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

Miguel Acosta Andrea Ajello Michael Bauer Francesca Loria
Silvia Miranda-Agrippino

March 19, 2025

Preliminary and incomplete. Please do not cite or circulate.

Abstract

High-frequency market movements around central banks' announcements can help identify effects of unexpected changes in the monetary policy stance on interest rates, asset prices and macroeconomic outcomes. Despite the widespread use of monetary policy surprises in monetary economics and macro-finance, no common empirical benchmark is available for Federal Open Market Committee (FOMC) announcements and official communication, which has led to a profusion of datasets and surprise measures. This paper aims to establish this benchmark by providing a new, publicly available U.S. Monetary Policy Event-Study Database (USMPD) with changes in interest rates and asset prices around FOMC announcements, Chair press conferences, and Minutes releases. Using this new database, we document three new empirical findings. First, hawkish policy surprises significantly lower inflation compensation, with a peak effect for forward maturities of three to five years, suggesting significant expected lags of monetary transmission. Second, financial markets, including bond yields and risky asset prices, respond very strongly to news conveyed during the Fed Chair's press conference. Third, the response of risk assets—including stock prices, dividend futures, and exchange rates—to FOMC interest rate surprises remains substantial and consistent with the conventional transmission of monetary policy shocks.

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

*Acosta: University of Wisconsin–Madison. Ajello: Federal Reserve Board. Bauer: Federal Reserve Bank of San Francisco and CEPR. Loria: Federal Reserve Board and CEPR. Miranda-Agrippino: Federal Reserve Bank of New York and CEPR. Caroline Foshee, Andrew Loevinger and Gregory Simitian provided outstanding research assistance. We are grateful to conference participants at the 2025 ASSA Annual Meeting for their feedback and to Margaret Jacobson and Connor Brennan for helpful conversations on shared data sources and methodology. The views expressed here are those of the authors and do not necessarily reflect the views of others in the Federal Reserve System.

1 Introduction

High-frequency market movements around central bank's announcements can help identify effects of unexpected changes in the monetary policy stance on interest rates, asset prices and macroeconomic outcomes. These "monetary policy surprises" have been widely used in monetary economics and macro-finance to estimate the causal effects of monetary policy on financial markets (Kuttner, 2001; Gürkaynak, Sack and Swanson, 2005b; Bernanke and Kuttner, 2005; Swanson, 2021), on economic beliefs and forecasts (Campbell, Evans, Fisher and Justiniano, 2012; Nakamura and Steinsson, 2018; Bauer and Swanson, 2023b), and on the macroeconomy (Gertler and Karadi, 2015; Jarociński and Karadi, 2020; Miranda-Agrippino and Ricco, 2021; Bauer and Swanson, 2023a).

Despite the ubiquity of high-frequency monetary policy surprises in empirical research, no common public benchmark database has been established for communication events of the Federal Open Market Committee (FOMC). While public databases have been created by the European Central Bank (Altavilla, Brugnolini, Gürkaynak, Motto and Ragusa, 2019), the Bank of England (Braun, Miranda-Agrippino and Saha, 2025), and the Swedish Riksbank (Almerud, Krygier, Lundvall and Njie, 2024), up to now the only publicly available data sources for the Federal Reserve are the updated replication data that some authors make available for their published papers.[1]

The first goal of this paper is to establish a new, publicly available U.S. Monetary Policy Event-Study Database, the USMPD, with high-frequency asset price changes around major FOMC communication events. The USMPD incorporates best practices from the literature on monetary policy surprises (including Acosta, Brennan and Jacobson, 2024; Brennan, Jacobson, Matthes and Walker, 2024), includes a wide range of risk-free interest rates and risky asset prices, and is regularly updated using a transparent methodology. The events include not only the publication of FOMC statements, but also the Chair press conferences and the publication of the FOMC meeting minutes. With the exception of a few recent studies (Narain and Sangani, 2023; Cieslak, McMahon and Pang, 2024; Swanson and Jayawickrema, 2024), communication events beyond the statements have received little attention in the empirical literature, despite their importance for FOMC communication about monetary policy. 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 policy surprises.

Our new event-study database contains high-frequency asset price changes for three different types of events: First, FOMC announcements, that is, the public release of a policy statement after an FOMC meeting, including scheduled and unscheduled meetings. Second, Chair press conferences, which started in 2011 and since 2019 are held after every FOMC meeting. Third, the minutes of FOMC meetings, which have been published three weeks after the meeting since 2005. The USMPD thus classifies the three types of events into four sets of surprises: (i) FOMC statements, (ii) press conferences, (iii) monetary events (combined FOMC statement release and press conference), and (iv) minutes. For FOMC statements and the minutes, we calculate changes

[1] See here for Jarociński and Karadi (2020), here for Miranda-Agrippino and Ricco (2021), here for Bauer and Swanson (2023a), and here for Acosta, Brennan and Jacobson (2024).

over the usual tight event windows, spanning 30 minutes around the event. For the press conference, our event windows start ten minutes prior the beginning of the event and end one hour later. We also consider a "monetary event window" which includes both the FOMC statement and the press conference and is equal to the FOMC statement window and on days without a press conference. Each set of surprises includes intraday changes in money market futures rates (for Fed funds and Eurodollar/SOFR), Treasury and TIPS yields, as well as intraday returns on stock market indices and dollar exchange rates. The sample used for the analysis in this paper contains all these FOMC communication events from 1995 to 2024. The database will be updated at regular intervals.

Instead of calculating and providing different policy factors capturing surprises about the policy rate, forward guidance and QE, we leave it up to the user of the USMPD to calculate their own monetary policy surprise of choice from the provided high-frequency data. For the analysis of this paper, we follow the methodology of Nakamura and Steinsson (2018) and Bauer and Swanson (2023a) and take the first principal component of the changes in several money market futures rates, appropriately scaled, as the monetary policy surprise. For the FOMC statements and monetary event windows, this surprise loads positively on all included futures contracts, and thus captures surprises in both the current policy rate and forward guidance. For press conferences and minutes publication windows, the loadings are similar to a path factor (Gürkaynak, Sack and Swanson, 2005b), as these events contain new information only about the future policy path.

The second goal of this paper is to provide new evidence on the transmission of monetary policy to financial markets, enabled by the expanded coverage of FOMC communication events, the inclusion of a broader set of interest rates and asset prices, and the extended sample period relative to earlier empirical studies. We establish several novel empirical findings about the financial market response to news about U.S. monetary policy. Our first set of results pertains to the Treasury bond market. We document that monetary policy surprises have a statistically and economically significant negative effect on the term structure of inflation compensation, with a peak impact on forward inflation breakeven rates with 4-7 years maturity. This finding stands in contrast to earlier studies by Hanson and Stein (2015) and Nakamura and Steinsson (2018) that found no response of market-based inflation expectations to monetary policy. We show that these differences are mainly due to the use of a short sample with limited variation in inflation expectations in these earlier studies. Our results reconcile the financial market evidence with the well-established VAR evidence of disinflationary effects of monetary policy shocks (Gertler and Karadi, 2015; Miranda-Agrippino and Ricco, 2021; Bauer and Swanson, 2023a). In addition, they suggest that market participants expect significant lags in the transmission of monetary policy to inflation.

We extend the evidence on the Treasury market using surprises around the Chair's press conference, as well as FOMC surprises based on intraday windows that include both the release of the statement and the press conference. The results of event-study regressions that include information from press conferences show an excess sensitivity of long-term real forward rates that is even more pronounced than when considering only FOMC statements. That is, the FOMC excess sensitivity puzzle, documented by Hanson, Lucca and Wright (2021) and others, becomes stronger when the

communication events include Chair press conferences. In addition, extending the event windows in this way also yields an even stronger estimated negative impact on breakeven inflation rates.

Our analysis establishes further novel evidence about the transmission of monetary policy to financial markets using event studies of risky asset prices. The response of stock prices, exchange rates, and other risk-sensitive indicators is strongly significant, quantitatively meaningful, and consistent with positive elasticities of discount rates and risk premia to monetary policy surprises. These findings confirm that information effects or other "wrong-signed" confounding shocks, though potentially relevant for some FOMC announcements, do not outweigh the effects of monetary policy shocks in event-study regressions. Including Chair press conferences leads to larger and even more significant estimated effects, perhaps a surprising result given the broader range of topics usually discussed by the Chair.

In the context of the response of risk assets to FOMC surprises, earlier studies have documented some puzzling findings using data on dividend strips, which capture (risk-adjusted) expectations of future stock market dividends. Specifically, Golez and Matthies (2025) estimate a positive response of short-maturity dividend strip prices to monetary policy surprises; see also Gilchrist, Yang and Zhao (2024). As demonstrated by Boguth, Carlson, Fisher and Simutin (2022), option-implied prices for dividend strips are subject to serious measurement error issues, and the literature on the term structure of equity risk premia has generally moved towards the use of dividend futures data (e.g. van Binsbergen and Koijen, 2017). We present new results based on both dividend futures and dividend swaps, which show a significantly negative response of market-based dividend expectations to FOMC surprises. Our results are again consistent with the transmission of a conventional monetary policy shock, but in contrast with recent estimates based on dividend strips.

Overall, our paper makes both methodological and empirical contributions to the macro-finance literature. On the methodological side, we establish a new, expanded reference database of FOMC communication events, and create different monetary policy surprises, including new surprises that account for new information in press conferences. On the empirical side, we document new results for the effects of monetary policy on both Treasury markets and risky asset markets. Our results speak to significant open issues and current debates in the literature, including the excess sensitivity puzzle, the lags in the monetary transmission, the risk-taking channel of monetary policy, and central bank information effects. Our hope is that both our new database and our empirical results stimulate further research on these policy-relevant topics.

The paper is structured as follows: Section 2 introduces the USMPD and explains how we construct monetary policy surprises for different FOMC communication events. Section 3 presents results for the response of Treasury markets to monetary policy surprises. Section 4 turns to risk assets, including stocks, exchange rates, corporate bond spreads, and dividend derivatives. Section 5 concludes.

Related literature:

- Monetary policy event-study databases for other central banks: European Central Bank (Altavilla et al., 2019), the Bank of England (Braun et al., 2025), and the Swedish Riksbank (Almerud et al., 2024).
- Construction of monetary policy surprises: Acosta et al. (2024), Brennan et al. (2024).
- Financial market effects of U.S. monetary policy: Kuttner (2001); Gürkaynak et al. (2005b); Bernanke and Kuttner (2005); Gilchrist et al. (2015); Swanson (2021); Miranda-Agrippino and Nenova (2022); Bauer and Swanson (2023a).
  - Lack of breakeven inflation response: Hanson and Stein (2015), Nakamura and Steinsson (2018).
  - Excess sensitivity of long rates: Gürkaynak et al. (2005a), Hanson and Stein (2015), Hanson et al. (2021)
  - Occasional wrong-signed response of stocks and dollar: Jarociński and Karadi (2020); Gürkaynak et al. (2021).
  - Puzzling response of dividend strips: Golez and Matthies (2025); Gilchrist et al. (2024). Criticism of dividend strips by Boguth et al. (2022).
- Some recent work has looked beyond FOMC announcements, notably Swanson and Jayawickrema (2024) and Cieslak et al. (2024). Rosa (2013) analyzed the financial market effects of FOMC meeting minutes between 2005 and 2011.

2 The USMPD: A New Database for FOMC Surprises

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 any unscheduled Committee meetings.[2] The post-meeting *statement* describes the Committee's current view and expected path of the state of the economy and policy stance. At every other policy meeting, the statement is accompanied by the *Summary of Economic Projections* (*SEP*), which provides detailed summary statistics on the economic forecasts of FOMC participants. Following policy statements, the FOMC Chair holds a press conference. Finally, three weeks after each meeting, the FOMC *minutes* are released, which provide a longer summary of the discussion during the corresponding meeting. The exact release timing and content of each of these four communication types—the statement, SEP, press conference, and minutes—have changed several times since the mid 1990s.

The FOMC statement has long been the FOMC's primary, and most timely, mode of communication with the public. The first statement was released following the January 1994 meeting. Those early statements tended to be short, factual statements of any change in monetary policy, and were issued only when policy was changed. Starting with the May 1999 meeting, the FOMC began issuing a statement after each meeting. The exact content of the statements has changed considerably over the years—going from one short paragraph about the economic outlook in 1999 to the Committee's primary means of issuing forward guidance. 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 one of the most closely watched FOMC communication events, given its timely release—typically within a few hours after the conclusion of the policy meeting.

The Chair's post-meeting press-conference allows members of the financial press to question the Chair about the Committee's views. These press conferences have a consistent structure: They begin with opening remarks by the Chair, followed by a "question and answer" between the Chair and reporters. In contrast to the speeches given by the Chair and other FOMC participants, the Chair speaks on behalf of the Committee during the press conference. For that reason, we exclude speeches from our analysis, and refer interested readers to the work of Swanson and Jayawickrema (2024), who study FOMC members speeches. Chair Bernanke held the first press conference in April 2011. They were held roughly every other meeting until June 2012, at which point they were held at the March, June, September, and December meetings through 2018. Starting with the January 2019 meeting, Chair Powell began holding press conferences after every regularly scheduled (and some unscheduled) meeting(s).

Nearly since its inception in 1933, the FOMC has released summaries of its policy decisions

[2] Unscheduled meetings tend to take place following news of severe economic or financial stress.

and the rationale behind those decisions in a relatively timely manner.[3] Today, this information is contained in the FOMC minutes. Over time, the lag between each meeting and the release of the minutes has shortened. Until 2004, the minutes of a particular meeting were not released until after (at times, several months after) the subsequent FOMC meeting. Starting with the January 2004 meeting, the FOMC began to release the minutes about three weeks after each meeting. In our analysis, we study financial market responses to the minutes beginning with the January 2004 since, before then, the information contained in them was somewhat stale.

The last-closely watched FOMC communication, the SEP, has been released alongside different FOMC communications over time.[4] While the FOMC provided projections alongside its semi-annual reports to Congress, the scope and frequency of those projections expanded in November 2007. Between 2007 and the first press conference, the SEP was released quarterly alongside the minutes. Starting in April 2011, the SEP was released quarterly alongside the FOMC statement. The exact content of the SEP has also changed over time—one notable addition was the "dot plot," which displayed FOMC participants' policy rate assumptions.

