The Macroeconomic Effects of the Federal Reserve's Conventional and Unconventional Monetary Policies

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Motivation

- During and after the Great Recession, the Fed and other central banks conducted unconventional monetary policy on a large scale
- Extensive evidence that forward guidance, LSAPs had significant financial market effects (Swanson, 2021)
- But there is very little evidence on the macroeconomic effects of these policies
- Main problem: there are only about 8 FOMC announcements per year, interest rate changes around FOMC announcements are typically small (2–3bp)

This Paper

- Measures monetary policy innovations using high-frequency interest rate changes around:
  - FOMC announcements
  - post-FOMC press conferences
  - FOMC meeting minutes releases
  - speeches, testimony by Fed Chair
  - speeches, testimony by Fed Vice Chair
- Decomposes these innovations into news about:
  - federal funds rate
  - forward guidance
  - large-scale asset purchases (LSAPs)
- Uses these components as external instruments in a monetary policy VAR to estimate effects of federal funds rate, forward guidance, and LSAPs on macroeconomic variables

Related Literature

Swanson (2021 JME)

- decomposes HF interest rate changes around FOMC announcements into federal funds rate, forward guidance, and LSAP components
- finds unconventional policies about equally effective as fed funds rate

Swanson and Jayawickrema (2023 WP)

- measure HF interest rate changes around FOMC announcements, press conferences, minutes, Chair speeches, Vice Chair speeches
- decompose them into federal funds rate, forward guidance, and LSAP components

Bauer-Swanson (2023 NBERMA)

- use SJ data to estimate effects of “monetary policy shock” in SVARs, LPs
- monetary policy shock is a hybrid of fed funds rate, forward guidance

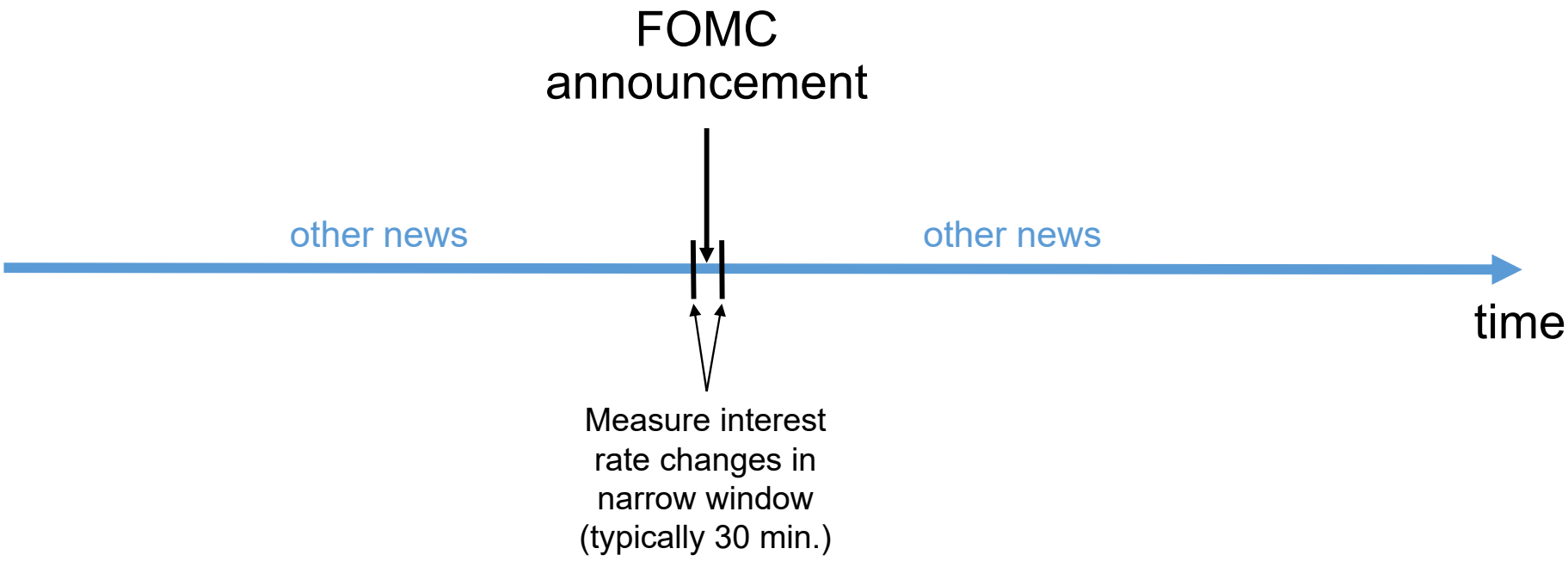
Miranda-Agrippino and Ricco (2023 JME)

