



## The disappearing pre-FOMC announcement drift<sup>☆</sup>



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### ABSTRACT

Lucca and Moench (2015) document large average excess returns in U.S. equities before scheduled Federal Open Market Committee (FOMC) meetings from September 1994 to March 2011, leading to a puzzle not explained by standard asset pricing theory. We extend the sample to December 2019. We find that after first appearing before FOMC announcements accompanied by the Fed Chair press conferences, the pre-FOMC drift essentially disappeared after 2015 in both announcements accompanied by press conferences and announcements not accompanied by press conferences. We discuss a possible explanation for this change: reduced uncertainty.

### 1. Introduction

In their influential paper, Lucca and Moench (2015) (LM) document large excess returns in U.S. equities before scheduled FOMC announcements. From September 1994 to March 2011, the returns on average increase by 49 basis points during 24 h before the FOMC announcements, accounting for approximately 80% of annual returns. This finding is a puzzle because standard asset pricing theories cannot explain it.

Boguth et al. (2019) (BGM) extend the sample to September 2017 to study the impact of a new communication policy implemented in April 2011: the FOMC Chair press conferences. These press conferences took place after approximately every other meeting during their sample and were “intended to further enhance the clarity and timeliness of the Federal Reserve’s monetary policy communication” (Bank, 2011). BGM find that the pre-FOMC drift is limited to announcements with press conferences. They attribute this to investors expecting policy decisions and paying more attention before announcements with press conferences than before announcements without press conferences. They also find that the drift begins at the stock market open of the previous day, earlier than during the LM period.

We extend the sample to December 2019, which allows us to analyze more than eight years since the end of the LM sample. We find that the behavior of pre-FOMC returns has changed during the most recent period. Not only did the pre-FOMC drift disappear in announcements without press conferences as in BGM, since January 2016 the pre-FOMC drift has also substantially weakened in announcements with press conferences. We then show that this decrease in the pre-FOMC drift can be explained by reduced uncertainty

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about market conditions. Our paper therefore adds to two strands of literature. First, it contributes to our understanding of what happens around the FOMC announcements and second, it contributes to our understanding of the role that uncertainty plays in the financial markets.

Uncertainty continues to raise considerable interest.<sup>1</sup> The standard asset pricing theory says that positive expected excess returns are a compensation for the systematic risk, but research has shown that uncertainty also impacts asset prices. For example, Brown et al. (1988) propose the uncertain information hypothesis to explain how investors react to unexpected information: the information increases risk and expected return, causing asset prices to be depressed by uncertainty.<sup>2</sup> Bansal and Yaron (2004) present a theoretical model where the equity premium is partly driven by economic uncertainty: an increase in uncertainty increases the equity premium, which decreases the stock prices.

Uncertainty has been studied to explain the behavior of the stock market around the FOMC meetings. Chen and Clements (2007) show that the VIX decreases on days with FOMC meetings. Vähämaa and Äijö (2011) come to the same conclusion and attribute it to the decisions on monetary policy impacting the stock market uncertainty. Fernandez-Perez and Frijns (2017) confirm the above findings with intraday data (as opposed to daily data) and also relate it to the market uncertainty resolution. Amengual and Xiu (2018) find that downward volatility jumps are correlated with monetary policy uncertainty resolution following from FOMC announcements and the Fed Chair speeches. Gu et al. (2018) distinguish between FOMC meetings with and without press conferences and show that uncertainty is higher on the days when the meeting is accompanied by a press conference.

Uncertainty has also received attention in explaining the pre-FOMC drift documented by LM and BGM. Hu et al. (2019) argue that the drift arises because there are two types of risks related to scheduled announcements. The first type is due to the uncertain content of the news itself and is therefore directional. The second type is due to elevated uncertainty in anticipation of the scheduled announcement and its impact. They show that it is resolution of the second type of risk before the announcement that causes the positive pre-announcement drift.<sup>3</sup> Our paper builds on this literature by showing that the pre-FOMC drift documented by LM and BGM has declined in not only announcements without press conferences but also announcements with press conferences and its disappearance is associated with a declining market uncertainty.

A concurrent Ben Dor and Rosa (2019) study finds no pre-FOMC drift from April 2011 to December 2017 similarly to BGM. Our analysis differs in two ways. Following BGM, we distinguish between announcements with and without press conferences (in contrast to combining all announcements as in Ben Dor and Rosa (2019)) and we use a pre-FOMC window starting at the stock market open of the previous day (in contrast to a 24-h pre-FOMC window in Ben Dor and Rosa (2019)). This allows us to show that the behavior of the pre-FOMC returns has changed: the drift initially remained in announcements with press conferences even after the end of the LM period, but it has weakened since January 2016 whereas (Ben Dor and Rosa, 2019) do not find any change in the pre-FOMC drift after 2015. It also allows us to test the possible explanation of reduced uncertainty.

