Inflation Measured Every Day Keeps Adverse Responses Away: Temporal Aggregation and Monetary Policy Transmission

Jacobson, Matthes, and Walker (JMW)

Discussion by Miguel Acosta

Federal Reserve Board*

Workshop on Methods and Applications for DSGE Models

Federal Reserve Bank of Dallas

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* The views expressed here are solely the responsibility of the authors and should not be interpreted as reflecting the view of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System.

JMW Overview

Motivation Estimated effects of monetary policy often inconsistent w.r.t. standard macro theory.
(e.g. price puzzle: $i \uparrow \rightarrow \pi \uparrow$)

What JMW do

1. Find a price puzzle in daily inflation, but only for a few days.
2. Show why the short-lived price puzzle is magnified in monthly regressions.

Contribution
Taking this frequency mismatch seriously and highlighting pitfalls

Overview of Comments

1. **A**(n old) **question**
   Does the sample matter?

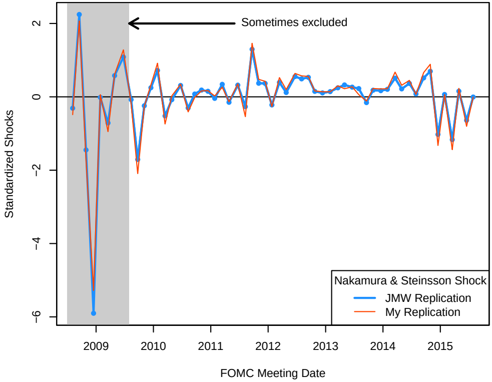
2. **A suggestion**
   Generalize (and simplify) the aggregation result.

3. **A request**
   Emphasize the state-space model and make it user-friendly.

   Could become a new go-to methodology!

1. Sample Period

- Estimated effects of monetary policy can be sensitive to sample period
  See Ramey (2016) and the Volcker Disinflation
- JMW are limited by BPP data ('08–'15)—could sample be expanded w/ other data?
- Nakamura and Steinsson (2018) exclude shaded region from main analysis
- Shocks here generally small. Would be good to understand if large shocks matter.
- If they do, JMW could consider looking into HF data like TIPS-based inflation



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2. Time Aggregation

Generalization of JMW's processes for daily inflation

$$\pi_t = \sum_{j=0}^{\infty} \Theta_j \varepsilon_t^{\text{monetary}} + \sum_{j=0}^{\infty} \Psi_j' \varepsilon_t^{\text{other}}$$

Note: $\{\Theta_j\}_{j=0}^{\infty}$ is the impulse response function $\left\{ \frac{d\pi_{t+j}}{d\varepsilon_t^{\text{monetary}}} \right\}_{j=0}^{\infty}$

Let Π_τ be monthly inflation. Then the *impact* response is

$$\frac{d\Pi_\tau}{d\varepsilon_\tau} = \Theta_0 + \Theta_1 + \cdots + \Theta_{m(\tau)}$$

where $m(\tau) \in [1, 31]$ is the day of the FOMC announcement.

2. Time Aggregation (cont'd)

The *impact* response of a monetary shock is

$$\frac{d\Pi_\tau}{d\varepsilon_\tau} = \Theta_0 + \Theta_1 + \cdots + \Theta_{m(\tau)}$$

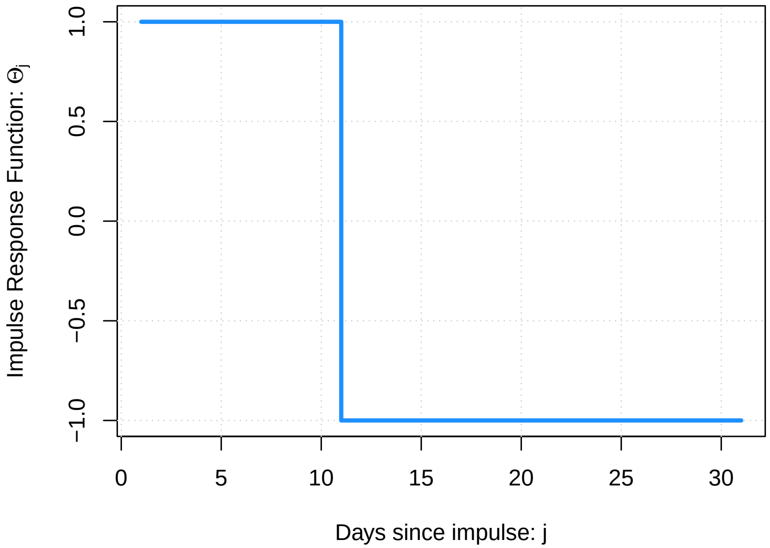
where $m(\tau) \in [1, 31]$ is the day of the FOMC announcement.

