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Financial Market Effects of FOMC Communication: Evidence from a New Event-Study Database*

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Abstract

This paper introduces the U.S. Monetary Policy Event-Study Database (USMPD), a novel, public, and regularly updated dataset of financial market data around Federal Open Market Committee (FOMC) policy announcements, press conferences, and minutes releases. Using the rich high-frequency data in the USMPD, we document several new empirical findings. Large monetary policy surprises have made a comeback in recent years, and post-meeting press conferences have become the most important source of policy news. Monetary policy surprises have pronounced negative effects on breakeven inflation based on Treasury yields. Risk assets, including dividend derivatives, also respond strongly and negatively to monetary policy surprises, consistent with conventional channels of monetary transmission. Press conferences have stronger effects than FOMC statements on most asset prices. Finally, the term structure evidence shows peak effects on market-based inflation and dividend expectations at horizons of several years.

Keywords: Federal Reserve, monetary policy surprises, high-frequency event studies
JEL Classifications: E43, E52, E58

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1 Introduction

High-frequency market movements around central bank announcements help identify the economic effects of unexpected monetary policy changes. Such "monetary policy surprises" are widely used to estimate the causal impact of monetary policy on financial markets, expectations, and the macroeconomy.[1] Yet no public intraday database exists that would allow researchers to construct FOMC policy surprises and conduct event studies of the Fed's policy communications.

Our first contribution is to establish the U.S. Monetary Policy Event-Study Database (USMPD), a public, regularly updated dataset of high-frequency asset price changes around FOMC communication events.[2] This database allows for the same transparency and comparability across studies as the databases published for other central banks, including the European Central Bank (Altavilla et al., 2019), the Bank of England (Braun et al., 2025), and the Swedish Riksbank (Almerud et al., 2024). The USMPD adopts and expands on best practices from the literature, covers a broad range of assets, and is created and updated using a transparent methodology. Our hope is that the USMPD will enable and foster robust empirical analysis of U.S. monetary policy by providing a reference database of easily available, extensive, and up-to-date high-frequency data for FOMC communication events.

The USMPD contains intraday financial market changes around three different FOMC communication events: the release of FOMC statements, the post-meeting press conferences, and the release of the FOMC meeting minutes. In addition, a "monetary event window" covers both the release of the FOMC statement and the post-meeting press conference, to account for all the monetary policy news disclosed after FOMC meetings. For these four different event windows, the USMPD includes intraday changes in various money market futures rates, OIS rates, Treasury and TIPS yields, as well as intraday returns for different stock market indices and dollar exchange rates. The USMPD contains all the series required to produce the most commonly used measures of monetary policy surprises, and to estimate the intraday market response of interest rates and risk assets to news about monetary policy.[3]

The second contribution of the paper is new evidence on the transmission of monetary policy to financial markets, enabled by the expanded coverage of FOMC communication

[1]See Kuttner (2001); Gürkaynak et al. (2005a); Bernanke and Kuttner (2005); Swanson (2021) for the effects on financial markets, Campbell et al. (2012); Nakamura and Steinsson (2018); Bauer and Swanson (2023b) for the effects on survey-based expectations, and Cochrane and Piazzesi (2002); Faust et al. (2003, 2004); Gertler and Karadi (2015); Jarociński and Karadi (2020); Miranda-Agrippino and Ricco (2021); Bauer and Swanson (2023a) for the macroeconomic effects.

[2]The USMPD is available online at https://sffed.us/usmpd.

[3]For example, it is possible to calculate the monetary policy surprises proposed by Gürkaynak et al. (2005a), Gertler and Karadi (2015), Jarociński and Karadi (2020), Swanson (2021), and Bauer and Swanson (2023a), using the data in the USMPD.

events, the inclusion of a broader set of interest rates and asset prices, and the extended sample period relative to earlier empirical studies. We construct four different monetary policy surprises, corresponding to the different communication event windows. For each event, the policy surprise is calculated as the first principal component of changes in money market futures rates covering a horizon of about one year. For the FOMC statements and monetary event windows, the surprise roughly corresponds to a level factor that loads about equally on all included futures rates. This surprise is akin to that of Nakamura and Steinsson (2018), and captures unexpected changes in both the current policy rate and forward guidance—it can be thought of as an average of the target and path factors of Gürkaynak et al. (2005a). Conversely, the minutes and press conferences do not convey news about the current policy stance, and the loadings of these surprises on different futures rates are akin to a slope factor that captures unexpected changes in forward guidance.

We document several novel facts about the distribution of policy news over time and across FOMC events. The quantitative importance of monetary policy surprises has increased markedly since the beginning of the tightening cycle in March 2022. In other words, monetary policy surprises have made a comeback, and using them in empirical analysis is both more promising and more relevant than pre-pandemic assessments have suggested. Post-meeting press conferences contain highly relevant information about the policy outlook, and have recently surpassed the FOMC statements as the main source of monetary policy news. They convey independent policy news in the sense that the policy surprises around press conferences are largely uncorrelated with surprises around FOMC statements. The FOMC meeting minutes are informative about the future policy path but convey only a small amount of information and generate much less market volatility. Most relevant policy information appears to be communicated through other channels before the minutes are released, suggesting that the FOMC's communication via statements and press conferences is effective.

Our second set of results pertains to the impact of monetary policy surprises on Treasury markets. We document that statement surprises have a statistically and economically significant negative effect on the term structure of inflation compensation, with peak effects at intermediate maturities. These results are driven by our extended sample, and stand in contrast with the earlier findings of Hanson and Stein (2015) and Nakamura and Steinsson (2018), estimated over periods characterized by limited variation in inflation expectations. In this sense, our results reconcile the financial market evidence with the time series evidence of disinflationary effects of monetary policy shocks (Gertler and Karadi, 2015; Miranda-Agrippino and Ricco, 2021; Bauer and Swanson, 2023a). Moving beyond FOMC statements, we show that policy surprises around the press conferences have a particularly strong impact on Treasury markets and on breakeven inflation rates.

Our third set of results updates and expands empirical evidence on the transmission of monetary policy to risk assets. The response of stock prices, exchange rates, and other risk-sensitive indicators is strongly significant and quantitatively meaningful. In line with previous studies, the direction of our estimates is consistent with the transmission of monetary policy shocks, as the prices of risk assets tend to respond negatively to monetary policy surprises. As for Treasury markets, the sensitivity of risk assets is especially pronounced for policy surprises from post-meeting press conferences. Using data on dividend futures and dividend swaps, we present new evidence on the effects of FOMC surprises on (risk-adjusted) expectations of future stock dividends. Prices for dividend claims at horizons beyond one year generally exhibit a strong and significant negative response to FOMC surprises. The estimated effects are consistent with standard New Keynesian models that imply negative effects of monetary policy on future output and profits (Bilbiie and Känzig, 2024), and with the typically sluggish response of dividends to news (Lintner, 1956; Leary and Michaely, 2011). Our results from dividend swaps and futures contrast with studies by Golez and Matthies (2025) and Gilchrist et al. (2024) that have estimated positive effects on short-run dividend strips. This is likely due to both our substantially longer horizons and measurement error issues with dividend strips (Boguth et al., 2022). Recent work by Nagel and Xu (2024) suggests that changes in risk-free discount rates alone could explain most of the systematic negative stock market response to monetary policy surprises. Our results show that effects on risk premia and dividend expectations—captured by changes in dividend swap prices—also constitute a quantitatively important channel for this response.

For both inflation and dividends, our term structure evidence suggests that the impact of monetary policy surprises on market-based expectations peaks at horizons around 3-5 years and can extend out to long horizons. If policy surprises mainly capture standard monetary policy shocks, these patterns would be consistent with substantial expected lags and highly persistent effects in the transmission of monetary policy to both inflation and real activity. However, our monetary policy surprises capture various types of monetary policy news, beyond standard target rate shocks. An alternative explanation is that monetary policy surprises can have long-lasting effects on expectations because they contain signals that change investors' beliefs about the conduct of monetary policy, including the perceived inflation target and responsiveness to economic conditions. This interpretation is consistent with recent work on the effects of monetary policy on the perceived reaction function (e.g. Bauer et al., 2024a,b; Jarociński and Karadi, 2025)

Our contributions have broad relevance for macro-finance research. The USMPD provides a new reference database of high-frequency market changes around FOMC communication events that other researchers can readily use. Our empirical evidence uncovers new results for the effects of monetary policy on Treasury markets and risk assets, and contributes to open debates on key issues in monetary economics: the sensitivity of Treasury yields, inflation and dividend expectations to monetary policy surprises, the empirical importance of different types of central bank communication, the risk-taking channel of monetary policy, information effects, and lags in the monetary transmission. We hope that both the database and our empirical results will stimulate further research on these policy-relevant topics. As a practical matter, given the empirical importance of the press conference and the limited relevance of the minutes, we recommend the monetary event surprise as a simple and effective summary measure of FOMC policy news.

Our paper is related to several strands of the monetary economics literature. From a methodological standpoint, our paper is similar to studies that have introduced new event-study databases of high-frequency monetary policy surprises for other central banks, namely Altavilla et al. (2019), Braun et al. (2025), and Almerud et al. (2024). Our approach for constructing high-frequency surprises around FOMC communication events builds on the seminal papers by Kuttner (2001) and Gürkaynak et al. (2005a) that introduced this type of analysis to monetary economics, and we incorporate insights and best practices from recent work on FOMC policy surprises, including Acosta et al. (2024) and Brennan et al. (2024).

Since the pathbreaking work of Kuttner (2001), Bernanke and Kuttner (2005), and Gürkaynak et al. (2005a), a large and continuously growing literature investigates the effects of the Fed's monetary policy on financial markets both in the U.S. and abroad.[4] We revisit and resolve several open issues in this literature. The influential studies by Hanson and Stein (2015) and Nakamura and Steinsson (2018) investigated the response of nominal and real Treasury yields to Fed surprises, and documented a strong response of long-term real rates.[5] Our evidence shows that this "excess sensitivity" of long-term rates, also evident in the work of Gürkaynak et al. (2005b) and Hanson et al. (2021), is substantially stronger for press conferences, and explained in large part by the nature of the monetary policy surprise. Surprisingly, Hanson and Stein (2015) and Nakamura and Steinsson (2018) found essentially no response of breakeven inflation rates to monetary policy surprises. We instead document that either extending the sample beyond 2014 or incorporating FOMC press conferences leads to the negative effects on market-based inflation expectations one would expect based

[4]See Ehrmann and Fratzscher (2004), Gürkaynak et al. (2010), Wright (2012), Gilchrist et al. (2015), Kroencke et al. (2021), Swanson (2021), Miranda-Agrippino and Nenova (2022), Bauer and Swanson (2023a), Bauer et al. (2023), Cieslak and McMahon (2024), Cieslak et al. (2024), and Kroen et al. (2025), among many others.

[5]Beechey and Wright (2009) and Gürkaynak et al. (2010), among others, also estimated the effects of FOMC announcement surprises on breakeven inflation rates based on TIPS.

on standard macro models and time series estimates of monetary transmission. Golez and Matthies (2025) and Gilchrist et al. (2024) estimated puzzling positive short-run effects of Fed policy surprises on dividend strip prices, while we show that evidence from dividend swaps and futures is consistent with standard channels of monetary transmission. Finally, our novel term structure evidence reveals that the response of market-based inflation and dividend expectations peaks at relatively long horizons.

Only a handful of papers have studied market reactions to other FOMC communication events beyond FOMC statements. In an early contribution, Rosa (2013) shows that FOMC meeting minutes increased financial market volatility for a short time after the release. Swanson (2023) documents that post-meeting press conferences and speeches by the Fed Chair are at least as important, as sources of monetary policy news for financial markets, as FOMC statements. Narain and Sangani (2024) show that stock market volatility around post-meeting press conferences is elevated, and that under Chair Powell the stock market often moved in the opposite direction over the press conference than around the release of the FOMC statement. Swanson and Jayawickrema (2024) investigate the financial market effects of FOMC announcements, press conferences, minutes releases, and policy-relevant speeches by the Fed Chair and Vice Chair. They show that Chair speeches lead to higher market volatility than FOMC announcements, and estimate the response of Treasury yields and the S&P 500 to policy surprises constructed for these events. Bauer and Swanson (2023a) document the response of Treasury yields and the U.S. stock market to surprises around Chair speeches.[6] Cieslak et al. (2024) study the Fed's monetary policy communication in the post-COVID episode, with detailed analysis of the intraday market responses to FOMC communication. van Binsbergen and Grotteria (2024) include high-frequency surprises around press conferences to estimate the effects of the Fed's monetary policy on mortgage rates and corporate bond yields. Our work adds to these earlier studies using a comprehensive new dataset of intraday market reactions to FOMC communication, which yields novel evidence on the reaction of Treasury markets and risk assets.

The paper is structured as follows. Section 2 introduces the USMPD and its content. In Section 3 we explain how we construct monetary policy surprises from these data and present new facts about the policy news from different FOMC communication events. Section 4 shows results for Treasury markets with a focus on breakeven inflation rates. Section 5 turns to risk assets, including stocks, exchange rates, corporate bond spreads, and dividend derivatives. Section 6 concludes.

[6] Ehrmann and Fratzscher (2009) estimate the financial market effects of ECB press conferences. Istrefi et al. (2025) extend this analysis using an extensive new database of ECB communication events including speeches.

2 The USMPD: A New Database for FOMC Events

The U.S. Monetary Policy Event-Study Database (USMPD) collects high-frequency changes of interest rates and asset prices around FOMC communication events. It contains data on a wide range of instruments, including money market futures, OIS rates, Treasury and TIPS yields, the U.S. stock market, and U.S. dollar exchange rates. The USMPD is intended for public dissemination and will be updated at regular intervals going forward.

In this section, we describe the content of the USMPD. We start with some institutional background on the FOMC communication events. We then provide details on the construction of high-frequency rate changes and asset returns over different intradaily event windows and on the different instruments contained in the database.

2.1 FOMC Communication Events

The FOMC communicates through several channels following each of its eight annual regularly scheduled policy meetings, as well as after the unscheduled meetings that can take place during times of financial stress. The post-meeting *statement* describes the Committee's current economic assessment, policy decisions, and future outlook for the economy and monetary policy. At roughly every other policy meeting, the statement is accompanied by the Summary of Economic Projections (SEP), which summarizes the economic forecasts of FOMC meeting participants. The policy statements are then followed by a *press conference* with the FOMC Chair and finally, three weeks after each meeting, the *minutes* of the FOMC meeting are released. The exact release timing and content of each of these communication types have changed over recent decades.

The FOMC statement has long been the Committee's primary mode of communication with the public. The first statement was released following the February 1994 meeting. Those early statements tended to be short, factual statements of any change in monetary policy, and were issued only when the Committee changed the target for the federal funds rate. Starting with the May 1999 meeting, the FOMC started issuing a statement after every meeting. The content and length of the statements changed considerably over the years, ranging from one short paragraph about the economic situation and policy decision to elaborate statements about the economic outlook, forward guidance, and unconventional policy tools. Today, statements typically describe the FOMC's economic outlook (especially in relation to the Committee's dual mandate), the current stance of policy (including any changes), and the outlook for policy. Through all of the changes in content, the statement has continued to be the most closely watched FOMC communication. The USMPD contains data for every FOMC announcement starting in February 1994, including the meetings from 1994 to 1999 that were not followed by the release of a statement. It also includes unscheduled FOMC meetings, which usually take place in the form of a conference call and are identified with an indicator variable in the database. For the empirical analysis in the paper, we use a sample that ends in December 2024, with a total of 265 FOMC announcements.

The Fed Chair's post-meeting press conference allows media representatives to ask questions about the Committee's views and decisions. The opening remarks are followed by a Q&A session during which the Chair addresses questions from reporters. Importantly, the Chair speaks on behalf of the FOMC during these press conferences. The first post-meeting press conference was held by Chair Bernanke in April 2011. Press conferences were then held after roughly every other meeting until June 2012, and after meetings with SEP releases through 2018. Starting with the January 2019 meeting, Chair Powell began holding them after every FOMC meeting. Over the period from 2011 to 2024, there were 81 post-meeting press conferences.

Almost since its inception in 1933, the FOMC has released summaries of its policy deliberations and the rationale behind its decisions in a relatively timely manner—Danker and Luecke (2005) provides more detail on this history. The minutes of an FOMC meeting provide a detailed summary of the discussions at the meeting. They are released to the public with a delay, which has shortened over time. Before 2005, the minutes were not released until after the subsequent meeting, so they contained little new information about monetary policy. Starting with the December 2004 meeting, the FOMC began releasing the minutes three weeks after each meeting, with the first release in January 2005. Although the USMPD contains data for minutes releases starting in 2001, our event studies focus on minutes released from 2005 onward to account for this change in timing and information content. During the period from 2005 to 2024, there were 160 releases of FOMC meeting minutes.

The SEP is another closely watched type of FOMC communication. Its content and timing have changed significantly over time: Initially, the FOMC provided its projections alongside its semiannual Monetary Policy Report to Congress. Starting in November 2007, the scope and frequency of those projections increased. Between 2007 and the first press conference, the SEP was released quarterly with the minutes, three weeks after the meeting. Since April 2011, the SEP has been released quarterly, after every other FOMC meeting, along with the statement. In 2012 the "dot plot" was introduced, which displays the assumptions of FOMC participants for the appropriate future path of the policy rate. The USMPD contains an indicator for FOMC meetings that were followed by an SEP release.

