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Monetary policy and the corporate bond market: How important is the Fed information effect?*

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Abstract

Does expansionary monetary policy drive up prices of risky assets? Or, do investors interpret monetary policy easing as a signal that economic fundamentals are weaker than they previously believed, prompting riskier asset prices to fall? We test these competing hypotheses within the U.S. corporate bond market and find evidence strongly in favor of the second explanation—known as the "Fed information effect". Following an unanticipated monetary policy tightening (easing), returns on corporate bonds with higher credit risk outperform (underperform). We conclude that monetary policy surprises are predominantly interpreted by market participants as signaling information about the state of the economy.

JEL Classifications: E40, E52, G12, G14

Keywords: Monetary policy, corporate bonds, reaching for yield, Federal Reserve information

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Introduction

How do risky asset prices react to changes in the stance of monetary policy? Given that the most immediate and direct effects of Federal Reserve actions and communications are on financial markets (Bernanke and Kuttner, 2005), answering this question is fundamental to understanding how monetary policy ultimately affects the broader economy. A widely held view among many observers—including academics, policy makers, and the popular press alike—is that more accommodative monetary policy drives up risky asset prices. This may come about through several channels. First, the securities of risky firms potentially stand to benefit from monetary stimulus, as lower borrowing costs boost aggregate demand, thus leading to an improvement in corporate fundamentals. Moreover, policy stimulus may reduce the compensation that investors require to bear credit risk, and may potentially induce investors to "reach for yield".[1] That is, lower interest rates may prompt investors to seek higher returns by investing in riskier assets, possibly driving up the prices of those assets beyond what is justified by fundamentals.

On the other hand, there is an alternative view of how market participants may interpret changes in the stance of monetary policy. Specifically, news about monetary policy also conveys information about the central bank's assessment of the economic outlook. In that respect, statements by the Federal Reserve may influence private-sector beliefs, not just about monetary policy, but also about the underlying economy.

[1] See, e.g., Janet L. Yellen, (then) Vice Chair of the Board of Governors of the Federal Reserve System, Remarks at International Conference: Real and Financial Linkage and Monetary Policy, Bank of Japan, June 1, 2011, http://www.federalreserve.gov/newsevents/speech/yellen20110601a.htm.

Indeed, starting with the seminal contribution of Romer and Romer (2000), a growing body of research has argued that the Federal Reserve possesses an informational advantage in assessing the economic outlook. Romer and Romer (2000) show that the Federal Reserve's internal forecasts of inflation and real output (which are only made public with a five year lag) are superior to private-sector forecasts. Building on this work, Campbell et al. (2012) and Nakamura and Steinsson (2018) show, respectively, that private-sector forecasters react to monetary policy surprises by revising their own forecasts for unemployment and output—a phenomenon dubbed the "Fed information effect".[2] In particular, private-sector forecasters interpret an unexpected monetary policy tightening (easing) as a signal that the economy is healthier (weaker) than they previously believed, and they revise their forecasts accordingly. In other words, monetary policy surprises are interpreted in the exact opposite way to that predicted by standard economic theory—with a fed information effect, output growth is expected to improve following tighter policy.[3]

Whether Federal Reserve policy announcements actually reveal valuable information about the state of the economy, however, remains controversial. Faust, Swanson, and Wright (2004) and Bauer and Swanson (2020) challenge the findings of Romer and Romer (2000) and Nakamura and Steinsson (2018), respectively. In contrast, several recent papers present evidence emphasizing the importance of a Fed information effect by focusing on instances where interest

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[2] Alternatively, Campbell et al. (2012) refer to information about economic fundamentals revealed through Federal Reserve policy announcements as "Delphic forward guidance".

[3] Nakamura and Steinsson (2018) argue that the Fed's informational advantage derives from the fact that the organization employs a large body of "well-trained economists whose primary role is to process and interpret all the information being released about the economy." A slightly weaker version of the hypothesis is that the Fed merely has some influence over private-sector beliefs about the underlying economy. In this sense, the Fed information hypothesis has clear parallels with the finance literature's study of influential private-sector market analysts (see, e.g., Loh and Stulz, 2011). An additional implication of this view, to paraphrase Nakamura and Steinsson (2018), is that information revelation through Federal Reserve policy announcements involves information that the private-sector would have eventually learned themselves through other channels—Fed policy announcements merely reveal this information earlier than it would otherwise have become known.

rates and stock returns move in the same direction following FOMC meetings: Cieslak and Schrimpf (2018) and Jarocinski and Karadi (2019).[4]

In this paper, we test whether the Fed information effect is relevant in explaining the U.S. corporate bond market's reaction to unanticipated changes in the stance of monetary policy on Federal Open Markets Committee (FOMC) announcement days. For simplicity, we call the alternative hypothesis the reaching for yield effect (although, as we explain further below, we recognize that this alternative hypothesis combines the reaching for yield effect with more fundamental explanations).

The $7.2 trillion U.S. corporate bond market provides a natural setting in which to study the relationship between monetary policy and investor demand for risky assets.[5] The price effects in this market are of direct relevance from a policy perspective, as cheaper corporate debt (potentially induced by accommodative monetary policy) may encourage companies to invest more, but also possibly to take on excess leverage, with the latter raising obvious financial stability concerns. Moreover, within the corporate bond market, there is wide variation in the credit-worthiness of different bonds—a feature that allows us to easily compare the price reaction of riskier versus safer securities, and thus test the information effect against the reaching for yield effects. In particular, a Fed information effect implies that a rise (fall) in interest rates on FOMC announcement days reveals good (bad) economic news. This means that riskier corporate bonds, whose likelihood of payoff is more sensitive to the overall health of the

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[4] Other studies supporting the informational advantage of central banks include Lunsford (2020), Campbell et al. (2016), Andrade and Ferroni (2016), Miranda-Agrippino and Ricco (2019), Sharpe, Sinha, and Hollrah (2020), Bu, Rogers, and Wu (2020), Lakdawala and Schaffer (2019), and Kerssenfischer (2019).

[5] Authors' calculation of the total amount of U.S. corporate bonds outstanding are as of 2019:Q2, based on data from the Mergent Fixed Income Securities Database.

economy, should outperform (underperform) along with rising (falling) rates—the exact opposite of that predicted by the reaching for yield hypothesis.

To preview our results, we find overwhelming support for the dominance of the Fed information effect. Following an unanticipated tightening (easing) of monetary policy, returns on corporate bonds with higher credit risk significantly outperform (underperform) relative to safer corporate bonds.

Our empirical strategy consists of several elements. First, to identify changes in the stance of monetary policy, we follow the approach in Hanson and Stein (2015) and use changes in the 2-year nominal Treasury yield on FOMC announcement days to proxy for changes in the expected future path of the federal funds rate over the next several quarters. Changes in the 2-year nominal yield capture not only surprise changes to the current level of the federal funds rate, but, crucially, also reflects changes to the Federal Reserve's "forward guidance" on the expected future path of policy. The latter has been shown to be an especially important monetary policy tool since 1990s (Gürkaynak, Sack, and Swanson, 2005; Campbell et al., 2012).

To study the reaction in the corporate bond market, we use secondary market trading data from the Trade Reporting and Compliance Engine (TRACE), covering the period 2002 to 2019. We link this to data on bond characteristics from the Mergent Fixed Income Securities Database (FISD), giving us a sample of over 300,000 bond returns on FOMC meeting dates, consisting of over approximately 30,000 unique corporate bonds.