Three things to notice

- In the paper already
  1. Generally, earlier Θ will matter more
     ($d\Pi_T / d\varepsilon_t = \Theta_0 + \cdots, \ \forall t$)
  2. Monthly IRF will typically be larger than daily
     (unless Θ's offset)
- Might want to mention
  3. Day of the FOMC announcement matters

(All of this comes out of a less-restrictive model than either example shown in the paper.)

2. Time Aggregation in Pictures



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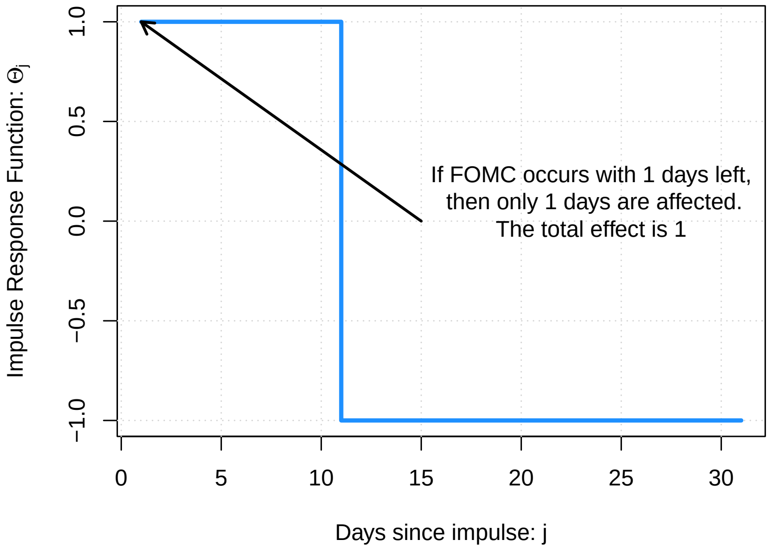

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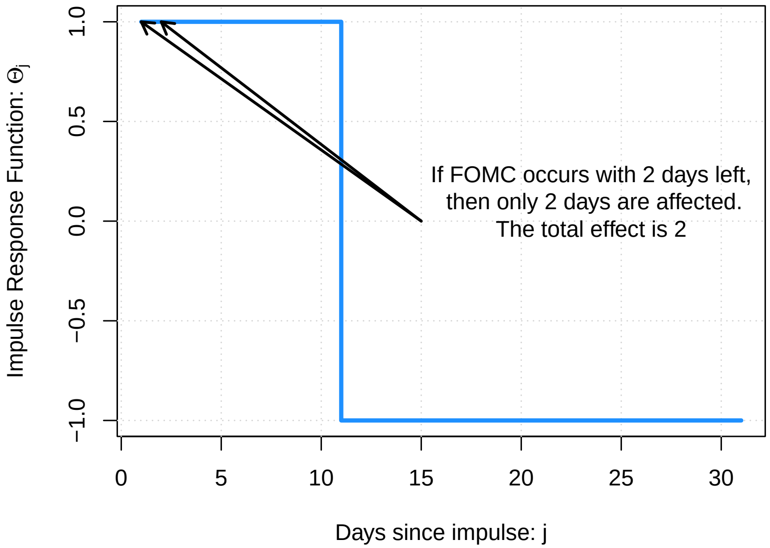

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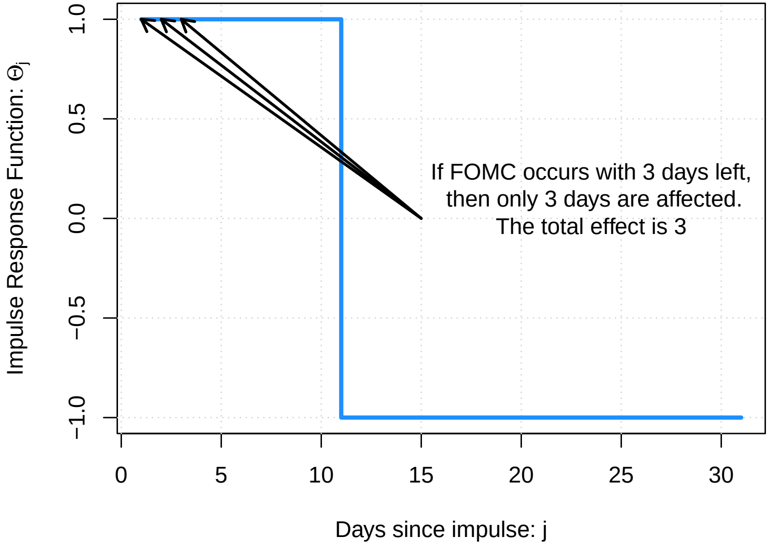

