

CHANGING PATTERNS OVER THE FOMC CYCLE

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Abstract:

We document that in the period 2017 to 2022, the US stock market did not feature the same pattern of higher excess stock returns in even weeks following Federal Open Market Committee (FOMC) announcements as in the period 1994 to 2016. We show that timing of Board of Governors meetings and direction of Fed funds target rate movements affect US market returns in both periods, and connect changes in these factors to the distortion of the even-week return pattern. The behavior of uncertainty over the FOMC cycle, both for the 1994-2016 and the 2017-2022 period, shows that drops in uncertainty neither are unique to the time of FOMC announcements nor persist in the post-sample period. Followingly, we argue that the resolution of a FOMC uncertainty risk premium is not what drives return- patterns around FOMC announcements.

Keywords:

FOMC, Federal Reserve Board of Governors, Pre-FOMC announcement drift, VIX, uncertainty, macro-announcements

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I. Introduction

What drives patterns of excess stock returns around macroeconomic announcements? In the recent decade, researchers have demonstrated a soaring interest in the relationship between the behavior of the stock market and pre-scheduled macroeconomic announcements, with a particular focus on monetary policy announcements by the Federal Reserve (the Fed). Early papers within this strand of literature have documented that policy announcements do have a direct impact on the stock market. Bernanke and Kuttner (2005) show that a hypothetical 25 basis point surprise decrease in the Federal funds rate leads to approximately 1% increase in broad stock indices. Savor and Wilson (2013) take a closer look at announcement days and find that US stocks systematically generate significantly positive excess returns on pre-scheduled announcement days of information with macroeconomic implications, explained by an equity premium for holding the risk embedded in these announcements. While these findings can be explained with traditional asset-pricing models, novel results presented by Lucca and Moench (2015) have been more difficult to derive to a risk-based explanation. They find that over the period 1994 to 2011, the entire risk premium connected to Federal Open Market Committee (FOMC) announcements is earned in the 24 hours *leading up to* the announcements, while the post-announcement returns are not significantly different from zero. The authors show that the result holds regardless of the direction of the coming news announcement and are not accompanied with increased variance in stock returns, suggesting that a traditional risk-based model is incapable of explaining the pre-FOMC announcement drift.

Amidst these findings, several studies have been conducted with the aim of bringing clarity into the peculiar pattern of a pre-FOMC announcement drift. Cieslak, Morse and Vissing-Jorgensen (2019) expand the scope of investigation by studying not only the behavior of the US stock market in the hours around the FOMC announcements, but the entire period between two FOMC meetings, referred to as a “FOMC cycle”. They find that, over the period 1994 to 2016, US stocks followed a pattern of biweekly excess returns. In even weeks, 0, 2, 4 and 6, of the FOMC cycle, US excess stock returns were significantly higher than odd weeks. The authors tie this pattern to biweekly decision-making at the Fed, through Federal Reserve Board of Governors meetings. They also argue that the systematically accommodating monetary policy during the period contributed to the observed pattern. Most importantly, the channel of informal communication is, Cieslak et al. (2019) argue, what led the market to react to the monetary policy between official FOMC announcements. With supporting evidence from a close examination of the timing of Board of Governors meetings, Fed Funds futures, stock market return patterns, together with narrative evidence of informal information flows, Cieslak et al. (2019) argue that the pre-announcement drift and the pattern of stock returns over the FOMC cycle is driven by Fed leaks.

To better understand the underlying drivers of the stock return pattern over the FOMC cycle, this study expands on the literature by prolonging the sample to years after the original period 1994 to 2016. This post-sample period features characteristics which makes it an interesting subject for examination. Firstly, it is overall a period characterized by proportionally more Fed funds rate increases than the original sample period. Cieslak et al. (2019) argue that the biweekly pattern of excess returns is a consequence of accommodating policy in response to poor market performance, that systematically has

been underestimated by investors, and as a result, driven down the equity premium once knowledge about the accommodating policy reached the market. As opposed to the 1994-2016 period which on average featured accommodating monetary policy, the post-sample period is characterized by relatively restrictive monetary policy. Except for the two precipitous Fed funds rate drops in March 2020 as a response to the Covid-19 pandemic, the period exhibited only 3 occasions of interest rate decreases, but 14 occasions of interest rate increases, resulting in a total 425 basis point increase in Fed funds rate over the period. Although a “promise to act”, by lowering rates in case of poor market returns, might still be present under such conditions, transcripts from FOMC meetings indicate a less accommodative stance from the beginning of our new sample period, with rapidly rising equity valuations seen rather as a concern than something desirable (see extracts of FOMC meeting transcripts in Appendix 1). Moreover, multiple Fed funds rate increases in 2022 despite poor market performance also signifies less regard taken to poor stock market performance in the post-sample period.

Second, the schedule of Board of Governors meetings, which Cieslak et al. (2019) argue is the source for the biweekly decision-making at the Fed, has changed in the post-sample period. The explanation put forward by Cieslak et al. (2019) as to why even weeks of the FOMC cycle feature higher excess returns is that the Federal Reserve Board of Governors convenes in one of the two days prior to a FOMC meeting, and then typically holds a meeting every other week throughout the cycle. Starting from the first FOMC cycle in the post-sample period, the last Board of Governors meetings prior to the FOMC meetings were continuously held on FOMC day -7 rather than in one of the two days before. Moreover, the post-sample period also features Board of Governors meetings less regularly throughout the FOMC cycle.

Third, in the post-sample period the biweekly pattern of excess returns is known to investors. Cieslak et al. (2019) argue that the impact of the accommodating policy systematically has been unexpected by investors, leading to a decrease in risk premium once the news has been unveiled. If the biweekly excess returns are driven by mis-calibrated expectations, the acknowledgment of such error would lead informed investors to adjust their expectations accordingly, which would eventually eliminate the pattern of biweekly excess returns (McLean and Pontiff, 2016).

In the light of this background, studying the pattern of returns over the FOMC cycle in a post-sample period serves several purposes. Firstly, expanding the aggregate sample period offers an opportunity to test whether the factors Cieslak et al. (2019) use to connect the pattern to the Fed in fact are the true drivers of it. If the timing of Board of Governors meetings as well as the nature of the policy decided at these have been the drivers for the biweekly pattern, changes to these would consequently lead to a changed pattern. Secondly, such investigation offers additional knowledge to the debate of whether return patterns around the FOMC announcement and throughout the cycle are driven by risk-based explanations or by informal news of systematically accommodating policy. Based on this, we aim to answer the following question: Does the pattern of higher US excess stock returns in even weeks of the FOMC cycle persist after 2016?

To examine whether the biweekly pattern of excess returns over the FOMC cycle has persisted in the post-sample period, we collect daily data of the excess returns of the US stock market. We gather the dates of all pre-scheduled FOMC meetings to relate the performance of the stock market to the FOMC cycles. Data of the timing of the discount rate meetings held by the Federal Reserve we obtain to investigate the importance of the timing of the decision-making by the Fed. In addition, we gather Fed funds target rates to

evaluate if the direction in which the Fed makes monetary policy decisions influences the impact of the Fed decision-making on the stock market. To guarantee comparability, as well as legitimacy of our contribution, we follow as closely as possible the methodology and data sources of Cieslak et al. (2019).

Our results reveal that the pattern of significantly higher excess returns in even weeks of the FOMC cycle is no longer present in the 2017 to 2022 period. In this post-sample period, daily US stock returns are on average lower in even weeks than odd weeks in the FOMC cycle. In week 0 of the cycle, excess returns were on average 17 basis points lower than in odd weeks, significant on the 10% level, and excess returns in weeks 2, 4 and 6 were on average 5 basis points lower than days in odd weeks, while not significant at the 10% level.

Acknowledging that the overall policy conducted by the Fed is more restrictive in the 2017 to 2022 period relative to the original sample period, and changes in timing of Board of Governors meetings, we examine if the occurrence of a Board of Governors meetings affects the US stock market. We do this by testing the performance of US stocks in the week following Board of Governors meetings while also controlling for the yearly change in Fed Funds target rate. Our results indicate that the effect of the two factors on daily excess return is approximately the same over the two periods, suggesting that changes in these factors led to the distortion of return pattern between FOMC announcements.

Lastly, bearing in mind that there exist other explanations beyond the leakage-story suggested by Cieslak et al. (2019) to explain return patterns around FOMC announcement, we follow up with a discussion on their different implications. Since many recent papers have explained the pre-FOMC announcement drift through the resolution of an uncertainty risk factor, we connect to these by investigating the behavior of uncertainty, proxied by the VIX index, over the entire FOMC cycle. By regarding the behavior of VIX over the FOMC cycle, in relation to the evolution of excess return, we further add on the research by Cieslak et al. (2019) as they do not formally investigate behavior of uncertainty between FOMC announcements. Our results show that for the period 1994-2016, resolution of VIX accompanied by high excess returns does not only occur just prior to FOMC announcements, but biweekly throughout the entire cycle, suggesting that such pattern is not uniquely linked to the occurrence of an FOMC announcement. Furthermore, results for the 2017-2022 period indicate that also the behavior of VIX over the FOMC cycle has changes its pattern in the post-sample period. In 2017 to 2022 VIX no longer drops in the days prior to FOMC announcements, further suggesting that both resolution of uncertainty and patterns of excess returns around FOMC announcements are not driven purely by a risk-premium inherently linked to the announcement. Rather, we argue that the resolution in uncertainty likely is caused by new information reaching the market through informal communication channels upon Board of Governors meetings.

