Final Report
Advanced Time Series Analysis

FOMC Decisions and Asset Price Responses:
A Classification of Policy Signals

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Abstract

This paper replicates and extends the findings of Herbert et al. (2025). Using a novel classification of FOMC announcements, we distinguish between policy-stance signals and higher-order moment signals, and examine the channels through which they affect asset prices. We find that higher-order moment announcements primarily influence the long end of the yield curve through changes in uncertainty and term premia, whereas policy-stance announcements mainly affect yields by revising expectations of future short-term interest rates, with only limited effects on long-term yields. We further extend results obtained using only FOMC statements by using the recently released US-MPD database, which includes high-frequency asset price responses around a wider set of monetary policy-related events. We show that the core findings remain robust when incorporating this broader information set.

Keywords: Monetary Policy Surprises, High-Frequency Identification, Term structure, Policy Signals

Contents

1 Objectives

In this report, we study the transmission of monetary policy announcements to financial markets, following the methodology of Herbert et al. (2025).

A vast literature studies the identification of monetary policy shocks and their effects on financial markets, using approaches such as high-frequency identification and SVAR analysis with an external instrument. This literature usually faces a well-known puzzle: across time, the dynamics of long-term interest rates are almost entirely captured by their variations around FOMC announcement periods. However, FOMC announcements only explain a small fraction of the variance of long-term interest rates on the day of their occurrence.

Herbert et al. (2025) argue that these two facts can be reconciled once the informational content of FOMC announcements is accounted for. Through its announcements, the central bank simultaneously conveys its policy decision, its assessment of future economic conditions, and information concerning the future path of monetary policy. These different types of information can influence the beliefs of financial market participants in various ways, depending on the main topic of the announcement. Consequently, monetary announcements have heterogeneous impacts on asset prices. For instance, if the announcement is characterized by a deviation of the policy decision from what the market expected, it will mostly affect the short-term interest rate, while indications about future policy actions might primarily drive long-term bond yields.

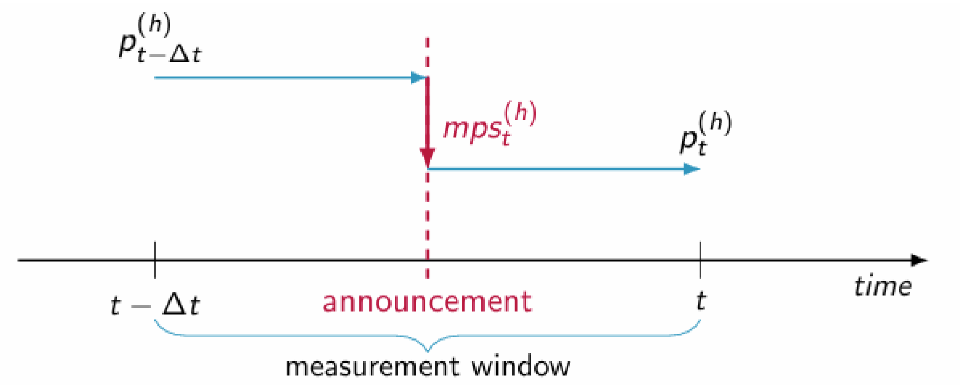
The key contribution of Herbert et al. (2025) is thus to propose a novel classification of FOMC announcements depending on the nature of the information they convey. Specifically, the authors distinguish between announcements that signal a future path of monetary policy that is in line with the current rate decision, and those that convey contradictory signals about future policy actions. In this report, we implement this classification and study the reactions of financial assets to both types of announcements. The rest of this report is organized as follows. Section 2 reviews the related literature on high-frequency analysis of monetary policy shocks on financial markets. Section 3 introduces the methodological framework. Section 4 presents the data used for our empirical work. Section 5 summarizes our main empirical findings and provides extensive interpretations of these results. Section 6 concludes.

2 Literature Review

The identification of the effects of monetary policy shocks on financial markets is an active field of research, as it requires specific identification strategies. Indeed, two main issues arise when evaluating the response of asset prices to monetary policy decisions: simultaneity and omitted variable bias. Over a given window, asset price movements may be caused by a monetary policy decision, but the central bank's decision itself may also be driven by financial markets' evolutions over this period. Another concern is the presence of unobserved shocks that may concurrently affect both asset prices and central bank decisions, confounding the causal inference.

The use of high-frequency monetary policy surprises has become widespread as a tool for causal identification. These surprises are commonly defined as high-frequency measures of market-based expectation revisions following a monetary event. Their main advantage is that they largely eliminate simultaneity and omitted variable bias concerns, as the central bank has to confirm its decision hours before being publicly announced. Consequently, the monetary policy surprise effectively measures the market response to a monetary policy shock.

Figure 1: Measurement of high-frequency monetary policy surprises.



Source: lecture slides by Giovanni Ricco, *Macroeconomics: Advanced Time Series Analysis*, ENSAE Paris.

A large literature has emerged using such high-frequency identification schemes. One of the seminal contribution is Kuttner (2001), who uses Fed funds futures data to measure the unanticipated response of monetary policy announcements on several interest rates. Cochrane and Piazzesi (2002) document sizable interest rate responses across the yield curve to unexpected target rate changes around FOMC events. Gürkaynak et al. (2005) further develop this approach by applying a principal component analysis to intraday changes in interest-rate futures. They identify two distinct factors: a "Target" factor capturing surprises in the current policy rate, and a "Path" factor reflecting revisions to the expected future path of monetary policy. Importantly, they show that responses at the long end of the yield curve are substantially larger for "Path" surprises than for "Target" surprises. Another methodological advancement was the use of intraday, instead of daily, changes to construct their surprises. Their approach, the two factors they identified, and the use of intraday asset responses to construct monetary policy surprises have become standard for subsequent analysis. Swanson (2021) extends the approach of Gürkaynak et al. (2005) to analyze the transmission of non-conventional monetary policy instruments, namely forward guidance and large-scale asset purchases (LSAPs), on financial assets. He identifies three factors interpreted as surprise changes in the federal funds rate, forward guidance and LSAPs. The effects of these factors on yield changes are measured with a local projection framework à la Jordà (2005).

While the aforementioned papers focus on the transmission of monetary policy to US financial markets, several papers conduct analogous studies for the euro area. For instance, Brand et al. (2006) construct monetary policy news indicators related to the central bank decisions and communication about the future policy rate path. Such indices measure the impact of action and communication on the level of interest rates. They are built using high-frequency changes in asset prices around the decision ("action") and around the press conference ("communication"). Jardet and Monks (2014) estimate two monetary policy factors for the euro area following the approach of Gürkaynak et al. (2005). They emphasize that the impact of these factors on financial assets changed during the sovereign debt crisis of the euro area. Finally, Altavilla et al. (2019) propose a three-factor-based approach for the transmission of monetary policy in the euro area, identifying a target, quantitative easing and forward guidance factors.

In the spirit of Gürkaynak et al. (2005), several recent studies compute monetary policy surprises only as the first principal component of price changes in federal funds futures contracts, including Nakamura and Steinsson (2018), Jarocinski and Karadi (2020) and Bauer and Swanson (2023b). In particular, Bauer and Swanson (2023b) propose monetary policy surprises orthogonalized with respect to economic and financial information available prior to FOMC announcements. While similar transformations are essential when one uses monetary policy surprises in a SVAR or a local projection framework, they show that accounting for prior data has a limited effect in high-frequency event-study analyses of monetary policy transmission.

3 Methodology and framework

In this section, we outline the key methodological ingredients underlying our replication and extension work. Our approach lies at the intersection of several strands of the recent literature and bridges them within a unified empirical framework. First, we describe the approach of Bauer and Swanson (2023b) to construct *news-adjusted* monetary policy surprises. Second, we detail the procedure used to identify *high-order moment* (HOM) statements (Herbert et al. 2025), using the *Target* and *Path* factors that underlie these monetary policy surprises, following the methodology of Gürkaynak et al. (2005).

Third, we explain how monetary policy surprises are used in an event-study framework to analyze the heterogeneous transmission of monetary policy to financial markets depending on the type of statement. Finally, we present the local-projection instrumental-variables (LP-IV) framework used to assess the macroeconomic effects of monetary policy surprises.

3.1 News-adjusted monetary policy surprises

The first pillar of our replication work consists in reconstructing the monetary policy surprises of Bauer and Swanson (2023b). While the series computed by Bauer and Swanson themselves are available up to 2023, they have not, to the best of our knowledge, been updated using more recent data. Moreover, high-frequency changes in asset prices around not only FOMC statements, but also press conferences, monetary events, and FOMC minutes have recently become publicly available, increasing the quantity of available data and the scope for constructing monetary policy surprises.

Bauer and Swanson follow Nakamura and Steinsson (2018) and construct their "raw" monetary policy surprise as the first principal component of price changes in the first four quarterly Eurodollar futures contracts (ED1-ED4) around FOMC statements. This principal component is scaled such that a one-unit change corresponds to a 1 percentage point change in the ED4 rate. As we will detail in Section 3.2.1, FOMC surprises can be separated into a "Target" and a "Path" factor, although the first principal component is generally interpreted as a weighted average of the two.

The "raw" monetary policy surprise has been shown to exhibit predictability. The recent literature debates whether this is evidence of a "Fed information effect" – that is, the revelation of the central bank's private information through policy actions (Miranda-Agrippino and Ricco 2021) – or a "Fed response to news effect" whereby the central bank reacts to macroeconomic news that is already publicly available. Bauer and Swanson advocates for the latter interpretation. They show that monetary policy surprises are correlated with publicly available data[1], and are therefore predictable to some extent. To address this issue, Bauer and Swanson orthogonalize their measure of monetary policy surprise and take the estimated residuals of Equation (1) as their *news-adjusted* measure:

$$mps_t = \alpha + \beta X_t + u_t. \tag{1}$$

The vector X_t contains the following predictors :

- The nonfarm payroll surprise;

[1] This is a key element distinguishing their approach from earlier contributions such as Miranda-Agrippino and Ricco (2021), which rely on the Fed Greenbook forecasts. While both approaches document predictability in the surprise measure, their interpretations differ.

- The employment growth;
- The 3-month log return of the S&P 500;
- The 3-month yield curve slope change;
- The 3-month log return of the Bloomberg Commodity Spot Price Index;
- Treasury skewness from Bauer and Chernov (2024).

All predictors in X_t are constructed using information available prior to the FOMC announcement, ensuring that the orthogonalization procedure does not introduce any look-ahead bias.

Following this methodology, we both extend the sample period and incorporate additional monetary policy events for which high-frequency financial data have recently become available.

3.2 High-Order Moment statements: policy uncertainty versus policy stance

Herbert et al. (2025) build on the Target-Path decomposition originally introduced by Gürkaynak et al. (2005) to classify FOMC statements according to the nature of the information they convey. We first detail the construction and definition of the "Target" and "Path" factors, then examine the type of information each of them embeds. Finally, we explain how this decomposition is used to identify so-called *higher-order moment* statements.

3.2.1 Target and Path surprises

In their seminal paper, Gürkaynak et al. (2005) argue that two latent factors explain most of the variation in high-frequency asset price changes around FOMC announcements and provide a parsimonious characterization of the term structure of monetary policy expectations. They take the first two principal components of high-frequency changes in the federal funds futures (current-month ahead and three-month ahead contracts) and in the second, third and fourth Eurodollar futures contracts (ED2-ED4).[2]

To structurally interpret the principal components, the authors rotate them such that the resulting factors, Z_1 and Z_2, respect four identifying restrictions:

[2] Changes in federal funds futures are scaled to account for the timing of FOMC meetings. We denote these scaled changes by $MP1$ and $MP2$.

1. Z_1 and Z_2 are normalized to have unit variance;

2. Z_1 and Z_2 are orthogonal;

3. Z_2 does not influence the current monetary surprise ($Z_2 \perp MP1$);

4. Z_1 and Z_2 are scaled so that Z_1 has a one-for-one effect on $MP1$ and $Z1$, $Z2$ have equal-magnitude effects on $ED4$.

Under these restrictions, Z_1 is the only factor that drives changes in the current policy rate (because of the third condition), while Z_2 captures information about expected future policy rates that are orthogonal to Z_1. Therefore, Z_1 is called the "Target" factor – essentially, the surprise about the current decision on the policy rate – whereas Z_2 is called the "Path" factor – essentially, the surprise about the future policy path.

3.2.2 Information conveyed by Target and Path

By construction, both factors isolate information about the present decision. However, the informational distinction regarding future policy is less clear. To show this, Herbert et al. (2025) study how Target and Path factors correlate with policy expectations at different maturities by estimating the following regressions:

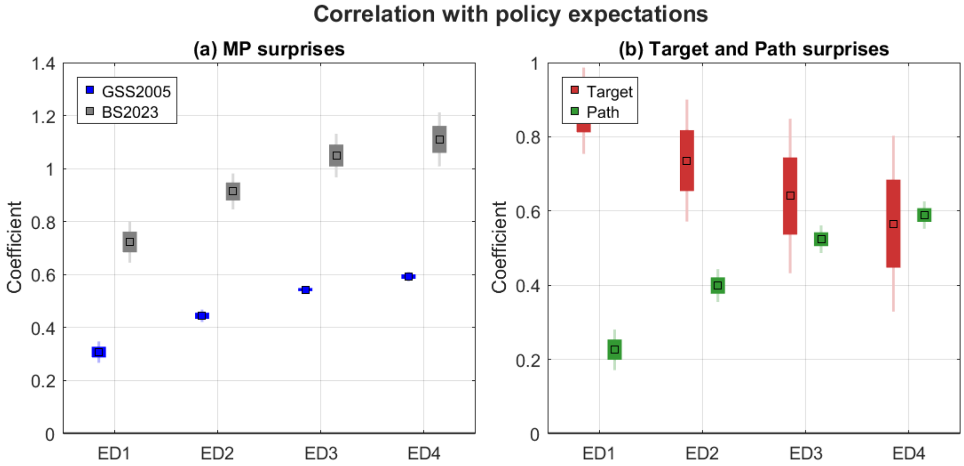
$$
\begin{aligned}
\Delta F_t^k &= \alpha + \beta_{MPS} \cdot MPS_t + \epsilon_t, \\
\Delta F_t^k &= \alpha + \beta_{Target} \cdot Target_t + \epsilon_t, \\
\Delta F_t^k &= \alpha + \beta_{Path} \cdot Path_t + \epsilon_t,
\end{aligned}
\tag{2}
$$

where ΔF_t^k denotes daily changes in Eurodollar futures of maturity k.