## 2. Analysis

Our data and method follow LM and BGM. There are 131 scheduled FOMC meetings from September 1994 to March 2011, the LM period. The post-LM period from April 2011 to December 2019 contains 70 scheduled meetings: 40 and 30 meetings with and without press conferences, respectively. The first press conference took place in April 2011. The following press conferences took place in June and November 2011, January, April, June, September and December 2012, and March, June, September and December from 2013 until January 2019 when they started taking place after every announcement.<sup>4</sup>

The announcements were released within a few minutes after 2:15 pm from September 1994 to March 2011, at 12:30 pm (eight announcements) or 2:15 pm (seven announcements) from April 2011 to January 2013, and at 2:00 pm since March 2013.<sup>5</sup> The press conferences started at 2:30 pm except for in 2011 and 2012 when they started at 2:15 pm.

We use intraday E-mini S&P 500 nearby contract futures prices.<sup>6</sup> Because this data begins only on September 10, 1997, we use the S&P 500 futures from September 1994 to September 9, 1997. Denoting price at time  $t$  by  $P_t$ , we compute the log return,  $R_t = \ln(P_t / P_{t-1})$ . Following LM, we initially focus on the return in 24 h ending 15 min before the announcement. For example, for 2:15 announcements, the return is computed from 2:00 pm on the day preceding the announcement day to 2:00 pm on the announcement day. The returns on non-announcement days are computed in the same 2:00 pm-to-2:00 pm window during the period from September

<sup>1</sup> In recent literature, for example, Goodell et al. (2020) study the relationship between financial market uncertainty, economic policy uncertainty, and election uncertainty in U.S. presidential elections and find that the incumbent-party election probability explains changes in the financial market uncertainty.

<sup>2</sup> The uncertain information hypothesis has been supported by, for example, Pantzalis et al. (2000) using international stock market data around elections.

<sup>3</sup> LM discuss and reject several other explanations for the positive pre-FOMC drift: risk, good news, information leakage, volatility, and liquidity. LM point to rational inattention or behavioral biases as possible explanations. Several papers have explored alternative explanations such as differences of opinion (Cocoma, 2017) and constrained institutional buying pressure (Kaul and Watanabe, 2015). Related Cieslak et al. (2019) find that the equity premium is earned entirely in weeks 0, 2, 4, and 6 of the FOMC cycle.

<sup>4</sup> In addition to announcements and press conferences, since April 2011 the FOMC has published a Summary of Economic Projections after every other meeting, showing the FOMC members' projections for GDP growth, unemployment rate, inflation, and appropriate federal funds rate.

<sup>5</sup> There are no qualitative differences between these three announcement times. These results are available upon request.

<sup>6</sup> BGM also use the futures. LM use the spot index and note that the futures returns are almost identical.

1994 to March 2011 and in the 1:45 pm-to-1:45 pm window during the period from April 2011 to December 2019.<sup>7</sup>

**Table 1** summarizes statistics for the log return. The first and second columns show announcement and non-announcement days, respectively, for the LM period (September 1994 to March 2011). The third and fourth columns show the post-LM period (April 2011 to December 2019). The pre-FOMC mean return in the post-LM period is close to zero and close to the mean return on non-announcement days. This contrasts with the LM period, where the pre-FOMC mean return is positive and much higher than on non-announcement days. This suggests that the pre-FOMC drift has recently weakened.

Focusing on announcement days, we compute average cumulative returns over a three-day window around the FOMC announcements (from the day before the announcement to the day after the announcement). The top panel of **Fig. 1** shows the period from September 1994 to March 2011, replicating the LM result: a large positive drift in the 24 h before announcements. The bottom panel shows the period from April 2011 when the press conferences started to September 2017, replicating **Fig. 3** in BGM. There are 27 and 25 announcements with and without press conferences, respectively. The drift exists only in announcements with press conferences and begins at the stock market open of the previous day, earlier than during the LM period.

Focusing on announcements with press conferences, **Fig. 2** extends the post-LM period to December 2019. We split the post-LM period in half. The first half comprises 20 announcements from April 2011 to December 2015, and the second half comprises 20 announcements from January 2016 to December 2019. This coincides with the zero lower bound (ZLB) liftoff in December 2015.<sup>8</sup> The top panel shows the first half of the sample. Consistent with BGM, there is a pre-FOMC drift. The bottom panel shows the second half of the sample. In contrast to the top panel, there is no evidence of a significant pre-FOMC drift. Due to the limited sample size, we confirm that the confidence bands constructed with bootstrapped standard errors are almost identical to those constructed with the regular standard errors reported in both panels of **Fig. 2**.

Because **Figs. 1** and **2** use different sample periods, we present **Fig. 3** to compare these two figures. **Fig. 3** shows the April 2011 - September 2017 line from the bottom panel of **Fig. 1** (blue line) and the April 2011 - December 2015 line from the top panel of **Fig. 2** (black line). (To simplify this **Fig. 3**, we are only showing CARs for meetings with press conferences and we are not displaying the confidence bands.) The black line is above the blue line. This indicates that the BGM result of the pre-FOMC drift in the April 2011 to September 2017 period (blue line) is driven by the earlier portion of the sample period from April 2011 to December 2015 (black line).