II. Theoretical Framework

This paper most closely relates to the strand of literature that investigates the relation between the stock market and macroeconomic announcements, and more specifically the behavior of the US stock market around monetary policy decisions by the Fed. Building on earlier findings showing that announcement days are associated with significantly higher excess returns unconditionally of the nature of the announcement (Savor and Wilson, 2013), Lucca and Moench (2015) show that this unconditional return in fact occurs prior to the announcements. This finding of the pre-FOMC announcement drift by Lucca and Moench (2015) suggests that the excess returns are not explained by the risk in holding stocks at the time of the announcement. Cieslak et al. (2019), show that over the period 1994 to 2016, US stocks exhibit biweekly peaks in excess returns around FOMC announcements. Based on their finding, Cieslak et al. (2019) argue that the pre-FOMC announcement drift is part of a larger pattern driven by news about accommodating policy from the Fed, slipping out from regularly scheduled Board of Governors meetings. In line with Cieslak et al. (2019), our scope of investigation spans to include all days of the FOMC cycle, not only the days around the announcement. Different from Cieslak et al. (2019), our study focuses on a post-sample period including the years 2017-2022. Moreover, motivated by the fact that Cieslak et al. (2019) tie the pattern to accommodating policy and the biweekly occurrence of Board of Governors meetings, we pay special attention to the behavior of the stock market following such meetings while considering the nature of the current monetary policy conducted. By doing so, we shift focus from timing of FOMC announcements to Board of Governors meetings and differentiate years depending on direction of Fed funds rate changes.

Sparked by Lucca and Moench's (2015) finding, several theoretical models incorporating different risk factors have been designed to explain the pre-FOMC announcement drift. Many of these highlight documented drops in uncertainty prior to the announcement, proxied by decreases in the VIX index. Hu, Xing, Pan, Wang, and Zhu (2022) develop a model where the drop in uncertainty prior to FOMC announcements represent the resolution of a risk factor connected to the market impact of the news, while Ai, Bansal, and Han al (2021) explain it by increased information acquisition by uninformed investors close to the announcement. To connect these models as plausible explanations to the return pattern around announcements, we also investigate changes in uncertainty between the FOMC announcement, both for the original sample period, as well as our sample period. Our paper differs from these by studying patterns of uncertainty over the *entire* FOMC cycle, specifically around Board of Governors meetings. Thus, we expand on the research by Cieslak et al. (2019) in an additional dimension by including change in uncertainty, through VIX, with background of the risk-oriented literature.

In summary, our contributions are threefold. Firstly, we use a later sample period as a subject for investigation. By doing so we grasp not only a longer period, but observations from a different economic climate compared to the original sample. Secondly, we more concretely consider the timing of Board of Governors meetings as the timeframe. This helps us to better identify the effect that such meetings pose on the stock market, indifferent to their scheduling. Thirdly, we regard a risk-based explanation to the pattern by comparing the movements of excess returns over the FOMC cycle with the evolution of VIX in the same timeframe.

III. Data Description and Methodology

To assure maximum comparability with the original paper, we use as close as possible the same data sources as Cieslak et al. (2019). Our main datasets consist of US stocks excess returns, dates of Federal Market Open Committee (FOMC) meetings and Federal Reserve Board of Governors meetings, daily VIX and the Fed funds target rate. All datasets and estimations throughout exclude weekends. Below, we describe each dataset in detail.

US Stock Market Data

To test the behavior of US stocks in relation to the FOMC cycle, we collect data of daily US market returns and risk-free rates from Kenneth French's website, for the period 1994-2022. As gathered, the US market return is a value-weighted average of all CRSP firms incorporated in the US and listed on the NYSE, NASDAQ, or AMEX. The US 1-month treasury bill rate is used as a proxy for the risk-free rate. To arrive at the daily risk-free rate, the 1-month bill rate is divided by the number of days in that specific month. The daily market excess return is calculated as the difference between the daily US market return and the daily risk-free rate, according to the following equation:

$$\text{Excess Return}_t = R_{m,t} - r_{f,t}$$

Where:

Excess Return_t = The %-log cum dividend daily excess return of the US stock market

$R_{m,t}$ = US stock market return at day t

$r_{f,t}$ = US risk free rate at day t

The US market excess return in our sample includes all days except weekends. Dates when the US stock market was closed due to holidays are included, but we set, as Cieslak et al. (2019), market returns and risk-free rates to zero on these days.

FOMC Meetings

The Federal Open Market Committee (FOMC) is the body of the Federal Reserve that controls the Open Market Operations, which, together with the discount rate and reserve requirements, is one of the three tools used by the Federal Reserve to control the US monetary policy. Open Market Operations, defined by the Federal Reserve as “the purchase and sale of securities in the open market by a central bank”, are used to increase or decrease the Fed funds rate paid by US banks on the overnight borrowing of reserves kept at the Fed (Federal Reserve, May 3, 2023). The Fed funds rate paid by banks impacts the interest rate at which the banks can offer loans to corporations and individuals. Therefore, the Fed funds rate is a key instrument in steering the national economic environment toward the goals of high employment rates, stable prices, and moderate long-term interest rates. The FOMC consists of 12 voting members that together decide on the Fed funds rate. These members are the 7 members of the Fed Board of Governors, the president of the Federal Reserve Bank of New York, as well as 4 rotating members from

the 11 remaining Federal Reserve Banks who serve on a 1-year basis. Normally, the FOMC convenes on 8 pre-scheduled meetings per year, where they decide on the Fed funds target rate. Each FOMC meeting is followed by an announcement the same day, where the decision to change or to keep the current Fed funds rate is declared to the public. Thus, FOMC meeting days and FOMC announcements days are synonymous in our study.

To map the timing of each FOMC cycle, we gather all the dates for the FOMC meetings from December 21, 1993 (which marks the beginning of the first FOMC cycle in 1994) to December 30, 2022. Data of FOMC meetings is collected from the Federal Reserve Archival System for Economic Research (FRASER). For the period until 2016, our dates are consistent with those used by Cieslak et al. (2019). In the new sample period 2017 to 2022, we exclude dates for notation votes and meetings that are unscheduled or canceled, as done by Cieslak et al. (2019). These exclusions amount to 8 dates. In case of meetings that last for two days we count, as Cieslak et al. (2019), the second meeting day as FOMC day in our data. After these adjustments, we count 46 FOMC meetings in the new sample period 2017 to 2022. All included FOMC meeting dates are listed in Appendix 2. In Figure 1, we display the timing of each FOMC meeting in the year, separated by the two sample periods, 1994 to 2016 and 2017 to 2022. In both samples, FOMC meetings are conducted on 8 occasions and with similar intervals, i.e., scheduling is consistent over the entire sample period.

In the search for textual indications of if the monetary policy conducted by the Federal Reserve has been characterized by increased tightening or accommodation, we have also review transcripts from FOMC meetings held over the studied period. FOMC meeting transcripts are made publicly available 5 years after the meeting has taken place, meaning that the latest transcripts available at the time of writing this paper is from 2017. Relevant extracts from transcripts are collected from the Federal Reserve's official website and are shown in Appendix 1 (Federal Reserve, Jan 13, 2023).

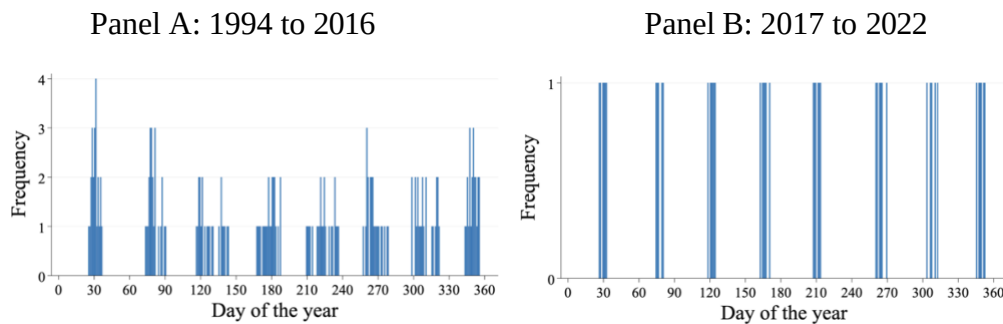


Figure 1. Timing of FOMC meetings in the year 1994 to 2016 and 2017 to 2022. This figure shows a histogram of days in the year when FOMC meetings occurred. Panel A shows meetings in years 1994 to 2016 and Panel B shows meetings for years 2017 to 2022. In case of two-day meetings, the second day is recorded.