Speeches by Fed governors and Bank presidents are another important channel of communication about monetary policy. However, they are different in several ways from the FOMC communication events just described. First, speeches reflect the views of individual policymakers and not those of the FOMC, as the usual disclaimer makes clear. Second, many speeches focus on other topics beyond monetary policy, including financial regulation, payment systems, or community engagement.[7] Third, the timing of speeches is often less clear and less suitable for financial market event studies, given that speeches can be long, delivered after trading hours, or lack timestamp data. Because of these differences, we do not include speeches in our database of FOMC communication events, and refer interested readers to the important work by Swanson and Jayawickrema (2024) on this topic.

In sum, the USMPD contains event-study data for all FOMC statements, which started in 1994; all press conferences, which started in 2011; and releases of the minutes since 2001. While the sample used for the empirical analysis in this paper ends in 2024, the USMPD will be continuously updated to include new FOMC communication events.

2.2 Intraday Event Windows

Event studies of monetary policy announcements rely on the assumption that changes in asset prices during tight windows around the announcements are predominantly driven by the information revealed in those announcements. If the event windows are too wide, many other factors may affect asset prices, making statistical inference more difficult. By contrast, if the windows are too narrow, market participants may not have enough time to fully digest the news, implying that prices may not fully incorporate the new information. In the following, we describe the different event windows used in the USMPD.

The typical assumption in the empirical monetary economics literature is that a 30-minute window around FOMC statements is appropriate and sufficient to capture the relevant market reaction to the news contained in these monetary policy announcements. This tradition goes back to Gürkaynak et al. (2005a), who demonstrated the benefits of these tight intraday windows over the daily event windows employed by Kuttner (2001) and others. FOMC statements typically take the form of relatively concise press releases, with only limited changes relative to the previous release, and are distributed to reporters under embargo a few minutes before the official release. Therefore, market participants can arguably digest the FOMC statement and related news headlines fairly quickly. Indeed, Gürkaynak et al. (2005a) show that using either 30 or 60 minute windows for FOMC announcements yields largely equivalent results. We follow this convention and define the "statement window" as a 30-minute interval that starts 10 minutes before and ends 20 minutes after the release of each FOMC statement.

Conversely, there is no consensus view in the literature regarding the appropriate length of

[7] Swanson and Jayawickrema (2024) found that fewer than half of the speeches given by the Chair and Vice Chair over the period from 1988 to 2023 contained information about monetary policy.

event windows for the release of the minutes and the post-meeting press conferences. Studies on the information content of the FOMC meeting minutes are limited. Rosa (2013) showed that market volatility increases substantially at the time of their release, and remained elevated for about 10-20 minutes thereafter, on average, and across different asset prices. This suggests that the market-relevant information in the minutes appears to be digested and processed in market prices very quickly after their public release. While the minutes are significantly longer than the FOMC statements, they are also released to reporters under embargo ahead of the public release, so that headlines and summaries for the minutes are published in a timely fashion. Based on these observations, we use a similar tight window for the minutes, and define the "minutes window" as a 30-minute interval that starts 10 minutes before and ends 20 minutes after their release time.

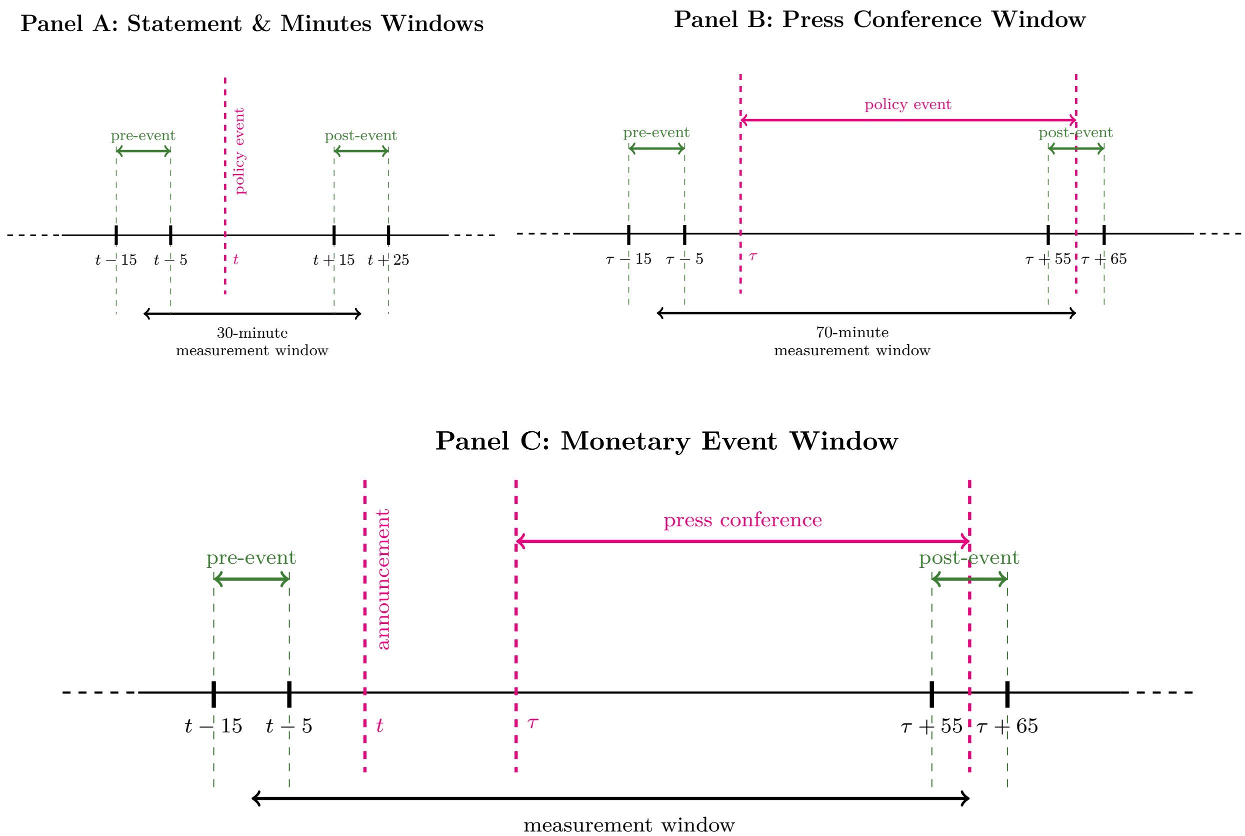
The post-meeting press conferences by the Fed Chair usually last around one hour.[8] Cieslak et al. (2024) use a 120-minute window from the beginning of the FOMC press conference to capture the reaction of financial markets, but note that their conclusions are robust to considering shorter windows; Swanson and Jayawickrema (2024) use an 85-minute window from ten minutes before to 75 minutes after the start. For the ECB press conferences which are also about one hour long, Altavilla et al. (2019) opt for an 85-minute window, from 10 minutes before to 15 minutes after the end of the event. For the Bank of England, Braun et al. (2025) use a window from 15 minutes before the start to 10 minutes after the conclusion of the press conference. Against this rather heterogeneous backdrop, to decide on the appropriate length of the FOMC press conference window, we experimented with different window lengths and found little market response beyond 60 minutes after the start, which is the usual end time of the press conference. Thus we define the "press conference window" as a 70-minute interval that starts 10 minutes before and ends 60 minutes after the beginning of the press conference.

Finally, we also include data in the USMPD for a "monetary event window" that combines information in the FOMC announcement and the post-meeting press conference. For announcements without a press conference, this window is identical to the 30-minute statement window. For FOMC meetings followed by a press conference, the monetary event window starts ten minutes before the release of the FOMC statement and ends 60 minutes after the beginning of the press conference.[9] In short, the market changes over the monetary event

[8] Swanson and Jayawickrema (2024) note that the "duration of the press conferences is typically about one hour, but ranges [...] from about 45 minutes to 1 hour and 15 minutes" (p. 10). We confirmed this using an analysis of press conference videos, which showed that the median length of press conferences is 54 minutes and the vast majority are shorter than one hour.

[9] Typically, the press conference starts half an hour after the corresponding statement is released, resulting in a 100-minute window. Occasionally, especially early in the press-conference sample, the gap has been larger, resulting in longer windows.

Figure 1: Intraday windows around FOMC communication events



The time of the FOMC announcement (and in panel A, of the minutes release) is denoted by t. The start of the press conference is denoted by τ.

window capture all of the monetary policy communication on days with FOMC meetings.

The calculation of changes and returns around events requires the choice of specific pre-event and post-event price observations. To avoid interference from misquotes and possible outliers, we follow Altavilla et al. (2019) and Braun et al. (2025) and define the pre-event and post-event prices as the median price in ten-minute windows that bracket the start and end of each event window.[10] Figure 1 illustrates the four different event windows in the USMPD, as well as the pre-event and post-event windows.

2.3 Interest Rates & Asset Prices in the USMPD

We now describe the various financial instruments included in the database. For each of the four different event windows, the USMPD contains high-frequency changes for various interest

[10]To deal with rare instances where the trading volume on a certain instrument is so low that there are not at least three prices within one of the ten-minute windows, we search over extended time windows of up to 24 hours until three distinct consecutive prices are found.

rates, stock market indices, and exchange rates.[11] More specifically, the USMPD includes high-frequency *changes* for various interest rates: federal funds, Eurodollar and Secured Overnight Financing Rate (SOFR) futures; overnight index swap (OIS) rates; and yields on Treasury bonds and Treasury Inflation-Protected Securities (TIPS). These are calculated as the simple difference in the pre- and post-event (implied) interest rates, in percentage points. For stock market indices and dollar exchange rates, the USMPD includes high-frequency *returns*, calculated as the relative price change, in percent, over each FOMC communication event window.

Money market futures have long been used to gauge financial markets' expectations about current and future policy rates, starting with the seminal work of Kuttner (2001). Federal funds futures are monthly contracts that settle based on the average federal funds rate over the course of each month. Contracts are available for a number of consecutive months, with declining liquidity as the maturity increases. The USMPD includes high-frequency changes for the first six contracts, FF1 to FF6. These provide an estimate of changes in market expectations for the average funds rate over each contract month, and it is straightforward to derive the surprise change in the policy rate around FOMC announcements (Gürkaynak et al., 2005a). We use this calculation to obtain MP1, the surprise rate change around the current FOMC meeting, and MP2, the implied change in the expected rate for the subsequent meeting. These two implied rate surprises are commonly used in the construction of monetary policy news for FOMC announcements, and we extend this logic to other FOMC communication events.[12]

For market expectations about interest rates at longer maturities, the empirical literature typically used Eurodollar futures, quarterly contracts settled based on the 3-month London Interbank Offered Rate (LIBOR) prevailing at the expiration date. These highly liquid money market futures provided an estimate of market-based short rate expectations up to a horizon of several years. The USMPD includes data for eight quarterly Eurodollar futures contracts which expire at the end of each of the next eight quarters relative to the FOMC event date, denoted by ED1 to ED8.[13]

The phasing out of LIBOR, and consequent halting of trading in Eurodollar futures in 2023, posed the question of how to measure longer-term policy expectations going forward.

[11] Appendix A contains details on the events, instruments, and data construction for the USMPD. The main data source is LSEG Tick History.

[12] Details on this construction are in Appendix A.3. For press conferences, MP1 is naturally close to zero, and for minutes releases, MP1 is always exactly zero by our definition. The MP2 surprise always captures news about the policy rate chosen at the next upcoming *scheduled* FOMC meeting.

[13] For example, for a meeting scheduled in May, the contracts ED1–ED3 have expiration dates at the end of June, September and December of that same year, and the ED4 contract expires at the end of March of the following year.

We follow the recommendation of Acosta et al. (2024) and switch from Eurodollar futures to SOFR futures starting in January 2022. SOFR futures have the important advantage—for the purpose of measuring monetary policy expectations—that their prices depend on overnight interest rates in the repo market, which are closely related to the federal funds rate. By contrast, LIBOR rates and thus Eurodollar futures were affected by changes in credit risk, as reflected in the LIBOR-OIS spread that measured the difference with overnight rates and could spike during periods of financial stress. Fortunately for empirical monetary economists, these are issues of the past. To retain consistency with the futures data up to 2021, the USMPD contains data for eight SOFR futures that align with the first eight quarterly Eurodollar futures.

The USMPD further contains high-frequency changes in various Treasury interest rates: three- and six-month T-Bill rates, (nominal) Treasury yields with maturities of 2, 5, 10 and 30 years, and (real) TIPS yields with maturities of 5, 10 and 30 years. These are all based on intraday observations for the benchmark yields from on-the-run securities.[14] The database also includes one- and two-year OIS rates.

Besides interest rates, the database also includes high-frequency returns on several risk assets. For the stock market, we include returns in the S&P 500 index, the S&P 500 E-mini futures and the Wilshire 5000 index. Finally, we include the dollar index DXY and bilateral exchange rates of the U.S. dollar against the euro and the Japanese yen.

3 Monetary Policy Surprises Across FOMC Events

In this section, we describe the construction of monetary policy surprises across the different FOMC communication events included in the USMPD. We document the properties of these policy surprises, including their loadings on rates across horizons and their changing behavior in recent years. We offer some guidance for the use of these measures in empirical research.

3.1 Construction of FOMC Surprises

The empirical approach of constructing policy surprises as changes in money market futures rates around FOMC announcements goes back to Kuttner (2001), Bernanke and Kuttner

[14] These benchmark yields have two significant advantages over Treasury futures, which are widely used to derive high-frequency interest rate changes. First, futures reflect the prices of the cheapest-to-deliver securities, which often have effective durations that are materially shorter than the indicated bond maturity. For example, the effective duration for the 10-year T-Note futures tends to be close to 7 years. Second, the calculation of implied yield changes based on futures prices requires a linear approximation and an estimate of the effective duration. By contrast, on-the-run-securities have effective duration closer to the bond maturity, and we directly observe their market yields.

(2005), and Gürkaynak et al. (2005a). These changes can be viewed as "surprises" under the assumption that over such short windows, interest rate changes are essentially unpredictable.[15] Various different choices and combinations of near-term interest rates have been used in the measurement of monetary policy surprises.[16] The information included in the USMPD allows researchers to construct any measure of their choice, replicating earlier studies and extending the analysis to more recent samples.

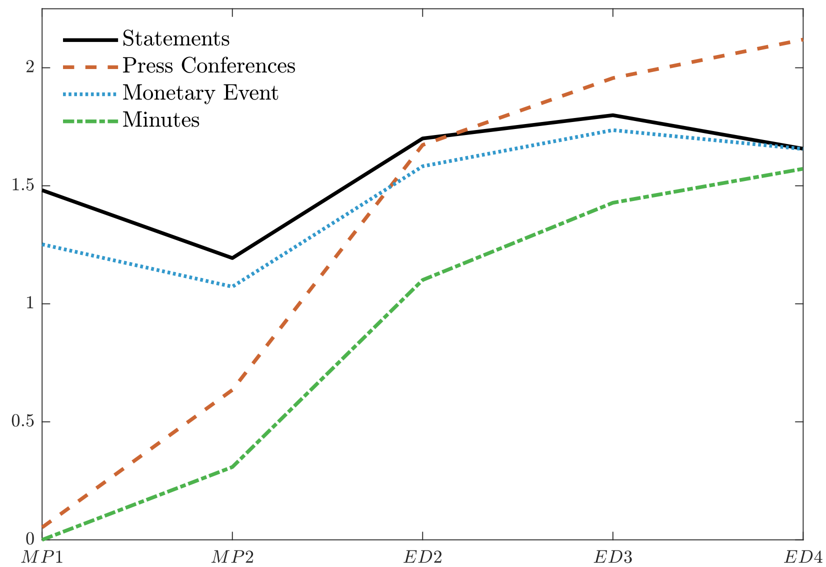
In our analysis, we follow the approach that Gürkaynak et al. (2005a) and Nakamura and Steinsson (2018) used to construct FOMC announcement surprises and extend it to other communication events. These studies used 30-minute changes around FOMC announcements in MP1, MP2, ED2, ED3, and ED4, which together cover a horizon from the upcoming policy meeting out to roughly one year ahead. We use these same five rate changes in order to capture news about the current and expected future policy rate.[17] While Gürkaynak et al. (2005a) derived two separate "target" and "path" factors, Nakamura and Steinsson (2018) used a single factor based on the first principal component. Our approach is as follows: For each of our four communication events, we separately calculate the first principal component of these five event-window rate changes. A principal component is only defined up to a scaling factor, and to obtain an economically interpretable quantity, we normalize each surprise in the same manner as Nakamura and Steinsson (2018) so that it has a one percentage point effect on the daily change in the one-year Treasury yield over the full sample available for each communication event.

[15]Several recent studies have documented some predictability using economic news and financial data observed before the FOMC announcements, at least based on in-sample regressions (Miranda-Agrippino, 2016; Cieslak, 2018; Bauer and Swanson, 2023b). While this "ex post" predictability can have important consequences for high-frequency identification in monetary VARs, it does not seem to cause issues for financial market event studies for FOMC announcements (Bauer and Swanson, 2023a). In this paper, we follow common terminology and denote as "surprise" any high-frequency rate changes around FOMC events, and leave the issue of predictability to future research.