Figure 2 reports the estimated coefficients[3]. The left-hand side of the figure makes it apparent that monetary policy surprises increasingly affect longer-maturity Eurodollar contracts, indicating that these surprises primarily reflect information about the future path of policy rather than the current policy rate. These findings are consistent with the existing literature. The right-hand side of the figure reveals a more subtle pattern. Although the correlation between the Target factor and Eurodollar futures declines with maturity, it remains sizable even for ED4. At the same time, the correlation between the Path factor and Eurodollar futures increases with maturity, in line with its definition. This evidence suggests that both factors convey information about future policy, but through distinct and uncorrelated channels (due to the orthogonality condition).

[3] Details of the regression can be found in Appendix Table A1

Figure 2: Information conveyed by Target and Path



Notes: Replicated figures, using series computed by Bauer and Swanson (2023b) and Acosta et al. (2025). Sample: 1999-2023. Figure (a) represents the coefficients using the news-adjusted MPS of Bauer and Swanson (2023a) (in grey) and $MPS_t = Target_t + Path_t$ (in blue). Contrarily to the authors, we used *intraday* changes, as we did not have access to *daily* changes in Eurodollar futures. The key takeaways remain unchanged despite that.

3.2.3 Higher-order-moment statements

The previous section is key to understand the main contribution of Herbert et al. (2025). While "Target" surprises primarily capture information about the current policy stance, they also display a non-negligible correlation with long-maturity futures, suggesting the presence of a forward-looking component in the "Target" surprise. By contrast, "Path" surprises isolate information about future policy that is orthogonal to this forward-looking component of Target.

Because of the orthogonality restriction, both factors may affect expectations about future policy, but the *type* of information they convey must differ. The authors argue that:

- The forward-looking component of Target reflects information about the expected future policy stance itself. The intuition is that Target correlates with current policy decision because the Federal Reserve Board adjusts current rates *anticipating* future economic conditions and their own future policy stance. This conveys expectation-based information, and they call this <u>first-order moment</u> news about future policy.

- The Path factor captures information about the uncertainty surrounding the future policy path. They call this <u>high-order moment</u> news about future policy.

Under this interpretation, first-order moment news primarily affects the expectations component of long-term interest rates, whereas high-order moment news operates through the term premium by altering uncertainty and risk compensation.

The identification of higher-order moments (HOM) is then straightforward. "Target" and "Path" must be of opposite sign, indicating conflicting signals about future policy reconciled through adjustments in the term premium under no-arbitrage, and the absolute magnitude of the "Path" surprise must exceed that of the "Target" surprise, implying that the change in the slope of the term structure is dominated by uncertainty-related news. We denote by $\mathbb{1}_t^{Opp}$ the indicator equal to one when Path and Target have opposite signs. The HOM indicator is then defined as:

$$\mathbb{1}_t^{HOM} = \begin{cases} 1 & \text{if } |Path_t| \geq |Target_t| \text{ and } \mathbb{1}_t^{\text{Opp}} = 1 \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

It may be the case that $|Path_t| < |Target_t|$ and both factors are of opposite sign. Herbert et al. (2025) label these episodes as *attenuation* moments, in the sense that Path surprises then act as an offsetting force relative to Target, but remain second-order in magnitude. In such cases, changes in the slope of the yield curve are driven primarily by revisions in policy expectations rather than by shifts in uncertainty.

This classification will be used in an event-study design to assess the heterogeneous effects of monetary decisions on asset prices depending on the type of decision.

3.3 Event-study design

We now seek to identify the causal effects of monetary policy on asset prices. The literature broadly uses event study regression to isolate the impact of monetary policy announcements. The idea is to measure the specific impact of the monetary event on asset prices by estimating the following regressions:

$$\begin{aligned} \Delta Y_t &= \alpha + \beta_{MPS} MPS_t + \epsilon_t, \\ \Delta Y_t &= \alpha + \beta_{Target}\ Target_t + \beta_{Path}\ Path_t + \epsilon_t, \end{aligned} \tag{4}$$

where ΔY_t denotes the change in the asset price of interest measured over a narrow window around the monetary policy announcement, MPS_t is the (orthogonalized) monetary policy surprise for that particular event, and $Target_t$, $Path_t$ are the Gürkaynak et al. (2005) factors.

As discussed in Section 3.1, MPS_t captures a monetary policy shock. The coefficients β_{MPS}, β_{Target}, β_{Path} of the regressions (4) are causal estimates of the impact of monetary policy shocks on asset prices under four main assumptions[4]:

[4] Bauer and Swanson (2023b) provide a detailed review of these assumptions, with associated literature

1. *No reverse causality*: changes in asset prices do not affect the monetary policy surprise. This assumption is likely to hold given the narrow event window.

2. *No omitted variable bias*: there is no variable correlated with the monetary surprise and affecting the asset price as well. In the considered window around FOMC announcement, we can assume that no news is correlated with the decision. Moreover, orthogonalizing monetary policy surprises ensures that prior publicly available information is uncorrelated with MPS_t.

3. *Unanticipated shocks*: monetary policy surprises do not contain a predictable component. Otherwise, measurement error would bias the estimated coefficients. Orthogonalization mitigates this concern.

4. *No information effects*: monetary policy surprises it do not reveal private information held by the central bank about future economic fundamentals that would directly affect asset prices independently of the policy shock itself. If such information effects were present, the estimated coefficients would conflate the impact of the monetary policy shock with the effect of changes in macroeconomic expectations. Following Bauer and Swanson (2023b), we assume that this channel is quantitatively limited, so that asset price responses primarily reflect the effect of the monetary policy shock.

To assess whether the transmission of monetary policy depends on the nature of the information conveyed by the announcement, Herbert et al. (2025) extend the baseline event-study specification of Equation (4) by interacting monetary policy surprises with indicators capturing attenuation and higher-order-moment statements:

$$\Delta Y_t = \alpha + \beta_1 \cdot MPS_t + \beta_2 \cdot \mathbb{1}_t^{Att} \cdot MPS_t + \beta_3 \cdot \mathbb{1}_t^{HOM} \cdot MPS_t + \beta_4 \cdot \mathbb{1}_t^{Att} + \beta_5 \cdot \mathbb{1}_t^{HOM} + \epsilon_t \quad (5)$$

In this setting:

- The effect of same-sign moment surprises (i.e. neither HOM nor attenuation statements) is captured by β_1
- The interaction effect between higher-order moment and monetary surprises is β_3,
- The marginal effect of higher-order moment monetary surprises conditional corresponds to $\beta_1 + \beta_3$.

This latter effect is of paramount importance for our work: differences between this coefficient and β_1 would provide evidence that high-order-moment statements alter the

for each of them.

transmission of monetary policy to financial markets, consistent with the hypothesis that such announcements primarily operate through changes in uncertainty and term premia.

To go beyond the immediate impact of announcements on asset prices, we will extend our analysis to the dynamic propagation of monetary policy shocks to macroeconomic variables by estimating Impulse Response Functions (IRFs). We rely on the Local Projections approach to do so.

3.4 Local Projections with Instrumental Variables

Local projections (Jordà 2005) provide a flexible framework to estimate impulse response functions without imposing strong dynamic restrictions, in contrast to vector autoregressions (VARs). The approach directly estimates the response to a structural shock of an outcome variable at each horizon through horizon-specific regressions.

In practice, structural shocks are unobserved and must therefore be instrumented. Jordà et al. (2015) introduce the Local-Projection-Instrumental-Variables (LP-IV) methodology to address this issue, which has since been widely adopted. Stock and Watson (2018) provide a detailed discussion of the identifying assumptions and theoretical properties of this approach. Let z_t denote an external instrument for the structural shock $\eta_{1,t}$. For z_t to be a valid instrument, the following conditions must hold:

1. **Relevance:** $\mathbb{E}(z_t \eta_{1,t}) \neq 0$.

   The instrument must be correlated with the structural shock of interest. In the context of monetary policy, this requires that policy announcements contain genuine information about exogenous policy changes.

2. **Contemporaneous exogeneity:** $\mathbb{E}(z_t \eta_{j,t}) = 0$ for all $j \neq 1$.

   The instrument must be uncorrelated with other structural shocks occurring in the same period, ruling out reverse causality and contemporaneous omitted variable bias.

3. **Lead-lag exogeneity:** $\mathbb{E}(z_t \eta_{j,t+k}) = 0$ for all $k \neq 0$.

   The instrument must be uncorrelated with structural shocks at other horizons, ensuring that it does not anticipate future shocks or respond to past ones.

Under conditions (1)–(3), impulse responses can be estimated via two-stage least squares (2SLS). For each horizon h and outcome variable y_i, we estimate:

- The first-stage regression:

$$y_{1,t} = \pi_{0,h} + \pi'_{1,h} w_t + \pi_{2,h} z_t + \xi_{h,t}, \tag{6}$$

- The second-stage regression (the local projection):

$$y_{i,t+h} = \alpha_{i,h} + \beta'_{i,h} w_t + \tilde{\Psi}_{i,1,h} \hat{y}_{1,t} + \nu_{i,t+h}, \tag{7}$$

where $y_{1,t}$ denotes the policy variable (e.g., a short-term interest rate or Treasury yield), $\hat{y}_{1,t}$ are the fitted values from the first stage, w_t is a vector of control variables (typically lagged endogenous variables), and $\tilde{\Psi}_{i,1,h}$ is the impulse response coefficient of interest. The vector of control variables serves essentially as a tool to ensure lead-lag exogeneity. In particular, as discussed in Ramey (2016), if one suspects z_t to be correlated to past values of $\eta_{1,t}$ (but not $\eta_{j,t}, j > 1$), adding lags of z_t as controls can restore the validity of the instrument.

The coefficient $\tilde{\Psi}_{i,1,h}$ measures the causal effect of a unit increase in the policy variable $y_{1,t}$ on outcome y_i at horizon h, identified through exogenous variation in the instrument z_t.

4 Data

To compare our results with Herbert et al. (2025) we first consider a period spanning January 1999 to December 2022. Over this period, we consider 191 scheduled FOMC announcements retrieved from the database of Bauer and Swanson (2023a).

We study the effects of monetary policy surprises on daily changes in the equity and bond markets. To do so, we use the Gürkaynak et al. (2007) dataset, where zero-coupon (ZC) nominal yields are constructed based on fitted Nelson-Siegel-Svensson curves. We mainly use the two-year, five-year and ten-year maturities for these yields throughout our analysis. They are reported in the database as percentage points directly (e.g. 7.13 for the two-year ZC yield on February 4, 1988).

Daily changes in equity markets are measured as the log-difference between the S&P 500 closing price on the day of the FOMC announcement and that of the previous trading day[5]. For bond yields, daily changes are measured as level difference in yields. As FOMC statements are released around 2 p.m., they always precede financial markets close.

The monetary policy measures we consider are of two sorts: the "Path" and "Target" factors of Gürkaynak et al. (2005), extended from February 1995 to May 2024 by Acosta et al. (2024), and the monetary policy surprises orthogonalized to macroeconomic and financial news from Bauer and Swanson (2023a). Details on the construction of these measures are discussed in Section 3. All datasets are publicly available.

[5]We extracted the series of S&P 500 close prices using Yahoo Finance (`GSPC` ticker).

To investigate the channels through which monetary policy surprises influence long-term interest rates, we rely on two additional datasets spanning the same period. First, we use the Abrahams et al. (2016) dataset that decomposes nominal ZC yields into their real component and an inflation compensation component, using TIPS instruments. Second, we use the Adrian et al. (2013) dataset that decomposes nominal ZC yields into an expectation component, and a term premium component. For both datasets, we consider the decomposition for the 2-year, 5-year and 10-year nominal yields, and measure daily changes for each of these components as the difference in level between the day of the announcement and the prior day.

In addition, we examine the daily response of several risk appetite and uncertainty indicators to monetary policy surprises, including the VIX, the risk aversion measure of Bekaert et al. (2022), the forward term-premium computed by Kim and Wright (2005) for a one- and ten-year ZC maturities, as well as the uncertainty indicator of Bauer et al. (2022).

We perform several robustness checks. First, we replicate our baseline analysis for the euro area using the monetary policy database of Altavilla et al. (2019), which reports asset price changes measured as the level change of the median quote within a 30-minute window surrounding the ECB press release. The euro-area sample spans January 1999 to October 2025, and includes 315 announcements. Second, we control for a quantitative easing effect using a dummy variable in our specification. So-called "QE announcements" correspond to the list provided by Corbet et al. (2019) (see Appendix A2). Third, we distinguish the effect of monetary policy surprises on the 2-, 5- and 10-year bond yields depending on whether the FOMC announcement corresponds to an increase, a decrease, or *status quo* in the federal funds target range[6]. To this end, we construct the evolution of the federal fund target range and compute the level difference between two FOMC announcement dates.