- use Swanson (2021) data to estimate effects of fed funds rate, forward guidance, LSAPs in a VAR
- weak instruments, robustness problems for unconventional policies

Preview of Results

- Federal funds rate, forward guidance, and LSAPs all had significant effects on macro variables
- Federal funds rate effects are the largest and most robust — suggests that short-term interest rates should continue to be central banks' primary monetary policy tool going forward
- FOMC announcements alone are a weak instrument, especially for forward guidance and LSAPs
- There is a significant Bauer-Swanson (2023) "Fed Response to News" effect/bias in the data for all three monetary policy tools — important to correct for this bias in IRF estimates from VARs

High-Frequency Monetary Policy Surprises



High-frequency monetary policy surprises are an important tool for estimating effects of monetary policy on asset prices and macroeconomic variables:

- asset prices: high-frequency OLS regressions
- macro variables: monetary policy surprises used as external instrument in structural VAR or LP

Problems with Monetary Policy Surprises

- Surprises around FOMC announcements have become much smaller over time, are typically only 2–3bp
- Fed has become more transparent, tends to communicate decisions before FOMC meeting
- This trend accelerated after 2008, due to ZLB
- Many authors focus on changes in futures rates a few months or quarters ahead to better capture changes in overall stance of monetary policy around FOMC announcements

  Gürkaynak, Sack, Swanson (2005), Gertler-Karadi (2015), Nakamura-Steinsson (2018), Miranda-Agrippino-Ricco (2021), Swanson (2021), Bauer-Swanson (2023a,b)

Five Types of Monetary Policy Announcements

From 1988 to 2019, Swanson and Jayawickrema collect all:

- **FOMC Announcements** (323 total)
  8 scheduled meetings per year, plus unscheduled intermeeting changes
- **Post-FOMC Press Conferences** (40 total)
  4 per year from 2011–18, 8 per year beginning in 2019
- **FOMC Meeting Minutes Releases** (184 total)
  8 per year from 1997–2019
- **Speeches and Congressional Testimony by Fed Chair** (847 total, not including press conferences)
- **Speeches and Congressional Testimony by Fed Vice Chair** (310 total)

Forward Guidance and LSAPs

For this expanded set of monetary policy announcements, define forward guidance component as in Gürkaynak, Sack, Swanson (2005), using principal components:

$$\underbrace{X^{FOMC}}_{T\times N} = \underbrace{F}_{T\times 2}\underbrace{\Lambda}_{2\times N} + \underbrace{\varepsilon}_{T\times N}$$

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Define LSAP component of each announcement as in Rogers, Scotti, Wright (2018) and Gilchrist, Yue, Zakrajsek (2019):

- before 2009: 0
- after 2009: change in the 10-year Treasury yield, orthogonalized with respect to changes in the federal funds rate and forward guidance

VAR Specification

Reduced-form VAR:

$$Y_t = \alpha + B(L)Y_{t-1} + u_t$$

Y_t includes:

- log Industrial Production
- log CPI
- log Commodity Price index
- Gilchrist-Zakrajsek (2012) credit spread
- Wu-Xia (2016) shadow federal funds rate
- 2-year Treasury yield
- 10-year Treasury yield

12 monthly lags, estimated from 1973:1–2020:2

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There are potentially many structural shocks in ε_t. Define first three elements of ε_t to be:

- federal funds rate shock: ε_t^{ff}
- forward guidance shock: ε_t^{fg}
- LSAP shock: ε_t^{lsap}

High-Frequency Identification of Structural Shocks

For each monetary policy tool $i \in \{ff, fg, lsap\}$, define monthly instrument z_t^i to be the sum each month of all the high-frequency innovations in policy tool i

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Caveat: Fed Information Effect and Fed Response to News bias, discussed below, violate exogeneity

