Activity*.

The-Violence-Project (2019). “The Violence Project: Mass Shooter Database”. Retrieved from https://www.theviolenceproject.org/

University of Michigan. (2018). “Surveys of Consumers”. Retrieved from http://www.sca.isr.umich.edu/

Wikipedia (2020). “List of Mass Shootings in the United States”. Wikipedia. Retrieved from https://en.wikipedia.org/wiki/List_of_mass_shootings_in_the_United_States