Stock Market Reactions to Monetary Policy Surprises Under Uncertainty*

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Abstract

This article investigates how uncertainty impacts the effect of monetary policy surprises on stock returns. Using high-frequency US data, we demonstrate that stock markets respond more aggressively to monetary policy surprises during periods of high uncertainty. We also show that uncertainty asymmetrically influences the transmission of positive and negative monetary policy surprises to stock market prices. The amplifying effect of uncertainty is found to be stronger for expansionary shocks than for contractionary shocks. Our robustness analysis confirms that financial uncertainty has a significant role in shaping the influence of monetary policy on the stock market.

Keywords: Monetary policy, Uncertainty, Stock returns, High-frequency data, Event study.

JEL Codes: E44, E52, E58, G12, G14.

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1 Introduction

This paper investigates whether the level of financial uncertainty affects the stock market's reaction to monetary policy (MP) surprises. Many studies have investigated the connection between MP and stock markets.[1] Economic theory suggests several channels through which MP surprises affect stock prices. First, unexpected changes in the policy rate may have a *direct* effect through discount rates. That is, an increase in the policy rate reduces the present discounted value of firms' expected earnings and dividends, therefore harming equity valuation. Second, MP surprises may *indirectly* impact stock price valuation by signaling information about the economic outlook and future path of MP. For example, Nakamura and Steinsson (2018) document that in the US, MP surprises convey information to financial markets about the Federal Reserve's (Fed) internal forecast, which in turn causes asset prices to react.

The level of uncertainty in financial markets may also influence stock prices and their reaction to MP shocks. Theoretically, Bansal and Yaron (2004) show that the equity risk premium[2] is a function of uncertainty, with a fall in the latter triggering an immediate increase in stock prices. Lakdawala and Schaffer (2019) present a theoretical model to examine the connection between MP and the stock market, with a focus on the impact of shocks that reveal information about economic activity ("Delphic" shocks). They build on the same framework as our paper (Bernanke and Kuttner, 2005) by using high-frequency market data to identify MP surprises. Their model decomposes the MP surprise measure into an exogenous and a Delphic component. The exogenous component represents shocks unrelated to economic activity, while the Delphic component captures shocks that reveal private information the Fed possesses. They construct a measure of private information by combining market survey data with the Fed's internal forecasts to show that such Delphic shocks reveal that the Fed's private information about underlying macro fundamentals also affects the market's perceived uncertainty about the future, thus highlighting the unique uncertainty dimension of MP transmission to the stock market. Our approach is close to their theoretical model, although we investigate the effects of uncertainty states rather than uncertainty shocks of the transmission of MP surprises on stock returns.

On the empirical front, Bekaert et al. (2013) show that MP decisions have important effects on financial uncertainty. Gu et al. (2018) show that uncertainty decreases after Federal Open Market Committee (FOMC) announcements, specif-

[1] See for example, Bernanke and Kuttner (2005) and Gürkaynak et al. (2005), among many others.

[2] The equity risk premium refers to the excess return investors can potentially earn by investing in the stock market over a risk-free rate. It compensates for the higher risk associated with equity investments. The size of the premium varies based on portfolio risk and changes over time.

ically when they are accompanied by the release of the Summary of Economic Projections. They argue that the decrease in uncertainty following the announcement can help explain positive post-announcement stock market returns. In a recent paper, Cieslak et al. (2019) suggest a new channel through which the Fed affects stock prices, which they term the "downside-risk channel". They provide evidence that Fed officials use systematic informal communication with the media and financial sector to reduce uncertainty and downside risk via an implicit promise to act if the financial system is under stress. The channel is in line with the "Fed put" view,[3] according to which the Fed reacts to falling stock prices by providing (or promising) MP accommodation. Kroencke et al. (2021) provide evidence for a "risk shift" following FOMC announcements, suggesting that there is an "uncertainty channel" through which MP announcements affect stock valuation by increasing or decreasing market participants' uncertainty.[4]

Several recent papers specifically focus on the impact of MP uncertainty. For example, Kurov and Stan (2018) examine the effects of economic news and MP uncertainty on MP expectations. They find that economic news significantly influence interest rates and the risk premium in times of high MP uncertainty. Consequently, the response of stocks to economic news weakens during periods of elevated MP uncertainty. Bauer et al. (2022) emphasize the crucial role of uncertainty about future policy rates in transmitting MP to financial markets. They demonstrate that FOMC announcements systematically resolve uncertainty, which subsequently gradually ramps up again. Changes in MP uncertainty around FOMC announcements, often driven by forward guidance, have pronounced effects on asset prices that are distinct from conventional policy surprises.