2.2 High-Frequency Interest Rates & Asset Prices

The US Monetary Policy Event-Study Database (USMPD) collects high-frequency reactions of a variety of futures on interest rates and other asset prices around each of the FOMC communication events just discussed. In its current form, the dataset spans all the FOMC communication events—including unscheduled meetings—from February 1994 to December 2024. The USMPD is intended for public dissemination, and will be updated at regular intervals going forward. The dataset collects information from Federal Funds Futures, Eurodollar and SOFR Futures, Treasury and TIPS yields, the stock market, and the US dollar exchange rate.[5] Intraday data are sourced from LSEG Tick History.[6]

Federal funds futures and Eurodollar 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 at the end of each month, and are available for a number of consecutive months, with declining liquidity as the maturity increases. The USMPD includes the first six contracts, although the market for federal funds futures is considered to be liquid enough to measure expectations of rates up to roughly three months in the future (Gürkaynak, Sack and Swanson, 2005b). The price of a Fed funds futures contract is the arithmetic average of the effective Fed funds rates over the duration of the contract. Therefore, these futures give a sense of market participants' expectations around the average fed funds rate up to maturity. It follows that, as the maturity increases, these contracts combine expectations

[3] Acosta (2023) provides a detailed history of the FOMC minutes and transcripts.

[4] More details can be found at https://www.federalreserve.gov/monetarypolicy/timeline-summary-of-economic-projections.htm.

[5] We report a detailed summary of the content of the USMPD in Table A.1 in the Appendix.

[6] Formerly Refinitiv Tick History https://www.lseg.com/en/data-analytics/market-data/data-feeds/tick-history.

that pertain to multiple upcoming FOMC decision meetings. Moreover, if the upcoming FOMC meeting is scheduled towards the end of the month, the implied rate from the contract expiring in that month will be largely reflective of the Fed funds rate that had prevailed prior to the meeting, providing a distorted assessment on how market participants update their view following the FOMC decision. Gürkaynak, Sack and Swanson (2005b) show how to combine Fed funds futures at different maturities to isolate policy rate expectations related to particular FOMC meetings. We follow their lead and include in the USMPD also expectations around policy rates for the two upcoming FOMC meetings, as follows:

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

$$MP2_s = \begin{cases} \frac{D^{s'}}{D^{s'} - d^{s'}} \left[(ff^j_{s',t} - ff^j_{s',t-\Delta t}) - \frac{d^{s'}}{D^{s'}} MP1_s \right] & \text{if } D^{s'} - d^{s'} > 7 \\ ff^{j+1}_{s,t} - ff^{j+1}_{s,t-\Delta t} & \text{otherwise,} \end{cases} \tag{2}$$

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. In Eq. (1), $MP1$ denotes the surprise around the next FOMC meeting. This is equal to the change in the price of the front contract if the FOMC meeting is scheduled within the first three weeks of the month, and to the change in price of the second contract if the meeting falls in the last week of the month. Similarly, $MP2$ in Eq. (2) denotes the surprise in the second upcoming FOMC meeting. $MP2$ uses a combination of longer maturity futures depending on the month in which the second meeting falls, and subtracts the surprise component relative to the upcoming one ($MP1$).[7]

For market's expectations about interest rates at longer maturities, the literature has typically used Eurodollar futures, until the regulatory phasing out of LIBOR rates in 2021. Differently from fed funds futures, until active these quarterly contracts settled based on the 3-month LIBOR rate that prevailed at the expiry/maturity date, and provided a reliable gauge of interest rate expectations up to roughly 1.5 years in the future. Because they were based on a 3-month rate, Eurodollar futures incorporated market participants' expectations of the future path of interest rates in the three months after the settlement date. We include in the USMPD eight Eurodollar futures until the end of 2021. These are defined as the contracts expiring at the end of each of the next eight quarters relative to the FOMC event date.[8] The phasing out of LIBOR rates, and consequent halting of Eurodollar futures posed the question on how to measure longer term

[7] For a further rationalization refer to Brennan, Jacobson, Matthes and Walker (2024).

[8] For example, for a meeting scheduled in May, the first four Eurodollar futures have expiry date at the end of June, September and December of that same year, and at the end of March of the following one. Note that as the settlement date approaches, liquidity in the front contract becomes very thin. Previous studies had devised rules to switch to the next set of quarterly contracts in these cases (e.g. Nakamura and Steinsson, 2018). LSEG automatically retires the contract as the maturity approaches so that the adjustment is seamlessly incorporated in our case without an explicit rule being in place.

expectations from 2022 onwards. Acosta, Brennan and Jacobson (2024) suggested switching to futures on the Secured Overnight Financing Rate (SOFR).[9] SOFR and Eurodollar futures share some similarities, including their quarterly schedule and the reference rate being a 3-month one. However, the settlement structure differs, such that care must be used when aligning the two. In particular, SOFR futures settle based on the interest rate prevailing 3 months before the expiry date, such that in maturity space, the first Eurodollar futures contract corresponds to the second SOFR futures contract and so on. To retain consistency with the data collected up to 2021, we include in the USMPD eight SOFR futures, matching the maturity and expiry dates of the corresponding Eurodollar futures.

The USMPD further contains information from the 3 and 6-month T-Bill rates, Treasury yields at 2, 5, 10 and 30 year maturity, TIPS yields at 5, 10 and 30 year maturity, and 1 and 2 year OIS rates. Moreover, we include surprises in the stock market (S&P 500 index and S&P 500 E-mini futures) and the dollar exchange rate (dollar index, as well as bilateral exchange rates vis-à-vis the euro and the Japanese yen.

2.3 Event Windows

The typical assumption in the empirical literature that uses high-frequency monetary policy surprises is that a 30-minute window is sufficient to capture the relevant market reaction to the news contained in monetary policy decision announcements. As noted at the beginning of this section, FOMC policy decisions are typically released alongside brief statements, which the market is arguably able to digest fairly quickly.[10] We follow this convention in the USMPD, and define the "statement window" as a 30-minute interval that goes from 10 minutes before to 20 minutes after each FOMC decision announcement.

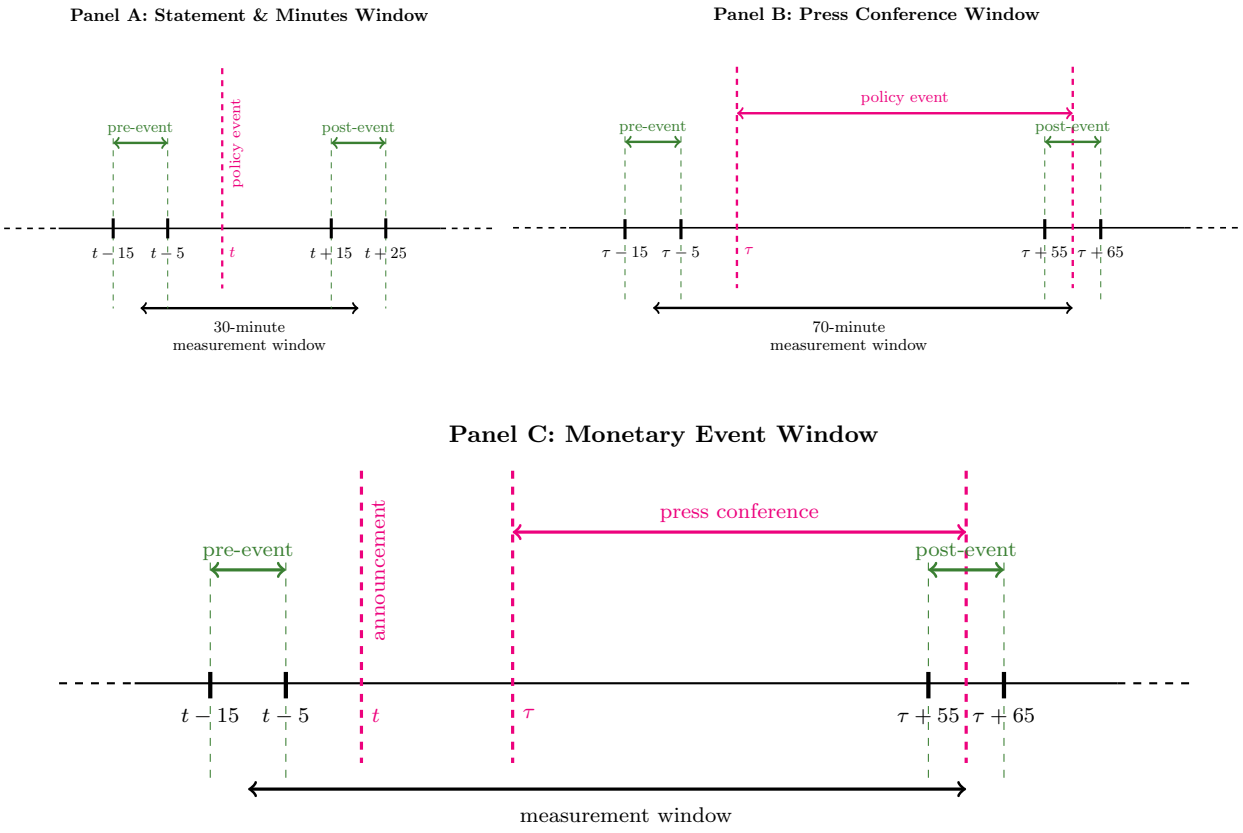
Conversely, there does not seem to be an agreement in the literature when it comes to define the appropriate length of event windows for the FOMC meeting minutes, and especially for the press conference. Studies on the information content of the FOMC minutes are limited. Rosa (2013) showed that market volatility increases substantially at the time of their release, and remained elevated for at least half hour thereafter, on average, and across different asset prices. Based on this evidence, in the USMPD we define the "minutes window" as a 30-minute interval that goes from 10 minutes before to 20 minutes after the release time of the minutes.

The press conferences that follow the FOMC announcements last around one hour. As noted earlier, their structure is fairly standardized, and includes opening remarks by the Chair followed by a Q&A session. 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

[9] 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. See Acosta et al. (2024).

[10] Gürkaynak et al. (2005b) for example show that results obtained using either 30 or 60 minute windows for FOMC announcements yields largely equivalent results.

Figure 1: Event Windows in the USMPD



Notes:

robust to considering shorter windows of either 60 or 90 minutes. For the ECB press conferences which are similarly 1-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 that goes from 15 minutes before to 10 minutes after the beginning of the press conference. Against this rather heterogeneous backdrop, to set the appropriate length of the FOMC press conference window we have experimented using windows of different length, ranging from 20 minutes to 2 hours after the beginning of the press conference. We have found that, on average, markets seem to stop updating as the press conference ends.[11] Based on this evidence, in the USMPD we define the "press conference window" as a 70-minute interval that goes from 10 minutes before the beginning of the press conference, until its end.

Finally, we include in the USMPD monetary policy surprises around what we call the "monetary event window". This encompasses both the announcement/statement and press conference when a press conference is scheduled, and is equal to the statement window otherwise.

Figure 1 summarizes the four different windows in the USMPD. In the figure, we use t to denote the time of the FOMC announcement and of the release of the minutes, whereas τ denotes the start

[11] See Appendix for additional details.

of the press conference. We retrieve the historical date-times for all the FOMC events in our sample by combining Bloomberg records with Fed archives.

With the exception of the S&P 500 and the exchange rates for which we use a percent change around each FOMC communication event, the monetary policy surprises for all other entries in the USMPD are calculated as the difference between the price (or implied yield) that prevailed before and after the event following the rules delineated above. 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. These correspond to the green intervals in Figure 1. In the vast majority of occurrences, and while liquidity in the markets for the contracts used in the USMPD is high, this procedure delivers well-defined price changes around the FOMC events. To account for days in which trading volumes is low, we let the algorithm for the computation of the policy surprises search over extended time windows, until three distinct consecutive prices are found either before or after the relevant event.[12] In practice, this exception is triggered only in a handful of cases, all concentrated during the ZLB spell and for very short maturity contracts. The resulting surprises are typically tiny, consistent with there being very little news around the fed funds rate over that period. Another important exception is the Sunday FOMC announcement made on the 15th of March 2020 at 5:00PM in response to the widespread disruptions initiated by the Covid pandemic. Being outside of market operating hours, this important announcement would not be picked up by our default search, resulting in a missing value. In this case, we have calculated the policy surprises using the prices prevailing at the close of the preceding Friday, and at the opening of futures markets at 6:00PM of that day.

In sum, the USMPD collates high-frequency surprises calculated around four different FOMC event windows for a variety of asset prices, including futures on interest rates, Treasury and TIPS yields, the stock market and the exchange rate. The sample runs from February 1994 to December 2024 and includes 266 FOMC announcements, 193 minutes releases, and 82 press conferences.

2.4 Measuring Monetary Policy Surprises using the USMPD

Empirical researchers have used different combinations of high-frequency monetary policy surprises to identify and estimate the effects of monetary policy on financial markets, expectations, and the macroeconomy more broadly. Examples abound. To name a few, Gürkaynak et al. (2005b) used information in short-term fed funds futures and Eurodollar futures to disentangle short and medium term monetary policy news in the form of a Target and Path factor. Swanson (2021) extended this approach to also estimate a QE factor, which was possible due to the use of high-frequency surprises in the 2, 5 and 10 year Treasury yields. Gertler and Karadi (2015) and Miranda-Agrippino and Ricco (2021) used variations of the fourth federal funds futures, while Jarociński and Karadi (2020) combined information in the fourth fed funds futures with that in the stock market to identify

[12] The extended search window goes from 24 hours before to 24 hours after the event.

monetary policy 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. The information included in the USMPD allows to replicate all the measures constructed in these and other studies, and to extend them to more recent samples.