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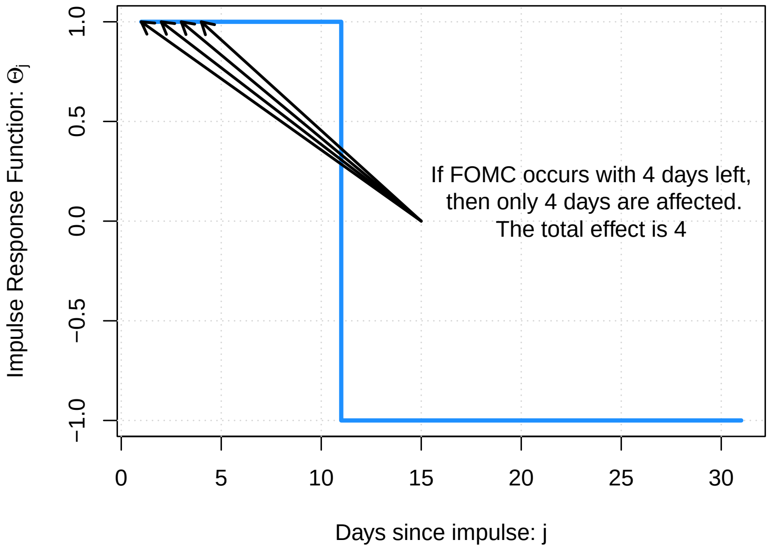

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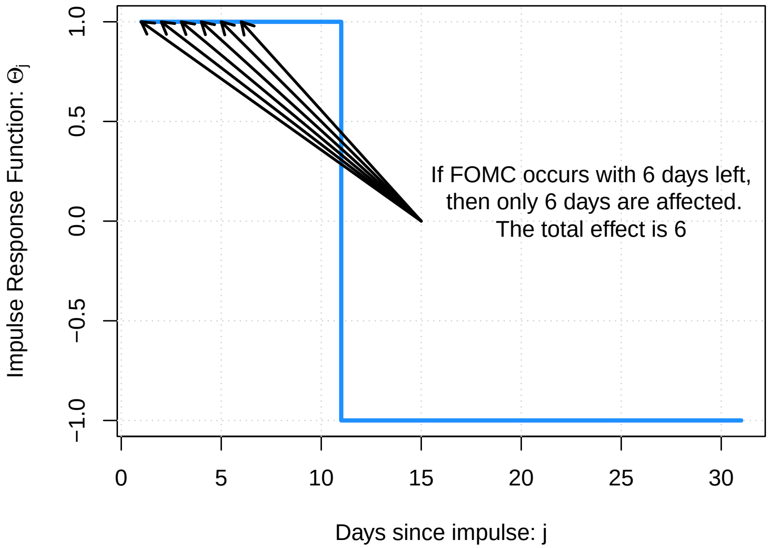

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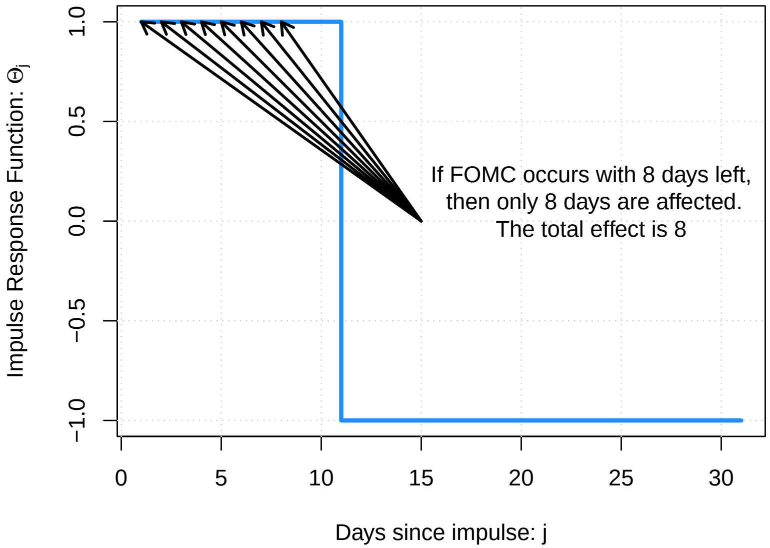

