The Life-Cycle of Policy Expectations

Sylvérie Herbert* Paul Hubert† Mathias Lé‡

January 7, 2025

*** VERY PRELIMINARY - DO NOT CIRCULATE ***

Abstract

This paper examines the adjustments on FOMC announcement days in policy rate expectations across maturities, emphasizing the role of news about the Fed's future policy path. Using a novel classification framework, we identify meetings with distinct shapes of policy expectation adjustments based on the interplay between current decision and future policy signals, and investigate their implications for the transmission of monetary policy. First, we show that "reversal" statements — where signals about the current and future policy stance conflict and signals about the future dominate — drive most, if not all, of the effect of monetary policy to medium- to long-term interest rates. In contrast, surprises with consistent signals affect short-term rates, stock prices and risk measures. Second, these effect on long-term rates appears driven by investors learning about the central bank reaction function.

JEL classification: E43, E52, E58, G12.
Keywords: Monetary policy surprises, Identification, Term structure, Signaling.

*Banque de France. Email: sylverie.herbert@banque-france.fr.
†Banque de France and SciencesPo - OFCE. Email: paul.hubert@sciencespo.fr.
‡Banque de France. Email: mathias.le@banque-france.fr.

We thank Adrien Auclert, Michael Bauer, Luigi Bocola, Refet Gürkaynak, Marek Jarocinski, Oscar Jorda, Monika Piazzesi, Valerie Ramey, Giovanni Ricco, Martin Schneider, Mauricio Ulate, Johannes Wieland and Jonathan Wright for very helpful discussions. We also thank participants at the San Francisco Fed seminar, Stanford internal macro seminar and the 2024 Empirical Monetary Economics workshop. A large part of this research was conducted while Paul Hubert was visiting Stanford University, whose hospitality is gratefully acknowledged. The views expressed in this paper represent those of the authors and not necessarily those of the Banque de France, the ECB or the Eurosystem.

1 Introduction

Monetary policy announcements are pivotal events that often generate surprises in asset prices, and which can convey information at different horizons. The resulting monetary policy surprises (MPS henceforth) are multidimensional: they can arise not just from the announced policy stance but also from investors' interpretation of central bank signals on the future policy path, and/or shifts in their expectations of broader economic and financial conditions.[1] Each underlying source of news on policy announcement days has a different impact on future policy rate expectations at different horizons, implying a different shape in expectations adjustments. In this paper, we examine how the shape of the adjustment in policy rate expectations across maturities on announcement days affects the transmission of monetary policy to asset prices, and how it can affect the following intermeeting period adjustments.

To characterize the shape of adjustments in policy rate expectations, we focus on the interplay between signals about the present and future monetary policy stance. We build on the framework of Gürkaynak, Sack, and Swanson (2005a) (GSS2005 henceforth) which decompose the MPS associated with a policy announcement into the current decision surprise, the *target* factor, and the future policy path surprise, the *path* factor. We use these two factors to classify Federal Open Market Committee (FOMC) meetings into distinct categories based on two dimensions. First, we consider the *sign* of the signals, *i.e.* whether both factors move in the *same* or *opposite* directions. This indicates whether path and target factors send *consistent* or *conflicting* signals. Second, we categorize meetings according to the *magnitude* of these signals, *i.e.* whether the path factor *is larger* than the target factor (in absolute value), and conversely. This indicates whether the signal about the future path of monetary policy *dominates* the signal about the current monetary policy stance. Based on the GSS2005 decomposition within meetings, we thus provide a classification across meetings that distinguishes announcements that bear relevant information for the future.

Using a standard event-study approach, we estimate the effects of state-of-the-art monetary policy surprises from Bauer and Swanson (2023b) on stock prices, nominal yields and risk measures. Our dataset spans US monetary policy announcements from 1999 to 2022, covering 188 statements. Without any classification of meetings, we replicate the standard response of asset prices to monetary policy surprises. It is worth stressing the low explanatory power of these regressions, although FOMC announcements are one of the major events for these asset prices. Once we examine the heterogeneous transmission of monetary policy surprises to asset prices according to our classification based the *sign* and *magnitude* of target/path factors, a key finding stands out: the identification of the MPS effects comes from two distinct subsets of statements.

On one hand, the standard response of stock prices, short-term interest rates and risk measures comes from the subset of *consistent* MPS where target and path have the same sign. On the other hand, the response of medium- to long-term interest rates to MPS comes from a subset of MPS where path and target not only send *conflicting* signals (they have opposite signs) but the signals about the future dominates that of the present. Said differently, the path factor is larger than the

[1] It may include the revelation of some private information of the central bank as in Romer and Romer (2000), Ellingsen and Söderström (2001) and Campbell, Evans, Fisher, and Justiniano (2012), perceptions about the risk premium as in Bernanke and Kuttner (2005) or Hanson and Stein (2015) or about the central bank reaction function as in Bauer, Pflueger, and Sunderam (2024) or Bocola, Dovis, Jørgensen, and Kirpalani (2024).

target surprise and reverses the signal about the current decision. In fact, we find that all the positive and significant responses of (long-term) interest rates to MPS come from this subset of "reversal" statements. Not only are the estimated elasticities for this subset of reversal statements several times larger than for those of non-reversal statements, but its explanatory power (the share of total variance in short- and long-term interest rates explained by MPS) is also much higher for reversal statements than for non-reversal statements.

These reversal statements – representing one third of the sample – appear to be uniquely informative about the future stance of monetary policy. The classification of statements according to the sign and magnitude of target and path factors enable to precisely distinguish announcements about the future. In contrast, target and path factors differentiate announcements about the present but have less power in identifying announcements that provide key information for the future which are arguably key for most economic decisions. We thus show that the shape of policy rate expectation adjustments plays a critical role for the transmission of monetary policy.

Our results hold in several alternative settings. We test various MPS measures, including those of Nakamura and Steinsson (2018), Bauer and Swanson (2023a) that are not corrected for the Fed's response to news, Jarociński and Karadi (2020) that are purged of central bank information shocks, or the original ones from Gürkaynak et al. (2005a). Our results are also robust to an alternative definition of reversal statements. In particular, it is also possible to isolate a subset of reversal statements from the series of Nakamura and Steinsson (2018) or Swanson (2021). This alternative subset of reversal statements does not perfectly match the subset of reversal statements identified using the target and the path factors from Gürkaynak et al. (2005a), but continues to identify statements that are highly informative for long-term interest rates.

We also control for a large number of potential confounding factors. It is possible that, in identifying reversal statements, we are identifying statements with some other dimension that may be driving the response of long-term interest rates. For example, monetary policy uncertainty or unconventional policy announcements, such as forward guidance with its high information content about the future, may well drive the effect of reversals. Similarly, statements can be accompanied by a press conference or the publication of the Summary of Economic Projections, which can also determine the response of long-term interest rates. Finally, we check that the key role of reversal statements in the transmission to long-term interest rates is not the sole effect of a large path factor. Indeed, our definition of reversal statements is likely to select statements with a large path component, and we want to make sure that our finding is not just explained by a higher elasticity associated with a large path factor. We find that none of these confounding factors explain the strong effects of reversal statements on interest rates, highlighting the unique role of these reversal statements.

Having identified these reversal statements, highly informative about the future, our second key contribution is to understand the underlying nature of the news conveyed by these reversal statements. In particular, we decompose the responses of nominal interest rates into their expectation hypothesis and term premium components, as well as into real interest rates and inflation compensation. Our analysis aims to distinguish several fundamentally different types of news which should affect interest rates components differently, in a similar spirit as Cieslak and Pang

(2021). Our analysis reveals a second key finding, suggesting that the effect of reversal statements on asset prices is more consistent with an underlying news about the central bank reaction function. Indeed, we observe a significant and positive impact on the 5-year and 10-year nominal yields, but no impact on equity valuations or the VIX. This excludes a potential risk premium channel. Further decomposition of nominal interest rates into the expectation hypothesis and the term premium which shows that it is the expectation of future short-term interest rates, rather than the risk premium, that responds to reversal statements, consistent with the precedent finding. The decomposition into a real component and an inflation compensation further shows an impact on real interest rates, suggesting that markets are revising their perception of the inflation target in the reaction function rather than the central bank's response to economic activity.

We then explore whether the content of monetary surprises also affects the following intermeeting period. We analyze market dynamics and the intensity of adjustments to policy rate expectations – as measured by Eurodollar futures – in the intermeeting period following a reversal statement. Given the high information content of reversal statements about the future stance, the need for information acquisition in the subsequent intermeeting period is likely to be reduced. Our third key results are consistent with this view: following a reversal statement, the volatility of policy rate expectations over the subsequent intermeeting period decreases markedly at all horizons and the daily impact of economic data releases on policy rate expectations is reduced. In addition, the sensitivity of 5-year interest rates (and their decompositions) to these policy rate expectations is also reduced after reversals. In other words, we observe less adjustment in policy rate expectations following reversal statements. Overall, our results support the hypothesis that reversal statements are highly informative about the future stance of monetary policy, *i.e.* they have a strong forward-looking component – and accordingly, we observe a less intense information acquisition in the subsequent intermeeting period.

Our findings have significant implications for state-dependent and time-varying analyses of monetary policy. The distinct subsets of announcements imply differential impacts on asset prices, highlighting the importance of considering the shape of policy rate expectation adjustments when evaluating the transmission of monetary policy. Models should allow for changing sensitivities of long-term yield responses to MPS for instance as a function of whether signals are future-oriented as in reversals. These insights are also relevant for calibrating macroeconomic models, depending on the targeted variable, stock prices versus long-term interest rates for instance, as they react differently across subsamples.

There is a prolific literature on the identification of monetary policy shocks (see Ramey 2016 for a comprehensive review). Gürkaynak et al. (2005a) first documented the dual dimensions of FOMC statements across present and future policy signals. Not only do policy announcements contain monetary news, but they have also been shown to contain central bank information effects (Nakamura and Steinsson 2018, Cieslak and Schrimpf 2019, Jarociński and Karadi 2020, Miranda-Agrippino and Ricco 2021), or in contrast, to be contaminated by the Fed reaction to news (Bauer and Swanson (2023a)). Gürkaynak, Kısacıkoğlu, and Wright (2020) focus on potentially missing information from asset price responses, while Handlan (2022), Acosta (2024) and Aruoba and Drechsel (2024) augment with textual analysis the measure of monetary policy surprises. Boehm and Kroner (2024) uses equity prices and exchange rates to complement the identification of mon-

etary policy surprises.

Our paper highlights a novel kind of identification issues with the state-of-the-art monetary surprises: we show that the effect on long-term rates is driven by a subset of FOMC meetings where the signals are future-dominated relative to present news. Our work is related to Gürkaynak, Sack, and Swanson (2005b), Gürkaynak, Sack, and Wright (2007) and Hillenbrand (2024) that stress the importance of monetary policy for long-term interest rates, but alose to Neuhierl and Weber (2019) and Lunsford (2020) that show the role of future signals for the transmission of monetary policy.

Our paper also speaks to the literature on central bank communication, in particular studying the effect of speeches, and the impact of economic data news on markets. We explore how reversal statements impact market dynamics and information acquisition in the next inter-meeting period. Cieslak, Morse, and Vissing-Jorgensen (2019) focus on the role of informal information flowing from the Fed to asset markets, while Cieslak and McMahon (2023) focus on the effect of policy announcements on the intermeeting dynamics. Compared to them, we emphasize the differential impact of speeches and data releases depending on whether the preceding statement was a reversal. While Gilbert, Scotti, Strasser, and Vega (2017) show timeliness and relation to fundamentals explain the differential impact of data releases, we show that the impact of data (information acquisition) depends on the forward-looking-ness of the statement preceding the inter-meeting. Reversal statements acting as a strong information transfer, they reduce the need for subsequent adjustments and dampen market sensitivity to new information.

Section 2 presents our framework and categorization of statements, while the following Section 3 documents how the shape of policy adjustments affects the transmission of monetary policy. Section 4 explore the information content in reversal statements. We explore the effect of reversal statements on the next inter-meeting in Section 5. Section 6 concludes.

2 The life-cycle of policy rate expectations along the term structure

Over the past thirty years, a rich literature has emerged on the measurement and identification of monetary policy shocks. Notably, we have seen a move from narrative approaches (Romer and Romer, 2000) to high-frequency approaches to mitigate important endogenous concerns (Cook and Hahn, 1989, Kuttner, 2001, Cochrane and Piazzesi, 2002). However, it comes at the cost of reduced statistical power.

In a seminal paper, Gürkaynak et al. (2005a) have shown that the effects of monetary policy on asset prices can be adequately characterized by two – and only two – factors: the *target* factor and the *path* factor. After performing a suitable rotation, they offer a structural interpretation of these unobserved factors: the *target* factor corresponds to surprise changes in the *current* Federal Fund Rate (FFR thereafter) target while the *path* factor corresponds to changes in the *future* path of monetary policy over the coming year. In other words, the target factor captures news about the *present* stance while the path factor captures news about the *future* stance. By construction, the changes in the future path are independent of the changes in the current FFR. Importantly, the *path* and the *target* factors can be viewed as shocks to the *level* and the *slope* components in factor

decompositions of the yield curve, respectively.

2.1 The term structure of policy rate expectations: a stylized graphical representation

It is important to understand the different implications of the target and path factors for policy rate expectations, depending on the horizon considered. To this end, we use a very stylized graphical representation to illustrate how both target and path factors should affect the term structure of policy rate expectations.

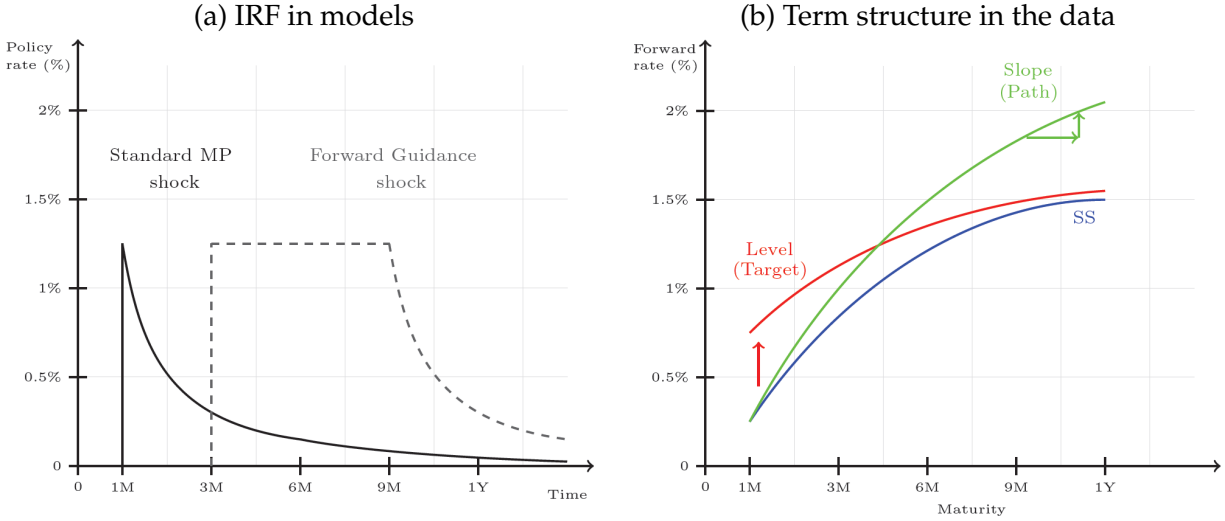
Figure 1 (a) shows the impulse response function (IRF) of the policy interest rate following a restrictive monetary policy shock (MP shock thereafter) in the models. The black, solid curve represents a standard, restrictive MP shock. The grey dashed curve represents a typical, restrictive forward guidance shock, *i.e.* a shock to interest rates at future horizons. Compared with a standard MP shock, a forward guidance shock causes the policy rates to rise at a later horizon, stagnate at that level for the duration of the forward guidance, and then decline more slowly.

Figure 1(b) shows a schematic representation of the term structure of the forward interest rates. The blue curve shows the steady-state (SS) term structure of interest rate expectations. The red curve shows the term structure of expectations following a shock to the *target* factor alone. The restrictive surprise to the current FFR materializes as an immediate increase in the *level* of the current short-term interest rates. Given the relative persistence of monetary policy decisions/shocks, medium-term interest rate expectations also rise slightly, but by a smaller amount, to eventually approach the SS.

The green curve shows the term structure of expectations following a shock to the *path* factor only. We can see that, in the absence of a target surprise, expectations of the current interest rate do not change, but expectations of future short-term rates increase. The two green arrows materialize a restrictive *path* factor as a *steepening* of the policy rate expectations curve. For what comes next, it is important to note that in this example the path and target factors move in the same restrictive direction.

The influential decomposition proposed by Gürkaynak et al. (2005a) suggests that policy statements potentially convey information about the *level* and *slope* of the term structure of policy rates. In the schematic representation plotted in Figure 1, we have considered both separately. Following an MP statement, any information relevant to the current stance of the monetary policy (the *target* factor) will mainly affect the policy rate expectations at short horizons, reflecting news about the *present*. Conversely, any information about future policy rates for the coming quarters without affecting the current FFR (*i.e.* the *path* factor) should mainly affect policy rate expectations at longer horizons, leaving the current policy rate expectation unchanged, as this reflects news about the *future* stance of monetary policy. In practice, both may happen simultaneously, with the overall effect on the term structure depending on whether the composition of the news is about the present or the future.