In our analysis, we follow the approach in Nakamura and Steinsson (2018), and measure monetary policy news using the first principal component of five contracts that collectively span maturities from one month to about 1 year ahead. We expand on this study along two dimensions. First, by extending the sample until the end of 2024. Second, by constructing the policy news variable over all the four event windows in the USMPD. Specifically, for each event window, we measure policy news as:

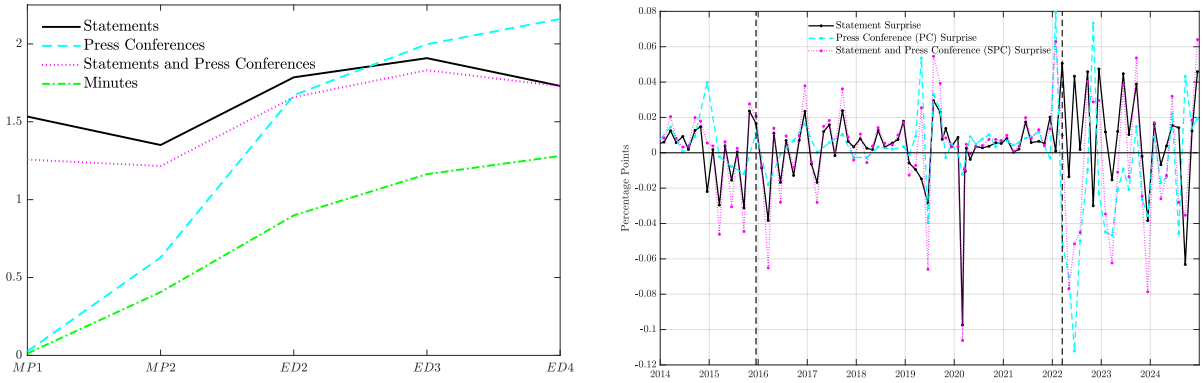
$$MPN_{t,j} = PC_1(MP1_{t,j}, MP2_{t,j}, ED2_{t,j}, ED3_{t,j}, ED4_{t,j}) \ , \tag{3}$$

where PC_1 denotes the first principal component, t is a time index that reflects the frequency of FOMC communication events, and $j = \{Statement,\ Minutes,\ PressConference,\ MonetaryEvent\}$ denotes the event. $MP1$ and $MP2$ are defined as in Eqs. (1-2), while $ED2$, $ED3$ and $ED4$ denote respectively the second, third and fourth Eurodollar futures until the end of 2021, and the third, fourth and fifth SOFR futures thereafter.

To translate the principal components into economically interpretable quantities, we rescale them such that their effect on the one-day change in the one-year nominal Treasury yield is 100 basis points, on average, over the full available sample for each communication event, and across all event windows. We include both scheduled and unscheduled FOMC announcements in all our analysis.

Figure 2 reports the scaled loadings of all the four monetary news measures on their underlying components (panel 2a) and the time series of the news extracted around statements, press conference and the combined monetary event windows from 2014 to 2024 (panel 2b). Policy news constructed around FOMC statements have fairly homogeneous loadings (solid line) across the maturity spectrum, confirming the intuition in Nakamura and Steinsson (2018) that this measure can be thought of as the average policy news up to a year ahead, thus combining elements of both short-term interest rates decisions and of shorter-term forward guidance. Conversely, the loadings of the news extracted from minutes (dash-dotted line) and press conferences (dashed line) increase monotonically as the maturity increases, and are essentially zero at very short maturities. It is worth emphasizing that the zero loadings on $MP1$ are not imposed a priori. Rather, they reveal that both these communication events convey very little (if any) information around the current policy decision, and are instead mostly informative about the medium term policy stance. Another way of thinking about this pattern of loadings is that it appears that markets extract all the relevant information about the current policy rate decision at the time of the announcement, and do not typically revise it thereafter. Conversely, both the minutes and the press conferences contain novel information about the future stance of policy relative to what can be inferred by market participants from the statement alone. Lastly, the figure reports the loadings of monetary policy

Figure 2: Monetary Policy News Across Event Windows



(a) Loadings

(b) Policy News

Panel (a) reports the scaled loadings of the principal components across different windows. In panel (b) monetary policy news measured around FOMC statements (solid black), press conferences (dashed turquoise) and monetary events (statements & press conferences, dotted pink). The vertical lines indicate the liftoff dates of December 16, 2015 and March 16, 2022.

news calculated around the monetary event window which encompasses both the statements and the press conferences (dotted line). The loadings are comparable to those of the statement news, although the coefficient on $MP1$ is smaller consistently with what noted above.

Figure 2b plots the evolutions of the monetary policy news extracted around statements (solid line), press conference (dashed line) and the joint monetary events (dotted line) from 2014 to 2024. There are a few patterns worth noting. First, until 2022, press conference news tends to be relatively small and mostly in line with what is disclosed in the associated FOMC statements. This holds true with the exception of two well-defined periods. The first one is the anticipation of the first lift-off in December 2014. At that meeting, the FOMC voted to keep the federal funds rate at its current level. However, both dissenting votes and the content of the press conference signaled that discussion around a possible lift-off had intensified, which resulted in the large positive (tightening) surprise in the press conference news measure. Similarly divergent messages were present in 2019. Second, since 2022 and the beginning of the latest tightening cycle, the volatility of policy news across events increases substantially relative to the earlier years. This is mostly driven by news about the medium run (as picked up by the SOFR futures). Third, between the 2022 liftoff and the middle of 2023, the large press conference news are very often in apparent contrast with that extracted from the statement alone. Indeed, the sequence of tightening statement news is accompanied by large easing news in the press conference. Conversely, since mid-2023, the news extracted from different FOMC communication events has become more homogeneous.

3 Treasury Yields and Breakeven Inflation

The focus of this section is the Treasury market, and specifically the response of nominal Treasury yields, TIPS yields, and breakeven inflation (BEI) rates to high-frequency monetary policy surprises from FOMC communication. Earlier research has studied this issue, going back to Kuttner (2001); we extend their work in several directions, including the analysis of communication events beyond FOMC statement releases and the extension of the sample to include the most recent monetary policy tightening cycles and the post-COVID inflationary episode.

We use data for nominal Treasury yields from Gürkaynak, Sack and Wright (2007), and for TIPS yields from Gürkaynak, Sack and Wright (2010), measured in percent.[13] BEI rates, also called inflation compensation rates, are differences of nominal and real (TIPS) yields, thus capturing market expectations of inflation over the maturity of the yields. All these yields are based on daily, smoothed zero-coupon curves, which flexibly capture the entire term structure of interest rates without being affected by idiosyncratic, instrument-specific variation and noise, including liquidity issue 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). 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. We start our analysis of TIPS yields in 2004, when this market had clearly left its infancy and provided realiable information about real interest rates. For the sake of comparability across asset classes, we also begin our event-study sample for nominal Treasury yields at that same time. While our high-frequency dataset also includes Treasury yields surprises, intraday data is available only for a limited set of maturities of nominal bonds, and not for TIPS. In addition, the lower liquidity in the TIPS market (Andreasen, Christensen and Riddell, 2021) raises the possibility that new information about monetary policy is not immediately incorporated in market prices, so longer daily event windows may be needed to fully capture the effects of monetary policy events on TIPS yields and BEI rates.

The regression samples used in our analysis of the Treasury market generally run from 2004 to 2024. Following Nakamura and Steinsson (2018), we exclude the peak crisis period from July 2008 to June 2009. The resulting sample includes 168 FOMC announcements (both scheduled and unscheduled), 80 of which were followed by a press conference. The minutes started being released three weeks after the meeting in 2005, so we start our sample for the minutes in that year, which yields 152 events.

Our analysis relies on event-study regressions of the form

$$\Delta y_t = \alpha + \beta\, s_t + \varepsilon, \tag{4}$$

where t are days with FOMC communication events. The regressor s_t is a high-frequency monetary policy surprise on day t. The dependent variable, $\Delta y_t = y_t - y_{t-1}$, is the daily change in a generic yield, that is, the change in a nominal, real, or BEI rate of a certain maturity. The yield data

[13] Updated yield data is available at https://www.federalreserve.gov/data/yield-curve-models.htm.

uses end-of-day bond prices, so 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. The parameter β quantifies the systematic effect of the monetary policy actions and communication captured by the surprise shock (FOMC announcement, press conferences, minutes) on y_t. Because the information in the surprise s_t is predetermined with respect to the financial market data on day t, this event-study regression provides causal estimates of the Treasury market effects of the Fed's monetary policy actions and communication (Bauer and Swanson, 2023a).

3.1 Effects of FOMC announcements on Treasury markets

We begin our analysis with the study of FOMC announcements, in order to connect with the long literature studying these types of high-frequency monetary policy surprises, going back to Gürkaynak, Sack and Swanson (2005b). As detailed in Section 2, we use essentially the same 30-minute event windows and surprise measure as Nakamura and Steinsson (2018)–that is, the first principal component of intraday changes of five money market futures rates covering a horizon out to about one year, scaled to have a one unit effect on the one-year yield over the full sample of monetary policy surprises.

Table 1 reports our baseline estimates of the impact of FOMC announcement surprises on nominal, real, and breakeven inflation rates. We include results for the two-year, five-year, and ten-year yields, and well as for 5-to-10-year forward rates. Again, our sample period is from 2004 to 2024, excluding the peak crisis period from July 2008 to June 2009. Here and elsewhere, we include both scheduled and unscheduled FOMC meetings.

Figure 3 plots the responses across the entire term structures of interest rates to scheduled FOMC announcements: 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. In the left three panels, we show the response of zero-coupon yields, and in the right three panels the response of (instantaneous) forward rates. The regressions use the exact same specification and data samples as in Table 1.

Consistent with earlier estimates, FOMC announcement surprises have a significant impact on both nominal and real yields. For nominal yields, yields with maturities of 2-3 years have the strongest sensitivity to these surprises, with a coefficient around 1.2. At longer maturities the sensitivity declines and becomes insignificant, at the five-percent level, for yields with maturities of seven years and more. The strong positive response of the TIPS yields is evidence of the "excess sensitivity puzzle" documented by Hanson and Stein (2015) and Nakamura and Steinsson (2018), even though in our sample long-term forward rates do not exhibit the significant positive response as in these earlier studies.[14]

The new and surprising evidence in Table 1 and Figure 3 is the negative impact of FOMC announcement surprises on market-based inflation expectations. Breakeven inflation rates with

[14] For interpreting the magnitudes of the coefficients, we note that they capture the response to a monetary policy surprise that increases the one-year yield by one percentage point over the full 1995-2024 sample.

Table 1: Response of Treasury market to FOMC announcement surprises

	2y yld	5y yld	10y yld	5-10y forw
(A) Nominal				
Coefficient	1.40	1.09	0.45	-0.19
SE	(0.32)	(0.33)	(0.26)	(0.22)
R^2	0.21	0.10	0.03	0.00
(B) Real				
Coefficient	1.58	1.33	0.78	0.23
SE	(0.39)	(0.36)	(0.26)	(0.20)
R^2	0.16	0.12	0.07	0.01
(C) Breakeven Inflation				
Coefficient	-0.17	-0.24	-0.32	-0.41
SE	(0.19)	(0.12)	(0.10)	(0.12)
R^2	0.01	0.02	0.05	0.05

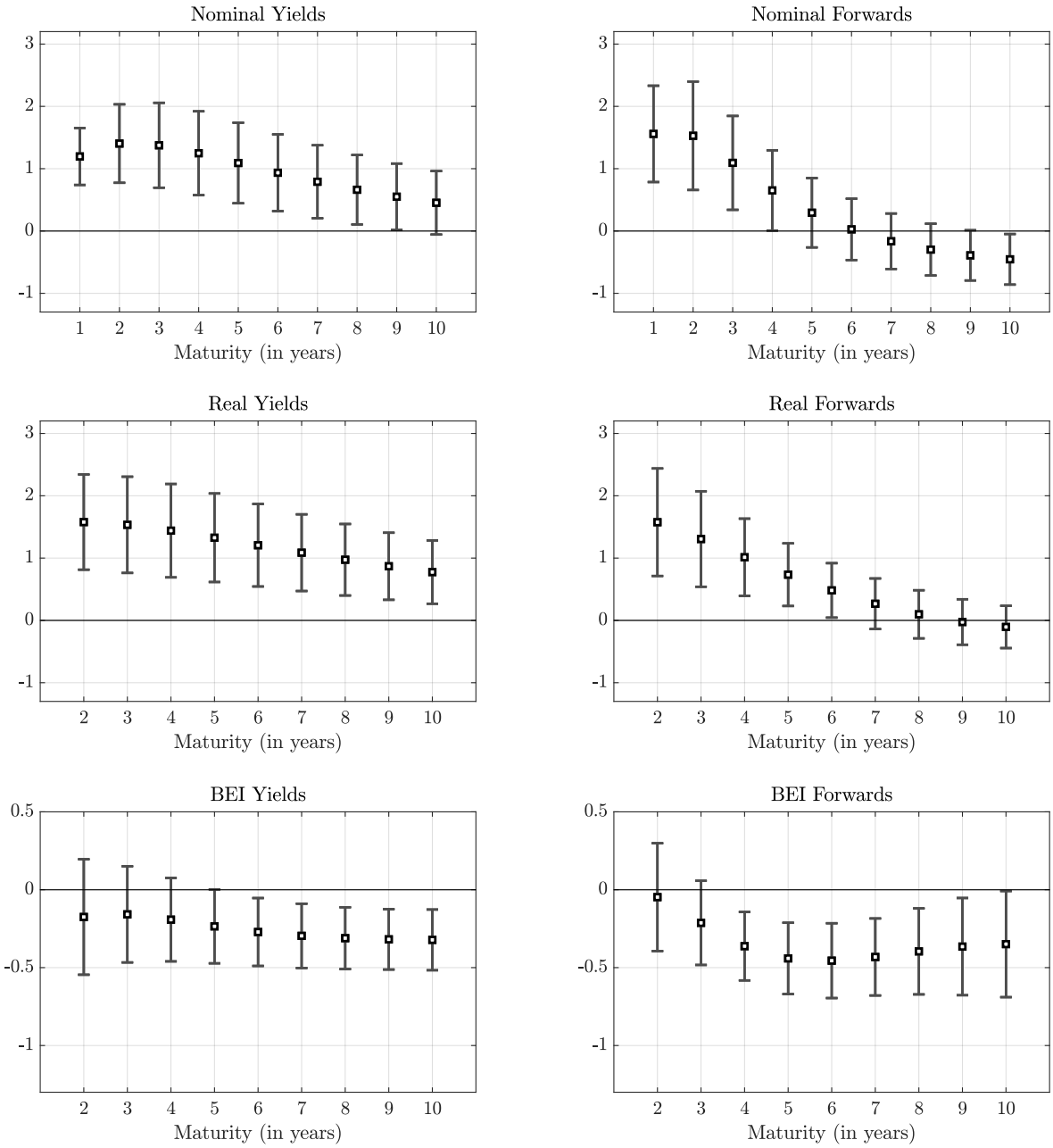
Event-study regressions of daily changes in Treasury rates around FOMC announcements on high-frequency announcement surprises, the scaled first principal component of 30-minute changes in near-term money market rates around the release of the FOMC statement. Response of nominal Treasury rates in panel (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: 168 FOMC announcements, including both scheduled and unscheduled FOMC meetings, and excluding the crisis period from July 2008 to June 2009. White standard errors are in parentheses.

maturity of five years and longer show a negative response that is significant at the five-percent level. Forward rates show a significant negative response that peaks at maturities of 5-6 years. The magnitude of the effects are meaningful, with a peak effect on forward rates around -0.5, meaning that a 100 basis point hawkish surprise leads to a roughly 50 basis point decline in inflation expectations for these horizons.

