Replication for: Forecasting the Covid Inflation Surge in Inflation

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Data: All Data are in the \Data directory

The PCE Inflation Data are in the subdirectory \NIPA_PCE

- The 'revised' data (downloaded from FRED in April 14, 2026) are in the spreadsheets:
  - nipa_table_2_3_4.xlsx (price indices)
  - nipa_table_2_3_5.xlsx (nominal quantities)
- The 'real-time' data are in the subdirectory \realtime_datasets
  - Each real-time dataset is composed of nipa_table_2_3_4_yyyy_mm_dd.xlsx and of nipa_table_2_3_5_yyyy_mm_dd.xlsx, where yyyy_mm_dd refers to the date of the release for these files. Note, these files have the same format as the revised data.
  - These files were downloaded from FRED using a two-step process:
    - The Matlab program **alfred_download.m** downloads each variable from ALFRED over the desired dates. These are saved to the \alfred_vintages directory
    - The Matlab program **make_realtime_datasets.m** reads these files and creates each of the nipa_table_2_3_4_yyyy_mm_dd.xlsx and of nipa_table_2_3_5_yyyy_mm_dd.xlsx files.

The Federal Funds data plotted in Figure 2 is in the DFF.xlsx file.

The SEP forecast values were taken from the SEP reports. These are in the \FOMC_SEP directory.

The SPF data are in the \SPF_Forecasts directory. The data downloaded from the SPF webpage at FRB-Philadelphia are in Median_PCE_Level.xlsx. These were re-formatted in the file Median_PCE_Level_1.xlsx.

- The program \Matlab_PComp\create_dpxe_current_realtime.m creates a file that contains the full-sample and real-time versions of the aggregate inflation (x-energy) data.

Estimation and Forecasting for the univariate and multivariate models

All programs are in the \Matlab_PComp directory

- Programs for fully-revised data
  - Univariate model:
    - The program ucsv_dp.m computes the results for the univariate UC model with stochastic volatility (.. the UCSV model from Stock and Watson (2016). This version of the program produces results using the revised data and computes the full-sample estimates of parameters, etc.
    - The estimation using the revised data, but using recursive estimates of the parameters, is carried out using **ucsv_dp_quasirealtime.m**.
    - The estimation using the realtime data and parameter values is carried out using **ucsv_dp_realtime.m**.
  - Multivariate model:
    - The program **mucsv_tvp_17c.m** computes the results for the multivariate UC model with stochastic volatility (.. the MUCSV model from Stock and Watson (2016). This version of the program produces results using the revised data and computes the full-sample estimates of parameters, etc.
    - The estimation using the revised data, but using recursive estimates of the parameters, is carried out using **mucsv_tvp_17c_quasirealtime.m**.
    - The estimation using the realtime data and parameter values is carried out using **mucsv_tvp_17c_realtime.m**.
  - Multiple Runs, Utility Programs and Trace Plots
    - The posterior and forecasts are computed using MCMC (Gibbs) methods as described in Stock and Watson (2016).
      - In the results presented here each MCMC chain was run twice using different a different random number seed.
      - The UCSV models used 110k MCMC iterations with the first 10k discarded, and every 20^{th} draw saved thereafter.
      - The MUCSV models used 220k MCMC iterations with the first 20k discarded and every 40^{th} draw saved thereafter.
      - 2021Q2 is an important date for the MUCSV model. To get more accurate estimates there, the model was run using 8 times using different random number seeds. Each run used 440k MCMC iterations, the first 40k were discarded and every 40^{th} draw was saved thereafter. The programs used were mucsv_tvp_17c_quasirealtime_2021_2.m and mucsv_tvp_17c_realtime_2021_2.m
    - The results from the various runs with combined using the programs compile_ucsv_draws.m and compile_mucsv_draws.m.

- Trace plots showing the resulting draws for each seed value can be computed using the various trace_plot_xxx.m programs. The trace plots focus on the value of τ_t for key dates.
    - These plots suggest that the Gibbs MCMC generally mixes well enough the provide good estimates of the predictive means and quantiles. The one interesting plot is for the quasi-realtime data for 2021Q2. Here the predictive density is bimodal and the MCMC draws mix relatively poorly across these two modes. (It was with this in mind that led me to use 8 different seed values and many MCMC draws.) Note that this is not an issue for the real time data in 2021Q2.
    - These programs also produce and save kernel density estimates of the posterior for τ_t. These are used in Figure xx.

Figures and Tables

The figures were computed using the following matlab scripts. Legends, arrows, etc. were then added by hand.

- Figure 1: Inflation_Plot_Figure_1.m
- Figure 2:
    - Panel a: Inflation_SPF_Plot_Figure_2.m
    - Panel b: These are taken from the SEP reports in \Data\FOMC_SEP
- Figure 3: Inflation_Plot_Figure_3.m
- Figure 4: ucsv_results_table_plots_paper.m
- Figure 5: ucsv_results_table_plots_paper.m
- Figure 6: ucsv_results_table_plots_paper.m
- Figure 7: UCSV_MUCSV_RT_Forecasts_Figure_7.m
- Figure 8: UCSV_MUCSV_Decomp_Figure_8.m
- Figure 9: kdensity_poster_plot_fig_9.m
    - The program uses the kernel density estimates computed in trace_plot_ucsv_dp_realtime.m and trace_plot_mucsv_dp_realtime.m
- Table 1: ucsv_results_table_plots_paper.m
- Table 2: Created by hand
- Table 3: MUCSV_Table_3.m
- Table 4: UCSV_MUCSV_Table_4.m