[16]Kuttner (2001) calculated the surprise component of the FOMC's policy rate decision using spot-month fed funds futures. Gürkaynak et al. (2005a) used information in short-term fed funds futures and Eurodollar futures to disentangle news about the current value of the policy rate (target factor) and news about its expected future course (path factor). Swanson (2021, 2024) extended this approach to also estimate a QE factor using surprises across the entire term structure of Treasury yields. Gertler and Karadi (2015) and Miranda-Agrippino and Ricco (2021) used variations of the fourth federal funds futures, Jarociński and Karadi (2020) combined information in the fourth fed funds futures with that in the stock market to identify monetary policy and information shocks, and Acosta (2023) combined information from MP1 and ED4 with text-based measures of macroeconomic expectations to identify monetary and information shocks. Nakamura and Steinsson (2018); Bauer and Swanson (2023b) and Bu et al. (2021) have combined information in high-frequency surprises at different maturities, either with principal components or Fama-MacBeth regressions.

[17]To reiterate, MP1 and MP2 are based on fed funds futures and measure the policy rate surprise for the current and upcoming FOMC meeting (see Appendix A.3), while ED2–ED4 capture changes in short-rate expectations for two to four quarters ahead, based on Eurodollar futures up to 2021 and SOFR futures thereafter.

Figure 2: Loadings of monetary policy news on rate changes



Scaled loadings of the principal components on intraday rate changes over four different FOMC communication event windows. Sample: 1994-2024 for Statement and Monetary Event, 2011-2024 for Press Conferences, 2005-2024 for Minutes.

Our procedure delivers four different measures of monetary policy surprises: for FOMC statements, press conferences, the combined monetary event, and the minutes. Figure 2 plots the loadings of the five underlying interest rate changes on each of these surprise measures.

Our policy surprises for FOMC statements, which correspond directly to those used by Nakamura and Steinsson (2018), have fairly homogeneous loadings across horizons. We can therefore interpret this measure as capturing news—released via the FOMC statement—about the average expected policy rate over the subsequent year. Of course, the calculation of the surprise is agnostic about the content of FOMC statements and treats all announcements equally, no matter what type of news about changes in the FFR, forward guidance, or QE they may contain.[18] The surprise is effectively an average of the target and path factors of Gürkaynak et al. (2005a), corresponding to a *level factor* of rate changes. Empirically, this level factor of near-term rate changes is highly correlated with interest rates at longer maturities.[19] Hence, FOMC statement news as defined in this paper should not be interpreted as conventional, short-run monetary policy surprises, but as the combined effect of monetary policy statements on the average policy path that can include shifts also at long horizons.

[18]News about QE can affect near-term expectations for the policy rate path via signaling effects (Bauer and Rudebusch, 2014).

[19]This is evident from the results for high-frequency event-study regression for Treasury yields shown in Appendix Table 3. Similarly, Swanson (2021) showed that his path factor significantly loads on rate changes at maturities well beyond one year.

Calculating measures that separately identify target rate, forward guidance, or QE surprises can be a powerful tool in different empirical applications (Gürkaynak et al., 2005a; Swanson, 2021, 2024; Jarociński, 2024). For the analysis in this paper, we instead choose to focus on the information content across the different FOMC communication events. For each type of event, we parsimoniously capture the policy news with a univariate surprise that measures the combined effects on the expected policy path from all policy tools and communication. We leave it to other researchers to use the data contained in the USMPD to calculate alternative sets of factors that isolate the effects of different policy measures.

Figure 2 shows that the loadings for the surprises around press conferences and minutes releases increase monotonically and peak for the longest interest rate, ED4. These communication events of course include no information about the earlier policy rate decision, and instead are informative about the future path of the policy rate. In other words, the surprises around the Chair's press conferences and minutes releases reveal unexpected changes in the implicit or explicit forward guidance and therefore correspond to a *slope factor* of rate changes. They contain novel information about the future policy rate path relative to what can be inferred by market participants from the statement alone.

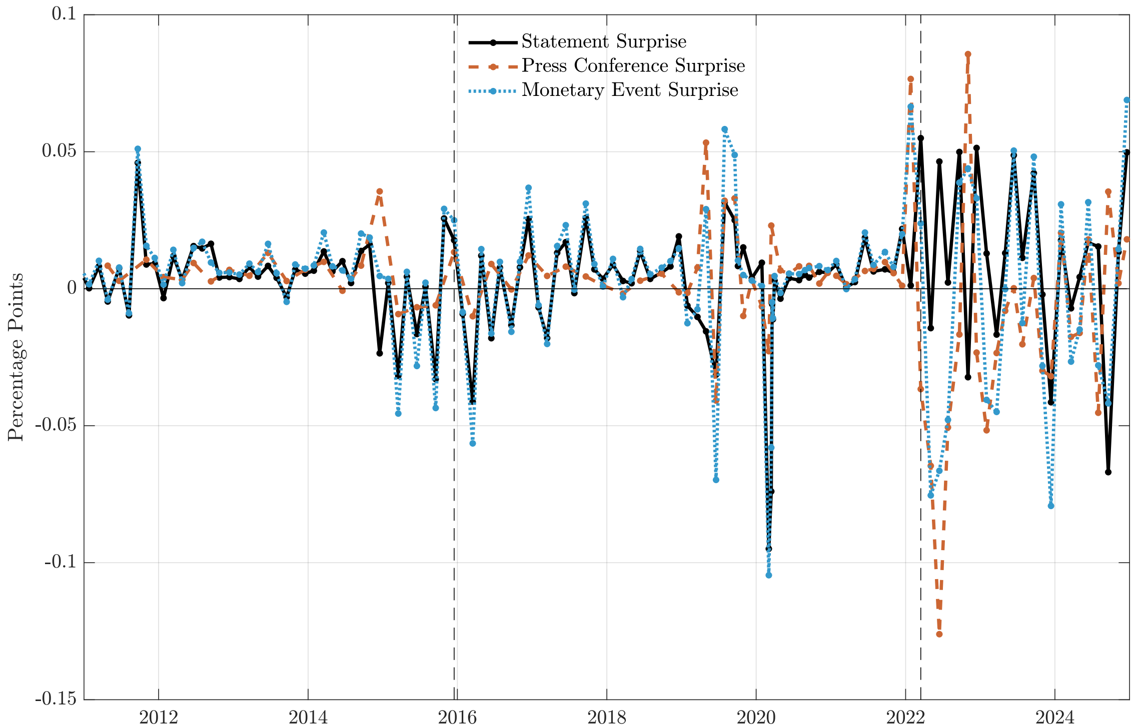
Lastly, Figure 2 reports the loadings of the monetary policy surprise around the monetary event window, which covers both the statements and the press conferences. The loadings are broadly similar to those for the statement surprise, loading positively on all five interest rates. The pattern is tilted somewhat more towards longer maturities, reflecting the additional information about the future rate outlook in the press conferences. However, the differences are small, given that there are only 81 press conferences on the 265 days with FOMC announcements. Going forward, with press conferences occurring after every FOMC meeting, the information revealed over the monetary event window will likely be tilted even more strongly towards forward guidance, down-weighing the news about the current policy stance in favor of information about the rate outlook.

3.2 Monetary Surprises Since 2011: Four New Facts

Several new facts about the behavior of monetary policy surprises are revealed by the most recent evidence and expanded set of communication events in the USMPD. Our focus is on the period since 2011, when post-meeting press conferences were first introduced. Figure 3 plots the time series of surprises around FOMC statements, press conferences, and monetary events over this period. Table 1 reports the standard deviations and pairwise correlations among the three types of surprises over different sample periods.

The first notable pattern, clearly evident in Figure 3, is that the volatility of statement

Figure 3: Time series of monetary policy news across FOMC events



Monetary policy news around FOMC statements, press conferences, and monetary events (statements and press conferences) from 2011 to 2024. Vertical lines indicate liftoff dates December 16, 2015 and March 16, 2022.

and press conference surprises has markedly increased since the liftoff in March 2022. Table 1 shows that the volatility of statement surprises (labeled STMT in the table) almost doubled, and the volatility of press conference surprises (labeled PC in the table) more than tripled in the period since the 2022 liftoff relative to the earlier period. Previous studies noted the small magnitude of monetary policy surprises since the early 2000s and attributed this to increased Fed transparency and effective forward guidance.[20] In recent years, however, large monetary policy surprises have clearly made a comeback. Their newly increased quantitative importance makes the empirical analysis of the financial and macroeconomic effects of monetary policy surprises, including the type of analysis we present in this paper, more important and informative than before the pandemic. Several forces likely contributed to the large policy surprises in recent years, including elevated uncertainty and learning about the Fed's reaction function (Bauer et al., 2024a; Cieslak et al., 2024), uncertainty about the

[20] Ramey (2016) noted at the time that "[m]onetary policy is being conducted more systematically, so true monetary policy shocks are now rare." Swanson (2021) showed that policy rate surprises were generally small not only over the widely noticed 2003–2007 episode and the ZLB period 2008–2015, but even after liftoff from the ZLB in 2015, "as the FOMC raised rates gradually and very predictably."

Table 1: Evolution of Monetary Policy News Across Events and Over Time

	Standard Deviation				Pairwise Correlation		
	STMT	PC	ME	MIN	STMT & PC	STMT & ME	PC & ME
Full Sample	2.24	2.73	2.89	1.08	-0.14 (0.11)	0.69 (0.06)	0.61 (0.07)
Until 2022	1.90	1.31	2.28	0.89	0.27 (0.12)	0.91 (0.02)	0.63 (0.08)
From 2022	3.17	4.41	4.56	1.62	-0.27 (0.20)	0.52 (0.16)	0.68 (0.11)

The table reports the standard deviation of news computed around FOMC statements (STMT), press conferences (PC), monetary events (ME), and minutes (MIN) as well as pairwise correlations among them. Standard errors of correlations (in parentheses) were calculated as $SE(r) = \sqrt{(1 - r^2)^2/(n-2)}$, with r denoting the sample correlation and n the sample size. The last row of the table reports standard deviations over the full sample available for each surprise. The 2022–2024 sample starts with the March 2022 FOMC meeting that marked liftoff from the effective lower bound.

degree of persistence in inflation (Hajdini et al., 2025), and sizable monetary policy shocks relative to standard monetary policy rules (Nakamura et al., 2025). While some of these forces were specific to the recent episode, it has become clear that even in an age of central bank transparency, sudden macroeconomic changes can lead to frequent and large unexpected changes in monetary policy.

Second, the introduction of press conferences since 2011 has added a powerful additional source of monetary policy news in its own right. Surprises around press conferences have been quantitatively meaningful, as their volatility has been similar to, or even larger than, the volatility of statement surprises. With the advent of press conferences, the relative importance of policy news in the FOMC statement—historically the main source of information about the Fed's policy—has actually decreased: Since 2011, statements that are accompanied by a press conference command 50% less market volatility relative to those that do not.[21] Strikingly, this is true even though FOMC statements with press conferences were often accompanied by an SEP release that tends to create additional volatility, and even though in recent years, which saw high volatility of policy surprises, every meeting was followed by a press conference. The quantitative importance of news from post-meeting press conferences has increased even further in recent years. Table 1 shows that since the liftoff in 2022, the volatility of press conference surprises was somewhat below the volatility of statement surprises, but since then press conferences have caused more volatile policy surprises than the FOMC statements.

Third, press conferences constitute an additional source of information about monetary policy that is largely independent from the information conveyed in policy statements. Importantly, over the whole sample from 2011 to 2024, the correlation between statement and

[21]The standard deviation of statement news is 3.45 over 2011–2024, 2.5 for meetings followed by a press conference, and 3.8 for meetings without a press conference.

press conference surprises is statistically close to zero, as shown in Table 1. The relationship between these two surprises has changed over time: Figure 3 shows that in the early period, before 2022, press conference surprises were often more or less in line with the statement surprises.[22] Their correlation was modest but positive and statistically significant. Since the liftoff in 2022, by contrast, statement and press conference surprises often had opposite signs, with prominent examples being the sizable hawkish statement surprises in 2022 and 2023 that were followed by dovish press conference surprises on the same day.[23] As a result, over this most recent period, the correlation between these surprises is modestly negative. Overall, disregarding the information contained in the press conferences when analyzing the effects of monetary policy risks leaving out a significant portion of relevant policy news.

Fourth, the release of the minutes generates only about half the amount of market volatility compared to the statements, making the minutes the least informative type of FOMC communication event. This could be considered a feature rather than a bug, because successful communication would imply that most if not all relevant information about monetary policy has been disclosed in a timely manner via standard channels after the FOMC meeting. The small footprint of the minutes releases will be important to keep in mind when comparing the response of financial markets to the different FOMC communication events in the next sections.[24]

Taken together, these facts about the role of press conferences and the limited importance of minutes releases suggest that measures of monetary policy surprises should, at a minimum, account for the information revealed in both the FOMC statements and the post-meeting press conferences. A simple and effective way to do this is by using the *monetary event window* that covers both events. Figure 3 shows that the resulting monetary event surprise tracks the statement news quite closely in the early period, and since 2022 is instead more heavily influenced by the press conferences. Table 1 reports that the correlation between the statement and monetary event (labeled ME in the table) surprises declined substantially, reflecting the increased relative importance of press conferences. Overall, we view the monetary event surprise as an accurate and parsimonious summary of monetary policy news on FOMC meeting days, and recommend it to researchers looking for a simple measure of Fed policy surprises.[25]

[22]The exception is the lead-up to the two tightening episodes beginning in 2015 and 2019, which were anticipated by market participants on the basis of the content of the press conferences.

[23]Narain and Sangani (2024) also document the same reversals in stock and Treasury market responses and use textual analysis to show that the valence of words chosen by the Chair during press conferences systematically differs from those in the related statements, predicting the sign change in market responses.

[24]The normalization that we adopt to translate the different types of news into interpretable units means that the minutes news are scaled by a significantly larger factor to yield a 1 ppt daily change in the one-year nominal yield.

[25]At the same time, it is important to note the larger weight that monetary event surprises place on

4 Treasury Yields and Breakeven Inflation

This section documents new evidence on the sensitivity of nominal Treasury yields, TIPS yields, and breakeven inflation (BEI) rates to monetary policy surprises. Earlier research, going back to Kuttner (2001) and Gürkaynak et al. (2005a), has studied the effects of monetary policy on the Treasury market in detail, and provided many important insights. By extending the event-study analysis to other communication events beyond FOMC statements and updating it to include more recent monetary policy cycles and the post-COVID inflationary episode, we are able to add several novel results to this literature.

For most of the following analysis, we use daily data for nominal Treasury yields from Gürkaynak et al. (2007), and from Gürkaynak et al. (2010) for TIPS yields, measured in percent. BEI rates—also called inflation compensation rates—are differences of nominal and real (TIPS) yields, thus capturing market-based expectations of inflation over the maturity of the yields.[26] While data on Treasury yields extend back for many decades, the TIPS market did not come into existence until 1997, and exhibited low liquidity until the early 2000s. To accommodate for this, and for comparability across yields, we restrict our analysis in this section to estimation samples starting in 2004, when the TIPS market had left its infancy and provided reliable information about real interest rates. Our baseline sample ends in 2024. To account for the collapse in TIPS market liquidity during the financial crisis, and following Nakamura and Steinsson (2018), we exclude the period from July 2008 to June 2009 in our baseline sample, which includes 171 FOMC announcements (both scheduled and unscheduled), 81 press conferences, and 152 minutes releases.

Our analysis relies on event-study regressions of the form

$$\Delta y_t = \alpha + \beta\, s_t + \varepsilon_t, \tag{1}$$

where t indexes days with FOMC communication events. $\Delta y_t = y_t - y_{t-1}$ denotes the daily change in a generic interest rate, such as nominal, real, and BEI yields or forward rates of a certain maturity. The yield data uses end-of-day bond prices, such that y_t is measured after the FOMC communication event (which takes place during market trading hours) and y_{t-1} is based on closing prices from the previous day. Our baseline results use daily rate changes

long-horizon monetary policy news, as discussed earlier, as well as the time-varying importance of statements and press conferences for monetary event surprises, when it comes to interpreting the results obtained with this surprise measure.

[26] Daily yield data is available at https://www.federalreserve.gov/data/yield-curve-models.htm. These smoothed zero-coupon curves flexibly capture the entire term structure of interest rates without being affected by idiosyncratic, instrument-specific variation and noise, including liquidity issues and on-the-run premia (Amihud and Mendelson, 1991), different behavior of T-bills (Duffee, 1996), or repo specialness spreads (D'Amico and Pancost, 2022).

as dependent variables, but the USMPD also includes high-frequency changes for several Treasury and TIPS yields, and we report additional results for Appendix B. The regressor s_t corresponds to one of the high-frequency monetary policy news variables constructed in Section 3. The parameter β quantifies the effect of monetary policy news across FOMC events on different interest rates. As long as the information in s_t is predetermined with respect to the financial market data on day t, such event-study regressions estimate the causal effects of the Fed's monetary policy actions and communication on asset prices.[27]

4.1 Effects of FOMC Announcements on Treasury Markets

We begin our analysis with the study of monetary policy news around FOMC announcements. Our "statement surprise" is the same measure of Fed policy news as in Nakamura and Steinsson (2018). As discussed in Section 3, the principal component is normalized such that the results can be interpreted as the response to a monetary policy surprise that increases the one-year yield by one percentage point over the full sample (1994–2024).