**Fig. 4** presents time-series of the pre-FOMC drift for announcements with press conferences (dashed black line). Following LM, we show an eight-observation moving average (solid black line). This figure also suggests that the pre-FOMC drift has recently weakened. In addition, there appears to be an increase in the pre-FOMC drift before the ZLB liftoff that took place in December 2015, which coincides with a period of elevated uncertainty measured by the VIX implied volatility index.<sup>9</sup> The figure also shows that the returns before FOMC meetings with press conferences have become less volatile since the ZLB liftoff. This is consistent with reduced uncertainty during the period since the ZLB liftoff.

**Table 2** presents summary statistics for log returns from the stock market open on the day before the announcement to 15 minutes before the announcement during the post-LM period (April 2011 to December 2019). The first column shows the pre-FOMC return for announcements without press conferences from April 2011 to December 2018. The results agree with the BGM analysis from April 2011 to September 2017: the mean pre-FOMC return for announcements without press conferences is close to zero. The second and third columns show mean returns for announcements with press conferences. In the first half of the sample (April 2011 to December 2015), the mean pre-FOMC return is 0.445, indicating a positive return of approximately 44 basis points similar in magnitude to the mean return during the LM period in **Table 1**. In contrast, the mean pre-FOMC return in the second half of the sample (January 2016 to December 2019) is 0.092. We conduct a test to find out whether the central tendencies in the two halves of the sample are equal. We use the Wilcoxon rank-sum test and reject the null hypothesis of equal central tendency at 1% level. This suggests that the pre-FOMC return distributions differ between the two periods.

Furthermore, the mean of returns computed from the previous day's open on non-announcement days during the January 2016 to December 2019 period (in the fifth column of **Table 2**) is 0.054. To find out whether the central tendencies on days with announcements accompanied by press conferences and on non-announcement days are equal, we again use the Wilcoxon rank-sum test. We cannot reject the null hypothesis of equal central tendency at conventional significance levels. This suggests that stock returns do not tend to be higher before FOMC announcements that have press conferences relative to days that do not have FOMC announcements. Together, these two tests suggest that the pre-FOMC drift has weakened for announcements with press conferences since January 2016.

### 3. Potential explanation

McLean and Pontiff (2016) show evidence of return predictability disappearing after the predictability was discovered by academic researchers. This mechanism does not seem to be driving our result because it does not explain why after the end of the LM sample period there initially was a preannouncement drift before FOMC announcements with press conferences. In this section, we therefore consider an alternative explanation for the disappearing drift: reduced uncertainty.

<sup>7</sup> Using other windows for non-announcement days (such as 2:00 pm-to-2:00 pm) from April 2011 to December 2019 does not affect our results.

<sup>8</sup> The federal funds rate target range was 0–0.25% until December 2015. From December 2015 to the end of our sample period, there were nine increases of 0.25% followed by three decreases of 0.25%.

<sup>9</sup> See [Section 3.1](#) for more detail about the relation between the pre-FOMC drift and the VIX.

**Table 1**

Summary statistics for returns (09/1994 - 12/2019)

	09/1994 - 03/2011		04/2011 - 12/2019	
	(LM Sample Period)		(Post-LM Sample Period)	
	Pre-FOMC	Non-FOMC Days	Pre-FOMC	Non-FOMC Days
Mean	0.492 (0.107)	0.009 (0.019)	0.047 (0.060)	0.038 (0.019)
St. Dev.	1.226	1.214	0.498	0.884
Max	9.576	12.210	1.489	4.510
Min	-2.875	-13.543	-1.792	-6.108
Obs.	131	4,082	70	2,184

This table presents summary statistics for the log return computed as  $R_t = \ln(P_t / P_{t-1})$ , where  $P_t$  denotes price at time  $t$ . The table uses data from September 1994 to December 2019. The E-mini S&P 500 futures are used from September 10, 1997 to December 2019; the S&P 500 futures are used from September 1994 to September 9, 1997. The Pre-FOMC columns use returns for the 24 hours ending 15 minutes before the FOMC announcements. The Non-FOMC Days columns use returns on non-announcement days. The returns on non-announcement days are computed in the 2:00 pm-to-2:00 pm window during the period from September 1994 to March 2011 and in the 1:45 pm-to-1:45 pm window during the period from April 2011 to December 2019. The first two columns summarize data for the [Lucca and Moench \(2015\)](#) (LM) sample period (September 1994 - March 2011); all announcements in the Pre-FOMC column are without press conferences. The last two columns summarize data for the post-LM sample period (April 2011 - December 2019); the Pre-FOMC column includes announcements both with and without press conferences. Standard errors for the mean are in parentheses.