The granularity of this data allows us to flexibly control for a host of bond characteristics, and thus isolate specifically how a bond's riskiness, as measured by its credit rating, affects its returns on FOMC announcement days. In particular, our baseline regressions include fixed effects that ensure that we compare the price reactions of bonds that have the same time-to-maturity but different levels of credit risk, while also controlling for industry effects and callability features.

Within this framework, we find that for a hypothetical 100 basis point (bp) rise (fall) in the 2-year nominal yield on FOMC announcement days, a one-notch lower bond credit rating (e.g., moving from a rating of BBB to BBB-) is associated with a 0.3 percent higher (lower) return. In other words, riskier corporate bonds outperform following contractionary monetary policy surprises and underperform following expansionary monetary policy surprises. As we show, our results are highly robust. For instance, our findings are not driven by any particular sub-period, cannot be explained by differences in duration between more risky versus less risky bonds, and are not sensitive to how returns are calculated, among other robustness checks. Moreover, we show that the effects we find are not driven by shocks to the current federal funds rate, but rather by a steeper expected path of monetary policy over the next several quarters (as measured by increases in the spread between the 2-year yield and the current federal funds rate). Our results show, therefore, that a steeper expected path of monetary policy, which captures the effect of Federal Reserve forward guidance, is interpreted by the corporate bond market as a positive signal about the economy, consistent with a Fed information effect.

Overall, our findings reveal that the corporate bond market reacts to monetary policy surprises in the same way as private-sector forecasters (as in Campbell et al., 2012, and Nakamura and Steinsson, 2018). A key contribution of our paper, therefore, is to show that the Fed information effect is deeper and more pervasive than previously understood. While it is certainly an important point that private-sector analysts appear to interpret a monetary policy surprise as a signal about economic fundamentals, it is arguably all the more striking that a $7.2 trillion financial market responds in the same way.

2. Related literature

Our study connects to a voluminous literature on how financial markets respond to monetary policy surprises. Notable contributions, to name those particularly relevant for our analysis, include: Cochrane and Piazzesi (2002), Gürkaynak, Sack, and Swanson (2005), Hanson and Stein (2015), and Nakamura and Steinsson (2018), who each examine responses in the Treasury market; Bernanke and Kuttner (2005) and Ozdagli and Velikov (2020) who, respectively, study the effects on the broad stock market and on the cross-section of equity returns[6]; and Gertler and Karadi (2015) and Gilchrist, López-Salido, and Zakrajšek (2015) who examine the effects on a wide array of financial variables.[7]

Several other studies have examined the corporate bond market reaction to monetary policy surprises, but they differ in important respects from our own. Anderson and Cesa-Bianchi (2020) examine the differential response of corporate credit spreads to monetary policy shocks based firm leverage, but focus on shocks to the current federal funds rate, whereas our results emphasize the importance of forward guidance in explaining the Fed information effect.[8] Gao, Kontonikas and Maio (2020), examine the relation between monetary policy surprises and

[6] Ozdagli and Velikov's (2020) results are directionally consistent with ours, although they do not explicitly frame their findings in terms of a Fed information effect. Specifically, they show that stocks that react more positively to expansionary monetary policy earn lower average returns because they provide a hedge against negative economic shocks—the key being that expansionary monetary policy is a response to such negative shocks.

[7] Gertler and Karadi (2015) study the effects of monetary policy shocks on a broad measure of corporate credit spreads, combing high frequency methods within a proxy SVAR framework. Ramey (2016), however, challenges the robustness of this approach. Gilchrist, López-Salido, and Zakrajšek (2015) restrict their analysis to the investment-grade segment of the market. See also Boyarchenko, Haddad, and Plosser (2018), who apply principal components analysis to the Treasury yield curve to uncover a "market confidence" factor of Federal Reserve policy announcements, which they in turn relate to conditions in several financial markets, including the corporate bond market.

[8] See also Cenesizoglu and Essid (2012), Javadi, Nejadmalayeri, and Krehbiel (2017).

corporate bond returns based on credit rating, but conduct their analysis at the monthly frequency, whereas we use a more standard event-study window to focus on the effects specifically due to monetary policy news.

Our paper also contributes to a burgeoning literature on the interaction between monetary policy and financial stability. Much of the empirical work in this area has shown that buildups of leverage and credit booms are ultimately detrimental to economic growth—see, e.g., Schularick and Taylor (2012), López-Salido, Stein, and Zakrajšek (2017), and Mian, Sufi, and Verner (2017).[9] What is arguably less clear, however, is the role of monetary policy in driving credit booms. In this respect, our findings indicate that reaching for yield does not appear to be the predominant response to monetary policy easing. However, several important caveats are in order. First, our results do not rule out that reaching for yield dynamics are never at play; rather, they show that, on net, the corporate bond market reacts to monetary policy surprises in such a way that any potential reaching for yield effect is completely overwhelmed by the information effect. Moreover, our conclusions are based on an event-study research design, and therefore assume that any reaching for yield effects should be reflected in corporate bond prices fairly quickly (due to foresight on the part of corporate bond market participants). It is possible, however, that excesses may build up more slowly over time—although this would be a fairly strong violation of market efficiency. We leave open this possibility as a topic for future research.

[9] For a recent review of the literature on the relationship between monetary policy and financial stability, see Adrian and Liang (2018).

3. Data and sample

3.1. Monetary policy surprises

Our empirical strategy first hinges on measuring surprise changes in the stance of monetary policy. To do so, we follow the approach of prior studies (reviewed above) and rely on the fact that a great deal of monetary policy news is revealed with the release of the FOMC statement, which occurs at eight regularly scheduled committee meetings per year. Crucially, the statement details not only the committee's decision as to the current level of the federal funds rate, but also characterizes economic and financial conditions, thus giving market participants important clues about the expected path of future policy (Gürkaynak, Sack, and Swanson, 2005).[10] To capture the overall stance of monetary policy, and in particular the all-important forward guidance component of FOMC communications, we adopt the approach of Hansen and Stein (2015). Specifically, we use changes in the nominal 2-year Treasury yield on FOMC announcement dates to proxy for changes in the expected future path of the federal funds rate over the next several quarters. Our data on nominal Treasury yields are from Gürkaynak, Sack, and Wright (2007). For some tests, we also examine the effects of change in real yields and inflation compensation, which we obtain from Gürkaynak, Sack, and Wright (2010).

Following Hansen and Stein (2015), for FOMC meetings on day t, our baseline measure of monetary policy surprises is the change in the 2-year nominal yield over a t-1 to t+1 day window. Hansen and Stein (2015) argue that using a two-day window is preferable to a potentially shorter window (that ends, for example, on day t) because the full market reaction might not be

[10] In 1994, the FOMC began issuing press releases of this type detailing its policy decisions. Up to mid-1999, the press releases were issued only when the FOMC changed the current federal funds rate target. After mid-1999, the FOMC has released a statement at the end of every meeting—our analysis only covers this latter period (since our corporate bond market data commence in 2002).

instantaneous; rather, it may take time for markets to digest the full information content of a given announcement. Since most of the FOMC statements in our sample are released at 2:15 p.m., this would give about an hour to capture the Treasury market reaction based on end-of-day quotes, which might not be adequate.[11] We would add, moreover, that starting in 2011, the FOMC Chair began conducting regular press conferences following committee meetings, during which market participants could potentially glean additional valuable information, thus further bolstering the rationale for using a two-day window.[12] In our case, a t-1 to t+1 window also corresponds with an appropriate time frame over which to compute corporate bond returns (see below for details). Due to illiquidity in the corporate bond market (see, e.g., Bao, Pan, and Wang, 2011; Goldstein and Hotchkiss, 2020), an alternative approach of confining our analysis only to bonds that trade late in the afternoon on day t would be overly restrictive.[13]