These disinflationary effects of monetary policy are qualitatively consistent with the evidence in the long-standing VAR literature that estimates the inflation effects of identified monetary policy shocks; see Gertler and Karadi (2015) and Bauer and Swanson (2023a) for recent examples. However, the horizon of the peak effect on market-based expectations is generally longer than the horizons at which inflation effects peak in monetary VARs, which tend to be closer to 1-2 years. One possible interpretation of our results in Figure 3 is that market participants expected long lags in the monetary transmission to inflation.

A caveat to this conclusion is that BEI rates reflect not only inflation expectations but also inflation risk premia and liquidity premia (Christensen, Lopez and Rudebusch, 2010; D'Amico, Kim and Wei, 2018; Andreasen, Christensen and Riddell, 2021). Although in principle these components can be estimated separately, in practice decompositions of interest rates into risk premia and expectations are highly uncertain and model-dependent (Kim and Orphanides, 2012; Bauer, 2018). Different estimated decompositions are available but differ widely. Treating any of these as data in downstream estimation would substantially understate the true statistical uncertainty. For these reasons we refrain from estimating the impact of monetary policy surprises on the expectations

Figure 3: Term structure of interest rate sensitivity to FOMC announcement surprises



Event-study regressions of daily changes in Treasury 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. 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: 168 FOMC announcements, including both scheduled and unscheduled FOMC meetings, and excluding the crisis period from July 2008 to June 2009. Error bars show 95% confidence intervals based on White standard errors.

component in BEI rates. Qualitative statements are possible based on the positive impact of monetary policy surprises on the magnitude of many risk premia in financial markets, according to

the risk-taking channel of monetary policy (Bauer, Bernanke and Milstein, 2023). Most estimates suggest that the response of inflation risk premia to monetary policy tightening shocks tend to be positive (Christensen, Lopez and Rudebusch, 2010; Abrahams, Adrian, Crump, Moench and Yu, 2016), meaning that an increase in their magnitude due to a hawkish policy surprise would *increase* the risk premium component of BEI rates. Given this potential upward bias due to inflation risk premia, the true response of inflation expectations to policy surprises could be even more negative than our estimated response coefficients. 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, which starts after the TIPS market had matured and excludes the financial crisis, the TIPS liquidity premia are empirically much less important and, according to some estimates, are of an order of magnitude smaller than inflation risk premia (Abrahams, Adrian, Crump, Moench and Yu, 2016).

Our findings stand in stark contrast with those of Hanson and Stein (2015) and Nakamura and Steinsson (2018) who found essentially no effects of monetary policy surprises on inflation compensation. These earlier results were puzzling, because Treasury market investors would be expected to price in the negative effects of monetary policy on future inflation, with market-based inflation expectations responding in a manner consistent with this channel. Our new evidence resolves this puzzle, which raises the question what accounts for the differences in results. While Hanson and Stein (2015) used a different surprise measure, namely the two-day change in the two-year nominal Treasury yield, our measure is essentially identical to that of Nakamura and Steinsson (2018). This implies that the differences have to come down to the different sample periods, as we confirm below.

Table 2: 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	0.39	0.09	-0.13	-0.36
SE	(0.16)	(0.12)	(0.14)	(0.20)
R^2	0.04	0.00	0.01	0.05
(B) Sample: April 2014 to December 2024, N = 90				
Coefficient	-0.71	-0.55	-0.50	-0.46
SE	(0.28)	(0.20)	(0.14)	(0.15)
R^2	0.08	0.11	0.11	0.06
(C) Sample: January 2004 to December 2019 (ex. GFC), N = 124				
Coefficient	-0.04	-0.20	-0.34	-0.49
SE	(0.24)	(0.15)	(0.15)	(0.17)
R^2	0.00	0.02	0.06	0.08

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 include both scheduled and unscheduled FOMC meetings, and exclude the great financial crisis (GFC) period from July 2008 to June 2009. White standard errors are in parentheses.

To investigate the robustness of the estimated breakeven inflation response and to reconcile them with earlier results in the literature, we estimate our event-study regressions for BEI rates over different subsamples. Table 2 reports estimates for the response of BEI rates, analogous to those in the bottom panel of Table 1, over three different sample periods. All three of these subsamples exclude the financial crisis, like our baseline sample.

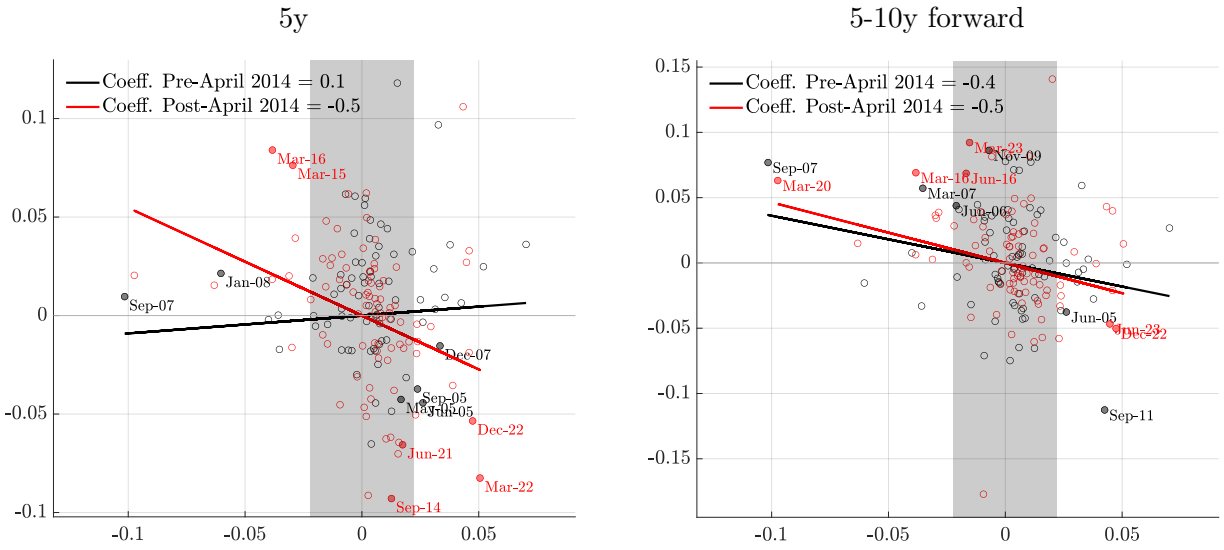
The first sample ends in March 2014, the same time that Nakamura and Steinsson (2018) end their sample. The estimated response of BEI rates to FOMC announcement surprises, shown in the top panel of Table 2, is either positive (for the two-year yield) or statistically insignificant (for the other rates). That is, when we use a sample period similar to the one used by Nakamura and Steinsson, we also do not find any effects of monetary policy surprises on long-term BEI rates, consistent with their results. While there are also small differences in the implementation details—for example, we use a newer vintage of TIPS fitted yields, and we estimate our principal component policy surprise over our full sample—that contribute to differences in the resulting estimates, the choice of sample period is the main explanation for the different headline findings on breakeven inflation rates between Nakamura and Steinsson's paper and our baseline estimates in Table 1.

For the period starting in April 2014, we estimate strongly and significantly negative responses of BEI rates to FOMC announcement surprises, as shown in panel (B) of Table 2. The sample for Panel (C) again starts in 2004, as our baseline sample, but ends in December 2019, before the onset of the COVID pandemic. We again estimate negative response coefficients, confirming that our results are not driven by influential observations during either the pandemic or the post-pandemic tightening episode.

To further analyze which episodes or even individual announcements drive our results, Figure 4 shows scatter plots of changes in the five-year BEI yield (left panel) and the 10-year BEI yield (right panel) against FOMC announcement surprises. Two different subperiods, corresponding to panels (A) and (B) in Table 2, are highlighted in the scatter plots: The red cloud of points corresponds to the sample from January 2004 to March 2014, whereas the black circles visualize the sample from April 2014 to December 2024. For each regression sample, the six most influential observations, as measured by the $DFBETA$ measure of influence, are highlighted as filled circles and labeled with the month of the FOMC announcement.

Figure 4 shows that the sensitivity of BEI rates became (more) negative over the later sample period mainly because of two important episodes. First, the "Yellen liftoff" episode in 2015–2016 included several dovish FOMC announcements that led to substantial upward revisions in market-based inflation expectations. The most prominent example is the FOMC announcement on March 16, 2016, in which the Committee signaled patience in light of the "current shortfall of inflation from 2 percent" and expectations for the policy rate path declined in response to the announcement. This led to a significant increase in breakeven inflation rates across the curve. A similar dovish surprise was the March 2015 FOMC announcement, which pushed out liftoff expectations and materially raised breakevens. The second important episode is the period since liftoff from the ZLB in March 2022, which included both hawkish and dovish surprises with significant negative impact on BEI

Figure 4: BEI 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 BEI yield (left panel) and the five-to-ten-year forward BEI rate (right panel). Red circles for 78 FOMC announcements from January 2004 to March 2014 (excluding the crisis period from July 2008 to June 2009); black circles for 90 FOMC announcements from April 2014 to December 2024. Both scheduled and unscheduled FOMC meetings are included. 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 2.

rates. The FOMC announcement on March 17, 2022, was a hawkish surprise due to both the size of the rate hike and the signaling for future rate hikes, and breakeven rates fell materially, at least for short maturities including the five-year yield. Dovish surprises included the announcements in March 2023 and September 2024, which raised breakeven rates. While it is difficult to pointpoint simple explanations for the increased sensitivity of BEI rates to FOMC surprises since 2015, the evidence suggests that FOMC announcement surprises around ZLB liftoff and during tightening cycles had especially pronounced effects on market-based inflation expectations.

3.2 Beyond FOMC announcements: press conferences and minutes

While empirical work on the financial market effects of the Fed's monetary policy has focused on the policy statements released after FOMC meetings, other communication events also convey information about future policy and move markets. In the following, we provide new estimates of the Treasury market effects of monetary policy surprises measured around the post-meeting press conference and around the release of the FOMC meeting minutes. We use the same type of event-study regressions as in equation 4, where the surprise s_t is now the scaled first principal component of changes in money market rates over three different event windows: (i) from five minutes before the start of the press conference to one hour after the start (PC surprise), (ii) from ten minutes before the release of the FOMC statement until one hour after the start of the press conference, if

there was one, or until 20 minutes after the statement release otherwise (SPC surprise, for statement and press conference surprise), and (iii) from ten minutes before the release of the minutes to 20 minutes afterwards (MIN surprise).

Table 3: Response of Treasury market to different monetary policy surprises

	5y yld				5-10y forw			
	NS	PC	SPC	M	NS	PC	SPC	M
				(A) Nominal				
Coefficient	1.09	1.63	1.44	0.91	-0.19	0.43	0.05	0.33
SE	(0.33)	(0.31)	(0.24)	(0.26)	(0.22)	(0.18)	(0.16)	(0.28)
R^2	0.10	0.32	0.28	0.09	0.00	0.04	0.00	0.01
N	167	80	167	142	167	80	167	142
				(B) Real				
Coefficient	1.33	2.04	1.76	1.04	0.23	0.62	0.41	0.46
SE	(0.36)	(0.39)	(0.26)	(0.23)	(0.20)	(0.22)	(0.15)	(0.27)
R^2	0.12	0.32	0.34	0.14	0.01	0.08	0.03	0.03
N	167	80	167	142	167	80	167	142
				(C) Inflation				
Coefficient	-0.24	-0.41	-0.32	-0.13	-0.41	-0.20	-0.36	-0.15
SE	(0.12)	(0.17)	(0.10)	(0.13)	(0.12)	(0.18)	(0.11)	(0.18)
R^2	0.02	0.08	0.07	0.01	0.05	0.02	0.07	0.00
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. SPC: changes around 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 SPC surprises, 168 FOMC announcements from January 2004 to December 2024; for PC surprises, 80 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.

Table 3 reports the estimation results for these three additional monetary policy surprises, including the statement surprises for reference. Policy surprises around press conferences cause substantial responses of nominal, real, and BEI rates, with a response that tends to be quite a bit larger in magnitude than for the FOMC announcement surprise. For 5-to-10-year forward rates, we estimate a significantly positive response to PC surprises, in contrast to our results for statement surprises. In other words, the evidence for excess sensitivity of long-term rates to monetary policy surprises becomes materially stronger when considering press-conference surprises. The negative response of the 5-year BEI rate is almost twice as large in magnitude as the response to statement surprises, and the R^2 quadruples. The only dependent variable that responds less to the PC surprise than to the statement surprise is the BEI forward rate, indicating a shift of the impact of monetary policy communication on inflation expectations towards shorter maturities.