Fed Funds Target Rate

Data of the Fed funds target rate over the period 1994 to 2022, was collected from the Federal Reserve Economic Data (FRED) website. The data is daily, excluding weekends, and in case of interval the rate is counted as the average of the upper- and lower limit of the Fed funds target rate range. In Figure 2 we show the yearly aggregate changes in Fed funds rate over the years 1994 to 2022.

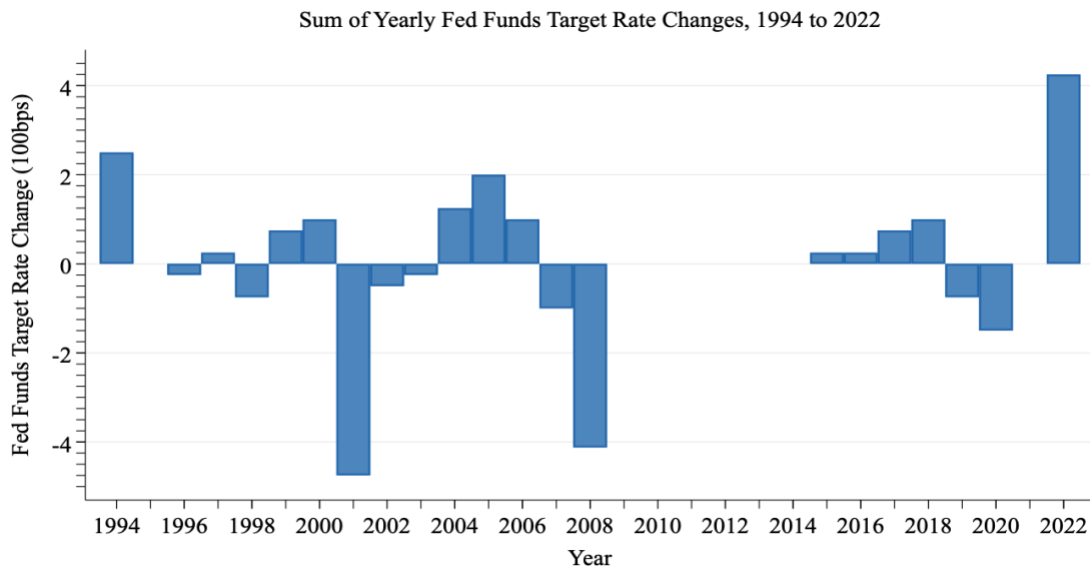


Figure 2. Yearly changes in the Fed funds target rate, years 1994 to 2022. This figure displays the aggregate yearly changes in Fed funds target rate over years 1994 to 2022.

Board of Governors Meetings

The Federal Reserve Board of Governors is a group of seven individuals, nominated by the US President, that guide the operations of the Federal Reserve System, and all of whom are members of the FOMC. One of the Board's most important responsibilities is the supervision of the nation's 12 regional Reserve Banks. The Reserve Banks gather data about the current economic situation from businesses in different industries in their respective region, which is considered when the FOMC and the Board of Governors make monetary policy decisions. The regional Reserve Banks also lend money to commercial banks and depository institutions, and the interest rate at which this is done, typically referred to as the "primary credit rate". The Federal Reserve Act of 1913, section 14 stipulates that each regional Reserve Bank must set their primary credit rate at least every 14th day (Federal Reserve, March 13, 2017). Since the primary credit rate is common for all 12 Reserve Banks and is subject to approval for the Board of Governors, each regional Reserve Bank submits recommendations on the primary credit rate, which is then discussed at Board of Governors discount rate meetings. As noted by Cieslak et al. (2019), since the regional Reserve Banks all submit discount rate recommendations at different times, but are obligated to submit recommendations biweekly, it takes two weeks for the Fed to gather a full set of updated recommendations. For this reason, Cieslak et al. (2019) argue that Board of Governors meetings, over the period 1994 to 2016, tend to occur biweekly. Since the closest Board of Governors meeting prior to FOMC announcements over the period 1994-2016 was held just before

the FOMC meeting, these meetings naturally occur around the start of each even week of the cycle. In their paper, Cieslak et al. (2019) argue that the importance of the Board of Governors meetings is connected to the update and discussion on the recent economic state that takes place at these meetings, and that they are highly important for monetary policy decision-making. As opposed to FOMC meetings, the scheduling of closed Board of Governors meetings is not made public long in advance but is declared a few days ahead on the Federal Reserve's website. Moreover, transcripts from the meetings are not published, only a short description of the matters considered as well as minutes made public 1-2 months after the occurrence of a meeting.

As access to the full record of Board of Governors meeting dates is restricted, we use the data published by Cieslak et al. (2019) for the period 1994 to 2016. Over the new sample period 2017 to 2022 we obtain data on the dates of Board of Governors meetings from the Federal Reserve website. In accordance with Cieslak et al. (2019), we only include the described discount rate meetings, which refer to meetings where the Board of Governors convenes to discuss the biweekly recommendations of primary credit rates submitted by the 12 regional Reserve Banks. In total, we count 72 such meetings over the 2017-2022 sample period. The timing of these meetings around FOMC announcements for both the original sample period 1994 to 2016 and the new sample 2017 to 2022 are depicted separately in Figure 3 which clearly shows the change in scheduling post 2016.

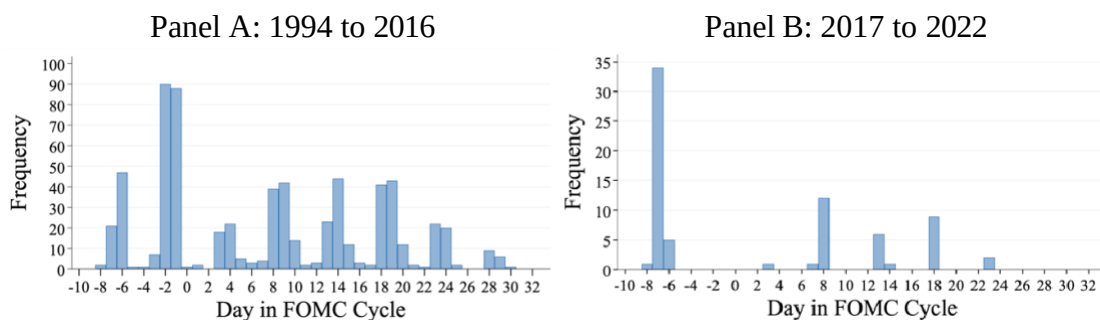


Figure 3. Timing of Board of Governors meetings around FOMC announcements years 1994 to 2016 and 2017 to 2022. This figure shows histograms of timing of Board of Governors meetings around FOMC announcements where day 0 is FOMC announcement day. For this exercise, the FOMC cycle begins on day -8, while in the original definition, it starts on day -6. Panel A shows meetings in years 1994 to 2016 and Panel B shows meetings in years 2017 to 2022.

VIX Data

To examine fluctuations and accumulations of uncertainty over the FOMC cycle, we use the CBOE Volatility Index (VIX) as a proxy for uncertainty. Daily VIX index data for years 1994 to 2022 is gathered from the Wharton Research Data Services (WRDS) website. The VIX index, also referred to as the “market fear gauge”, measures the expected volatility of the US stock market. Calculated by taking the weighted average prices of call and put options on the S&P500 index with different maturities and strike prices, the VIX index level indicates the expected percentage change for the S&P500 index over the coming year, calculated at a 68% significance level.

IV. Analysis and Results

To investigate whether the pattern of biweekly excess returns in the FOMC cycle remains in the 2017 to 2022 period, we begin by mapping the behavior of US stocks over the FOMC cycle. Our results visualized in Figure 4 show that in the period 2017 to 2022, the US stock market has not followed the same even-week pattern of excess returns over the FOMC cycle as in the 1994 to 2016 period. We arrive at these results when replicating the exercise by Cieslak et al. (2019) by plotting the average cumulative 5-day US excess returns, counting t to $t+4$, over each day in the FOMC cycle for the two periods 1994 to 2016 and 2017 to 2022 respectively. Because of the smaller size of the later sample, we limit the days of the FOMC cycle of the 2017 to 2022 period to 28 (instead of day 33 as for the period 1994 to 2016) since the number of observations per cycle day drops sharply after week 5. In line with the definition set by Cieslak et al. (2019), day -1 marks the first day of week 0, and since the data excludes weekends, a new week commences every five days. Over the 1994 to 2016 period, the average cumulative 5-day excess returns were 0.57%, 0.33%, 0.46% and 0.60% for week 0, 2, 4 and 6 respectively, with all of these being at or in immediate proximity to the peaks in the pattern of cumulative excess returns over the FOMC cycle. Over the 2017 to 2022 period, the average cumulative 5-day excess returns for the even weeks were -0.47%, 0.42% and -0.02% for week 0, 2 and 4 respectively, with none of these constituting peaks in the pattern of excess returns over the FOMC cycle.