Also related are papers that examine how MP shocks impact investors uncertainty and sentiment. For example, Guo et al. (2021) focus on the pre-FOMC announcement drift, investigating the influence of investor' sentiment and economic policy uncertainty on stock prices before FFR announcements. In months characterized by high sentiment, which may correspond to low uncertainty periods, they find a positive drift in the S&P 500 index during the pre-FOMC window. However, this positive drift is absent in months of low sentiment (high uncertainty). Build-

[3]The "Fed put view" refers to Fed MP accommodations in response to significant declines in the stock market. This view suggests that the Fed is willing to ease MP to mitigate the negative effects of stock market slumps on the economy. This policy approach refers to the Fed's willingness to provide a safety net for the stock market.

[4]The "uncertainty channel" suggests that the level of uncertainty in financial markets significantly influences how the stock market reacts to unexpected changes in MP. Supported by economic theory and empirical evidence, reductions in financial uncertainty following MP announcements can explain positive stock market returns. Central banks also use communication strategies to reduce uncertainty and downside risk, reinforcing the "uncertainty channel." The level of financial uncertainty plays a critical role in determining the stock market's reaction to MP decisions. Specifically, accommodative MP surprises can boost the stock market during periods of high uncertainty, while restrictive MP surprises may not have the same impact (For more details on these asymmetric effects, see Section 4).

ing upon their previous work, Guo et al. (2022) explore the interaction between investor sentiment and MP news. They find that the stock market reacts strongly to MP surprises only during sentiment-waning phases, which are distinct from recessionary or bear market episodes.

Overall, these papers indicate that the impact of MP on financial uncertainty and the equity risk premium might be a crucial channel through which MP affects stock prices.[5] Our paper contributes to this literature by unveiling this relationship's state-dependent nature and nonlinear dynamics. In particular, we reveal that heightened uncertainty magnifies the impact of MP shocks solely in the case of negative shocks and under non-extreme circumstances. These findings suggest that certain channels elucidated in the literature and empirical observations may only hold relevance under specific conditions, highlighting the need for a nuanced understanding of this complex interaction.

Specifically, we examine if the connection between MP and stock returns depends on the direction of the policy decision–accommodative vs. restrictive. We expect that financial uncertainty plays a different role in accommodative and restrictive policy surprises for several reasons. First, according to the studies on the "fed put view," MP may have an asymmetric impact on stock markets since markets expect an accommodative policy stance during bad times but do not expect tightening during good times (Mishkin, 2017). An unexpected loosening of monetary conditions during periods of high uncertainty may signal to the markets that the Fed is committed to acting aggressively to ease financial conditions. However, an unexpected tightening may not have the same impact since markets may interpret the shock as a positive signal about economic health and not as the Fed attempting to cool the stock market. Second, a reduction in uncertainty following the MP announcement may positively affect stock prices, regardless of the direction of the policy decision. Therefore, the post-announcement reduction in uncertainty will strengthen the direct impact of accommodative MP decisions and weaken the direct effects of contractionary ones. Consequently, we expect that if the amplifying effect of financial uncertainty exists, it will be stronger for accommodative MP surprises than for contractionary shocks.

To test these predictions, we follow previous literature[6] and use an event study methodology with high-frequency US data to examine how uncertainty affects the reaction of stock market returns to MP decisions. This methodology allows us to identify the immediate effect of an unanticipated MP decision, while mitigating any simultaneity concerns between stock markets and policy changes. We find evidence that the impact of MP on stock markets depends on the level of uncer-

[5] Unanticipated changes in the MP rate may exacerbate (alleviate) financial uncertainty, decreasing (increasing) equity risk premiums, and causing contemporaneous stock prices to decline (rise).