We then extend the analysis using more recent data from the US-MP database of Acosta et al. (2025), which contains the high-frequency responses of several financial variables (Federal Funds futures, Eurodollar Futures, OIS futures, US Treasury securities, TIPS, S&P 500, currencies) around FOMC statements, press conferences, as well as minutes of the Fed ranging from February 1994 to December 2025. Overall, this database contains the changes of asset prices around 273 FOMC statements, 90 press conferences, and 200 minutes releases.

We construct monetary policy surprises over this extended dataset orthogonalized to economic and financial news following the approach of Bauer and Swanson (2023a) which is described in Section 3. We compute the YoY% employment growth using the

[6]Series were extracted from the FRED website.

NFP series from FRED.[7] The 3-month log return of the S&P 500 and BCOM index are retrieved from Yahoo Finance (GSPC and BCOM tickers). The yield curve slope changes come from the variation of the β_1 parameter from the Gürkaynak et al. (2007) dataset. The treasury skewness measure from Bauer and Chernov (2024) is retrieved from the Fed website.

Last, we perform a local projection exercise in the spirit of Ramey (2016) and Bauer and Swanson (2023b). The macroeconomic variables considered include the CPI and industrial production, the two-year ZC nominal yield and an excess bond premium. The industrial production and CPI are retrieved from FRED[8]. The two-year ZC nominal yield is in level and comes from Gürkaynak et al. (2007). Finally, the excess bond premium series was computed by Gilchrist and Zakrajsek (2012) and is also in level. All these variables are monthly over a period ranging from 1994 to December 2025. In this LP analysis, we use monthly monetary surprises as an external instrument. Monthly monetary surprises are computed as the sum of surprises within a given month.

A summary of all the data used throughout our work can be found in Appendix A3.

5 Empirical Analysis

We now present the main results of our study, following the methodology described in Section 3. We begin by documenting the properties of the "Target" and "Path" factors using the full sample available – that is, without restricting attention to FOMC announcements. As expected given their construction, the "Target" and "Path" factors admit a stable economic interpretation across different categories of monetary policy–related events. Next, we analyze in detail the effects of monetary policy surprises on asset prices, replicating and extending the results of Herbert et al. (2025). We then assess the robustness of our findings to a range of alternative specifications and samples. Finally, we explore a local projection framework with instrumental variables. While the identification strategy is conceptually appealing, the instrument exhibits weak first-stage relevance. As a result, the LP-IV framework delivers limited additional insight in our setting. Unless stated otherwise, the results reported in the main text are computed using the **extended** dataset – that is, using all the data available from February 1999 to December 2025 and considering FOMC Statements, Press Conferences, Monetary Events and FOMC Minutes.

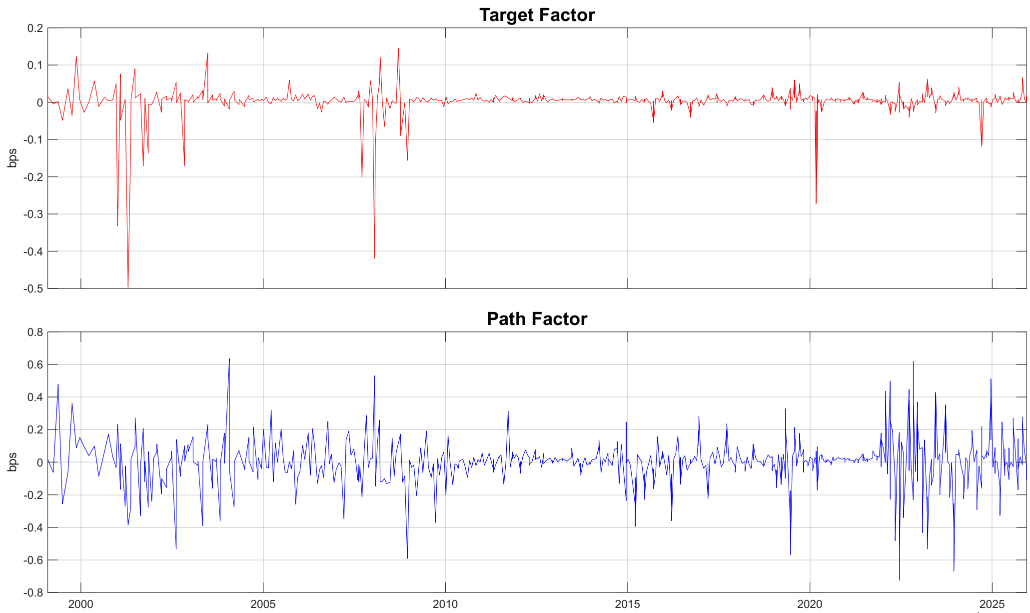
[7] All Employees, Total Nonfarm (PAYEMS).

[8] Industrial Production: Total Index (INDPRO) and Consumer Price Index for All Urban Consumers: All Items in U.S. City Average (CPIAUCSL)

5.1 Construction and interpretation of Target and Path factors

We begin by constructing our "Target" and "Path" factors over the whole sample. As can be seen in the Appendix (Figure A1), our estimates closely match those used in Herbert et al. (2025) when restricting the sample accordingly. Figure 3 shows the estimated factors we obtained. One can easily see that the "Path" factor is substantially more volatile than the "Target" factor, which is consistent with its interpretation as it captures information about the uncertainty surrounding the future policy path.

Figure 3: Target and Path surprises, all types of event combined

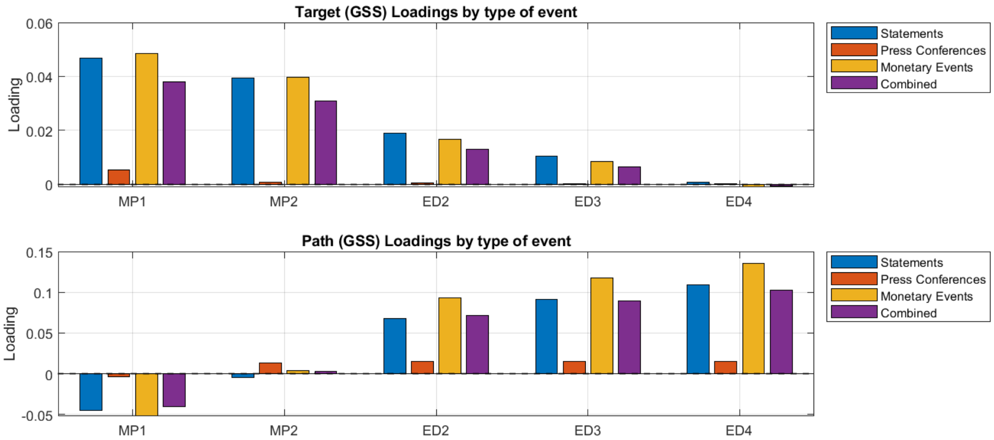


Notes: Factors are constructed following the procedure of Gürkaynak et al. (2005). Sample: 1999-2025 (751 observations).

Figure 4 reports the loadings of the "Target" and "Path" factors on MP1-MP2[9] and ED2-ED4 futures contracts across different types of monetary policy–related events. For all event categories, the "Target" factor loads predominantly on short-term instruments (MP1-MP2), with rapidly declining loadings at longer maturities, consistent with an interpretation as surprises to the current policy stance. Conversely, the "Path" factor displays weak or negative loadings at short horizons and increasingly positive loadings at longer maturities (ED2-ED4), capturing revisions to the expected future path of policy rates. Importantly, both the sign and the maturity profile of the loadings are remarkably stable across event types, indicating that the economic interpretation of the Target and Path factors does not depend on restricting attention to FOMC statement days. This stability suggests that the Target-Path decomposition reflects a structural feature of monetary policy communication rather than event-specific information content.

[9]Recall that they correspond to scaled FF1 and FF2.

Figure 4: Rotated loadings of Target and Path factors



Notes: Loadings are rotated following Gürkaynak et al. (2005) procedure. Sample: 1999-2025 (751 observations). The first principal component explains 78.16% of the total variance, while the second explains an additional 18.31%.

5.2 Analysis of monetary policy surprises

The key contribution of this report is to look at whether the informational content of different central bank announcements, as captured through the classification between HOM and policy-stance announcements, has a differentiated impact on financial assets. We first document the aggregate effects of monetary policy surprises on financial markets. Then, we take into account the informational content of the events, investigating the heterogeneous responses. After that, we analyze the monetary surprises transmission across event types. Finally, we focus on the differentiated implications of HOM events on the term structure of interest rates.

5.2.1 Effects of monetary policy on financial variables

We first reconstruct the monetary policy surprises à la Bauer and Swanson (2023b), as described in Section 3.1. Unless stated otherwise, the considered monetary policy surprises are orthogonalized with respect to news. As can be seen in the Appendix (Figure A2), our estimates closely match those of Bauer and Swanson (2023b), despite the absence of the NFP surprises.

We first analyze the daily responses of asset prices by estimating Equations (4). The results are reported in 1.

Standard monetary policy transmission theory rely on the negative comovement between stock markets and monetary surprises. A positive relationship between short nominal interest rates and monetary surprises is also expected. These results are verified under different measures of monetary surprises. In terms of interpretation, a 10 bps positive monetary surprise implies a 46 bps decrease in equity prices, while interest rates raise by 6.4 to 3.1 bps. All these effects are significant. However, the associated R^2 are low: the variation of monetary surprises only explain 4.4% of the daily variance of the ten-year ZC yield. When considering another measures of monetary policy surprises, that is the path and target decomposition of Gürkaynak et al. (2005), we observe a much stronger response of yields to the path factor than the target factor. On top of that, these responses are highly significant, but here again explain a low share of the variance of daily yields. When looking at the extended periods, the results are overall similar. Moreover, these results are in line with the puzzle mentioned in the introduction.

Table 1: Effects of monetary policy surprises on asset prices

	1999–2022				1999–2025			
	SP500	2y	5y	10y	SP500	2y	5y	10y
MPS_t	-4.607*	0.642***	0.552***	0.306***	-5.037***	0.591***	0.472***	0.260***
	[2.36]	[0.11]	[0.12]	[0.10]	[1.28]	[0.05]	[0.06]	[0.05]
R^2	0.033	0.224	0.121	0.044	0.043	0.218	0.116	0.045
$Target_t$	-5.008	0.331**	0.179	0.043	-1.791	0.228***	0.095	0.014
	[3.49]	[0.15]	[0.14]	[0.13]	[1.83]	[0.09]	[0.10]	[0.08]
$Path_t$	-1.752	0.341***	0.317***	0.204***	-1.638***	0.086***	0.102***	0.081***
	[1.18]	[0.04]	[0.05]	[0.05]	[0.39]	[0.02]	[0.02]	[0.02]
R^2	0.04	0.30	0.17	0.08	0.04	0.30	0.20	0.10
Observations	191	191	191	191	751	751	751	751

Notes: This table reports the effects of orthogonalized monetary policy surprises, "Target" and "Path" following the specification of (4). Huber-White heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

To further investigate these results, we implement the classification of monetary policy events between HOM and policy-stance statements, following the methodology described in Section 3.2.3.

5.2.2 Effects of monetary policy - controlling for the content of announcements

We provide some descriptive statistics for HOM statements over the 1999-2022 sample, as well as over our extended sample:

Overall, we observe that the proportion of HOM statements is lower in our extended sample as they only represent 39% of all statements compared to 45% between 1999 and 2022. The most striking result is that while the distribution of monetary surprises over these subsamples was really similar between 1999 and 2022, we observe that HOM monetary surprises are on average negative over a longer, and more dense, sample. In

Table 2: Summary statistics by classification

	1999–2022					1999–2025				
	N	%	Mean	Mean Abs	SD	N	%	Mean	Mean Abs	SD
HOM	87	45	0.004	0.032	0.045	293	39	-0.005	0.035	0.050
Policy stance	104	55	0.005	0.038	0.050	458	61	0.005	0.035	0.056

addition, the overall variability of monetary surprises increases when considering our full sample.

We now use these hom signals to test for an heterogeneous effect of monetary surprises on financial assets using the regression (5). The results are summarized in the table 3

Table 3: Monetary policy effects with higher-order moment signals

	1999–2022				1999–2025			
	SP500	2y	5y	10y	SP500	2y	5y	10y
MPS_t	-7.544**	0.395**	0.290	0.066	-5.740***	0.495***	0.357***	0.158***
	[3.44]	[0.19]	[0.19]	[0.16]	[1.54]	[0.06]	[0.06]	[0.06]
$MPS_t \times \mathbb{1}^{Att}$	13.492*	0.140	-0.012	-0.040	-4.500	-0.471	-0.711	-0.419
	[7.31]	[0.33]	[0.28]	[0.25]	[11.4]	[0.32]	[0.46]	[0.39]
$MPS_t \times \mathbb{1}^{HOM}$	4.349	0.549**	0.627***	0.595***	2.477	0.315***	0.381***	0.329***
	[4.50]	[0.22]	[0.24]	[0.22]	[2.69]	[0.11]	[0.12]	[0.10]
$MPS_t \mid \mathbb{1}^{Att} = 1$	5.948	0.535**	0.278	0.026	-10.240	0.023	-0.355	-0.261
	[6.45]	[0.26]	[0.21]	[0.20]	[11.34]	[0.31]	[0.46]	[0.39]
$MPS_t \mid \mathbb{1}^{HOM} = 1$	-3.195	0.944***	0.918***	0.661***	-3.263	0.809***	0.738***	0.486***
	[2.90]	[0.10]	[0.15]	[0.15]	[2.21]	[0.09]	[0.10]	[0.08]
R^2	0.06	0.28	0.17	0.09	0.05	0.24	0.15	0.07
Observations	191	191	191	191	751	751	751	751

Notes: This table reports the effects of monetary policy surprises with interaction terms for attenuation and higher-order-moment events. Huber-White heteroskedasticity-robust standard errors are reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

The MPS_t row corresponds to same-sign statements, i.e. statements for which "Target" and "Path" factors evolve in the same direction, and thus convey similar information. The overall effect of monetary policy surprises on stock prices comes from this type of statements. As expected, they load negatively on them, and positively on bond yields regardless of the maturity considered here.