Figure 1: A schematic illustration of policy rate expectations at different horizons



Note: Figure (a) on the left plots the IRF of the policy rate following a monetary policy shock. It represents (i) a *standard monetary policy shock* (solid black line) and (ii) a *typical forward guidance shock* (dashed grey line). Figure (b) on the right plots the term structure of the forward rate. It shows the steady state (SS) term structure (blue line) as well as the deviation from this steady state following (i) a *target* monetary policy shock and (ii) a *path* monetary policy shock as in Gürkaynak et al. (2005a). A target shock affects the *level* of the forward rate term structure, while a path shock affects the *slope* of that term structure.

2.2 Policy rate expectations and monetary policy surprises in the data

We have just examined what the different effects of the target and path factors on the term structure of policy rate expectations would be conceptually. We now want to evaluate what these effects are empirically. For this purpose, we examine in the data how path and target surprises co-move with the policy rate expectations at different horizons.

Measuring policy rate expectations. It is standard practice in the literature to measure changes in policy rate expectations using movements in federal funds futures rates across different horizons (Nakamura and Steinsson, 2018, Bauer and Swanson, 2023a). A Fed funds futures contract reflects the market's consensus about the average daily effective federal funds rate (EFFR) for a given calendar month, as reported by the Federal Reserve Bank of New York. The price of a Fed funds futures contract is directly tied to this expected rate, with its value inversely related to the implied interest rate. Most of the papers in the literature rely on the current-month and three-month-ahead federal funds futures contracts[2] – labelled FF1 to FF3 – and on the one- to four-quarter-ahead Eurodollar futures contracts – labelled ED1 to ED4 – to assess changes in policy rate expectations. We follow the latter and rely on FF1, ED1-ED4.

Measuring monetary policy surprises. Once we have obtained those series of futures rates, it is relatively straightforward to build monetary policy surprises. Kuttner (2001) pioneered this literature using data from the futures market for Federal funds to separate changes in the target funds rate into anticipated and unanticipated components after an FOMC announcement. These contracts are particularly useful for distinguishing between anticipated and unanticipated changes in

[2]Importantly, the federal funds futures contracts include a scaling adjustment to account for the timing of FOMC meetings within the month.

the Fed's policy rate. Anticipated changes are already embedded in futures prices based on the Fed's communications and economic data. However, if the Fed's actual decision differs from what is implied by the futures, this discrepancy represents an unanticipated change, referred to as the MPS. Gürkaynak et al. (2005a) went one step further by taking the first and the second principal component of various policy rate expectations measures to decompose MPS into a path and a target component as explained previously.

Alternatively, Nakamura and Steinsson (2018) construct a pure monetary shocks (*FF shock* thereafter) using unexpected changes in interest rates over a 30-minute window surrounding scheduled Federal Reserve announcements. They also compute a composite measure of changes in interest rates at different maturities (*News shock* thereafter) spanning the first year of the term structure in the spirit of Gürkaynak et al. (2005a). Jarociński and Karadi (2020) proposed to decompose MPS into pure monetary shocks and information shocks, depending on whether stock prices move in the opposite direction or same direction as interest rates, respectively.

More recently, Bauer and Swanson (2023a) propose an improved measure of MPS. Compared to raw MPS – based on the 30-minute changes in money market futures rates around the FOMC announcements – these *news-adjusted MPS* are "orthogonalized" with respect to publicly available information before the announcements. Basically, these orthogonalized surprises are "cleaned" of predictable variations, and therefore are better measures of the new information about monetary policy conveyed by the policy announcement.

In this paper, we focus on monetary policy announcements following the 188 (scheduled) FOMC meetings that took place between 1999 and 2022. We use the target and path measures to characterize each policy announcement along two dimensions. For this purpose, we use the updated series of these path and target factors estimated by Acosta, Brennan, and Jacobson (2024). However, in order to measure the (overall) monetary policy surprises associated with each policy announcement, we prefer to use what now appears to be the state of the art MPS: the *news-adjusted* MPS from Bauer and Swanson (2023a).

2.3 The term structure of policy rate expectations in the data

In this section, we examine how policy rate expectations vary along the term structure following a policy announcement. Specifically, for each policy announcement or FOMC meeting t, we run the following regression on each of the k federal funds/eurodollar futures contracts F_t^k used to construct the path and the target factors (FF1, ED1, ED2, ED3 and ED4):

$$\Delta F_t^k = \alpha + \beta_{MPS} \cdot MPS_t + \epsilon_t \tag{1}$$

We then run the same regression using the *path* and *target* components:

$$\begin{cases} \Delta F_t^k = \alpha + \beta_P \cdot Path_t + \epsilon_t \\ \Delta F_t^k = \alpha + \beta_T \cdot Target_t + \epsilon_t \end{cases} \tag{2}$$

Given that the path and target factors are estimated through principal components analysis using those federal funds futures contracts F_t^k, we can see the various estimated $\hat{\beta}$ as pseudo *factor*

loadings. An estimate closer to 1 indicates a higher association between the observed variable and the factor considered.

We start by estimating equation 2 using both the total MPS – path and target components – from Gürkaynak et al. (2005a) and the *news-adjusted* MPS from Bauer and Swanson (2023a). We plot the estimated pseudo factor loading of both MPS measures on various policy rate expectations in the Figure 2(a). In these figures, the shaded bars correspond to confidence intervals of 1 and 2 standard errors respectively.

We can observe that the shape of those pseudo factor loadings across maturity is very similar from one MPS measurement to another. The loading associated with the federal funds future contracts at a horizon of one-month (FF1) is very small, almost null.[3] However, the loadings associated with the four Eurodollar futures contracts ED1 to ED4 are much higher and fluctuate around 1.

In Figure 2(b), we now plot the pseudo factor loadings associated with the target and the path factors from Gürkaynak et al. (2005a). These loadings help quantify how much of a change in policy rate expectations can be attributed to changes in the current policy rate – the target factor – versus expectations about future policy rates – the path factor. What do we learn ? First, we observe that the target factor (in red) influences the policy stance of the current month, with quite strong loadings on ED1 and declining but significant loadings at longer horizon (ED2 to ED4). On the other hand, looking at the loadings associated with the path factor (in green), we see no relationship at all with the current month's stance but strong, significant and slightly increasing loadings as we move to longer horizons.

In summary, the Figures 2 convey three important messages. First, the shape of the pseudo factor loadings across different maturities is similar across monetary policy surprises. Second, the pseudo factor loadings of the target and the path factors discriminate well between news about the current monetary policy stance (FF1). Third, and in contrast, the pseudo factor loadings of the target and path factors do not discriminate well between monetary policy signals about the future policy path (ED1 to ED4).

2.4 Two dimensions for classifying changes in the term structure

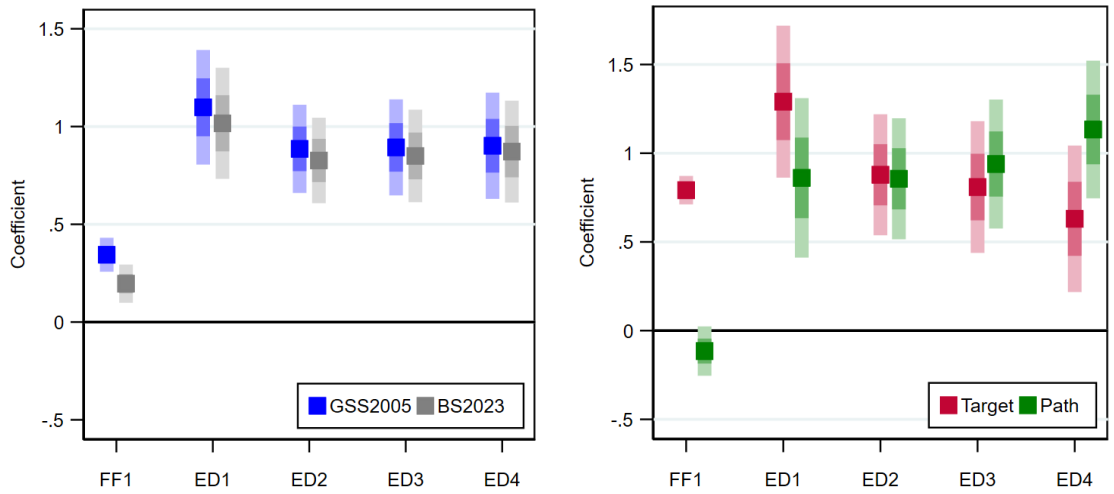
In this section, we characterize the life cycle of policy rate expectations (across maturities) on policy announcement days, relying on the duality between surprises about the current stance and surprises about the (short-term) future stance on these announcement days.

As aforementioned, a given policy announcement can be composed of both a target factor (related to unexpected change in the current target for the FFR, hence news about current monetary policy), and a path factor capturing information affecting the expected path of monetary policy in coming months (news about future(short-term rates). Hence, we leverage on this decomposition of the MPS to propose a novel, very simple but powerful classification of the MPS associated with

[3] If we had plotted the "true" *factor loadings* coming from the principal component analysis of Gürkaynak et al. (2005a) – including the suitable rotation needed to give a structural interpretation of this factor –, the factor loading associated with the FF1 would be a true zero.

Figure 2: Correlation with policy rate expectations at different maturities

(a) Standard MP surprises (b) Target and path factors



Note: These figures represent the pseudo factor loadings of different monetary policy shocks and their sub-components on policy rate expectations at different maturities (from one month ahead to one year ahead). They are obtained by estimating the equation 1. On the left hand side, we plot the pseudo factor loadings of the MPS derived from Gürkaynak et al. (2005a) and the *news-adjusted* MPS derived from Bauer and Swanson (2023a). On the right hand side, we plot the pseudo factor loadings associated with the decomposition of the MPS from Gürkaynak et al. (2005a) into a target factor (in red) and a path factor (in green). They are obtained by estimating equations 2.

the 188 FOMC meetings, according to whether both components go in the same direction, and whether one factor dominates the other.

Directionality. First, we sort each of the 188 MPS according to whether the policy announcement resulted in a *consistent* or *conflicting* signal about the current stance and the future stance. In practice, we separately identify (i) MPS characterized by path and target factors with the same sign and (ii) MPS characterized by path and target factors with opposite signs:

$$\mathbb{1}_t^{\text{Opp. Sign}} = \begin{cases} 1 \text{ if } Path_t \times Target_t < 0 \\ 0 \text{ if } Path_t \times Target_t > 0 \end{cases} \tag{3}$$

When the path and the target factors are of the same sign – let us say a restrictive surprise – the information conveyed to the market by the statement is *consistent* between the current stance and the future stance.

Conversely, when the path and the target factors are of opposite signs – let us say a restrictive target factor and an accommodative path factor – the news delivered to the market by the statement is *contradictory* or *conflicting* between both the current stance and the future stance.

An alternative way of looking at this classification is to consider that we are identifying statements that lead to a *flattening* of the term structure of policy rate expectations separately from those that lead to a *steepening* of the term structure of policy rate expectations (as illustrated in Figure 1). As a result, out of 188 MPS between 1999 and 2023, we end up with 100 "same sign" MPS (53%) and 88 "opposite sign" MPS (47%).

Dominance. Second, we now abstract from the signs of the target and path factors and we sort the MPS associated with the 188 statements according to the relative magnitude (in absolute terms) of their two factors. In other words, we distinguish between (i) statements with a (relatively) larger path component and (ii) those with larger target component:

$$\mathbb{1}_t^{\text{Path Dom}} = \begin{cases} 1 \text{ if } |Path_t| \geq |Target_t| \\ 0 \text{ if } |Path_t| < |Target_t| \end{cases} \tag{4}$$

This second dimension tells us the extent to which the path or the target component "dominates" in the policy announcement. If they have the same sign, it tells us which type of monetary policy news – news about the current or the future stance – contributes the most to the overall MPS. If they have opposite signs, it indicates about which component is driving the stance of the overall MPS. Put differently, the "dominance" tells us how much of the steepening/flattening is driven by the short end or the long end of the term structure of policy rate expectations.

3 Monetary policy transmission and the shape of policy expectation adjustments

Whether the target and path factors are consistent or send conflicting signals about the current and future policy rates will affect the term structure, *i.e.*, the life cycle of policy rate expectations across maturities. Two MPS of the same size may convey a different mix of information about the present and the future, *i.e.*, monetary news being predominantly about the future or vice versa. Does this matter for the impact of monetary policy?

In this section, we analyze the extent to which the transmission of monetary policy shocks depends on the underlying nature of the signals sent about the current and the future stance of monetary policy. We follow the standard event study approach (Jordà, 2005) to assess the effect of monetary policy surprises on three types of asset prices: stock prices, nominal yields and market volatility measures. In particular, we run the following regressions:

$$\Delta Y_t = \alpha + \beta_1 \cdot MPS_t + \epsilon_t \tag{5}$$

where ΔY_t is the daily change in various asset prices, including stock prices ($S\&P500$), zero oupon nominal interest rates at 2, 5, and 10-year maturity, and a market volatility measure (VIX). MPS_t are the news-adjusted MPS – labelled $BS23_{NewsAdj}$ – from Bauer and Swanson (2023a).

First, we re-estimate the standard effects of monetary policy shocks on these three asset classes. Without any sub-classification according to the dimensions aforementioned, we recover the expected effects of monetary policy: we observe a positive relationship between the monetary policy shock and nominal interest rates (with a larger effect on the short end of the yield curve), a negative co-movement with stock market valuations – the reasons being that the present value of future payoffs falls as the discount rate rises with higher real interest rates and rising risk premia and also because expected payoffs decline with the deteriorating outlook induced by the policy tightening –, a a positive relationship with volatility. The results are presented in Table 1.

Table 1: Standard effects of MPS on asset prices

	S&P500	2y	5y	10y	VIX
$BS23_{NewsAdj}$	-4.679*	0.645***	0.552***	0.308***	6.236**
	[2.46]	[0.12]	[0.12]	[0.11]	[3.03]
R^2	0.03	0.22	0.12	0.04	0.02
Obs.	188	188	188	188	188

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the estimated transmission of the news-adjusted MPS derived from Bauer and Swanson (2023a) to various asset prices. The parameters are estimated from equation 5 using OLS with Huber-White heteroskedasticity-robust standard errors. The dependent variables are the daily return on the S&P500 in column (1), the 2-year, 5-year and 10-year nominal yields in columns (2), (3) and (4), and the VIX in column (5).

Not surprisingly, we find consistent responses of asset prices to a monetary policy shock: a 10 bp restrictive monetary policy shock causes the interest rates to rise by 6.4 bp to 3.1 bp, the S&P500 to fall by 0.47% and the VIX to rise by 0.62 units (which correspond to one-third of the standard deviation of VIX variations on FOMC days).

We now examine the extent to which the response of asset prices to monetary policy shocks varies according to the dominance/directionality dimensions that we defined in the previous section. In other words, we ask whether the transmission of monetary policy is sensitive to the underlying structure of the mix of signals about the current and future stance of monetary policy.

3.1 Consistent versus conflicting signals

Let us first present the distribution of MPS across these two sub-samples. Table 2 presents the descriptive statistics about *conflicting* vs *consistent* MPS. Of our 188 policy announcement days, 88 have path and target factors with the same sign (47%), leaving 100 (the remaining 53%) with opposite signs. More importantly, we can clearly see in this Table 2 that MPS with consistent and conflicting signals are indistinguishable in terms of their magnitude or variability.

Table 2: MPS summary statistics by directionality

Directionality	N	%	Mean	Mean Abs.	SD
Same sign	88	47%	0.004	0.038	0.032
Opp. sign	100	53%	0.004	0.031	0.032

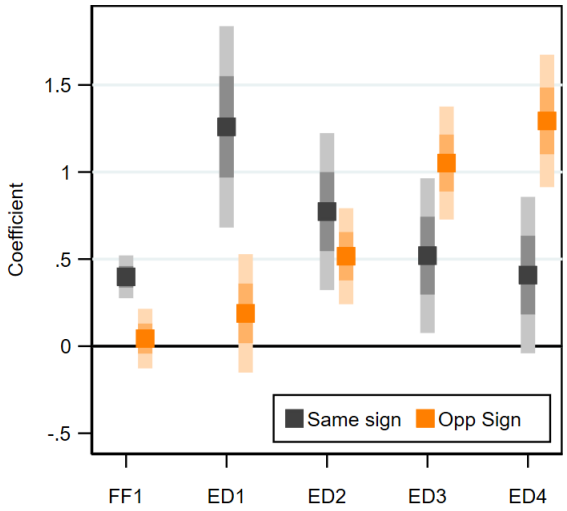
Note: This table shows the total number and the percentage of FOMC meetings in which the path and target factors move in the same direction (*Same sign MPS*), or in the opposite direction (*Opp. signs MPS*). It also shows the mean of these MPS, the mean of the absolute value of these MPS and the standard deviation of these MPS, highlighting similar sample characteristics.

Before examining the transmission of monetary policy shocks to asset prices, we first represent the shape of policy rate expectations (akin to pseudo factor loadings) over the same maturities as in Figure 2, but now decomposed into statements in which the signals about the present and the

future are consistent – *i.e.* pointing in the same direction – or conflicting – *i.e.* pointing in opposite directions. We thus re-estimate the equation 1 separately on the sample of policy announcements with consistent signals ($\mathbb{1}_t^{\text{Opp. Sign}} = 0$) and the sample of policy announcement with conflicting signals ($\mathbb{1}_t^{\text{Opp. Sign}} = 1$).

Figure 3 shows the results of these regressions, *i.e.* the factor loadings associated with policy rate expectations at different horizons. The blue bars represent the loadings associated with the overall MP shock as shown in Figure 2. Disentangling the loadings when path/target are of the same or opposite sign, we find that when information about the present and future move in opposite directions (conflicting monetary news), the loadings increase along maturities. In other words, for two MPS of the same size, the one with consistent signals will load at the short end, while the one with conflicting signals will load at the longer end. In other words, longer-dated Eurodollar futures are more responsive to these monetary policy shocks than shorter-dated ones when the signals are conflicting.