When comparing the time periods, we see a changed pattern in evolution of US excess stock return over the FOMC cycle. While our results in Figure 4 reveal that the pattern found by Cieslak et al. (2019) is drastically different from what we see in the period 2017 to 2022, visual inspection indicates continued cyclicity in the behavior of US stock returns around FOMC announcements. However, this cyclicity differs from the original sample period both with regards to the timing and frequency in peaks of 5-day excess returns. The original sample 1994 to 2016 showed peaks in 5-day cumulative excess return approximately every 10 days in the cycle, lining up at (or at immediate proximity to) the start of even weeks in the cycle, occurring at days -1, 11, 20 and 29. However, the sample 2017 to 2022 showed peaks on days -5, 5, 12 and 21. Seemingly, there has been a distortion of the pattern of higher excess returns on the US market in even weeks of the FOMC cycle first documented by Cieslak et al. (2019), and the pattern has not persisted in the later period 2017 to 2022.

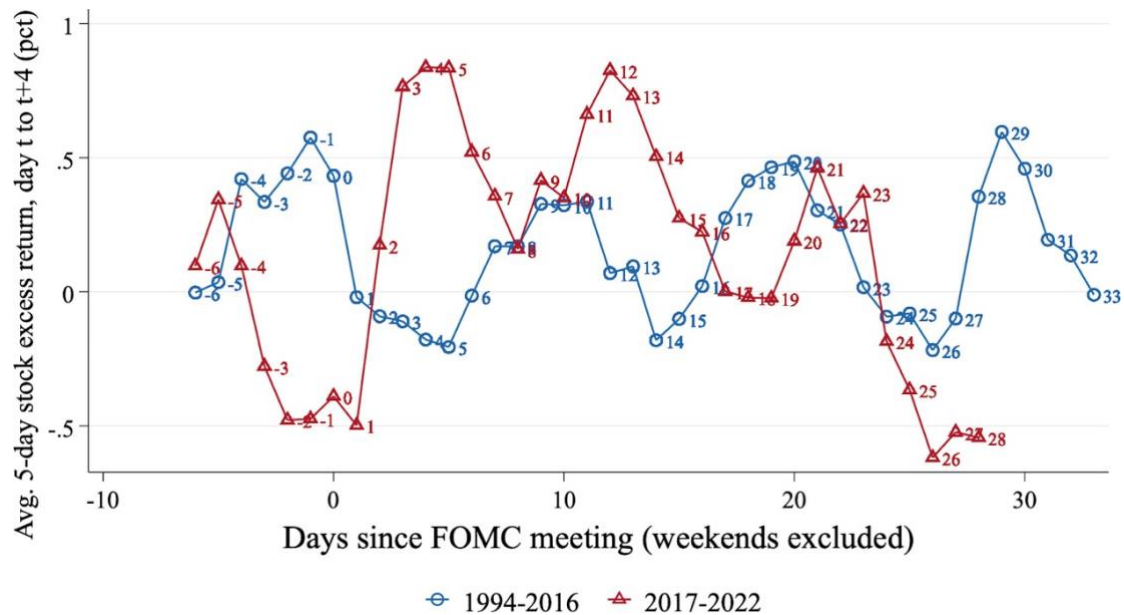


Figure 4. Stock returns over the FOMC cycle in years 1994 to 2016 and 2017 to 2022.

This figure shows the plot of average 5-day cumulative excess returns, counting t to $t+4$, in days of the FOMC cycle. Day 0 is FOMC announcement day. Point labels indicate the day of the FOMC cycle on the x-axis. Weeks of the FOMC cycle are defined as; Week -1, day -6 to -2; Week 0, day -1 to 3; Week 1; day 4 to 8; Week 2, day 9 to 13; Week 3, day 14 to 18; Week 4, day 19 to 23; Week 5, day 24 to 28; Week 6, day 29 to 33.

For statistical confirmation that the pattern of biweekly peaks in excess returns has not remained the same in the post-sample period, we proceed to test the statistical significance of the daily excess returns in even weeks of the FOMC cycle during 2017- 2022. For comparison, we also replicate the results by Cieslak et al. (2019) for the original sample period. The results, which are presented in Table I further highlights that a change in the pattern of excess returns over the FOMC cycle has taken place in the post-sample period. In 2017 to 2022, the average excess returns in week 0 of the cycle was 17 basis points lower than odd-week days, significant at the 10% level, and average excess returns on days in weeks 2, 4 and 6 were 5 basis points lower than odd-week days, while insignificant on the 10% level. In the original sample period, average excess returns were 14 basis point higher in week 0 compared to odd-week days, and 11 basis point higher in week 2, 4 and 6 compared to odd-week days, both significant at the 1% level. Thus, these results further underscores that the previously documented pattern of significantly higher excess returns in even weeks of the FOMC cycle does not hold over the period 2017 to 2022.

Table I
Regression of Daily US Excess Stock Returns over FOMC Cycle Even Week
Dummies, 1994 to 2016 and 2017 to 2022

This table represents regressions of daily US excess stock returns over dummies for even weeks in the FOMC cycle. Even weeks in the FOMC cycle are defined as; Week 0: days -1 to 3, Week 2: days 9 to 13, Week 4: days 19 to 23, Week 6: days 29 to 33. Column 1 shows the regression for the original sample period 1994 to 2016 and column 2 shows the same regression for the new sample 2017 to 2022. Results are in percent, robust to heteroskedasticity. Standard errors are reported in parentheses.

	Dependent Variable: 1-Day Excess Return	
	1994 to 2016	2017 to 2022
Dummy=1 in Week 0	0.141*** (0.0445)	-0.170* (0.0895)
Dummy=1 in Week 2,4,6	0.109*** (0.0337)	-0.0512 (0.0719)
Constant	-0.0246 (0.0197)	0.0727* (0.0390)
N(Days)	5997	1519
r ²	0.00276	0.00237

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The apparent shift in pattern of excess returns over the FOMC cycle between the two sample periods naturally leads to the question of what has caused this change.

As a starting point we return to the factors that Cieslak et al. (2019) underline as drivers of the biweekly pattern of excess stock returns over the 1994 to 2016 period. These highlighted drivers are biweekly decision-making at Board of Governors meetings, unexpectedly accommodative policy, and leaks about such. Followingly, we analyze if these drivers have changed between the earlier and later sample period. Logically, if these factors were essential for the biweekly pattern to occur over the original sample period, changes to any one of these would consequently cause a change to the pattern of returns over the FOMC cycle. Since there are inherent difficulties in concluding whether informal channels of communication have ceased, we focus our analysis by looking at the other two factors, that is, the timing of Board of Governors meetings and whether policy conducted by the Fed has been accommodative.

A closer examination of Board of Governors meetings scheduling and Fed funds rate movements in the post-sample period reveals that both have changed since the original sample period, suggesting that both may explain the changed pattern of excess returns over the FOMC cycle. Therefore, we proceed to regard both factors one by one, starting with Board of Governors meetings.

In their paper, Cieslak et al. (2019) show that the even-week effect of higher excess returns is driven by even weeks following Board of Governors meetings. In the sample 2017 to 2022 the timing of Board of Governors meetings is different to that of the earlier sample in two aspects. Firstly, the frequency of meetings has decreased substantially. From an average of 29 meetings yearly (659 in total), from 1994 to 2016, the frequency decreased to 12 meetings yearly (72 in total) from 2017 to 2022 (yearly frequency of Board of Governors meetings shown in Appendix 3). Secondly, the timing

of Board of Governors meetings is not consistent over the two periods. As shown in Figure 3, the 1994-2016 period shows a more distinct pattern of weekly Board of Governors meetings and highest concentration on days -2 and -1, days preceding FOMC announcements. Over the years 2017 and 2022, the Board of Governors meetings were conducted with clear overweight on day -7 of the cycle, more than one week before FOMC announcements, and no meetings on days -2 and -1 of the cycle.

Moreover, the post-sample period is characterized by generally more restrictive monetary policy than the original sample period. Cieslak et al. (2019) argue that informal news from the Board of Governors meetings positively affected the stock market in 1994 to 2016 because decision-making was systematically accommodating, and that the Fed responded to poor market performance by ensuring decreases in Fed funds rates if needed. We find several clear indicators that the policy enacted has been less characterized by accommodation in the post-sample period, both in general and regarding the performance of equity markets. First, the cumulative change in Fed funds target rates over the period 2017-2022 equals a 425 basis point increase, with fourteen target rate hikes and only five target rate decreases. Second, published transcripts from FOMC meetings indicate the abandonment of accommodative monetary policy, starting in 2017. For instance, the following quote was expressed by FOMC member Robert S. Kaplan on the first FOMC meeting of 2017:

I believe we're making good progress on reaching our dual-mandate objectives. I believe, though, that the risk of overshooting our full employment objective is real, and I do believe we'll continue to make gradual progress on reaching our 2 percent inflation objective in the medium term. In light of this, I believe we should be taking steps to remove accommodation in the months ahead. And while I believe it's appropriate to stand pat for today, I also believe that if the economy progresses as I expect, it will be appropriate to remove some amount of accommodation at our March meeting.