[6] From Bernanke and Kuttner (2005) and Gürkaynak et al. (2005), to Tsai (2014), Lucca and Moench (2015), and Cieslak et al. (2019), among many others.

tainty. Specifically, we show that during periods of high uncertainty, MP surprises induce a stronger reaction by stock markets.

On the one hand, we find that accommodative MP surprises can boost the stock market during periods of high uncertainty but is mostly ineffective when uncertainty is low. On the other hand, restrictive MP is ineffective when uncertainty is high but has a significant negative relationship with the stock market when uncertainty is low. Overall, the results suggest that reducing the level and price of uncertainty is an important mechanism through which MP affects stock markets. This mechanism is critical to investors in periods of high financial uncertainty. To strengthen the interpretation of the results, we also investigate possible asymmetrical MP influences on financial uncertainty. Looking at the change in uncertainty days around an FOMC announcement, we show that uncertainty declines following a restrictive MP announcement. The decline in uncertainty is stronger and more significant during periods of mid-high levels of financial uncertainty, suggesting that the uncertainty-based connection (channel) between MP and stock prices is mostly relevant during periods of high uncertainty. We also find that the response of stock returns is asymmetric to positive and negative policy changes.

This paper makes several contributions to the literature. First, it advances the literature on the state dependency of the stock market response to MP surprises. Previous studies have shown that MP surprises tend to have a stronger impact on stock markets during periods of extreme market conditions such as recessions or bear markets (Basistha and Kurov, 2008; Jansen and Tsai, 2010; Kurov, 2010; Kontonikas et al., 2013). In line with these studies, we show that periods with elevated levels of uncertainty are characterized by a stronger reaction of the stock market to MP surprises, specifically accommodative surprises. Second, we show that financial uncertainty can help explain the time-varying response of stock prices to MP shocks documented by previous studies (Galí and Gambetti, 2015; Jansen and Zervou, 2017). Finally, the paper contributes to a series of recent studies that use the stock market's response to MP announcements to decompose MP surprises into exogenous and information shocks (Jarociński and Karadi, 2020). This paper highlights a possible shortcoming of such an identification: Since the interpretation of a MP shock by financial markets might be state-dependent on the level of stress (uncertainty), two MP shocks can result in different market reactions even when they are similar in magnitude and information.

From a policy perspective, the results highlight the possible adverse effects of failing to monitor uncertainty when making MP decisions. For example, when uncertainty in the financial markets is high, a strong accommodative policy surprise may induce an over-aggressive reaction by the markets, which could lead to excessive risk-taking and a higher risk of asset price bubbles. These unintended consequences may lead to additional interventions and weaken the central bank's

credibility. In line with Kurov and Gu (2016), we find that MP can also be helpful to boost equity prices, especially during periods of financial stress. However, the results also suggest that restrictive MP will be an ineffective tool to cool down the stock market if policymakers are concerned that stock prices are deviating from fundamentals, in line with Galí and Gambetti (2015).

The paper is structured as follows. Section 2 describes the empirical model, and Section 3 presents the high-frequency data. Section 4 describes the empirical findings and Section 5 the robustness and sensitivity tests. Section 6 draws some policy implications, and Section 7 concludes.

2 Empirical Methodology

This section first presents a standard event-study specification following Kuttner (2001). Specifically, we regress the S&P 500 stock return during a narrow window around each FOMC announcement on the unexpected change in the federal funds rate (FFR):

$$\Delta r_t = \alpha + \beta \Delta i_t^s + \varepsilon_t, \tag{1}$$

where r_t is the log change in the S&P 500 stock index between 10 minutes before and 20 minutes after the FOMC announcement, Δi_t^s is the surprise change in the FFR, and ε_t is a stochastic error term that represents the effects unrelated to the FOMC announcement that influence the stock index. α and β are the estimated parameters.