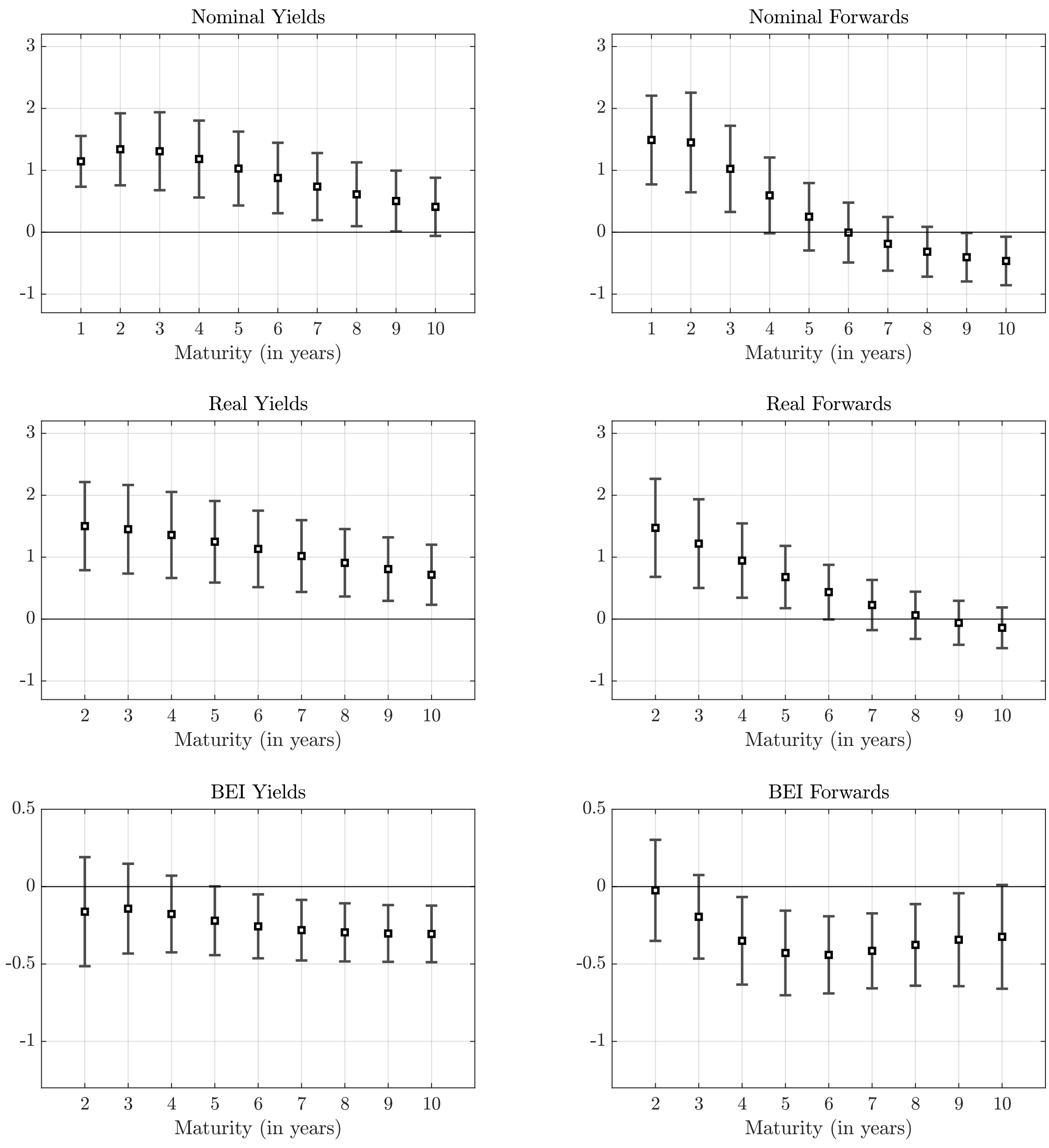
Figure 4 shows the event-study estimates of the response of the Treasury market to FOMC statement surprises. Each panel plots response coefficients across the entire term structure of interest rates: for the nominal term structure in the top panels, for the real term structure in the middle panels, and for the term structure of breakeven inflation in the bottom panels. Results for zero-coupon yields are shown in the left panels and for instantaneous forward rates in the right panels.

Consistent with previous studies, FOMC statement news significantly affects both nominal and real yields across the curve. For nominal yields, the sensitivity is strongest for maturities of 2-3 years, with a coefficient around 1.3–1.4, and then it declines with maturity towards around 0.5. Nominal forward rates at the short end of the yield curve respond strongly positively to statement surprises, reflecting revised market expectations about the policy path due to the surprise move. Long-term forward rates, by contrast, respond negatively to the policy surprise. This sign reversal echoes the patterns documented by Gürkaynak et al. (2005b), who estimated a negative response of long-term forward rates to target rate surprises.

Real yields exhibit a strong and significant positive response to statement surprises that declines monotonically with maturities. This real yield response pattern is in line with

[27]This assumption is plausibly satisfied for statement and minutes surprises. For surprises including the press conference, it is possible that the Chair's communication could be affected by previous market changes in the day, in which case s_t would only be predetermined in regressions with intraday changes as the dependent variable. However, we show below that regressions for intradaily changes in Treasury yields lead to very similar results, suggesting that this effect does not lead to any noticeable bias in event-study regressions for daily market changes.

Figure 4: Term structure of interest rate sensitivity to FOMC announcement surprises



Event-study regressions of daily rate changes on FOMC statement news, the scaled first principal component of 30-minute changes in money market rates around the release of the FOMC statement. Response of nominal Treasury rates in top panels, of real (TIPS) rates in middle panels, and of breakeven inflation rates in bottom panels. Yield responses in left panels, and forward rate responses in right panels. Sample: 171 FOMC announcements between 2004 and 2024, and excluding the crisis period from July 2008 to June 2009. Error bars show 95% confidence intervals based on White standard errors.

the "excess sensitivity puzzle" documented by Hanson and Stein (2015) and Nakamura and Steinsson (2018). The response of real forward rates, however, declines more quickly with maturity than the response of real yields, and it is significant only at shorter maturities.

The most novel evidence in Figure 4 is the negative impact of statement surprises on market-based inflation expectations. BEI yields and forward rates at medium and long maturities exhibit a significantly negative response. The magnitudes of the effects are meaningful, with a peak effect on forward rates around -0.5, implying that a 10 basis point hawkish statement surprise on the one-year yield leads to a roughly 5 basis point decline in market expectations for inflation at these peak horizons.

Our findings contrast with the earlier evidence of Hanson and Stein (2015) and Nakamura and Steinsson (2018) that showed essentially no response of BEI rates at most horizons.[28] The absence of any effects of monetary policy surprises on market-based inflation expectations is puzzling from the perspective of standard New Keynesian models and monetary VARs, both of which indicate negative effects of monetary policy shocks on inflation (see, e.g., Gertler and Karadi, 2015; Miranda-Agrippino and Ricco, 2021; Bauer and Swanson, 2023a, for recent empirical contributions). Our new results, based on an extended sample, resolve the puzzle. The estimated effects of monetary policy on inflation compensation have the same sign as in monetary macro models and time series evidence.

Breakeven inflation rates reflect market-based or "risk-adjusted" expectations, which include not only inflation expectations, but also inflation risk premia and liquidity premia (Christensen et al., 2010; D'Amico et al., 2018; Andreasen et al., 2021). Given the substantial challenges and uncertainties involved in the estimation of these premia, we focus our event-study analysis on observed market rates and do not analyze estimated expectations and risk premia. How might accounting for risk premia potentially affect our results? Direct evidence from New Keynesian macro-finance models and event studies (Hördahl and Tristani, 2012; Aronovich and Meldrum, 2025), as well as various empirical results in the macro-finance literature, suggest that inflation risk premia respond positively to changes in monetary policy.[29] In light of this evidence, the response of actual, real-world inflation expectations is likely

[28] Hanson and Stein (2015) estimated a small positive response of forward BEI rates at the very short end and insignificant coefficients for other maturities. Nakamura and Steinsson (2018) found mostly insignificant estimates for most BEI rates, with the exception of a negative response for distant forward rates.

[29] Kim and Orphanides (2012) and Bauer (2018) document that estimates of risk premia in Treasury yields are highly uncertain and model-dependent. The literature on the risk-taking channel of monetary policy speaks to the positive impact of monetary policy on many risk premia in financial markets (Bauer et al., 2023). Most estimates suggest that inflation risk premia tend to be positive (Christensen et al., 2010; Abrahams et al., 2016), so that an increase in their magnitude due to a hawkish policy surprise would *increase* the risk premium component of BEI rates. See also Hanson and Stein (2015) and Gertler and Karadi (2015) for evidence on bond risk premia. Related evidence shows that monetary policy tightening can raise uncertainty (Mumtaz and Theodoridis, 2020), which is a key factor in determining risk premia (Wright, 2011).

even more negative than our estimated response of market-based inflation expectations.[30]

The estimated effects of statement surprises on forward BEI rates (bottom right panel of Figure 4) reveal a hump-shaped response of market-based inflation expectations, with a peak impact around the five-year horizon. These forward rate responses are significantly negative out to very long horizons, and Table 2 below shows that the five-to-ten year forward BEI rate responds with a large, negative and highly significant coefficient to statement surprises. If monetary policy surprises mainly capture standard monetary policy shocks, then this term structure evidence could reflect long expected lags, and highly persistent effects, in the monetary transmission to inflation. But this interpretation appears incongruent with the established time series evidence for the effects of monetary policy. Although estimates differ widely in their implications for transmission lags, this evidence generally suggests that peak effects of monetary policy on inflation occur at relatively short horizons of one to two years, and that the effects die out for longer horizons.[31] The sign-reversal in the estimated nominal forward rate response also appears at odds with the evidence from monetary VARs.

The estimated term structure patterns therefore suggest mechanisms that extend beyond a conventional monetary policy shock alone. If monetary policy surprises change beliefs about the conduct of monetary policy, this can explain both the sign reversal in the response of nominal forward rates (top right panel of Figure 4) and the persistently negative responses of BEI rates (bottom right panel of Figure 4). The idea that policy surprises can affect the perceived inflation target goes back to Gürkaynak et al. (2005b), and recent studies have considered the effects on the coefficients in the perceived policy reaction function (Bauer et al., 2024a,b; Jarociński and Karadi, 2025; Bocola et al., 2025; Ricco and Savini, 2025). As an example, consider a hawkish statement surprise that signals a lower long-run inflation target or a more aggressive inflation response. This type of surprise can raise near-term policy expectations while also lowering distant nominal forward rates and longer-term inflation expectations, due to revised beliefs about monetary policy.

This mechanism aligns with historical episodes in which long-run inflation expectations were shifting. In particular, potential de-anchoring of long-run inflation expectations was an important concern over the tightening period from the 2015 liftoff to the end of 2018.

[30] Conversely, liquidity premia could influence our results in the other direction, as they increase TIPS yields and thus decrease BEI rates. However, during our sample period the TIPS liquidity premia are empirically much less important and, according to some estimates, of an order of magnitude smaller than inflation risk premia (Abrahams et al., 2016).

[31] Examples include Christiano et al. (2005); Gertler and Karadi (2015); Jarociński and Karadi (2020); Miranda-Agrippino and Ricco (2021); Bauer and Swanson (2023a). Some recent work using daily economic data, such as Miranda-Pinto et al. (2023); Alves da Silva et al. (2025), documents evidence for especially short transmission lags. Studies that point to more persistent effects and longer expected lags include Brunnermeier et al. (2021); Ma and Zimmermann (2023); Jordà et al. (2024); Aruoba and Drechsel (2024).

Policy actions and communications over this episode plausibly provided new information about the Fed's reaction function and in this way shifted long-run inflation expectations. Appendix B shows that monetary policy surprises led to especially strong negative responses of breakeven inflation rates at medium-to-long maturities during this period. In contrast, during the period of relative stability of market inflation expectations between 2004 and 2015, we observe no response of long-horizon forward rates and of market-based inflation expectations. This sample largely overlaps with the ones in Nakamura and Steinsson (2018) and Hanson and Stein (2015), which explains why these studies found essentially no response of breakeven inflation rates to monetary policy.

4.2 Press Conferences and Minutes

While empirical work on the effects of Fed communication on financial markets has mostly focused on the FOMC announcements, we noted in Section 3 how press conferences have become a very important source of monetary policy news in recent years. In what follows, we provide new estimates of the Treasury market effects for the other communication events in the USMPD. We use the same type of event-study regressions as in Eq. (1), where s_t now denotes the monetary policy surprise around press conferences, minutes releases, and monetary events. Each news variable is scaled to yield a 1 ppt increase in the 1-year nominal rate over the full sample.

Table 2 reports the estimation results for these three additional monetary policy surprises—including the statement surprises for reference—on the 5-year yield and 5-to-10-year forward rate for nominal, real and BEI rates. Press conference surprises cause substantial responses of both real and nominal rates, and in most cases the estimated coefficients are materially larger in magnitude, and the R^2 substantially higher, compared to the estimates for the statement surprises. Press conference surprises have significantly positive effects on 5-to-10-year forward nominal and real rates, while statement surprises do not. This excess sensitivity of long-term rates is likely due to the fact that press conferences contain policy news mainly in the form of forward guidance.

Turning to BEI rates, Table 2 shows that they also tend to respond even more strongly to press conference surprises than to statement surprises. In particular, the negative response of the 5-year BEI yield is almost twice as large in magnitude, while the R^2 rises from 2 to 7 percent.[32] However, the response of the 5-to-10-year forward BEI rate to press conference news is not significant. To help us better understand the response of the BEI term structure,

[32] Note that the sample for press conference news starts in 2011. Based on results in Table 1, we expect the relevance of statement news to be even smaller over this period, compared to the 2004-2024 sample used in Table 2.

Table 2: Response of Treasury market to different monetary policy surprises

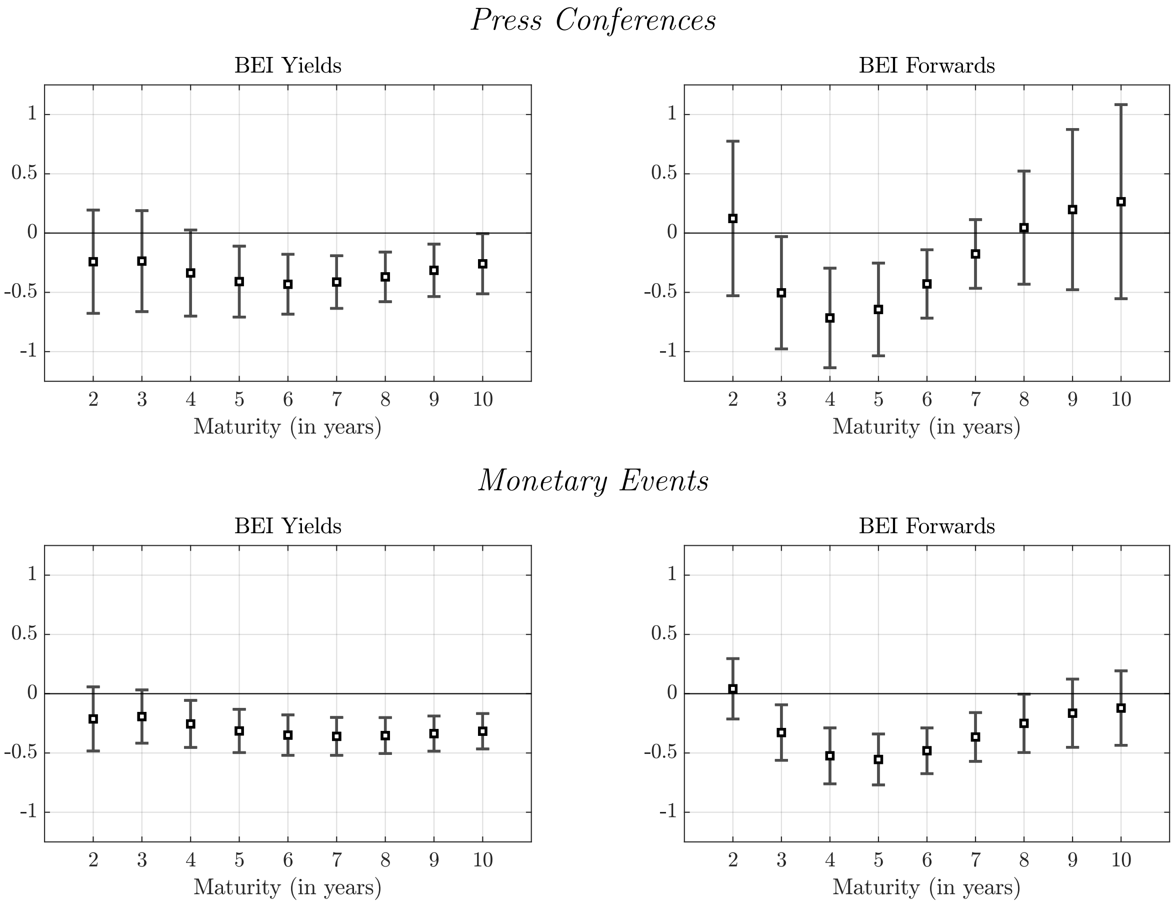
	5y yld				5-10y forw			
	STMT	PC	ME	MIN	STMT	PC	ME	MIN
(A) Nominal								
Coefficient	1.03	1.58	1.37	1.11	-0.21	0.47	0.03	0.37
	(0.30)	(0.25)	(0.23)	(0.31)	(0.21)	(0.16)	(0.17)	(0.34)
R^2	0.11	0.30	0.28	0.09	0.01	0.05	0.00	0.01
N	167	80	167	142	167	80	167	142
(B) Real								
Coefficient	1.25	1.99	1.68	1.28	0.19	0.59	0.36	0.58
	(0.34)	(0.32)	(0.26)	(0.28)	(0.20)	(0.20)	(0.15)	(0.32)
R^2	0.13	0.30	0.35	0.14	0.01	0.08	0.03	0.03
N	167	80	167	142	167	80	167	142
(C) Inflation								
Coefficient	-0.22	-0.41	-0.31	-0.17	-0.40	-0.12	-0.33	-0.22
	(0.11)	(0.15)	(0.09)	(0.16)	(0.12)	(0.17)	(0.10)	(0.21)
R^2	0.02	0.08	0.07	0.01	0.06	0.01	0.06	0.01
N	167	80	167	142	167	80	167	142