The estimates based on the SPC surprises, which include information from statements and press

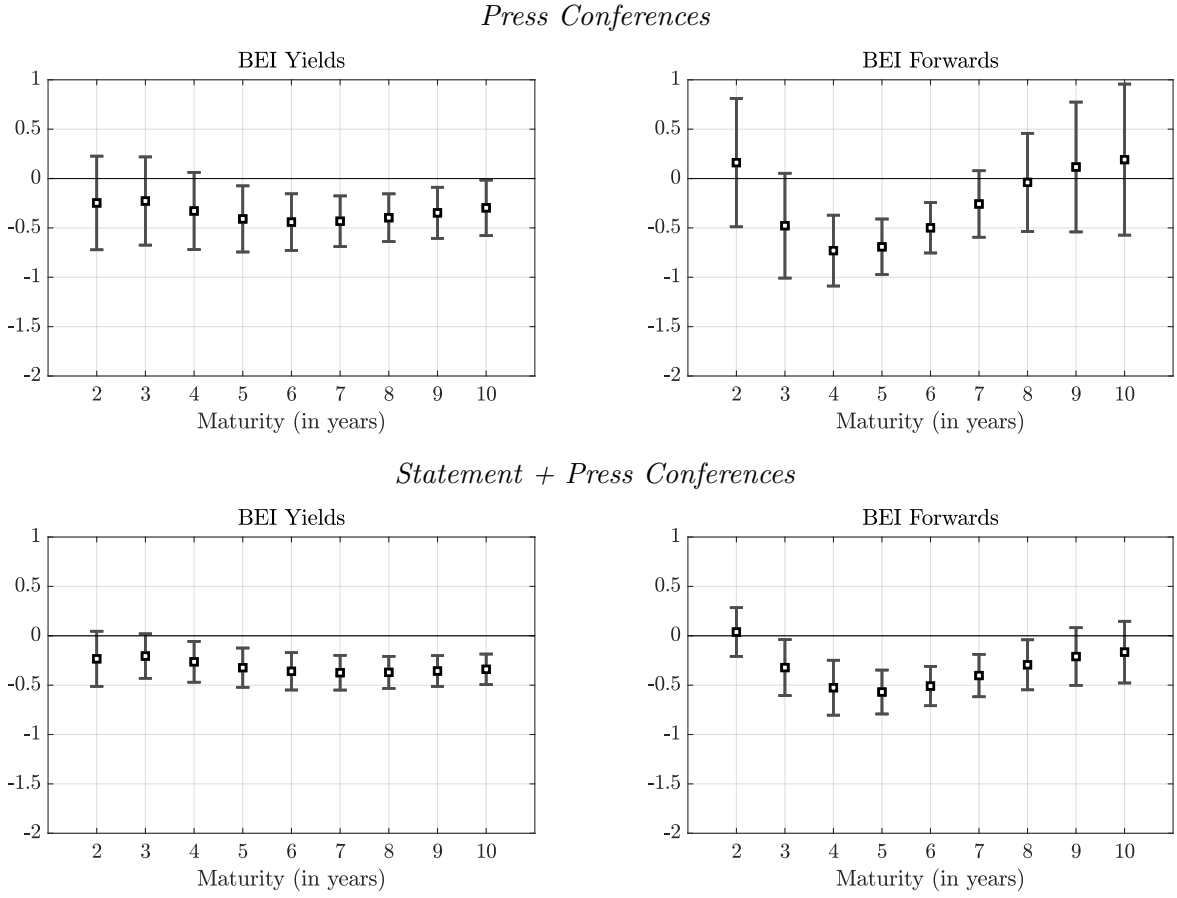
conferences when available, provide evidence of the combined impact of these FOMC communications on Treasury markets. In most cases, the estimated coefficients are large in magnitude as well and close to the estimates for the press-conference surprise. We find strong excess sensitivity for the long-term real forward rate to the SPC surprise. Crucially, market-based inflation expectations decline significantly according to both the BEI yield and forward rate. The 5-to-10-year nominal forward rate is the only case where the estimated response to the SPC surprise is weak. Aside from this exception, the regression R^2 for the regressions with SPC surprises is higher than for either regressions with STMT or PC surprises. The strong statistical relationship of the SPC surprises with changes in the Treasury market is a strong argument in favor of using these surprises to gain a fuller picture of financial market effects of FOMC communication.

Information about monetary policy released in the minutes of FOMC meetings also has a significant impact on the Treasury market, as evidenced by the estimates in the columns labeled MIN in Table 3. The response of 5-year nominal and real yields to minutes surprises is about as strong as the response to statement. The long-term real forward rate exhibits a marginally significant response. On the other hand, there is no significant response of BEI rates to the minutes surprise.

Given our focus on market-based inflation expectations, we now turn to term structure estimates of BEI rate sensitivity. The panels in Figure 5 are comparable to the bottom panels of Figure 3 as they show the response of the BEI yield curve and BEI forward curve to monetary policy surprises. The difference is that we now report estimates to the surprises including information from the press conference, that is, the PC and SPC surprises. The top left panel of Figure 5 shows that monetary surprises in press conferences negatively affect all BEI yields, with a response that is statistically significant at the five-percent level for maturities from 5 to 10 years. The response of the forward curve, shown in the top right panel, clearly shows the horizons at which market-based inflation expectations respond most strongly. Forward rates at maturities from 4 to 6 years exhibit a strong and highly significant response, with the peak effect at the 4-year horizon. These estimates confirm our finding from FOMC statements that the strongest impact of policy surprises on BEI forwards comes after a lag of several years. Finally, the estimated responses to SPC surprises, shown in the bottom panels of Figure 5, provide strong evidence of the negative impact of policy surprises on BEI yields, with a peak impact at a forward-rate horizon of 4-5 years.

In sum, we document several novel results for the Treasury market effects of FOMC surprises. In contrast to earlier results in the literature, we estimate significant negative effects on breakeven inflation, consistent with disinflationary effects of monetary policy shocks. The peak impact on forward rates at 4-5 years suggests significant expected lags of the monetary transmission to inflation. Finally, information from other FOMC communication events, including the post-meeting press conference and the release of the minutes, has a substantial impact on Treasury markets, strengthening the evidence on excess-sensitivity of long-term interest rates and the negative inflation effects of surprise changes in policy.

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 80 observations from April 2011 to December 2024. Bottom panel shows results for the statement-and-press-conference (SPC) surprise, including all FOMC statements as well as press conferences when available, with 168 observations from January 2004 to December 2024. 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.

4 Risk Assets

Monetary policy is known to materially affect the prices of risky assets, including stocks, exchange rates, and corporate bond spreads.[15] The effects result from three different channels: First, monetary policy changes the risk-free rates at which expected future cash flows are discounted, meaning that the effects documented in Section 3 are relevant for risk assets as well. Second, policy affects the cash flows and other fundamentals underlying these assets, such as dividend expectations and corporate defaults. Third, monetary policy causes changes in the risk premia that investors demand for bearing the risks about these fundamentals, according to the risk-taking channel of monetary policy (Bauer, Bernanke and Milstein, 2023). As an example, tighter policy would raise risk-free discount rates, lower cash flow and 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, and ultimately a slowing of consumption, investment, and inflation.[16] While monetary policy announcement surprises should capture these effects, they may also reflect central bank information effects that would push in the opposite direction (Jarociński and Karadi, 2020; Miranda-Agrippino and Ricco, 2021). For example, a hawkish policy surprise may in part reflect a more benign economic outlook by the central bank, which may cause investors to shift upward their cash flow expectations and risk appetite, and could actually raise risky asset prices.

4.1 Stocks, dollar, and other risk indicators

In the following analysis, we will provide some new evidence on these different channels based on a broad set of risk assets and indicators. We now consider all our FOMC communication events from January 1995 to December 2024, excluding the peak crisis period from July 2008 to June 2009.

We use a range of risk assets and indicators that cover important asset markets, including stocks, exchange rates, and corporate bonds: daily returns of the S&P 500 index (in percent), daily changes in the VIX (in index points), two-day returns in the broad nominal U.S. dollar index (in percent), two-day changes in market-based monetary policy uncertainty from Bauer, Lakdawala and Mueller (2022), two-day changes in investor risk appetite as measured by the index of Bauer, Bernanke and Milstein (2023), and two-day changes in the spread of the effective yield of the Bank of America BBB corporate bond index over the ten-year Treasury yield (in basis points).[17] We use two-day changes/returns for risk indicators that are based on options, exchange rates, or corporate bond data, in order to account for possible lags in their response arising from market liquidity and trading hours.

Table 4 shows estimates from event-study regressions of these risk indicators on our four different series of monetary policy surprises. Around FOMC announcements, we find a strong and

[15] See, for example, the seminal work by Bernanke and Kuttner (2005).

[16] Recent research by Nagel and Xu (2024) suggests that the risk-free rate channel alone may be sufficient to explain the stock price reaction to monetary policy surprises.

[17] The monetary policy uncertainty series ends in May 2024; the risk appetite measure ends in May 2022.

Table 4: Response of risk assets to monetary policy surprises

	S&P500	VIX	Dollar	MPU	Risk Appetite	BBB Spread
(A) FOMC Statements						
Coefficient	-8.2	10.5	4.0	20.2	-10.2	72.2
SE	(3.8)	(5.0)	(1.0)	(11.7)	(3.7)	(24.7)
R^2	0.04	0.03	0.06	0.03	0.04	0.05
N	244	242	242	239	223	228
(B) Press Conferences						
Coefficient	-15.3	21.4	9.7	48.0	-10.1	154.5
SE	(4.6)	(7.1)	(2.1)	(24.0)	(11.5)	(48.8)
R^2	0.12	0.05	0.17	0.12	0.01	0.20
N	80	80	79	75	59	80
(C) Statements and Press Conferences						
Coefficient	-9.5	12.2	5.1	23.9	-9.4	91.1
SE	(3.2)	(4.7)	(1.1)	(10.7)	(3.0)	(26.3)
R^2	0.07	0.05	0.12	0.05	0.04	0.11
N	244	242	242	239	223	228
(D) Minutes						
Coefficient	-3.7	1.7	5.9	-1.3	3.5	73.0
SE	(3.8)	(4.6)	(2.0)	(13.5)	(4.7)	(28.2)
R^2	0.01	0.00	0.05	0.00	0.00	0.03
N	152	144	151	148	132	152

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; one-day change in VIX; two-day return in broad dollar index; two-day change in market-based monetary policy uncertainty (MPU); two-day change in risk appetite index; two-day change in BBB corporate bond spread. Sample: all scheduled and unscheduled FOMC meetings from February 1995 to December 2024, excluding meetings between July 2008 and June 2009, 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.

generally statistically significant response of all risk indicators. Stock prices and risk appetite respond negatively to policy surprises, while VIX, dollar, monetary-policy uncertainty and the BBB spread respond positively. These results are qualitatively consistent with earlier findings in the literature, including Gürkaynak, Sack and Swanson (2005b); Bernanke and Kuttner (2005); Gilchrist, López-Salido and Zakrajšek (2015); Bauer, Bernanke and Milstein (2023). The economic magnitudes and statistical significance of our estimates tend to be somewhat stronger, likely because of our expanded sample period that includes the post-pandemic episode. The results are generally consistent with a positive response of risk premia and uncertainty to policy surprises, although the stock market response may also arise simply due to changes in risk-free discount rates (Nagel and Xu, 2024).

Around press conferences, the estimated responses are generally stronger than around FOMC

statements, with larger coefficients and R^2 that double (the only exception being the response of the risk appetite index). As a result of this pattern, the response to the "monetary event" surprises, covering both FOMC statements and press conferences, also tend to be quite a bit stronger than for the FOMC statement surprises. For estimating the response of risk assets, as for estimating the response of the Treasury market, it seems advisable to include the information from the post-meeting press conferences in the measurement of the monetary policy surprise.

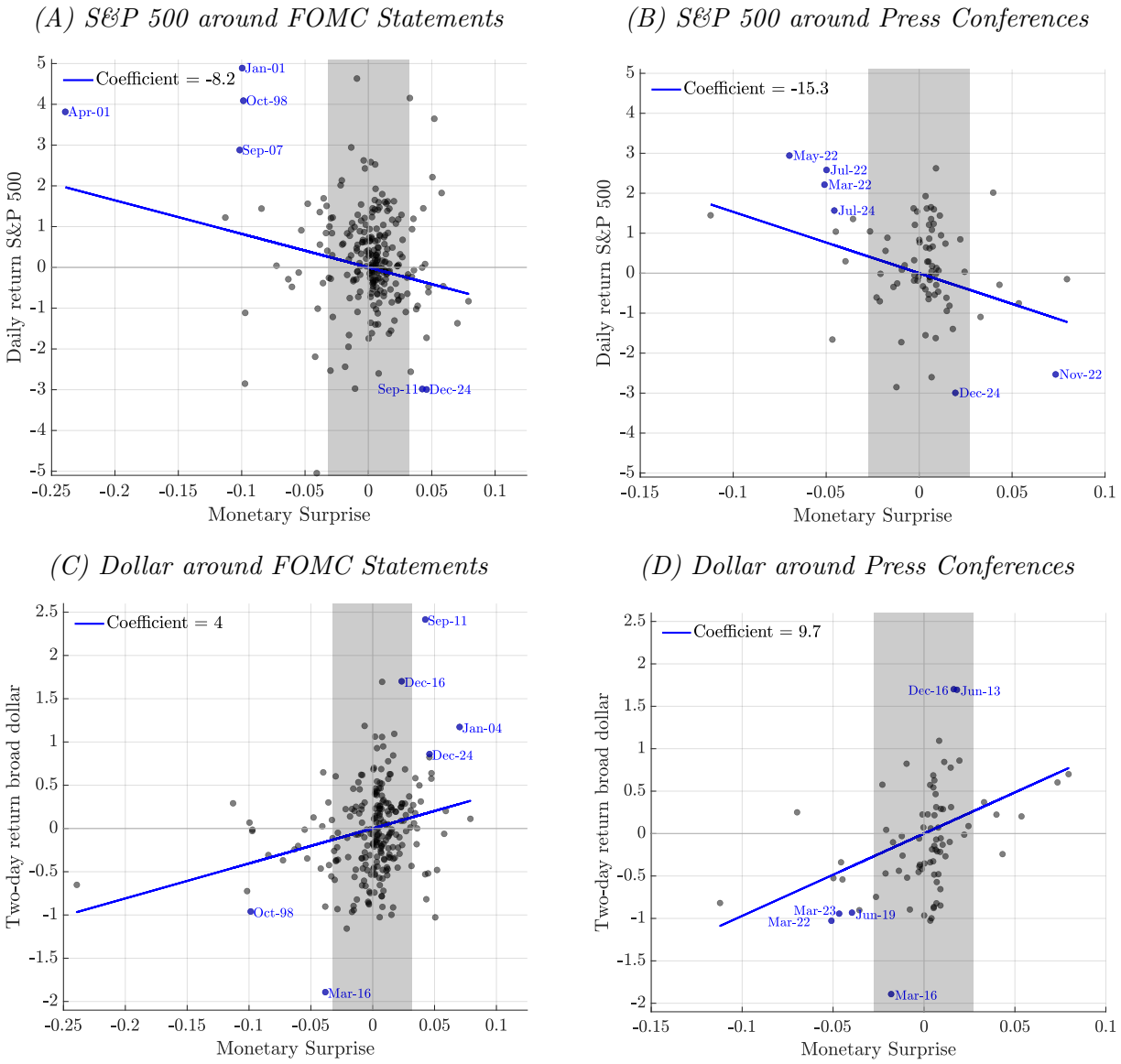
Around the release of the minutes of FOMC meetings, we find little systematic reaction of risk indicators to policy surprises. There are two exceptions, however: The dollar and the BBB corporate bond spread show a significant positive response to FOMC minutes surprises.