This methodology mitigates endogeneity concerns. All the public information available at the beginning of a narrow window is already incorporated into financial markets. In these regressions, the error terms only contain information revealed in a very narrow window. This methodology identifies a "pure" MP shock, which is assumed to be orthogonal to this limited amount of information (Bernanke and Kuttner, 2005; Gürkaynak et al., 2005).

To investigate the impact of financial uncertainty on stock markets' sensitivity to MP, we re-estimate Eq. 1 with an interaction term between the unexpected policy change and the measure of financial market uncertainty:

$$\Delta r_t = \alpha + \beta_1 U_{t-1} + \beta_2 \Delta i_t^s + \beta_3 \Delta i_t^s U_{t-1} + \varepsilon_t, \tag{2}$$

where U_{t-1} is the measure of uncertainty in financial markets, lagged one period.[7] We next examine the possible asymmetric impact of market uncertainty by estimating Eq. 2 separately for negative and positive policy surprises. Note that according to the expected effect through the discount rate, for both sub-samples

[7] In the baseline specification, we use a lagged daily measure of financial uncertainty explained in Section 3.

the coefficients on the positive and negative policy surprises should be negative, such that stock prices drop following MP tightening (positive shock) and rise after monetary conditions are loosened (negative shock).

We next examine the possible asymmetric impact of market uncertainty for negative and positive policy surprises using the following specification:

$$\begin{aligned} \Delta r_t &= \alpha + \beta_1 U_{t-1} + \varepsilon_t \\ &\quad + \left[\beta_2^- \Delta i_t^s + \beta_3^- \Delta i_t^s U_{t-1} \right] D_t^- \\ &\quad + \left[\beta_2^+ \Delta i_t^s + \beta_3^+ \Delta i_t^s U_{t-1} \right] D_t^+, \end{aligned} \tag{3}$$

where D_t^- (D_t^+) is a dummy variable taking the value one if the surprise FFR change is negative (positive) and 0 otherwise. The coefficient β_2^- and β_2^+ measures the response of stock market prices to negative and positive surprises, respectively. β_3^- and β_3^+ measure the influence of uncertainty on negative and positive surprises, respectively. According to the expected effect through the discount rate, the coefficients on positive (β_2^+) and negative (β_2^-) policy surprises should both be negative, such that stock prices drop following MP tightening (positive shock) and rise after monetary conditions are loosened (negative shock).

Finally, we consider the possible nonlinear impact of financial uncertainty on the relationship between MP and stock markets. Kontonikas et al. (2013) show that stock prices typically increase as a response to unexpected FFR cute in the U.S., and that the reaction is stronger during “bad times" such as recessions and bear markets. However, stocks did not react positively to expansionary shocks during the GFC since they were perceived as a signal for worsening future economic conditions. Therefore, extreme levels of financial stress may induce a non-positive reaction of stocks to expansionary FFR shocks. We address this issue of nonlinearity using a quantile regression model. Specifically, the quantile regression model is expressed as follows:

$$r_t = \alpha^{(\tau)} + \beta_1^{(\tau)} U_{t-1} + \beta_2^{(\tau)} \Delta i_t^s + \beta_3^{(\tau)} \Delta i_t^s U_{t-1} + \varepsilon_t \tag{4}$$

where $\tau \in [0, 1]$. The regression coefficients depend on the τ^{th} quantile regression function of stock returns.

3 Data

Based on an updated version of the Gürkaynak et al. (2005) dataset, we utilize asset-price changes for 240 FOMC announcements from 1990 to 2016.[8] However, our sample starts in 1994 since market participants had to infer the policy change

[8]We are grateful to Refet Gürkaynak for providing us with the data.

by observing open market operations and movements in the FFR before 1994, as a press statement did not accompany FOMC decisions.