When we extend our sample, we observe that the overall effect of same sign statements on nominal ZC yields becomes highly significant. In particular, the 10-year ZC yield has an average response following a 10 bps positive monetary surprises of $1.58bps$, that is 2.4 times stronger than what was reported over the 1999-2022 period with only FOMC statements.

Second, when "Path" and "Target" have opposite signs, and "Path" surprises attenuates surprises from "Target", the responses of financial assets to monetary policy surprises is weak and non-significant. This result is observed *via* the interaction term between monetary surprises and attenuation, or the marginal effect of the attenuation statements. Even if the responses of financial assets to these indicators are not significant, we remark that the coefficients over our extended sample became much stronger and negative, although it remains non-significant.

Lastly, the monetary surprises conveying high-order moment signals have a significant impact on nominal ZC yields, independently of the sample considered. However, this effect becomes weaker when enlarging our database. Even so, most of the transmission of monetary policy surprises to long-term yields is driven by HOM statements, and this effect becomes stronger at longer maturities.

To summarize, announcements conveying higher-order moment signals have an highly significant positive impact on the daily changes of bond yields, for all maturities considered here. Finally, same-sign statements explain little of the daily variation in zero-coupon bond yields over the 1999-2022 period. However, when considering a broader set of events and a longer sample, their impact becomes stronger and highly significant. To further investigate these results, we distinguish the daily responses of assets to monetary surprises between each type of central bank communication, that is FOMC announcements, the press conferences and the Fed minutes, over the extended sample.

5.2.3 Effects of monetary policy depending on the type of events

One key contribution of our work is to use the recent US-MPD containing not only narrow window changes around FOMC statements, but also around other events, namely Press Conferences, "Monetary Events" and FOMC Minutes. As previously discussed, adding these events seem to change substantially the findings of the authors. This is why we propose to investigate for each type of event.

Table 4 decomposes the baseline specification of Equation (5) by event type. Across all categories, orthogonalized monetary policy surprises display the standard pattern: positive on short and medium-term nominal yields, and negative effects on equity returns. The magnitude of these baseline responses varies across events, with press conferences exhibiting the largest average yield responses and the highest explanatory power, as reflected in their higher R^2, consistent with these events concentrating a substantial share of policy-relevant information and being regarded with more and more attention by the markets, essentially thanks to their forward guidance elements.

One key feature of the results per type of events is the lack of significance of the interaction effect between MPS_t and high-order moment events. At first glance, these results may appear at odds with the pooled estimates discussed in Section 5.2.2. However, this lack of statistical significance at the event-specific level should not be interpreted as evidence against the existence of HOM effects. Rather, it reflects a power issue arising from sample fragmentation[10]. To formally assess whether these effects differ across communication formats, we estimate a specification with triple interactions between MPS_t, $\mathbb{1}^{HOM}$, and event-type dummies. Specifically, we estimate the following regression on the combined sample:

$$\begin{aligned}\Delta Y_t \;&= \alpha + \beta_1\, MPS_t + \beta_2\, \mathbb{1}_t^{Att} \cdot MPS_t + \beta_3\, \mathbb{1}_t^{HOM} \cdot MPS_t \\ &\quad + \beta_4\, \mathbb{1}_t^{Att} + \beta_5\, \mathbb{1}_t^{HOM} \\ &\quad + \delta_{PC}\, \mathbb{1}_t^{PC} + \delta_{ME}\, \mathbb{1}_t^{ME} + \delta_{Min}\, \mathbb{1}_t^{Minutes} \\ &\quad + \theta_{PC}\, \mathbb{1}_t^{PC} \cdot MPS_t + \theta_{ME}\, \mathbb{1}_t^{ME} \cdot MPS_t + \theta_{Min}\, \mathbb{1}_t^{Minutes} \cdot MPS_t \\ &\quad + \kappa_{PC}\, \mathbb{1}_t^{PC} \cdot \mathbb{1}_t^{HOM} \cdot MPS_t + \kappa_{ME}\, \mathbb{1}_t^{ME} \cdot \mathbb{1}_t^{HOM} \cdot MPS_t \\ &\quad + \kappa_{Min}\, \mathbb{1}_t^{Minutes} \cdot \mathbb{1}_t^{HOM} \cdot MPS_t + \varepsilon_t.\end{aligned} \tag{8}$$

where $\mathbb{1}_t^{PC}$, $\mathbb{1}_t^{ME}$, and $\mathbb{1}_t^{Minutes}$ denote press conferences, monetary events, and minutes, respectively; FOMC statements are the omitted reference category. The results, reported in Appendix A10 documents no statistically significant heterogeneity in HOM-related effects across event types. At the same time, the interaction between monetary policy surprises and HOM events remains significant in the pooled sample. Taken together, these results suggest that HOM-related effects are broadly common across communication formats and that their statistical relevance mainly arises from increased power when events are aggregated.

5.2.4 Effects of monetary policy over a narrow window

We now want to address the question of low explicative power of monetary surprises to daily changes in asset prices, as illustrated by the small R^2 in the previous results. One caveat of these regressions is to consider daily changes instead of intraday responses. Indeed, there might be some confounding factors when doing so (e.g. publication of an economic news just after a FOMC announcement, result publication by a top firm). Thus, it is interesting to look at the intraday responses of asset prices to monetary surprises. We consider changes in a 30-minute window around FOMC announcements which are reported in Table 5.

Qualitatively, we observe that when considering narrow responses of financial assets, same-sign statements signals becomes significant to explain daily changes of long-term

[10] This is especially true for Press Conferences, which only have 89 observations in our sample. Recall that estimator's variance decreases with the number of observations.

Table 4: Monetary Policy Surprises with HOM Signals by Event Type

	S&P 500	2y	5y	10y
Panel A: FOMC Statements				
MPS_t^{orth}	-4.844*	0.493***	0.333***	0.131
	(2.785)	(0.105)	(0.105)	(0.090)
$MPS_t^{orth} \times \mathbb{1}^{HOM}$	0.045	0.218	0.342	0.325
	(4.589)	(0.228)	(0.230)	(0.199)
R^2 / Obs	0.04 / 231	0.19 / 231	0.12 / 231	0.06 / 231
Panel B: Press Conferences				
MPS_t^{orth}	-8.532***	0.639***	0.545***	0.362***
	(2.474)	(0.108)	(0.138)	(0.086)
$MPS_t^{orth} \times \mathbb{1}^{HOM}$	-0.493	0.155	0.378	0.174
	(4.358)	(0.281)	(0.260)	(0.183)
R^2 / Obs	0.16 / 89	0.31 / 89	0.27 / 89	0.20 / 89
Panel C: Monetary Events				
MPS_t^{orth}	-6.235***	0.548***	0.391***	0.168*
	(2.288)	(0.089)	(0.091)	(0.081)
$MPS_t^{orth} \times \mathbb{1}^{HOM}$	-0.569	0.196	0.288*	0.264*
	(3.153)	(0.171)	(0.171)	(0.142)
R^2 / Obs	0.09 / 231	0.32 / 231	0.20 / 231	0.09 / 231

Notes: This table reports the effects of orthogonalized monetary policy surprises and their interaction with higher-order moment announcements, indicated by $\mathbb{1}^{HOM}$. Panels distinguish between FOMC Statements, Press Conferences, and Monetary Events. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. Detailed specifications are reported in Appendix A.

Table 5: Effects of monetary policy surprises on financial assets in a narrow window (1999-2022)

	SP500	2y	5y	10y
MPS_t	-6.805***	0.680***	0.526***	0.303***
	[1.21]	[0.10]	[0.10]	[0.08]
$MPS_t \times \mathbb{1}^{HOM}$	0.784	0.347***	0.519***	0.455***
	[1.74]	[0.12]	[0.15]	[0.12]
$MPS_t \mid \mathbb{1}^{HOM} = 1$	-6.021***	1.028***	1.046***	0.758***
	[1.26]	[0.07]	[0.10]	[0.09]
R^2	0.31	0.68	0.54	0.38
Observations	191	191	191	191

Notes: This table reports the effects of orthogonalized monetary policy surprises on intraday asset price changes measured in a 30-minute window around FOMC announcements. Huber-White heteroskedasticity-robust standard errors are reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

bond yields. The effects of higher-order statements, as well as the marginal effects, remain fairly significant. Finally, the R^2 is much higher with these specifications, reaching out 0.68 for the regression over the two-year ZC yield against 0.28 when considering daily responses.

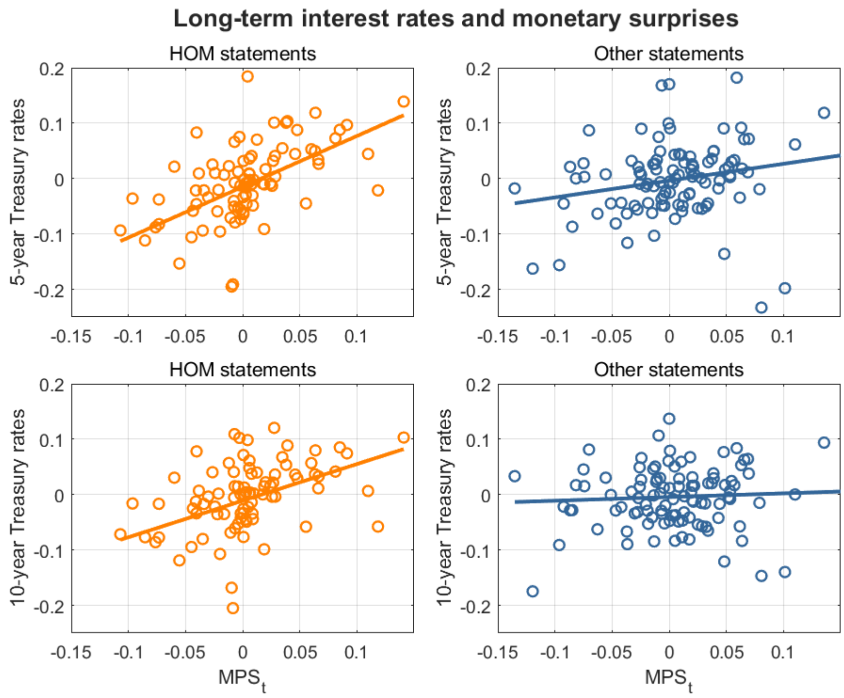
5.2.5 Impact of HOM statements on interest rates

We now examine thoroughly the effects of monetary surprises, especially higher-order moments against policy-stance announcements, on nominal ZC yields. First, we compare the effects of monetary surprises on 5- and 10-year ZC nominal yields, depending on the type of announcement. To this end, Figure 5 plots the relationship between monetary policy surprises and changes in nominal yields depending on the type of announcement.

We observe that the slope is steeper for HOM statements, and the data points are closer to the regression line. This suggests both a better fit – and consequently, a better explicative power – and a stronger relationship between monetary surprises and yield changes for HOM events. The former result can be highlighted by comparing the R^2 of regressions performed over HOM statements to regressions performed over other statements. Doing so, we observe a R^2 of 45, 24, and 13% for the 2-, 5- and 10-year rates when considering HOM statements, against approximately 12, 5, 0% for attenuating and same-sign statements.

To further analyze the relationship between long-term rates and monetary surprises, we look at the responses of asset prices for maturities ranging from one to thirty years. Table 6 reports the main results. These results highlight that, overall, there is a positive

Figure 5: Long-term interest rates and monetary surprises



Notes: Daily changes in nominal yields against orthogonalized monetary policy surprises. Only higher-order moments are considered on the left, other statements on the right. Regression line has been plotted. Sample: 1999-2022 (191 FOMC statements).

response of nominal yields over an higher-order moment signal conveyed by a FOMC statement, regardless of the maturity considered. This effect is maximal for bonds on the medium end of the yield curve, that is the 3- to 5-year maturity ZC. In comparison, the effects from other types of statements are not significant to explain daily changes in bond yields for ZC with a maturity longer than four years. One might then consider the channels through which higher-order moment statements affect the longer end of the yield curve.

5.3 Mechanisms of transmission from higher-order moment statements

We have shown in the previous section that higher-order moment statements have a substantial effect on bond yields, and more specifically on the medium and longer end of the yield curve, compared to other types of statements. We explore three channels through which these decisions might affect long-term yields: the inflation compensation, the term premium and financial uncertainty.