Our sample consists of 135 scheduled FOMC meeting dates from August, 2002 (the first meeting for which corporate bond market data are available), to June, 2019. Table 1 presents summary statistics of the change in the nominal 2-year yield, along with other relevant interest rates that we consider, using a t-1 to t+1 window around each of these FOMC meetings. As shown in the first row, the average FOMC meeting is associated with little change in the stance of monetary policy—the mean change in the 2-year yield is zero. However, there is notable variation from meeting to meeting: the standard deviation of the change in the 2-year yield is 7

[11] In particular, Hansen and Stein (2015) cite evidence in Gürkaynak, Sack, and Swanson (2005) that it takes markets time to impound news about the future path of policy, and also the work of Fleming and Remolona (1999) who show that price formation in the Treasury market is gradual following major announcements, with elevated trading volume and volatility lasting 90 minutes or more.
[12] Press conferences by the FOMC Chair, consisting of a prepared remarks and a question-and-answer session with the media, commence at 2:15 p.m. and typically last about one hour. (From 2013 onwards, all FOMC statements have been released at 2:00 p.m.). From 2011-2018, press conference were held after every second FOMC meeting; starting in 2019, press conferences are held after every meeting.
[13] For the same reason, it would not be feasible for us to use a higher frequency identification approach as in Cochrane and Piazzesi (2002), Gürkaynak, Sack, and Swanson (2005) and Nakamura and Steinsson (2018), among others.

bps. The remaining rows show summary statistics for the other interest rates changes that we consider in the analysis, including surprise changes in the current federal funds rate, as implied by federal funds futures contracts,[14] as well as changes in 10-year nominal rates, changes in the slope of the Treasury yield curve (using both near- and far-term measures), and changes in real interest rates based on Treasury Inflation Protected Securities (TIPS) yields.[15] For all these interest rates, the mean change is close to zero, with notable variation from meeting to meeting.

3.2. Corporate bond market data

For secondary market corporate bond trading data, we use the regulatory version of TRACE provided by the Finance Industry Regulatory Authority (FINRA) for the period August, 2002, to May, 2019.[16] TRACE contains transaction-level data on corporate bond trades from which we compute volume-weighted average daily prices. For our purposes, TRACE is ideal, as it allows us to compute secondary market returns for bonds that trade on both day *t*-1 and day *t*+1 around a given FOMC meeting. Given illiquidity in the corporate bond market, with many bonds trading infrequently, one may worry that an alternative approach of relying only on bond quotes could be problematic, due to the possibility of stale quotes. Focusing on secondary market prices based on executed trades therefore bypasses this issue. Moreover, in robustness tests, we further rule out illiquidity as a potential confounding factor by restricting the analysis to trades greater than $100,000 and by estimating weighted regressions based on each bond's volume traded.

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[14] For details, see Kuttner (2001) and Gürkaynak, Sack, and Swanson (2005). In computing surprise changes in the current federal fund rate, we drop instances where a new month starts sometime in the *t*-1 to *t*+1 window, which results in a slightly smaller sample of FOMC meetings. This condition ensures that surprise federal funds rate changes over *t*-1 to *t*+1 window are calculated based on the same current-month futures contract, thus avoiding month-end noise associated with transitions to a new front-end contract.
[15] Data on 2-year TIPS yields is available starting in January, 2004, resulting in a slightly smaller sample.
[16] All of our results, however, can be obtained using the enhanced version of TRACE.

We merge TRACE with Mergent FISD to obtain information on bond characteristics such as the maturity date, coupon rate, coupon type, credit rating, bond option features and issuer characteristics. The data is then filtered as follows. We include only corporate bonds with fixed coupon payments issued by U.S. firms and denominated in U.S. dollars that have between 2 to 30 years to maturity. We exclude convertible, perpetual, exchangeable and preferred securities. In cleaning the trade-level data, we remove primary market transactions and cancelled trades, and adjust records that been subsequently corrected or reversed. To remove extreme values, we drop trades that deviate from their median daily price by a factor of 10. From the cleaned transaction-level data we compute volume-weighted average daily prices for each bond.[17] We then trim the daily price data at the 0.5^{th} and 99.5^{th} percentiles to remove the influence of outliers. From this, we compute returns using a t-1 to t+1 day window around FOMC announcement dates, which are winsorized at the 0.5^{th} and 99.5^{th} percentiles. Finally, to compute bond's credit rating, we assign a numerical value from 1 to 21 for each notch of a given credit agency's ratings scale (with higher values indicating worse ratings), and then take the average across the three major credit rating agencies (S&P, Moody's, and Fitch).

Table 2 presents summary statistics of corporate bond returns around FOMC meetings and corporate bond prices, as measured the day before an FOMC meeting. Panel A shows the full sample, while Panels B and C shows sample statistics for policy tightenings and easings, respectively. In all panels, the average volume-weighted trading price is slightly above par and the average return is close to zero. Overall, the sample appears well-balanced.

[17] In robustness tests we impose further filters, such as excluding trades that have not been publicly disseminated and dropping agency trades, interdealer trades and trades less than $100,000.

4. Empirical methodology

We run regressions of the following general form:

$$(1) \qquad Ret_{i,t} = \beta \Delta 2yr\_Ty_t \times Credit\_Risk_{i,t} + \gamma Credit\_Risk_{i,t} + \alpha_{t,m} + \alpha_{t,j} + \alpha_{t,c} + \varepsilon_{i,t},$$

where $Ret_{i,t}$ is the return on corporate bond i using a *t*-1 to *t*+1 day window around the release of an FOMC statement; $\Delta 2yr\_Ty_t$ is the change in the 2-year nominal Treasury yield over the same period; $Credit\_Risk_{i,t}$ is the bond's average credit rating at the time of the meeting, with higher values indicating riskier bonds (a unit increase means a one notch worse credit rating—e.g., BBB to BBB-); $\alpha_{t,m}$, $\alpha_{t,j}$, and $\alpha_{t,c}$ are fixed effects interacting each FOMC meeting with, respectively, a bond's years-to-maturity, the bond issuer's SIC2 industry, and an indicator variable for whether a bond is callable; $\varepsilon_{i,t}$ is the idiosyncratic error term. Standard errors are two-way clustered by FOMC meeting and by firm.

The sign on our coefficient of interest, β, tests for which of the two hypotheses—i.e., reaching for yield or information effects—best explains how the corporate bond market reacts to surprise changes in the stance of monetary policy. If $\beta > 0$, then monetary policy tightening ($\Delta 2yr_{Ty} > 0$) induces bonds with higher credit risk to outperform, while monetary easing ($\Delta 2yr_{Ty} < 0$) induces bonds with higher credit risk to underperform—consistent with an information effect of Federal Reserve policy announcements. Conversely, if $\beta < 0$, then riskier bonds outperform following monetary policy easing and underperform following tightening, indicating that reaching for yield best explains the price response to FOMC announcements.

Strictly speaking, $\beta < 0$ is a necessary but insufficient condition for the dominance of the reaching for yield effect. This is because, if $\beta < 0$, some of the differential performance of riskier corporate bonds could be explained by fundamental factors rather than reaching for yield. For example, if policy easing stimulates the economy, this may reduce the default risk more for bonds with lower credit ratings, thus causing them to outperform when interest rates fall. Nonetheless, our finding that $\beta > 0$ is sufficient to show that, for whatever reaching for yield effect there is, this is completely overwhelmed by the fed information effect. In that sense, we can conclude that reaching for yield is not the predominant way that the corporate bond market responds to surprise changes in the stance of monetary policy.