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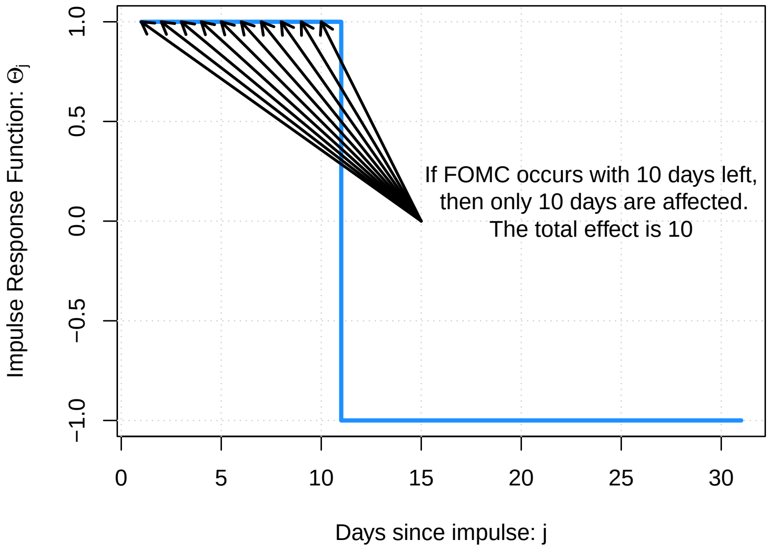

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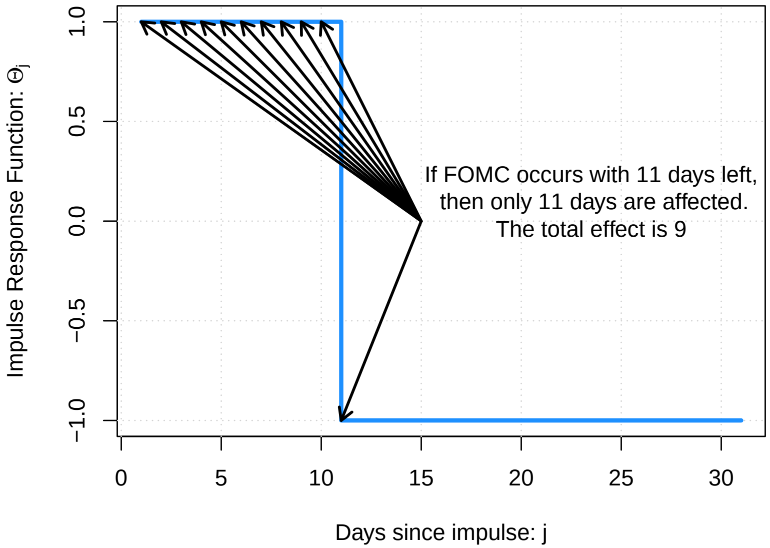

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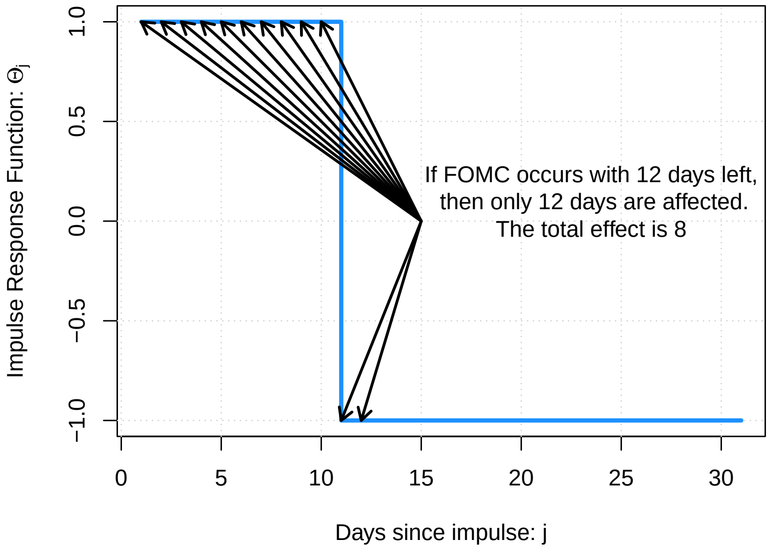

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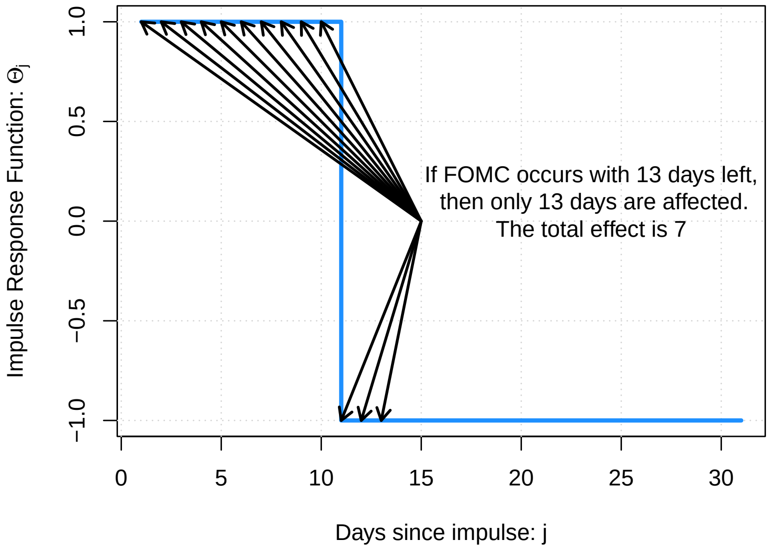