In addition to general tightening, quotes from FOMC members indicate that high equity valuations in the beginning of the post-sample period are seen as a warning sign rather than something desirable. The following quote was expressed by Chair Yellen on the FOMC meeting held on December 12-13, 2017:

My September SEP submission had already factored in (...) But I hadn't factored in the almost 7 percent rise in stock prices that's occurred since September. This latest increase, if it were to persist, would modestly boost consumer spending growth over the next few years, as households tend to adjust their spending gradually in response to an increase in net worth. (...) In light of the additional stimulus arising from the proposed changes to fiscal policy and the recent increase in equity prices, I now anticipate that a modestly faster pace of policy tightening will be appropriate over the next several years in order to prevent the economy from overheating.

This kind of reasoning stands in stark contrast to how Cieslak et al. (2019) argued that the Fed had used the stock market to inform about suitable monetary policy in the original sample period, and thus further indicates less policy accommodation in the post-sample period. Lastly, multiple interest rate hikes in 2022 despite poor stock market

performance further suggest that the Fed has not enacted accommodating policy in response to poor stock market performance in the post-sample period.

Hence, two fundamental drivers of the pattern of biweekly returns as originally discovered by Cieslak et al. (2019) seems to have changed; Scheduling of Board of Governors meetings and the policy conducted by the Federal Reserve. To bring clarity to what has altered the pattern of excess returns from biweekly to what we see for the new period 2017-2022, we begin to examine the change in Board of Governors meetings. If the changed schedule of Board of Governors meetings is the true cause for the changed pattern of stock returns over the FOMC cycle, we would expect to see the average similar effect in the days following Board of Governors meetings in both periods, regardless of their timing. To see if this is the case, we run a regression of daily excess stock return in t over dummy for occurrence of a Board of Governors meeting in the proceeding 5 days $t-5$ to $t-1$. On average, the effect is absent in the new period 2017 to 2022, while significant and positive at the 1% level in 1994 to 2016 (see column 1 and 3 of Table II), indicating that a change of timing of the Board of Governors meetings *alone* has not caused a changed pattern of the stock returns in the cycle.

We proceed to run the same regression for each year over the entire period 1994 to 2022 individually to see if there is a breaking point in time where excess returns in the days following the Board of Governors have stopped being significantly different from zero. Connecting to our indication that generally more restrictive monetary policy has characterized the post-sample period, we also acknowledge that the stock market reaction to news leaking from Board of Governors meetings likely depends on if these indicate interest rate increases or decreases. Reasonably, if leaks about Board of Governors meetings still have occurred, but the news indicate monetary policy tightening, we would expect this to have another effect than news about accommodating policy. To account for monetary policy, we separate years depending on the direction of Fed funds rate change by highlighting years of increase in blue and years of decrease in orange. In figure 5, we see that in years of Fed funds rate decrease (orange dots), the average effect of Board of Governors meetings occurring in the preceding week on daily excess returns in day t tends to be positive and higher than in years of Fed funds rate increases (blue dots). This holds consistently with one obvious exception of 2007 in the original sample (left of the dashed line), and consistently in the post 2016 sample.

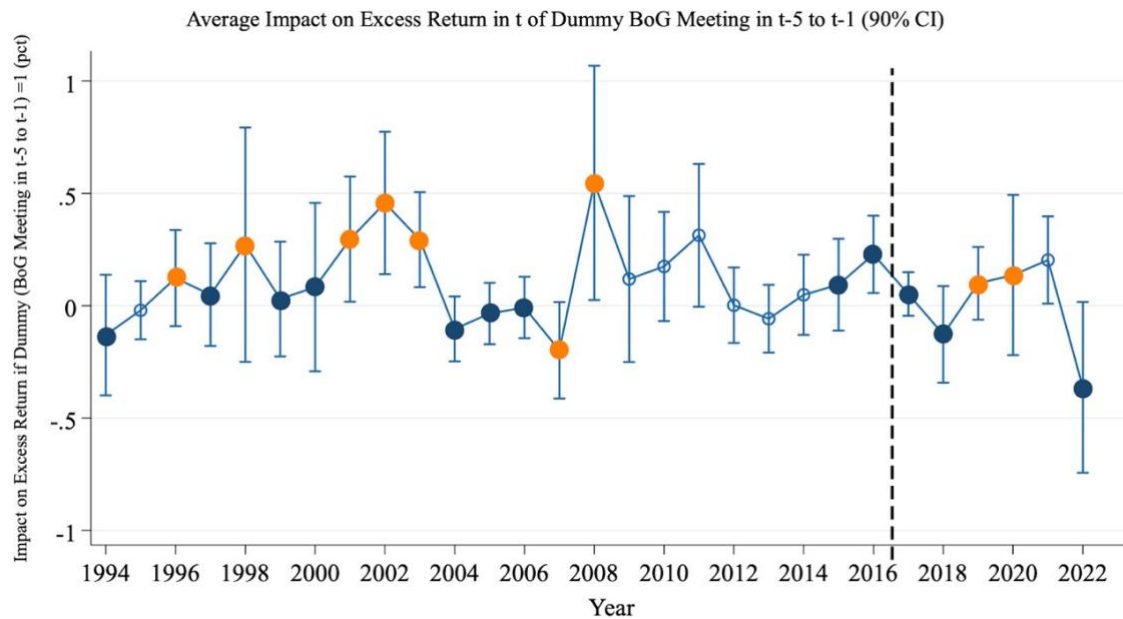


Figure 5. Effect of Board of Governors meetings on daily US excess stock return, year by year, 1994 to 2022. This figure shows a margin plot of the average effect of occurrence of Board of Governors (BoG) meetings in the five preceding days, $t-5$ to $t-1$ (excluding weekends) on daily excess return on day t . Margins indicate the 90% confidence interval. Years highlighted in blue are characterized by Fed funds rate increase and years highlighted with orange are characterized by Fed funds rate decreases. The dashed vertical line marks the separation of the two sample periods, 1994 to 2016 and 2017 to 2022.

As the conducted policy seemingly impacts how Board of Governors meetings affect excess stock returns, we run regressions where we include both these factors. Table II shows that when accounting for timing of Board of Governors meetings and direction of Fed funds rate changes in the year, the effect on stock returns is the same in both sample periods. In column 2 and 4 of Table II, we run regressions of daily excess return in t over three variables: 1) occurrence of Board of Governors meeting in days $t-5$ to $t-1$, 2) a dummy variable for yearly increase in Fed funds rate and 3) the first two variables in interaction. The results show us the significant average negative effect of the interaction term on daily excess returns in both periods, of the same direction and comparable magnitude. We also see a similar positive effect of the Board of Governors meeting dummy on excess returns in both periods. This supports the thesis that the change in scheduling of Board of Governors meetings and policy conducted through Fed funds rate changes *together* has contributed to the distortion of the biweekly pattern of US excess stock returns that Cieslak et al. (2019) documented in years 1994 to 2016. However, the key underlying drivers, Board of Governors meetings and Fed funds rate changes, are present in both periods, yet in different composition.

Table II
Regressions of Daily US Excess Stock Returns over Board of Governors Meetings
Dummies and Fed Funds Target Rate Changes

This table presents daily US excess stock returns over a dummy variable for Board of Governors (BoG) meetings occurring on days t-5 to t-1, yearly increases in Fed funds target rate and these two variables in interaction. In column 1 and 3, we present regressions of Daily US excess stock returns in t over the dummy for the occurrence of a Board of Governors meeting on day t-5 to t-1. We present in column 2 and 4, regressions of Daily US excess stock returns in day t over three independent variables: 1) occurrence of Board of Governors meetings in day t-5 to t-1 in a year, 2) a dummy variable for yearly aggregate Fed funds rate increase, 3) the first two in interaction. Results are in percent, robust to heteroskedasticity. Standard errors are reported in parentheses.

