

Deciphering Federal Reserve Communication via Text Analysis of Alternative FOMC Statements

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[†] The views expressed herein are those of the authors and do not represent the views of the Federal Reserve Bank of Kansas City or the Federal Reserve System.

ABSTRACT

We apply a natural language processing algorithm to FOMC statements to construct a new measure of monetary policy stance, including the tone and novelty of a policy statement. We exploit cross-sectional variations across alternative FOMC statements to identify the tone (for example, dovish or hawkish) and contrast the current and previous FOMC statements released after Committee meetings to identify the novelty of the announcement. We then use high-frequency bond prices to compute the surprise component of the monetary policy stance. Our text-based estimates of monetary policy surprises are not sensitive to the choice of bond maturities used in estimation, are highly correlated with forward guidance shocks in the literature, and are associated with lower stock returns after unexpected policy tightening. The key advantage of our approach is that we are able to conduct a counterfactual policy evaluation by replacing the released statement with an alternative statement, allowing us to perform a more detailed investigation at the sentence and paragraph level.

TEXT-BASED ANALYSIS OF FOMC COMMUNICATION

- Communication on the future policy stance is a standard toolkit for policymakers.
- **Dominant Approach:** Back out unexpected information in communication from solely on the high-frequency responses of interest rates. (bond market response → text shock)
- **Our Approach:** Leveraging the natural language processing (NLP) tool, we quantify the impact of different wording on the perceived monetary policy stance.
- Using the NLP, we quantify the semantic differences among multiple texts.
- Our approach allows us to assess the impact of alternative “counterfactual” language in FOMC communication.

CONSTRUCTION OF MONETARY POLICY SURPRISES FROM FOMC STATEMENTS

- Text-based monetary policy stance (mp) tilt: novelty \times tone.
- Novelty: $1 - \text{similarity}$ between statements released after two consecutive meetings.
- Tone: sign of $|mp_t - mp_{t-1}|$

$$\begin{aligned} \text{Sign}(|mp_{A,t} - mp_{t-1}|) &= -1, \\ \text{Sign}(|mp_{C,t} - mp_{t-1}|) &= 1, \end{aligned}$$

$$mp_t = \underbrace{(1 - \text{Sim}(FOMC_t, FOMC_{t-1}))}_{\text{Novelty}} \underbrace{\left(\frac{\text{Sim}(FOMC_t, FOMC_{C,t}) - \text{Sim}(FOMC_t, FOMC_{A,t})}{1 - \text{Sim}(FOMC_{A,t}, FOMC_{C,t})} \right)}_{\text{Tone}} \quad (1)$$

- $E_{t-\delta}(mp_t - mp_{t-1})$: Market expectations of the change in the intended policy stance (mp_t) prior to the meeting.

$$E_{t-\delta}(mp_t - mp_{t-1}) = -p_t |mp_t - mp_{t-1}| + (1 - p_t) |mp_t - mp_{t-1}| \quad (2)$$

- Asset prices respond to surprises in monetary policy tilt ($mp_t - mp_{t-1} - E_{t-\delta}(mp_t - mp_{t-1})$).