Table 6: Effects of monetary policy on bond yields at various maturities (1999–2022)

	1y	2y	3y	4y	5y	6y	7y	8y	9y
MPS_t	0.394**	0.395**	0.376*	0.338*	0.290	0.239	0.188	0.142	0.101
	[0.16]	[0.19]	[0.20]	[0.19]	[0.19]	[0.18]	[0.17]	[0.17]	[0.16]
$MPS_t \times \mathbb{1}^{HOM}$	0.258	0.549**	0.629***	0.636***	0.627***	0.619***	0.613***	0.608***	0.602***
	[0.18]	[0.22]	[0.23]	[0.24]	[0.24]	[0.24]	[0.24]	[0.23]	[0.23]
$MPS_t \mid \mathbb{1}^{HOM} = 1$	0.652***	0.944***	1.004***	0.974***	0.918***	0.857***	0.801***	0.750***	0.703***
	[0.08]	[0.10]	[0.12]	[0.13]	[0.15]	[0.16]	[0.16]	[0.16]	[0.16]
R^2	0.290	0.280	0.250	0.210	0.170	0.140	0.120	0.110	0.090
R^2 Other	0.170	0.110	0.090	0.070	0.050	0.040	0.020	0.010	0.010
R^2 HOM	0.410	0.450	0.370	0.300	0.240	0.200	0.170	0.150	0.140

	10y	11y	12y	13y	14y	15y	20y	25y	30y
MPS_t	0.066	0.035	0.009	-0.012	-0.031	-0.047	-0.097	-0.124	-0.142
	[0.16]	[0.16]	[0.16]	[0.15]	[0.15]	[0.15]	[0.15]	[0.15]	[0.16]
$MPS_t \times \mathbb{1}^{HOM}$	0.595***	0.586***	0.575***	0.562***	0.548***	0.532***	0.445**	0.364*	0.301
	[0.22]	[0.22]	[0.21]	[0.21]	[0.20]	[0.20]	[0.19]	[0.20]	[0.23]
$MPS_t \mid \mathbb{1}^{HOM} = 1$	0.661***	0.621***	0.585***	0.550***	0.517***	0.485***	0.348***	0.240*	0.159
	[0.15]	[0.15]	[0.14]	[0.14]	[0.14]	[0.13]	[0.13]	[0.14]	[0.16]
R^2	0.090	0.080	0.070	0.070	0.060	0.060	0.040	0.040	0.040
R^2 Other	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.020	0.030
R^2 HOM	0.130	0.120	0.120	0.110	0.110	0.100	0.060	0.030	0.010

Notes: This table reports the effects of orthogonalized monetary policy surprises on daily changes in zero-coupon Treasury yields across maturities. Huber-White heteroskedasticity-robust standard errors are reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

5.3.1 Effects of higher-order moment statements on inflation compensation

We first investigate the transmission of monetary surprises to ZC yields relying on the following decomposition proposed by Abrahams et al. (2016), that is:

$$i_t = r_t + ic_t, \tag{9}$$

where:

- i_t denotes nominal ZC yield
- r_t denotes real ZC yield, measured from TIPS securities
- ic_t denotes the inflation compensation measured with break-even inflation

We regress the daily change of each of these components on monetary surprises, controlling for higher-order and attenuation statements. Results are reported in Table 7. From this decomposition, we find that the effect of higher-order moment statements on nominal yields primarily operates through the real interest rate component. In particular, the response of inflation compensation to monetary policy surprises is generally not statistically significant, except at the two-year maturity. This finding suggests that higher-order moment statements do not affect bond yields through revisions in investors' inflation expectations. Extended results using more recent data and alternative event classifications, reported in the Appendix A11, lead to the same conclusion for the 1999-2022 sample.

Table 7: Decomposition of nominal interest rates: real rates and inflation compensation (1999–2022)

	Nominal interest rates			Real interest rates			Inflation compensation		
	2y	5y	10y	2y	5y	10y	2y	5y	10y
MPS_t	0.40**	0.29	0.07	-0.39	0.17	0.12	0.79**	0.12	-0.05
	[0.19]	[0.19]	[0.16]	[0.73]	[0.23]	[0.17]	[0.71]	[0.15]	[0.10]
$MPS_t \times \mathbb{1}^{HOM}$	0.55**	0.63***	0.60***	1.71**	0.68**	0.56**	-1.16**	-0.06	0.04
	[0.22]	[0.24]	[0.22]	[0.81]	[0.31]	[0.31]	[0.23]	[0.80]	[0.19]
$MPS_t \mid \mathbb{1}^{HOM} = 1$	0.94***	0.92***	0.66***	1.32***	0.86***	0.67***	-0.37	0.06	-0.01
	[0.10]	[0.15]	[0.15]	[0.36]	[0.20]	[0.15]	[0.36]	[0.12]	[0.07]
R^2	0.28	0.17	0.09	0.07	0.12	0.10	0.04	0.05	0.07
Observations	191	191	191	191	191	191	191	191	191

Notes: This table reports the effects of orthogonalized monetary policy surprises on daily changes in nominal yields, real yields, and inflation compensation components. Huber–White heteroskedasticity-robust standard errors are reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

5.3.2 Term Premia

We now look at the decomposition of nominal ZC yields into an expectation component and a term premia. Those quantities comes from the three-step regression procedure proposed by Adrian et al. (2013). It yields the following decomposition:

$$y_t^{(n)} = \frac{1}{n}\sum_{k=0}^{n-1} \mathbb{E}_t\{i_{t+k}\} + TP_t^{(n)} \tag{10}$$

Following the expectations hypothesis interpretation of yields, a bond yield can be decomposed into the average expected path of future short-term interest rates over the life of the bond and a term premium capturing compensation for interest rate risk over that horizon. Using the yield decompositions provided by Adrian et al. (2013), we evaluate the daily responses of each of these components to monetary policy surprises. Regression results are displayed in Table 8.

We find that depending on the content of an announcement, financial assets respond differently to monetary surprises. Indeed, same sign statements induce a positive response of nominal interest rate which is driven by the expectation hypothesis component. Indeed, when the Target factor is positive, it implies that the rate decision, and future rate decisions, should be more restrictive than anticipated. Such result, backed by a positive Path factor, encourage investors to revise their expectations of future short term rate.

By contrast, when the Target and Path factors convey conflicting signals, and es-

Table 8: Decomposition of nominal interest rates: expectation hypothesis and term premium (1999–2022)

	Nominal interest rates			Expectation hypothesis			Term premium		
	2y	5y	10y	2y	5y	10y	2y	5y	10y
MPS_t	0.40**	0.29	0.06	0.52***	0.49***	0.38***	-0.13	-0.20*	-0.32**
	[0.20]	[0.19]	[0.16]	[0.18]	[0.17]	[0.14]	[0.11]	[0.10]	[0.14]
$MPS_t \times \mathbb{1}^{HOM}$	0.56**	0.63***	0.61***	0.16	0.27	0.25	0.39***	0.36***	0.36**
	[0.22]	[0.24]	[0.22]	[0.20]	[0.19]	[0.16]	[0.13]	[0.14]	[0.18]
$MPS_t \mid \mathbb{1}^{HOM} = 1$	0.95***	0.92***	0.67***	0.69***	0.75***	0.63***	0.27***	0.17*	0.04
	[0.10]	[0.15]	[0.15]	[0.08]	[0.08]	[0.07]	[0.06]	[0.09]	[0.12]
R^2	0.28	0.17	0.08	0.28	0.27	0.26	0.09	0.05	0.05
Observations	191	191	191	191	191	191	191	191	191

Notes: This table reports the effects of orthogonalized monetary policy surprises on daily changes in nominal zero-coupon yields and their decomposition into expectations and term premium components, following Adrian et al. (2013). Huber–White heteroskedasticity-robust standard errors are reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

pecially when announcements contain higher-order moment information, the transmission mechanism shifts. In this case, monetary policy surprises affect zero-coupon yields mainly through the term premium rather than through expectations. Heightened uncertainty about future policy actions increases the compensation investors require to hold long-maturity bonds, resulting in a rise in term premia. When extending to a larger sample, we still observe that the term premium remains central for the transmission of higher-order moment signals to bond yields (see Appendix A12).

Last, we look at how both types of statements, that is higher-order moments and policy-stance statements, affect risk and uncertainty measures.

5.3.3 Transmissions of monetary policy through risk measures

We look at the effects of both types of statements on the following indicators:

- the VIX, which measures the expected volatility on the US stock market
- The risk aversion measure of Bekaert et al. (2022)
- Term premium and forward term premium computed by Kim and Wright (2005)
- The monetary policy uncertainty indicator of Bauer et al. (2022): daily changes of short-rate uncertainty around FOMC announcement, with short-rate uncertainty defined as the implied conditional volatility of LIBOR compute from exchange-rate derivatives.

Doing so, we get the following results:

Table 9: Monetary policy effects on various higher-order moment measures (1999–2022)

	Risk appetite		Term premium and uncertainty				
	VIX	BEX21	TP1Y	FTP1Y	TP10Y	FTP10Y	BLM22
MPS_t	9.653**	2.271*	0.032	0.057	0.064	0.062	0.136
	[4.28]	[1.16]	[0.03]	[0.05]	[0.07]	[0.08]	[0.09]
$MPS_t \times \mathbb{1}^{HOM}$	-6.228	-2.328*	0.113***	0.196***	0.276***	0.314***	-0.043
	[5.24]	[1.20]	[0.04]	[0.06]	[0.09]	[0.11]	[0.11]
$MPS_t \mid \mathbb{1}^{HOM} = 1$	3.425	-0.057	0.145***	0.252***	0.341***	0.375***	0.094
	[3.03]	[0.31]	[0.02]	[0.03]	[0.06]	[0.07]	[0.07]
R^2	0.05	0.06	0.19	0.20	0.15	0.11	0.06
Observations	191	191	191	191	191	191	191

Notes: This table reports the effects of orthogonalized monetary policy surprises on risk, term premium, and uncertainty measures. VIX denotes the implied volatility index. BEX21 refers to the risk appetite measure of Bekaert et al. (2022). TP and FTP correspond to term premium and forward term premium estimates from Kim and Wright (2005). BLM22 denotes the monetary policy uncertainty indicator of Bauer et al. (2022). Huber-White heteroskedasticity-robust standard errors are reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

These results highlight that policy-stance announcements have a significant effect on risk appetite measure, while high-order moment statements have a strong effect on term premium and uncertainty risk measures. It implies that higher-order moment statements convey information about the term structure of interest rate, while policy-stance statements are more general, and potentially convey relevant information relevant over several asset classes.

5.4 Robustness checks

In this section, we investigate the robustness of our baseline results to a range of alternative specifications and sample definitions. Specifically, we examine potential asymmetries between tightening and easing surprises, distinguish between different types of monetary policy events, and assess the role of unconventional monetary policy episodes. We further explore whether our findings extend to the euro area and across subsamples.[11]

5.4.1 Controlling for an asymmetry effect

We control for the type of monetary policy decisions by allowing the effects of monetary policy surprises to differ across hikes, holds, and other announcements. Specifically,

[11] Herbert et al. (2025) conduct an extensive set of robustness checks. We introduce two additional exercises (the first two) and extend several of their existing ones.

we estimate the following regression:

$$\begin{aligned}\Delta Y_t = \alpha + \beta_1 MPS_t + \beta_2 \cdot \mathbb{1}_t^{Att} \cdot MPS_t + \beta_3 \cdot \mathbb{1}_t^{HOM} \cdot MPS_t \\ + \beta_4 \cdot MPS_t \cdot \mathbb{1}_t^{Hike} + \beta_5 \cdot MPS_t \cdot \mathbb{1}_t^{Hold} \\ + \beta_6 \cdot \mathbb{1}_t^{Att} + \beta_7 \cdot \mathbb{1}_t^{HOM} + \beta_8 \cdot \mathbb{1}_t^{Hike} + \beta_9 \cdot \mathbb{1}_t^{Hold} + \epsilon_t,\end{aligned} \tag{11}$$

where $\mathbb{1}_t^{Hike} = \begin{cases} 1 & \text{if } FFTR_t > FFTR_{t-1} \\ 0 & \text{otherwise} \end{cases}$ and $\mathbb{1}_t^{Hold} = \begin{cases} 1 & \text{if } FFTR_t = FFTR_{t-1} \\ 0 & \text{otherwise} \end{cases}$.[12]

Table 10 reports the main results obtained over the full sample when controlling for the type of policy decision. We find no evidence of asymmetry in the transmission of monetary policy surprises across rate hikes, cuts, or holds for all the considered assets. In other words, market participants appear to price monetary policy surprises in a directionally consistent way: hawkish decisions are associated with hawkish reactions, dovish decisions with dovish ones (conditional on the magnitude of the surprise).

Importantly, the absence of a decision-type asymmetry implies that the heterogeneous effects documented in the previous sections cannot be attributed to mechanical differences between tightening and easing episodes. It reinforces the idea that variation in the transmission of monetary policy surprises appears to be driven by the informational content of central bank communication. In particular, the differentiated responses associated with attenuation and higher-order moment (HOM) events remain economically and statistically significant once decision-type controls are introduced.

Results obtained when restricting the sample to that of Herbert et al. (2025) (Appendix, Table A4) lead to the same conclusion: controlling for whether the policy rate is raised, lowered, or left unchanged does not alter the qualitative pattern of results. The remaining differences between the restricted and extended samples are consistent with those discussed in Section 5.2.2.

5.4.2 Controlling for Quantitative Easing announcements

We now control for Quantitative Easing announcements. Specifically, we consider the following regression:

$$\begin{aligned}\Delta Y_t = \alpha + \beta_1 MPS_t + \beta_2 \cdot \mathbb{1}_t^{Att} \cdot MPS_t + \beta_3 \cdot \mathbb{1}_t^{HOM} \cdot MPS_t \\ + \beta_4 \cdot MPS_t \cdot \mathbb{1}_t^{QE} + \beta_5 \cdot \mathbb{1}_t^{Att} + \beta_6 \cdot \mathbb{1}_t^{HOM} + \beta_7 \cdot \mathbb{1}_t^{QE} + \epsilon_t,\end{aligned} \tag{12}$$

where $\mathbb{1}_t^{QE} = 1$ if t corresponds to one of the events indicated in Table A2.

[12] The federal funds target rate ($FFTR$) corresponds to the announced target rate prior to 2008 and to the midpoint of the target range thereafter.