Event-study regressions of daily changes in Treasury rates around FOMC communication events on high-frequency monetary policy surprise over different windows. STMT: 30-minute changes around FOMC statements. PC: changes around the post-meeting press conference. ME: changes over the monetary event window, that is, statements as well as press conferences when available. MIN: 30-minute changes around release of FOMC meeting minutes. Response of nominal Treasury rates in panel (A), of real (TIPS) rates in panel (B), and of breakeven inflation rates in panel (C). Rates are 5-year yields in the first four columns, and 5-to-10-year forward rate in the last five columns. Sample: for STMT and ME surprises, 171 FOMC announcements from 2004 to 2024; for PC surprises, 81 press conferences from April 2011 to December 2024; for MIN surprises, 152 releases of the minutes from January 2005 to December 2024; all sample periods excluding the crisis period from July 2008 to June 2009. White standard errors are in parentheses.

the two top panels of Figure 5 report the sensitivity of BEI yields and forward rates to press conference surprises (comparable to those shown in the bottom panels of Figure 4 for statement surprises). BEI yields respond negatively across all maturities (top left panel), with a response that is statistically significant at the five-percent level for maturities from 5 to 10 years. The negative response of BEI forward rates (top right panel) peaks around the 4-year horizon and then dies out and becomes statistically insignificant at the 7-year horizon. This term structure pattern is slightly different than for statement surprises. Nevertheless, the response of forward breakevens still exhibits strong effects at longer horizons, consistent with the interpretation spelled out in Section 4.1 that surprise policy changes have longer-run effects by affecting beliefs about the conduct of monetary policy.

Our results suggest that press conference surprises may have stronger effects on the Treasury market than the commonly studied statement surprises. Appendix B carries this

Figure 5: BEI rate sensitivity around FOMC announcements and press conferences



Event-study regressions of daily changes in breakeven inflation (BEI) rates around FOMC announcements on high-frequency monetary policy surprises that include the press conference. Top panel shows results for the press conference (PC) surprise, based on changes around only the press conference, with 81 observations from April 2011 to December 2024. Bottom panel shows results for the monetary event (ME) surprise that includes all FOMC statements as well as press conferences when available, with 171 observations from January 2004 to December 2024, excluding the crisis period from July 2008 to June 2009. BEI yield responses shown in left panels, and BEI forward rate responses in right panels. Error bars show 95% confidence intervals based on White standard errors.

comparison further using several multivariate regressions, estimating the effects of statements and press conferences over the same sample and accounting for possible correlation between these surprises. There we also report results for separate target and path factors derived from the statement surprises, following Gürkaynak et al. (2005a), in order to directly compare the effects of forward guidance news from the statements and press conferences. These additional results show that for FOMC meetings with press conferences, the policy surprise around the press conferences has generally been the most important source of policy news for Treasury markets.

The estimates based on the monetary event surprises combine policy news from both statements and press conferences. Table 2 shows that in most cases, the estimated coefficients for monetary event surprises are in between the estimates for the statement and press conference news. For the 5-year nominal, real and BEI yields, the explanatory power of the monetary event surprise, measured in terms of R^2, is as strong as for the press conference surprise. It is the effects of the press conference and statement news that deliver, respectively, the sensitivity of the 5-to-10-year real and BEI forward rates to monetary event surprises. The bottom panels of Figure 5 show that the response of the BEI term structure to monetary event news is effectively a combination of the effects of the two sources of policy news. When considered jointly, these lead to peak responses in 4-6 year BEI forward rates, while longer maturities are unresponsive.

As noted in Section 3, monetary event surprises effectively combine the two main channels of FOMC communication—statements and press conferences—and are therefore highly informative about the outlook for monetary policy. This is confirmed by the coefficients for monetary event news being estimated more precisely than for either statement or press conference surprises. The evidence documented so far provides strong reasons to use the surprises measured over monetary event windows when estimating the effects of monetary policy communication on financial markets. It is understood, however, that the interpretation of the effects should take into account the large role that news about the future policy path plays, compared to more conventional news about the current policy stance.

Table 2 also shows the estimated response of the Treasury market to the release of the minutes of the FOMC meeting. As discussed in Section 3, this surprise captures news about the future policy rate path relative to the information previously communicated by the FOMC. The estimates show that, for the case of the five-year nominal and real yields, both the explanatory power and the estimated coefficients are broadly similar to those for the statement surprise. However, for the interpretation it is important to note that all surprises are normalized to yield a unit effect on the one-year daily Treasury yield and the minutes surprises are significantly less volatile than other surprises (see Table 1). Furthermore, there is no significant response of long-term real or nominal forward rates, or of any BEI rates, to the minutes surprise. Overall, the policy news revealed by the minutes has some effect on medium-term Treasury yields but is generally of limited quantitative importance for the Treasury market.

Our Treasury market evidence so far has been based on the daily zero-coupon yield curves that are widely used in the macro-finance literature, but the USMPD also contains high-frequency changes in on-the-run Treasury yields around FOMC communication events which provides useful complementary evidence. Table 3 reports the estimated high-frequency response of five-year and ten-year yields and five-to-ten-year forward rates to different FOMC

Table 3: High-frequency Treasury market response to different monetary policy surprises

	5y yld			10y yld			5-10y forw		
	STMT	PC	ME	STMT	PC	ME	STMT	PC	ME
(A) Nominal									
Coefficient	1.12	1.24	1.44	0.57	0.80	0.85	0.02	0.37	0.26
	(0.22)	(0.20)	(0.24)	(0.17)	(0.17)	(0.20)	(0.15)	(0.15)	(0.17)
R^2	0.39	0.29	0.44	0.19	0.20	0.27	0.00	0.06	0.03
N	171	81	171	171	81	171	171	81	171
(B) Real									
Coefficient	1.40	1.85	1.71	0.86	1.20	1.14	0.32	0.55	0.57
	(0.23)	(0.16)	(0.23)	(0.15)	(0.14)	(0.17)	(0.13)	(0.14)	(0.17)
R^2	0.46	0.58	0.50	0.34	0.39	0.38	0.05	0.11	0.11
N	163	81	163	163	81	163	163	81	163
(C) Inflation									
Coefficient	-0.34	-0.61	-0.30	-0.35	-0.40	-0.32	-0.35	-0.18	-0.34
	(0.06)	(0.10)	(0.10)	(0.06)	(0.08)	(0.06)	(0.10)	(0.09)	(0.07)
R^2	0.21	0.28	0.10	0.27	0.27	0.19	0.20	0.06	0.17
N	163	81	163	163	81	163	163	81	163

High-frequency regressions of changes in Treasury rates around FOMC communication events on high-frequency monetary policy surprise over different windows. STMT: 30-minute changes around FOMC statements. PC: changes around the post-meeting press conference. ME: changes over the monetary event window, that is, statements as well as press conferences when available. Response of nominal Treasury rates in panel (A), of real (TIPS) rates in panel (B), and of breakeven inflation rates in panel (C), constructed as the difference between nominal and real yields. Rates are 5-year yields, 10-year yields, and (approximate) 5-to-10-year forward rates. Sample: 171 FOMC announcements from 2004 to 2024, excluding the crisis period from July 2008 to June 2009. White standard errors in parentheses.

policy surprises.[33] These estimates confirm and strengthen our earlier results: The coefficients are generally of a similar magnitude as in the results shown above, but they tend to be estimated more precisely and the R^2 tend to be quite a bit larger. Most notably, Table 3 documents very strong negative effects of FOMC surprises on five-year breakeven inflation rates which are even stronger than those estimated on daily data.

In sum, we document several novel results for the Treasury market effects of FOMC surprises. Using longer and more recent samples, and in contrast to earlier results in the literature, we estimate significant negative effects on breakeven inflation, consistent with disinflationary effects of contractionary monetary policy shocks. Moreover, we document a term structure pattern for these effects that reveals peak effects on forward rates at 4-5 years. Finally, other FOMC communication events contain additional relevant information that

[33]It should be noted that these yields are not zero-coupon yields but instead reflect yield-to-maturity for on-the-run Treasury securities. We calculate an approximate 5-to-10-year forward rate as twice the 10-year yield minus the 5-year yield.

impacts Treasury markets, with the effects of press conferences being particularly pronounced.

5 Risk Assets

Monetary policy is known to materially affect the prices of risk assets, including stocks, exchange rates, and corporate bond spreads (e.g. Bernanke and Kuttner, 2005; Gilchrist et al., 2015; Jarociński and Karadi, 2020; Swanson, 2021; Bauer and Swanson, 2023a). These effects result from three main channels: First, changes in monetary policy affect the risk-free rates at which expected future cash flows are discounted, meaning that the effects documented in Section 4 are relevant for risk assets as well. Second, policy changes affect expectations of the risky cash flows underlying these assets, such as dividends and corporate defaults. Third, policy changes influence the risk premia that investors demand to bear the risks surrounding future cash flows, according to the risk-taking channel of monetary policy (Bauer et al., 2023). As an example, tighter policy would raise risk-free discount rates, lower dividend expectations and raise default expectations, and also lower the risk appetite of investors and financial intermediaries, thereby raising risk premia across a broad range of assets. All three of these channels would lead to lower prices of risk assets in response to tighter monetary policy, as captured by a hawkish monetary policy surprise. In addition to these "conventional" channels, monetary policy surprises could also lead to central bank information effects that would push in the opposite direction (Campbell et al., 2012; Nakamura and Steinsson, 2018; Jarociński and Karadi, 2020). For example, a hawkish policy surprise may in part reflect a more benign economic outlook by the central bank, which could cause investors to revise their growth expectations upward.[34] In the following analysis, we study the response of a broad set of risk asset prices to FOMC communication, using all communication events in our sample from 1994 to 2024.

5.1 Stocks, Dollar, and Other Risk Assets

The first part of this analysis considers a range of assets and indicators that cover important markets, including stocks, exchange rates, corporate bonds, and mortgage rates. We include the following series: daily returns of the S&P 500 index, daily changes in the VIX, daily returns in the U.S. dollar index DXY, changes in an index of investor risk appetite, changes in the spread of the effective yield of the Bank of America BBB corporate bond index over the ten-year Treasury yield, changes in investment grade CDS spreads, and changes in an MBS

[34] Bauer and Swanson (2023a) provide evidence in favor of an alternative "Fed response to news" channel that can also lead to a positive correlation between measured monetary policy surprises and changes in the economic outlook.

yield and an option-adjusted MBS spread.[35] We use one-day changes/returns for the stock market and dollar series, and two-day changes for all other series to account for slower price responses due to lower liquidity in options, corporate bonds, and MBS markets. Returns are measured in percent, index changes in index points, and changes in yield and spreads in basis points.

Table 4 shows the event-study estimates. Around FOMC announcements, we find a strong and generally statistically significant response, and the response coefficient has the conventional sign for all risk assets. Stock prices and risk appetite respond negatively to policy surprises, while the VIX, the dollar, the BBB spread, the CDX index, and MBS yield and spread respond positively. These results are qualitatively consistent with earlier findings in the literature (Gürkaynak et al., 2005a; Bernanke and Kuttner, 2005; Swanson, 2021; Bauer et al., 2023). The estimates indicate a negative response of cash flow expectations and/or a positive response of risk premia to policy surprises, in addition to the response of risk-free discount rates. The response is especially strong for the stock market, dollar, risk appetite index, and MBS yield. The magnitudes are economically meaningful, for example, the S&P 500 declines by close to one percentage point (-0.86) for a surprise corresponding to a 10 basis point increase in the one-year Treasury yield.

The estimated responses around press conferences are shown in the second panel of Table 4. These tend to be even stronger than for FOMC statements, with larger coefficients and R^2 in most cases.[36] The results for FOMC statements and press conferences in panels (A) and (B) are, however, not directly comparable because press conferences only started in 2011 and thus the sample periods are different. Appendix C provides further comparisons of the effects of these different types of policy news using multivariate regressions for the sample of FOMC meetings with press conferences, including the target and path factors of Gürkaynak et al. (2005a). These additional results show that when the Committee communicated policy news via both a statement and press conference, the latter is the key driver of movements in most risk assets.

The responses to the monetary event surprises, covering both FOMC statements and press conferences, also tend to be stronger than for the FOMC statement surprises alone. The coefficients for these event-study regressions, shown in panel (C) of Table 4, are statistically

[35]The risk appetite measure is from Bauer et al. (2023) and ends in May 2022. For CDS spreads we use the CDX-IG index. The MBS yield is the 30-year current-coupon MBS yield. The option-adjusted MBS spread is derived from Barclays' model and measures the spread of current-coupon MBS yields over Treasuries with comparable maturities.

[36]The strong stock market response to press conference surprises is consistent with the finding in Swanson and Jayawickrema (2024) that forward guidance surprises around press conferences have a strong negative impact on the S&P 500. Narain and Sangani (2024) document a change in the market reaction to press conferences by Chair Powell compared to those by Chairs Bernanke and Yellen.

Table 4: Response of risk assets to monetary policy surprises

	S&P 500	VIX	Dollar Index	Risk Appetite	BBB Spread	CDX IG	MBS Yield	MBS OAS
(A) FOMC Statements								
Coefficient	-8.6	9.8	4.3	-13.8	22.2	81.5	103.7	17.4
	(3.6)	(4.4)	(1.3)	(4.2)	(11.4)	(36.3)	(25.7)	(16.9)
R^2	0.05	0.03	0.08	0.07	0.01	0.10	0.05	0.00
N	254	252	260	242	238	171	262	262
(B) Press Conferences								
Coefficient	-15.6	20.5	7.7	-8.6	0.5	17.6	214.6	92.7
	(4.6)	(6.4)	(2.3)	(13.3)	(25.7)	(18.8)	(55.7)	(41.1)
R^2	0.12	0.05	0.16	0.01	0.00	0.01	0.07	0.02
N	80	80	80	59	80	80	80	80
(C) Monetary Events								
Coefficient	-9.8	11.5	4.9	-12.6	20.8	66.7	120.1	28.0
	(3.0)	(4.1)	(1.2)	(3.6)	(9.6)	(28.9)	(25.8)	(15.9)
R^2	0.08	0.05	0.12	0.07	0.01	0.09	0.08	0.01
N	254	252	260	242	238	171	262	262
(D) Minutes								
Coefficient	-4.1	-3.6	9.8	8.7	23.5	-60.7	122.3	2.4
	(9.1)	(7.9)	(2.7)	(14.7)	(44.8)	(43.2)	(63.8)	(43.1)
R^2	0.00	0.00	0.10	0.00	0.00	0.02	0.01	0.00
N	160	152	153	140	160	154	160	160

Event-study regressions of changes/returns in risk assets around FOMC communication events on high-frequency monetary policy surprises over different windows. Panel (A): 30-minute changes around FOMC statements. Panel (B): changes around post-meeting press conferences. Panel (C): changes around statements, and press conferences when available. Panel (D): 30-minute changes around release of FOMC meeting minutes. Risk assets: one-day return of S&P 500 (percent); one-day change in VIX; one-day return in dollar index DXY (percent); two-day change in risk appetite index; two-day change in BBB corporate bond spread (basis points); two-day change in investment-grade CDX index (basis points); two-day change in MBS yield and option-adjusted spread (OAS) (both basis points). Sample: all FOMC meetings from February 1994 to December 2024 for panels (A) and (C); all post-meeting press conferences from April 2011 to December 2024 for panel (B); all releases of the FOMC meeting minutes from January 2004 to December 2024 for panel (D). White standard errors in parentheses.

significant at conventional levels, with the only exception being the response of the MBS OAS. Similarly to the results for the Treasury market, this evidence confirms that the press conferences contain information that is relevant for the prices of risk assets and goes beyond what was disclosed in the FOMC statements alone.