To help us better understand the effects of FOMC surprises on the stock market and the dollar, we visualize the data with scatterplots. Figure 6 plots the daily S&P 500 returns against monetary policy surprises in the top panels, and the two-day broad dollar returns in the bottom panels. In each case, the left panel shows surprises around FOMC announcements, corresponding to the estimates in panel (A) of Table 4, and the right panel shows surprises around post-meeting press conferences, as in panel (B) of Table 4. Figure 6 includes the estimated regression lines in each sample, and also highlights the six most influential observations according to the $DFBETA$ influence statistic, that is, those observations that are most responsible for the negative slope in the stock market regressions, and the positive slope in the dollar regressions.

Figure 6 shows that the significant effects of monetary policy surprises on stock prices and the dollar are not driven by a small number of highly influential observations, but by surprises around FOMC meetings across different episodes and phases of the monetary policy cycle.

It is also evident that a significant number of FOMC surprises led to a response in the stock market or dollar that had the opposite sign than would be expected based on conventional effects of monetary policy. As emphasized by Jarociński and Karadi (2020), while stock returns are negatively correlated with FOMC announcement surprises, it is often the case that dovish surprises coincide with negative returns and hawkish surprises with positive returns, as evident from the observations in the lower left and upper right quadrant in panel (A) of Figure 6. To assess the quantitative importance and investigate individual occurrences of such "wrong-signed" responses, it is helpful to focus on FOMC announcements that meaningfully surprised markets, i.e. those with a high-frequency surprise outside the gray-shaded area covering one standard deviation above and below zero. While there are indeed a fair number of FOMC announcements with a wrong-signed stock market response to these larger surprises, this is not the case for post-meeting press conferences. Indeed, there are only two press conferences which led to surprises larger than one standard deviation in magnitude and led to an unconventional response of the stock market. Regarding the dollar's response to monetary policy, Gürkaynak et al. (2021) have shown that it often has the opposite sign than conventional theory would predict, and in panel (C) we indeed find that even a fair number of the larger FOMC announcement surprises lead to a "wrong-signed" dollar response (upper left and lower right quadrants). But again, around press conferences there are only two material surprises, out of 80, that lead to a response that has a puzzling sign.

Figure 6: Risk assets and monetary policy surprises



Returns in risk assets on days with FOMC announcements and monetary policy surprise. Top panels show daily S&P 500 returns on vertical axis, bottom panels show two-day returns on broad nominal dollar index. Left panels show FOMC statement surprises for all scheduled and unscheduled FOMC meetings from 1995 to 2024, excluding peak-crisis episode from July 2008 to June 2009 (244 observations). Right panels show press conference surprises for all post-meeting press conferences from 2011 to 2024 (80 observations). 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 4. Gray-shaded areas correspond to one standard deviation, above and below zero, for the monetary policy surprise.

Jarociński and Karadi (2020) interpreted wrong-signed stock market responses as evidence for central bank information effects, and Gürkaynak et al. (2021) drew similar conclusions from the occasional wrong-signed response of exchange rates. Figure 6 shows that around FOMC press conferences, aside from observations with very small surprises on the order of 1-2 basis points, the

U.S. stock market and the dollar rarely ever move in the "wrong" direction. One interpretation of this result is that there is little evidence for information effects from the financial market response to press conferences by the Fed Chair.

4.2 Evidence from dividend futures and swaps

Derivatives based on dividends are a particularly interesting asset class in the context of our analysis. Dividend strips, swaps, and futures are all derivatives tied to future dividend payments, most commonly on a stock market index such as the S&P 500. These can provide evidence about the reaction of market-based dividend expectations to changes in monetary policy, with the possibility for new insights about the channels of monetary transmission.

Some recent work has documented puzzling responses of market-based dividend expectations to monetary policy. In particular, Golez and Matthies (2025) estimate that prices of dividend strips respond positively to FOMC surprises. Similar evidence was recently documented by Gilchrist, Yang and Zhao (2024). But the conventional effects of a monetary policy shock would lead to a negative response of dividend expectations, given that tighter policy slows future growth in earnings and dividends. Some concerns have recently been raised about the use of dividend strips, which are constructed from option prices in a way that can amplify measurement errors (Boguth et al., 2022). As a result, we instead use dividend futures and swaps to revisit this puzzling issue.

Dividend futures are exchange-traded contracts with payoffs tied directly to dividends. Because of their advantages, the literature on the term structure of equity risk premia has generally moved towards the use of dividend futures data (e.g. van Binsbergen and Koijen, 2017). They are also a natural candidate for event studies of monetary policy announcements. One problem is that they have only been trading on futures exchanges since 2015, and with only eight FOMC meetings per year such event studies have until recently been impractical due to small sample sizes. But given that we now have about ten years of price data for these derivatives, and because of the statistical power from including additional FOMC communication events, event-study analysis with dividend futures is starting to become a promising avenue for investigating the effects of the FOMC's policy decisions on market-based growth expectations.

We obtain data on dividend futures from Bloomberg, and 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. Dividend futures have annual expirations in the middle of December, and we construct constant-maturity data by linearly interpolating the returns of the future contracts. Our method of interpolation is similar to that of van Binsbergen and Koijen (2017).[18]

Table 5 reports the estimation results for event-study regressions of implied dividend futures returns for horizons of one to five years on FOMC surprises. The estimated response is generally negative around FOMC statements and press conferences. The R^2 are low, but there are several

[18] For example, if t is the current trading day, F_{1t} is the return on the current-year contract with last trading day T in the middle 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 $w\,F_{1t} + (1-w)\,F_{2t}$.

Table 5: Response of dividend futures to monetary policy surprises

	1y	2y	3y	4y	5y
(A) FOMC Statements, $N = 77$					
Coefficient	3.2	0.7	-7.2	-9.6	-9.5
SE	(2.8)	(3.5)	(4.9)	(5.5)	(6.0)
R^2	0.00	0.00	0.01	0.01	0.01
(B) Press Conferences, $N = 61$					
Coefficient	-3.2	-5.7	-4.7	-3.8	-0.3
SE	(1.5)	(2.2)	(2.1)	(2.3)	(4.1)
R^2	0.03	0.05	0.03	0.02	0.00
(C) Statements and Press Conferences, $N = 77$					
Coefficient	-1.1	-3.5	-6.4	-6.6	-4.4
SE	(1.2)	(1.6)	(2.4)	(2.9)	(4.2)
R^2	0.00	0.02	0.01	0.01	0.01
(D) Minutes, $N = 73$					
Coefficient	3.4	3.1	0.4	2.3	9.7
SE	(5.5)	(6.1)	(5.5)	(5.7)	(13.9)
R^2	0.00	0.00	0.00	0.00	0.01

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. The sample starts with the FOMC announcement on December 16, 2015, for panels (A)–(C), and with the minutes release on November 18, 2015, for panel (D). White standard errors in parentheses.

coefficients that are statistically significant at conventional levels. In particular, the estimated responses to press conference surprises in panel (B) are significantly negative at the five-percent level for horizons of 1-3 years, and similarly for the responses to surprises including statements and press conferences in panel (C) for horizons of 2-4 years. Around FOMC statements, the responses at horizons of 3-5 years are negative with t-statistics around 1.5. We find no significantly positive responses as in earlier work using dividend strips. Overall, these estimates are consistent with a negative response of dividend expectations to monetary policy surprises.

Some researchers, including van Binsbergen and Koijen (2017) and Nagel and Xu (2024), have used proprietary data for dividend derivatives for the period preceding the arrival of dividend futures on public exchanges.[19] We obtained daily data for dividend swaps from Goldman Sachs that extends back to 2004. A disadvantage of this type of data is the reduced transparency about these markets, as no information on volumes, bid/ask spreads, etc., is available. But the substantially expanded sample period is an important advantage for our purpose, as it more than doubles the number of FOMC announcements we can include in our event-study regressions. These swaps have expiration dates at the end of calendar years, and we use a similar method of interpolation to

[19]The terms "dividend futures" and "dividend swaps" have typically been 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.

constant maturities. We again consider two-day log returns for consistency with our results on dividend futures.

Table 6: Response of dividend swaps to monetary policy surprises

	1y	2y	3y	4y	5y
(A) FOMC Statements, $N = 160$					
Coefficient	3.09	-0.69	-4.85	-3.55	-3.91
SE	(2.11)	(2.33)	(2.78)	(2.77)	(3.90)
R^2	0.01	0.00	0.01	0.01	0.01
(B) Press Conferences, $N = 79$					
Coefficient	-2.77	-3.96	-4.87	-3.84	-5.3
SE	(1.40)	(2.66)	(2.95)	(3.38)	(4.63)
R^2	0.02	0.03	0.03	0.02	0.03
(C) Statements and Press Conferences, $N = 160$					
Coefficient	1.04	-2.23	-5.4	-3.95	-4.87
SE	(1.56)	(1.61)	(1.89)	(2.00)	(2.90)
R^2	0.00	0.01	0.01	0.01	0.01
(D) Minutes, $N = 152$					
Coefficient	26.09	-7.51	0.69	-2.25	-7.84
SE	(14.28)	(10.10)	(5.30)	(4.42)	(5.00)
R^2	0.07	0.01	0.00	0.00	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. The sample includes all FOMC announcements from 2005 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.

Table 6 shows the estimation results for dividend swaps. Again, as in the case of dividend futures, most response coefficients are estimated to be negative, and the few positive estimates are far from being statistically significant. The strongest evidence for a negative response of market-based dividend expectations comes again from the surprises that include both the FOMC statements and press conferences, where the coefficients for horizons of 3-4 years are largest in magnitude and significantly negative.

Given the availability of an entire term structure of dividend derivatives, one could also try to draw conclusions about the expected lags in the monetary transmission to corporate earnings and dividends. We generally find the largest negative effects at horizons of 3-4 years. The picture is less clear than for the transmission to expected inflation in Figures 3 and 5, given the lower precision in the estimates and some differences in the patterns for different types of announcements. Nevertheless, the evidence on expected lags is broadly consistent for estimates from Treasury and dividend derivative markets, and it suggests that market participants expect significant lags in the transmission of monetary policy to inflation and economic activity.

In sum, our new evidence from dividend futures and swaps shows no sign of any positive

response of market-based dividend expectations to monetary policy surprises that would suggest an interpretation based on Fed information effects. Instead, we generally find negative effects on future dividends, consistent with conventional effects of monetary policy shocks. The stark differences between our results and the estimates based on dividend strips in Golez and Matthies (2025) and Gilchrist et al. (2024) raises new questions about the consistency of estimates from dividend strips and dividend futures. Given that a satisfactory reconciliation of these differences is beyond the scope of this paper, we can only speculate that they arise, at least in part, from measurement errors in dividend strips. This is an important topic for future research.

5 Conclusion

This paper introduces a new database of high-frequency monetary policy surprises, the USMPD. Different from other available sources, it includes data on a broader set of FOMC communication events and a wider range of risk-free and risky asset prices. The database will be available to the public, and we plan to maintain and regularly update it using a consistent and transparent methodology. Our hope is that the availability of this extensive, reliable data source of U.S. monetary policy announcements will further stimulate empirical research in monetary economics.

In the empirical applications of the paper, we document several novel empirical findings. First, in contrast to earlier results in the literature, our estimates show a significantly negative response of market-based inflation expectations to monetary policy surprises. These estimates reconcile the event-study evidence around FOMC communication events with the empirical consensus from the VAR literature, which inludes significant negative effects of monetary policy shocks on inflation. Second, we document that Treasury and risky asset markets respond very strongly to new information conveyed in the post-meeting press conference by the Fed Chair. We therefore propose that researchers use, as a baseline summary of monetary policy surprises, a measure based on intradaily windows that include both the FOMC announcement and, when available, the post-meeting press conference. This FOMC surprise measure, and intraday asset price changes over such an event window, are all included in the USMPD. Third, the response of risk assets—including stock prices, dividend futures/swaps, and exchange rates—to FOMC interest rate surprises remains substantial and consistent with standard models of monetary transmission and the risk-taking channel of monetary policy. Among other results, we find a significant negative response of market-based dividend expectations at horizons of 3-5 years to FOMC surprises. Our evidence broadly supports the view that the financial market reaction to monetary policy surprises reflects the transmission of monetary policy shocks, and that investors expect significant lags in the monetary transmission to inflation and economic activity.

References

Abrahams, Michael, Tobias Adrian, Richard K. Crump, Emanuel Moench, and Rui Yu, "Decomposing Real and Nominal Yield Curves," *Journal of Monetary Economics*, 2016, *84*, 182–200.

Acosta, Miguel, "A New Measure of Central Bank Transparency and Implications for the Effectiveness of Monetary Policy," *International Journal of Central Banking*, 2023, *19* (3), 49–97.

_ , Connor M. Brennan, and Margaret M. Jacobson, "Constructing High-Frequency Monetary Policy Surprises from SOFR Futures," *Economics Letters*, 2024, *242*, 111873.

Almerud, Jakob, Dominika Krygier, Henrik Lundvall, and Mambuna Njie, "Measuring Riksbank Monetary Policy: Shocks and Macroeconomic Transmission," Discussion Working Paper 445, Sveriges Riksbank 2024.

Altavilla, Carlo, Luca Brugnolini, Refet S. Gürkaynak, Roberto Motto, and Giuseppe Ragusa, "Measuring Euro Area Monetary Policy," *Journal of Monetary Economics*, 2019, *108*, 162–179.

Amihud, Yahok and Haim Mendelson, "Liquidity, Maturity, and the Yields on U.S. Treasury Securities," *The Journal of Finance*, 1991, *46* (4), 1411–1425.

Andreasen, Martin M., Jens H. E. Christensen, and Simon Riddell, "The TIPS Liquidity Premium," *Review of Finance*, 10 2021, *25* (6), 1639–1675.

Bauer, Michael D, "Restrictions on Risk Prices in Dynamic Term Structure Models," *Journal of Business & Economic Statistics*, 2018, *36* (2), 196–211.

Bauer, Michael D., Aeimit Lakdawala, and Philippe Mueller, "Market-Based Monetary Policy Uncertainty," *The Economic Journal*, 2022, *132* (644), 1290–1308.

_ and Eric T. Swanson, "A Reassessment of Monetary Policy Surprises and High-Frequency Identification," *NBER Macroeconomics Annual*, 2023, *37* (1), 87–155.

_ and _ , "An Alternative Explanation for the 'Fed Information Effect'," *American Economic Review*, March 2023, *113* (3), 664–700.

_ , Ben S. Bernanke, and Eric Milstein, "Risk Appetite and the Risk-Taking Channel of Monetary Policy," *Journal of Economic Perspectives*, Winter 2023, *37* (1), 77–100.