Table 10: Monetary Policy Surprises with Decision-Type Controls

	S&P 500	2y	5y	10y
MPS^{orth}	-8.573***	0.353***	0.244**	0.156
	(2.206)	(0.103)	(0.119)	(0.111)
$MPS^{orth} \times \mathbb{1}_t^{Att}$	-4.954	-0.480**	-0.705***	-0.401
	(5.111)	(0.237)	(0.276)	(0.256)
$MPS^{orth} \times \mathbb{1}_t^{HOM}$	1.816	0.290***	0.351***	0.328***
	(1.951)	(0.091)	(0.105)	(0.098)
$MPS^{orth} \times \mathbb{1}_t^{Hike}$	3.455	0.429*	0.404	0.236
	(5.517)	(0.256)	(0.298)	(0.276)
$MPS^{orth} \times \mathbb{1}_t^{Hold}$	3.610	0.163	0.138	-0.004
	(2.509)	(0.117)	(0.136)	(0.126)
$MPS^{orth} \mid \mathbb{1}_t^{Att}$	-13.526**	-0.127	-0.461	-0.245
	(5.438)	(0.253)	(0.294)	(0.272)
$MPS^{orth} \mid \mathbb{1}_t^{HOM}$	-6.757**	0.644***	0.595***	0.483***
	(2.851)	(0.132)	(0.154)	(0.143)
R^2	0.050	0.245	0.150	0.069
Observations	751	751	751	751

Notes: This table reports the effects of orthogonalized monetary policy surprises on asset prices while controlling for announcement content and the type of policy decision. Only coefficients of interest are reported. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. Sample: 1999-2025 (751 observations).

The results for the entire extended sample are displayed in Table 11, and they do not contradict the evidence documented above regarding the singularity of HOM events. It is worth stressing that policy actions implemented during QE episodes are associated with a stronger response of medium-term yields, in line with the theory behind QE. Results based on the restricted sample (FOMC statements up to December 2022) are displayed in the Appendix (Table A5), and are in line with the authors' findings.

Table 11: Monetary Policy Surprises with Quantitative Easing Controls (Full sample)

	S&P 500	2y	5y	10y
MPS_t	-5.359***	0.482***	0.341***	0.154***
	(1.574)	(0.061)	(0.065)	(0.057)
$MPS_t \times \mathbb{1}^{Att}$	-4.933	-0.457	-0.692	-0.410
	(11.296)	(0.320)	(0.463)	(0.398)
$MPS_t \times \mathbb{1}^{HOM}$	2.312	0.320***	0.382***	0.319***
	(2.708)	(0.111)	(0.116)	(0.094)
$MPS_t \times \mathbb{1}^{QE}$	-31.046***	1.062**	1.638*	1.057
	(2.366)	(0.478)	(0.936)	(1.132)
$\mathbb{1}^{QE}$	0.874***	-0.031	-0.073	-0.083
	(0.153)	(0.023)	(0.045)	(0.055)
$MPS_t \mid \mathbb{1}^{HOM} = 1$	-3.046	0.802***	0.723***	0.473***
	(2.207)	(0.092)	(0.095)	(0.074)
R^2	0.070	0.249	0.174	0.097
Observations	751	751	751	751

Notes: This table reports regressions of asset-price changes on monetary policy surprises while controlling for QE announcement. Only coefficients of interest are reported. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. Sample: 1999-2025.

5.4.3 Euro Area evidence

We now examine whether the relevance of HOM events documented for the US also extend to another monetary area, namely the euro area. We use the EA-MPD (version available as of November 4, 2025;) and consider asset price changes in the Press Release Window. Monetary policy surprises in the euro area constitute a distinct strand of literature, sharing conceptual similarities with FOMC monetary surprises but also featuring specific challenges stemming from the institutional structure of the euro area. A detailed discussion of euro area monetary factors and surprises is beyond the scope of this paper, but interested readers are referred, among others, to Altavilla et al. (2019), who introduced the high-frequency database for the euro area, or Ricco et al. (2024), who identify four statistically significant factors in the intraday price changes and provide a way to rotate them, allowing for a structural interpretation. Here, euro-area evidence is used strictly as a robustness exercise.

Following the methodology of Herbert et al. (2025), we adapt our framework to the euro-area setting as follows:

- we use high-frequency changes in the STOXX 50 instead of the S&P 500 and in the 2-, 5- and 10-year German sovereign yield,
- we consider the high-frequency changes in the 1-month OIS rates as our Target factor,
- we consider the high-frequency changes in the 1-year OIS rates, orthogonalized to changes in the 1-month OIS rates, as our Path factor.

Monetary policy surprises are then defined as the sum of the Target and Path surprises. HOM announcements are defined exactly as before.

The results from estimating Equation (5) for the euro area are reported in Table 12 (and again, for comparison, results using the exact sample used by Herbert et al. (2025) are reported in Appendix, Table A6). We want to stress that while the authors identify 98 HOM announcements out of the 299 policy decisions they consider, we identify 86 events as HOM over the same period. Extending the sample only yields one additional HOM observation. These minor discrepancies do not affect the results much compared to Herbert et al. (2025).

The key takeaway from the results is that HOM announcements significantly amplify the response of medium and long-term yields. It is especially true for the 10-year yield, for which HOM events account for the bulk of the transmission of monetary policy. Although significant, non-HOM announcements play a comparatively limited role for this maturity.

We also highlight the fact that the euro-area regressions have substantially higher explanatory power. The R^2 values are markedly larger than those obtained for FOMC statements under comparable specifications, suggesting that euro-area monetary policy surprises measured in press release windows explain a larger share of high-frequency asset price movements.

A noteworthy feature of the euro-area results is the strong relevance of attenuation events[13] for the transmission of monetary policy to medium and long-term yields. Compared to the US, where we do not find such significance regardless of the sample considered, attenuation announcements appear to play an important role in the euro area.

[13] For the period 1999-2023, we identify 48 attenuation events. Extending the sample to December 2025 yields 10 additional attenuation events.

Table 12: Euro Area Evidence: Monetary Policy Surprises with HOM Signals

	STOXX 50	2y	5y	10y
MPS_t	-0.059***	0.851***	0.600***	0.212***
	(0.022)	(0.055)	(0.071)	(0.080)
$MPS_t \times \mathbb{1}^{Att}$	0.008	-0.438***	-0.564***	-0.392**
	(0.025)	(0.159)	(0.189)	(0.179)
$MPS_t \times \mathbb{1}^{HOM}$	0.014	0.337***	0.635***	0.650***
	(0.026)	(0.125)	(0.135)	(0.133)
$MPS_t \mid \mathbb{1}^{HOM} = 1$	-0.045***	1.188***	1.235***	0.863***
	(0.014)	(0.112)	(0.115)	(0.106)
R^2	0.148	0.751	0.578	0.309
Observations	315	315	315	315

Notes: This table reports regressions of euro-area asset-price changes on monetary policy surprises. Only coefficients of interest are reported. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. Sample: Press Releases, 1999-2025.

Recall that an attenuation event occurs when Path and Target surprises are of opposite signs and Path surprise is smaller in magnitude. The negative sign of our interaction estimates for the fixed-income assets is consistent with this definition: conditional on the size of the monetary policy surprise, yield responses are dampened when forward guidance partially offsets the contemporaneous policy signal. In such episodes, market reactions remain primarily driven by the Target factor –reflecting both the current policy decision and revisions in expected future policy – but the uncertainty-related component conveyed by Path acts as a mitigating force. This partially offsets the revision in expectations and reduces the overall response of medium- and long-term yields.

For longer maturities, this mechanism becomes particularly pronounced. In the case of the 10-year yield, the attenuation effect even dominates the standard monetary policy effect, consistent with the idea that the relative importance of Path-related information increases with maturity.

The fact that attenuation effects are statistically significant in the euro area but not in the US may reflect differences in communication strategies across central banks. One possible interpretation is that the ECB relies more systematically on forward guidance to smooth market reactions to contemporaneous policy surprises, leading to a more frequent and empirically detectable attenuation of long-term yield responses.

Overall, we can draw two main insights from this euro area exercise. First, the relevance of HOM events for transmission of monetary policy to longer-term yields holds, confirming the relevance of the identification proposed by Herbert et al. (2025). Second, there may be differences in communication practices between the ECB and the FOMC, as the increased explanatory power and attenuation events significance suggest.

5.4.4 Across subsamples

As a final robustness check, we estimate the regression (5) on different subsamples corresponding to what are commonly agreed to be different monetary policy periods:

1. between 1999 and the first time the zero interest rate policy was implemented (December 16, 2008);
2. between December 17, 2008 and the beginning of the tightening cycle following the post-COVID inflation surge (March 16, 2022);
3. from March 16, 2022 to the end of our sample (December 2025).[14]

The results are in Table 13. First, across all subsamples, the interaction between HOM events and monetary surprise coefficients remain significant for the 2-year yield. The recent sample does not exhibit significant heterogeneity implied by HOM events (although the average marginal effect remains significantly above zero), but the other two do. Second, when it is significant, the interaction effect is stronger for longer maturities, consistent with the above discussions about the term premia transmission of HOM events.

A final point worth noting concerns the incidence of HOM events in the most recent subsample. During the 2023–2025 period, HOM episodes account for nearly half of all policy events (+11 percentage point compared to the post-GFC sample). This could be explained by the macroeconomic and geopolitical environment prevailing over this period, which forced the FOMC to choose its words more wisely while relying more and more on forward guidance.[15] Following the post-pandemic inflation surge, monetary policy decisions took place in a context of heightened uncertainty, marked by persistent inflationary pressures, geopolitical tensions, and renewed trade-policy risks. In such an environment, policy rate decisions were frequently accompanied by communication emphasizing conditionality and risk management.

In particular, during the tightening phase of 2022-2024, policy rate hikes were often coupled with guidance stressing that future policy would remain highly data-dependent and contingent on inflation dynamics. More recently, as the Federal Reserve shifted toward pauses or prospective easing, communication continued to highlight upside risks

[14] Note that for this period, only four attenuation events were identified. It led to numerical instability, so we estimated a revised specification of (5) without $\mathbb{1}_t^{Att}$.

[15] Further evidence of this is the small amount of attenuation moments (4). This indicates that Path surprises were larger in magnitude more often than the reverse, and this is a sign that uncertainty revisions were larger.

to inflation, including those associated with potential tariff increases following political developments. These patterns are consistent with the observed increase in HOM classifications. Conditional on HOM events, Target surprises are on average small and positive, while Path surprises are negative and larger in magnitude.[16]

In this environment, current policy actions convey information about the expected stance of policy through the Target component, while accompanying communication reshapes uncertainty about future policy trajectories, generating Path surprises of opposite sign. This mechanism naturally gives rise to a higher frequency of HOM events in periods characterized by heightened macroeconomic uncertainty and conditional forward guidance.

5.5 Local Projections

Finally, in order to analyze the dynamic responses of macroeconomic variables to monetary policy shocks, we estimate impulse response functions using the LP-IV method presented in Section 3.4. Specifically, we consider the design:

$$Y_{t+h} = \alpha_h + \Upsilon_h(L)Y_{t-1} + \tilde{\Psi}_h Y_t^{2y} + \nu_{t+h}, \tag{13}$$

where:

- Y contains the following macro variables: the log-industrial production, the log-Consumer Price Index, the Excess Bond Premium (Gilchrist and Zakrajsek 2012) and the 2-year yield,
- $\Upsilon_h(L)$ is a 12th order lag-polynomial (for control, see Bauer and Swanson (2023b)),
- $\tilde{\Psi}$ is the coefficient we want to estimate,
- Y_t^{2y} is the 2-year yield,
- ν_{t+h} is the vector of residuals.

Y_t^{2y} is instrumented using the (extended) orthogonalized monetary policy surprise.

Results are rather inconclusive: the F-statistic of the first stage regression is found to be equal to 2.5, so the instrument prove to be weak. Despite that, we present the IRFs in Figure 6, but their results should be taken with great care.

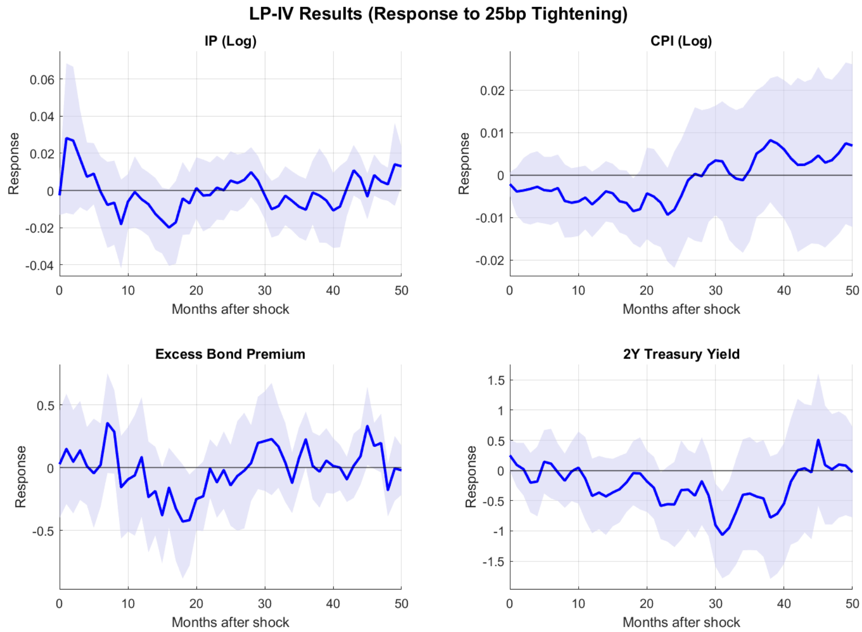
[16] Over the 56 HOM events in the recent subsample, the average Target surprise is 0.0065, whereas the average Path surprise is -0.0139. By construction, HOM events involve opposite-signed Target and Path surprises. Under the interpretation discussed in Section 3.2.2, this configuration reflects announcements in which expectation-based information about future policy remains slightly hawkish, while higher-order moment news alters the perceived uncertainty surrounding the future policy path.