	Dependent Variable: 1-Day Excess Return			
	1994 to 2016	1994 to 2016	2017 to 2022	2017 to 2022
Dummy=1 if BoG meeting in t-5 to t-1	0.105*** (0.0300)	0.163*** (0.0422)	-0.00381 (0.0664)	0.148* (0.0870)
Dummy=1 if Yearly FF rate increases		0.0685* (0.0416)		-0.0105 (0.0733)
(BoG Dummy)*(Yearly FF rate increases)		-0.149*** (0.0569)		-0.313** (0.133)
Constant	-0.0249 (0.0225)	-0.0493 (0.0315)	0.0314 (0.0365)	0.0367 (0.0565)
N	5997	5997	1519	1519
r ²	0.00204	0.00304	0.00000182	0.00431

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In summary, our results display multiple findings. Firstly, the pattern of higher excess returns on the US stock in even weeks following FOMC announcements is not present in the same way during the period 2017 to 2022 as in 1994 to 2016. During the post-sample period 2017-2022, average 5-day excess returns over the FOMC cycle show a cyclical pattern, however with different timing and intervals of peaks compared to the 1994 to 2016 sample. Secondly, when controlling for timing of Board of Governors meetings and yearly Fed Funds target rate changes, we see consistent effects of these variables on daily excess returns over both periods. Occurrence of Board of Governors meetings has a marginal positive effect on daily excess returns in the following week. However, this positive average effect on daily excess return is dampened in the case of a year characterized by Fed funds rate increase. These findings suggest that the change in scheduling of Board of Governors meetings and the difference in Fed funds rate movements between the two samples contributed to the inconsistency in return pattern. However, the key underlying drivers are present in both periods and with consistent effect, which in turn indicate that the informal communication may still explain the movements in excess return over the FOMC cycle.

V. Discussion

Despite evidence by Cieslak et al. (2019) indicating that biweekly decision-making, systematically accommodating policy following weak stock market performance and leaks about such policy has driven the biweekly pattern of returns, there is expression of doubt in related literature whether leakage is the true explanation to return patterns around FOMC announcements. Focusing specifically on the pre-announcement drift, several researchers have attempted to derive risk-based explanations to the phenomenon in recent years. While these papers propose different explanations to why the market has systematically generated positive returns prior to FOMC announcements, a common denominator is that market uncertainty plays a vital role in explaining the occurrence and magnitude of the drift. Hu et al. (2022) show that over the period 1994-2018, uncertainty tended to accumulate over a 6-day period before FOMC announcements to later resolve just prior to the announcement, and that both the magnitude of the accumulation and its following resolution predicts the occurrence and size of the pre-FOMC announcement drift. The authors argue that in addition to the risk carried in the news announcement itself, which is demonstrated by the risk-return ratio, the VIX index represents an additional risk factor concerning the market impact of the news risk, which as opposed to the news risk is resolved before the announcement and consequently brings positive pre-announcement excess returns. While the resolution of market impact uncertainty is claimed to be the reason for a drop in VIX index in this model, Hu et al. (2022) remain silent on the reasons why this would occur prior to the actual announcement. Along the same lines, Ai, Bansal, and Han (2021) document that a drop in uncertainty prior to the FOMC announcement helps to explain the drift. However, they propose that the drop is a consequence of uninformed investors acquiring information that already exists in the market, close to the FOMC announcement, which reduces overall uncertainty and brings positive excess returns. Also, Laarits (2022) shares the view that the pre-FOMC announcement drift can be explained by the resolution of an uncertainty risk premium. However, rather than the resolution of market impact uncertainty or information acquisition by uninformed investors, Laarits (2022) argues that the reduced uncertainty comes from the resolution of announcement interpretations, where investors' understanding of FOMC announcements depends on whether recent news has been good or bad.

While these recent papers suggest conflicting explanations to why uncertainty historically has dropped prior to FOMC announcements, they express a consensus that the resolution of an uncertainty risk premium can explain the occurrence of the pre-FOMC announcement drift. As Hu et al. (2022) present, the empirics for their 1994-2018 sample period also shows that uncertainty in fact has accumulated to then drop prior to FOMC announcements, and that the drop in uncertainty predicts the pre-FOMC announcement drift. However, although these proposed models theoretically could explain stock behavior around FOMC announcements, they do not offer any explanation as to why stocks have experienced a pattern of biweekly excess returns throughout the FOMC cycle, as shown by Cieslak et al. (2019). Although not expressed explicitly, none of the models by Hu et al. (2022), Ai, Bansal, and Han (2021) or Laarits (2022) suggest any systematic sudden drops in uncertainty over the FOMC cycle (for instance following Board of Governors meetings), as they argue that the drops in uncertainty are uniquely linked to the FOMC announcements. To assess whether drops in uncertainty are unique

to the days before the announcement, we investigate the behavior of uncertainty, proxied by the VIX index, over the entire FOMC cycle for the 1994-2016 period. Moreover, since the aforementioned authors, Hu et al. (2022), Ai, Bansal and Han (2021) and Laarits, (2022), argue that FOMC announcements *inherently* are associated with resolution of an uncertainty risk premium, their models suggest that FOMC announcement should bring positive pre-announcement returns regardless if monetary policy enters a eriod characterized by more tightening, or if there has been a change of timing of the Board of Governors meetings before the FOMC meeting and throughout the FOMC cycle. To check whether that reasoning holds, we also map the behavior of VIX over the 2017-2022 period, which as earlier concluded is a period characterized by more restrictive monetary policy and changed scheduling of Board of Governors meetings. We do this by plotting excess return and change in VIX, both as 5-day aggregation counting day t to $t+4$ and separating the two periods 1994 to 2016 and 2017 to 2022.

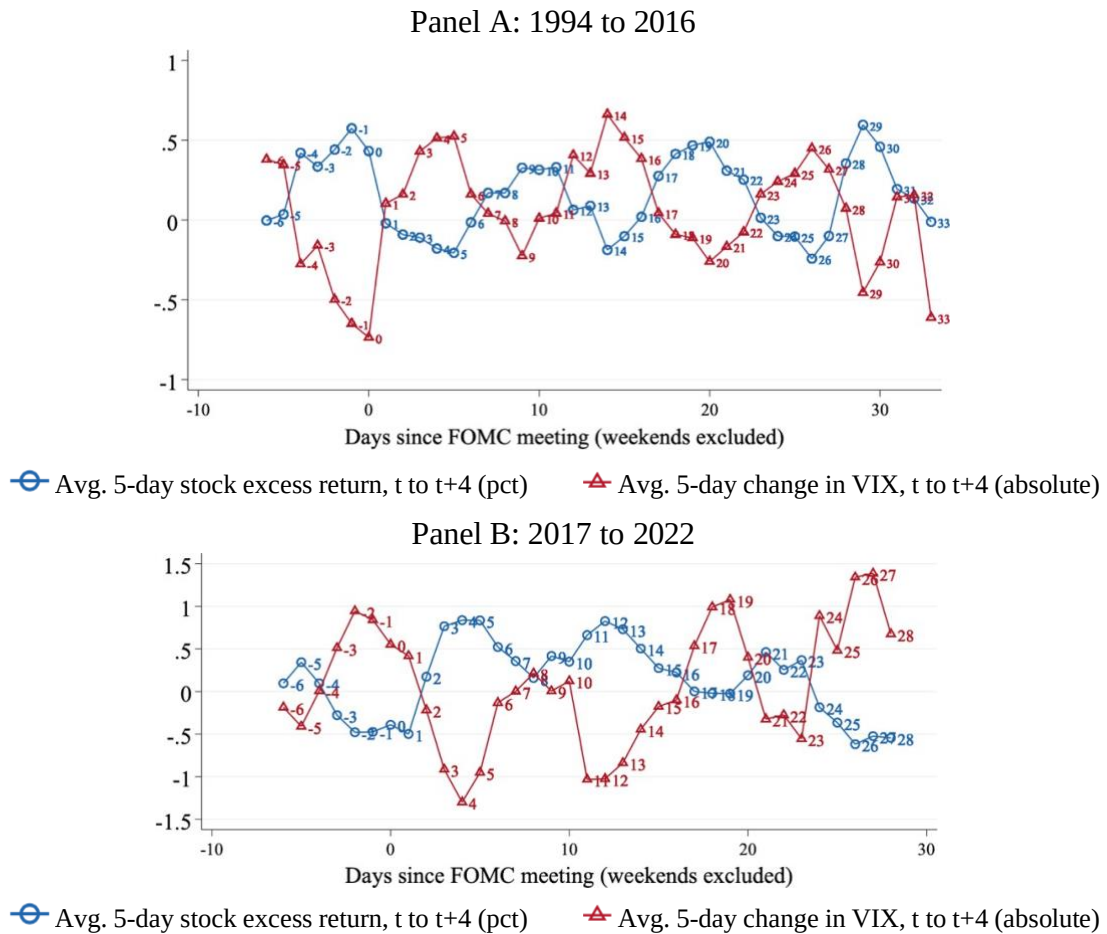


Figure 6. Excess returns and VIX changes over the FOMC cycle, 1994 to 2016 and 2017 to 2022. This figure shows the forward 5-day US stock excess return and forward 5-day VIX changes over the FOMC cycle. Both metrics are aggregates of days t to $t+4$. VIX change is counted in absolute terms and calculated as the difference in VIX between day $t-1$ and t . Panel B, 2017 to 2022, is delimited to days in the FOMC cycle up to and including day 28 because of smaller sample size with few observations after day 28. Point labels indicate the day of the FOMC cycle on the x-axis.