Around the release of the minutes of FOMC meetings, we find little systematic reaction of risk assets to policy surprises. One exception is the dollar, which exhibits a substantial and significantly positive response. The MBS yield positively responds to the minutes surprise,

Table 5: Intraday response of risk assets to monetary policy surprises

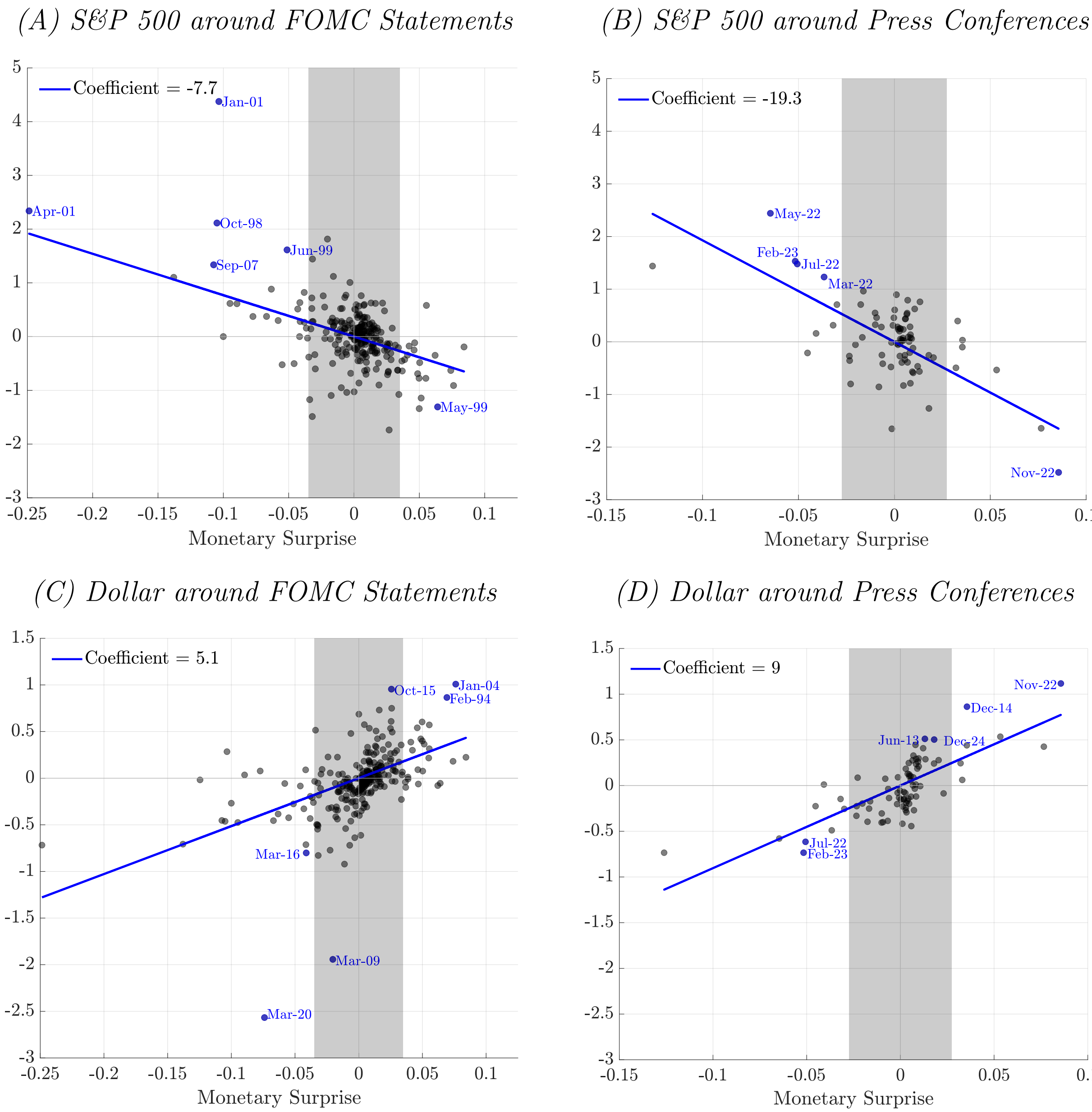
	STMT	PC	ME	MIN
(A) S&P 500				
Coefficient	-7.7	-19.3	-9.2	-3.6
	(2.7)	(4.3)	(2.0)	(2.0)
R^2	0.11	0.21	0.15	0.04
N	248	81	248	160
(B) Dollar				
Coefficient	5.1	9.0	5.2	6.0
	(0.9)	(1.2)	(0.7)	(0.8)
R^2	0.26	0.56	0.27	0.31
N	265	81	265	160

Event-study regressions of high-frequency returns in the S&P500 and the dollar index on monetary policy surprises. STMT: 30-minute returns around FOMC statements. PC: returns around post-meeting press conferences. ME: returns around monetary events, that is around statements and press conferences when available. MIN: 30-minute returns around release of FOMC meeting minutes. Sample: all FOMC meetings from February 1994 to December 2024, for STMT and ME; all post-meeting press conferences from April 2011 to December 2024 for PC; all releases of the FOMC meeting minutes from January 2004 to December 2024 for MIN. White standard errors in parentheses.

but the statistical significance is marginal and the R^2 is small. The stock market and the various risk spreads do not seem affected by minutes surprises (similar to long-term nominal Treasury forward rates and inflation breakevens in Table 4). Overall, the evidence for the financial market response to minutes news is mixed, again indicating that the information content of these surprises is more limited.

The dependent variables in our event studies have so far been measured over one-day or two-day windows around FOMC communication events. For some of the most important risk assets, the USMPD contains high-frequency data, allowing us to use tight intraday windows for the dependent variables that match those for the monetary policy surprises. Table 5 reports the estimated response of the intraday returns on the S&P 500 (top panel) and the dollar index (bottom panel), with the four columns corresponding to the different monetary policy surprises and event windows. In these regressions, the explanatory power of the policy surprise is substantially stronger than when we use daily changes for the dependent variables. The stronger explanatory power is due to the elimination of other factors influencing asset prices on the event days, which naturally reduces the variance of the regression residual and brings the effects of FOMC communication into sharper relief. Consequently, the coefficients are also estimated much more precisely and tend to be larger in magnitude than the regressions with daily data in Table 4. For the FOMC minutes releases, we again find no significant effect on the stock market, while the dollar index exhibits a highly significant response, similar to

Figure 6: Intraday risk assets and monetary policy surprises



Intraday returns in risk assets and monetary policy surprise. Top panels show intraday S&P 500 returns on vertical axis, bottom panels show intraday dollar returns. Left panels show FOMC statement surprises for all FOMC statements from 1994 to 2024 (264 observations). Right panels show press conference surprises for all post-meeting press conferences from 2011 to 2024 (81 observations). Six most influential observations are highlighted and labeled: for the stock market (dollar) regressions, the most influential observations are those with the most negative (positive) $DFBETA$ statistic. For readability, Panel (B) omits the March 15th, 2020 observation, which corresponds to a 2.3 basis point press conference surprise and an intraday S&P 500 return of -8%. Least squares regression lines correspond to estimates shown in first two columns of 5. Gray-shaded areas correspond to one standard deviation, above and below zero, for the monetary policy surprise.

our earlier results.

To help us better understand the effects of FOMC surprises on the stock market and the dollar, we visualize the high-frequency data with scatter plots. Figure 6 plots the intraday S&P 500 returns against monetary policy surprises in the top panels, and the intraday dollar returns against the policy surprises in the bottom panels. In each case, the left panel shows the responses around FOMC announcements, corresponding to the estimates in the first column of Table 5, and the right panel shows surprises around post-meeting press conferences, as in the second column of Table 5. Each panel also includes the estimated regression lines, highlights the six most influential observations, and shows shaded areas covering one standard deviation for the policy surprise.[37]

The plots in Figure 6 visualize the strong negative (positive) correlation of FOMC statement and press conference surprises with S&P 500 returns (the dollar). The signs of these correlations are well-established in the empirical literature and in line with standard channels of monetary transmission. The scatter plots show that the estimated comovements are not driven by a small number of outliers. For FOMC statements, the most influential surprises are spread across different episodes and phases of the monetary policy cycle. For press conferences, the most important surprises all took place during the 2022–2024 period of monetary tightening.[38] As noted in Section 3.2, during this period, press conferences conveyed information about the policy rate path that was both substantial and largely independent from FOMC statement surprises. Figure 6 confirms the large effects of press conference surprises on risk assets during this episode, consistent with the Chair providing Odyssean forward guidance (Campbell et al., 2012).

Figure 6 also shows that a significant share of FOMC surprises caused responses of the stock market and dollar that fall in the "wrong" quadrant, compared to the conventional sign of these correlations. The prevalence of these wrong-signed observations, originally documented by Jarociński and Karadi (2020) and Gürkaynak et al. (2021), could indicate the presence of Fed information effects.[39] We note that these non-conventional responses do not typically occur alongside meaningfully large monetary policy surprises, that is, those that fall outside of the gray-shaded areas corresponding to one standard deviation above and below the mean. While this pattern could be interpreted as little evidence for information effects, it is important to note that financial market event studies alone cannot conclusively

[37] The influential observations are determined using the $DFBETA$ influence statistic. For the stock market (dollar) regressions, these observations have the most negative (positive) $DFBETA$ and are thus most responsible for the negative (positive) slope coefficient.

[38] During this episode, there were both large hawkish (Nov-22, Sep-24) and dovish (May-22, Feb-23) press conference surprises, and they all led to sizable risk asset responses with the conventional signs.

[39] In the presence of central bank information effects, a positive response of dividend expectations to monetary policy surprises could dampen or even reverse the negative effects on stock prices from changes in risk-free discount rates and risk premia.

speak to the absence of information effects, which tend to play out in the estimated response of macroeconomic aggregates or survey forecasts at lower frequencies (Miranda-Agrippino and Ricco, 2021; Acosta, 2023).[40] Nevertheless, we view our intraday evidence as a useful addition to earlier event-study results in Jarociński and Karadi (2020) and Gürkaynak et al. (2021), as we extend the sample of FOMC communication events beyond the COVID pandemic and beyond FOMC statement surprises.

5.2 Dividend Derivatives

Derivatives tied to future dividends can provide evidence on the reaction of dividend expectations to changes in monetary policy and yield new insights about the channels of monetary transmission. Dividend derivatives, such as dividend strips, swaps, and futures, are therefore particularly promising to analyze in event studies of FOMC communication.

We estimate the effects of monetary policy on dividend expectations using data on dividend swaps and futures. These instruments have important advantages over dividend strips, which are based on option prices. First, they are tied directly to future dividends, while dividend strip prices are backed out from option prices and put-call parity, raising concerns about measurement error (Boguth et al., 2022). Second, they have annual expirations out to several years, which allows us to obtain term structure evidence about the response pattern of market-based dividend expectations. By contrast, reliable option price data for dividend strips is available only out to a horizon of a few months. Third, the prices of dividend swaps and futures are (essentially) forward prices of dividends, so we do not need to account for changes in risk-free interest rates to translate from spot prices to market-based dividend expectations. Given these advantages, the literature on the term structure of equity risk premia has generally moved towards the use of dividend swaps and futures data (van Binsbergen and Koijen, 2017).

Dividend swaps and futures are very similar instruments in that their payoffs are tied directly to future dividends.[41] Dividend swaps are over-the-counter derivatives between financial intermediaries, and these instruments have been used in the U.S. since the early 2000s. Futures have the advantage that they are standardized exchange-traded contracts, but

[40] In fact, it is typically the case that event study regressions with asset prices at daily or higher frequency recover average effects that are consistent with standard macroeconomic theory (Miranda-Agrippino and Nenova, 2022; Braun et al., 2025). Jarociński and Karadi (2020) show that removing the "wrong-signed" observations, even though they may appear small, is sufficient to resolve the puzzling responses in VARs. More generally, in the presence of information effects, the size of any single asset-price movement is not informative about which underlying structural shock is causing the market reaction.

[41] The terms "dividend futures" and "dividend swaps" are in fact sometimes used interchangeably in this context, because the small differences in institutional details between these derivatives are immaterial for most empirical research on market-based dividend expectations.

for the U.S. they have only been trading since late 2015, resulting in a smaller sample size. In the following, we focus on results for dividend swaps, motivated by the longer sample period.

Our dividend swap data are from Goldman Sachs and consist of daily prices over a sample period starting in 2004. Dividend swap contracts for the U.S. are tied to dividends on the S&P 500 over each future calendar year.[42] This data has been used extensively in earlier research, e.g., by van Binsbergen and Koijen (2017) and Nagel and Xu (2024). We calculate two-day log returns (in percent) to account for the potentially slower transmission of policy surprise to the prices of assets with lower liquidity. We construct constant-maturity data by linearly interpolating these returns.[43] We start our sample period in 2010 due to low liquidity during earlier years of the dividend swap market and during the financial crisis. In Appendix C we show additional results for other sample periods and also for dividend futures.

Table 6 reports the estimation results for event-study regressions of dividend swap returns on FOMC surprises. We consider annual horizons from one to seven years. The estimated response coefficients are generally negative, the only exceptions being some short-horizon coefficients that are positive but statistically insignificant. For FOMC statements, panel (A) shows that the negative coefficients are statistically significant at conventional levels for horizons of four years and longer. The response coefficients for press conferences, shown in panel (B), are all negative, but generally not statistically significant. Nevertheless, the press conferences materially strengthen the negative responses, with the result that the coefficients for monetary event surprises in panel (C) are strongly statistically significant for horizons of three years and longer. Finally, the responses to minutes surprises are negative for horizons of three years and longer, and of broadly similar magnitude as for other surprises, but aside from the six-year horizon not statistically significant.[44]

Our estimates for dividend swaps are consistent with a negative response of dividend expectations to monetary policy surprises. Appendix Table C.4 shows qualitatively similar results for dividend futures. While the strength of the estimated response depends somewhat on the sample period, our main results are quite robust.[45]

[42] For a detailed description of dividend swap markets, see Manley and Mueller-Glissmann (2008). We thank Christian Mueller-Glissman for providing the dividend swap data.

[43] Our method of interpolation is similar to that of van Binsbergen and Koijen (2017). For example, if t is the current trading day, F_{1t} is the return on the current-year contract with last trading day T at the end of December, F_{2t} is the return on the subsequent contract, and w is $T - t$ measured in years, then we construct the return on a one-year dividend contract as $w\, F_{1t} + (1 - w)\, F_{2t}$.

[44] It should again be noted that monetary policy surprises around minutes releases tend to be much smaller than for other FOMC communication events.

[45] Appendix Table C.3 shows that for dividend swaps over the full 2004–2024 sample, almost all estimated coefficients are negative as well, though somewhat smaller in magnitude and statistical significance than in our main results. In additional unreported results, we have found that ending our sample in 2019 before the onset of the COVID pandemic, or using dividend swaps only over the 2016–2024 sample when dividend futures were also trading, leads to very similar results as in Table 6. Scatter plots in Appendix Figure C.1

Table 6: Response of dividend swaps to monetary policy surprises

	1y	2y	3y	4y	5y	6y	7y
(A) FOMC Statements, $N = 124$							
Coefficient	2.5	-0.1	-6.6	-8.3	-12.4	-13.0	-11.2
	(2.4)	(3.4)	(4.6)	(4.1)	(4.6)	(4.8)	(4.4)
R^2	0.00	0.00	0.01	0.02	0.03	0.04	0.03
(B) Press Conferences, $N = 79$							
Coefficient	-2.9	-4.2	-5.4	-4.3	-6.0	-4.7	-8.0
	(1.4)	(2.7)	(3.0)	(3.4)	(4.8)	(4.1)	(3.8)
R^2	0.03	0.03	0.04	0.02	0.03	0.02	0.04
(C) Monetary Events, $N = 124$							
Coefficient	-0.8	-2.9	-7.1	-7.4	-10.5	-10.2	-11.0
	(1.3)	(1.7)	(2.4)	(2.3)	(3.0)	(3.1)	(2.9)
R^2	0.00	0.01	0.01	0.02	0.04	0.05	0.05
(D) Minutes, $N = 120$							
Coefficient	6.3	2.6	-3.7	-6.8	-5.6	-13.1	-12.4
	(5.7)	(5.5)	(5.7)	(5.9)	(6.5)	(6.3)	(7.7)
R^2	0.00	0.00	0.00	0.01	0.00	0.02	0.02

Event-study regressions of two-day returns in dividend swaps, for constant (interpolated) annual horizons, on high-frequency monetary policy surprises over different windows. Panel (A): 30-minute changes around FOMC statements. Panel (B): changes around post-meeting press conferences. Panel (C): changes around statements, and press conferences when available. Panel (D): 30-minute changes around release of FOMC meeting minutes. The sample includes all FOMC announcements from 2010 to 2024 for panels (A) and (C), and all press conferences and minutes releases for panels (B) and (D), respectively. White standard errors in parentheses.