Table 13: Monetary Policy Effects across Subsamples

	S&P 500	2y	5y	10y
Panel A: Pre-GFC (1999-Dec 2008)				
MPS_t	-6.836***	0.544***	0.372***	0.199***
	(1.791)	(0.073)	(0.074)	(0.069)
$MPS_t \times \mathbb{1}^{HOM}$	3.096	0.357*	0.491**	0.456***
	(3.249)	(0.199)	(0.196)	(0.158)
$MPS_t \mid \mathbb{1}^{HOM} = 1$	-3.740	0.901***	0.862***	0.655***
	(2.710)	(0.185)	(0.182)	(0.142)
R^2	0.16	0.30	0.25	0.17
Obs	240	240	240	240
HOM events (= 40%)	96	96	96	96
Panel B: Post-GFC (2009-March 2022)				
MPS_t	0.489	0.519***	0.350***	-0.007
	(3.326)	(0.111)	(0.121)	(0.121)
$MPS_t \times \mathbb{1}^{HOM}$	2.032	0.259*	0.503**	0.568***
	(4.075)	(0.155)	(0.211)	(0.206)
$MPS_t \mid \mathbb{1}^{HOM} = 1$	2.520	0.778***	0.854***	0.561***
	(2.354)	(0.107)	(0.173)	(0.166)
R^2	0.06	0.26	0.13	0.05
Obs	391	391	391	391
HOM events (≈ 36%)	141	141	141	141
Panel C: Recent tightening period (2023–2025)				
MPS_t	-6.706**	0.245	0.279	0.145
	(2.645)	(0.192)	(0.180)	(0.128)
$MPS_t \times \mathbb{1}^{HOM}$	-0.042	0.559**	0.332	0.188
	(4.909)	(0.227)	(0.204)	(0.150)
$MPS_t \mid \mathbb{1}^{HOM} = 1$	-6.748	0.803***	0.611***	0.333***
	(4.135)	(0.122)	(0.097)	(0.079)
R^2	0.10	0.31	0.29	0.16
Obs	120	120	120	120
HOM events (≈ 47%)	56	56	56	56

Notes: This table reports regressions of asset-price changes on monetary policy surprises across subsamples. Only coefficients of interest are reported. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Figure 6: Local Projections - full sample



Notes: Local Projections IRFs to a 25bp monetary policy shock using high-frequency orthogonalized monetary policy surprise around all type of events. Shaded-area report 90% Newey-West standard-errors bands.

In Appendix (Figure A3), we present the IRFs considering only HOM events, as our initial objective was to analyze a differentiated transmission of monetary surprises to macroeconomic variables depending on the content of statements. The instrument is found to be even weaker in this case, and results are inconclusive. This is why we prefer not to comment further on these results, as no real inference can be made.

6 Conclusion

Our work aimed to replicate and extend the analysis of Herbert et al. (2025), examining how the informational content of FOMC announcements shapes the transmission of monetary policy surprises to financial markets.

Our analysis yields several key insights. First, the effects of monetary surprises on the longer end of the yield curve are disproportionately driven by HOM statements, even though these events represent only a minority of all announcements in our database. Second, the transmission channels themselves appear heterogeneous: HOM announcements affect medium- and long-term yields primarily via the term premium, while same-sign announcements rely predominantly on the expectations channel. Third, by controlling for the informational content of monetary events, our findings help reconcile the long-standing puzzle whereby FOMC announcements explain most of the low-frequency dynamics of long-term yields but account for only a small fraction of their high-frequency variance on announcement days.

Our key additional contribution lies in leveraging the recently released US-MPD, which substantially expands the set of high-frequency observations, beyond FOMC statements. We confirm the central findings of Herbert et al. (2025) – that is, monetary policy announcements convey heterogeneous information that produces differentiated effects on asset prices, and specifically, HOM statements primarily affect bond yields through changes in term premia and uncertainty, rather than through revisions to expected future short-term rates. Adding more events did not affect the robustness of the analysis.

Overall, this report confirms that accounting for the informational heterogeneity of central bank announcements is essential to understanding the transmission mechanisms of monetary policy. Future work could further explore these mechanisms using the recently released Euro-Area Extended Monetary Policy Database (EA-EMPD), which contains over 4,000 events, to assess whether the relevance of HOM announcements extends more broadly across different institutional settings and communication practices, and could go beyond our brief discussion of euro area effects.

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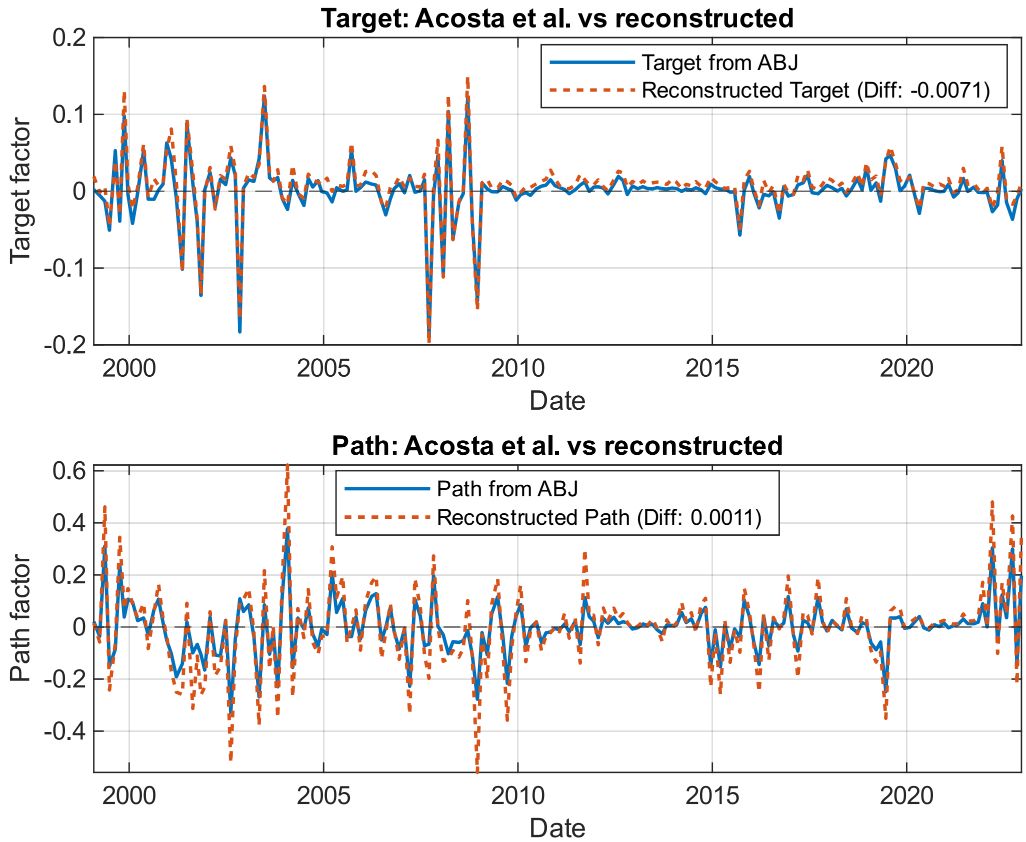
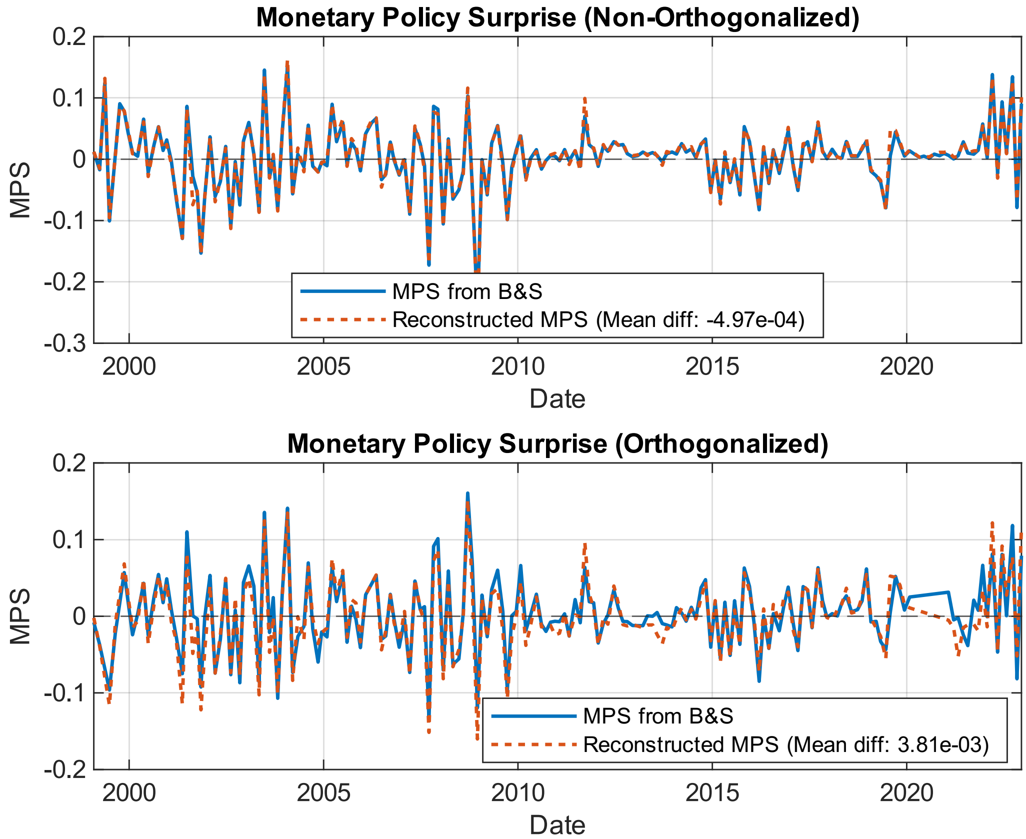
A Additional Results

Figure A1: Target and Path factor: comparison with available series



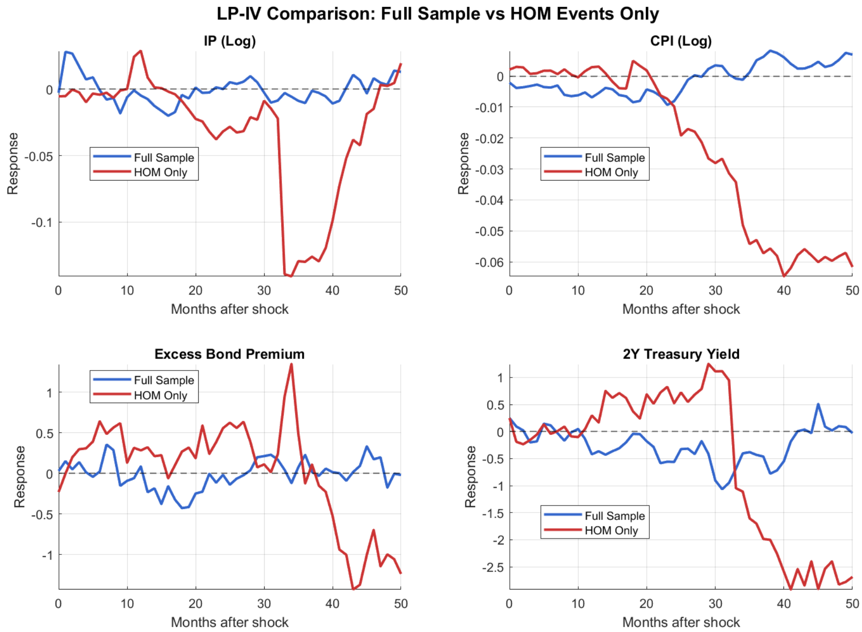
Notes: Target and Path surprises are reconstructed using FOMC statements from the US-MPD database following the procedure described in Section 3.2.1 and compared to Acosta et al. (2024) series. Sample: 1999-2024. (return to main text).

Figure A2: Monetary Policy surprises: comparison with available data



Notes: Monetary policy surprises are reconstructed using FOMC statements from the US-MPD database following the procedure described in Section 3.1 and compared to Bauer and Swanson (2023b) series. Sample: 1999-2023. (return to main text).

Figure A3: Local Projections - HOM events



Notes: Local Projections IRFs to a 25bp monetary policy shock using high-frequency orthogonalized monetary policy surprise around all HOM events. Shaded-area report 90% Newey-West standard-errors bands. Sample: 1999-2025 (751 observations). (return to main text).

Table A1: Information Effects on Eurodollar Futures

	ED1	ED2	ED3	ED4
GSS	0.308***	0.445***	0.544***	0.592***
	(0.040)	(0.020)	(0.008)	(0.012)
BS	0.723***	0.914***	1.049***	1.110***
	(0.077)	(0.054)	(0.065)	(0.083)
Target	0.870***	0.736***	0.640***	0.566***
	(0.111)	(0.118)	(0.131)	(0.142)
Path	0.226***	0.399***	0.524***	0.589***
	(0.040)	(0.029)	(0.022)	(0.023)
R^2 (GSS)	0.552	0.886	0.979	0.961
R^2 (BS)	0.646	0.793	0.773	0.715
R^2 (Target)	0.543	0.298	0.167	0.108
R^2 (Path)	0.265	0.634	0.807	0.843

Notes: This table reports coefficients from regressions of intraday changes in Eurodollar futures (ED1–ED4) on alternative monetary policy surprise measures. "GSS" refers to the surprise constructed following Gürkaynak et al. (2005), "BS" to the news-adjusted monetary policy surprise of Bauer and Swanson (2023a). "Target" and "Path" denote the rotated factors capturing surprises to the current policy rate and the expected future policy path, respectively. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. Sample: 1999–2023 (191 observations). (return to main text).

Table A2: FOMC announcement dates and times (return to main text).