In the above specification, the fixed effects play an essential role. Our approach involves having a separate set of fixed effects for each FOMC meeting, which are in turn interacted with bond and issuer characteristics. This allows us to isolate the price reaction specifically attributable to credit risk, and thus cleanly test the hypotheses of interest, while removing the potentially confounding influence of other factors that may affect bond returns. In particular, the meeting-by-years-to-maturity fixed effects, $\alpha_{t,m}$, which involve a separate fixed effect for each year to maturity,[18] flexibly control for changes in the term structure of interest rates. Analogously, the meeting-by-industry fixed effects, $\alpha_{t,j}$, control for potentially differential industry-level responses from meeting to meeting, while the meeting-by-call-option fixed effects control for potential changes in the value of a bond's call option. In essence, after adjusting for industry effects and callability, our regressions always compare the price reactions of bonds that have the same time-to-maturity but different levels of credit risk. In robustness checks, we consider alternative, even tighter, specifications.

[18] Specifically, we compute the bond's time-to-maturity and round to the nearest year, creating a separate fixed effect for each year to maturity, each of which is then interacted with the meeting fixed effects.

5. Results

5.1. Baseline results

Table 3 presents our main findings. Column 1 runs the baseline specification and shows that bonds with higher credit risk outperform (underperform) following monetary policy tightening (easing). In particular, for a hypothetical 100 bp rise (fall) in the 2-year nominal yield on FOMC announcement days, a one notch decrease in a bond's credit rating (e.g., moving from a rating of BBB to BBB-) is associated with a 0.3 percent higher (lower) return. In other words, riskier corporate bonds outperform following contractionary monetary policy surprises and underperform following expansionary monetary policy surprises—consistent with a Fed information effect, but exactly the opposite to that predicted by the reaching for yield hypothesis.

Columns 2 and 3 of Table 3 address the concern that there may be difference in duration between bonds with higher versus lower credit risk, even after including fixed effects that hold constant the time-to-maturity. In particular, our aim is to rule out a potential "coupon effect," since bonds with higher coupon rates will, all else equal, have lower durations, and thus lower price sensitivities to changes in risk-free interest rates. In column 2, we control for this possibility by including in the regression an additional term that interacts the corporate bond's coupon rate with the meeting-by-years-to-maturity fixed effects. Doing so directly controls for the coupon rate in a way that allows for possibly differential effects for each meeting-by-years-to-maturity grouping. In column 3, we adopt a slightly different approach: we use the same set of fixed effects as in column 1, but now "duration-adjust" the return on each corporate bond. We do so by subtracting from the corporate bond return the return on a synthetic risk-free security with the same cash flows as the underlying corporate bond.[19] In both cases, for columns 2 and 3, the results are qualitatively similar to those in column 1, clearly indicating that the "coupon effect" cannot explain our findings.

The presence of FOMC meeting fixed effects in our baseline regression prevents us from measuring the standalone (or average) effect of interest rate changes on corporate bond returns. While the fixed effects control for a host of potential confounding factors, they limit us to measuring only the cross-sectional differences in returns based on credit risk. Column 4 of Table 3 estimates a specification that does not include any fixed effects, which allows us to examine the standalone effect of interest rate changes on corporate bond returns around FOMC meetings. In this regression, we include as explanatory variables the corporate bond's credit risk, the change in the 2-year Treasury yield, and the interaction of the two. Crucially, as a dependent variable, we use the adjusted return measure from column 3—as such, each corporate return is measured relative to a duration-matched Treasury security, giving us a spread-like measure of corporate bond returns.

Two results stand out. First, the interaction effect of the change in the 2-year Treasury yield with the corporate bond's credit risk is very similar in magnitude to the other specifications shown in columns 1 to 3. This indicates that our baseline results are not simply an artefact of using a highly saturated array of fixed effects; our results hold in a more simplified regression setup as well. Second, the standalone effect of an increase in the 2-year Treasury yield runs in the same direction as the interaction effect. In other words, our findings are not just limited to the

[19] Specifically, we compute the price of the synthetic risk-free security using the Treasury yield curve estimated by Gürkaynak, Sack, and Wright (2007); we then subtract this synthetic price from the price of the underlying corporate bond and calculate returns over the t-1 to t+1 window using these adjusted prices. The procedure is analogous to that used in Gilchrist and Zakrajšek (2012) to compute duration-matched corporate bond spreads to Treasury yields.

cross-section of corporate bond returns; rather, when interest rates rise following an FOMC meeting, on average, all corporate bonds prices rise relative to duration-matched Treasury securities, but riskier corporate bond prices appreciate by more.

In Table 4, we examine how our results vary by time period. We start, in column 1, by excluding the financial crisis (July 2008 through to June 2009). In column 2, we consider only the period prior to the financial crisis (pre-July 2008), while in column 3 we consider the period after the financial crisis (post-June 2009). Quite strikingly, our results are highly stable across all these specifications, with coefficient estimates little changed compared to our baseline estimates (Table 3, column 1). In other words, the corporate bond market's reaction to surprise changes in monetary policy reveals an information effect from Federal Reserve policy announcements that appears very stable over different sub-periods.

5.2. Meeting-by-meeting regressions

An alternative way of presenting the results is to run regression Eq. (1) separately for each FOMC meeting. We therefore run a meeting-by-meeting regression as follows:

(2) $$Ret_{i,t} = \beta_t \times Credit\_Risk_{i,t} + \alpha_{t,m} + \alpha_{t,j} + \alpha_{t,c} + \varepsilon_{i,t},$$

where, for a given FOMC meeting, β_t, measures the relative outperformance (or underperformance) of bonds with higher credit risk, conditional on the same fixed effects as before (i.e., years-to-maturity, industry, and callability). Importantly, these meeting-by-meeting regressions do not include the change in the Treasury yield as a regressor, since this a constant for each meeting. Of course, after running each meeting-by-meeting regression, we can then relate the estimated β_t's to the corresponding changes in the 2-year Treasury yield.

Figure 1 plots this relationship. The conclusions for this exercise are the same as shown in

Table 3—i.e., β_t is positive when interest rates rise around FOMC meetings, meaning that corporate bonds with higher credit risk bonds outperform. Conversely, when interest rates fall, β_t tends to be negative; i.e., riskier bonds underperform. The figure reveals that the relationship is approximately linear and is not driven by any particular sub-period, with roughly symmetric effects for rising versus falling Treasury interest rates. The coefficient estimate of the fitted line's slope shown in the figure is 0.331 (p=0.001), roughly similar to our estimates in Table 3, with R-squared of 9.9%.[20]

5.3. Alternative Treasury interest rates and further robustness tests

Table 5 considers the effect of other interest rate changes around FOMC announcement days, apart from changes in the 2-year nominal yield. In column 1, we start by decomposing the change in the 2-year yield into two components: (i) the surprise change in the current federal funds rate, as implied by federal funds futures contracts; and (ii) the surprise change in the spread between the 2-year yield and the current federal funds rate. The latter provides a measure of the change in the expected future path of monetary policy over the medium-term, excluding the component due to surprise changes in the current federal funds rate. Interestingly, the regression reveals that our baseline results cannot be explained by shocks the current federal funds rate. Compared to our baseline estimates, the coefficient associated with the surprise federal funds rate change is smaller in absolute magnitude, is not statistically significant, and has the opposite sign.[21] Rather, our baseline findings are driven entirely by unexpected changes in

[20] Our estimates of β_t using repeated cross-sections has some similarities with the procedure of Fama and Macbeth (1973), except for that, in our case, we are interested not in the simple time-series average of the β_t's, but rather how β_t varies conditional on the change in interest rates around FOMC meetings.