Figure 3: Correlation at different maturities: same vs. opposite sign



Note: This figure represents the pseudo factor loadings of the *news-adjusted* MPS derived from Bauer and Swanson (2023a) on policy rate expectations at different maturities (from one month ahead to one year ahead). They are obtained by estimating the equation 1 on the two different sub-samples of same sign vs. opposite sign MPS. The classification of MPS into same sign (consistent) and opposite-sign (conflicting) MPS is based on the target and path factors derived from Gürkaynak et al. (2005a).

The fact that we observe increasing factor loadings when monetary policy news is conflicting suggests that monetary policy shocks are viewed as having effects that may persist into the future. In contrast, constant factor loadings do suggest higher (or lower) interest rates in the future, but they do not indicate any dynamic change or amplification in expectations across maturities. For example, a shock that raises policy rates by 25 basis points may lead to uniform expectations of "business as usual", with no expectation of prolonged tightening or easing. Conversely, when markets adjust interest rates further out in the future, they may interpret the policy shock as signaling a more fundamental change in the monetary policy stance (*e.g.* a tightening cycle), which amplifies its effect over time. Does this mean that the impact of monetary policy will be different?

Note that this result cannot be driven by the fact that larger MPS would be associated with

larger elasticities of asset prices to MPS because, as we have shown in Table 2, the magnitude of the MPS does not vary with the nature of the signals sent by the policy announcement.

We now examine how the nature of the underlying signals, whether conflicting or consistent, affects the way in which monetary policy shocks are transmitted to other asset prices. To this end, we run a similar regression as before, but now we interact the MPS with a dummy for consistent versus opposite sign policy announcements.

$$\Delta Y_t = \alpha + \beta_1 \cdot MPS_t + \beta_2 \cdot \mathbb{1}_t^{\text{Opp. Sign}} + \beta_3 \cdot MPS_t \cdot \mathbb{1}_t^{\text{Opp. Sign}} + \epsilon_t \tag{6}$$

where here Y_t successively denotes the S&P500, nominal yields at various horizons, and the VIX, as before. The results can be found in Table 3. In the first row, we retrieve the standard effects of monetary policy shocks on the $S\&P500$, the VIX and the 2-year rate on the subsample of policy announcement where path and targets send consistent signals about the present and the future. However, when the news about the current and future path of monetary policy diverges, we find that monetary policy shocks are strongly transmitted to longer-term rates (2, 5 and 10-year rates). Indeed, we had seen that conflicting signals lead to increasing loadings on policy rate expectations at longer maturities: this means that these signals contain more information about the future. It is therefore not surprising that these MPS have a strong impact on long-term nominal yields.

Table 3: The effect of monetary policy surprises: consistent vs conflicting signals

	S&P500	2y	5y	10y	VIX
$BS23_{NewsAdj}$	-7.834**	0.393**	0.285	0.057	9.683**
	[3.54]	[0.20]	[0.19]	[0.16]	[4.36]
$BS23_{NewsAdj}$ x $\mathbb{1}^{\text{Opp. Sign}}$	6.526	0.521**	0.553**	0.519**	-7.128
	[4.69]	[0.23]	[0.24]	[0.22]	[5.78]
$BS23_{NewsAdj} \mid \mathbb{1}^{\text{Opp. Sign}} = 1$	-1.308	0.914***	0.838***	0.576***	2.555
	[3.08]	[0.11]	[0.15]	[0.15]	[3.79]
R^2	0.06	0.26	0.15	0.07	0.03
Obs.	188	188	188	188	188

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the estimated transmission of the news-adjusted MPS derived from Bauer and Swanson (2023a) to various asset prices.The parameters are estimated from equation 6 using OLS with Huber-White heteroskedasticity-robust standard errors. Only the main estimated parameters are reported in the table. The dependent variables are the daily return on the S&P500 in column (1), the 2-year, 5-year and 10-year nominal yields in columns (2), (3) and (4) and the VIX in column (5). The first row shows the estimated transmission of the MPS to asset prices for *same sign* MPS. The second row shows the marginal effect on the estimated transmission of MPS to asset prices for *opposite sign* MPS. The last row ($BS23_{NewsAdj} \mid \mathbb{1}^{\text{Opp. Sign}} = 1$) shows the estimated transmission of MPS to asset prices for *opposite sign* MPS.

We have just identified a first important finding: the underlying structure of current versus future news about the monetary policy path in the MPS shapes the transmission of monetary policy shocks to asset prices. Only policy announcements with conflicting signals affect the long-term nominal yields.

It is natural to now ask a second, related question: are these strong effects of MPS on nominal

yields associated with conflicting signals driven by predominant information about the future monetary policy path (*e.g.* forward guidance or expected policy changes such as the tightening cycle) vs. predominant information about the current monetary policy path?

3.2 Reversal statements: conflicting signals with dominance of future information

We therefore use the second dimension of interest of monetary news – dominance – indicating whether the news in the policy announcement is relatively more about the *present* or the *future* path of monetary policy. We have just shown that policy announcements conveying conflicting information lead to a steepening of the term structure of policy rate expectations. But this steepening could reflect two very different situations.

On the one hand, if long-term Eurodollar futures rise more than short-term ones after a policy announcement, this could reflect expectations of persistently higher policy rates in the future or, in other words, strong information about the future, such as forward guidance, but less or no information about the present. This would be an example of a steepening dominated by the long end of the term structure of policy rate expectations. In this case, the path factor surprise *attenuate* or mitigate the opposite target factor surprise.

Alternatively, after a large surprise to the target component – for example after a policy meeting where a hike was expected and did not take place – markets could be surprised by a delay and anticipate a later but faster hike. This would be an example of a steepening dominated by the short end of the term structure of policy rate expectations. In this case, the path factor surprise *reverse* the opposite target factor surprise.

The dominance property that we have defined earlier in the equation 4 – whether the magnitude of the path factor dominate the magnitude of the target factor and vice versa – captures these two situations. We can use it to test for a non-linear effect of monetary policy surprises on asset prices depending on the relative magnitude of the target and the path factors. Formally, we define two new variables:

$$\mathbb{1}_t^{\text{Rev}} = \begin{cases} 1 \text{ if } \mathbb{1}_t^{\text{Opp. sign}} = 1 \text{ and } \mathbb{1}_t^{\text{Path Dom}} = 1 \\ 0 \text{ if } \mathbb{1}_t^{\text{Opp. sign}} = 1 \text{ and } \mathbb{1}_t^{\text{Path Dom}} = 0 \end{cases} \tag{7}$$

$$\mathbb{1}_t^{\text{Att}} = \begin{cases} 1 \text{ if } \mathbb{1}_t^{\text{Opp. sign}} = 1 \text{ and } \mathbb{1}_t^{\text{Path Dom}} = 0 \\ 0 \text{ if } \mathbb{1}_t^{\text{Opp. sign}} = 1 \text{ and } \mathbb{1}_t^{\text{Path Dom}} = 1 \end{cases} \tag{8}$$

We can then estimate the following specification:

$$\Delta Y_t = \alpha + \beta_1 \cdot MPS_t + \beta_2 \cdot \mathbb{1}_t^{\text{Att.}} + \beta_3 \cdot MPS_t \cdot \mathbb{1}_t^{\text{Att.}} + \beta_4 \cdot \mathbb{1}_t^{\text{Rev.}} + \beta_5 \cdot MPS_t \cdot \mathbb{1}_t^{\text{Rev.}} + \epsilon_t. \tag{9}$$

Table 4 shows the results of this estimation. The results are striking. First, most of the traditionally identified effect on the stock market (S&P500) or the volatility (VIX) comes from the subset of meetings with consistent signals, *i.e.* path and target factors pointing in the same direction. Second, we do not see much transmission of MP shocks to asset prices in the policy statements where

the surprise in the target factor attenuates or mitigates the surprise in the path factor. Third, and most importantly, the entire transmission of MP shocks to (long-term) interest rates comes from the subset of policy announcements classified as "reversals", *i.e.* policy announcements where the surprise in the path factor *reverses* the surprise in the target factor.

Table 4: The effect of monetary policy surprises: attenuation vs. reversal

	S&P500	2y	5y	10y	VIX
$BS23_{NewsAdj}$	-7.834**	0.393**	0.285	0.057	9.683**
	[3.56]	[0.20]	[0.19]	[0.16]	[4.38]
$BS23_{NewsAdj}$ x $\mathbb{1}^{Att.}$	14.163**	0.192	0.060	-0.032	-11.831
	[7.00]	[0.37]	[0.31]	[0.25]	[12.54]
$BS23_{NewsAdj}$ x $\mathbb{1}^{Rev.}$	4.496	0.602***	0.673***	0.654***	-6.351
	[4.74]	[0.22]	[0.25]	[0.23]	[5.51]
$BS23_{NewsAdj} \mid \mathbb{1}^{Rev.} = 1$	-3.338	0.995***	0.958***	0.711***	3.331
	[3.14]	[0.10]	[0.16]	[0.16]	[3.34]
R^2	0.07	0.27	0.17	0.10	0.04
R^2 No Reversal	0.04	0.10	0.05	0.00	0.03
R^2 Reversal	0.02	0.49	0.26	0.16	0.01
Obs.	188	188	188	188	188

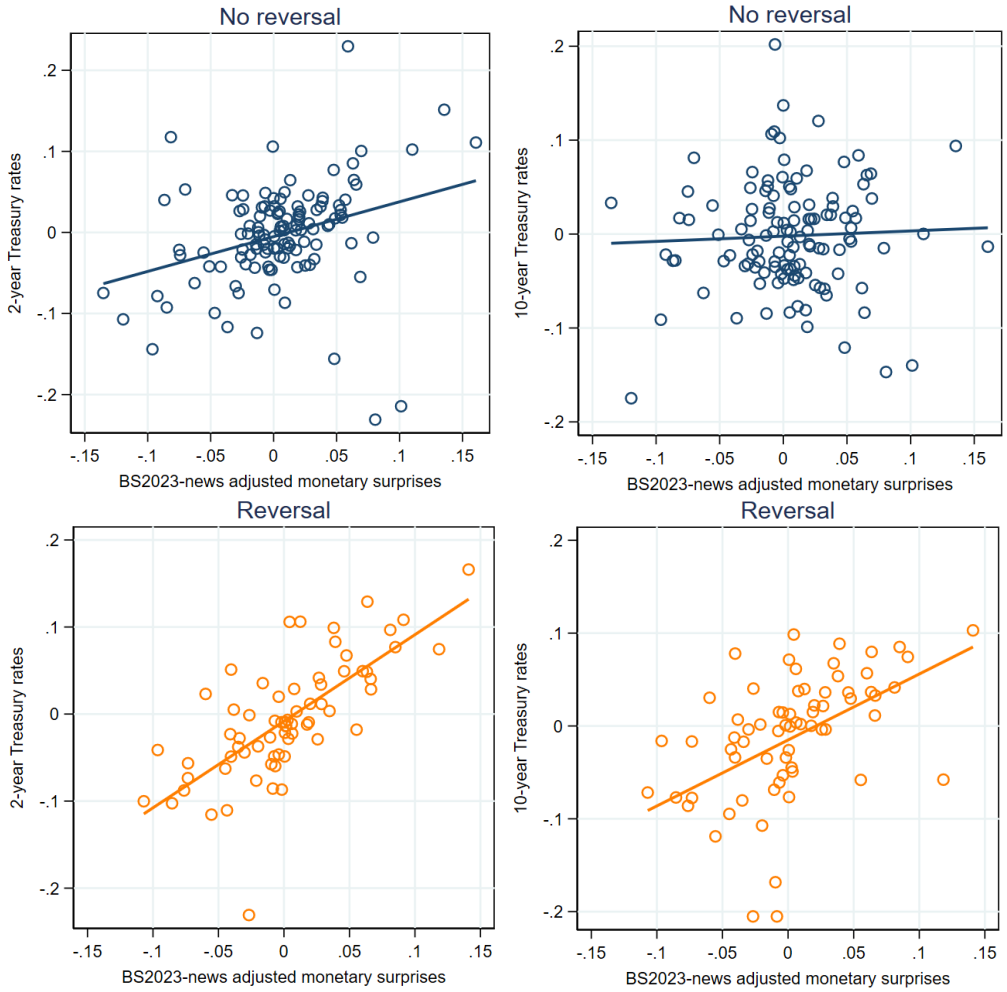
Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the estimated transmission of the news-adjusted MPS derived from Bauer and Swanson (2023a) to various asset prices.The parameters are estimated from equation 9 using OLS with Huber-White heteroskedasticity-robust standard errors. Only the main estimated parameters are reported in the table. The dependent variables are the daily return on the S&P500 in column (1), the 2-year, 5-year and 10-year nominal yields in columns (2), (3) and (4) and the VIX in column (5). The first row shows the estimated transmission of the MPS to asset prices for *same sign* MPS. The second row shows the marginal effect on the estimated transmission of MPS to asset prices for *attenuating* MPS. The third row shows the marginal effect on the estimated transmission of MPS to asset prices for *reversal* MPS. The last row ($BS23_{NewsAdj} \mid \mathbb{1}^{Rev.} = 1$) shows the estimated transmission of MPS to asset prices for *reversal* MPS. The classification of MPS into reversal and non-reversal MPS is based on the target and path factors derived from Gürkaynak et al. (2005a). The R-squared are derived from regressions estimated on selected sub-samples.

Not only we can see that the magnitude of the estimated elasticities is several times larger on *reversals* policy announcements compared to policy announcement with consistent or attenuating signals. But we can also observe that the fraction of the variance of nominal yields that is explained by the variance of MPS is significantly much higher for policy announcement where the surprise on the path factor reverse the surprise on the target factor. For example, for the 10-year nominal yields, our estimates suggest that the transmission of monetary policy shocks is close to zero for policy announcements with a consistent (0.057) or attenuated signal (-0.032), while it is sizable for reversal policy announcements (0.654). Similarly, the fraction of variance of the 10-year nominal yield explained by the variance of MPS is close to zero for non-reversal statements while it is almost 16% for reversal statements.

In other words, the transmission of monetary policy to (long-term) interest rates is very effective precisely when (i) the signals sent by the path and the target factor conflict, and (ii) when news about the future stance of monetary policy dominates news about the current stance of monetary

policy. In contrast, for those reversal statement, we do not see any significant reaction from the equity market or the market volatility measure. In other words, these reversal statement seems to be very informative for long-term interest rates.

Figure 4: MPS and interest rates: reversal vs. no reversal MPS



Note: These figures plot the daily changes in nominal yields (y-axis) for 2-year ahead (left) and the 10-year ahead (right) against the *news-adjusted* MPS derived from Bauer and Swanson (2023a) (x-axis) for all the 188 statement days classified into *reversal* and *non-reversal* FOMC meetings. The orange dots in the bottom panel represent the reversal FOMC meetings while the blue dots in the top panel represent the non-reversal FOMC meetings. The classification of MPS into reversal and non-reversal MPS is based on the target and path factors derived from Gürkaynak et al. (2005a).

In Figure 4, for the sake of transparency, we visually inspect the relationship between monetary policy surprises and nominal yields (2-year and 10-year) in a scatter plot. We plot this relationship separately for statements classified as non reversal (top) –*i.e.* statements with *consistent* or *attenuating* signals – and for statements classified as *reversals* (bottom). We can clearly observe (i) a much steeper relationship for reversal statements than for non-reversal statements and (ii) the data points for reversal statements cluster more tightly around the regression line than for non-reversal statements, indicating a much more meaningful relationship. In the Appendix **??**, we show the scatter plots for the 5 year, the 10 year and the 15 year as well.

To conclude this section, we now examine how statements identified as reversals affect the transmission of the MPS to nominal yields across all maturities, from 1 to 10 years and then to 15, 20, 25 and 30 years. These estimated elasticities are shown in Table 6 below. We observe that the stronger transmission associated with reversal statements applies to all maturities, from 2 to 20/25 years (but with a smaller effect on the 25-year yield). We also observe that the steepening of the term structure of policy rate expectations – *i.e.* – does not necessarily translate into a steepening of the yield curve itself.

Table 5: **The effect of monetary policy surprises on nominal yields at all maturities**

	Maturity						
	1y	2y	3y	4y	5y	6y	7y
BS23	0.395**	0.393**	0.372*	0.334*	0.285	0.232	0.181
	[0.16]	[0.20]	[0.20]	[0.20]	[0.19]	[0.18]	[0.18]
BS23 x $\mathbb{1}_{Rev.}$	0.294	0.602***	0.681***	0.684***	0.673***	0.666***	0.662***
	[0.19]	[0.22]	[0.24]	[0.25]	[0.25]	[0.25]	[0.25]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	0.689***	0.995***	1.052***	1.018***	0.958***	0.898***	0.843***
	[0.09]	[0.10]	[0.12]	[0.14]	[0.16]	[0.17]	[0.17]
R^2	0.27	0.27	0.24	0.2	0.17	0.14	0.12
R^2 No Reversal	0.16	0.10	0.08	0.06	0.05	0.03	0.02
R^2 Reversal	0.46	0.49	0.41	0.32	0.26	0.22	0.19
Obs.	188	188	188	188	188	188	188
	Maturity						
	8y	9y	10y	15y	20y	25y	30y
BS23	0.134	0.093	0.057	-0.057	-0.106	-0.13	-0.145
	[0.17]	[0.17]	[0.16]	[0.16]	[0.15]	[0.15]	[0.16]
BS23 x $\mathbb{1}_{Rev.}$	0.660***	0.658***	0.654***	0.593***	0.493**	0.396*	0.319
	[0.24]	[0.24]	[0.23]	[0.21]	[0.20]	[0.21]	[0.24]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	0.794***	0.751***	0.711***	0.536***	0.387***	0.266*	0.174
	[0.17]	[0.17]	[0.16]	[0.14]	[0.13]	[0.15]	[0.17]
R^2	0.11	0.1	0.1	0.08	0.06	0.05	0.05
R^2 No Reversal	0.01	0.01	0.00	0.00	0.01	0.01	0.02
R^2 Reversal	0.17	0.16	0.16	0.15	0.12	0.07	0.02
Obs.	188	188	188	188	188	188	188

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the estimated transmission of the news-adjusted MPS derived from Bauer and Swanson (2023a) to nominal yields at different horizons.The parameters are estimated from equation 5 using OLS with Huber-White heteroskedasticity-robust standard errors. Only the main estimated parameters are reported in the table. The dependent variables are the nominal yields for maturities from 1 year to 10 years and then to 15, 20, 25 and 30 years. The first row shows the estimated transmission of the MPS to nominal yields for *non-reversal* MPS, *i.e. same sign* and *attenuating* MPS. The second row shows the marginal effect on the estimated transmission of MPS to nominal yields for *reversal* MPS. The last row ($BS23_{NewsAdj} \mid \mathbb{1}^{\text{Rev.}} = 1$) shows the estimated transmission of MPS to asset prices for *reversal* MPS. The classification of MPS into reversal and non-reversal MPS is based on the target and path factors derived from Gürkaynak et al. (2005a). The R-squared are derived from regressions estimated on selected sub-samples.