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Identify impact effect of ε_t^i on u_t by regressing u_t on u_t^i by 2SLS using z_t^i as an external instrument (sample 1988:1–2019:12):

$$u_t = \gamma + s_i u_t^i + \eta_t$$

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First-stage F-statistic for Y_t^i on instrument z_t^i measures instrument strength

Predictability of Monetary Policy Surprises

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Several recent papers find evidence against this hypothesis: Cieslak (2018 RFS), Miranda-Agrippino (2017 WP), Miranda-Agrippino and Ricco (2021 AEJM), Karnaukh and Volkata (2022 JFE), Bauer and Swanson (2023 AER, NBERMA), Bauer and Chernov (2023 JF), Sastry (2022 WP)

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Bauer and Swanson (2023 AER, NBERMA): financial markets seem to have underestimated how aggressively the Fed would respond to incoming data (see also Cieslak, 2018, Schmeling et al, 2022)

Correcting for Fed Response to News Bias

Orthogonalize the instruments z_t^i with respect to economic, financial data released in the weeks leading up to the announcements

$$z_t^i = \delta + \psi' X_{t-} + z_t^{i\perp}$$

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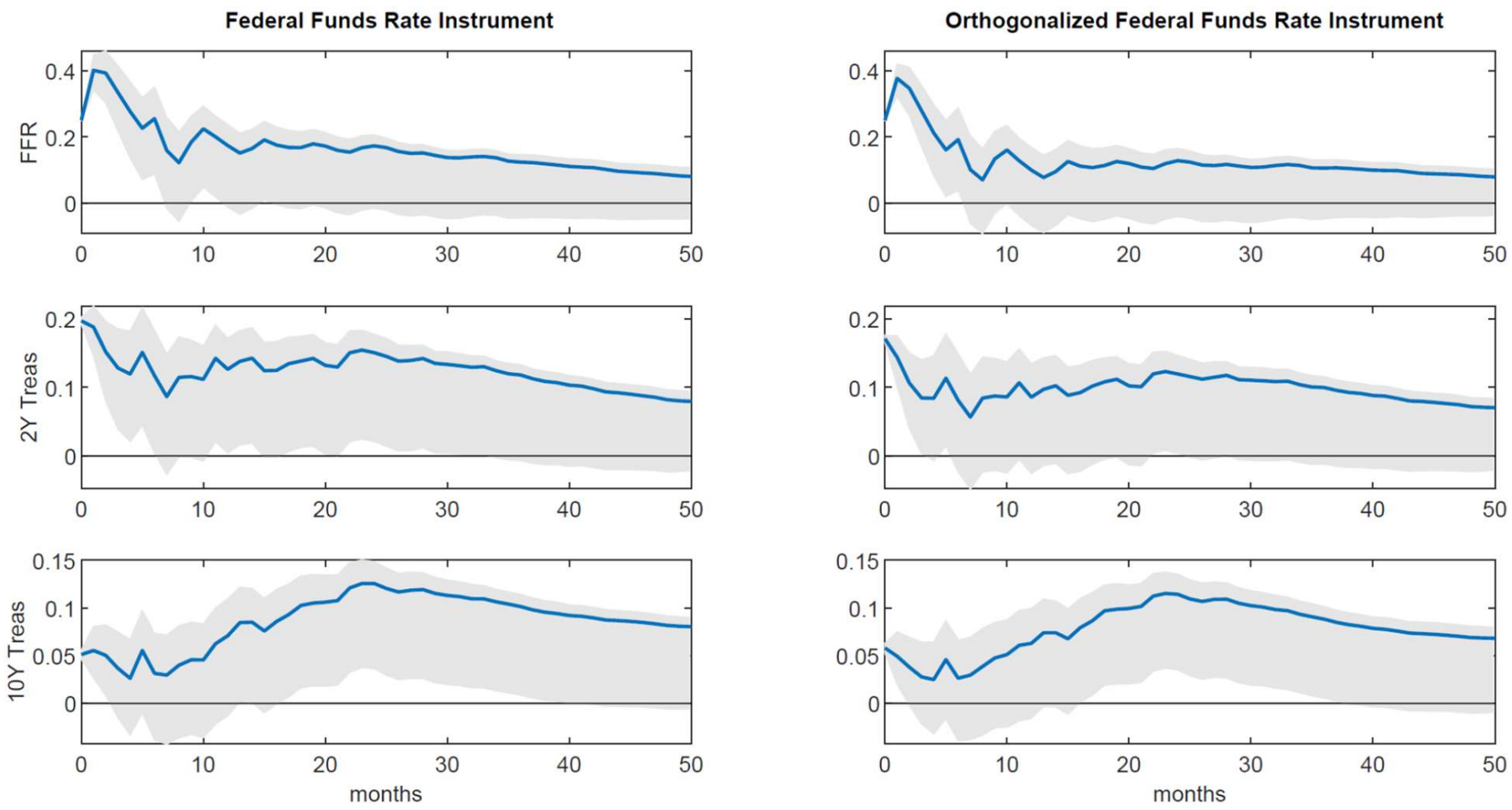
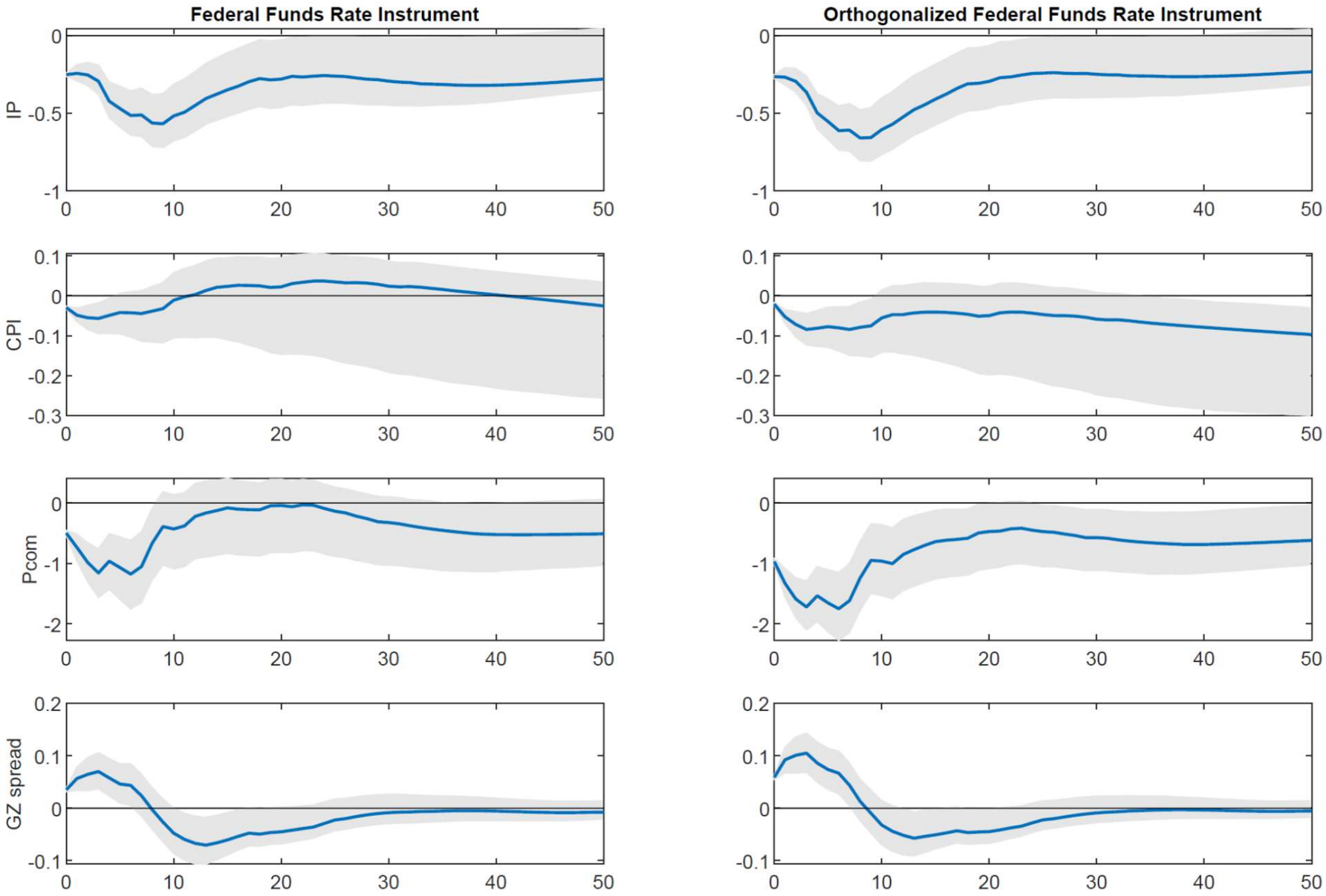
Instrument $z_t^{i\perp}$ should still be relevant, but now orthogonalized with respect to X_{t-}, more exogenous