[21] Indeed, the negative sign is consistent with other studies that examined the corporate bond market response to shocks to the current federal funds rate, such as Cenesizoglu and Essid (2012), Javadi, Nejadmalayeri, and Krehbiel (2017), Guo, Kontonikas, and Maio (2020), and Anderson and Cesa-Bianchi (2020).

the spread between the 2-year yield and the current fed funds rate. This result supports the information effect hypothesis. Specifically, a steeper expected path of monetary policy over the next several quarters is interpreted by the corporate bond market as a positive signal about the economy, with risky corporate bonds earning higher returns.

An additional noteworthy point is that in recent years there have been relatively few sizeable shocks to the current federal funds rate around FOMC meetings. For one, shocks to the federal funds rate were particularly muted during the prolonged effective lower bound period. Moreover, heading into a given FOMC meeting, market participants in recent years arguably have a reasonably accurate idea about the FOMC's likely decision with respect to the current federal funds rate, as this is often hinted at beforehand through speeches and other communications. Our findings indicate, therefore, that news about the trajectory of future monetary policy on FOMC announcement days, rather than decisions concerning the current federal funds rate, convey more important information about the state of the economy. In this sense, our results are consistent with the findings of Gürkaynak, Sack, and Swanson (2005), who argue that focusing only on federal funds rate shocks, while ignoring forward guidance, misses a very important part of the overall effect of Federal Reserve policy announcements. This contrasts our study with others that have examined the response of asset prices to monetary policy surprises, but only in the context of federal fund rate shocks.

Column 2 of Table 5 considers the effect of using the 10-year nominal rate instead of the 2-year nominal rate. This gives us essentially the same result. In column 3, we decompose the change in the 10-year rate into the change in the 2-year rate and the change the spread between the 10-year and 2-year rates, with the latter measuring the far-term slope of the yield curve. Changes in the slope of the yield curve are frequently interpreted by both researchers and market participants as a valuable predictor of future economic activity, with a higher (lower) slope typically signaling a strengthening (weakening) economy. Column 3 shows that when the yield curve steepens (flattens) on FOMC announcement days, riskier corporate bonds outperform (underperform)—exactly as predicted by a Fed information effect. In column 4, we add the far-term yield curve slope to our regression from column 1, giving us a full decomposition of changes in 10-year nominal yields into changes in the current federal funds rate, changes in the near-term yield curve slope (2-year yield minus fed funds) and changes in the far-term yield curve slope (10-year minus 2-year yield). Consistent with our prior results, a steepening yield curve, using both the near-term and far-term measures, is associated with outperformance by riskier corporate bonds, while surprise changes in the current federal funds rate do not have statistically significant effects.

In column 5 of Table 5, we decompose the change in the 2-year nominal rate into the change in the 2-year real interest rate, as measured by the 2-year TIPS yield, and the corresponding change in the implied breakeven inflation rate (the difference between the nominal and real rates).[22] This reveals that the effect of a change in the 2-year real interest rate is essentially the same as the 2-year nominal rate. Moreover, higher expected inflation following FOMC announcements, as proxied for by an increase in the breakeven inflation rate, is also associated with outperformance by riskier corporate bonds. In the period that we consider, higher expected inflation was generally regarded as good economic news; our sample, which starts in 2002, covers the entire post-crisis decade during which persistently low inflation coinciding with tepid economic growth was a large concern. As such, market expectations of higher inflation

[22] Our results are qualitatively unchanged if we instead use the 10-year TIPS yield and the 10-year implied inflation breakeven.

following an FOMC announcement signal higher expected growth. When that occurs, riskier corporate bonds outperform, exactly as predicted by the Fed information effect hypothesis.

Table 6 presents several robustness tests. One possible concern with our approach is that a bond's credit risk may be correlated with other bond-level characteristics that we have not already controlled for, in which case these other characteristics may be driving the differences in corporate bonds returns around FOMC meetings. Although this arguably seems unlikely, column 1 examines this possibility by additionally including a bond fixed effect to the regression. The presence of a bond fixed effect means that the specification examines how the *same* bond reacts to monetary policy surprises as its credit risk changes over time. As shown, including a bond fixed effect has close to no effect on our main estimate, thus ruling out the possibility that some other unobserved bond-level characteristic, apart from credit risk, might be driving our results.

Column 2 of Table 6 considers an alternative corporate bond return measure, where value-weighted prices are computed based only on disseminated trades, excluding agency and interdealer trades, and excluding trades under $100,000. Requiring that prices are calculated based only on trades greater than $100,000 rules out the possibility that corporate bond market illiquidity might somehow be explain our findings. If anything, when we impose these additional filters, the estimated effects becomes somewhat stronger.

In column 3, we consider an alternative way of ruling out corporate bond market illiquidity as a potential explanation of our findings. Specifically, we run weighted least squares regressions, using each bond's total dollar trading volume on day *t-1* and day *t+1* as weights. As shown, the coefficient estimate is similar to the baseline specification and remains highly statistically significant. This gives us further confidence that illiquidity cannot be an explanation for our findings.

Column 4 excludes the worst rated bonds from the sample, requiring that bonds that have a credit rating no worse than B- (or equivalent). Doing so has little effect on our results, thus ruling out the possibility that our results might be driven by the lowest-rated segment of the corporate bond market.

Column 5 examines whether there is asymmetry in the effect of rising versus falling interest rates around FOMC meetings. Specifically, we split our main explanatory variable into two components, depending on whether the change in the 2-year Treasury yield is positive or negative. As shown, both coefficients are approximately similar in magnitude and are not statistically different from each other. Consistent with our finding from the meeting-by-meeting regressions shown in Figure 1, we conclude that rising versus falling interest rates around FOMC meetings have symmetric effects on the cross-section of corporate bond returns.

5.4. The effect of economic uncertainty

Table 7 considers the effect of economic uncertainty. The information effect hypothesis implies that Federal Reserve policy announcements are likely to be more valuable signals about the state of the economy when economic uncertainty is higher. To test this, we use two measures of economic uncertainty: the VIX, shown in column 1, and the measure of macroeconomic uncertainty of Jurado, Ludvigson, and Ng (2015), shown in column 2. Specifically, we interact our main explanatory variable with indicators for whether these uncertainty measures are high or not at the time of a given FOMC meeting. For both measures, we categorize states of high uncertainty as those where the measure is in the top third of its distribution, as observed just prior to each FOMC meeting. The results indeed confirm a stronger Fed information effect when economic uncertainty is higher: for both measures, the coefficient estimates are larger, and statistically different, during periods of high versus low uncertainty.

6. Conclusions

We show that reaching for yield is not the predominant response of corporate bond market investors to surprise changes in the stance of monetary policy. Following an unanticipated tightening (easing) of monetary policy on Federal Open Markets Committee announcement days, returns on corporate bonds with higher credit risk outperform (underperform) relative to safer corporate bonds—exactly the opposite of what a reaching for yield effect would predict. Rather, our results indicate that investors interpret surprise monetary tightening (easing) as signaling good (bad) news about economic fundamentals. Overall, our findings therefore reveal a strong information component of Federal Reserve policy announcements.

References

Adrian, Tobias, and Nellie Liang, 2018, Monetary policy, financial conditions, and financial stability, *International Journal of Central Banking* 14(1), 73–131.