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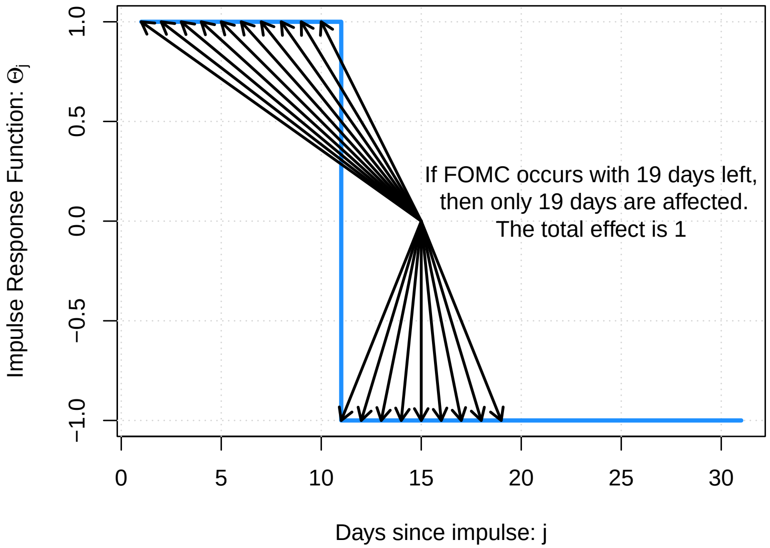

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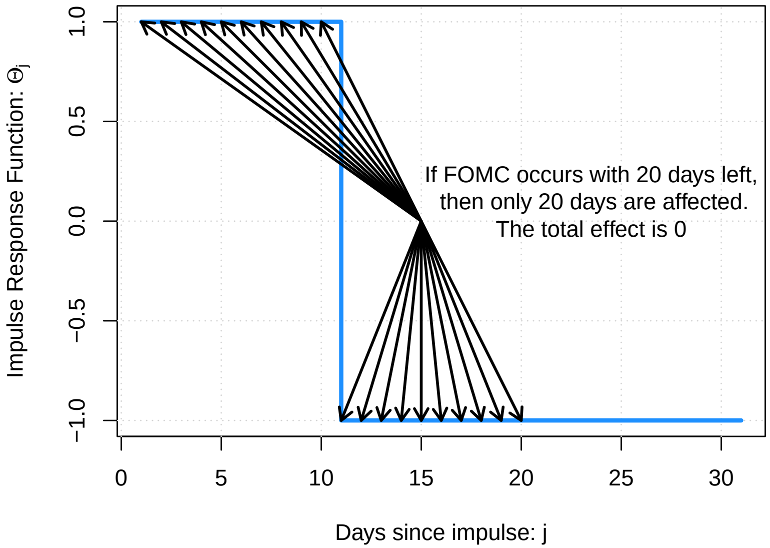

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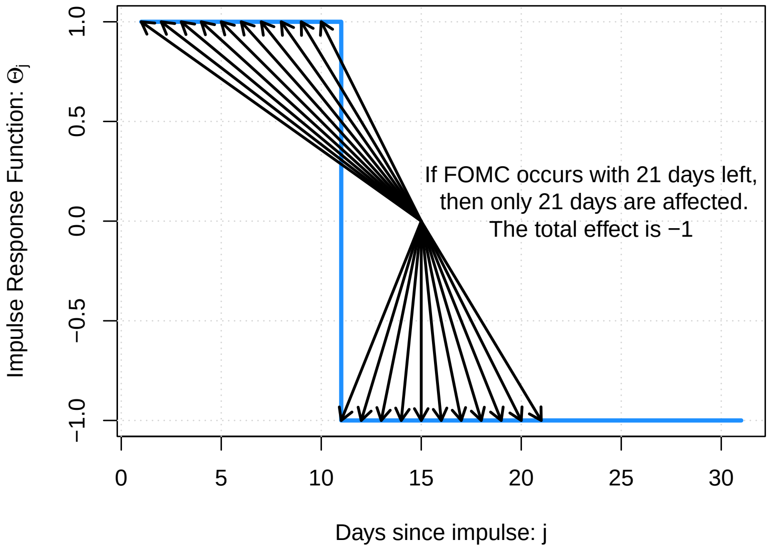

