Identifying Monetary Policy Shocks: A Natural Language Approach

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Paper Overview

- Research Question: Is NLP+ML helpful in identifying monetary policy shocks?
  - Monetary policymaking rule: $s_t = f(\Omega_t) + \epsilon_t$
  - Romer and Romer (2004): $\Delta i_t = \alpha + \beta i_{t-1} + \gamma X_t + \epsilon_t^{RR}$
    - Information set Ω_t: numerical forecasts (X_t)
    - Linear regression

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- Text Data
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  - × FOMC meeting minutes and transcripts $\leftarrow$ decision process rather than information set

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- Method
  - FOMC documents → Economic Concepts → Sentiment Indicators → Model Estimation
  - Ridge/LASSO regression

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Main findings

- Description of the new shock measurement
  - Better capture the systematic component of monetary policy R^2 $0.50 \rightarrow 0.76$
  - Main drivers: sentiment about broad real activity and international economic development, numerical forecasts of real activity
- Effects of the new shock measurement
  - BVAR analysis: consistent with theoretical concensus

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A lot to like

- Important and innovative: NLP+ML $\rightarrow$ "pure" monetary policy shocks
- Enormous data work
- Results already very rich and robust

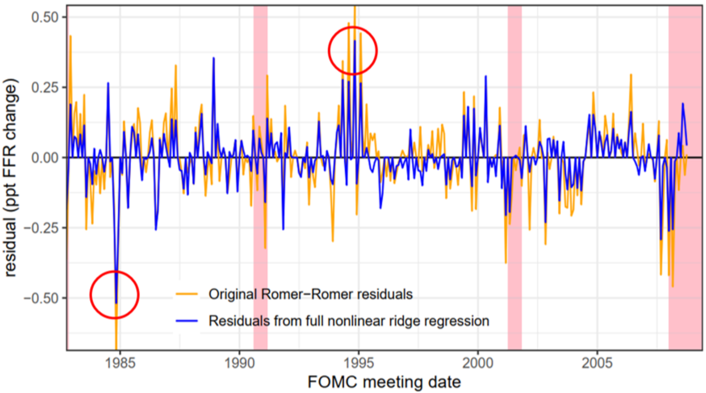
When the shock is large

- Nov 1984, FOMC participants' views about the economy differ from that of the Fed staffs'
- Nov 1994, "behind the curve", "ahead of general expectation"

⇒ Uncertainty

⇒ Non "pure" shocks: information effect, forward guidance, large-scale asset purchase

Figure 4: ESTIMATED MONETARY POLICY SHOCKS



Comment 1: Uncertainty

- The unsystematic surprises could be larger when uncertainty is higher
- Baker-Bloom-Davis and Husted-Rogers-Sun monetary policy uncertainty index

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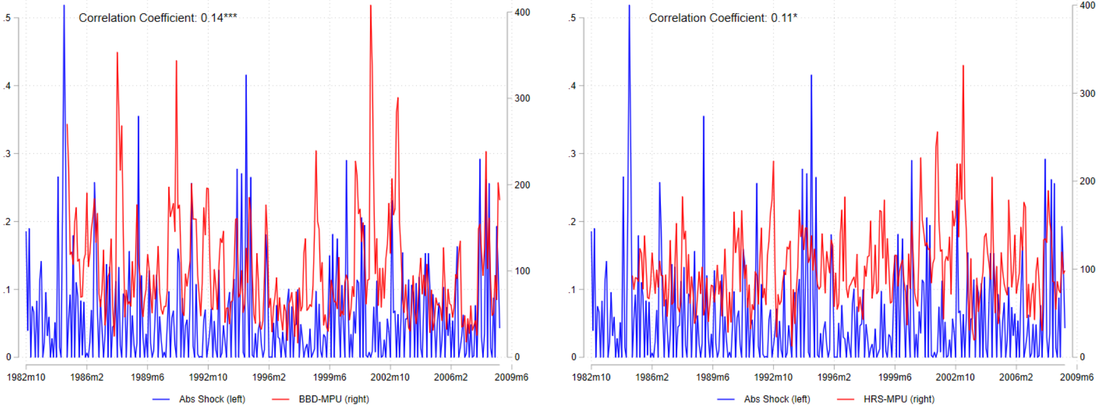

Comment 1: Uncertainty

- Significant correlation coefficients between larger surprises and uncertainty

Suggestion

- Second moment of sentiment
- NLP for uncertainty and account for it in the model
- Compare the increase in R^2 in periods with low and high uncertainty

Comment 2: Non "pure" shocks

1. Information effect
   - Fed: $s_t = f(\Omega_t^m, \Omega_t^f) + \epsilon_t$, say $f(\Omega_t^m) + g(\Omega_t^f) + \epsilon_t$
   - The method in this paper can produce a cleaner measure of ϵ_t
   - But market reacts to $g(\Omega_t^f) + \epsilon_t$, information effect matters in the full responses

Suggestion

- Can construct Ω_t^m and separate information effect and "pure" shock
  - Among the variables in numerical forecasts, use market consensus
  - Difference between Fed staff forecasts and market consensus
- Further, can even measure market sentiment and find the difference with Fed sentiment
- Show time series of this measurement and HF measurement

Comment 2: Non "pure" shocks

2. Forward guidance
   - "ahead of general expectation", guide future course of FFR
   - Fed: $s_t = f(\Omega_t^m) + g(\Omega_t^f) + \Gamma^{FG} + \epsilon_t$
   - Market reacts to $g(\Omega_t^f) + \Gamma^{FG} + \epsilon_t$

Suggestion

- Can identify forward guidance from the FOMC meeting minutes based on textual analysis
- Show the IRF separately to "pure" shock, information effect, and forward guidance

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3. Large-scale asset purchase
   - Less concern in the pre-2008M10 sample
   - But matters in the BVAR covering through 2016

Suggestion

- Show results limiting the BVAR analysis to the same pre-2008M10 sample
- Show results using the new measurement but the same periods as Romer and Romer (2004)

Conclusion

- A very nice application of NLP+ML on monetary policy shock identification!
- Important for evaluating and guiding policymaking
- Tons of possibilities
- Good luck with the paper!