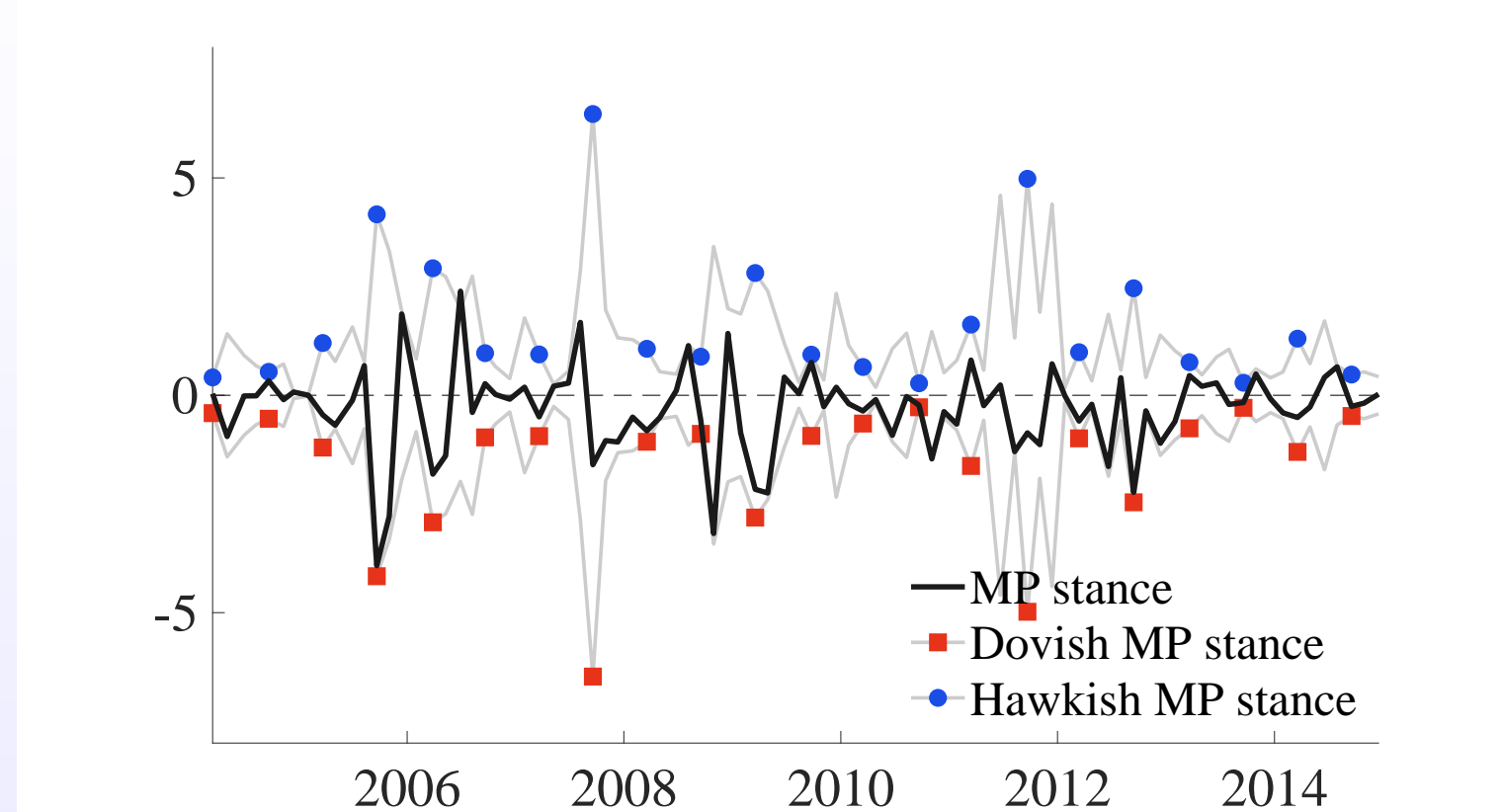
UNDERLYING ASSUMPTIONS ON THE TEXT-BASED MEASURE OF MONETARY POLICY STANCE

- Dissimilarity between the previous FOMC statement and the current FOMC statement captures the magnitude of monetary policy stance tilt.
- The sign of change is identified by using alternative FOMC statements (dovish alternative: Alt A, hawkish alternative: Alt C), making the labeled datasets.
- High-frequency financial market data are used to back out **surprises** in monetary policy stance tilt.

MAIN FINDINGS

- Alternative statements are useful for identifying the tone of the released statement ($\text{Sign}(|mp_{A,t} - mp_{t-1}|) \leq \text{Sign}(|mp_t - mp_{t-1}|) \leq \text{Sign}(|mp_{C,t} - mp_{t-1}|)$).
- Monetary policy surprises identified by text analysis of alternative FOMC statements are highly correlated with forward guidance shocks in the literature.
- The counterfactual analysis: if the explicit time-based language (“at least through the mid-2012”) had replaced the vague language (“for an extended period”) in the Dec. 2010 FOMC statement, stock prices would have increased by 0.7%.

ESTIMATES OF MONETARY POLICY STANCE TILT



ESTIMATES OF MONETARY POLICY SURPRISE