On the contrary, the transmission from policy rates to market rates in reversal statements seems to decline monotonically with the maturity, starting from the 2 year horizon: the estimated elasticity of transmission declines from 0.99 at the 2 year horizon to 0.71 at the 10 year horizon and even to 0.38 for the 20 years horizon. The fraction of variance explained also diminishes from almost

50% at the 2 year horizon to 0.16% at the 10 year horizon.

3.3 Alternative MPS measures and reversal classifications

So far, we have shown that a subset of FOMC meetings is crucial for the transmission of MP to interest rates. This subset of policy announcements are characterized by the fact that the signals sent by the path and the target factors in the statement diverge and that the path surprise dominates the target surprise. Say differently, these statement are highly informative for the future monetary policy path.

We have established this result based on the *news-adjusted* MPS from Bauer and Swanson (2023a) and we have used the path and target factors as originally defined by Gürkaynak et al. (2005a) to classify FOMC meeting between *consistent*, *attenuating* and *reversal* statements. We could however ask whether these results are specific to (i) the measurement of monetary policy surprises we use and (ii) the measurement of the target and the path factors and the resulting classification of policy announcements.

We first examine whether our main finding holds when using alternative measurement of monetary policy surprises. In the Table 6, we replicate the estimation of equation 9 but we now use the monetary policy surprises constructed by Nakamura and Steinsson (2018). Our main finding is entirely confirmed if we use this alternative way to measure monetary policy surprises: the entire transmission of monetary policy shocks to nominal yields relies on the same subset of policy announcements where the signals sent about the future stance of monetary policy *contradict* and *dominate* the current MP decision, *i.e.* when the news about the future matters a lot and diverges from news about the present.

We also replicate the results presented in the Table 6 using successively MPS from Gürkaynak et al. (2005a), those from Jarociński and Karadi (2020) and unadjusted MPS from Bauer and Swanson (2023a). These results are presented in the Table A1, A2 and A3 in the appendix A. Our main finding – the crucial role of "reversal" statement for monetary policy transmission to long-term yields – holds across these various definitions of MPS.

Even more importantly, we want to make sure that our result is not too sensitive to the definition of reversal statements. We now examine whether this finding still hold with an alternative definition of the target and the path factors than that of Gürkaynak et al. (2005a), and, as a result, with an alternative classification of policy announcements. It is possible to isolate "reversal" policy announcements using a classification based on the policy news shock and the unexpected change in the fed funds rate (FFR shocks) constructed by Nakamura and Steinsson (2018). These two measures are closely related to the target and the path factors considered by Gürkaynak et al. (2005a). In particular, the policy news shock is built in the same way as the path factor, *i.e.* as a composite measure of changes in interest rates at different maturities spanning the first year of the term structure. However this policy news shock is a noisier measure, as it is a sort of mix of the target and the path factors from Gürkaynak et al. (2005a).

Using the "news shock" and the "FFR shock", we end up with a smaller subset of reversal policy announcements. While we identify 68 reversal statements using the target/path factors,

Table 6: The effect of alternative monetary policy surprises

	S&P500	2y	5y	10y	VIX
NS18	-10.308*	0.688***	0.496**	0.188	11.543*
	[5.28]	[0.19]	[0.22]	[0.23]	[6.20]
NS18 x $\mathbb{1}^{\text{Rev.}}$	3.774	1.456***	1.573***	1.330***	-1.604
	[8.95]	[0.29]	[0.42]	[0.44]	[10.04]
NS18 $\mid \mathbb{1}^{\text{Rev.}} = 1$	-6.534	2.144***	2.070***	1.518***	9.938
	[7.22]	[0.22]	[0.36]	[0.38]	[7.89]
R^2	0.06	0.33	0.20	0.12	0.04
R^2 No Reversal	0.05	0.16	0.07	0.02	0.02
R^2 Reversal	0.02	0.58	0.31	0.18	0.02
Obs.	188	188	188	188	188

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the estimated transmission of the MPS derived from Nakamura and Steinsson (2018) – the *news shock* – to various asset prices.The parameters are estimated from equation 5 using OLS with Huber-White heteroskedasticity-robust standard errors. The dependent variables are the daily return on the S&P500 in column (1), the 2-year, 5-year and 10-year nominal yields in columns (2), (3) and (4) and the VIX in column (5). The first row shows the estimated transmission of the MPS to asset prices for *same sign* and *attenuating* MPS. The second row shows the marginal effect on the estimated transmission of MPS to asset prices for *reversal* MPS. The last row (NS18 $\mid \mathbb{1}^{\text{Rev.}} = 1$) shows the estimated transmission of MPS to asset prices for *reversal* MPS. The classification of MPS into reversal and non-reversal MPS is based on the target and path factors derived from Gürkaynak et al. (2005a). The R-squared are derived from regressions estimated on selected sub-samples.

we identify only 24 reversal statements using the news/FFR shock.

In Table 7, we could see that our main finding remains fully valid when using this alternative classification of reversal statement. In Table A4, we replicate our main estimation of the transmission of MP across asset classes using both this alternative classification of reversal statement and the alternative measure of MPS coming from Nakamura and Steinsson (2018). All the results remain valid.

Note that these estimated elasticities of nominal yields to reversal MPS are significantly larger than those estimated based on reversal statements defined using the path and the target factors from Gürkaynak et al. (2005a). However, this issue is largely orthogonal to our classification of statements into consistent, attenuating and reversal statements. Rather, the stronger elasticities are embedded in surprises themselves. For instance, the elasticities for the 5 years and 10 years nominal yields associated to consistent statements in Table 4 are 0.285 and 0.057 when, using MPS from Bauer and Swanson (2023a). The same elasticities are twice larger when using the MPS from Nakamura and Steinsson (2018): 0.496 and 0.188.

These 24 reversal statements identified as reversal statements using the FFR shocks and the news shocks from Nakamura and Steinsson (2018) are not a perfect subset of the 68 reversal statements originally identified with the path and target factors. In other words, some meetings are classified as reversal statements in one case and not in the other. Interestingly, if we consider the intersection of these two subsets of reversal statements and we replicate our estimations on these

Table 7: The effect of MP surprises based on alternative reversal statements

	S&P500	2y	5y	10y	VIX
$BS23_{NewsAdj}$	-7.569***	0.544***	0.471***	0.254*	8.762***
	[2.60]	[0.15]	[0.15]	[0.13]	[3.21]
$BS23_{NewsAdj}$ x $\mathbb{1}_{Rev.}$	11.545*	0.581***	0.588***	0.498***	-11.553**
	[6.54]	[0.18]	[0.20]	[0.19]	[5.85]
$BS23_{NewsAdj} \mid \mathbb{1}_{Rev.} = 1$	3.975	1.125***	1.059***	0.752***	-2.790
	[6.01]	[0.09]	[0.13]	[0.13]	[4.89]
R^2	0.08	0.26	0.14	0.07	0.04
R^2 No Reversal	0.05	0.16	0.08	0.02	0.03
R^2 Reversal	0.04	0.70	0.63	0.52	0.01
Obs.	188	188	188	188	188
Obs. Reversal	24	24	24	24	24

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the estimated transmission of the news-adjusted MPS derived from Bauer and Swanson (2023a) to various asset prices.The parameters are estimated from equation 5 using OLS with Huber-White heteroskedasticity-robust standard errors. The dependent variables are the daily return on the S&P500 in column (1), the 2-year, 5-year and 10-year nominal yields in columns (2), (3) and (4) and the VIX in column (5). The first row shows the estimated transmission of the MPS to asset prices for *same sign* and *attenuating* MPS. The second row shows the marginal effect on the estimated transmission of MPS to asset prices for *reversal* MPS. The last row ($BS23_{NewsAdj} \mid \mathbb{1}^{Rev.} = 1$) shows the estimated transmission of MPS to asset prices for *reversal* MPS. The classification of MPS into reversal and non-reversal MPS is based on the FFR and news shocks derived fromNakamura and Steinsson (2018). The R-squared are derived from regressions estimated on selected sub-samples.

19 common reversal statements, we continue to find that these meetings where the path surprise overturns the target surprise are key to the transmission of MP to interest rates, as shown in Table A6 in the Appendix A. Note that the variance of the MPS on those 19 meetings explains from 50% to 70% of the variance of nominal yields.

3.4 Alternative mechanisms and confounding factors

The key role of statements classified as *reversal* in the transmission of MPS to nominal interest rates could also be due to various confounding factors. We cannot rule out the possibility that, in selecting our reversal statements using our criteria, we are actually capturing some other correlated dimensions that would explain the stronger and more meaningful pass-through of policy rates to market rates. For example, it is possible that reversal statements serve as a proxy for periods of greater uncertainty, during which the policy announcement leads to a greater sensitivity of market rates to the policy rate.

In this section, we take a closer look at these competing explanations. We show that the MPS of the reversal statement retains its significant and stronger transmission to long-term interest rates even after controlling for some candidates, such as uncertainty, large path factor, central bank information effects or unconventional policy announcements.

Unconventional policy announcements. Announcements related to quantitative easing (QE thereafter) or forward guidance (FG thereafter) contain a strong path component. Over our sample period, the Fed at the zero lower bound calibrated its forward guidance, whether time- or state-dependent, to lower long-term rates. Quantitative easing, through the purchase of Treasuries, also put pressure on bond prices (with an inverse effect on yields). Perhaps reversal statements are regularly characterised by unconventional policy announcements in such a way that we capture the effects of these policies rather than the effects of the reversal itslef.

To control for that, we list unconventional monetary policy announcements related to QE using the list of Krishnamurthy and Vissing-Jorgensen (2011) and Corbet, Dunne, and Larkin (2019). For forward guidance, we use the timeline provided by the Federal Reserve on policy actions and communication[4]. We add a linear and interacted term in our regression to control alternatively for both these confounding factor and confirm that it does not change our results (see Table A10 in Appendix A).

Central bank information effects. We consider the possibility that monetary policy surprises reveal signals about the central bank's private information about future economic conditions (Jarociński and Karadi (2020), Cieslak and Schrimpf (2019)). This central bank information channel could lead to large revisions in long-term interest rates (following the logic of a central bank reaction function). We therefore replicate our results using the MPS from Jarociński and Karadi (2020) adjusted for the central bank information effects. Table A5 in the appendix shows that our results hold.

Press Conferences. Since 2011, the Fed has held a press conference at FOMC meetings at which it releases the (quarterly) Summary of Economic Projections (SEP thereafter, published since 2007). Since 2018, these press conferences have been held systematically at each meeting. The press conference is typically structured to explain key aspects of monetary policy: an 11-minute opening statement, potential discussion of Economic Projections, followed by a 45-minute Q&A session where it is not uncommon for journalists to ask clarifying questions, potentially on future actions or policy shifts.[5] There has been evidence of sizable amplified price reactions during the Q&A, comparable, if not greater than that of the FOMC statements, especially for meetings without SEP when investors cannot take guidance from the path in the projections.[6] Even when controlling for the press conference, our coefficient of interaction between MPS and reversal retains its significance and magnitude. (see Table A13 in Appendix).

Publication of FOMC projections. The SEP contains longer-run projections of the most likely outcomes for GDP, inflation, and the unemployment rate, as well as the future path of the federal funds rate. In particular, a chart is published showing FOMC participants' assessments of appropriate monetary policy, the midpoint of the target range, or the target level for the federal funds rate at various horizons (calendar year-end and longer-term). Thus, the SEP, with its longer-run

[4]See Federal Reserve website for the list.

[5]FOMC Press conference, 03/17/2021 (Chris Rugaber): "*Chair Powell, I wanted to ask about the forecast overall. You're forecasting a very low unemployment rate next year and in 2023, you have inflation—or, the Fed overall is, in the SEP, forecasting inflation at or above 2 percent by 2023, yet no rate hike in any of this—in any of this forecast horizon. [...] Or* ***what is this telling us about the Fed's reaction function****, that it seems you're meeting the Fed's dual mandate by 2023, yet, again, no rate hike expected?*"

[6]See Liberty Street Post, 11/2013 and Fed Notes, 12/10/2021.

projections, can guide market expectations of future policy and should, in theory, affect long-term nominal yields. In Table A12 in Appendix A, we control for the publication of FOMC forecasts and we confirm that we are not confounding the effect of reversals with the effect of these releases. If anything, the interaction between the SEP and MPS is not significant.

Monetary policy uncertainty. By definition, reversal statements are statements where the target and the path factors move in opposite directions, *i.e.*, conflicting information about the current and the future path of policy rates. This could simply reflect a heightened uncertainty, especially about how the Fed will adjust rates in the future, suggesting that what we are capturing is precisely this uncertainty about monetary policy. Controlling for measures of uncertainty such as the market-based measure of monetary policy uncertainty proposed by Bauer, Lakdawala, and Mueller (2022) does not eliminate our effect (see Table A7 in Appendix A). Our finding on reversal statements is also robust to alternative measures of uncertainty as well, such as the VIX (Table A9), or such as the interest rate skewness of Bauer and Chernov (2024). Skewness measures the asymmetry and balance of interest rate risks (asymmetry in the probability distribution of interest rate changes). Intuitively, a positive skewness indicates that large rate hikes are more likely than large rate cuts, so that the balance of risk is tilted to the upside. As such, it may contain information (or uncertainty about it) about the likely direction of future interest rate changes. Even after controlling for interest rate skewness (Table A8), the key role of reversal statements remains.

Large changes in the slope of the term structure of policy rate expectations. The dominance of the path factor over the target factor is characteristic of reversal statements. Therefore, by construction, the path surprise tends to be relatively large for reversal statements (regardless of its direction). We test whether what we are capturing with the reversal statements are indeed the characteristics of a reversal (conflicting current and future signals and dominant forward-looking information) rather than just a (relatively) large path surprise (*i.e.*, the provision of a lot of information about future policy in general). We control for large path (the steepening dummy is equal to 1 when the path factor is above the median), in Table A14) and find a much more moderate effect in such cases.

4 The information content of reversal statements

So far, we have established that reversal statements are characterized by information about the future path of monetary policy contradicting and dominating information about the current path. Because of those two properties, we claim that those reversal statement are very informative about the future path of monetary policy. It is not just that the path factor is large, it is also that it contradicts the target factor and hence does not just amplified the signal about the current stance. In this section, we try to identify the underlying nature of the information that markets are learning with reversal statement.

4.1 What do we learn from asset prices co-movements?

As a first exercise, one could use the sign covariance of asset price responses to gain information about the nature of the news driving policy rate expectations adjustments, in the spirit of Cieslak

and Pang (2021). Indeed, sign restrictions on the co-movements between yields, stock prices and the VIX have been widely used to distinguish between monetary policy, news (growth) and risk premium shocks, see also Cieslak and Schrimpf (2019), Jarociński and Karadi (2020) and Bianchi, Ludvigson, and Ma (2024).

The fact that we find no effect on the S&P500 and the VIX, but a strong and positive effect on 2 to 20-year nominal yields, suggests that the underlying signals in these reversal statements are not about short-term monetary policy. Learning about the short-term path of monetary policy would imply an effect on short-term yields and stock prices. Indeed, the short end of the yield curve is more directly affected by shocks to short-term policy rate expectations as these shocks reflect current policy rate expectations. However, as short-term interest rate expectations are mean-reverting, we should at the same time expect a much smaller effect on the long end of the yield curve.

Similarly, CBI/growth news would imply a positive relationship between short-term yield and stock prices: if the central bank raises its policy rates as a result of more optimistic economic outlook, then this is good news for the stock market (indicating higher future dividends). These two co-movements have been used by Jarociński and Karadi (2020), for example, to distinguish between CBI shocks and pure monetary policy shocks. We can also discard this type of news, as the bulk of our effect is on longer-term yields.

Now that we have just shown that reversal statements are not about learning about either short-term monetary policy or the CBI, expectations about long-term policy rates could still be affected as markets learn about the reaction function, or as they learn about the risk premia. In other words, it is key to differentiate the short-term policy rate from the standard discount rate.

The risk premium is a compensation for discount-rate news exposure, *i.e.*, the risk premium compensates investors for an exposure to an uncertain future path of interest rates. The discount rate affects the present value of future cash flows. we should therefore observe a positive co-movement between long-term interest rates, and the VIX (our measure of uncertainty) and a negative co-movement with stock prices.