Bernanke, Ben and Kenneth Kuttner, "What Explains the Stock Market's Reaction to Federal Reserve Policy?," *Journal of Finance*, 06 2005, *60* (3), 1221–1257.

Boguth, Oliver, Murray Carlson, Adlai Fisher, and Mikhail Simutin, "The Term Structure of Equity Risk Premia: Levered Noise and New Estimates," *Review of Finance*, 09 2022, *27* (4), 1155–1182.

Braun, Robin, Silvia Miranda-Agrippino, and Tuli Saha, "Measuring Monetary Policy in the UK: The UK Monetary Policy Event-Study Database," *Journal of Monetary Economics*, 2025, *149*, 103645.

Brennan, Connor M., Margaret Jacobson, Christian Matthes, and Todd B. Walker, "Monetary Policy Shocks: Data or Methods?," 2024. Available at SSRN: https://ssrn.com/abstract=4758815.

Bu, Chunya, John Rogers, and Wenbin Wu, "A unified measure of Fed monetary policy shocks," *Journal of Monetary Economics*, 2021, *118*, 331–349.

Campbell, Jeffrey, Charles Evans, Jonas Fisher, and Alejandro Justiniano, "Macroeconomic Effects of Federal Reserve Forward Guidance," *Brookings Papers on Economic Activity*, Spring 2012, *2012*, 1–54.

Christensen, Jens H. E., Jose A. Lopez, and Glenn D. Rudebusch, "Inflation Expectations and Risk Premiums in an Arbitrage-Free Model of Nominal and Real Bond Yields," *Journal of Money, Credit and Banking*, 2010, *42* (s1), 143–178.

Cieslak, Anna, Michael McMahon, and Hao Pang, "Did I Make Myself Clear? The Fed and the Market in the Post-2020 Framework Period," Discussion Paper 19360, CEPR 2024.

Duffee, Gregory R., "Idiosyncratic Variation of Treasury Bill Yields," *The Journal of Finance*, 1996, *51* (2), 527–551.

D'Amico, Stefania and N. Aaron Pancost, "Special Repo Rates and the Cross-Section of Bond Prices: The Role of the Special Collateral Risk Premium," *Review of Finance*, 2022, *26* (1), 117–162.

_ , Don H. Kim, and Min Wei, "Tips from TIPS: The Informational Content of Treasury Inflation-Protected Security Prices," *Journal of Financial and Quantitative Analysis*, 2018, *53* (1), 395–436.

Gertler, Mark and Peter Karadi, "Monetary Policy Surprises, Credit Costs, and Economic Activity," *American Economic Journal: Macroeconomics*, 2015, *7* (1), 44–76.

Gilchrist, Simon, David López-Salido, and Egon Zakrajšek, "Monetary Policy and Real Borrowing Costs at the Zero Lower Bound," *American Economic Journal: Macroeconomics*, January 2015, *7* (1), 77–109.

_ , Ei Yang, and Guihai Zhao, "Equity Price Responses and the Fed Information Effect," *Available at SSRN 4865794*, 2024.

Golez, Benjamin and Ben Matthies, "Fed Information Effects: Evidence from the Equity Term Structure," *Journal of Financial Economics*, 2025, *165*, 103988.

Gürkaynak, Refet S., A. Hakan Kara, Burçin Kısacıkoğlu, and Sang Seok Lee, "Monetary policy surprises and exchange rate behavior," *Journal of International Economics*, 2021, *130*, 103443.

Gürkaynak, Refet S, Brian Sack, and Jonathan H Wright, "The US Treasury Yield Curve: 1961 to the Present," *Journal of monetary Economics*, 2007, *54* (8), 2291–2304.

_ , _ , and _ , "The TIPS Yield Curve and Inflation Compensation," *American Economic Journal: Macroeconomics*, 2010, *2* (1), 70–92.

Gürkaynak, Refet S., Brian Sack, and Eric Swanson, "The Sensitivity of Long-Term Interest Rates to Economic News: Evidence and Implications for Macroeconomic Models," *American Economic Review*, March 2005, *95* (1), 425–436.

_ , _ , and Eric T. Swanson, "Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements," *International Journal of Central Banking*, May 2005, *1* (1).

Hanson, Samuel and Jeremy Stein, "Monetary Policy and Long-Term Real Rates," *Journal of Financial Economics*, 2015, *115* (3), 429–448.

Hanson, Samuel G., David O. Lucca, and Jonathan H. Wright, "Rate-Amplifying Demand and the Excess Sensitivity of Long-Term Rates," *Quarterly Journal of Economics*, 2021, *136* (3), 1719–1781.

Jarociński, Marek and Peter Karadi, "Deconstructing Monetary Policy Surprises—The Role of Information Shocks," *American Economic Journal: Macroeconomics*, 2020, *12* (2), 1–43.

Kim, Don H. and Athanasios Orphanides, "Term Structure Estimation with Survey Data on Interest Rate Forecasts," *Journal of Financial and Quantitative Analysis*, 2012, *47* (1), 241–272.

Kuttner, Kenneth N., "Monetary Policy Surprises and Interest Rates: Evidence from the Fed Funds Futures Market," *Journal of Monetary Economics*, June 2001, *47* (3), 523–544.

Miranda-Agrippino, Silvia and Giovanni Ricco, "The Transmission of Monetary Policy Shocks," *American Economic Journal: Macroeconomics*, 2021, *13* (3), 74–107.

_ and Tsvetelina Nenova, "A Tale of Two Global Monetary Policies," *Journal of International Economics*, 2022, *136*, 103606. NBER International Seminar on Macroeconomics 2021.

Nagel, Stefan and Zhengyang Xu, "Movements in Yields, Not the Equity Premium: Bernanke-Kuttner Redux," Working Paper 32884, National Bureau of Economic Research August 2024.

Nakamura, Emi and Jón Steinsson, "High-Frequency Identification of Monetary Non-Neutrality: The Information Effect," *The Quarterly Journal of Economics*, 2018, *133* (3), 1283–1330.

Narain, Namrata and Kunal Sangani, "The Market Impact of Fed Communications: The Role of the Press Conference," *Available at SSRN 4354333*, 2023.

Rosa, Carlo, "The Financial Market Effect of FOMC Minutes," *Economic Policy Review*, 2013, *19* (2).

Swanson, Eric T., "Measuring the Effects of Federal Reserve Forward Guidance and Asset Purchases on Financial Markets," *Journal of Monetary Economics*, March 2021, *118*, 32–53.

_ **and Vishuddhi Jayawickrema**, "Speeches by the Fed Chair Are More Important Than FOMC Announcements: An Improved High-Frequency Measure of U.S. Monetary Policy Shocks," 2024. working paper, available at https://sites.socsci.uci.edu/~swanson2/papers/hfdat.pdf.

van Binsbergen, Jules H. and Ralph S.J. Koijen, "The Term Structure of Returns: Facts and Theory," *Journal of Financial Economics*, 2017, *124* (1), 1–21.

A Details of USMPD

Table A.1: Content of USMPD: Variables

Name	Contracts/Maturities	Start Date in USMPD
Fed Funds Futures	first six monthly contracts	1995
Eurodollar Futures	first eight quarterly contracts	ED1:ED4 1994, ED5:ED8 1997
SOFR Futures	first eight quarterly contracts	2022
T-Bill Yields*	3 and 6 months	US3MT 1994, US6MT 1997
Treasury Yields*	2, 5, 10, 30 years	1994
TIPS Yields*	5, 10, 30 years	2005
OIS Rates*	1 and 2 years	USD1YOIS 2004, USD2YOIS 2011
S&P 500	market index	1996
S&P 500 E-mini Futures	front contract	1997
Dollar Index	spot index	1997
USDEUR	spot bilateral FX	1998
USDJPY	spot bilateral FX	1997

Notes: * Denotes yield on benchmark rates as calculated by LSEG (London Stock Exchange Group).

Table A.2: Summary statistics for high-frequency data around FOMC events

Instruments	Description	Mean	SD	Min	Max	Obs
	Statements					
FF1	Fed Funds Future (current month)	-0.01	0.04	-0.35	0.07	253
FF2	Fed Funds Future (1 month ahead)	-0.01	0.05	-0.42	0.12	253
FF3	Fed Funds Future (2 month ahead)	-0.01	0.05	-0.46	0.13	253
FF4	Fed Funds Future (3 month ahead)	-0.01	0.05	-0.43	0.13	253
ED1	Eurodollar/SOFR future (current month)	-0.01	0.06	-0.48	0.18	262
ED2	Eurodollar/SOFR future (1 month ahead)	-0.01	0.06	-0.45	0.15	262
ED3	Eurodollar/SOFR future (2 month ahead)	-0.01	0.07	-0.44	0.19	262
ED4	Eurodollar/SOFR future (3 month ahead)	-0.01	0.07	-0.27	0.24	262
MP1	Rate surprise current FOMC meeting	-0.01	0.07	-0.47	0.12	253
MP2	Rate surprise next FOMC meeting	-0.01	0.05	-0.42	0.15	253
PC	Principal Component	-0.00	0.03	-0.24	0.08	253
	Press Conferences					
FF1	Fed Funds Future (current month)	-0.00	0.00	-0.03	0.01	80
FF2	Fed Funds Future (1 month ahead)	-0.00	0.01	-0.06	0.01	80
FF3	Fed Funds Future (2 month ahead)	-0.01	0.02	-0.08	0.03	80
FF4	Fed Funds Future (3 month ahead)	-0.01	0.02	-0.10	0.07	80
ED1	Eurodollar/SOFR future (current month)	-0.01	0.03	-0.19	0.09	80
ED2	Eurodollar/SOFR future (1 month ahead)	-0.01	0.05	-0.25	0.12	80
ED3	Eurodollar/SOFR future (2 month ahead)	-0.01	0.06	-0.23	0.15	80
ED4	Eurodollar/SOFR future (3 month ahead)	-0.02	0.06	-0.19	0.19	80
MP1	Rate surprise current FOMC meeting	-0.00	0.01	-0.03	0.01	80
MP2	Rate surprise next FOMC meeting	-0.01	0.02	-0.08	0.06	80
PC	Principal Component	-0.00	0.03	-0.11	0.08	80
	Statements and Press Conferences					
FF1	Fed Funds Future (current month)	-0.01	0.04	-0.35	0.07	253
FF2	Fed Funds Future (1 month ahead)	-0.01	0.05	-0.42	0.12	253
FF3	Fed Funds Future (2 month ahead)	-0.01	0.05	-0.46	0.13	253
FF4	Fed Funds Future (3 month ahead)	-0.01	0.05	-0.43	0.13	253
ED1	Eurodollar/SOFR future (current month)	-0.01	0.06	-0.48	0.18	262
ED2	Eurodollar/SOFR future (1 month ahead)	-0.01	0.06	-0.45	0.15	262
ED3	Eurodollar/SOFR future (2 month ahead)	-0.01	0.07	-0.44	0.19	262
ED4	Eurodollar/SOFR future (3 month ahead)	-0.01	0.07	-0.28	0.24	262
MP1	Rate surprise current FOMC meeting	-0.01	0.07	-0.47	0.12	253
MP2	Rate surprise next FOMC meeting	-0.01	0.05	-0.42	0.15	253
PC	Principal Component	-0.00	0.04	-0.26	0.09	253
	Minutes					
FF1	Fed Funds Future (current month)	-0.00	0.00	-0.01	0.01	160
FF2	Fed Funds Future (1 month ahead)	-0.00	0.00	-0.03	0.02	160
FF3	Fed Funds Future (2 month ahead)	-0.00	0.01	-0.04	0.04	160
FF4	Fed Funds Future (3 month ahead)	-0.00	0.01	-0.04	0.04	160
ED1	Eurodollar/SOFR future (current month)	-0.00	0.01	-0.03	0.03	160
ED2	Eurodollar/SOFR future (1 month ahead)	-0.00	0.02	-0.06	0.06	160
ED3	Eurodollar/SOFR future (2 month ahead)	-0.00	0.02	-0.09	0.07	160
ED4	Eurodollar/SOFR future (3 month ahead)	-0.00	0.02	-0.09	0.08	160
MP1	Rate surprise current FOMC meeting	-0.00	0.00	-0.02	0.02	160
MP2	Rate surprise next FOMC meeting	0.00	0.01	-0.05	0.06	160
PC	Principal Component	-0.00	0.02	-0.07	0.06	160

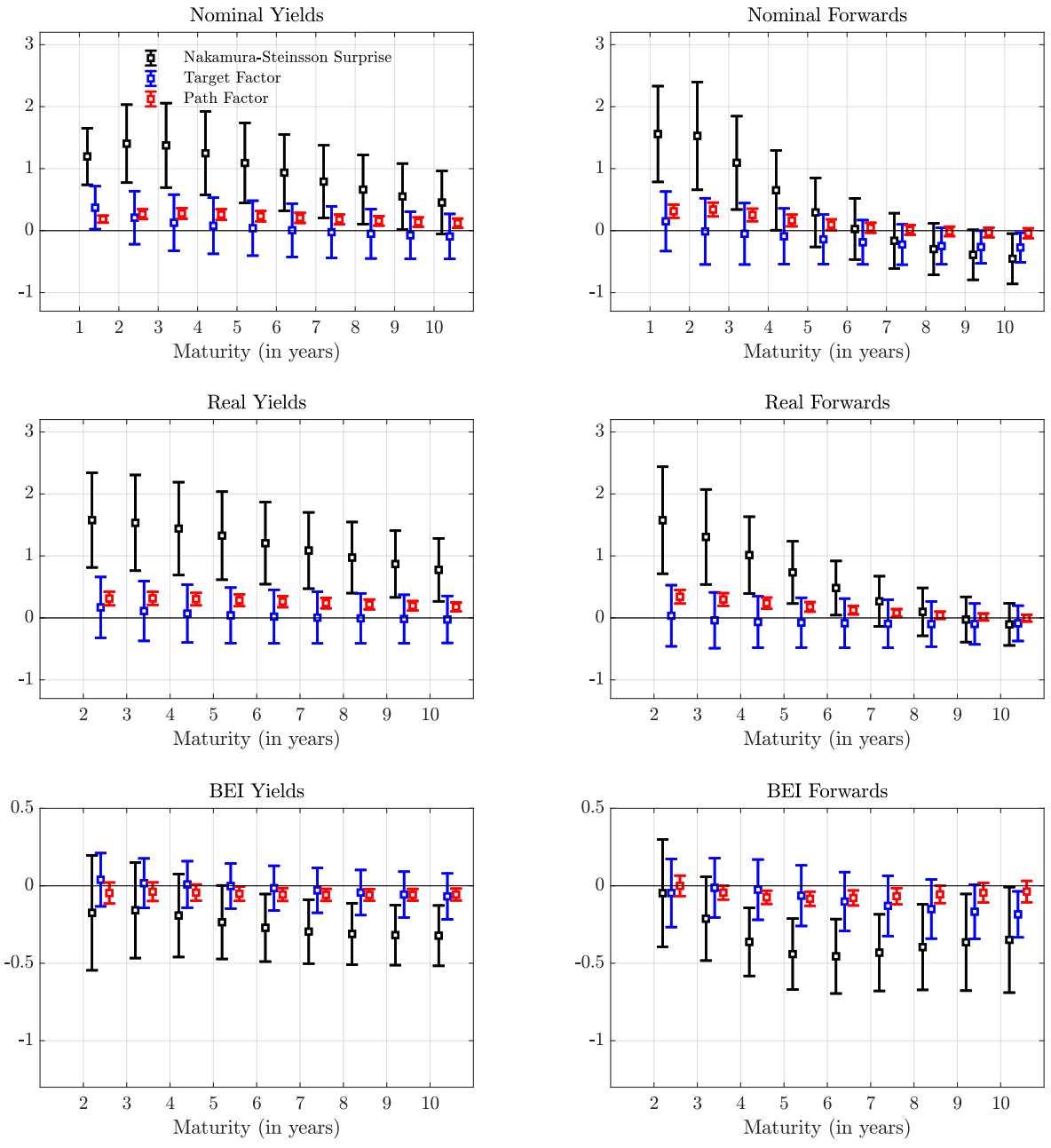
B Additional Figures and Tables

Table B.1: Response of Treasury market to FOMC announcement surprises, target and path factors.