Anderson, Gareth, and Ambrogio Cesa-Bianchi, 2020, Crossing the credit channel: Credit spreads and firm-heterogeneity. Working paper, Bank of England, No. 854.

Andrade, Philippe and Filippo Ferroni, 2016, Delphic and Odyssean monetary policy shocks: Evidence from the Euro-area. Discussion Paper 12-16, University of Surrey.

Bao, Jack, Jun Pan, and Jiang Wang, 2011, The illiquidity of corporate bonds, *Journal of Finance* 66(3), 911-–946.

Bauer, Michael D., and Eric T. Swanson, 2020, The Fed's response to economic news explains the "Fed information Effect". Working Paper, Federal Reserve Bank of San Francisco and University of California, Irvine.

Bernanke, Ben S., and Kenneth N. Kuttner, 2005, What explains the stock market's reaction to Federal Reserve policy? *Journal of Finance* 60(3), 1221–1257.

Boyarchenko, Nina, Valentin Haddad, and Matthew C. Plosser, 2017. The Federal Reserve and market confidence. Working paper, Federal Reserve Bank of New York Staff Reports 773.

Bu, Chunya, John Rogers, and Wenbin Wu, 2020, A unified measure of Fed monetary policy shocks. Working Paper, Board of Governors of the Federal Reserve System.

Campbell, Jeffrey R., Charles L. Evans, Jonas D.M. Fisher, Alejandro Justiniano, Charles W. Calomiris, and Michael Woodford, 2012, Macroeconomic effects of federal reserve forward guidance, *Brookings Papers on Economic Activity* (Spring), 1–80.

Campbell, Jeffrey R., Jonas D.M. Fisher, Alejandro Justiniano, and Leonardo Melosi, Forward guidance and macroeconomic outcomes since the financial crisis, in *NBER Macroeconomics Annual* 2016, Vol. 31: University of Chicago Press.

Cenesizoglu, Tolga, and Badye Essid, 2012, The effect of monetary policy on credit spreads, *Journal of Financial Research* 35(4), 581–613.

Cieslak, Anna, and Andreas Schrimpf, 2019, Non-monetary news in central bank communication, *Journal of International Economics* 118, 293–315.

Cochrane, John H., and Monika Piazzesi, 2002, The fed and interest rates—a high-frequency identification, *American Economic Review* 92(2), 90–95.

Fama, Eugene F., and James D. MacBeth, 1973, Risk, Return, and Equilibrium: Empirical Tests, *Journal of Political Economy* 81(3), 607–636.

Faust, Jon, Eric T. Swanson, and Jonathan H. Wright, 2004, Do Federal Reserve policy surprises reveal superior information about the economy? *Contributions in Macroeconomics* 4(1), 1–29.

Fleming, Michael J., and Eli M. Remolona, 1999, Price formation and liquidity in the US Treasury market: The response to public information, *Journal of Finance* 54(5), 1901–1915.

Gertler, Mark, and Peter Karadi, 2015, Monetary policy surprises, credit costs, and economic activity, *American Economic Journal: Macroeconomics* 7(1), 44–76.

Gilchrist, Simon, David López-Salido, and Egon Zakrajšek, 2015, Monetary policy and real borrowing costs at the zero lower bound, *American Economic Journal: Macroeconomics* 7(1), 77–109.

Gilchrist, Simon, and Egon Zakrajšek, 2012, Credit spreads and business cycle fluctuations, *American Economic Review* 102(4), 1692–1720.

Goldstein, Michael A., and Edith S. Hotchkiss, 2020, Providing liquidity in an illiquid market: Dealer behavior in US corporate bonds, *Journal of Financial Economics* 135(1), 16–40.

Guo, Haifeng, Alexandros Kontonikas, and Paulo Maio, 2020, Monetary policy and corporate bond returns, *Review of Asset Pricing Studies* 10(3), 441–489.

Gürkaynak, Refet S., Brian Sack, and Eric T. Swanson, 2005, Do actions speak louder than words? The response of asset prices to monetary policy actions and statements, *International Journal of Central Banking* 1(1), 55–93.

Gürkaynak, Refet S., Brian Sack, and Jonathan H. Wright, 2007, The US Treasury yield curve: 1961 to the present, *Journal of Monetary Economics* 54(8), 2291–2304.

Gürkaynak, Refet S., Brian Sack, and Jonathan H. Wright, 2010, The TIPS yield curve and inflation compensation, *American Economic Journal: Macroeconomics* 2(1), 70–92.

Hanson, Samuel G., and Jeremy C. Stein, 2015, Monetary policy and long-term real rates, *Journal of Financial Economics* 115(3), 429–448.

Jarociński, Marck, and Peter Karadi, 2020, Deconstructing monetary policy surprises – the role of information shocks, *American Economic Journal: Macroeconomics* 12(2), 1–43.

Javadi, Siamak, Ali Nejadmalayeri, and Timothy L. Krehbiel, 2017, Do FOMC actions speak loudly? Evidence from corporate bond credit spreads, *Review of Finance* 22(5), 1877–1909.

Jurado, Kyle, Sydney C. Ludvigson, and Serena Ng, 2015, Measuring uncertainty, *American Economic Review* 105(3), 1177–1216.

Kerssenfischer, Mark, 2018, Information effects of Euro-area monetary policy: New evidence from high-frequency futures data. Working Paper, Deutsche Bundesbank.

Lakdawala, Aeimit and Matthew Schaffer, 2019, Federal Reserve private information and the stock market, *Journal of Banking and Finance* 106, 34–49.

Lunsford, Kurt, 2020, Policy language and information effects in the early days of Federal Reserve forward guidance, *American Economic Review* 110(9), 2899–2934.

Loh, Roger K., and René M. Stulz, 2011, When are analyst recommendation changes influential?, *Review of Financial Studies* 24(2), 593–627.

López-Salido, David, Jeremy C. Stein, and Egon Zakrajšek, 2017, Credit-market sentiment and the business cycle, *Quarterly Journal of Economics* 132(3), 1373–1426.

Mian, Atif, Amir Sufi, and Emil Verner, 2017, Household debt and business cycles worldwide, *Quarterly Journal of Economics* 132(4), 1755–1817.

Miranda-Agrippino, Silvia and Giovanni Ricco, 2019, The transmission of monetary policy shocks. Working Paper 657, Bank of England.

Nakamura, Emi, and Jón Steinsson, 2018, High-frequency identification of monetary non-neutrality: the information effect, *Quarterly Journal of Economics* 133(3), 1283–1330.

Ozdagli, Ali, and Mihail Velikov, 2020, Show me the money: The monetary policy risk premium, *Journal of Financial Economics* 135(2), 320–339.

Ramey, Valerie, 2016, Macroeconomic shocks and their propagation, *Handbook of Macroeconomics* (eds. Taylor, John, and Uhlig, Harald), chapter 2, 71–162.

Romer, Christina D., and David H. Romer, 2000, Federal Reserve information and the behavior of interest rates, *American Economic Review* 90(3), 429–457.

Schularick, Moritz, and Alan M. Taylor, 2012, Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870-2008, *American Economic Review* 102(2), 1029–1061.

Sharpe, Steven A., Nitish R. Sinha, and Christopher A. Hollrah, 2020, The power of narratives in economic forecasts, Board of Governors of the Federal Reserve System, FEDS Working Paper 2020-001.