The estimated term structure response shows that the peak negative impact of monetary policy surprises on dividend swaps occurs at relatively long horizons, around four to six years. These longer-run effects in the response of market-based expectations are similar to what we have documented for breakeven inflation forward rates in Section 4. Again, taken at face value, these term structure patterns could be interpreted as evidence for long expected lags in the monetary transmission, in this case to corporate profits and dividends.[46] However, they seem more likely to arise from the various policy tools, communications, and types of shocks that are captured by our monetary policy surprises and may have longer-run effects.

visualize the response of the three-year dividend swap return to monetary policy surprises around FOMC statements and press conferences. The left panel shows an outlier with a very large positive response to the surprise on March 19, 2020. Excluding this event, an announcement of international swap lines, has no material impact on our estimation results.

[46]The interpretation through the lens of transmission lags is somewhat complicated here by the fact that dividend derivative prices capture *levels* of future dividends, while questions about the lags of monetary policy are generally focused on the effects on *growth rates*. In addition, these derivative prices depend on *nominal* future dividends, which compound any expected effects on inflation.

Both the direction and the horizon patterns in our estimates contrast with recent work on the response of dividend strips to FOMC announcements. Gilchrist et al. (2024) and Golez and Matthies (2025) both estimated significant positive effects of monetary policy surprises on market-based dividend expectations at short horizons and attributed them to the presence of strong information effects dominating conventional channels of monetary transmission. While various differences in the implementation—including the data frequency, types of FOMC communication events, and precise measure of policy surprises—could help explain our contrasting findings relative to these earlier studies, two candidate explanations stand out. First, the horizons are substantially different. The positive effects on dividend strips were documented only for very short horizons, generally below six months, while we estimate negative effects for horizons of several years.[47] Second, measurement error appears to be an especially serious problem for dividend strips.[48]

Our results are consistent with conventional views on dividends from both corporate finance and monetary economics. The term structure patterns in our results conform with the stylized fact from corporate finance that dividends are sticky: Firms generally tend to adjust dividends only gradually and with a lag in response to changing business conditions (Lintner, 1956; Leary and Michaely, 2011). Moreover, our results can be explained with the standard channels of monetary transmission that predict a negative impact on dividends and profits. Intuitively, tighter policy slows future economic activity, which puts downward pressure on earnings and dividends. In line with this intuition, Bilbiie and Känzig (2024) show that both in the data and in the standard New Keynesian model, corporate profits respond negatively to a contractionary monetary policy shock.

In important recent work, Nagel and Xu (2024) revisit the negative stock market effects of monetary policy surprises around FOMC statements. They use dividend futures to calculate the counterfactual stock market response resulting only from changes in risk-free discount rates, and conclude that the systematic stock market response is "explained mostly by changes in the default-free term structure of yields, not by changes in the equity premium." Since dividend swaps are unaffected by changes in discount rates, our evidence of a large response of the prices of such derivatives to policy surprises shows that changes in risk premia and

[47] Golez and Matthies (2025) focus on a claim to dividends over the next 180 days and Gilchrist et al. (2024) estimate positive responses that are strongest for 60 days and decline with horizon. At the shortest maturities, we estimate positive (though insignificant) response coefficients, indicating that the patterns in dividend strip and swap prices are not necessarily inconsistent.

[48] While essentially all market prices, including those of dividend swaps and futures, provide only noisy estimates of the underlying object of interest, Boguth et al. (2022) show that the synthetic prices of dividend strips tend to significantly magnify the measurement errors in the underlying option prices. This casts some doubt on the reliability of dividend strips in empirical analysis, though it remains an open question how this measurement error could lead to a positive correlation with monetary policy surprises.

dividend expectations also constitute an important channel for explaining this systematic response to FOMC surprises.[49] Overall, it appears that all three channels—via risk-free rates, dividend expectations, and risk premia—are likely at work in the transmission of monetary policy to the stock market.

6 Conclusion

This paper introduces the USMPD, a new public database of high-frequency monetary policy surprises around FOMC communication events. Different from other available sources, the USMPD includes data on a broader set of FOMC communication events—including statements, minutes and press conferences—and a wider range of risk-free rates and risk asset prices. The USMPD is intended for public dissemination, and will be updated regularly using a consistent and transparent methodology. Our hope is that the availability of this extensive, reliable data source of U.S. monetary policy surprises will further stimulate empirical research in monetary economics.

The paper establishes several new facts about monetary policy news and their financial market effects. Monetary policy surprises have increased in magnitude over recent years, providing a renewed relevance on the use of high-frequency event studies and identification methods for the study of monetary policy. Press conferences convey important and independent monetary news relative to the more traditional statements, suggesting that disregarding information in the press conferences risks overlooking an important source of information. In contrast to earlier studies, our estimates show that monetary policy news is effective at steering market-based expectations of both future inflation and dividends, and in a way that is generally consistent with the standard transmission channels of monetary policy shocks. Monetary policy news from press conferences—whether in isolation or in conjunction with the news in the associated statement—is a particularly important source of information, with strong effects on Treasury yields and prices of risk assets.

[49] A separate question, which neither our evidence nor the results of Bernanke and Kuttner (2005) or Nagel and Xu (2024) speaks to, is about the role of expectations and risk premia for the *unsystematic* response to monetary policy. As documented by Kroencke et al. (2021) and Boehm and Kroner (2024), a large share of the movements in the stock market around FOMC announcements is unrelated to empirical monetary policy surprises and may well be related to orthogonal movements in risk premia.

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A Details on USMPD

A.1 FOMC Meetings and Announcements

The USMPD contains data for all FOMC meetings since 1994, including those from 1994 to 1999 that were not followed by a statement release. For simplicity, we refer to the high-frequency surprises for all of these as "statement surprises."

Over the period from 1994 to 2024, the FOMC released 18 unscheduled announcements, which are included in the USMPD as statement surprises and identified with an indicator variable. Generally, these were FOMC statements after unscheduled meetings that took place during emergency situations in the form of a conference call. The database also includes in this category announcements of extraordinary measures, such as international dollar swap lines. An example is the announcement of the establishment of dollar swap lines on March 19, 2020, during the height of the COVID pandemic. Conference calls or other consultations of the FOMC that were not followed by the release of a statement are not included in the database, given that no new information was made public at that time.

In extraordinary circumstances, the FOMC may convene an emergency meeting and make an announcement on weekends or holidays. One instance is the FOMC announcement made on Sunday March 15, 2020, at 5pm Eastern time, in response to the widespread financial stress at the onset of the COVID pandemic. Being outside of market operating hours, this important announcement would not be picked up by our default procedure, resulting in a missing value. In this case, we defined the event window from the market close on Friday to the opening of futures markets at 6pm Eastern time on Sunday, following Swanson and Jayawickrema (2024). Future announcements outside trading hours will be dealt with in a similar manner.

A.2 Data Sources

Our main source of intraday data is LSEG Tick History.[50] Historical data from LSEG Tick History starts in 1996. Intraday data for 1994 and 1995 are from the Chicago Mercantile Exchange (CME), Tick Data and Gürkaynak et al. (2005a).

Timestamps for the events correspond to the information on the Federal Reserve Board's website.[51] For events before 2016, this information was backfilled using information from Reuters/Bloomberg and the data in Gürkaynak et al. (2005a). For FOMC meetings from 1994 to 1999 that were not followed by a statement release, the timestamp corresponds to the Reuters/Bloomberg headline announcing the meeting conclusion.

A.3 Implied Target Surprises for FOMC Meetings

Federal funds futures in general combine expectations that pertain to multiple upcoming FOMC meetings. Gürkaynak et al. (2005a) show how to combine federal funds futures at

[50] For more details on LSEG Tick History, formerly known as Reuters/Refinitiv Tick History, see https://www.lseg.com/en/data-analytics/market-data/data-feeds/tick-history.

[51] See https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm for recent years and https://www.federalreserve.gov/monetarypolicy/fomc_historical_year.htm for historical information.

different maturities to isolate policy rate expectations related to particular FOMC meetings. We follow this approach to calculate the implied target rate surprises for the current and subsequent FOMC meeting, as follows:

$$MP1_s = \begin{cases} \frac{D^s}{D^s - d^s}(ff^1_{s,t} - ff^1_{s,t-\Delta t}) & \text{if } D^s - d^s > 7 \\ ff^2_{s,t} - ff^2_{s,t-\Delta t} & \text{otherwise} \end{cases} \tag{2}$$

$$MP2_s = \begin{cases} \frac{D^{s'}}{D^{s'} - d^{s'}}\left[(ff^j_{s',t} - ff^j_{s',t-\Delta t}) - \frac{d^{s'}}{D^{s'}} MP1_s\right] & \text{if } D^{s'} - d^{s'} > 7 \\ ff^{j+1}_{s,t} - ff^{j+1}_{s,t-\Delta t} & \text{otherwise,} \end{cases} \tag{3}$$

where $ff^j_{s,t}$ denotes the j^{th} Fed funds futures in month s traded at time t, D^s is the number of days in month s and d^s is the day the asset is traded. The current FOMC meeting happens in month s, and the next scheduled FOMC meeting is in month s'.

In equation (2), $MP1$ denotes the surprise around the current FOMC meeting. This is equal to the rescaled rate change for the current-month contract if the meeting is occurring in the first three weeks of the month. If, however, the meeting falls in the last week of the month, the current-month contract rate largely reflects the federal funds rate that had prevailed prior to the meeting and the rescaled change can be very noisy. To avoid this issue, $MP1$ equals the change in price of the second contract if the meeting falls in the last week of the month.

The implied surprise for the subsequent FOMC meeting, $MP2$, is shown in equation (3). $MP2$ uses a combination of longer maturity futures depending on the month in which the upcoming meeting falls, and subtracts the implied surprise for the current one ($MP1$). Note that the calculation of $MP2$ pertains to the next *scheduled* FOMC meeting. For further details, see Gürkaynak et al. (2005a) and also Brennan et al. (2024).

For the calculation of $MP1$ and $MP2$ around press conferences, we follow the same methodology. Importantly, $MP2$ also refers to the next scheduled FOMC meeting, which may or may not have a press conference. The calculation of $MP1$ and $MP2$ for monetary events is analogous.

For releases of the FOMC meeting minutes, we need to adjust these definitions. Since there is no current-meeting surprise with the release of the minutes, we set $MP1 = 0$. For the calculation of $MP2$, we use (3), which gives us the surprise for the upcoming FOMC meeting, usually scheduled to occur three weeks later.

A.4 Eurodollar and SOFR Futures

Following the LIBOR scandal in 2012, in 2014 the Federal Reserve convened private sector participants to recommend a new reference rate in place of LIBOR. SOFR was endorsed in June 2017 and first released in April 2018. A month later, SOFR futures began trading on the CME. In 2021, the CME announced that by April 14, 2023 all Eurodollar futures would be automatically converted to SOFR futures at a fixed spread. For more details, see Acosta et al. (2024).

SOFR and Eurodollar futures share some similarities, and are designed to be aligned in terms of their quarterly schedule and their reference rate being a 3-month rate. A key difference is that SOFR futures settle based on the compounded daily SOFR rate over the three-month period *before* the expiration date. Care must be taken to correctly align SOFR and Eurodollar contracts, because the LIBOR rate underlying a Eurodollar futures contract instead captures expectations for overnight rates for the three-month period *after* the contract's expiration, so that ED1 corresponds to the second SOFR futures contract, and so on.

As an example, consider a March SOFR and ED futures contracts. The March SOFR futures contract settles in June based on the realized SOFR rate from, roughly, mid-March to mid-June. This aligns with the March Eurodollar futures contract, which settles based on the 3-month LIBOR at the contract expiration in March. That is, the March SOFR contract expires in June, while the March ED contract expires in March, but both reflect market expectations of short-term rates over the three-month period from mid-March to mid-June. In February, the March ED contract is denoted by ED1. We use the same identifier, ED1, to denote the March SOFR contract, although this is the second active quarterly SOFR futures contract at that time.[52]

A.5 Instruments

Table A.1 lists and explains the financial instruments contained in the USMPD, including their LSEG tickers (RICs).

For Treasury and TIPS yields, the data up to 2024 uses 'RR' RICs which refer to data sourced directly from TradeWeb. Due to licensing reasons, from 2025 onward we use 'RRPS' RICs that refer to values from LSEG Pricing Service. We have verified that both types of data series yield very similar high-frequency Treasury yield changes.

A.6 Units

All financial market data in the USMPD are high-frequency *changes or returns* over different intradaily event windows. These are based on the median price or yield over the pre-event and post-event windows.

- For interest rates, we calculate changes, and these are measured in percentage points.
- For the stock market and exchange rates, we calculate net returns, and these are measured in percent (the relative change multiplied by 100).

[52] In February, the preceding December contract is still actively traded until expiration in March.

Table A.1: Instruments in the USMPD

Label	LSEG RIC	Description	Start Date
MP1		Surprise for current FOMC meeting (based on FF)	1994
MP2		Surprise for next FOMC meeting (based on FF)	1994
FF1:FF6	FF	Federal Funds futures (six monthly contracts)	1994
ED1:ED8	ED	Eurodollar futures (eight quarterly contracts)	1994
	SRA	SOFR futures (eight quarterly contracts)	2022
OIS1Y	USD1YOIS=	1-year OIS rate	Dec-2003
OIS2Y	USD2YOIS=	2-year OIS rate	Aug-2011
UST3M	US3MT=RR	3-month T-Bill rate	1994
UST6M	US6MT=RR	6-month T-Bill rate	1996
UST2Y	US2YT=RR	2-year Treasury yield	1994
UST5Y	US5YT=RR	5-year Treasury yield	1994
UST10Y	US10YT=RR	10-year Treasury yield	1994
UST30Y	US30YT=RR	30-year Treasury yield	1994
TIPS5Y	UST5YTIP=RR	5-year TIPS yield	2005
TIPS10Y	UST10YTIP=RR	10-year TIPS yield	2005
TIPS30Y	UST30YTIP=RR	30-year TIPS yield	2005
SP500	.INX	S&P 500 market index	1996
SPFUT	ESc1	S&P E-mini futures (front contract)	Sep-1997
DXY	.DXY	Dollar index	1994
EURUSD	EUR=	Spot Euro-Dollar exchange rate	May-1998
USDJPY	JPY=	Spot Dollar-Yen exchange rate	1996

B Additional Results for Section 4

This Appendix shows additional figures and tables for the response of the Treasury market to FOMC policy surprises.

To better compare statement and press conference surprises, we estimate various multivariate regressions using only the FOMC meetings with press conferences. Table B.1 shows estimates of multivariate regressions using the statement and press conference surprises. Table B.2 reports results for similar multivariate regressions for Treasuries over the same sample, but in addition to the press conference surprise includes target and path surprises, similar to those of Gürkaynak et al. (2005a). We construct the target and path surprises using FOMC statement surprises for meetings with press conferences, scaling the target surprise so that a one-unit change moves MP1 by 100 bp and the path surprise so that it has the same effect on ED4 as the target surprise (≈40 bp). The press conference surprise is rescaled over this sample so that its impact on ED4 around press conferences matches the effects of the target and path surprises around FOMC announcements.

Table B.1: Response to statement and press conference surprises

	2y yld	5y yld	10y yld	5-10y forw
(A) Nominal				
STMT	1.35	1.22	0.68	0.13
	(0.40)	(0.47)	(0.48)	(0.52)
PC	2.33	1.98	1.46	0.94
	(0.35)	(0.38)	(0.43)	(0.52)
R^2	0.46	0.29	0.16	0.05
(B) Real				
STMT	2.27	2.06	1.42	0.78
	(0.55)	(0.57)	(0.46)	(0.42)
PC	2.76	2.72	2.05	1.39
	(0.50)	(0.44)	(0.43)	(0.45)
R^2	0.42	0.38	0.29	0.14
(C) Inflation				
STMT	-0.91	-0.84	-0.74	-0.65
	(0.38)	(0.29)	(0.23)	(0.25)
PC	-0.43	-0.74	-0.59	-0.45
	(0.30)	(0.27)	(0.24)	(0.25)
R^2	0.08	0.16	0.14	0.08

Event-study regressions of daily changes in Treasury rate around FOMC communication events on high-frequency statement (STMT) and press conference (PC) surprises. Response of nominal Treasury rates in panel (A), of real (TIPS) rates in panel (B), and of breakeven inflation rates in panel (C). Rates are 2-year, 5-year, and 10-year yields in the first three columns, and the 5-to-10-year forward rate in the last column. Sample: all FOMC meetings with post-meeting press conferences from April 2011 to December 2024. White standard errors in parentheses. Sample consists of 80 observations.