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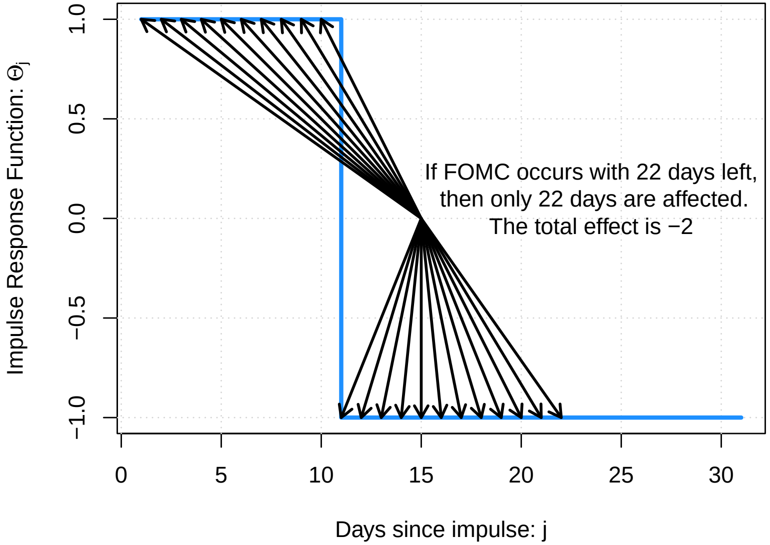

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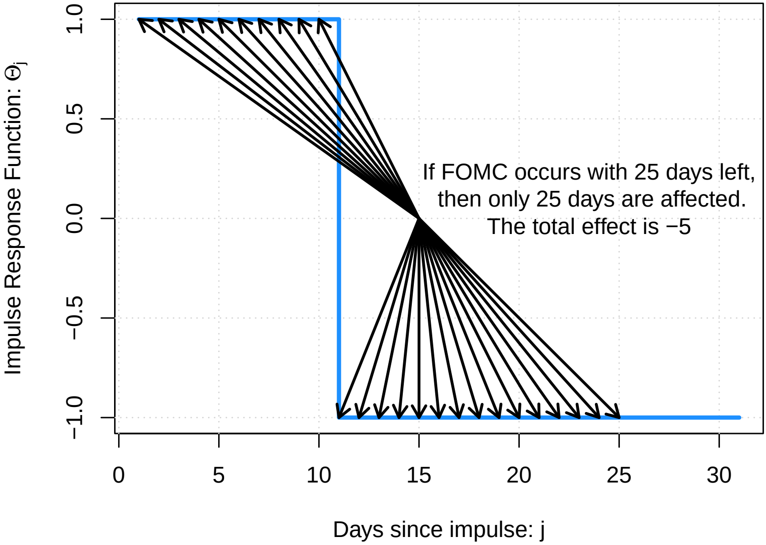

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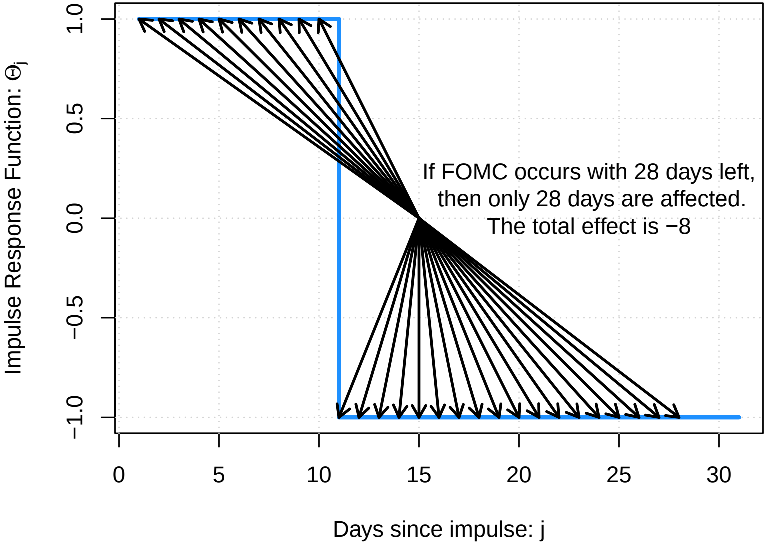

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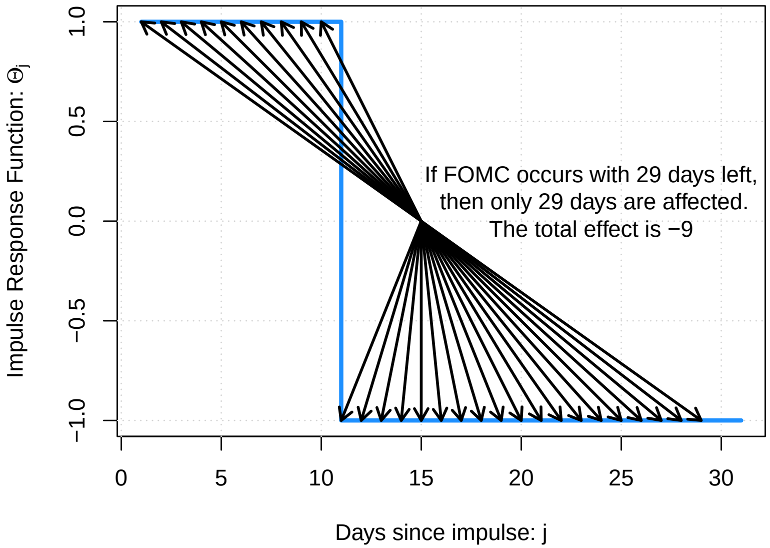

