

The Heterogeneous Effects of Government Spending: It's All About Taxes README FILE

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Below we explain how to replicate all results in the paper. We start describing replication of model results and then move to replication of empirical results. Please let us know if you have comments or questions.

1 Model Results

The `MODEL` folder contains all files needed to replicate the quantitative findings in the paper. The `CODES` folder contains all FORTRAN codes, as well as output of the codes in `.txt` files, and MATLAB files to compute various moments of the calibrations. The `MATLAB_FIGURES` folder reports all MATLAB files to produce the plots, which are stored in the folder titled `FIGURES`.

The `CODES` folder is organized as follows.

- The `BENCHMARK` folder contains the benchmark calibration and results. It contains five subfolders.
 - The `CALIB` computes the calibration of the benchmark economy. In this folder, the `MATLAB` subfolder also contains MATLAB files to compute the distribution of *lpe*, *mpc* and wealth (Tables 1, 2, 3, and 4, and numbers reported in Section 3.3, 3.4), and to compute numbers in Section 4.2.
 - The `CG` folder computes the transition for the “Constant Progressivity” case, while the `MG` folder computes the transition for the “Higher Progressivity” case.

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- The `CG_DECOMP` and `MG_DECOMP` folders produce the results of the direct and indirect effects of the spending shock in Section 5.3. There are three cases: choosing `index_decomp` on line 60 in the `Main.f90` file computes the paths with all equilibrium taxes and prices (case 1), only indirect effects (case 2) and only direct effects (case 3).

The `BENCHMARK` folder is used to produce Figures 1 to 4.

- The `ROBUST` folder contains additional quantitative results in the main text.
 - The `FLATLPE` and `FLATMPC` folders are used to produce Figure 5 of the paper. In each folder, there are three subfolders, `CALIB`, `CG` and `MG`, to compute the calibration and the transition under the two tax schemes; in the `CALIB` folder, a `MATLAB` subfolder also computes distributions of *lpe* and *mpc* (Tables 6, 7, 8 and 9).
 - The `NOMCONS` and `HIGHDEBT` folders produce results for the “Accommodative Monetary Policy” and “High Public Debt” cases presented in Figure 6. In each folder, the folders `CG` and `MG` compute transitions under the two tax schemes. There is no `CALIB` file as the steady state is as in the benchmark.
 - The `FLEXWAGES` and `NEOCLASS` folders produce results for the “Flexible Wages” and “Frictionless Economy” cases presented in Figure 7. In each folder, the folders `CG` and `MG` compute transitions under the two tax schemes. There is no `CALIB` file as the steady state is as in the benchmark.
- The `ROBUST_APPEND` folder contains additional quantitative results presented in Appendix.
 - The `HETB` folder contains the (β, B) model presented in Appendix A.6.1. It contains three subfolders, `CALIB`, `CG` and `MG`, to compute the calibration and the transition under the two tax schemes used to produce Figure 16; in the `CALIB` folder, a `MATLAB` subfolder also computes distributions of *lpe* and *mpc* (Figure 15).
 - The `PROFITMORE` and `PROFITLESS` present models with alternative rules for the distribution of profits. Each folder contains two subfolders, `CG` and `MG`, used to produce Figure 17.
 - The remaining five folders are used to produce Figure 18. In particular, `STICKWAGES` computes in `CG` and `MG` transitions with more sticky wages in the benchmark calibration. `FLATLPE_FLEXWAGES` and `FLATMPC_FLEXWAGES` computes in `CG` and `MG` transitions with flexible prices, while `FLATLPE_STICKWAGES` and `FLATMPC_STICKWAGES` computes in `CG` and `MG` transitions with more sticky prices; the calibrations for

these two economies are in `FLATLPE` and `FLATMPC` in the `ROBUST` folder described above.

All tolerances for steady states and transitions are at $1e-5$, except for the (β, B) model and the “Higher Progressivity” shock with more sticky wages, which were harder to converge, and for which errors are below $3e-5$ and $2e-5$, respectively. However, multipliers were stable across iterations.