Previous studies suggest that the Global Financial Crisis (GFC) caused a structural change in the relationship between stock prices and MP (Kontonikas et al., 2013). The GFC induced panic and a "flight to safety" reaction, which changed the stock market's response to policy changes. Additionally, the period following the crisis featured unprecedentedly low policy rates and unconventional policy measures. We account for these possible structural breaks by also reporting results for a sub-sample ending in December 2007. We use both scheduled (183) and unscheduled (9) FOMC meetings.[9] Following much of the related literature, we exclude the 9/17/2001 and 3/18/2009 target rate announcements.[10]

Our baseline measure of stock price returns is the log change in the S&P 500 stock index between 10 minutes before and 20 minutes after the announcement. To measure MP surprises, we follow Jarociński and Karadi (2020) and use the change in the 3-month FFR futures traded on the Chicago Board of Trade in the window around the FOMC policy decisions. Following the seminal work of Bloom (2009), our primary measure of financial uncertainty is the Chicago Board Options Exchange Volatility Index (VIX). The VIX is commonly used as a measure of global financial uncertainty, while local uncertainty measures (Jurado et al., 2015; Baker et al., 2016, 2019) are used in Section 5. However, we acknowledge the potential limitations of using the VIX as a proxy for financial uncertainty.[11]

Summary statistics for the full and pre-GFC samples and positive and negative MP surprises are presented in Table 1.

[9] Results are insensitive to using only the scheduled meetings. See Section 5.

[10] The 9/17/2001 announcement occurred on the first trading day following the September 11 attacks. On 3/18/2009, the FOMC made its first announcement regarding purchases of longer-term Treasuries and expansion of MBS purchases.

[11] Sentiment may also affect the direction of price reaction. For example, Stambaugh et al. (2015) show that overpricing is higher following periods of high sentiment, and Mian and Sankaraguruswamy (2012) reveal that sensitivity to good (bad) earnings is higher during high (low) sentiment periods. While the VIX may be related to sentiment, they are not the same concept. Sentiment refers to the overall emotional state of investors, whereas the VIX is a measure of implied volatility based on option prices. Therefore, our use of the VIX, which differs from investor sentiment, also contributes to the literature. In addition, Bekaert et al. (2013) and Drechsler (2013) have discussed and contributed to considering the variance risk premium as a measure of ambiguity. This suggests that the VIX may be inappropriate for proxying financial uncertainty. Therefore, one could consider alternative measures of uncertainty, such as the variance risk premium, to gain a more comprehensive understanding of market conditions or sentiment that might yield results similar to those obtained using the VIX and provide directions for further research.

Table 1: Descriptive Statistics

Full sample	Obs.	Mean	St. Dev.	Median	Min.	Max.
S&P 500 return	192	0.001	0.644	−0.051	−1.880	4.076
MP surprise	192	−0.009	0.054	0	−0.370	0.120
Uncertainty (VIX)	192	20.938	8.613	19.355	10.710	66.960
Pre-GFC						
S&P 500 return	118	−0.043	0.682	−0.129	−1.597	4.076
MP surprise	118	−0.011	0.061	0	−0.370	0.120
Uncertainty (VIX)	118	20.237	7.036	19.905	10.710	39.680
Positive surprise						
S&P 500 return	58	−0.223	0.527	−0.239	−1.597	1.665
MP surprise (+)	58	0.031	0.031	0.020	0.005	0.120
Uncertainty (VIX)	58	20.785	6.914	20.400	11.460	37.950
Negative surprise						
S&P 500 return	81	0.177	0.789	0.139	−1.880	4.076
MP surprise (-)	81	−0.043	0.063	−0.020	−0.370	−0.005
Uncertainty (VIX)	81	22.741	10.303	21.480	10.710	66.960