Our results pictured in Figure 6 indicate two things; evolution of VIX change (in absolute terms) also follows a cyclical pattern over the entire FOMC cycle and likewise stock returns, the VIX pattern shifted between the two sample periods. As we see in Panel A, during the period 1994 to 2016, 5-day change in VIX was on average 0.38%-units in week -1, 0.51%-units in week 1, 0.66%-units in week 3 and 0.23%-units in week 5. In even weeks of the cycle, the uncertainty tended to resolve, with a 5-day change in VIX of -0.65%-units in week 0, -0.23%-units in week 2, -0.11%-units in week 4 and -0.45%-units in week 6. The figure indicates a clear negative relationship between the uncertainty index and the excess returns over the cycle, emphasized by the fact that all the local peaks in 5-day excess returns over the cycle (day -1, 9, 20 and 29) also occur at or close to the lowest local points of the VIX accumulations, indicating that drops in uncertainty have been accompanied by high excess returns. While the negative relationship between change in uncertainty and excess returns have been previously documented (Dennis, Mayhew and Stivers, 2006), these results show that VIX systematically has accumulated in odd weeks of the FOMC cycle and resolved in even weeks of the cycle over the 1994- 2016 period. In Panel B, we repeat the same task for the 2017 to 2022 period. Our results show that the negative relationship between market uncertainty proxied by the VIX index, and the stock returns persists in the post-sample period despite the shift in the pattern of excess returns over the FOMC cycle. Like the 1994-2016 period, peaks in average 5-day cumulative excess returns in the 2017 to 2022 period are accompanied by resolutions in uncertainty, following days of VIX accumulation. As a part of this shift, we also note that the pattern of high VIX accumulation in the period prior to FOMC announcements does not seem to have persisted in the 2017-2022 period.

After learning that VIX moves countercyclical to excess return over both sample periods despite the change in behavior of excess return, we relate these insights to existing theory. Firstly, Panel A is in line with the VIX-returns relationship around FOMC announcement first shown by Hu et al. (2022), namely that VIX over the period 1994 to 2016 features high average accumulation in the period before the announcements, to then drop just prior to the announcement, accompanied by increases in excess returns. However, the results also show that uncertainty accumulation followed by a subsequent drop, accompanied by high excess returns is not unique to the days around the announcement. Rather, for the 1994-2016 period, such a pattern repeats itself biweekly over the FOMC cycle. Moreover, the fact that the pattern of drops in VIX following periods of accumulation over the entire cycle indicates that the VIX-return behavior is not uniquely linked to the timing of FOMC announcements. Another finding is that the VIX does not seem to show an accumulating pattern followed by a drop prior to the FOMC announcement in the post-sample period. In the case that the VIX-return pattern shown in the period 1994 to 2016 period was caused by the resolution of a risk premium that emerged because of the occurrence of an FOMC announcement, as suggested by Hu et al. (2022), asset-pricing theory suggests that we would observe the same pattern in the post-sample period. Arguably, if FOMC announcements inherently cause the resolution of an uncertainty risk premium, we would expect that pattern to persist in the 2017-2022 period.

Instead of resolution of a risk premium connected to the FOMC announcement explains announcement's preceding VIX drop, it is likely that the reduced uncertainty has been caused by information about accommodating decision-making from Board of Governors meetings reaching the market. The period 1994 to 2016 systematically features Board of Governors meetings in the days prior just to FOMC meetings. In a case where

the general market sentiment is characterized by high uncertainty, and information about accommodating policy reaches the market, we would expect to see the market uncertainty decline in the following days. Moreover, if such an event would occur throughout the FOMC cycle, and not only before the announcement, we would expect a similar effect. The pattern shown in Figure 6 Panel A is thus alignable with the explanation by Cieslak et al. (2019) that information from decision-making at Board of Governors meetings drive both the pre-FOMC announcement drift, as well as the pattern of biweekly excess returns for the 1994 to 2016 period through reduced uncertainty. Additionally, the explanation that information about accommodating policy from Board of Governors meetings has driven both return patterns and uncertainty drops around FOMC meetings and throughout the cycle is further supported by the fact that the pattern is changed in the post-sample period, which both featured changes in the timing of Board of Governors meetings and more restrictive policy than the original sample. While the risk-based explanations assume that the VIX-return behavior is independent of both the content of the announcements as well as the timing of the preceding Board of Governors meeting, the leakage-explanation implies that the pattern were to change in the case that these factors changed and is thus consistent with the results we show in Figure 6.

As a concluding remark, while our results support that information from even-week Board of Governors meetings drives the pattern of excess returns through the FOMC cycle over the 1994-2016 period we are yet unable to confidently determine whether the pattern is a pure anomaly driven by investor's mis-calibrated expectations, or if the pattern contains a risk parameter. For instance, it remains unclear why uncertainty accumulates systematically in odd weeks of the cycle over the 1994-2016 period. Since the occurrence of Board of Governors meetings usually is declared a few days in advance, it is theoretically possible that a risk-premium connected to informally communicated information from these meetings exists if such information is anticipated. Since we neither can confirm nor deny that this is the case based on our results, we see risk-based models focusing on the occurrence of Board of Governors meetings as interesting avenues for future research.

In summary, we investigate the behavior of the VIX index over the FOMC cycle, both for the 1994 to 2016 period as well as for our post-sample period. We find that patterns of resolution of uncertainty have occurred biweekly throughout the cycle, indicating that such pattern is not unique to timing of FOMC announcements and therefore not likely purely driven by a risk-premium connected to the announcement. Moreover, we find that the behavior of uncertainty, just like with that of excess returns, changes in the post-sample period that is characterized by different scheduling of Board of Governors meetings and less accommodating policy. As part of this change, resolution of uncertainty prior to FOMC announcements are not observable in the 2017 to 2022 period. This further underscores that both inter-announcement uncertainty and excess return patterns more likely are explained by informal communication from the Federal Reserve between announcements than by a pure FOMC announcement risk premium. Although it is possible that uncertainty level plays a role in explaining the magnitude of both the pre-announcement drift, as shown by Hu et al. (2022), and returns over the entire cycle, our above results indicate that the uncertainty drop is not uniquely driven by the FOMC announcement. Consequently, we argue that models aiming at explaining the movements in stock returns between FOMC announcements should pay closer attention to the events of Board of Governors meetings.

VI. Conclusion

This paper investigates the behavior of US stocks in relation to announcements about monetary policy made by the Federal Reserve Open Market Committee (FOMC). We show that the previously documented pattern of US stocks generating significantly higher excess returns in even weeks of the FOMC cycle does not persist in the post-sample period 2017 to 2022. We find that there has been a distortion of the biweekly return pattern, both in timing of high peaks of 5-day excess return and length of intervals between peaks. We document that the two factors - timing of Board of Governors meetings and proportion of Fed funds rate increases versus decreases - have changed in the post-sample period. When controlling for both Board of Governors meeting scheduling and yearly aggregate changes in Fed funds rate, we find that the effect on daily excess return is consistent over both sample periods. We conclude that for both sample periods, both Board of Governors meetings occurring in the preceding week and direction of Fed funds rate changes in the year affects daily excess returns, and differences in these factors likely caused the change in return pattern.

We also connect to recent models suggesting that excess returns prior to the FOMC announcement have been driven by the resolution of an uncertainty risk premium which inherently occurs close to the announcement. We do this by investigating the behavior of uncertainty, proxied by VIX, over the entire FOMC cycle. Our results show that for the 1994 to 2016 period, VIX has decreased systematically in even weeks of the cycle and not only around the FOMC announcement, indicating that drops in uncertainty do not seem to be uniquely linked to the occurrence of an FOMC meeting. Moreover, we find evidence that the pattern of VIX accumulation as excess return patterns has changed in the post-sample period. This finding further suggests that both drops in uncertainty and patterns of biweekly excess returns have been driven by news about accommodating policy for the 1994 to 2016 period around Board of Governors meeting dates, rather than by the resolution of an uncertainty risk premium connected to FOMC announcements.

Our research contributes to understanding of the mechanisms behind systematic movements on the US stock market between monetary policy announcements by the FOMC. We highlight the importance of explanations connected to both risk and informal communication when trying to deduce what is the cause for observed patterns of stock returns over the FOMC cycle. Yet, the puzzle of stock movements around FOMC announcements is not fully resolved and reason for further investigation remains. There is need for continued research of the risk-side of explanations to the Board of Governors meetings impact on the stock market and qualitative study of informal communication from the Fed.