### 3.1. Reduced uncertainty

We proceed in two steps. In the first step, we analyze whether the drift before the FOMC meetings with press conferences differs between the period before the ZLB liftoff and the period after the ZLB liftoff. We estimate an ordinary least squares (OLS) event-study regression for announcements with press conferences from April 2011 to December 2019 where we regress the pre-FOMC returns (measured as in [Table 2](#)) on an indicator variable equal to one after the ZLB liftoff:

$$Ret_t = \beta_0 + \beta_1 PostZLB_t + \epsilon_t \quad (1)$$

The first specification in [Table 3](#) shows the results. The post-ZLB indicator variable is negative and statistically significant at 5% level. In addition, the sum of  $\beta_0$  and  $\beta_1$  (not reported in [Table 3](#)), which measures the mean pre-FOMC drift after the ZLB liftoff, is not statistically significant. This indicates that for meetings accompanied by press conferences the pre-FOMC drift in the period before the ZLB liftoff differs from the pre-FOMC drift in the period after the ZLB liftoff; in particular, the drift is lower after the ZLB liftoff than before the ZLB liftoff.<sup>10</sup>

In the second step, we investigate whether uncertainty might have played a role in this change in the pre-FOMC drift. Following [Gu et al. \(2018\)](#), we use the VIX implied volatility index as a measure of uncertainty about market conditions. We note that the average VIX is 17.7 and 14.7 before and after the ZLB liftoff, respectively, and this difference is significant at 1% level. To focus on pre-FOMC market uncertainty, we use VIX at market close two days before the FOMC announcements. We estimate the following equation:

$$Ret_t = \beta_0 + \beta_1 PostZLB_t + \beta_2 VIX_{t-2} + \epsilon_t \quad (2)$$

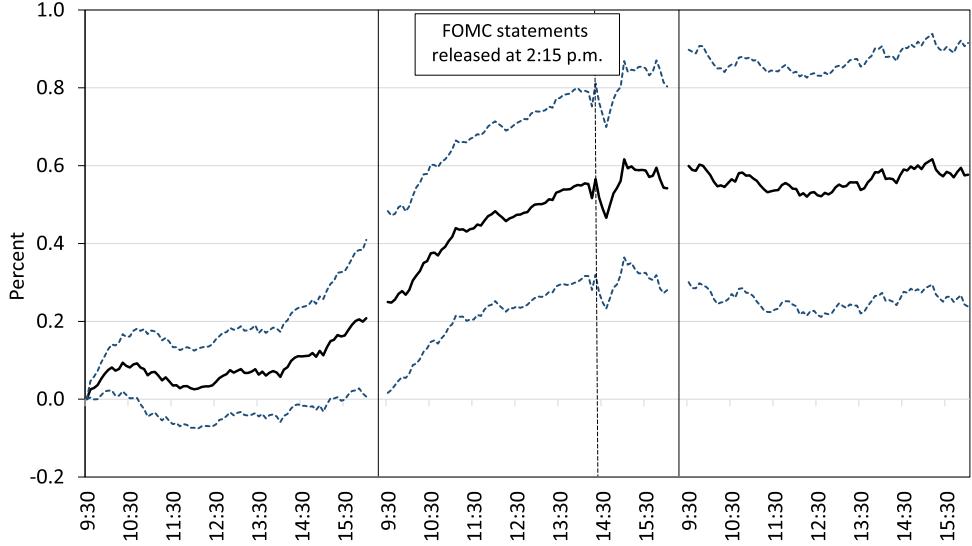
The second specification in [Table 3](#) shows the results. The post-ZLB indicator variable becomes insignificant while the VIX is significant. This indicates that the decrease in the pre-FOMC drift is associated with a reduction in VIX. In other words, the significance of the post-ZLB indicator variable in the first column is driven by the VIX. While these results come with a small sample caveat, they are consistent with the lower pre-FOMC drift in recent years explained partially by lower uncertainty. This explanation of reduced uncertainty is also consistent with [Hu et al. \(2019\)](#) who explain the pre-FOMC returns by heightened uncertainty measured by VIX.