Note that, in each folder, the `Command.txt` file specifies the command to compile and run the codes, with the options for starting guesses. We run the codes using an Intel compiler with a MKL library, primarily on the FED HPC server. Matlab codes use the Compecon library.¹

2 Empirical Results

The `EMPIRICAL` folder contains all files needed to replicate empirical findings in the paper. This includes the databases, the STATA files used for regressions, and the MATLAB files used for plots. To simplify replication of our results, we provide separate codes for each figure/table/result whenever possible. We provide a more detailed description of all codes below.

Databases We use five databases in the paper.

- Most results use the database in `DATA_MACRO_FN.csv`, which is under the folder `EMPIRICAL`. See Appendix B.1 for a description of most variables, and Appendix B.3 for a description of tax-related variables.
- The state-level tax responses on Appendix C.5 uses the data `DATA_STATE_FN.csv`, also under the folder `EMPIRICAL`. See Appendix C.5 for a description of the variables.
- The multipliers comparison with Ramey and Zubairy (2018) uses the data under folder `RZ_codes`. We obtained these data from Ramey’s website ([link](#)).
- The wealth distribution computation uses the 1983 wave of the Survey of Consumer Finances (SCF). The original data can be obtained from the SCF website ([link](#)), and we also added the 1983 SCF wave under the folder `EMPIRICAL`. See Appendix B.2.1 for more details on the variables description.
- Some computations related to the *mpc* use the Survey of Households Income and Wealth (SHIW) database. The original SHIW data is made available by Banca D’Italia

¹The Compecon library can be downloaded at: <https://github.com/PaulFackler/CompEcon>.

([link](#)). We use the 2010 and 2016 waves, which added under the folder **EMPIRICAL**. We also use the SHIW data provided by [Jappelli and Pistaferri \(2020\)](#) ([link](#)), which we add added under the folder **EMPIRICAL**

LPM Results Below we explain how to replicate the local projections in our paper

- The MATLAB code `FIGURE_8_12_21.m` generates Figures 8, 12, and 21 in the paper.
- To replicate Figure 9, first run the STATA code `LPM_FIGURE_9.do` and then run the MATLAB code `FIGURE_9.m` which generates the plot.
- To replicate Figure 10, first run the STATA code `LPM_FIGURE_10.do` and then run the MATLAB code `FIGURE_10.m` which generates the plot.
 - To generate the three plots in Figure 10, `LPM_FIGURE_10.do` has to be run three times changing the corresponding variable in line 40. See STATA code for more instructions.
- To replicate Figure 11, first run the STATA codes `LPM_FIGURE_11_lngov.do` and `LPM_FIGURE_11_deficit.do`, and then run the MATLAB code `FIGURE_11.m` which generates the figure.
- To replicate Figure 13, run the MATLAB code `FIGURE_13.m`. The STATA code `LPM_FIGURE_14.do` needs to be run before, because it generates and stores the shocks that are plotted in Figure 13.
- To replicate Figure 14, first run the STATA code `LPM_FIGURE_14.do` setting `pvar` to `pfed` on line 50. Then run the MATLAB code `FIGURE_14.m` which generates the plot.
- To replicate Figure 19, run the MATLAB code `FIGURE_19.m`. The STATA code `LPM_FIGURE_14.do` needs to be run before, because it generates and stores the shocks that are plotted in Figure 19.
- Most robustness cases in Table 11 and Table 12 are generated by the STATA file `LPM_TABLE_11_12.do`. Select the relevant robustness case on line 42 of the STATA code. Each case outputs an excel file with the numbers in the table. See STATA code for more instructions.
 - The **Expansion & slack** robustness check of Table 11 is generated by the STATA code `LPM_TABLE_11_unemp.do`. It generates an excel file with the numbers in the table.
 - The **Sign** robustness check of Table 11 is generated by the STATA code titled `LPM_TABLE_11_sign.do`. It generates an excel file with the numbers in the table.