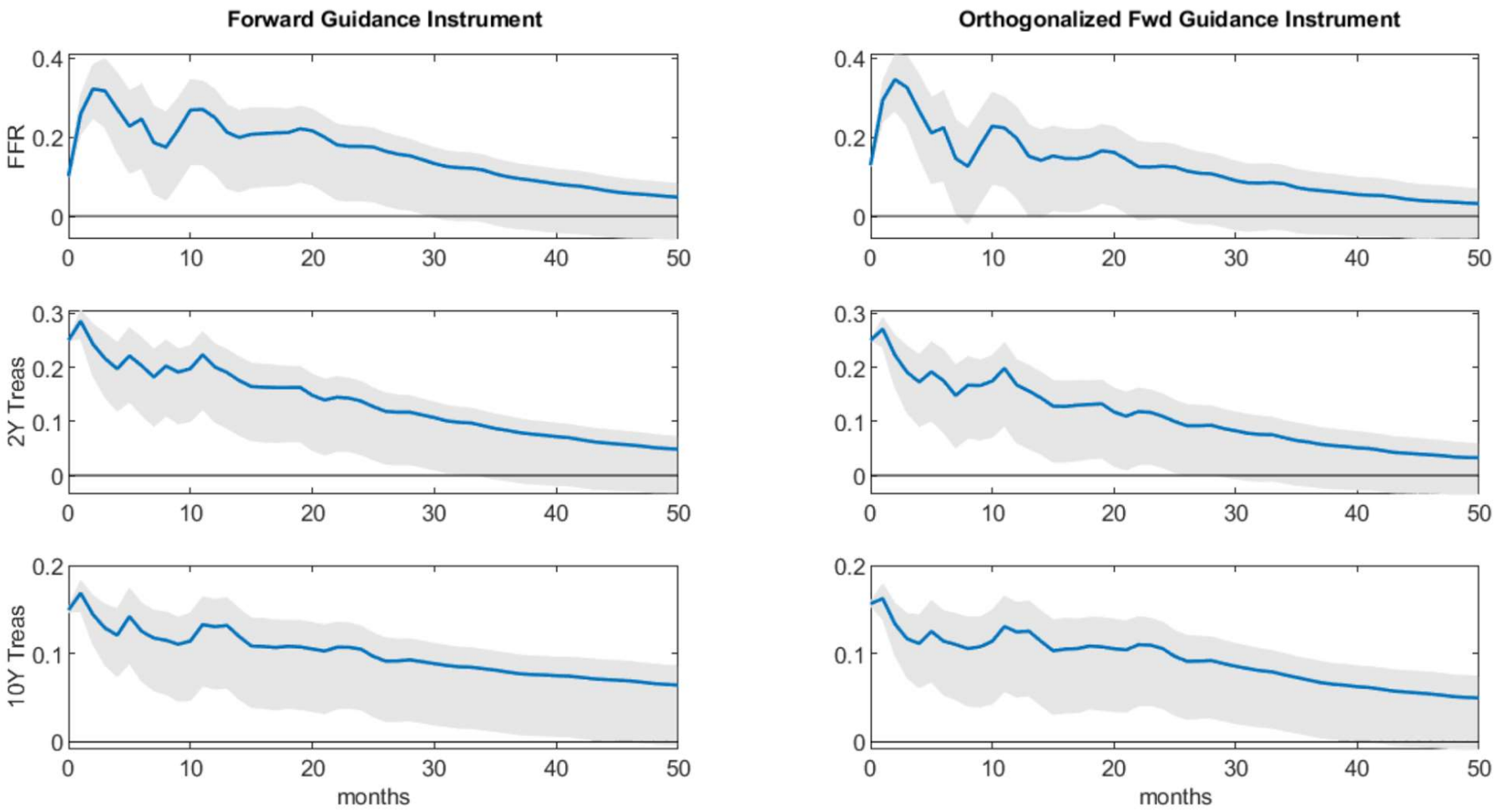
Response to Federal Funds Rate