Table B.2: Response to target, path, and press conference surprises

	2y yld	5y yld	10y yld	5-10y forw
(A) Nominal				
Target	-0.02	-0.13	-0.27	-0.42
	(0.30)	(0.26)	(0.27)	(0.29)
Path	0.28	0.27	0.18	0.09
	(0.07)	(0.08)	(0.08)	(0.09)
PC	0.41	0.35	0.26	0.17
	(0.06)	(0.06)	(0.07)	(0.09)
R^2	0.52	0.36	0.22	0.09
(B) Real				
Target	0.34	0.15	0.05	-0.05
	(0.16)	(0.17)	(0.19)	(0.24)
Path	0.40	0.39	0.28	0.17
	(0.09)	(0.09)	(0.08)	(0.07)
PC	0.49	0.48	0.36	0.24
	(0.09)	(0.08)	(0.08)	(0.08)
R^2	0.46	0.43	0.33	0.16
(C) Inflation				
Target	-0.36	-0.28	-0.33	-0.37
	(0.26)	(0.17)	(0.13)	(0.11)
Path	-0.13	-0.12	-0.10	-0.07
	(0.06)	(0.05)	(0.04)	(0.05)
PC	-0.07	-0.13	-0.10	-0.08
	(0.05)	(0.05)	(0.04)	(0.04)
R^2	0.08	0.16	0.15	0.09

Event-study regressions of daily changes in Treasury rate around FOMC communication events on high-frequency target and path factors of statement (STMT) and press conference (PC) surprises. Response of nominal Treasury rates in panel (A), of real (TIPS) rates in panel (B), and of breakeven inflation rates in panel (C). Rates are 2-year, 5-year, and 10-year yields in the first three columns, and the 5-to-10-year forward rate in the last column. Sample: all FOMC meetings with post-meeting press conferences from April 2011 to December 2024 (80 observations). White standard errors in parentheses.

To investigate the robustness of our estimates and to reconcile them with earlier results in the literature, we estimate the event-study regressions for BEI rates over different subsamples. Results are reported in Table B.3.

- The sample in panel (A) ends in March 2014, as in Nakamura and Steinsson (2018).
- The sample in panel (B) starts in April 2014, and thus captures the remaining observations in our full sample.
- The sample for Panel (C) starts in 2004, as in our baseline, but ends in December 2019, before the onset of the COVID pandemic.
- Panel (D) adds the financial crisis episode to our baseline sample, and provides estimates over the full 2004–2024 period.
- Panel (F) considers the "deanchoring concerns" period corresponding to the tightening cycle from December 2015 to December 2018.
- The sample in panel (E) starts in 2004, as in our baseline, but ends before the start of the sample in panel (F).
- Panel (G) shows results for the complementary sample that leaves out the period considered in panel (F).

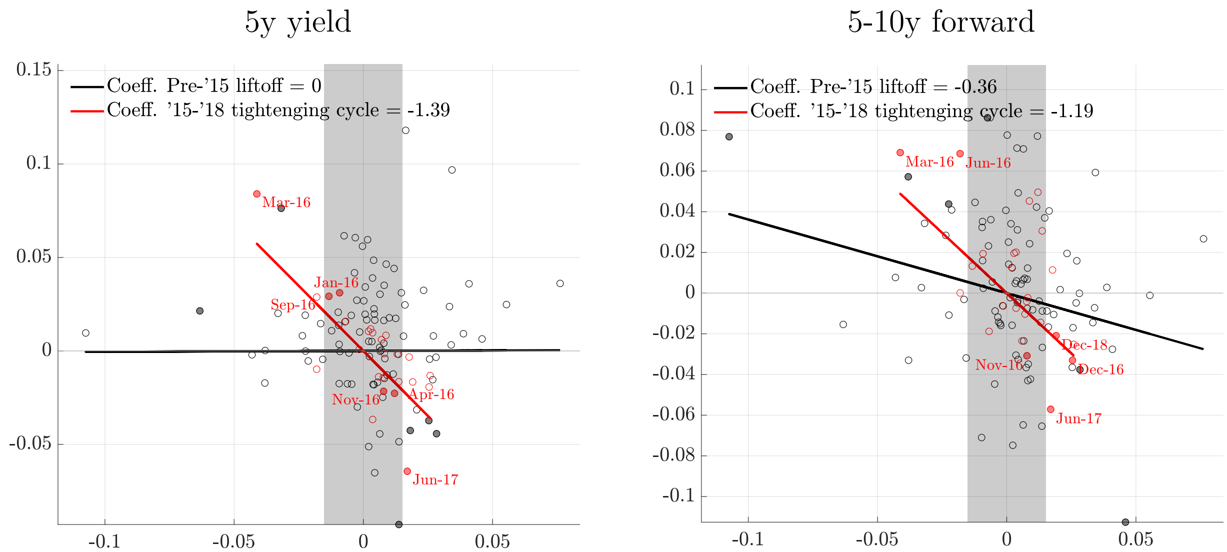
To investigate which period leads to the especially strong negative responses of breakeven inflation rates at medium-to-long maturities, Figure B.1 shows scatter plots of changes in the five-year BEI yield (left panel) and the five-to-ten-year BEI forward rates (right panel) against FOMC announcement surprises. Two different subperiods are highlighted in the scatter plots: The red cloud of points corresponds to the tightening cycle from December 2015 to December 2018, whereas the black circles visualize the sample from the beginning of our sample, January 2004, to just before the onset of the tightening cycle, November 2015. For each regression sample, the six most influential observations, as measured by the $DFBETA$ measure of influence, are highlighted as filled circles. They are labeled with the month of the FOMC announcement for the sample corresponding to the tightening cycle.

Table B.3: Breakeven inflation response to FOMC announcement surprises across subsamples

	2y yld	5y yld	10y yld	5-10y forw
(A) Sample: January 2004 to March 2014 (ex. GFC), N = 77				
Coefficient	0.37	0.09	-0.12	-0.34
	(0.15)	(0.10)	(0.12)	(0.19)
R^2	0.04	0.01	0.01	0.05
(B) Sample: April 2014 to December 2024, N = 90				
Coefficient	-0.67	-0.52	-0.48	-0.45
	(0.26)	(0.19)	(0.14)	(0.15)
R^2	0.08	0.11	0.12	0.06
(C) Sample: January 2004 to December 2019 (ex. GFC), N = 124				
Coefficient	-0.04	-0.18	-0.32	-0.47
	(0.22)	(0.13)	(0.12)	(0.15)
R^2	0.00	0.02	0.06	0.08
(D) Sample: January 2004 to December 2024, N = 176				
Coefficient	-0.64	-0.43	-0.38	-0.33
	(0.30)	(0.15)	(0.11)	(0.15)
R^2	0.06	0.07	0.08	0.05
(E) Sample: January 2004 to November 2015, N = 90				
Coefficient	0.26	0.00	-0.18	-0.36
	(0.18)	(0.11)	(0.12)	(0.17)
R^2	0.02	0.00	0.02	0.06
(F) Sample: December 2015 to December 2018, N = 25				
Coefficient	-2.36	-1.39	-1.29	-1.19
	(0.49)	(0.29)	(0.21)	(0.29)
R^2	0.33	0.58	0.56	0.32
(G) Sample: January 2004 to December 2024 (ex. '15-'18 tightening cycle), N = 151				
Coefficient	-0.56	-0.38	-0.34	-0.30
	(0.31)	(0.16)	(0.11)	(0.15)
R^2	0.05	0.06	0.07	0.04

Event-study regressions of daily changes in breakeven inflation rates around FOMC announcements on high-frequency announcement surprises, the scaled first principal component of 30-minute changes in near-term money market rates around the release of the FOMC statement. Samples (A) and (C) exclude the great financial crisis (GFC) period from July 2008 to June 2009. White standard errors are in parentheses.

Figure B.1: BEI forward rate changes and FOMC surprises across subsamples



BEI rate changes on days with FOMC announcements and monetary policy surprise calculated from 30-minute rate changes around the release of the FOMC statement, for the five-year yield (left panel) and the five-to-ten-year forward rates (right panel). Red circles for 90 FOMC announcements from January 2004 to November 2015 (excluding the crisis period from July 2008 to June 2009); black circles for 25 FOMC announcements from December 2015 to December 2018. Six most influential observations, as measured by the $DFBETA$ measure of influence, highlighted and labeled. Least squares regression lines correspond to estimates shown in Table B.3 panels (E) for pre-'15 liftoff and (F) for '15-'18 tightening cycle.

C Additional Results for Section 5

This Appendix shows additional figures and tables for the response of risk assets to FOMC policy surprises. Tables C.1 and C.2 show estimates for multivariate regressions similar to those above for the Treasury market in Tables B.1 and B.2.

Table C.1: Response of risk assets to monetary policy surprises: multivariate regression

	S&P 500	VIX	Dollar Index	Risk Appetite	BBB Spread	CDX IG	MBS Yield	MBS OAS
STMT	-2.2	7.4	7.9	-4.6	44.1	42.7	76.1	10.0
	(9.2)	(16.5)	(2.7)	(14.3)	(21.3)	(19.3)	(77.8)	(52.9)
PC	-15.8	21.3	8.5	-7.6	5.0	21.9	222.3	93.7
	(4.9)	(7.4)	(1.8)	(16.2)	(22.7)	(17.6)	(58.0)	(42.5)
R^2	0.12	0.05	0.30	0.01	0.04	0.07	0.08	0.02
N	80	80	80	59	80	80	80	80

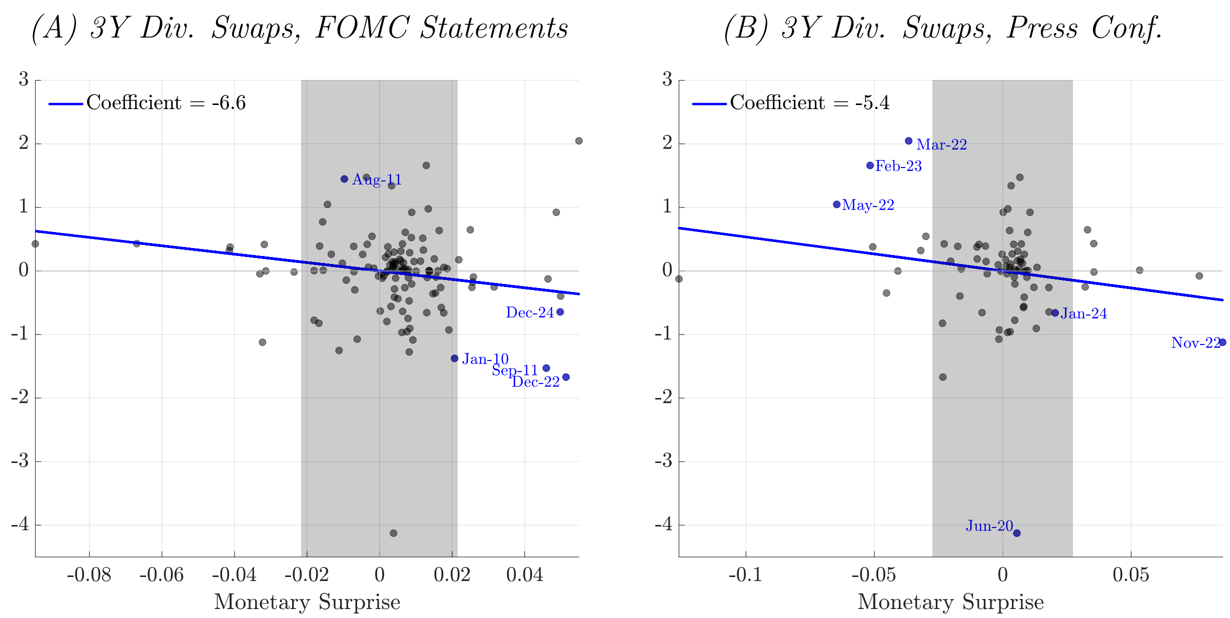
Event-study regressions of changes/returns in risk assets around FOMC meetings on high-frequency statement (STMT) and press conference (PC) surprises. For description of risk assets, see notes to Table 4. Sample: all FOMC meetings with post-meeting press conferences from April 2011 to December 2024. White standard errors in parentheses.

Table C.2: Response of risk assets to monetary policy surprises: multivariate regression 2

	S&P 500	VIX	Dollar Index	Risk Appetite	BBB Spread	CDX IG	MBS Yield	MBS OAS
Target	4.7	-5.8	1.3	-6.5	32.9	18.2	-71.1	-49.7
	(5.6)	(7.0)	(1.2)	(3.9)	(14.7)	(13.6)	(23.5)	(22.7)
Path	-1.2	2.4	1.4	0.7	3.6	5.7	26.9	10.1
	(1.1)	(2.5)	(0.4)	(3.0)	(4.2)	(3.5)	(8.7)	(5.6)
PC	-2.8	3.8	1.5	-1.0	0.8	3.8	39.5	16.7
	(0.9)	(1.2)	(0.3)	(2.4)	(3.8)	(3.1)	(9.7)	(7.3)
R^2	0.17	0.08	0.33	0.03	0.06	0.07	0.13	0.03
N	80	80	80	59	80	80	80	80

Event-study regressions of changes/returns in risk assets around FOMC meetings on high-frequency target and path factors for FOMC statements, as well as press conference (PC) surprises. For description of risk assets, see notes to Table 4. Sample: all FOMC meetings with post-meeting press conferences from April 2011 to December 2024. White standard errors in parentheses.

Figure C.1: Dividend swaps and monetary policy surprises



Two-day returns on dividend swaps with interpolated three-year horizon and high-frequency monetary policy surprises. Left panel: FOMC statement surprises for all FOMC meetings from January 2010 to December 2024. Right panel: press conference surprises for all post-meeting press conferences from April 2011 to December 2024. Six most influential observations, as measured by the $DFBETA$ measure of influence, highlighted and labeled. Least squares regression lines correspond to estimates shown in panels (A) and (B) of Table 6. Gray-shaded areas correspond to one standard deviation, above and below zero, for the monetary policy surprise.

Figure C.1 plots returns in three-year dividend swaps against monetary policy surprises for FOMC statments (panel A) and press conferences (panel B), complementing the evidence in Table 6. Table C.3 presents event-study regression results for dividend swap returns similar to Table 6, but using a sample that uses the complete sample of dividend swap data starting in 2004. Table C.4 presents estimates for the same type of regressions, but using dividend futures instead of dividend swaps (which limits the sample to 2016-2024).

Table C.3: Response of dividend swaps to monetary policy surprises: 2004–2024 sample

	1y	2y	3y	4y	5y	6y	7y
(A) FOMC Statements, $N = 169$							
Coefficient	0.4	-1.2	-0.9	-1.6	-2.2	-1.1	-1.9
	(3.1)	(2.1)	(3.7)	(2.9)	(3.5)	(4.0)	(3.4)
R^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(B) Press Conferences, $N = 79$							
Coefficient	-2.9	-4.2	-5.4	-4.3	-6.0	-4.7	-8.0
	(1.4)	(2.7)	(3.0)	(3.4)	(4.8)	(4.1)	(3.8)
R^2	0.03	0.03	0.04	0.02	0.03	0.02	0.04
(C) Monetary Events, $N = 169$							
Coefficient	-0.8	-2.5	-2.4	-2.5	-3.5	-2.2	-3.7
	(2.2)	(1.5)	(2.9)	(2.3)	(2.8)	(3.1)	(2.8)
R^2	0.00	0.01	0.00	0.00	0.01	0.00	0.01
(D) Minutes, $N = 160$							
Coefficient	17.5	-10.0	-4.1	-7.2	-11.5	-10.2	-8.7
	(13.6)	(9.3)	(6.2)	(5.5)	(6.0)	(6.1)	(8.8)
R^2	0.03	0.01	0.00	0.01	0.02	0.02	0.01

Event-study regressions of two-day returns in dividend swaps, for constant (interpolated) annual horizons, on high-frequency monetary policy surprises over different windows. Panel (A): 30-minute changes around FOMC statements. Panel (B): changes around post-meeting press conferences. Panel (C): changes around statements, and press conferences when available. Panel (D): 30-minute changes around release of FOMC meeting minutes. Sample period: 2004–2024 (our full sample of dividend swap data). White standard errors in parentheses.

Table C.4: Response of dividend futures to monetary policy surprises

	1y	2y	3y	4y	5y	6y	7y
(A) FOMC Statements							
Coefficient	3.1	0.9	-5.4	-7.6	-7.6	-6.9	-8.5
	(2.7)	(3.9)	(5.1)	(5.5)	(5.8)	(4.3)	(3.2)
R^2	0.00	0.00	0.00	0.01	0.01	0.02	0.02
N	72	72	72	72	72	64	64
(B) Press Conferences							
Coefficient	-3.2	-6.0	-5.5	-4.3	-0.9	-1.9	-1.5
	(1.5)	(2.9)	(3.4)	(3.9)	(5.8)	(3.6)	(2.8)
R^2	0.03	0.06	0.04	0.02	0.00	0.00	0.00
N	72	72	72	72	72	64	64
(C) Monetary Events							
Coefficient	-1.0	-3.6	-6.2	-6.3	-4.0	-4.6	-5.0
	(1.2)	(1.7)	(2.4)	(2.7)	(3.8)	(2.6)	(2.2)
R^2	0.00	0.02	0.01	0.01	0.01	0.01	0.01
N	72	72	72	72	72	64	64
(D) Minutes							
Coefficient	3.8	4.1	0.4	-0.8	-1.3	-9.7	-2.0
	(7.1)	(7.9)	(7.5)	(6.4)	(7.1)	(7.2)	(2.6)
R^2	0.00	0.00	0.00	0.00	0.00	0.02	0.00
N	72	72	72	72	72	64	64

Event-study regressions of two-day returns in dividend futures, for constant (interpolated) annual horizons, on high-frequency monetary policy surprises over different windows. Panel (A): 30-minute changes around FOMC statements. Panel (B): changes around post-meeting press conferences. Panel (C): changes around statements, and press conferences when available. Panel (D): 30-minute changes around release of FOMC meeting minutes. Sample period: 2016–2024. White standard errors in parentheses.