- To replicate Figure 20, first run the STATA code `LPM_FIGURE_20.do` and then run the MATLAB code `FIGURE_20.m` which generates the plot.
- To replicate Figure 22, first run the STATA code `LPM_FIGURE_14.do` setting `pvar` to *psoc* on line 50. Then run the MATLAB code `FIGURE_22.m` which generates the plot.
- To replicate Figure 23, first run the STATA code `LPM_FIGURE_23.do` and then run the MATLAB code `FIGURE_23.m` which generates the plot.
 - To generate the three plots in Figure 23, `LPM_FIGURE_23.do` has to be run three times changing the corresponding dates in lines 35-36—as well as the string variables on lines 37-38. When running the post-80 sample (shorter sample), use quadratic time-trend by setting `TP = 2` on line 31. See STATA code for more instructions.
- To replicate Figure 24, first run the STATA code `LPM_FIGURE_24.do` and then run the MATLAB code `FIGURE_24.m` which generates the plot.
 - To generate the two plots in Figure 24, `LPM_FIGURE_24.do` has to be run two times changing the corresponding dates in lines 38-39—as well as the string variables on lines 40-41. See STATA code for more instructions.
- To replicate Figure 25, first run the STATA code `LPM_FIGURE_25.do` and then run the MATLAB code `FIGURE_25.m` which generates the plot. Run the codes for Figure 10 before, since those results are used to produce Figure 25.
- Figure 26 is produced using several codes, some of which we borrow from [Ramey and Zubairy \(2018\)](#).
 - First, run the STATA code `LPM_FIGURE_26.do`. Run this code twice, for the cases: (1) benchmark, and (2) no MTR. Each case can be selected on line 24. See STATA code for more instructions.
 - Second, run the STATA code `jordagk_twainstruments.do` under the `RZ_code` folder. This is the code provided by [Ramey and Zubairy \(2018\)](#), to which we only changed the samples dates use for the regressions. Run this code twice: (1) for the 1889-2012 sample (as in [Ramey and Zubairy, 2018](#) sample), and (2) for for 1913-2006 case (as in our sample). Each case can be selected on line 19. See STATA code for more instructions.
 - Finally, run the MATLAB code `FIGURE_26.m` which produces the plot.
- To replicate Figure 27, first run the STATA code `LPM_FIGURE_27.do` and then run the MATLAB code `FIGURE_27.m` which generates the plot.

- Run the STATA code `LPM_FIGURE_27.do` four times to generate the four irfs on Figure 27. In particular, set the left-hand-side variable `yvar` to “gdp” or “gov” on line 39, and the shock to `shock` “bp” or “news” on line 42. These four possible combinations give the four irfs on Figure 27.
- To replicate Figure 28 and Figure 29, run the STATA code `LPM_FIGURE_28_29.do` and then run the MATLAB code `FIGURE_28_29.m` which generates the plot.
- Run the STATA code `LPM_FIGURE_28_29.do` six times to generate the six irfs on Figure 28 and Figure 29. In particular, set the case on line 38 of the STATA code. See STATA code for more instructions.

Micro databases Below we explain how to replicate the results using the SCF and the SHIW databases

- The STATA code `SCF_MAIN.do` computes the wealth distribution reported in Table 2. See Appendix B.2.1 for more details.
- The STATA code `SHIW_MAIN.do` computes the correlations between *mpc* and labor income, as well as *mpc* and total income, which we report in Section 3.4. See Appendix B.2.2 for more details.

Miscellaneous We use two measures of progressivity in the paper: $P[fed]$, based on federal income taxes only, and $P[ss]$, which also includes social security taxes. Appendix B.3.1 explains how to construct the progressivity measures using average marginal tax rates (AMRT) and average tax rates [ATR], while Table 10 reports the numbers. The database `DATA_MACRO_FN.csv` contains the variables needed to compute $P[fed]$ (labeled as `MITR` and `AITR`) as well as to compute $P[ss]$ (labeled as `MTR` and `ATR`).

References

- JAPPELLI, T. and PISTAFERRI, L. (2020). Reported mpc and unobserved heterogeneity. *American Economic Journal: Economic Policy*, **12** (4), 275–97.
- RAMEY, V. A. and ZUBAIRY, S. (2018). Government spending multipliers in good times and in bad: Evidence from u.s. historical data. *Journal of Political Economy*, **126** (2), 850–901.