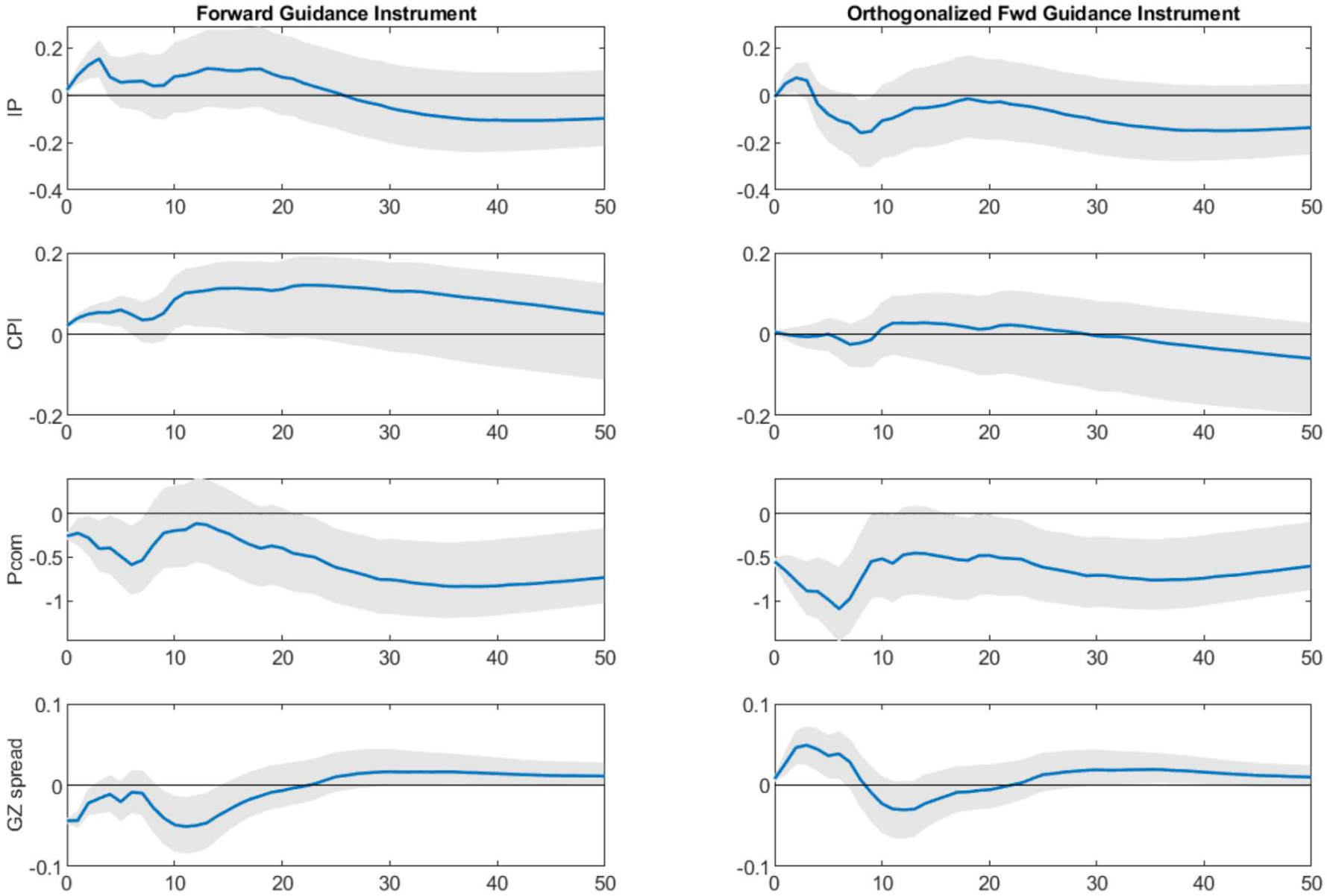
Response to Federal Funds Rate (cont.)