Table 8: Identification through sign of co-movements

	Short-term MP	CBI/Growth news	Risk premium	CB reaction function
ST yield	+	+		
LT yield			+	+
Stock prices	−	+	−	o
VIX			+	o

Note: This table shows the co-movement in the signs of asset price responses of the news-adjusted MPS derived from Bauer and Swanson (2023a) associated with different possible interpretations about the underlying nature of the news driving policy rate expectations adjustments, in the spirit of Cieslak and Pang (2021). Each row corresponds to an asset price reaction and each column denotes the possible underlying nature of the news driving these co-movements in asset price reactions. *Short-term MP* refers to the standard monetary policy shock; *CBI/-Growth news* refers to news about economic growth and broader economic conditions; *Risk premium* refers to news affecting risk premia; and finally *CB reaction function* refers to news about the reaction function of the central bank.

News about the central bank's reaction function refers to new information about how the cen-

tral bank will adjust its policy rate in response to changes in the economy. News about the central bank's reaction function affects short-term policy rates, but it does not directly affect the discount rate. The observed significant reactions of long-term yields combined with the absence of reactions of stock prices and the VIX seems to suggest that the underlying news affecting interest rate expectations is learning about the central bank reaction function.

We summarize the expected co-movements in asset prices and the different types of information that can explain these co-movements in Table 8.

4.2 Expectation hypothesis versus term premia

Our evidence so far suggests that reversal statements are more about shocks to short-term interest rates (potentially future short-term interest rates) than shocks to the discount rate. Sign restriction analysis also suggests that we learn the most about the central bank's reaction function with a reversal statement.

In this section, we decompose nominal yields into (i) the expectation hypothesis (EH) component (average of expected future short-term interest rates) and (ii) a term premium component in order to examine whether the effect of reversal statements is indeed working through the expectations of future short-term interest rates. We proceed in two steps. First, we regress nominal interest rates i_t^k at maturities k of 2, 5 and 10 years on their corresponding forward rates f_t^k.

$$i_t^k = \alpha + \beta \cdot f_t^k + \epsilon_t^k \tag{10}$$

The fitted values of these regressions $\hat{i}_t^k$ then provides the proxy for the average of expected future short-term interest rates and the estimated residual of these regressions $\hat{\epsilon}_t^k$ is our proxy for the term/risk premium. After that, we simply regress both components at each horizon on the news-adjusted MPS from Bauer and Swanson (2023a) as before.

The results of these estimations are presented in Table 9. The first three columns reproduce our baseline results from Table A4. The next three columns show the estimated effect of MPS on the expectation hypothesis component, namely the fitted value. Finally, the last three columns show the estimated effects on the risk/term premium component.

We find that after a typical reversal statement, a 10 bp monetary policy surprise has a significant positive impact of 5 to 10 bp on the expectations hypothesis. In contrast, we find no discernible effect of the MPS on the risk/term premium. This suggests that reversal statements primarily convey information about future short-term rates rather than information that affect risk perceptions. In contrast, during consistent FOMC meetings (we do not report the results for attenuating signals for the sake of exposition) monetary policy surprises affect long-term interest rates through the term premium, consistent with Hanson and Stein (2015).

One plausible explanation for why monetary policy might affect term premia with non-reversal statements is that yield-seeking investors rebalance their portfolios towards long-term bonds to prevent their portfolio yield from falling too much. Our results suggest that the standard effects that we attribute to monetary policy on term premia (Appendix Table A16) tend to be driven

Table 9: Decomposition of nominal interest rates into EH and term premium

	Nominal interest rates			Expectation hypothesis			Term premium		
	2y	5y	10y	2y	5y	10y	2y	5y	10y
$BS23_{NewsAdj}$	0.393**	0.285	0.057	0.385	0.025	-0.232	0.007	0.260**	0.289**
	[0.20]	[0.19]	[0.16]	[0.25]	[0.18]	[0.15]	[0.09]	[0.12]	[0.12]
$BS23_{NewsAdj}$ x $\mathbb{1}^{Rev}$	0.602***	0.673***	0.654***	0.957***	0.580**	0.502***	-0.355***	0.093	0.152
	[0.22]	[0.25]	[0.23]	[0.30]	[0.28]	[0.18]	[0.12]	[0.15]	[0.15]
$BS23_{Adj} \mid \mathbb{1}^{Rev} = 1$	0.995***	0.958***	0.711***	1.343***	0.605***	0.270***	-0.348***	0.353***	0.440***
	[0.10]	[0.16]	[0.16]	[0.16]	[0.22]	[0.10]	[0.08]	[0.08]	[0.09]
R^2	0.27	0.17	0.10	0.21	0.05	0.05	0.08	0.13	0.13
R^2 No Reversal	0.10	0.05	0.00	0.05	0.00	0.03	0.00	0.10	0.09
R^2 Reversal	0.49	0.26	0.16	0.37	0.07	0.06	0.13	0.16	0.18
Obs.	188	188	188	188	188	188	188	188	188

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the estimated transmission of the news-adjusted MPS derived from Bauer and Swanson (2023a) to nominal yields at the 2-year, 5-year and 10-year horizons (columns (1) to (3)), to their expectation hypothesis components (columns (4) to (6)) and to their term premium components (columns (7) to (9)). The expectation hypothesis and the term premium components are extracted by regressing the (spot) nominal rate to the corresponding forward rate as in equation 10. The fitted values of these regressions is the expectation hypothesis component while the residual is the term premium component.The parameters are estimated from equation 5 using OLS with Huber-White heteroskedasticity-robust standard errors. The first row shows the estimated transmission of the MPS to nominal yields for *non-reversal* MPS, *i.e. same sign* and *attenuating* MPS. The second row shows the marginal effect on the estimated transmission of MPS to nominal yields for *reversal* MPS. The last row ($BS23_{NewsAdj} \mid \mathbb{1}^{Rev.} = 1$) shows the estimated transmission of MPS to asset prices for *reversal* MPS. The classification of MPS into reversal and non-reversal MPS is based on the target and path factors derived from Gürkaynak et al. (2005a). The R-squared are derived from regressions estimated on selected sub-samples.

exclusively by these non-reversal statements (where markets learn relatively less about future short-term rates).

4.3 Nominal versus real rates

We use a second decomposition to better understand the nature of the news that drives the observed effects on long-term *nominal* yields. Specifically, we decompose nominal yields into their real component (using Treasury Inflation-Protected Securities, TIPS) and the inflation compensation (break-even securities at equivalent maturities).

Table 10 presents the results from this decomposition. We find that the stronger transmission to long-term rates in reversal statements is mainly driven by a stronger transmission to real interest rates. Notably, there is no significant effect of the MPS on inflation compensation in reversal statements, suggesting that the observed changes in long-term rates are not due to changes in market expectations of future inflation.

This also suggests that, when markets update their expectations about future interest rates, they view monetary policy as neutral with respect to inflation (since inflation compensation remains unchanged). Instead, the changes in long-term yields appear to reflect revisions in beliefs about the future path of the natural rate of interest (often denoted by $r*$) rather than adjustments in the central bank's responsiveness to economic conditions (denoted by "Φ" in the reaction function, which would induce a policy tightening with respect to the neutral rate). In other words, the market is responding to perceived changes in the long-run equilibrium interest rate rather than to changes in the Fed's inflation-fighting stance.

Table 10: Decomposition of nominal interest rates

	Nominal interest rates			Real interest rates			Inflation compensation		
	2y	5y	10y	2y	5y	10y	2y	5y	10y
$BS23_{NewsAdj}$	0.393**	0.285	0.057	-0.513	0.191	0.123	0.906	0.094	-0.066
	[0.20]	[0.19]	[0.16]	[0.74]	[0.24]	[0.18]	[0.72]	[0.15]	[0.10]
$BS23_{NewsAdj}$ x $\mathbb{1}^{Rev}$	0.602***	0.673***	0.654***	1.504*	0.800**	0.599**	-0.903	-0.127	0.055
	[0.22]	[0.25]	[0.23]	[0.78]	[0.31]	[0.24]	[0.75]	[0.18]	[0.12]
$BS23_{Adj} \mid \mathbb{1}^{Rev} = 1$	0.995***	0.958***	0.711***	0.991***	0.990***	0.722***	0.003	-0.032	-0.011
	[0.10]	[0.16]	[0.16]	[0.25]	[0.20]	[0.17]	[0.21]	[0.11]	[0.08]
R^2	0.27	0.17	0.10	0.06	0.14	0.11	0.06	0.04	0.07
R^2 No Reversal	0.10	0.05	0.00	0.00	0.04	0.02	0.03	0.00	0.03
R^2 Reversal	0.49	0.26	0.16	0.10	0.20	0.14	0.00	0.00	0.00
Obs.	188	188	188	188	188	188	188	188	188

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the estimated transmission of the news-adjusted MPS derived from Bauer and Swanson (2023a) to nominal yields at the 2-year, 5-year and 10-year horizons (columns (1) to (3)), to their real interest rate components (columns (4) to (6)) and to their inflation compensation components (columns (7) to (9)). The real interest rate component is derived from Treasury Inflation-Protected Securities (TIPS) with similar maturities and the inflation compensation component is derived from the break-even securities with equivalent maturities. The fitted values of these regressions is the expectation hypothesis component while the residual is the term premium component.The parameters are estimated from equation 5 using OLS with Huber-White heteroskedasticity-robust standard errors. The first row shows the estimated transmission of the MPS to nominal yields for *non-reversal* MPS, *i.e. same sign* and *attenuating* MPS. The second row shows the marginal effect on the estimated transmission of MPS to nominal yields for *reversal* MPS. The last row ($BS23_{NewsAdj} \mid \mathbb{1}^{Rev.} = 1$) shows the estimated transmission of MPS to asset prices for *reversal* MPS. The classification of MPS into reversal and non-reversal MPS is based on the target and path factors derived from Gürkaynak et al. (2005a). The R-squared are derived from regressions estimated on selected sub-samples.

Considering the standard effects (Appendix Table A17) and the lack of significant effects after non-reversal statements, we find that the observed effects on real interest rates are essentially driven by our subsample of reversal statements. This suggests that the standard effects typically attributed to monetary policy surprises – such as changes in real interest rates – are more pronounced when the policy stance involves a reversal, where the path and target factors move in opposite directions.

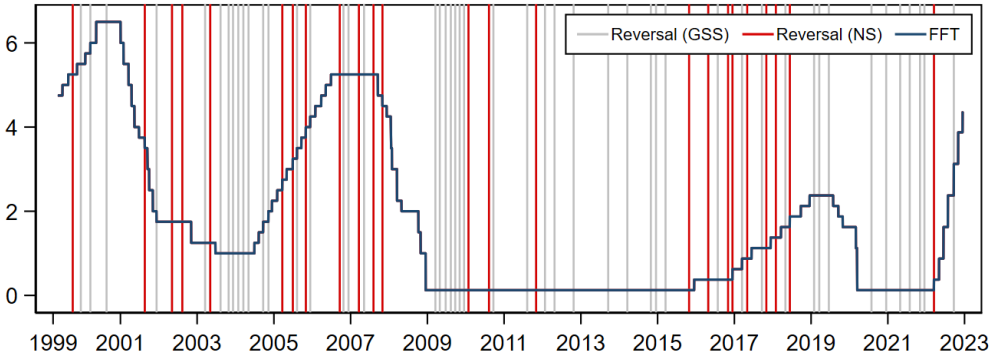
4.4 When do these future-dominant signals happen?

Having observed that these reversal statements, with future-dominant signals, tend to convey information about future short-term rates (the reaction function), and most likely on the path of future natural rates of interest, we now investigate, when do they happen?

Figure 5 plots the distribution of FOMC meeting reversals over time according to our two measures: one based on the target and path factors from Gürkaynak et al. (2005a), and the other based on a smaller set of reversals defined using FFR shocks and news shocks from Nakamura and Steinsson (2018)

We do not observe any striking pattern in this distribution of reversal statements. When next try to identify factors that could be related to a higher likelihood of observing a reversal statements. To this end, we run the following regressions:

Figure 5: Distribution over time of reversal statements



Notes: This chart plots the distribution of reversal statements over time. A reversal statement is defined as a statement for which (i) the path and target factors move in opposite directions and (ii) the path factor dominates the target factor. We present these reversal statements using two definitions of these factors: in grey, we identify reversal statement using the path and target factor derived from Gürkaynak et al. (2005a) and in red, we identify reversal statement using the FFR shocks and news shocks derived from Nakamura and Steinsson (2018). The blue line represents the Federal Fund Target (FFT), taken as a middle point of the range after the switch from target to range.

$$\begin{aligned}\Pr(\mathbb{1}_t^{Rev} = 1) = \Phi\,(&\beta_0 + \beta_1 \cdot \text{QE} + \beta_2 \cdot \text{FG} + \beta_3 \cdot \text{SEP} + \beta_4 \cdot \text{Press Conf} \\ &+ \beta_5 \cdot \text{Turning Point} + \beta_6 \cdot \text{Status Quo} + \beta_7 \cdot \text{MPU} \\ &+ \beta_8 \cdot \text{ISK} + \beta_9 \cdot \text{VIX}) + \epsilon_t\end{aligned} \tag{11}$$

Table 11 shows the results of these regressions. We find a higher probability of reversal statements when forward guidance announcements are updated, when monetary policy uncertainty (MPU) is elevated, and during *statu quo* interest rate decisions. For example, a *statu quo* decision occurs when the FOMC decides to leave rates unchanged but signals potential future rate changes. This signaling can lead to conflicting market interpretations, contributing to reversal dynamics. Similarly, periods of heightened monetary policy uncertainty often reflect divergent expectations or ambiguous signals from the FOMC, which can lead to conflicting updates in market beliefs. In contrast, FOMC meetings at key turning points in the interest rate cycle (such as the first or last move of a cycle) are less likely to be reversals.

These together, these factors suggest that reversal statements are more likely to occur in environments where forward guidance plays a central role, where policy direction is at an inflection point, or where uncertainty leads to mixed interpretations.

5 The effect of reversal over the following inter-meeting period

Given the inherently conflicting nature of the information conveyed to the markets in reversal statements, we can now reasonably ask to what extent and how these reversal statements affect subsequent market dynamics, focusing on the information acquisition process in the next inter-meeting period. With the exception of Cieslak and McMahon (2023) for the risk premium and Cieslak et al. (2019) for stock returns, intermeeting information dissemination and market dynamics following the FOMC statements are rarely studied.

Table 11: Probit model for determination of reversal statements

	Probability that statement is identified as a reversal: $\mathbb{1}_t^{Rev}$										
QE	0.092									0.087	
	[0.12]									[0.14]	
FG		0.232**								0.258**	0.279***
		[0.11]								[0.11]	[0.10]
SEP			-0.002							-0.017	
			[0.08]							[0.10]	
Press conf.				-0.026						0.085	
				[0.07]						[0.11]	
Turning pt					-0.297***					-0.193*	-0.186*
					[0.09]					[0.11]	[0.11]
Statu quo						0.140*				0.186**	0.186**
						[0.07]				[0.08]	[0.08]
MPU							0.128*			0.296***	0.254***
							[0.07]			[0.09]	[0.07]
ISK								0.064		0.002	
								[0.07]		[0.07]	
VIX									-0.003	-0.008**	-0.007*
									[0.00]	[0.00]	[0.00]
R^2	0.00	0.03	0.00	0.00	0.02	0.02	0.02	0.00	0.00	0.12	0.11
Obs.	188	188	188	188	188	188	188	188	188	188	188

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the results of the probit estimation of regression 11. The dependent variable is the probability that a statement is identified as a reversal statement using the target and the path factors derived from Gürkaynak et al. (2005a). The independent variables are, in turn: a dummy that takes the value of 1 if the FOMC meeting decides on a change in quantitative easing (QE) policy; a dummy that takes the value of 1 if the FOMC meeting decides on a change in forward guidance (FG) policy; a dummy that takes the value of 1 if the FOMC meeting is accompanied by a Summary of Economic Projections (SEP); a dummy that takes the value of 1 if the FOMC meeting is followed by a press conference (Press conf.); a dummy that takes the value of 1 if the FOMC meeting is a turning point, *i.e.* decides the last or first hike/cut before pauses; a dummy that takes the value of 1 if the FOMC meeting is decide a statu quo; an indicator of monetary policy uncertainty (MPU); an indicator reflecting macro uncertainty (ISK); and finally an index of the market volatility (VIX).The parameters are estimated from equation 5 using OLS with Huber-White heteroskedasticity-robust standard errors. The first nine columns show the effect of each variable separately. In the column (10), the effects of these covariates are estimated simultaneously. Finally, in the last column, only the relevant covariates are estimated simultaneously.

5.1 Data for intermeeting events

We focus on two key types of events during the intermeeting period, where the reception of information and subsequent market reactions could be affected by the influence of previous reversal statements: speeches and data releases.

Speeches. We focus on speeches given by members of the Board of Governors (who therefore vote at each meeting), taken from the Federal Reserve Board of Governors' website. We refer the reader to the Appendix B.1 for further details on the speeches. Figure A1 in Appendix shows the evolution of speeches across intermeetings. We then measure the information content of these speeches using the Latent Dirichlet Allocation (LDA thereafter, Blei, Ng, and Jordan (2003)), which is an unsupervised learning algorithm that clusters terms according to their co-occurrence across speeches. This requires pre-processing of the text (removing stopwords, and stemming). The topics in the LDA models are then determined endogenously. The researchers feed the LDA algorithm with a corpus of text and a pre-specified number of clusters, $C = 8$ in our case. The output is the distribution of words for each cluster and a set of proportions expressing the fraction of each speech (indexed by $d = 1, ..., D$) covered by the cluster topic k: $\theta_{k,d}{}_{d=1}^{D} \in [0, 1]$.