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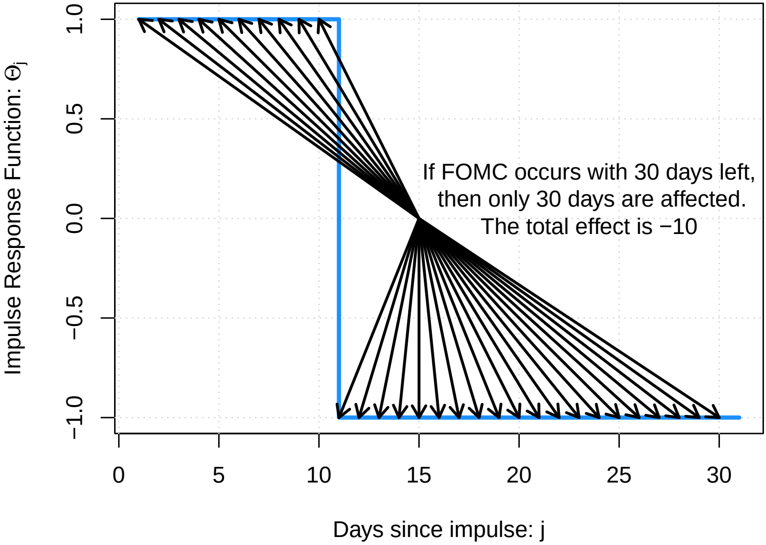

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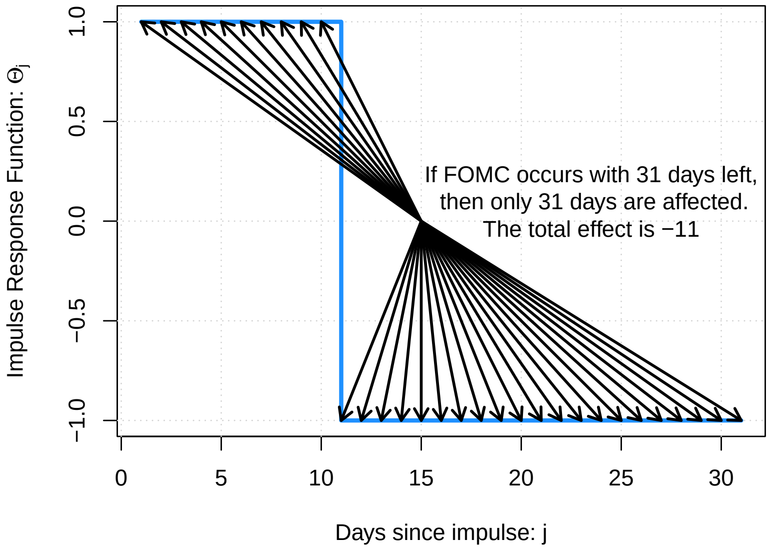
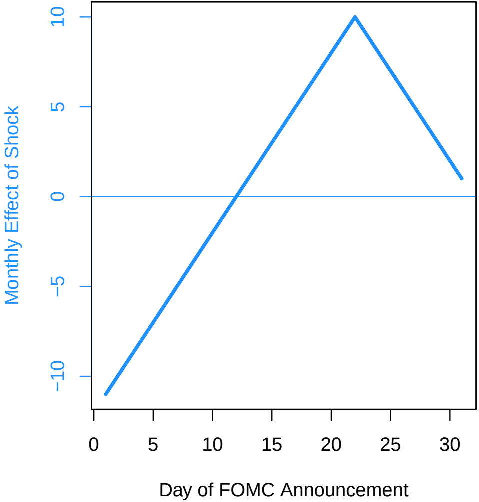


Aggregated IRF Depends on Announcement Day



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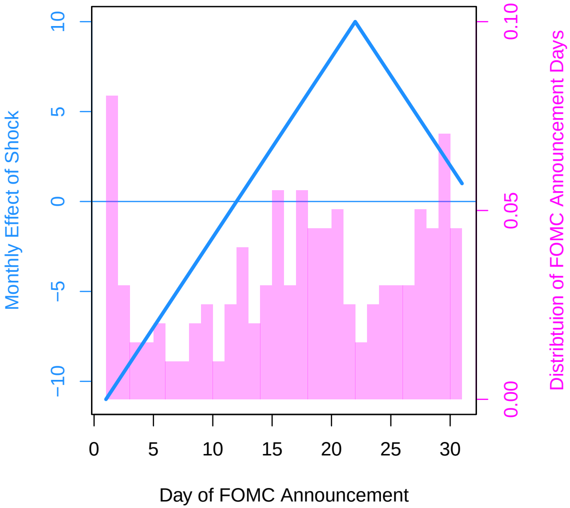


Weighted

3. Wishlist

Low-frequency (LF) data

- measures what we care about, but
- can be driven by myriad shocks—power problem.