### 3.2. Robustness check: alternative measure of uncertainty

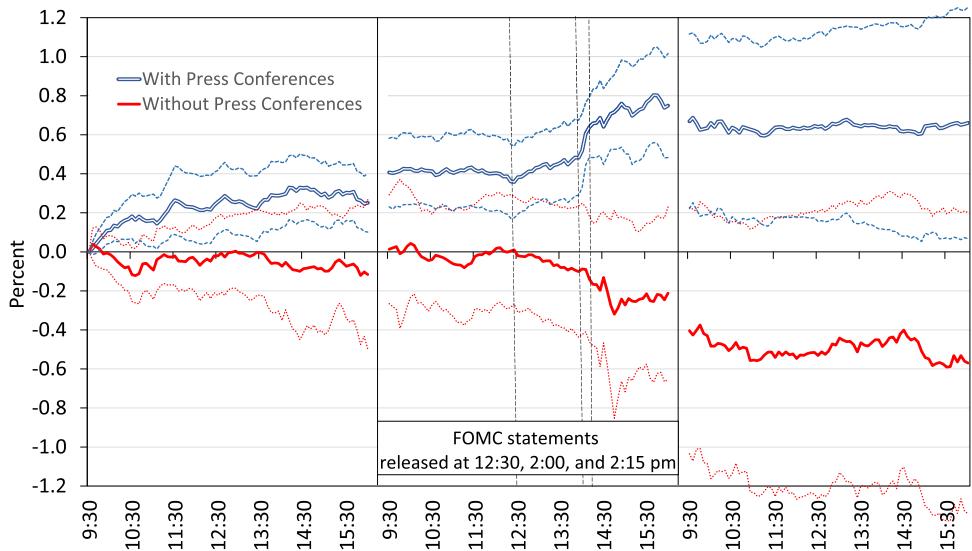
As a robustness check, we utilize an alternative measure of uncertainty following [Gu et al. \(2018\)](#): the 10-year U.S. Treasury Note Volatility Index (TYVIX), a market-based measure of monetary policy uncertainty. Consistent with the analysis in [Section 3.1](#) that uses VIX, we note that the average TYVIX is 5.90 and 4.68 before and after the ZLB liftoff, respectively, and this difference is significant at 1% level. To again focus on pre-FOMC market uncertainty, we use the TYVIX at market close two days before the FOMC announcements. We estimate [Eq. \(2\)](#) with TYVIX instead of VIX.

<sup>10</sup> An alternative specification involves an event-study regression for announcements both with and without press conferences from April 2011 to December 2019 that regresses the pre-FOMC return on the press conference indicator variable and on the interaction term that interacts the press conference indicator variable with the ZLB liftoff indicator variable. The coefficient on the press conference indicator variable is 0.497 and statistically significant at 5% level. The coefficient on the interaction term is -0.353 also statistically significant at 5% level. Consistent with the first column of [Table 3](#), these results indicate that the pre-FOMC drift that existed before meetings accompanied by press conferences declined after the ZLB liftoff.

September 1994 to March 2011 (LM Sample Period)



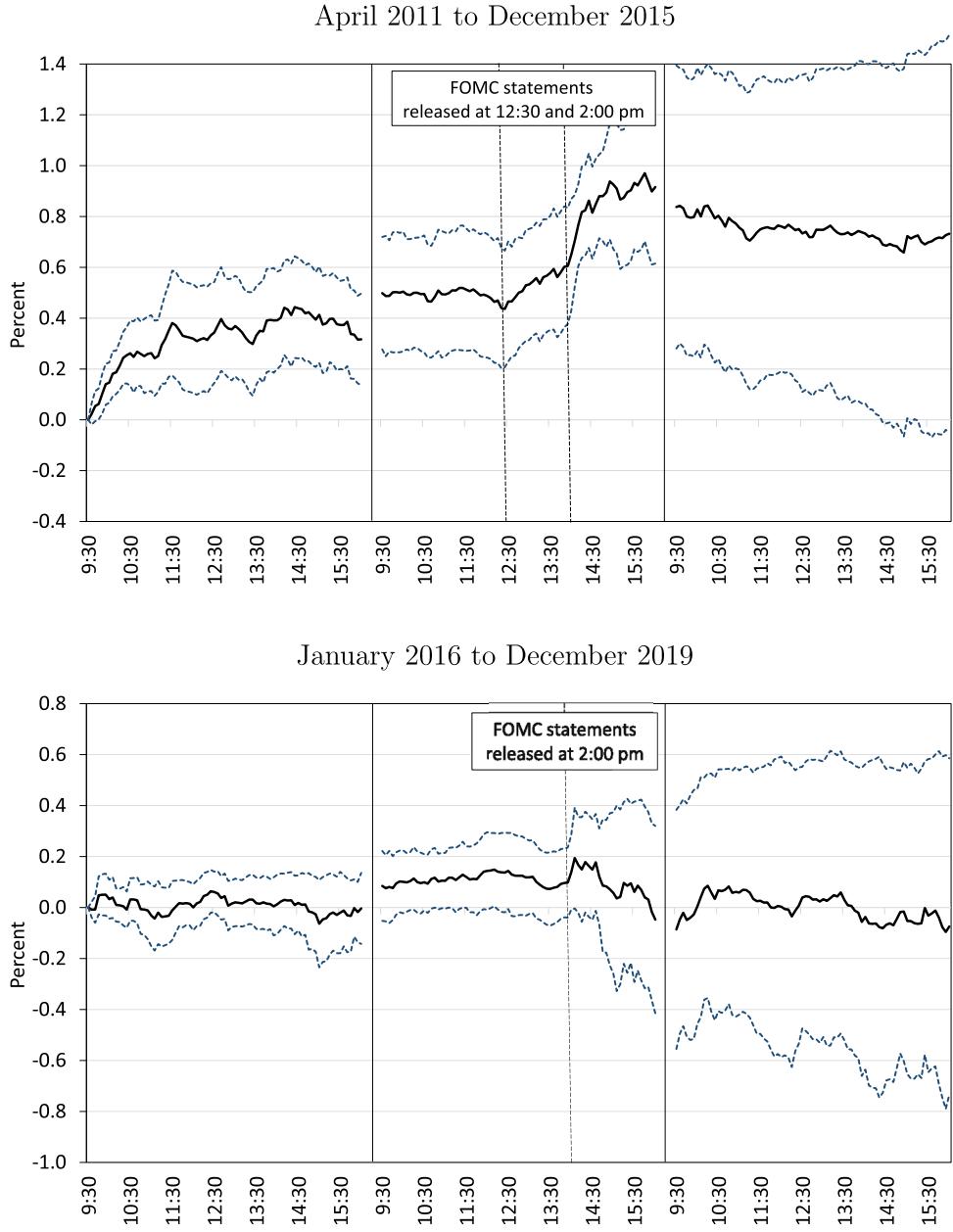
April 2011 to September 2017 (BGM Sample Period)