Economic data releases. We use a comprehensive set of important 27 key economic data releases, based on Gilbert et al. (2017): *GDP, PMI, Factory orders, Industrial production, ISM manufacturing, Construction Spending, Business inventories, Durable goods orders, Philadelphia Fed Business outlet, Leading index, capacity utilization, CPI, CPI excl. food and energy, PPI, PPI Excl. food and energy, GDP price deflator, Non-farm payroll, Unemployment rate, personal income, consumer credit, Trade balance, housing starts, New home sales, Conf. Board consumer confidence, University of Michigan Sentiment index*. We get the release from Bloomberg. Figure A2 shows the time series of our data releases.

Market reactions. To measure market reactions associated to an economic data release or a speech, we focus on daily data and gather data on Eurodollar futures contracts and 5-year interest rates (as well as their decomposition), for a sample going from 18 May 1999 to 14 December 2022. We provide descriptive statistics in the Appendix. One drawback of relying solely on daily data is that we are likely to capture the pre-FOMC announcement drift (Lucca and Moench (2015), Boguth, Grégoire, and Martineau (2019), Hu, Pan, Wang, and Zhu (2022)) in these daily fluctuations. On the other hand, the use of daily data avoids min-by-min liquidity issues (especially outside of FOMC days). Daily data also allow for better handling of event timing, especially for speeches or key excerpts that may not have a precise time stamp in the intraday records.

Another problem arising from using daily variations is that there may be a large number of events on a given day, which would imply imposing a priority rule across events. Finally, daily data captures investors' delayed reactions or reinterpretations of information. Markets may not fully digest or react to news immediately, and intra-day data may miss these lagged responses.

Appendix B.3 provides descriptive statistics on the occurrences of different Fed-related events over the inter-meeting period, statements, unscheduled meetings, speeches, data releases, and minutes. Overall, we cover 5,895 business days and 188 intermeeting period.

5.2 The impact of reversal on the next intermeeting

In this section, we examine how the nature of the information/news delivered in statement m – namely whether or not it is a reversal statement that delivers conflicting and long-term dominant information or not – affects market dynamics during the *subsequent* intermeeting period. The first part of this paper has established the fundamental role of reversal statements for the transmission of policy rates to long-term market rates. We have also bring some evidence suggesting that reversal statements are statements that are very informative about the future policy path and we argue that it may affect the information acquisition process in the subsequent intermeeting periods. We start by estimating the following equation, defined at the intermeeting period level $m = 1, ..., 188$:

$$\Delta Y_m = \alpha + \beta_1 \cdot \mathbb{1}_m^{Rev} + \beta_2 \cdot \mathbb{1}_m^{\text{MPU}} + \beta_3 \cdot \mathbf{X}_m + \epsilon_m \tag{12}$$

where ΔY_m represents various measures of policy rate expectations characterizing the intermeeting period following immediately the statement m, including:

- (i) the volatility of expectations for the policy rate, measured as the standard deviation of

daily changes in ED1 to ED4 over the next intermeeting period;

- (ii) the cumulative change in expectations for the policy rate, calculated as the sum of the absolute changes in ED1 to ED4 over the intermeeting period;

$\mathbb{1}_m^{Rev}$ is a dummy variable indicating whether the statement m, published just before the start of the intermeeting period, is a reversal statement or not. $\mathbb{1}_m^{\text{MPU}}$ is a dummy variable for high monetary policy uncertainty (above the sample median), as measured by Bauer et al. (2022). $\mathbf{X}_m$ is a vector of control variables, including dummies for large path factors and forward guidance announcements.

We then work with a similar equation, now defined and estimated at a daily frequency t, but only for days with speeches ($n = 806$) or economic data releases ($n = 3,595$):

$$\Delta Y_t = \alpha + \beta_1 \cdot \mathbb{1}_m^{Rev} + \beta_2 \cdot \mathbb{1}_m^{\text{MPU}} + \beta_3 \cdot \mathbf{X}_m + \epsilon_t \tag{13}$$

where ΔY_t now represents the market impact of data releases and speeches, as measured by the daily change in Eurodollar contracts (ED1-ED4) in the event of a speech or economic data release. With this specification, we examine how reversals and MPU affect the daily impact of data and speeches on policy rate expectations. In other words, we examine the extent to which the information acquisition process is modified following a reversal statement that provides both conflicting and dominant forward-looking information (controlling for MPU).

We also estimate this second specification 13 on all business days ($n = 5,866$) but the dependent variable ΔY_t now represents the changes in the 5-year nominal interest rates and their decompositions into (i) forward rates vs. term premia and (ii) real rates vs. inflation compensations. We examine the extent to which the magnitude of adjustment in long-term interest rates (and its various components) varies after a reversal statement.

Finally, we enrich this last specification 13 to examine how reversal statements affect the subsequent transmission of speeches and economic data releases to long-term interest rate. We estimate the following specification:

$$\begin{aligned}\Delta Y_t =& \alpha + \beta_1 \cdot \Delta ED4_{Speech_t} + \beta_2 \cdot \Delta ED4_{Speech_t} \cdot \mathbb{1}_m^{Rev} + \beta_3 \cdot \Delta ED4_{Speech_t} \\ &+ \beta_4 \cdot \Delta ED4_{Speech_t} \cdot \mathbb{1}_m^{\text{MPU}} + \beta_5 \cdot \mathbf{X}_m + \epsilon_t\end{aligned} \tag{14}$$

Here, $\Delta ED1_{Speech_t}$ is the change in the four quarters ahead Eurodollars when a speech take place at date t.

For all theses specifications, our null hypothesis (H0) is that a more informative statement reduces both the volatility of policy rate expectations and the weight placed on data releases and speeches in the subsequent intermeeting period. The rationale behind this hypothesis is that an informative statements provide market participants with sufficient information about the Federal Reserve's policy intentions, thereby reducing uncertainty and the need for information acquisition.

Table 12 shows that the volatility of policy rate expectations, particularly the standard deviation of one- and two-quarter maturity Eurodollar futures, tends to decline in the intermeeting period following a reversal statement. More specifically, we can see that for non-reversal, low MPU intermeeting periods, the average volatility of policy rate expectations is 0.021 and this volatility is more than 50% lower for intermeeting periods following a reversal (0.09). Lower volatility of policy rate expectations implies lower uncertainty. This is confirmed by the opposite finding, namely that high monetary policy uncertainty increases volatility very strongly at all maturities considered.

The cumulative change in policy rate expectations is another measure of the intermeeting adjustments in expectations. Again, we find that policy rate expectations move significantly less following a reversal statement: Eurodollar futures move by around 15-23 bp less in cumulative terms in the inter-meeting after a reversal statement. In other words, relative to intermeeting periods with low MPU that do not follow a reversal statement, the average cumulative change in intermeeting periods following a reversal statement is 40% lower.

These two results indicate that after a reversal statement –*i.e.* a statement that provides contrasting information between the current and future monetary policy paths and dominant news about the future – the adjustments in policy rate expectations are reduced in the subsequent intermeeting period. This is consistent with our null hypothesis that more informative statements reduce the need for information acquisition.

Table 12: The impact of reversal statements in the subsequent intermeeting period

	Volatility				**Cumulative change**			
	ED1	ED2	ED3	ED4	ED1	ED2	ED3	ED4
$\mathbb{1}_{Rev}$	-0.012**	-0.007**	-0.006	-0.005	-0.233***	-0.198**	-0.169**	-0.151*
	[0.00]	[0.00]	[0.00]	[0.00]	[0.08]	[0.08]	[0.08]	[0.09]
$\mathbb{1}_{MPU}$	0.035***	0.038***	0.044***	0.048***	0.560***	0.835***	1.043***	1.147***
	[0.01]	[0.00]	[0.00]	[0.00]	[0.09]	[0.09]	[0.09]	[0.10]
Constant	0.021***	0.025***	0.028***	0.032***	0.380***	0.533***	0.646***	0.752***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.05]	[0.05]	[0.06]	[0.06]
R^2	0.21	0.38	0.49	0.50	0.22	0.38	0.47	0.49
Obs.	187	187	187	187	187	187	187	187

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the impact of reversal meetings and monetary policy uncertainty on the magnitude of adjustments of policy rate expectations in the subsequent intermeeting period.The parameters are estimated from equation 12 using OLS with Huber-White heteroskedasticity-robust standard errors. In the first three columns, the depend variable is the standard deviation of ED1 to ED4 computed over the entire subsequent intermeeting period. In the next three columns, the dependent variable is the sum of the absolute value of the daily changes in ED1 to ED4 over the entire subsequent intermeeting period. In the first row, the independent variable is a dummy that takes the value of 1 if the current intermeeting period ends with a reversal statement. In the second row, the independent variable is a dummy that takes the value of 1 if the monetary policy uncertainty is higher than its sample median.

Next, we focus on the impact that economic data releases and speeches delivered by Federal Board members may have on policy rate expectations over an intermeeting period. In particular, we examine the extent to which more informative reversal statements modify these two relationships. To assess this, we look at the impact on the daily absolute changes in the Eurodollar futures

contracts (ED1-ED4) on the days when each of these events takes place.

Importantly, we restrict our attention to speeches that are directly relevant to monetary policy, *i.e.* they must discuss either the state of the economy or monetary policy itself. These speeches are identified using textual analysis methods, in particular the Latent Dirichlet Allocation (LDA).[7]

The results in the Table 13 suggest that statement providing both conflicting signals and dominant forward-looking signals lead to smaller fluctuations in the policy rate expectations associated to an economic data release in the subsequent intermeeting period. In other words, there is less subsequent information acquisition after a reversal statement. These results are robust, as we still find smaller fluctuations in the policy rate expectations following an economic data release even when we consider only the set of unique events, *i.e.* after excluding from the sample the days on which speeches and data releases coincide, thus ensuring that the effects of one event are not attributed to the other.

Now, we examine the extent to which reversal statements can affect the subsequent magnitude of the variations in the 5-year nominal interest rate (spot and forward) and its decomposition (i) between the expectation hypothesis and the term premium and (ii) between real and inflation compensation. We also examine how it affects the transmission of changes in policy rate expectations driven by speeches or economic data releases to these interest rates. Results are presented in Table 14.

There are two key takeaways from this Table 14. First, with respect to the magnitude of interest rate changes in the intermeeting period following a reversal statement, our estimates suggest weaker adjustments in long-term interest rates after a reversal statement. For instance, the nominal 5-year nominal and real interest rates are XX% and XX% lower in the intermeeting period following a reversal statement than in other intermeeting periods.

Second, after a reversal, the transmission to interest rates of the changes in the policy rate expectations induced by speeches and economic data releases weakens. This effect operates through different channels. The reduced sensitivity of the 5-year nominal yields speech-induced changes in policy rate expectations appears to be mainly due to changes in the term premium and/or inflation compensation. In contrast, for data-driven changes in policy rate expectations, the effect operates through shifts in forward rates (reflecting expectations of future average short-term rates) and the real component of the 5-year rate. Overall, the weaker transmission of information from speeches and data to 5-year rates after reversal statements highlights the strong forward-looking nature of reversal statements.

6 Conclusion

This paper contributes to the understanding of monetary policy transmission by emphasizing the heterogeneous effects of policy announcements on asset prices and interest rates. We first established that the structure of policy rate expectations—as defined by the interplay of target and path factors—plays a key role in determining market reactions. Specifically, by categorizing policy an-

[7] For a detailed explanation of the LDA methodology and its related topics, we refer the reader to Appendix B.4.

Table 13: Daily impacts of data releases and speeches about MP and state of econ

	All events				Unique events			
	ED1	ED2	ED3	ED4	ED1	ED2	ED3	ED4
	Speeches							
$\mathbb{1}_{Rev}$	-0.003	-0.002	-0.002	-0.001	-0.002	-0.001	-0.000	0.000
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]	[0.01]
$\mathbb{1}_{MPU}$	0.016***	0.025***	0.033***	0.037***	0.011***	0.019***	0.027***	0.032***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]
Constant	0.009***	0.016***	0.021***	0.024***	0.009***	0.014***	0.017***	0.020***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
R^2	0.05	0.10	0.13	0.14	0.06	0.08	0.09	0.10
Obs.	806	806	806	806	287	287	287	287
	Data releases							
$\mathbb{1}_{Rev}$	-0.007***	-0.006***	-0.005***	-0.004**	-0.007***	-0.006***	-0.005**	-0.004*
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
$\mathbb{1}_{MPU}$	0.020***	0.029***	0.037***	0.040***	0.017***	0.028***	0.035***	0.038***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Constant	0.012***	0.017***	0.021***	0.024***	0.013***	0.017***	0.020***	0.023***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
R^2	0.04	0.11	0.15	0.15	0.03	0.10	0.14	0.15
Obs.	3,595	3,595	3,595	3,595	2,637	2,637	2,637	2,637

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. This table shows the impact of reversal meetings and monetary policy uncertainty on the magnitude of the daily adjustments in policy rate expectations on the day of an economic data release or a monetary policy speech.The parameters are estimated from equation 13 using OLS with Huber-White heteroskedasticity-robust standard errors. In the top panel, the dependent variable is the daily change in ED1 to ED4 on the day of a monetary policy speech. In the bottom panel, the dependent variable is the daily change in ED1 to ED4 on the day of an economic data release. In the first four columns, we consider all these days, ignoring the occurrence of multiple events on the same day. In the next four columns, we restrict our sample to days with a single, unique event (speech or economic data release). In the first row, the independent variable is a dummy that takes the value of 1 if the current intermeeting period ends with a reversal statement. In the second row, the independent variable is a dummy that takes the value of 1 if the monetary policy uncertainty is higher than its sample median.

nouncements through the lens of target and path factors, we identified the pivotal role of reversal statements—characterized by conflicting signals where forward-looking information dominates. These reversal events, while constituting only a fraction of statements, disproportionately shape long-term interest rates, emphasizing their unique role in monetary policy transmission. Consistent signals, where present and future monetary news go in the same direction, affect short-term rates, stock prices and market volatility. These findings underscore that the transmission of monetary policy is not uniform; rather, it is highly contingent on the nature and composition of policy signals.

Our other main two findings suggest that reversal statements effectively transfer significant information about the central bank's reaction function and future policy path, thereby reducing market volatility and information acquisition during subsequent intermeeting periods. Beyond identifying the key role of reversal statements, our results thus have critical implications for cen-

Table 14: 5-year interest rates and their decomposition

	Nom. 5y	Forw. 5y	TP 5y	Real 5y	Inf. Comp. 5y
	Magnitude (abs. value changes)				
$\mathbb{1}_{Rev}$	-0.006***	-0.006***	-0.001	-0.003***	-0.003***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
$\mathbb{1}_{MPU}$	0.019***	0.009***	0.004***	0.011***	0.014***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Constant	0.035***	0.048***	0.019***	0.033***	0.023***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
R^2	0.06	0.01	0.01	0.02	0.06
Obs.	5,866	5,866	5,866	5,855	5,855
	Transmission (changes)				
$\Delta ED4_{Speech}$	0.370***	0.288***	0.102***	0.220***	0.151***
	[0.05]	[0.06]	[0.03]	[0.05]	[0.04]
$\Delta ED4_{Speech}$ x $\mathbb{1}_{Rev}$	-0.269**	-0.196	-0.087**	-0.122	-0.148**
	[0.11]	[0.12]	[0.04]	[0.08]	[0.07]
$\Delta ED4_{Data}$	0.676***	0.582***	0.135***	0.450***	0.226***
	[0.03]	[0.04]	[0.02]	[0.03]	[0.02]
$\Delta ED4_{Data}$ x $\mathbb{1}_{Rev}$	-0.109*	-0.143***	0.024	-0.108**	-0.001
	[0.06]	[0.06]	[0.03]	[0.05]	[0.04]
R^2	0.40	0.20	0.09	0.20	0.09
Obs.	5,866	5,866	5,866	5,855	5,855

Note: Robust standard errors in brackets. * p < 0.10, ** p < 0.05, *** p < 0.01. The top panel of this table shows the impact of reversal statements and monetary policy uncertainty on the daily change in the absolute value of the 5-year nominal yield and its decomposition into (i) an expectations hypothesis component vs. a term premium component and (ii) a real interest rate component vs. an inflation compensation component. The parameters are estimated from equation 13 using OLS with Huber-White heteroskedasticity-robust standard errors. In the first row, the independent variable is a dummy that takes the value of 1 if the current intermeeting period ends with a reversal statement. In the second row, the independent variable is a dummy that takes the value of 1 if the monetary policy uncertainty is higher than its sample median. The bottom panel of this table shows the estimated transmission of changes in policy rate expectations on the day of an economic data release or a monetary policy speech to the 5-year nominal yield and its decomposition into (i) an expectation hypothesis component vs. a term premium component and (ii) a real interest rate component vs. an inflation compensation component. The first and the third rows represent the unconditional effect of speeches and economic data releases on the nominal yield and its decomposition. The second and the fourth rows show the effect of speeches and economic data releases on the nominal yield and its decomposition when the previous intermeeting period ends with a reversal statement. The parameters are estimated from equation 14 using OLS with Huber-White heteroskedasticity-robust standard errors.

tral bank communication strategies. Policymakers should be cognizant of how different mixes of current and future policy signals are perceived by markets and adapt their messaging accordingly. Clarity in signaling the future policy path can optimize market responses over the next intermeeting period.

Beyond its policy implications, our analysis also underscores the importance of integrating these dimensions into macroeconomic modeling and policy evaluation frameworks. For instance,

our results suggest that macroeconomic models would benefit from incorporating state-dependent sensitivities of asset prices to monetary policy surprises, particularly for long-term yields.