	2y yld	5y yld	10y yld	5-10y forw
(A) Nominal				
Nakamura-Steinsson Surprise				
Coefficient	1.40	1.09	0.45	-0.19
SE	(0.32)	(0.33)	(0.26)	(0.22)
Target Factor				
Coefficient	0.21	0.04	-0.09	-0.23
SE	(0.22)	(0.23)	(0.19)	(0.16)
Path Factor				
Coefficient	0.27	0.23	0.12	0.01
SE	(0.04)	(0.04)	(0.04)	(0.04)
(B) Real				
Nakamura-Steinsson Surprise				
Coefficient	1.58	1.33	0.78	0.23
SE	(0.39)	(0.36)	(0.26)	(0.20)
Target Factor				
Coefficient	0.17	0.04	-0.03	-0.09
SE	(0.25)	(0.23)	(0.19)	(0.18)
Path Factor				
Coefficient	0.31	0.28	0.18	0.07
SE	(0.06)	(0.05)	(0.04)	(0.03)
(C) Inflation				
Nakamura-Steinsson Surprise				
Coefficient	-0.17	-0.24	-0.32	-0.41
SE	(0.19)	(0.12)	(0.10)	(0.12)
Target Factor				
Coefficient	0.04	-0.00	-0.07	-0.14
SE	(0.09)	(0.07)	(0.08)	(0.09)
Path Factor				
Coefficient	-0.05	-0.05	-0.06	-0.06
SE	(0.03)	(0.02)	(0.02)	(0.03)

Event-study regressions of daily changes in Treasury rates around FOMC announcements ($t-1$ to t) 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, as well as its target and path factor. 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: 168 FOMC announcements, including both scheduled and unscheduled FOMC meetings, and excluding the crisis period from July 2008 to June 2009. White standard errors are in parentheses.

Figure B.1: Term structure of interest rate sensitivity to FOMC announcement surprises, target and path factors.



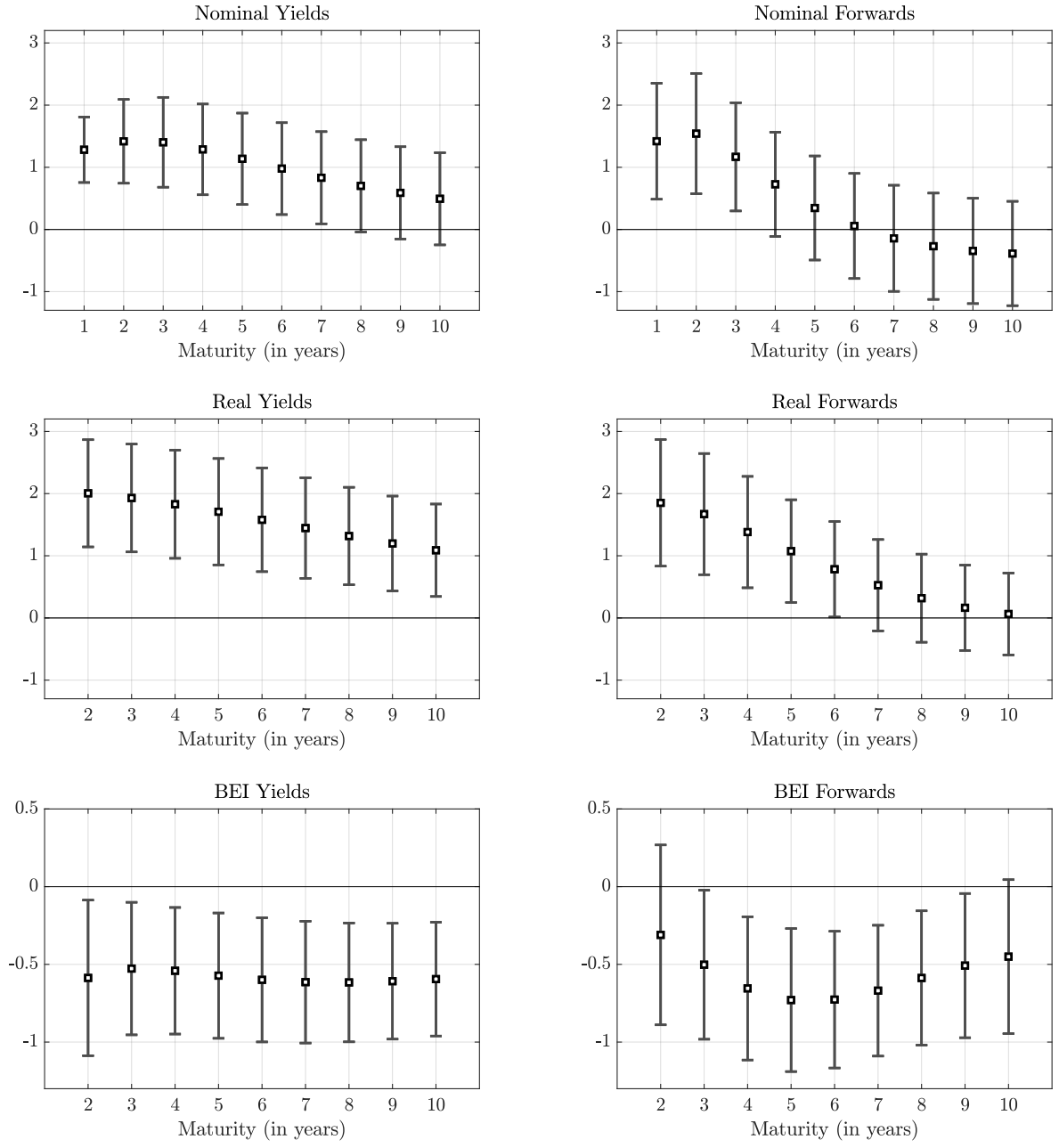
Dependent variable are changes in one-day window around scheduled FOMC meetings ($t-1$ to t). Sample period is January 2004 to December 2024. 95% confidence intervals based on White standard errors.

Table B.2: Response of Treasury market to FOMC announcement surprises. Two-day change.

	2y yld	5y yld	10y yld	5-10y forw
(A) Nominal				
Coefficient	1.42	1.14	0.49	-0.15
SE	(0.34)	(0.38)	(0.38)	(0.43)
R^2	0.13	0.07	0.01	0.00
(B) Real				
Coefficient	2.01	1.71	1.09	0.48
SE	(0.44)	(0.44)	(0.38)	(0.37)
R^2	0.15	0.11	0.06	0.01
(C) Inflation				
Coefficient	-0.59	-0.57	-0.59	-0.63
SE	(0.26)	(0.21)	(0.19)	(0.21)
R^2	0.03	0.04	0.05	0.04

Event-study regressions of two-day changes in Treasury rates around FOMC announcements ($t-1$ to $t+1$) 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, as well as its target and path factor. 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: 168 FOMC announcements, including both scheduled and unscheduled FOMC meetings, and excluding the crisis period from July 2008 to June 2009. White standard errors are in parentheses.

Figure B.2: Term structure of interest rate sensitivity to FOMC announcement surprises. Two-day change.



Dependent variable are changes in two-day window around scheduled FOMC meetings ($t-1$ to $t+1$). Sample period is January 2004 to December 2024. 95% confidence intervals based on White standard errors.

Table B.3: Breakeven inflation response to FOMC announcement surprises across subsamples. Two-day change.

	2y yld	5y yld	10y yld	5-10y forw
(A) Sample: January 2004 to March 2014 (ex. GFC), N = 76				
Coefficient	-0.29	-0.25	-0.35	-0.46
SE	(0.30)	(0.25)	(0.27)	(0.32)
R^2	0.01	0.01	0.02	0.02
(B) Sample: April 2014 to December 2024, N = 90				
Coefficient	-0.87	-0.88	-0.82	-0.78
SE	(0.40)	(0.33)	(0.26)	(0.27)
R^2	0.07	0.10	0.10	0.07
(C) Sample: January 2004 to December 2019 (ex. GFC), N = 123				
Coefficient	-0.71	-0.59	-0.64	-0.70
SE	(0.35)	(0.27)	(0.26)	(0.28)
R^2	0.04	0.04	0.05	0.05

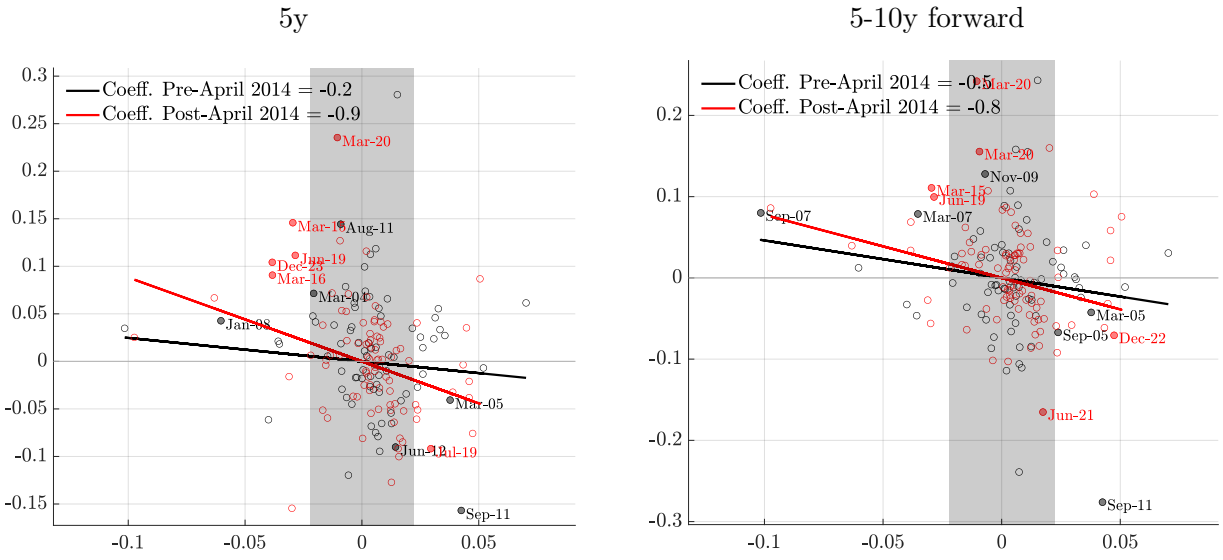
Event-study regressions of two-day changes in breakeven inflation rates around FOMC announcements on high-frequency announcement surprises, the scaled first principal component of 30-minute changes in near-term money market rates around the release of the FOMC statement. Samples include both scheduled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

Table B.4: Two-day response of Treasury market to monetary policy surprises

	5y yld				5-10y forw			
	NS	PC	SPC	M	NS	PC	SPC	M
				(A) Nominal				
Coefficient	1.14	2.07	1.62	0.83	-0.15	0.97	0.27	0.31
SE	(0.38)	(0.52)	(0.32)	(0.36)	(0.43)	(0.54)	(0.37)	(0.40)
R^2	0.07	0.26	0.22	0.04	0.00	0.05	0.00	0.00
N	166	80	166	136	166	80	166	136
				(B) Real				
Coefficient	1.71	2.72	2.25	1.06	0.48	1.39	0.85	0.80
SE	(0.44)	(0.58)	(0.37)	(0.37)	(0.37)	(0.49)	(0.31)	(0.38)
R^2	0.11	0.29	0.29	0.06	0.01	0.12	0.05	0.04
N	166	80	166	136	166	80	166	136
				(C) Inflation				
Coefficient	-0.57	-0.65	-0.63	-0.24	-0.63	-0.42	-0.58	-0.50
SE	(0.21)	(0.26)	(0.17)	(0.19)	(0.21)	(0.25)	(0.16)	(0.23)
R^2	0.04	0.07	0.08	0.01	0.04	0.03	0.06	0.02
N	166	80	166	136	166	80	166	136

Event-study regressions of two-day changes in Treasury rates around FOMC communication events on high-frequency monetary policy surprise. STMT: 30-minute changes around FOMC statements. PC: changes around the post-meeting press conference. SPC: changes around 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 SPC surprises, 168 FOMC announcements from January 2004 to December 2024; for PC surprises, 80 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.

Figure B.3: BEI rate two-day changes and FOMC surprises across subsamples.



BEI rate two-day changes on days with FOMC announcements ($t-1$ to $t+1$) and monetary policy surprise calculated from 30-minute rate changes around the release of the FOMC statement, for the five-year BEI yield (left panel) and the five-to-ten-year forward BEI rate (right panel). Red circles for 78 FOMC announcements from January 2004 to March 2014 (excluding the crisis period from July 2008 to June 2009); black circles for 90 FOMC announcements from April 2014 to December 2024. Both scheduled and unscheduled FOMC meetings are included. 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 B.3.