**Fig. 1.** Cumulative Average Returns from September 1994 to September 2017 This figure shows the cumulative average returns during three days around FOMC announcements. The E-mini S&P 500 futures are used from September 10, 1997 to September 2017; the S&P 500 futures are used from September 1994 to September 9, 1997. The top panel includes 131 announcements from September 1994 to March 2011, which is the Lucca and Moench (2015) (LM) sample period; all announcements in this sample period are without press conferences. The bottom panel includes 27 and 25 announcements with (blue line) and without (red line) press conferences, respectively, from April 2011 to September 2017, which is the (Boguth et al., 2019) (BGM) sample period. The dashed lines represent 95% confidence bands around the mean returns. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

The third specification in Table 3 shows the results. As in the second column, the post-ZLB indicator variable becomes insignificant while the uncertainty variable is significant. This again indicates that the decrease in the pre-FOMC drift is associated with a reduction in uncertainty. In other words, the significance of the post-ZLB indicator variable in the first column is driven by the uncertainty differing between the before-ZLB and after-ZLB periods.

As an additional specification, we estimate Eq. (2) while including both the VIX and TYVIX measures of uncertainty. Although the TYVIX is not statistically significant on its own (perhaps because the general market uncertainty measured by the VIX is partially subsuming uncertainty about monetary policy decisions measured by the TYVIX), it does affect the coefficient on the statistically

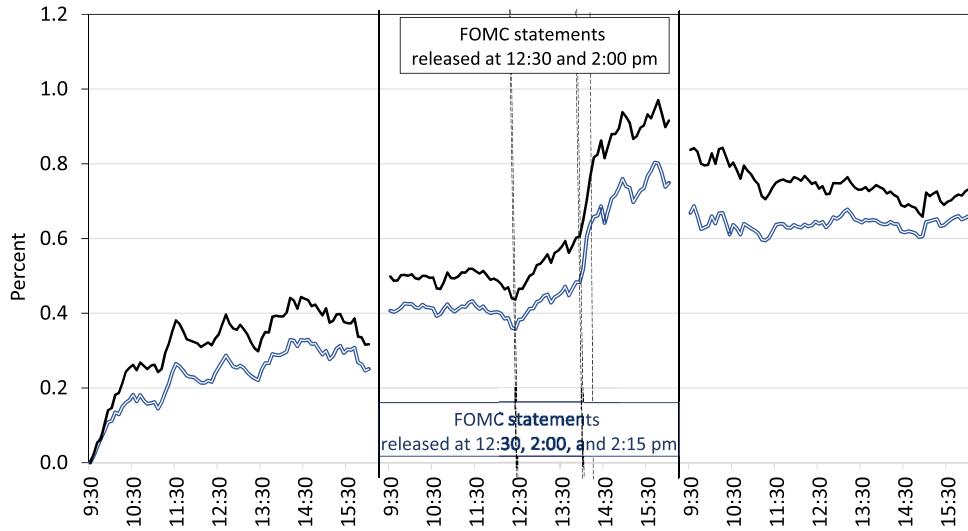


**Fig. 2.** Cumulative Average Returns for Announcements with Press Conferences from April 2011 to December 2019 This figure shows the E-mini S&P 500 futures cumulative average returns during three days around FOMC announcements with press conferences. The top panel includes 20 announcements from April 2011 when the press conferences started to December 2015. The bottom panel includes 20 announcements from January 2016 to December 2019. The dashed lines represent 95% confidence bands around the mean returns.