Future research could explore the interaction between reversal statements and other macroeconomic variables, as well as extend the analysis to other central banks and economic contexts. By refining our understanding of the life-cycle of policy rate expectations, we aim to contribute to a more effective and transparent monetary policy framework.

References

ACOSTA, M. (2024): "The perceived causes of monetary policy surprises," *Manuscript*.

ACOSTA, M., C. BRENNAN, AND M. M. JACOBSON (2024): "Constructing high-frequency monetary policy surprises from SOFR futures," *Economics Letters*, 242, 111873.

ARUOBA, B. AND T. DRECHSEL (2024): "Identifying monetary policy shocks: A natural language approach," *NBER Working Paper*, No. 32417.

BAUER, M. AND M. CHERNOV (2024): "Interest rate skewness and biased beliefs," *The Journal of Finance*, 79, 173–217.

BAUER, M., A. LAKDAWALA, AND P. MUELLER (2022): "Market-based monetary policy uncertainty," *The Economic Journal*, 132, 1290–1308.

BAUER, M., C. PFLUEGER, AND A. SUNDERAM (2024): "Perceptions about monetary policy," *The Quarterly Journal of Economics*, 139, 2227–2278.

BAUER, M. AND E. SWANSON (2023a): "An alternative explanation for the "Fed information effect"," *American Economic Review*, 113, 664–700.

——— (2023b): "A reassessment of monetary policy surprises and high-frequency identification," *NBER Macroeconomics Annual*, 37, 87–155.

BERNANKE, B. S. AND K. N. KUTTNER (2005): "What explains the stock market's reaction to Federal Reserve policy?" *The Journal of finance*, 60, 1221–1257.

BIANCHI, F., S. C. LUDVIGSON, AND S. MA (2024): "What Hundreds of Economic News Events Say About Belief Overreaction in the Stock Market," Tech. rep., National Bureau of Economic Research.

BLEI, D., A. NG, AND M. JORDAN (2003): "Latent dirichlet allocation," *Journal of Machine Learning Research*, 3, 993–1022.

BOCOLA, L., A. DOVIS, K. JØRGENSEN, AND R. KIRPALANI (2024): "Bond market views of the Fed," *NBER Working Paper*, No. 32620.

BOEHM, C. AND N. KRONER (2024): "Monetary Policy without Moving Interest Rates: The Fed Non-Yield Shock," *NBER Working Paper*, No. 32636.

BOGUTH, O., V. GRÉGOIRE, AND C. MARTINEAU (2019): "Shaping expectations and coordinating attention: The unintended consequences of FOMC press conferences," *Journal of Financial and Quantitative Analysis*, 54, 2327–2353.

CAMPBELL, J., C. EVANS, J. FISHER, AND A. JUSTINIANO (2012): "Macroeconomic Effects of Federal Reserve Forward Guidance," *Brookings Papers on Economic Activity*, 2012, 1–80.

CIESLAK, A. AND M. MCMAHON (2023): "Tough talk: The Fed and the risk premium," *Available at SSRN*.

CIESLAK, A., A. MORSE, AND A. VISSING-JORGENSEN (2019): "Stock returns over the FOMC cycle," *The Journal of Finance*, 74, 2201–2248.

CIESLAK, A. AND H. PANG (2021): "Common shocks in stocks and bonds," *Journal of Financial Economics*, 142, 880–904.

CIESLAK, A. AND A. SCHRIMPF (2019): "Non-monetary news in central bank communication," *Journal of International Economics*, 118, 293–315.

COCHRANE, J. AND M. PIAZZESI (2002): "The Fed and Interest Rates - A High-Frequency Identification," *American Economic Review*, 92, 90–95.

COOK, T. AND T. HAHN (1989): "The effect of changes in the federal funds rate target on market interest rates in the 1970s," *Journal of Monetary Economics*, 24, 331–351.

CORBET, S., J. DUNNE, AND C. LARKIN (2019): "Quantitative easing announcements and high-frequency stock market volatility: Evidence from the United States," *Research in International Business and Finance*, 48, 321–334.

ELLINGSEN, T. AND U. SÖDERSTRÖM (2001): "Monetary policy and market interest rates," *American Economic Review*, 91, 1594–1607.

GILBERT, T., C. SCOTTI, G. STRASSER, AND C. VEGA (2017): "Is the intrinsic value of a macroeconomic news announcement related to its asset price impact?" *Journal of Monetary Economics*, 92, 78–95.

GÜRKAYNAK, R., B. KISACIKOĞLU, AND J. WRIGHT (2020): "Missing events in event studies: Identifying the effects of partially measured news surprises," *American Economic Review*, 110, 3871–3912.

GÜRKAYNAK, R., B. SACK, AND E. SWANSON (2005a): "Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements," *International Journal of Central Banking*, 1, 55–93.

——— (2005b): "The sensitivity of long-term interest rates to economic news: Evidence and implications for macroeconomic models," *American Economic Review*, 95, 425–436.

GÜRKAYNAK, R., B. SACK, AND J. WRIGHT (2007): "The US Treasury yield curve: 1961 to the present," *Journal of Monetary Economics*, 54, 2291–2304.

HANDLAN, A. (2022): "Text shocks and monetary surprises: Text analysis of FOMC statements with machine learning," *Manuscript*.

HANSON, S. AND J. STEIN (2015): "Monetary Policy and Long-Term Real Rates," *Journal of Financial Economics*, 115, 429–448.

HILLENBRAND, S. (2024): "The Fed and the secular decline in interest rates," *Review of Financial Studies*, forthcoming.

HU, G., J. PAN, J. WANG, AND H. ZHU (2022): "Premium for heightened uncertainty: Explaining pre-announcement market returns," *Journal of Financial Economics*, 145, 909–936.

JAROCIŃSKI, M. AND P. KARADI (2020): "Deconstructing monetary policy surprises—the role of information shocks," *American Economic Journal: Macroeconomics*, 12, 1–43.

JORDÀ, Ò. (2005): "Estimation and inference of impulse responses by local projections," *American Economic Review*, 95, 161–182.

KRISHNAMURTHY, A. AND A. VISSING-JORGENSEN (2011): "The effects of quantitative easing on interest rates: Channels and implications for policy," *Brookings Papers on Economic Activity*, Fall 2011, 215–265.

KUTTNER, K. (2001): "Monetary policy surprises and interest rates: Evidence from the Fed funds futures market," *Journal of Monetary Economics*, 47, 523–544.

LUCCA, D. AND E. MOENCH (2015): "The pre-FOMC announcement drift," *The Journal of Finance*, 70, 329–371.

LUNSFORD, K. (2020): "Policy language and information effects in the early days of Federal Reserve forward guidance," *American Economic Review*, 110, 2899–2934.

MIRANDA-AGRIPPINO, S. AND G. RICCO (2021): "The Transmission of Monetary Policy Shocks," *American Economic Journal: Macroeconomics*, 13, 74–107.

NAKAMURA, E. AND J. STEINSSON (2018): "High-Frequency Identification of Monetary Non-Neutrality: The Information Effect," *Quarterly Journal of Economics*, 133, 1283–1330.

NEUHIERL, A. AND M. WEBER (2019): "Monetary policy communication, policy slope, and the stock market," *Journal of Monetary Economics*, 108, 140–155.

RAMEY, V. (2016): "Macroeconomic shocks and their propagation," *Handbook of Macroeconomics*, 2, 71–162.

ROMER, C. AND D. ROMER (2000): "Federal Reserve information and the behavior of interest rates," *American Economic Review*, 90, 429–457.

SWANSON, E. (2021): "Measuring the effects of federal reserve forward guidance and asset purchases on financial markets," *Journal of Monetary Economics*, 118, 32–53.

Appendix
For online publication

A Additional evidence

Table A1: The effect of MPS using Gürkaynak et al. (2005a)

	S&	2y	5y	10y	VIX
GSS05	-3.427	0.254***	0.199**	0.082	3.636
	[2.10]	[0.07]	[0.08]	[0.08]	[2.23]
GSS05 x $\mathbb{1}_{Rev.}$	2.124	0.173**	0.207*	0.215*	-1.535
	[2.57]	[0.08]	[0.11]	[0.11]	[2.73]
GSS05 $\mid \mathbb{1}_{Rev.} = 1$	-1.303	0.428***	0.407***	0.297***	2.101
	[1.49]	[0.04]	[0.07]	[0.07]	[1.57]
R^2	0.06	0.32	0.20	0.11	0.04
R^2 No Reversal	0.05	0.14	0.08	0.02	0.02
R^2 Reversal	0.02	0.56	0.29	0.17	0.02
Obs.	188	188	188	188	188

Table A2: The effect of MPS using Jarociński and Karadi (2020)

	S&P500	2y	5y	10y	VIX
JK20	-6.936**	0.438***	0.320**	0.120	7.710**
	[3.26]	[0.12]	[0.14]	[0.15]	[3.85]
JK20 x $\mathbb{1}_{Rev.}$	3.641	0.704***	0.802***	0.722***	-3.238
	[5.07]	[0.17]	[0.25]	[0.27]	[5.74]
JK20 $\mid \mathbb{1}_{Rev.} = 1$	-3.295	1.142***	1.122***	0.842***	4.472
	[3.88]	[0.12]	[0.21]	[0.23]	[4.25]
R^2	0.07	0.34	0.21	0.12	0.05
R^2 No Reversal	0.06	0.16	0.08	0.01	0.03
R^2 Reversal	0.02	0.58	0.32	0.20	0.01
Obs.	188	188	188	188	188

Table A3: The effect of MPS using unadjusted MPS from Bauer and Swanson (2023a)

	S&P500	2y	5y	10y	VIX
BS23	-7.031**	0.396***	0.305**	0.124	7.789**
	[3.41]	[0.14]	[0.15]	[0.16]	[3.75]
BS23 x $\mathbb{1}_{Rev.}$	4.170	0.596***	0.649***	0.586**	-4.190
	[4.82]	[0.18]	[0.24]	[0.26]	[5.10]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	-2.861	0.993***	0.954***	0.710***	3.599
	[3.41]	[0.11]	[0.19]	[0.20]	[3.46]
R^2	0.07	0.32	0.20	0.12	0.04
R^2 No Reversal	0.06	0.13	0.07	0.01	0.03
R^2 Reversal	0.02	0.58	0.31	0.19	0.01
Obs.	188	188	188	188	188

Table A4: MPS and reversal statement classification from Nakamura and Steinsson (2018)

	S&P500	2y	5y	10y	VIX
NS18	-9.581**	0.913***	0.738***	0.408**	11.088**
	[4.38]	[0.19]	[0.20]	[0.19]	[5.23]
NS18 x $\mathbb{1}_{Rev.}$	19.212	1.133***	1.140***	0.914***	-17.867
	[12.37]	[0.29]	[0.34]	[0.31]	[11.83]
NS18 $\mid \mathbb{1}_{Rev.} = 1$	9.631	2.046***	1.877***	1.322***	-6.780
	[11.57]	[0.22]	[0.28]	[0.25]	[10.61]
R^2	0.06	0.28	0.14	0.06	0.03
R^2 No Reversal	0.06	0.20	0.09	0.03	0.03
R^2 Reversal	0.06	0.69	0.59	0.48	0.03
Obs.	188	188	188	188	188
Obs. Reversal	24	24	24	24	24

Table A5: The effect of MPS using pure MP shocks from Jarociński and Karadi (2020)

	S&P500	2y	5y	10y	VIX
$JK20_{MP}$	-10.973***	0.325*	0.262	0.071	12.628***
	[3.08]	[0.18]	[0.19]	[0.18]	[3.69]
$JK20_{MP}$ x $\mathbb{1}_{Rev.}$	5.030	0.795***	0.960**	0.897**	-11.737*
	[4.40]	[0.23]	[0.38]	[0.43]	[6.28]
$JK20_{MP} \mid \mathbb{1}_{Rev.} = 1$	-5.943*	1.120***	1.222***	0.968**	0.891
	[3.14]	[0.15]	[0.33]	[0.39]	[5.07]
R^2	0.14	0.32	0.25	0.17	0.07
R^2 No Reversal	0.12	0.10	0.06	0.01	0.07
R^2 Reversal	0.06	0.59	0.40	0.27	0.00
Obs.	188	188	188	188	188

Table A6: Combined reversal statement classification from GSS2005 and NS2018

	S&P500	2y	5y	10y	VIX
BS23	-7.364***	0.560***	0.490***	0.267**	8.684***
	[2.58]	[0.15]	[0.15]	[0.13]	[3.17]
BS23 x $\mathbb{1}_{Rev.}$	10.606	0.556***	0.536***	0.461**	-11.529*
	[6.71]	[0.18]	[0.20]	[0.19]	[6.03]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	3.243	1.116***	1.026***	0.728***	-2.845
	[6.19]	[0.10]	[0.14]	[0.14]	[5.12]
R^2	0.07	0.25	0.14	0.06	0.04
R^2 No Reversal	0.05	0.17	0.09	0.03	0.03
R^2 Reversal	0.02	0.70	0.63	0.51	0.02
Obs.	188	188	188	188	188
Obs. Reversal	19	19	19	19	19

Table A7: Controlling for monetary policy uncertainty

	S&P500	2y	5y	10y	VIX
BS23	-18.015**	1.373***	1.265***	0.560*	24.646*
	[7.41]	[0.33]	[0.34]	[0.32]	[12.89]
BS23 x $\mathbb{1}_{Rev.}$	3.702	0.663***	0.728***	0.678***	-4.887
	[4.86]	[0.22]	[0.23]	[0.22]	[5.82]
BS23 x MPU	10.543	-1.009***	-1.007***	-0.515	-15.604
	[7.80]	[0.39]	[0.38]	[0.32]	[12.83]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	-14.313**	2.036***	1.993***	1.237***	19.759
	[7.21]	[0.42]	[0.43]	[0.36]	[13.45]
R^2	0.09	0.33	0.21	0.11	0.08
R^2 No Reversal	0.09	0.13	0.07	0.01	0.09
R^2 Reversal	0.03	0.49	0.26	0.16	0.01
Obs.	188	188	188	188	188

Table A8: Controlling for interest rate skewness

	S&P500	2y	5y	10y	VIX
BS23	-8.036**	0.375*	0.260	0.029	9.772**
	[3.46]	[0.20]	[0.18]	[0.15]	[3.82]
BS23 x $\mathbb{1}_{Rev.}$	3.231	0.586**	0.597**	0.555**	-3.029
	[5.46]	[0.26]	[0.29]	[0.27]	[5.66]
BS23 x ISK	6.959	0.118	0.445	0.565	-17.464
	[7.88]	[0.57]	[0.55]	[0.42]	[10.95]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	-4.805	0.960***	0.856***	0.584***	6.743*
	[3.65]	[0.16]	[0.21]	[0.19]	[4.05]
R^2	0.08	0.29	0.19	0.14	0.06
R^2 No Reversal	0.09	0.13	0.07	0.01	0.09
R^2 Reversal	0.03	0.49	0.26	0.16	0.01
Obs.	188	188	188	188	188

Table A9: Controlling for the volatility of financial market (VIX)

	S&P500	2y	5y	10y	VIX
BS23	1.113	0.577**	-0.004	-0.639*	-6.101
	[6.98]	[0.27]	[0.34]	[0.34]	[7.52]
BS23 x $\mathbb{1}_{Rev.}$	2.652	0.580**	0.745***	0.801***	-3.295
	[4.85]	[0.22]	[0.27]	[0.25]	[5.83]
BS23 x VIX	-0.366	-0.007	0.012	0.028**	0.643***
	[0.30]	[0.01]	[0.01]	[0.01]	[0.23]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	3.765	1.158***	0.740***	0.162	-9.396*
	[5.80]	[0.17]	[0.22]	[0.21]	[5.51]
R^2	0.09	0.30	0.20	0.16	0.06
R^2 No Reversal	0.09	0.13	0.07	0.01	0.09
R^2 Reversal	0.03	0.49	0.26	0.16	0.01
Obs.	188	188	188	188	188

Table A10: Controlling for quantitative easing

	S&P500	2y	5y	10y	VIX
BS23	-6.403**	0.355*	0.204	-0.022	8.444*
	[3.01]	[0.21]	[0.20]	[0.15]	[4.31]
BS23 x $\mathbb{1}_{Rev.}$	4.368	0.600**	0.668***	0.648***	-6.121
	[4.70]	[0.23]	[0.25]	[0.23]	[5.52]
BS23 x Unconv	-15.141	0.377	0.811	0.783	13.567
	[13.02]	[0.36]	[0.54]	[0.61]	[12.35]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	-2.035	0.955***	0.872***	0.626***	2.323
	[3.43]	[0.10]	[0.15]	[0.15]	[3.56]
R^2	0.09	0.28	0.20	0.13	0.05
R^2 No Reversal	0.05	0.10	0.05	0.00	0.04
R^2 Reversal	0.03	0.51	0.30	0.20	0.04
Obs.	188	188	188	188	188

Table A11: Controlling for forward guidance

	S&P500	2y	5y	10y	VIX
BS23	-6.189**	0.342	0.203	-0.028	8.228*
	[2.93]	[0.21]	[0.19]	[0.14]	[4.40]
BS23 x $\mathbb{1}_{Rev.}$	6.929	0.547**	0.576**	0.546***	-8.775*
	[4.34]	[0.21]	[0.22]	[0.20]	[5.01]
BS23 x FG	-16.129***	0.526***	0.828***	0.850***	13.930**
	[5.46]	[0.19]	[0.30]	[0.32]	[5.66]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	0.739	0.889***	0.779***	0.518***	-0.547
	[3.44]	[0.10]	[0.14]	[0.14]	[3.08]
R^2	0.15	0.28	0.20	0.14	0.08
R^2 No Reversal	0.05	0.10	0.05	0.00	0.04
R^2 Reversal	0.03	0.51	0.30	0.20	0.04
Obs.	188	188	188	188	188