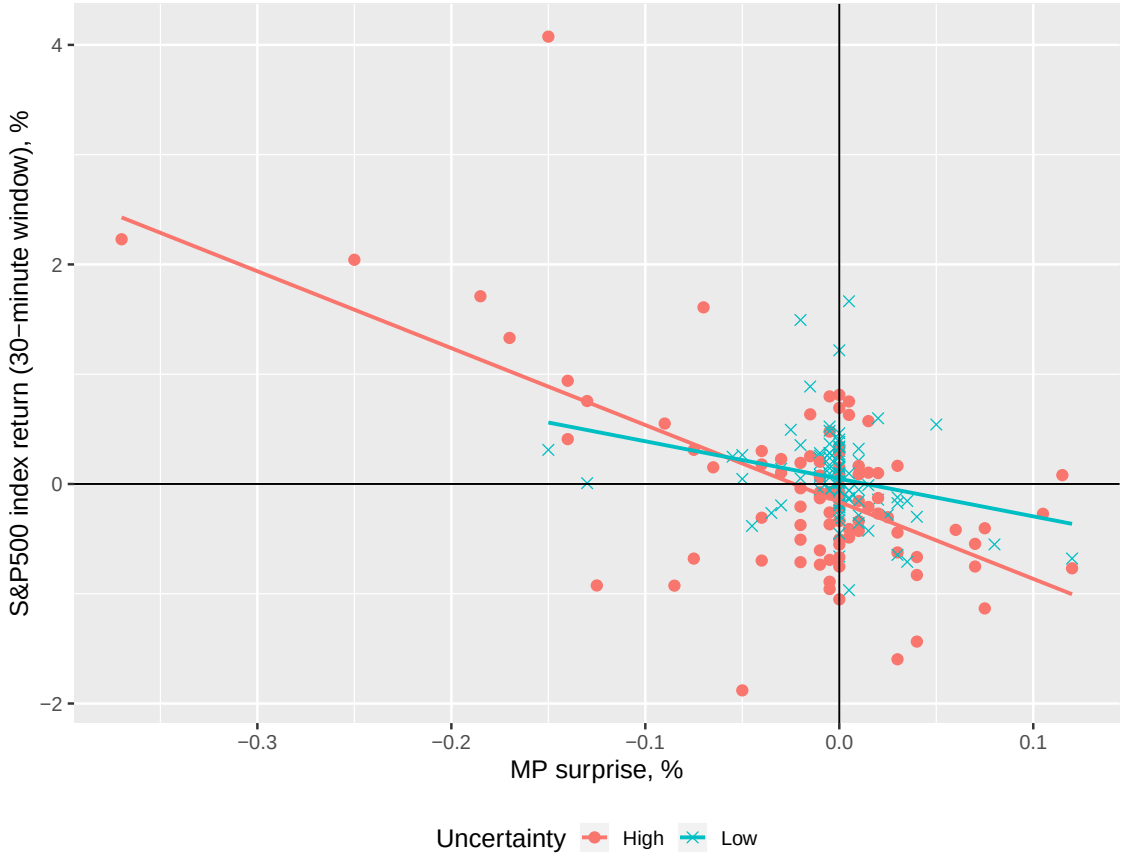
Notes: This table reports descriptive statistics for the full sample (February 1994-December 2016) and the pre-GFC sample (February 1994-December 2007). S&P 500 return is the log change in the S&P 500 index in the 30-minute window around the FOMC announcement. MP surprise is the unexpected change in the FFR target rate, and Uncertainty is measured using the VIX index.

4 Results

4.1 Baseline Analysis

Fig. 1 presents a simple scatter plot of the change in the stock market against the MP surprises in the 192 announcements, looking separately at periods of high and low uncertainty.[12] The negative relationship between MP surprises and the stock market return is visible for periods of both low and high uncertainty. However, this negative relationship appears stronger when financial uncertainty is high, providing suggestive evidence that financial uncertainty can amplify the reaction of stock markets to MP shocks.

Figure 1: MP Surprises and Stock Prices



Notes: The figure shows a scatter plot of the change in the S&P 500 stock index between 10 minutes before and 20 minutes after a MP announcement, against the surprise component of the policy decision. The level of financial uncertainty splits observations, measured using the VIX at the beginning of the announcement, relative to the full sample median.

Table 2 reports the results of estimating Eq. 1 and Eq. 2 for all types of MP sur-

[12] A point is defined as low uncertainty if the VIX at the beginning of the decision day was below the full sample median. Otherwise, it is defined as high uncertainty.

prises, and for positive and negative MP surprises. Columns (1) and (3) confirm previous studies that show that MP surprises significantly impact stock market returns. The negative coefficients indicate that an unexpected increase in the policy rate induces a fall in stock prices as predicted by the direct impact of policy rates through the discount rate.