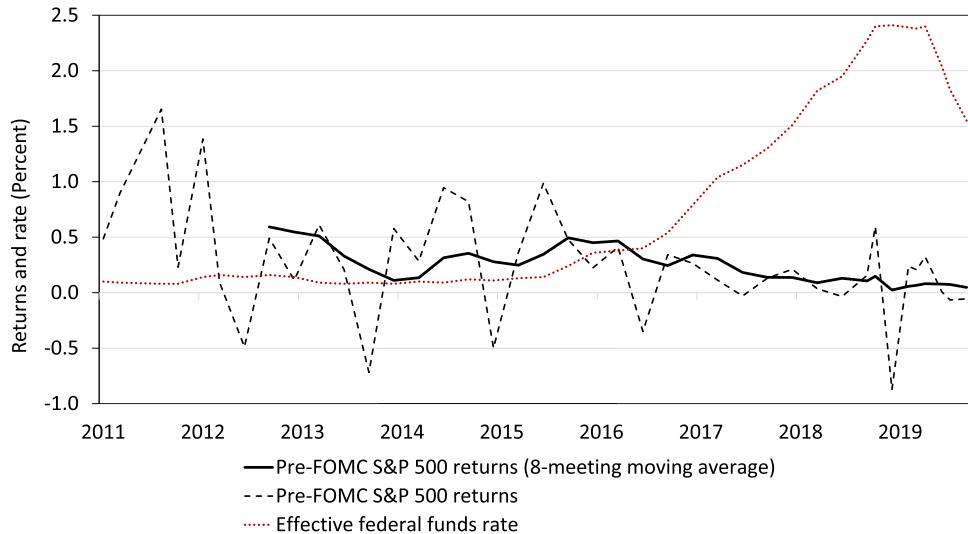
significant VIX that is now 0.193 compared to 0.229 in the second column. Crucially, the post-ZLB indicator variable remains insignificant, confirming results from the second and third specifications that showed that the significance of the post-ZLB indicator variable in the first column is driven by the uncertainty differing between the ZLB and post-ZLB periods.

### 3.3. Robustness check: changes in VIX on announcement days with press conferences

In addition to examining the impact of uncertainty by estimating Eq. (2), we analyze changes in VIX on announcement days with press conferences. We find evidence that FOMC announcements with press conferences were accompanied by greater uncertainty resolution before the ZLB liftoff than after the ZLB liftoff. Before the ZLB liftoff, the mean log-change in the VIX on days of these announcements is -6.52%, significant at 1% level. In contrast, after the ZLB liftoff, the mean log-change is an insignificant -1.27%. The



**Fig. 3.** Cumulative Average Returns for Announcements with Press Conferences from Figs. 1 and 2 This figure shows the cumulative average returns during three days around FOMC announcements. The S&P 500 futures are used. Only announcements with press conferences are used. The blue line (from the bottom panel of Fig. 1) uses data from April 2011 to September 2017, which includes 27 announcements. The black line (from the top panel of Fig. 2) uses data from April 2011 to December 2015, which includes 20 announcements.



**Fig. 4.** Pre-FOMC Returns for Announcements with Press Conferences from April 2011 to December 2019 This figure shows the E-mini S&P 500 futures log returns from the stock market open on the day before the announcement to 15 minutes before the announcement (dashed black line), their 8-observation moving average (solid black line), and the effective federal funds rate (dotted red line). Only FOMC announcements with press conferences are included. The sample period is from April 2011 when the press conferences started to December 2019. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

difference between these log-changes is statistically significant at 5% level. This suggests that announcements with press conferences were accompanied by greater uncertainty resolution before the ZLB liftoff. In contrast, changes in the VIX on announcement days without press conferences are not significant before or after the ZLB liftoff during the post-LM period. These results are consistent with the results from estimating Eq. (2) in Section 3.2 showing that the lower pre-FOMC drift in recent years is explained by lower uncertainty.

#### 4. Conclusion

We show that the pre-FOMC drift of Lucca and Moench (2015) has not only disappeared for announcements without press conferences as documented by Boguth et al. (2019) but also weakened in announcements with press conferences. This result is consistent

**Table 2**

Summary statistics for returns (04/2011 - 12/2019)

	Without PC	With PC	With PC	Non-FOMC Days	Non-FOMC Days
	04/2011-12/2018	04/2011-12/2015	01/2016-12/2019	04/2011-12/2015	01/2016-12/2019
Mean	-0.051 (0.141)	0.445 (0.133)	0.092 (0.069)	0.043 (0.032)	0.054 (0.031)
St. Dev.	0.774	0.596	0.307	1.090	0.969
Max	1.212	1.653	0.594	4.765	3.938
Min	-2.611	-0.718	-0.872	-6.695	-5.584
Obs.	30	20	20	1187	998

This table presents summary statistics for the log return computed as  $R_t = \ln(P_t / P_{t-1})$ , where  $P_t$  denotes price at time  $t$ . The table uses data from April 2011 when the press conferences started to December 2019. The E-mini S&P 500 futures are used. The returns are reported for days with announcements accompanied by press conferences (PC), days with announcements unaccompanied by PC, and days without announcements. For announcement days, the return is computed from the stock market open on the day before the announcement to 15 minutes before the announcement. For non-announcement days, the return is computed from the stock market open on the previous day to 1:45 pm on the given day. Standard errors for the mean are in parentheses.