Event	Date announced
QE1	FOMC Statement. 25 November 2008, 8:15 a.m. ET
QE1 Expansion	FOMC Statement. 18 March 2009, 2:15 p.m. ET
QE1 Ends	FOMC Statement. 16 March 2010, 2:15 p.m. ET
QE2	FOMC Statement. 3 November 2010, 2:15 p.m. ET
QE2 Ends	FOMC Statement. 22 June 2011, 12:30 p.m. ET
Operation Twist	FOMC Statement. 21 September 2011, 2:15 p.m. ET
Operation Twist Extension	FOMC Statement. 20 June 2012, 12:30 p.m. ET
QE3	FOMC Statement. 13 September 2012, 12:30 p.m. ET
QE3 Expansion & Operation Twist Ends	FOMC Statement. 12 December 2012, 12:30 p.m. ET
Taper Tantrum Event	Chairman Ben Bernanke, Joint Economic Committee, 22 May 2013, 10:00 a.m. ET. Event at 10:32 a.m. ET
May Scale Back Event	Transcript of Chairman Bernanke's Press Conference, 19 June 2013, 2:30 p.m. ET. Event at 2:37 p.m. ET
QE3 Taper	FOMC Statement. 18 December 2013, 2:00 p.m. ET
QE3 Ends	FOMC Statement. 29 October 2014, 2:00 p.m. ET

Table A3: Summary of datasets and samples (return to main text).

Dataset	Variables	Frequency	Sample
Bauer (2023a); GSW (2007); ABJ (2024)	S&P 500 returns; 2-, 5-, and 10-year zero-coupon nominal yields; monetary policy surprises	Intraday and Daily	Jan. 1999 – Dec. 2022
AACMY (2016); ACM (2013); Bauer et al (2022); Kim and Wright (2005);Bekaert et al (2022)	Real yields, inflation compensation, expectations, term premia and forward term premia for 2-, 5-, and 10-year maturities, VIX, risk appetite measure, and uncertainty index	Daily	Jan. 1999 – Dec. 2022 and Jan.1999 – Dec 2025
Altavilla et al. (2019)	Euro-area asset price changes around ECB policy announcements	Intraday	Jan. 1999 – Dec. 2025
Acosta (2025) (USMDP)	High-frequency responses of futures, yields, equities, and exchange rates around FOMC communications	Intraday	Feb. 1999 – Dec. 2025
FRED; GSW (2007); Gilchrist and Zakrajšek (2012)	CPI, industrial production, 2-year zero-coupon yield, excess bond premium	Monthly	Feb. 1999 – Dec. 2025

Table A4: Monetary Policy Surprises with Decision-Type Controls (Restricted Sample)

	S&P 500	2y	5y	10y
MPS_t	-11.032**	0.444	0.326	0.196
	(4.524)	(0.276)	(0.268)	(0.245)
$MPS_t \times \mathbb{1}^{Att}$	12.117*	0.075	-0.086	-0.062
	(7.015)	(0.368)	(0.309)	(0.240)
$MPS_t \times \mathbb{1}^{HOM}$	0.615	0.558**	0.607**	0.673***
	(4.693)	(0.227)	(0.247)	(0.219)
$MPS_t \times \mathbb{1}^{Hike}$	5.950	-0.250	-0.198	-0.344
	(7.461)	(0.462)	(0.437)	(0.344)
$MPS_t \times \mathbb{1}^{Hold}$	7.706	-0.011	0.031	-0.182
	(5.875)	(0.308)	(0.300)	(0.262)
$MPS_t \mid \mathbb{1}^{HOM} = 1$	-10.417*	1.002***	0.933***	0.869***
	(6.299)	(0.314)	(0.320)	(0.285)
R^2	0.083	0.291	0.173	0.095
Observations	191	191	191	191

Notes: This table reports the effects of monetary policy surprises on asset prices while controlling for the type of policy decision when sample is restricted to the one used in Herbert et al. (2025). Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. Sample: 1999-2022. (return to main text).

Table A5: Monetary Policy Surprises with Quantitative Easing Controls (Restricted sample)

	S&P 500	2y	5y	10y
MPS_t	-6.862**	0.367*	0.252	0.047
	(3.438)	(0.198)	(0.193)	(0.164)
$MPS_t \times \mathbb{1}^{Att}$	12.810*	0.168	0.026	-0.021
	(7.310)	(0.328)	(0.288)	(0.257)
$MPS_t \times \mathbb{1}^{HOM}$	4.354	0.547**	0.620***	0.585***
	(4.484)	(0.217)	(0.231)	(0.212)
$MPS_t \times \mathbb{1}^{QE}$	-40.396***	1.797**	2.693	1.746
	(8.647)	(0.837)	(1.690)	(2.135)
$\mathbb{1}^{QE}$	0.565**	-0.042	-0.090	-0.098
	(0.260)	(0.037)	(0.071)	(0.091)
$MPS_t \mid \mathbb{1}^{HOM} = 1$	-2.508	0.914***	0.872***	0.632***
	(2.931)	(0.092)	(0.127)	(0.130)
R^2	0.104	0.311	0.235	0.149
Observations	191	191	191	191

Notes: This table reports the effects of monetary policy surprises on asset prices while controlling for Quantitative Easing announcements when sample is restricted to the one used in Herbert et al. (2025). Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. Sample: 1999-2022. (return to main text).

Table A6: Euro area evidence (restricted sample)

	STOXX 50	2y	5y	10y
MPS_t	-0.059***	0.844***	0.588***	0.198**
	(0.022)	(0.056)	(0.071)	(0.080)
$MPS_t \times \mathbb{1}^{Att}$	0.008	-0.431***	-0.550***	-0.377**
	(0.026)	(0.160)	(0.187)	(0.181)
$MPS_t \times \mathbb{1}^{HOM}$	0.019	0.354**	0.676***	0.667***
	(0.028)	(0.145)	(0.156)	(0.150)
$MPS_t \mid \mathbb{1}^{HOM} = 1$	-0.040**	1.199***	1.263***	0.865***
	(0.017)	(0.134)	(0.140)	(0.126)
R^2	0.142	0.742	0.564	0.285
Observations	299	299	299	299

Notes: This table reports the effects of monetary policy surprises on asset prices in the euro area when sample is restricted to the one used in Herbert et al. (2025). Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. Sample: 1999-2023. (return to main text).

Table A7: Monetary Policy Surprises with HOM Signals — FOMC Statements

	S&P 500	2y	5y	10y
MPS_t^{orth}	-4.844*	0.493***	0.333***	0.131
	(2.785)	(0.105)	(0.105)	(0.090)
$MPS_t^{orth} \times \mathbb{1}^{Att}$	-0.055	-0.230	-0.592	-0.464
	(15.480)	(0.502)	(0.654)	(0.554)
$MPS_t^{orth} \times \mathbb{1}^{HOM}$	0.045	0.218	0.342	0.325
	(4.589)	(0.228)	(0.230)	(0.199)
$MPS_t^{orth} \mid \mathbb{1}^{HOM} = 1$	-4.799	0.710***	0.676***	0.456***
	(3.647)	(0.202)	(0.205)	(0.177)
R^2	0.039	0.191	0.120	0.063
Observations	231	231	231	231

Notes: This table reports the effects of orthogonalized monetary policy surprises on asset prices using only FOMC statements. $\mathbb{1}^{Att}$ denotes attenuation events and $\mathbb{1}^{HOM}$ higher-order moment announcements. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. (return to main text).

Table A8: Monetary Policy Surprises with HOM Signals — Press Conferences

	S&P 500	2y	5y	10y
MPS_t^{orth}	-8.532***	0.639***	0.545***	0.362***
	(2.474)	(0.108)	(0.138)	(0.086)
$MPS_t^{orth} \times \mathbb{1}^{Att}$	19.397	0.762	0.916	0.841
	(23.935)	(1.451)	(1.584)	(1.231)
$MPS_t^{orth} \times \mathbb{1}^{HOM}$	-0.493	0.155	0.378	0.174
	(4.358)	(0.281)	(0.260)	(0.183)
$MPS_t^{orth} \mid \mathbb{1}^{HOM} = 1$	-9.025**	0.794***	0.923***	0.536***
	(3.587)	(0.259)	(0.220)	(0.162)
R^2	0.156	0.305	0.273	0.200
Observations	89	89	89	89

Notes: This table reports the effects of orthogonalized monetary policy surprises on asset prices using only FOMC press conferences. $\mathbb{1}^{Att}$ denotes attenuation events and $\mathbb{1}^{HOM}$ higher-order moment announcements. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. (return to main text).

Table A9: Monetary Policy Surprises with HOM Signals — Monetary Events

	S&P 500	2y	5y	10y
MPS_t^{orth}	-6.235***	0.548***	0.391***	0.168*
	(2.288)	(0.089)	(0.091)	(0.081)
$MPS_t^{orth} \times \mathbb{1}^{Att}$	4.052	-0.105	-0.327	-0.278
	(14.346)	(0.499)	(0.591)	(0.482)
$MPS_t^{orth} \times \mathbb{1}^{HOM}$	-0.569	0.196	0.288*	0.264*
	(3.153)	(0.171)	(0.171)	(0.142)
$MPS_t^{orth} \mid \mathbb{1}^{HOM} = 1$	-6.804***	0.745***	0.679***	0.432***
	(2.170)	(0.146)	(0.144)	(0.116)
R^2	0.093	0.316	0.198	0.092
Observations	231	231	231	231

Notes: This table reports the effects of orthogonalized monetary policy surprises on asset prices using only Monetary Events. $\mathbb{1}^{Att}$ denotes attenuation events and $\mathbb{1}^{HOM}$ higher-order moment announcements. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. (return to main text).

Table A10: Heterogeneity of HOM Effects Across Event Types

	S&P 500	2y	5y	10y
MPS_t^{orth}	-4.773*	0.453***	0.297***	0.109
	(2.692)	(0.097)	(0.100)	(0.091)
$MPS_t^{orth} \times \mathbb{1}_t^{HOM}$	1.400	0.343*	0.440**	0.392**
	(4.241)	(0.194)	(0.202)	(0.178)
$MPS_t^{orth} \times \mathbb{1}_t^{HOM} \times \mathbb{1}_t^{PC}$	-3.456	0.113	-0.196	-0.184
	(6.721)	(0.330)	(0.390)	(0.282)
$MPS_t^{orth} \times \mathbb{1}_t^{HOM} \times \mathbb{1}_t^{ME}$	-0.393	-0.062	-0.070	-0.067
	(5.389)	(0.253)	(0.265)	(0.227)
$MPS_t^{orth} \times \mathbb{1}_t^{HOM} \times \mathbb{1}_t^{Minutes}$	22.844	-0.261	-0.168	-0.209
	(15.099)	(0.406)	(0.396)	(0.350)
R^2	0.080	0.253	0.162	0.077
Observations	751	751	751	751

Notes: This table estimates a model with triple interactions between orthogonalized monetary policy surprises, higher-order moment (HOM) announcements, and event-type indicators. FOMC Statements constitute the omitted reference category. Only coefficients of interest are reported. Huber-White heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. (return to main text).

Table A11: Decomposition of nominal interest rates: real rates and inflation compensation; 1999-2025

	Nominal interest rates			Real interest rates			Inflation compensation		
	2y	5y	10y	2y	5y	10y	2y	5y	10y
MPS_t	0.43***	0.27***	0.10	0.12	0.31**	0.19**	0.30	-0.05	-0.10*
	[0.09]	[0.09]	[0.08]	[0.40]	[0.12]	[0.09]	[0.40]	[0.08]	[0.05]
$MPS_t \times \mathbb{1}^{HOM}$	0.30*	0.41**	0.36**	0.68	0.54***	0.40***	-0.18	0.06	0.07
	[0.17]	[0.18]	[0.16]	[0.46]	[0.21]	[0.17]	[0.43]	[0.12]	[0.08]
$MPS_t \mid \mathbb{1}^{HOM} = 1$	0.73***	0.68***	0.46***	0.79***	0.85***	0.59***	0.12	0.01	-0.03
	[0.15]	[0.15]	[0.13]	[0.22]	[0.17]	[0.14]	[0.18]	[0.09]	[0.06]
R^2	0.16	0.09	0.04	0.03	0.11	0.08	0.01	0.03	0.06
Observations	429	429	429	429	429	429	429	429	429

Notes: This table reports the effects of orthogonalized monetary policy surprises on intraday asset price changes measured in a 30-minute window around FOMC announcements. Huber–White heteroskedasticity-robust standard errors are reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels. (return to main text).

Table A12: Decomposition of Nominal Rates (EH and TP) - 1999-2025, all type of events

	Nominal interest rates			Expectation hypothesis			Term premium		
	2y	5y	10y	2y	5y	10y	2y	5y	10y
MPS_t	0.50***	0.36***	0.17***	0.52***	0.48***	0.38***	-0.02	-0.11***	-0.21***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.03)	(0.04)	(0.06)
$MPS_t \times \mathbb{1}^{HOM}$	0.43***	0.50***	0.41***	0.04	0.20*	0.21**	0.39***	0.30***	0.20**
	(0.11)	(0.12)	(0.10)	(0.13)	(0.12)	(0.10)	(0.07)	(0.16)	(0.09)
$MPS_t \mid \mathbb{1}^{HOM} = 1$	0.924***	0.863***	0.583***	0.56***	0.685***	0.585***	0.363***	0.179***	-0.001
	(0.09)	(0.10)	(0.08)	(0.11)	(0.10)	(0.08)	(0.07)	(0.05)	(0.07)
R^2	0.27	0.17	0.09	0.21	0.22	0.22	0.10	0.04	0.03
Observations	751	751	751	751	751	751	751	751	751

Notes: This table reports the effects of orthogonalized monetary policy surprises constructed following Bauer and Swanson (2023a) on daily changes in nominal zero-coupon yields and their decomposition into expectations and term premium components, based on the ACM term structure model Adrian et al. (2013). Huber–White heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. Extended sample. (return to main text).