Table A12: Controlling for *Summary of Economic Projections* (SEP)

	S&P500	2y	5y	10y	VIX
BS23	-9.354**	0.464**	0.368*	0.134	12.612***
	[4.11]	[0.21]	[0.20]	[0.18]	[4.81]
BS23 x $\mathbb{1}_{Rev.}$	3.614	0.646***	0.704***	0.656***	-3.944
	[4.58]	[0.22]	[0.25]	[0.23]	[5.15]
BS23 x SEP	5.834	-0.273	-0.316	-0.288	-11.406**
	[4.43]	[0.25]	[0.29]	[0.24]	[5.67]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	-5.740*	1.110***	1.072***	0.790***	8.668***
	[3.26]	[0.14]	[0.18]	[0.17]	[3.07]
R^2	0.08	0.28	0.17	0.11	0.07
R^2 No Reversal	0.05	0.10	0.05	0.00	0.04
R^2 Reversal	0.03	0.51	0.30	0.20	0.04
Obs.	188	188	188	188	188

Table A13: Controlling for press conferences

	S&P500	2y	5y	10y	VIX
BS23	-8.518**	0.481**	0.365*	0.152	10.366**
	[3.77]	[0.19]	[0.20]	[0.18]	[4.92]
BS23 x $\mathbb{1}_{Rev.}$	4.354	0.619***	0.695***	0.674***	-6.164
	[4.70]	[0.22]	[0.24]	[0.22]	[5.45]
BS23 x PressConf	3.020	-0.387	-0.362	-0.423*	-3.093
	[5.72]	[0.30]	[0.30]	[0.23]	[8.27]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	-4.163	1.100***	1.060***	0.826***	4.202
	[3.33]	[0.13]	[0.16]	[0.16]	[3.84]
R^2	0.07	0.28	0.18	0.11	0.05
R^2 No Reversal	0.04	0.11	0.06	0.01	0.03
R^2 Reversal	0.03	0.49	0.26	0.16	0.01
Obs.	188	188	188	188	188

Table A14: Controlling for large path factors (above median)

	S&P500	2y	5y	10y	VIX
BS23	-8.859**	0.214	0.013	-0.246	13.229*
	[4.01]	[0.27]	[0.24]	[0.16]	[6.77]
BS23 x $\mathbb{1}_{Rev.}$	4.009	0.493*	0.514*	0.480*	-4.131
	[5.48]	[0.25]	[0.27]	[0.25]	[5.78]
BS23 x Steepening	1.735	0.314	0.474	0.526**	-6.247
	[5.66]	[0.33]	[0.30]	[0.23]	[7.92]
BS23 $\mid \mathbb{1}_{Rev.} = 1$	-4.850	0.706**	0.527	0.234	9.098
	[5.94]	[0.32]	[0.32]	[0.26]	[8.09]
R^2	0.07	0.28	0.18	0.12	0.05
R^2 No Reversal	0.04	0.10	0.05	0.01	0.03
R^2 Reversal	0.05	0.50	0.26	0.16	0.02
Obs.	188	188	188	188	188

Table A15: Summary of BS23, Interactions, and Control Effects on Asset Prices

Control	Dep.Var.	BS23	BS23 x Rev	BS23 x Control	R^2	Obs.
MPU	S&P500	-18.015**	3.702	10.543	0.09	188
	2Y	1.373***	0.663***	-1.009***	0.33	188
	5Y	1.265***	0.728***	-1.007***	0.21	188
	10Y	0.560*	0.678***	-0.515	0.11	188
	VIX	24.646*	-4.887	-15.604	0.08	188
ISK	S&P500	-8.036**	3.231	6.959	0.08	188
	2Y	0.375*	0.586**	0.118	0.29	188
	5Y	0.260	0.597**	0.445	0.19	188
	10Y	0.029	0.555**	0.565	0.14	188
	VIX	9.772**	-3.029	-17.464	0.06	188
VIX	S&P500	1.113	2.652	-0.366	0.09	188
	2Y	0.577**	0.580**	-0.007	0.30	188
	5Y	-0.004	0.745***	0.012	0.20	188
	10Y	-0.639*	0.801***	0.028**	0.16	188
	VIX	-6.101	-3.295	0.643***	0.06	188
QE	S&P500	-6.403**	4.368	-15.141	0.09	188
	2Y	0.355*	0.600**	0.377	0.28	188
	5Y	0.204	0.668***	0.811	0.20	188
	10Y	-0.022	0.648***	0.783	0.13	188
	VIX	8.444*	-6.121	13.567	0.05	188
FG	S&P500	-6.189**	6.929	-16.129***	0.15	188
	2Y	0.342	0.547**	0.526***	0.28	188
	5Y	0.203	0.576**	0.828***	0.20	188
	10Y	-0.028	0.546***	0.850***	0.14	188
	VIX	8.228*	-8.775*	13.930**	0.08	188
SEP	S&P500	-9.354**	3.614	5.834	0.08	188
	2Y	0.464**	0.646***	-0.273	0.28	188
	5Y	0.368*	0.704***	-0.316	0.17	188
	10Y	0.134	0.656***	-0.288	0.11	188
	VIX	12.612***	-3.944	-11.406**	0.07	188
PCONF	S&P500	-8.518**	4.354	3.020	0.07	188
	2Y	0.481**	0.619***	-0.387	0.28	188
	5Y	0.365*	0.695***	-0.362	0.18	188
	10Y	0.152	0.674***	-0.423*	0.11	188
	VIX	10.366**	-6.164	-3.093	0.05	188
LP	S&P500	-8.859**	4.009	1.735	0.07	188
	2Y	0.214	0.493*	0.314	0.28	188
	5Y	0.013	0.514*	0.474	0.18	188
	10Y	-0.246	0.480*	0.526**	0.12	188
	VIX	13.229*	-4.131	-6.247	0.05	188

Table A16: Decomposition of nominal interest rates

	Nominal interest rates			Real rates			Inflation comp.		
	2y	5y	10y	2y	5y	10y	2y	5y	10y
$BS23_{NewsAdj}$	0.645***	0.552***	0.308***	0.263	0.571***	0.401***	0.382	-0.019	-0.093
	[0.12]	[0.12]	[0.11]	[0.42]	[0.15]	[0.11]	[0.40]	[0.11]	[0.08]
R^2	0.22	0.12	0.04	0.01	0.09	0.07	0.01	0.00	0.02
Obs.	188	188	188	188	188	188	188	188	188

Table A17: Decomposition of nominal interest rates

	Nominal interest rates			Expectation hypothesis			Term premium		
	2y	5y	10y	2y	5y	10y	2y	5y	10y
$BS23_{NewsAdj}$	0.645***	0.552***	0.308***	0.735***	0.256*	-0.044	-0.120**	0.314***	0.344***
	[0.12]	[0.12]	[0.11]	[0.15]	[0.14]	[0.11]	[0.06]	[0.08]	[0.07]
R^2	0.22	0.12	0.04	0.15	0.02	0.00	0.02	0.12	0.12
Obs.	188	188	188	188	188	188	188	188	188

B Events database

B.1 Speeches

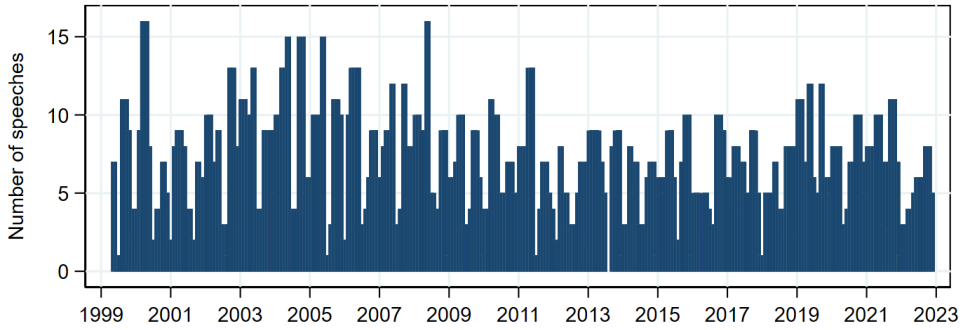
The FOMC members' speeches are obtained from the Federal Reserve website, covering speeches from the Board members between 1996-2020 and the ECB speech database, covering the Executive Board members speeches only as well. For the ECB, we keep only the speeches in English, as only a few speeches in a database are not enough to pursue a language-specific topic analysis, and letting different langugages in the database impact the topic distribution.

We move the date of a speech that is happening on a weekend or holiday to the next business day. Note that several speeches can happen the same day. The topic analysis collapses the topics share by date. In order to have metadata by date as well, we concatenate the different speakers, text and location when there are several speeches.

Timing of the speeches. There are only 3 speeches of Board members for the Fed, happening the same day of a given FOMC statement: 13/12/2017 (Brainard at 6pm), 29/09/1998 (Ferguson at 3:15pm) and 11 March 2008 (Krozner at 10:00 am. There was a conference call on the 10th and the press release is on the 11th, with an announcement was at 8:30 am. See FOMC Conference Call Transcript, March 10, 2008). On all these occasions, the speeches did not happen at the same time as the statement is released at 2:15 pm.

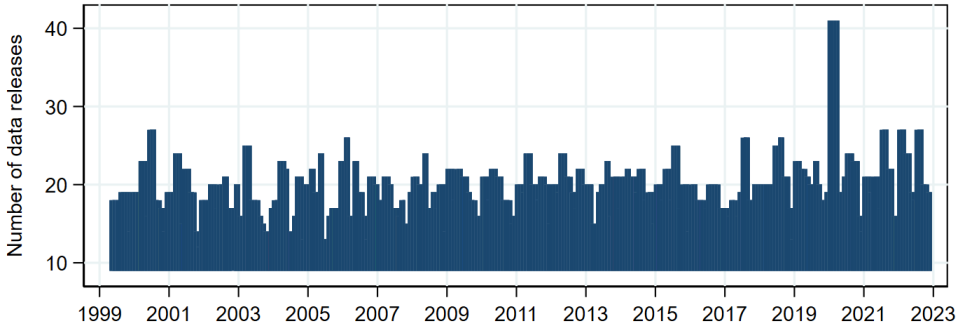
Speeches are made available on the media the same day as their occurrence. Merging with the Factiva database, we do see that they are published the same day (for example: 11/16/2009 published at 11:33 pm, 12/07/2009 at 05:34 pm and 22/08/2008 at 11:29 pm (Jackson Hole speech).

Figure A1: Number of speeches in each intermeeting



B.2 Data releases

Figure A2: Number of data releases in each intermeeting



B.3 Descriptive statistics

Table A18: Descriptive statistics

	Total	Share	Avg Nb/IM	Max/IM	All events		Unique events	
					Avg. effect	IM adj. share	Avg. effect	IM adj. share
Statements	188	3.2	1	1	0.063	5.5	0.063	6.6
Unscheduled	10	0.2	0.07	2	0.161	0.3	0.180	0.2
Speeches	1207	20.5	6.6	16	0.035	19.7	0.031	7.9
Data releases	2747	46.6	15.0	36	0.036	49.2	0.036	55.6
Minutes	54	0.9	0.3	1	0.029	0.9	0.029	1.1
Residual	1689	28.7	9.1	17	0.030	24.3	0.030	28.7

Figure A3: Contribution of each event in cumulated absolute changes in ED4, per IM

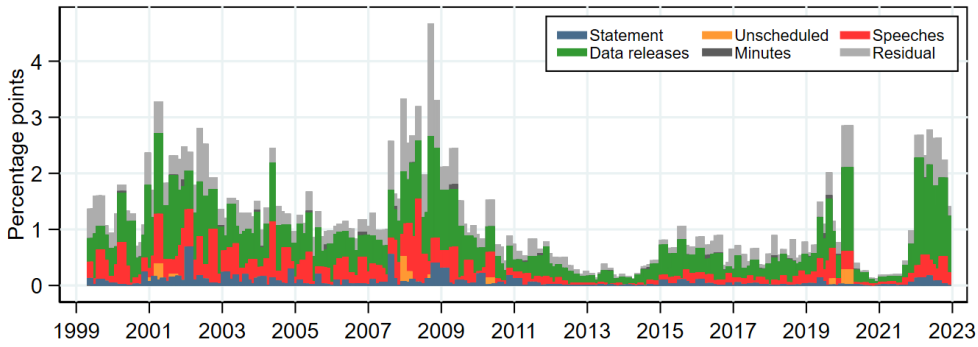


Figure A4: Share of each event in cumulated absolute changes in ED4, per IM

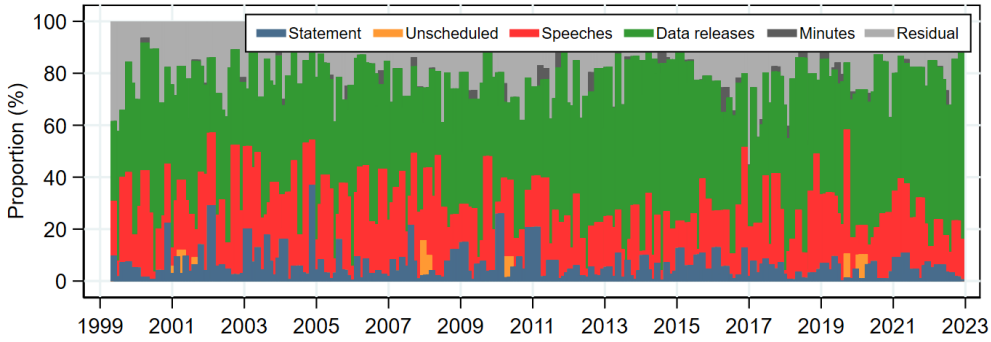


Figure A5: Share of data releases in ED4 cumulated adjustment in each IM

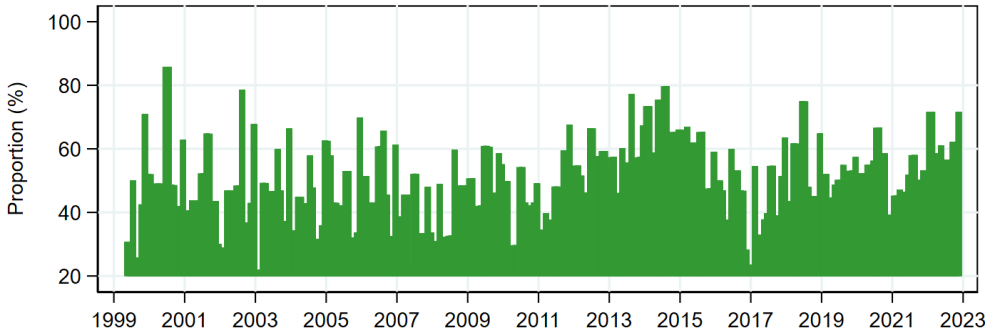
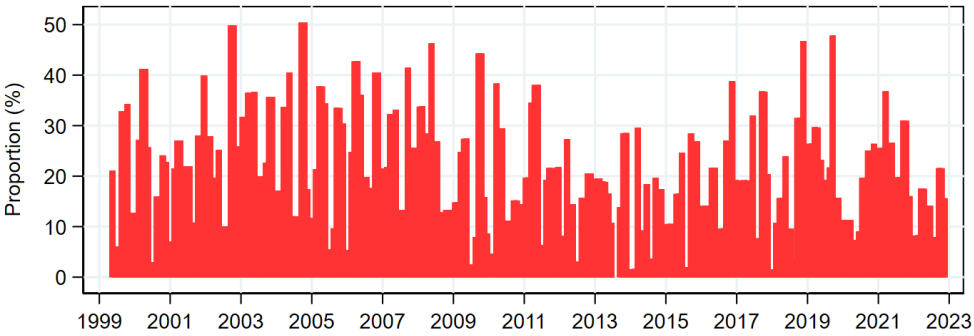


Figure A6: Share of speeches in ED4 cumulated adjustment in each IM



B.4 Measuring the content of speeches

We describe here the textual analysis on our corpus composed of both speeches and statements in order to identify speeches on monetary policy and state of the eocnomy. Before attributing a distribution of topic for each speech, we need to prepare the corpus. This involves:

- Pre-processing: removing stopwords, punctuations
- Stemming tokens to a common root (e.g., inflationary and inflation)

We then apply the LDA, a probabilistic model which outputs a distribution of topics over our texts, each topic associated with a distribution of words. Each document d of the D documents (speeches and statements) is described as a probabilistic mixture of $T = 8$ topics (fixed by the

researcher).

$$* \begin{pmatrix} \theta_1 \\ . \\ . \\ . \\ \theta_D \end{pmatrix} = \begin{pmatrix} p(t_1|d_1) & ... & p(t_T|d_1) \\ . & . & . \\ . & . & . \\ p(t_1|d_D) & ... & p(t_T|d_D) \end{pmatrix} \tag{15}$$

* Each topic $t \in T$ itself is a probability distribution over a vocabulary (set of words in a document) of size V:

$$* \begin{pmatrix} \phi_1 & ... & \phi_T \end{pmatrix} = \begin{pmatrix} p(w_1|t_1) & ... & p(w_1|t_T) \\ . & & \\ . & & \\ p(w_v|t_1) & ... & p(w_v|t_T) \end{pmatrix} \tag{16}$$

Table A19 summarizes the 8 clusters obtained.

Table A19: The eight topics from the LDA analysis of FOMC and ECB text data

Payment systems



Monetary policy (Fed)



Economy



Fed credit



Euro area



Banking



Financial risk



Monetary policy (ECB)