Figure 1: Meeting-by-meeting results

The figure presents the results from running the following regression separately for each FOMC meeting: $Ret_{i,t} = \beta_t \times Credit\_Risk_{i,t} + \alpha_{t,m} + \alpha_{t,j} + \alpha_{t,c} + \varepsilon_{i,t}$. The estimated β_t's are then plotted against the change in the 2-year nominal Treasury yield for each meeting. The coefficient estimate of the fitted line' slope shown below is 0.331 (p=0.001), with R-squared of 9.9%.

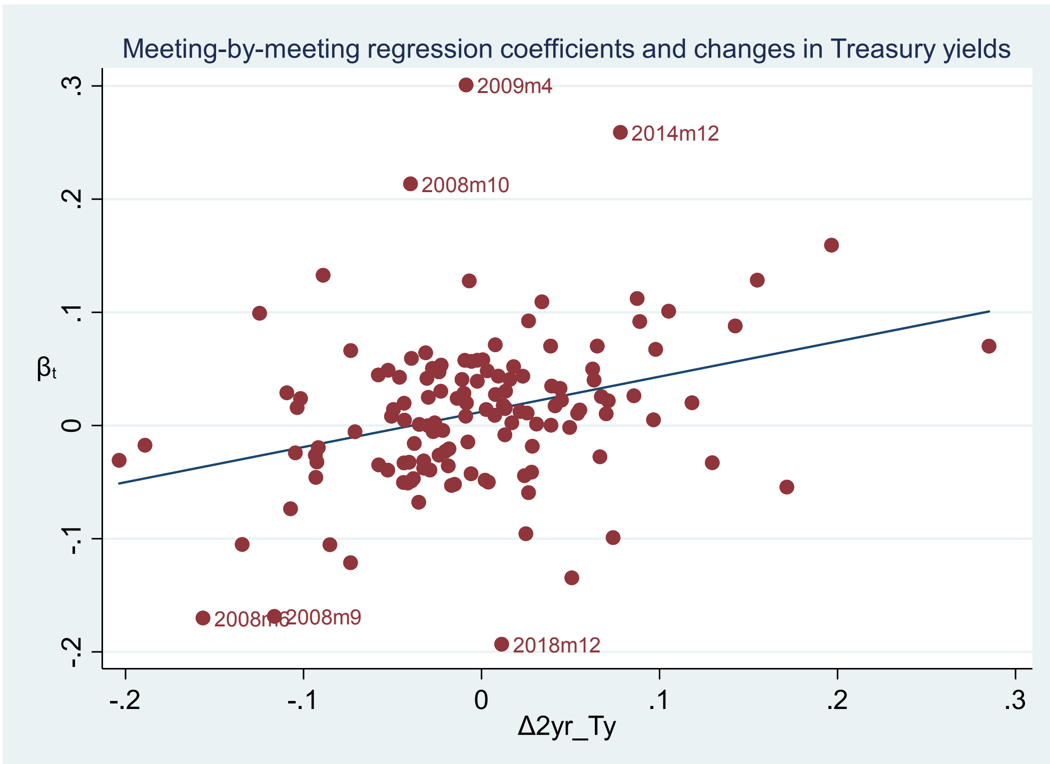

Table 1: Summary statistics of interest rate changes around FOMC meetings

This table presents summary statistics of various interest rates changes around FOMC meetings using a *t*-1 to *t*+1 day window. The sample consists of 135 scheduled FOMC meeting from August, 2002, to June, 2019.

				Percentile:				
	Obs.	Mean	S.d.	Min.	10th	50th	90th	Max.
Change in:								
2-year nominal	135	0.00	0.07	-0.20	-0.09	-0.01	0.08	0.28
Effective fed funds rate	119	0.00	0.04	-0.22	-0.02	0.00	0.02	0.13
Slope, 2-year minus fed funds	119	0.00	0.07	-0.18	-0.08	-0.01	0.08	0.18
10-year nominal	135	-0.01	0.11	-0.51	-0.13	-0.02	0.11	0.28
Slope, 10- minus 2-year	135	-0.01	0.09	-0.39	-0.10	-0.01	0.09	0.19
2-year TIPS	123	-0.02	0.15	-0.93	-0.17	-0.02	0.14	0.29
2-year inflation comp.	123	0.02	0.13	-0.33	-0.10	0.02	0.09	0.93
10-year TIPS	135	-0.02	0.12	-0.61	-0.13	0.00	0.11	0.32
10-year inflation comp.	135	0.00	0.06	-0.22	-0.07	0.00	0.09	0.26

Table 2: Summary statistics of corporate bond returns around FOMC meetings

This table shows descriptive statistics for individual corporate bond returns and prices based on our sample of 135 scheduled FOMC meeting from August, 2002, to June, 2019. Daily prices are computed as the volume-weighted average daily trading price for each bond using data from TRACE. Returns are calculated using a *t*-1 to *t*+1 day window around each FOMC meeting. The table shows both raw corporate bond returns and "adjusted"-returns, which subtract from the raw corporate bond return the return on a synthetic risk-free security with the same cash flows as the underlying corporate bond. Panel A shows the full sample, while Panels B and C split the sample depending on whether monetary policy tightens or eases, respectively, as measured by the directional change in the 2-year nominal Treasury yield around each FOMC meeting.

Panel A: Full sample

				Percentile:				
	Obs.	Mean	S.d.	Min.	10th	50th	90th	Max.
Return, %, *t*-1 to *t*+1	330,005	0.11	1.41	-6.30	-1.17	0.05	1.43	7.15
Return-Adj., %, *t*-1 to *t*+1	330,005	0.077	1.43	-13.88	-1.16	0.04	1.36	11.71
Price, $, *t*-1	330,005	102.0	11.4	25.2	92.2	102.0	113.8	136.2

Panel B: Policy tightening, Δ2yr_Ty > 0

				Percentile:				
	Obs.	Mean	S.d.	Min.	10th	50th	90th	Max.
Return, %, *t*-1 to *t*+1	147,730	-0.09	1.43	-6.30	-1.42	-0.12	1.23	7.15
Return-Adj., %, *t*-1 to *t*+1	147,730	0.247	1.45	-13.88	-0.96	0.13	1.63	11.71
Price, $, *t*-1	147,730	102.6	11.3	25.4	92.9	102.4	114.4	136.2

Panel C: Policy easing, Δ2yr_Ty < 0

				Percentile:				
	Obs.	Mean	S.d.	Min.	10th	50th	90th	Max.
Return, %, *t*-1 to *t*+1	182,275	0.27	1.38	-6.30	-0.90	0.20	1.55	7.15
Return-Adj., %, *t*-1 to *t*+1	182,275	-0.062	1.39	-10.91	-1.30	-0.03	1.12	9.02
Price, $, *t*-1	182,275	101.6	11.4	25.2	91.6	101.8	113.3	136.2