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Appendices

Appendix 1. Extracts from FOMC Meeting Transcripts

January 31-February 1, 2017

MS MESTER:

...So it's important that we remain vigilant against falling "behind the curve." Like the siren song, waiting for uncertainty to resolve before acting is always seductive. But we have continued to make progress on our goals. There's a growing list of policy rules that suggests the current stance of policy is too accommodative and increasingly so. The Board staff's assessment of asset valuation pressures has risen from moderate to notable, and leverage is very high for speculative-grade corporate borrowers. In this environment, if we accumulate enough delays, we could easily find ourselves "behind the curve." I hope we avoid that shipwreck. And if between now and March the data come in consistent with the forecast, I hope we will be open to moving the funds rate up

March 14-15, 2017

MS BRAINARD:

...Third, I favor a gradual and predictable phaseout of reinvestments, at least over the first two years when principal repayments are elevated. While the background memo suggests there would be little difference in the economic effects of gradually phasing out versus immediately ceasing reinvestment, we cannot rule out that there may be material differences in how markets will react. A phaseout should reduce the risk of an adverse market reaction because it would only gradually increase the amount of securities the market will be required to absorb. It also aligns with the Committee's desire to remove accommodation gradually and seems to risk a lower likelihood of misinterpretation by markets as a signal of impatience

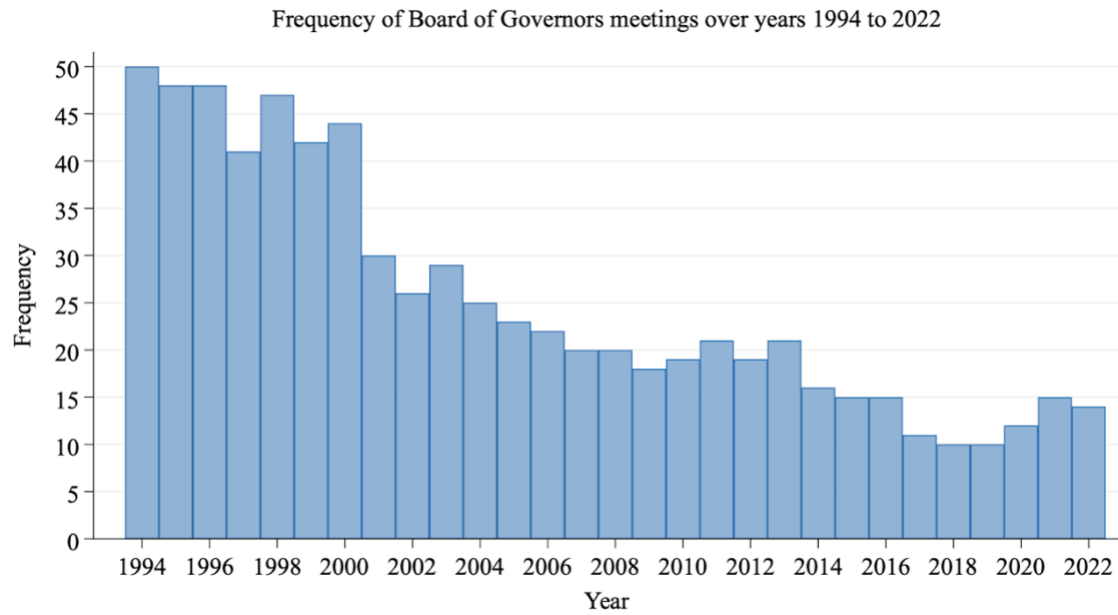
July Meeting 2017:

VICE CHAIRMAN DUDLEY:

Since the previous FOMC meeting, we're seeing the same trends: Stocks are higher, and the dollar is weaker. These movements have been large compared with the modest rise we see in short- and long-term interest rates. As I've noted many times, monetary policy does work through financial conditions. So if financial conditions do not tighten as we desire, then we are likely to have to do more.

Appendix 2
Included FOMC meetings

1993	Dec-21							
1994	Feb-04	Mar-22	May-17	Jul-06	Aug-16	Sep-27	Nov-15	Dec-20
1995	Feb-01	Mar-28	May-23	Jul-06	Aug-22	Sep-26	Nov-15	Dec-19
1996	Jan-31	Mar-26	May-21	Jul-03	Aug-20	Sep-24	Nov-13	Dec-17
1997	Feb-05	Mar-25	May-20	Jul-02	Aug-19	Sep-30	Nov-12	Dec-16
1998	Feb-04	Mar-31	May-19	Jul-01	Aug-18	Sep-29	Nov-17	Dec-22
1999	Feb-03	Mar-30	May-18	Jun-30	Aug-24	Oct-05	Nov-16	Dec-21
2000	Feb-02	Mar-21	May-16	Jun-28	Aug-22	Oct-03	Nov-15	Dec-19
2001	Jan-31	Mar-20	May-15	Jun-27	Aug-21	Oct-02	Nov-06	Dec-11
2002	Jan-30	Mar-19	May-07	Jun-26	Aug-13	Sep-24	Nov-06	Dec-10
2003	Jan-29	Mar-18	May-06	Jun-25	Aug-12	Sep-16	Oct-28	Dec-09
2004	Jan-28	Mar-16	May-04	Jun-30	Aug-10	Sep-21	Nov-10	Dec-14
2005	Feb-02	Mar-22	May-03	Jun-30	Aug-09	Sep-20	Nov-01	Dec-13
2006	Jan-31	Mar-28	May-10	Jun-29	Aug-08	Sep-20	Oct-25	Dec-12
2007	Jan-31	Mar-21	May-09	Jun-28	Aug-07	Sep-18	Oct-31	Dec-11
2008	Jan-30	Mar-18	Apr-30	Jun-25	Aug-05	Sep-16	Oct-29	Dec-16
2009	Jan-28	Mar-18	Apr-29	Jun-24	Aug-12	Sep-23	Nov-04	Dec-16
2010	Jan-27	Mar-16	Apr-28	Jun-23	Aug-10	Sep-21	Nov-03	Dec-14
2011	Jan-26	Mar-15	Apr-27	Jun-22	Aug-09	Sep-21	Nov-02	Dec-13
2012	Jan-25	Mar-13	Apr-25	Jun-20	Aug-01	Sep-13	Oct-24	Dec-12
2013	Jan-30	Mar-20	May-01	Jun-19	Jul-31	Sep-18	Oct-30	Dec-18
2014	Jan-29	Mar-19	Apr-30	Jun-18	Jul-30	Sep-17	Oct-29	Dec-17
2015	Jan-28	Mar-18	Apr-29	Jun-17	Jul-29	Sep-17	Oct-28	Dec-16
2016	Jan-27	Mar-16	Apr-27	Jun-15	Jul-27	Sep-21	Nov-02	Dec-14
2017	Feb-01	Mar-15	May-03	Jun-14	Jul-26	Sep-20	Dec-13	
2018	Jan-31	Mar-21	May-02	Jun-13	Aug-01	Sep-26	Nov-08	Dec-19
2019	Jan-30	Mar-20	May-01	Jun-19	Jul-31	Sep-18	Oct-30	Dec-11
2020	Jan-29	Apr-29	Jun-10	Jul-29	Sep-16	Nov-05	Dec-16	
2021	Jan-27	Mar-17	Apr-28	Jun-16	Jul-28	Sep-22	Nov-03	Dec-15
2022	Jan-26	Mar-16	May-04	Jun-15	Jul-27	Sep-21	Nov-02	Dec-14



Appendix 3. Frequency of Board of Governors meetings over years 1994 to 2022.

This figure presents a histogram of the frequency of conducted Board of Governors meetings, year by year, over the period 1994 to 2022. Only interest meetings among scheduled Board of Governors meetings are counted.

Appendix 4

Regressions of Daily US Excess Stock Returns over Board of Governors Meetings Dummies and Fed Funds Target Rate Changes

This table presents daily US excess stock returns over a dummy variable for Board of Governors (BoG) meetings occurring on days t-5 to t-1, continuous yearly change in Fed funds target rate and these two variables in interaction. In column 1 and 3, we present regressions of Daily US excess stock returns in t over the dummy for the occurrence of a Board of Governors meeting on day t-5 to t-1. We present in column 2 and 4, regressions of Daily US excess stock returns in day t over three independent variables: 1) occurrence of Board of Governors meetings on day t-5 to t-1 in a year, 2) continuous yearly aggregate Fed funds rate increase, 3) the first two in interaction. Results are in percent, robust to heteroskedasticity. Standard errors are reported in parentheses.

	Dependent Variable: 1-Day Excess Return			
	1994 to 2016	1994-2016	2017 to 2022	2017-2022
Dummy=1 if BoG meeting in t-5 to t-1	0.105*** (0.0300)	0.0910*** (0.0287)	-0.00381 (0.0664)	0.0661 (0.0641)
Yearly Fed funds rate change		0.0588*** (0.0213)		-0.00301 (0.0256)
(BoG dummy)*(Yearly ff rate change)		-0.0792*** (0.0275)		-0.0959** (0.0485)
Constant	-0.0249 (0.0225)	-0.0114 (0.0207)	0.0314 (0.0365)	0.0333 (0.0409)
N	5997	5997	1519	1519
r2	0.00204	0.00529	0.00000182	0.00592

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$