**Table 3**

Pre-FOMC returns and uncertainty

	(1)	(2)	(3)	(4)
Constant	0.445*** (0.130)	0.362*** (0.113)	0.345** (0.130)	0.328** (0.124)
Post-ZLB indicator	-0.353** (0.146)	-0.187 (0.141)	-0.152 (0.157)	-0.118 (0.152)
VIX		0.229*** 0.069		0.193*** (0.065)
TYVIX			0.186** (0.085)	0.087 (0.070)
Adjusted $R^2$	0.10	0.27	0.18	0.27

The sample contains 40 FOMC announcements accompanied by press conferences. The sample period is from April 2011 when the press conferences started to December 2019. The first specification shows results of estimating  $Ret_t = \beta_0 + \beta_1 PostZLB_t + \epsilon_t$  where  $Ret_t$  is the pre-FOMC return measured as in Table 2, and  $PostZLB_t$  is an indicator variable equal to one after the ZLB liftoff. The second specification includes  $VIX_t$  measured as the level of the VIX index at the market close two days before the FOMC announcement (standardized to have a mean of zero and a standard deviation of one) following LM. The third specification includes  $TYVIX_t$  measured as the level of the TYVIX index at the market close two days before the FOMC announcement (standardized to have a mean of zero and a standard deviation of one). The fourth specification includes both VIX and TYVIX. Heteroskedasticity consistent standard errors are shown in parentheses. \*\* and \*\*\* indicate statistical significance at the 5% and 1% levels, respectively.

with the explanation of reduced uncertainty. One interesting question for future research is whether the market uncertainty heightened by the COVID-19 pandemic in 2020 will bring an impact on the pre-FOMC returns, especially since the FOMC has been highlighting the health crisis and its consequences for economic activity as the reason for its monetary policy actions (Bank, 2020).

## Supplementary material

Supplementary material associated with this article can be found, in the online version, at [10.1016/j.frl.2020.101781](https://doi.org/10.1016/j.frl.2020.101781)

## References

- Amengual, D., Xiu, D., 2018. Resolution of policy uncertainty and sudden declines in volatility. *J. Econ.* 203, 297–315.
- Bank, F. R., 2011. Chairman Bernanke will hold press briefings four times per year to present the FOMC's current economic projections and to provide additional context for policy decisions, March 24.
- Bank, F. R., 2020. Federal Reserve Bank press release, June 10.
- Bansal, R., Yaron, A., 2004. Risks for the long run: a potential resolution of asset pricing puzzles. *J. Finance* 59, 1481–1509.
- Ben Dor, A., Rosa, C., 2019. The pre-FOMC announcement drift: an empirical analysis. *J. Fixed Income* 28 (4), 60–72.
- Boguth, O., Gregoire, V., Martineau, C., 2019. Shaping expectations and coordinating attention: the unintended consequences of FOMC press conferences. *J. Financ. Quant.* 54 (6), 2327–2353.
- Brown, K.C., Harlow, W.V., Tinic, S.M., 1988. Risk aversion, uncertain information, and market efficiency. *J. Financ. Econ.* 22 (2), 355–385.
- Chen, E.-T.J., Clements, A., 2007. S&P 500 implied volatility and monetary policy announcements. *Finance Res. Lett.* 4, 227–232.
- Cieslak, A., Morse, A., Vissing-Jorgensen, A., 2019. Stock returns over the FOMC cycle. *J. Finance* 74 (5), 2201–2248.
- Cocoma, P., 2017. Explaining the pre-announcement drift. Manuscript.
- Fernandez-Prez, A., Frijns, T.-R.A.Bart, 2017. When no news is good news the decrease in investor fear after the FOMC announcement. *J. Empir. Finance* 41, 187–199.

- Goodell, J.W., McGee, R.J., McGroarty, F., 2020. Election uncertainty, economic policy uncertainty and financial market uncertainty: a prediction market analysis. *J. Bank. Finance* 110, 105684.
- Gu, C., Kurov, A., Wolfe, M., 2018. Relief rallies after FOMC announcements as a resolution of uncertainty. *J. Empir. Finance* 49, 1–18.
- Hu, G.X., Pan, J., Wang, J., Zhu, H., 2019. Premium for heightened uncertainty: solving the FOMC puzzle. Manuscript.
- Kaul, A., Watanabe, M., 2015. Dissecting the pre-FOMC announcement drift. Manuscript.
- Lucca, D.O., Moench, E., 2015. The pre-FOMC announcement drift. *J. Finance* 70 (1), 329–371.
- McLean, R.D., Pontiff, J., 2016. Does academic research destroy stock return predictability? *J. Finance* 71 (1), 5–32.
- Pantzalis, C., Strangeland, D.A., Turtle, H.J., 2000. Political elections and the resolution of uncertainty: the international evidence. *J. Bank. Finance* 24 (10), 1575–1604.
- Väähamaa, S., Äijö, J., 2011. The Fed's policy decision and implied volatility. *J. Futures Mark.* 31, 995–1009.