Table 3: Corporate bond returns around FOMC meetings by credit rating

This table presents the main results examining how corporate bonds with different levels of credit risk react to surprise changes in the stance of monetary policy. Δ2yr_Ty is the change in the 2-year nominal Treasury yield around FOMC announcement days. Credit_Risk is the bond's average credit rating at the time of the meeting, with higher values indicating riskier bonds (a unit increase means a one notch worse credit rating—e.g., BBB to BBB-). Column 1 is our baseline specification, which includes fixed effects interacting each FOMC meeting with a bond's years-to-maturity (i.e., a separate fixed effect for every year-to-maturity to control for changes in the term structure of interest rates), the bond issuer's SIC2 industry, and an indicator variable for whether a bond is callable. Column 2 additionally includes an interaction term of the coupon rate with the Meeting*Years-to-maturity fixed effects. In column 3, the return is "duration-adjusted" by subtracting from the corporate bond return the return on a synthetic risk-free security with the same cash flows as the underlying corporate bond, giving us a spread-like measure of corporate bond returns. Column 4 omits all fixed effects to examine the standalone effect of changes in the 2-year Treasury yield on average corporate bond returns, using the adjusted return measure from column 3. Standard errors, shown in parentheses underneath the coefficient estimates, are two-way clustered by FOMC meeting and by firm. *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Ret.	(2) Ret.	(3) Ret.-Adj.	(4) Ret.-Adj.
Δ2yr_Ty*Credit_Risk	0.303***	0.222***	0.274***	0.246***
	(0.082)	(0.080)	(0.081)	(0.082)
Δ2yr_Ty				1.427**
				(0.593)
Credit_Risk	0.011*	0.016***	0.012**	0.009*
	(0.006)	(0.005)	(0.005)	(0.005)
Meeting*Years-to-maturity FE	✓	✓	✓	
Meeting*SIC2 FE	✓	✓	✓	
Meeting*Callable FE	✓	✓	✓	
Meeting*Years-to-maturity FE*Coupon		✓		
Observations	330,005	330,005	330,005	330,005
Adjusted R^2	0.194	0.215	0.209	0.029

Table 4: Sample splits by time period

This table examines whether our estimates vary by sub-period. Column 1 excludes the financial crisis (July, 2008, through to June, 2009). Column 2 considers only the period prior to the financial crisis (pre-July, 2008). Column 3 considers the period after the financial crisis (post-June, 2009). Standard errors, shown in parentheses underneath the coefficient estimates, are two-way clustered by FOMC meeting and by firm. *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Exclude crisis (1) Ret.	Pre-crisis (2) Ret.	Post-crisis (3) Ret.
Δ2yr_Ty*Credit_Risk	0.297***	0.257**	0.346**
	(0.088)	(0.115)	(0.145)
Credit_Risk	0.008	0.008	0.008
	(0.005)	(0.009)	(0.007)
Meeting*Years-to-maturity FE	✓	✓	✓
Meeting*SIC2 FE	✓	✓	✓
Meeting*Callable FE	✓	✓	✓
Observations	317,029	80,720	236,309
Adjusted R^2	0.177	0.121	0.213

Table 5: Corporate bond returns by credit risk and other interest rate changes

This table considers the effect of different interest rate changes around FOMC announcement days. Column 1 decomposes the change in the 2-year yield into the surprise change in the current federal funds rate and the surprise change in the spread between the 2-year yield and the current federal funds rate. Column 2 examines the effect of changes in the 10-year yield. Column 3, decomposes 10-year yield changes into changes in the 2-year yield and the far-tem yield curve slope (10-year minus 2-year yield). Column 4 includes the far-term yield curve slope to the regression in column 1. Column 5 decomposes changes in the 2-year nominal yield into changes the 2-year real interest rate, as measured by the TIPS yield, and the implied inflation breakeven rate. Standard errors, shown in parentheses underneath the coefficient estimates, are two-way clustered by FOMC meeting and by firm. *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Ret.	(2) Ret.	(3) Ret.	(4) Ret.	(5) Ret.
ΔFed_Funds*Credit_Risk	-0.160			-0.108	
	(0.205)			(0.209)	
(Δ2yr_Ty - ΔFed_Funds)*Credit_Risk	0.410***			0.373***	
	(0.098)			(0.098)	
Δ10yr_Ty*Credit_Risk		0.267***			
		(0.057)			
(Δ10yr_Ty - Δ2yr_Ty)*Credit_Risk			0.253***	0.242***	
			(0.081)	(0.078)	
Δ2yr_Ty*Credit_Risk			0.288***		
			(0.081)		
Δ2yr_TIPS*Credit_Risk					0.341***
					(0.094)
Δ2yr_BkEven*Credit_Risk					0.442***
					(0.125)
Credit_Risk	0.011*	0.012**	0.012**	0.012**	0.009
	(0.006)	(0.005)	(0.005)	(0.006)	(0.006)
Meeting*Years-to-maturity FE	✓	✓	✓	✓	✓
Meeting*SIC2 FE	✓	✓	✓	✓	✓
Meeting*Callable FE	✓	✓	✓	✓	✓
Observations	289,238	330,005	330,005	289,238	308,774
Adjusted R^2	0.200	0.196	0.196	0.202	0.205

Table 6: Robustness

This table presents key robustness checks. Column 1 includes an additional bond fixed effect to our baseline specification. Column 2 uses an alternative corporate bond return measure, where value-weighted prices are computed based only on disseminated trades, excluding agency and interdealer trades, and excluding trades under $100,000. Column 3 presents a weighted least squares regression, with weights based on each bond's total dollar volume traded. Column 4 includes only bonds that have a credit rating no worse than B- (or equivalent). Column 5 examines potential asymmetric effects based on whether changes in the 2-year are positive or negative. Standard errors, shown in parentheses underneath the coefficient estimates, are two-way clustered by FOMC meeting and by firm. *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Include bond fixed effect (1) Ret.	No agency, interdealer or small trades (2) Ret.*	Volume-weighted (3) Ret.	Exclude lowest rated bonds (4) Ret.	Rate rises v. cuts (5) Ret.
Δ2yr_Ty*Credit_Risk	0.328***	0.415***	0.373***	0.343***	
	(0.080)	(0.116)	(0.128)	(0.087)	
(Δ2yr_Ty, if positive)*Credit_Risk					0.279*
					(0.142)
(Δ2yr_Ty, if negative)*Credit_Risk					0.331**
					(0.152)
Credit_Risk	0.041***	0.017**	0.026***	0.003	0.012
	(0.009)	(0.007)	(0.009)	(0.005)	(0.008)
Meeting*Years-to-maturity FE	✓	✓	✓	✓	✓
Meeting*SIC2 FE	✓	✓	✓	✓	✓
Meeting*Callable FE	✓	✓	✓	✓	✓
Bond FE	✓				
Positive = Negative, *p*-value					0.833
Observations	323,927	111,548	330,005	309,929	330,005
Adjusted R^2	0.215	0.413	0.454	0.203	0.194

Table 7: Economic uncertainty

This table investigates heterogeneous effects based on whether economic uncertainty is high or not at the time of a given FOMC meeting. Column 1 measures economic uncertainty using the VIX, while column 2 uses the macroeconomic uncertainty measure of Jurado, Ludvigson, and Ng (2015). For both measures, states of high uncertainty are categorized as those where the relevant measure is in the top third of its distribution, as observed just prior to each FOMC meeting. Indicators for high versus low uncertainty are then interacted with our main explanatory variable. Standard errors, shown in parentheses underneath the coefficient estimates, are two-way clustered by FOMC meeting and by firm. *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Ret.	(2) Ret.
Δ2yr_Ty*Rating*High_VIX	0.457***	
	(0.129)	
Δ2yr_Ty*Rating*Low_VIX	0.145	
	(0.088)	
Δ2yr_Ty*Rating*High_Macro_Uncertainty		0.485***
		(0.118)
Δ2yr_Ty*Rating*Low_Macro_Uncertainty		0.207**
		(0.098)
Credit_Risk	0.012**	0.012**
	(0.006)	(0.005)
Meeting*Years-to-maturity FE	✓	✓
Meeting*SIC2 FE	✓	✓
Meeting*Callable FE	✓	✓
High = Low, *p*-value	0.048**	0.069*
Observations	330,005	330,005
Adjusted R^2	0.194	0.194