High-frequency (HF) data

- solves power problem, but
- introduces measurement error (e.g. risk premia).
  (Cieslak and Schrimpf, 2019)

"Ideal" data is a HF measure of a LF counterpart.

I propose an approach in Acosta (2022) using text, but here's another idea:

3. Wishlist

- JMW's time series model explicitly links HF and LF data!
  (would be nice to see the posterior distribution)
- Could this explicit link help to recover direct, HF measure of inflation/GDP etc.?
- Idea: use model to filter measurement error in HF data.
- Estimation that loads on HF responses would be appealing
  (e.g. SMM using response of daily or intra-day data to HF MP shocks)

Conclude

- Everyone should read this before estimating response of LF object to HF object (an increasingly popular approach!)
- One big takeaway—take caution in examining *impact* response to HF shocks (e.g. one-month changes in macro expectations!)
- Looking forward to seeing more of the state-space model!

END

THANKS!

APPENDIX

References I

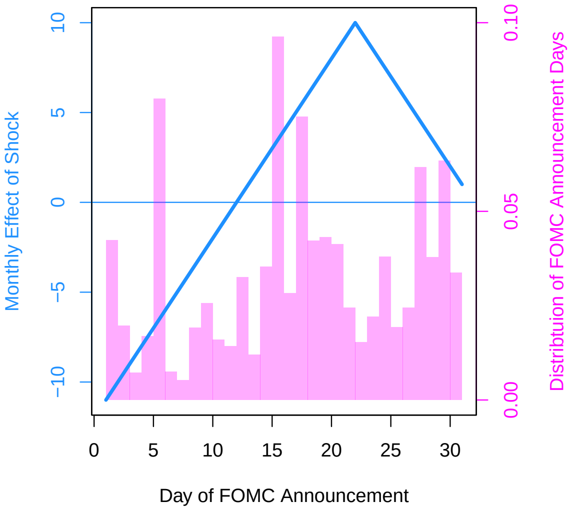
Acosta, Miguel, "The Perceived Causes of Monetary Policy Surprises," Technical Report, Working Paper 2022.

Cieslak, Anna and Andreas Schrimpf, "Non-monetary news in central bank communication," *Journal of International Economics*, 2019, *118*, 293 – 315.

Nakamura, Emi and Jón Steinsson, "High Frequency Identification of Monetary Non-Neutrality," *Quarterly Journal of Economics*, 2018, *133* (3), 1283–1330.

Ramey, Valerie A, "Macroeconomic shocks and their propagation," in "Handbook of macroeconomics," Vol. 2, Elsevier, 2016, pp. 71–162.

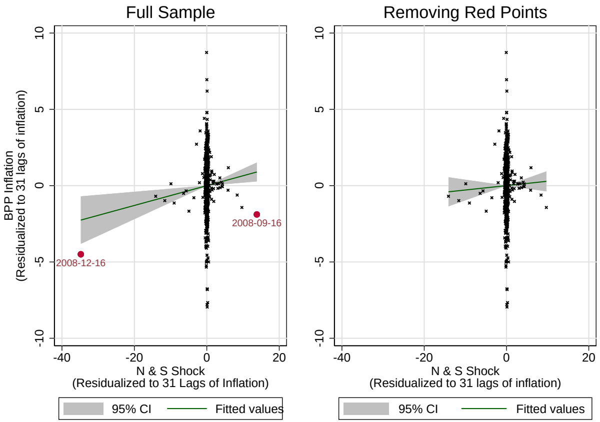
FOMC Day Distribution: Weighted by $|\varepsilon_t^m|$



back

1. Sample Period

$$\pi_t = \alpha + \beta \varepsilon_t^{\text{NS}} + \sum_{j=1}^{31} \pi_{t-j} + \xi_t$$



- $\pi_t = 1200 \left[\log \left(P_t^{\text{BPP}} \right) - \log \left(P_{t-31}^{\text{BPP}} \right) \right]$,
- P_t^{BPP} is the daily Billion Prices project price index
- $\varepsilon_t^{\text{NS}}$ is the Nakamura and Steinsson (2018) monetary policy shock back