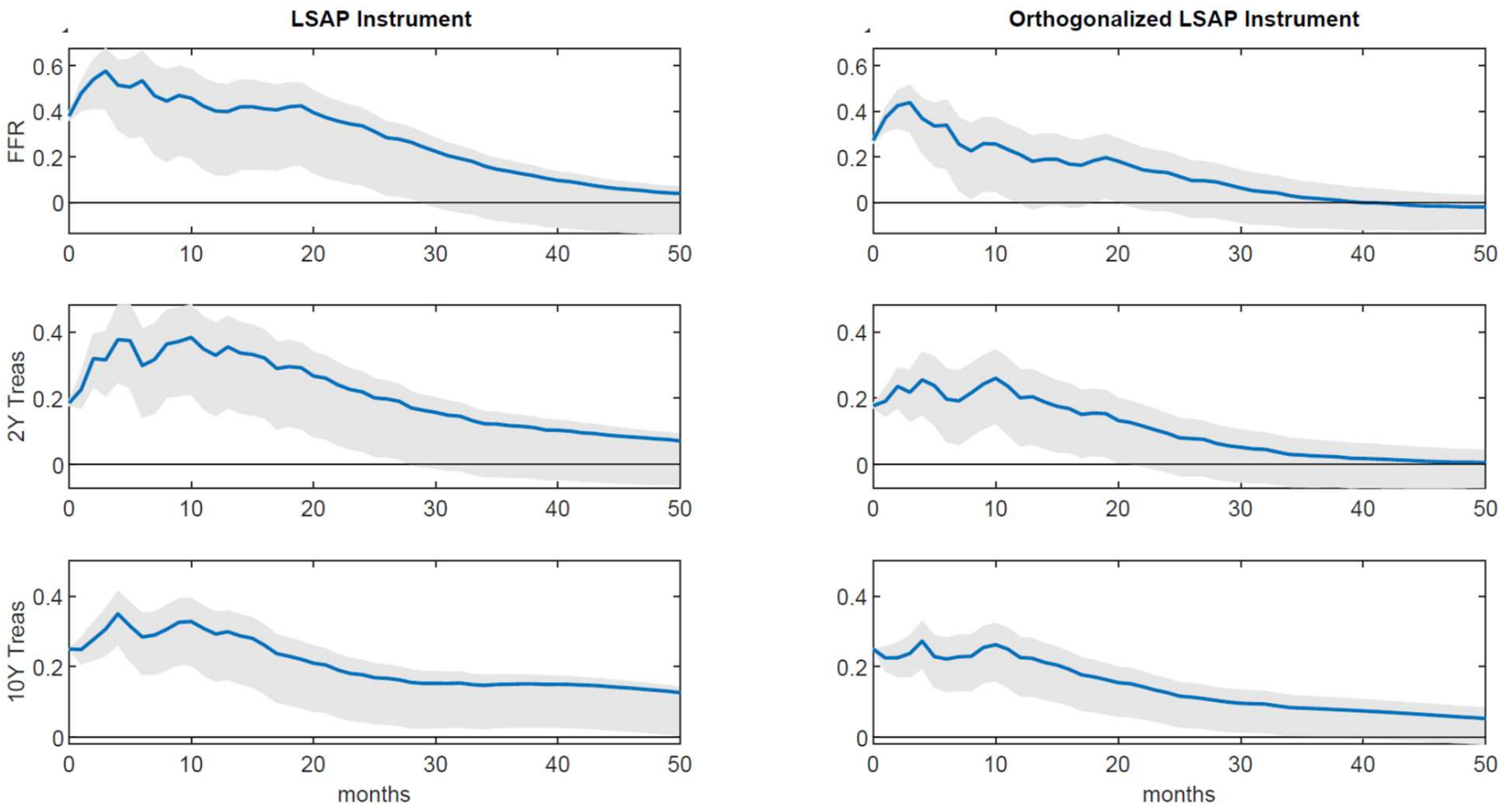
Response to Forward Guidance



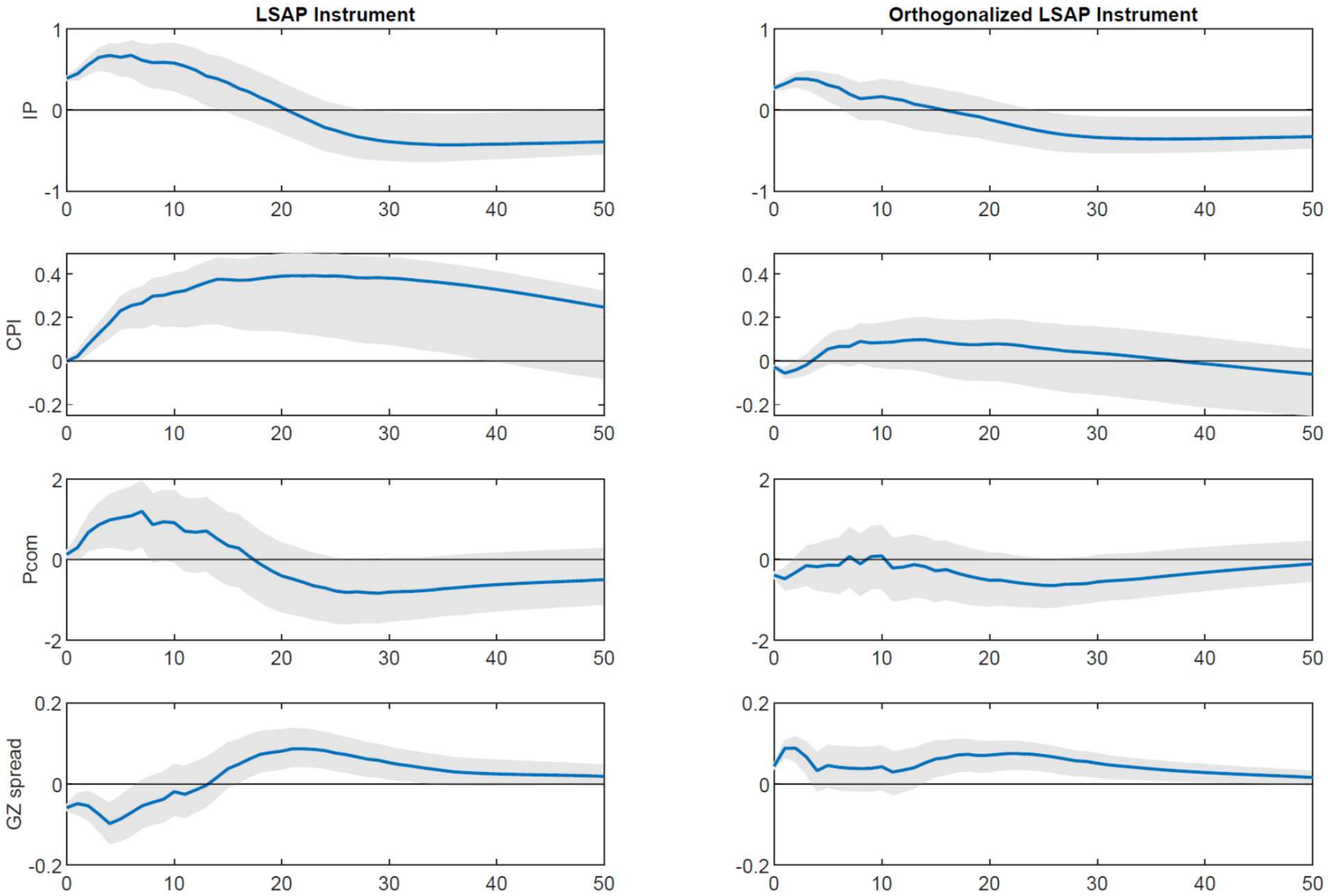
Response to Forward Guidance (cont.)



Response to LSAPs



Response to LSAPs (cont.)



Conclusions

- Federal funds rate, forward guidance, and LSAPs all had significant effects on macro variables
- Federal funds rate effects are the largest and most robust
  — suggests that short-term interest rates should continue to be the primary monetary policy tool going forward
  — contrasts with Swanson (2021), who found all three policies were about equally effective at moving financial markets
- FOMC announcements alone are a weak instrument, especially for forward guidance and LSAPs
- There is a significant Bauer-Swanson (2023) “Fed Response to News” effect/bias in the data for all three monetary policy tools
  — important to correct for this bias in IRF estimates