Estimates of Eq. 2 appear in columns (2), (4) and (6) of Table 2, which allow for the interaction with financial uncertainty. The coefficients on the interaction term are negative and significant for both samples but not for positive surprises, suggesting that the impact of MP surprises is significant during periods of high uncertainty and is asymmetrically effective for negative surprises than for positive.

Comparing the results from the two samples, the magnitude of the interaction term is larger in the pre-GFC period, in line with Kontonikas et al. (2013), who found that the GFC weakened the negative relationship between MP surprises and stock markets. Additionally, for the full sample, the magnitude of the coefficient is larger for the negative policy shocks, in line with Chuliá et al. (2010), who find that the response of stock returns to negative policy surprises is stronger and more significant than it is to positive changes.

As explained in the introduction, several possible explanations exist for the asymmetric impact of uncertainty. One reason is the asymmetric impact of the "Fed put view," which postulates that market participants interpret accommodative MP during periods of heightened uncertainty such as the Fed doing "whatever it takes" to help markets, while restrictive shocks are interpreted as a positive signal regarding the economic outlook. Another possible explanation is that both positive and negative MP announcements decrease the level of uncertainty since they both reveal new information. The drop in uncertainty reduces the equity risk premium, which positively impacts stock prices, thereby mitigating the direct effect of restrictive MP and strengthening the direct effects of accommodative monetary conditions. We examine these different explanations formally in the next section. Overall, the results suggest that MP's impact on stock markets depends on the level of financial uncertainty, and that the relationship could shift given the direction of the policy change.

The asymmetric nature of this uncertainty channel is also highlighted in Table 3, presenting the results from estimating Eq. 3, which considers the asymmetric effect of positive and negative policy surprises.

Table 3 displays the estimation results over the full and pre-GFC samples. Columns (1) and (3) present results without the interaction with uncertainty for the full and pre-GFC samples. Both the positive policy surprise coefficient (β_2^+) and the negative policy surprise coefficient (β_2^-) are negative and significant in both samples. This implies that, in general, stock prices experience negative co-

Table 2: Responses of Stock Returns to Unexpected FFR Changes: Controlling for Uncertainty.

	S&P 500 index return (30 min. window)					
	All surprises		Positive surprise		Negative surprise	
	(1)	(2)	(3)	(4)	(5)	(6)
Full sample						
MP surprise	-6.186^{***}	-1.918	-6.089^{***}	-2.618	-6.690^{***}	2.804
	(1.071)	(1.800)	(1.973)	(6.052)	(1.358)	(1.984)
Uncertainty		-0.021^{***}		0.003		-0.045^{***}
		(0.006)		(0.013)		(0.008)
MP surprise ×		-0.178^{***}		-0.144		-0.382^{***}
Uncertainty		(0.059)		(0.276)		(0.050)
Observations	192	192	58	58	81	81
Adjusted R^2	0.264	0.326	0.110	0.080	0.273	0.454
Pre-GFC sample						
MP surprise	-6.957^{***}	0.028	-4.302^{***}	6.064	-7.337^{***}	4.961
	(1.200)	(2.089)	(1.623)	(5.879)	(1.489)	(3.396)
Uncertainty		-0.018^{***}		0.008		-0.044^{***}
		(0.007)		(0.013)		(0.009)
MP surprise ×		-0.290^{***}		-0.517^{*}		-0.497^{***}
Uncertainty		(0.100)		(0.273)		(0.147)
Observations	118	118	39	39	53	53
Adjusted R^2	0.380	0.421	0.048	0.039	0.359	0.461
Post-GFC sample						
MP surprise	-3.740	4.124	-7.461^{**}	-10.894	-3.761	9.791
	(2.396)	(5.324)	(3.720)	(40.544)	(3.768)	(6.734)
Uncertainty		-0.028^{***}		-0.001		-0.048^{***}
		(0.009)		(0.025)		(0.011)
MP surprise ×		-0.264^{*}		0.113		-0.455^{***}
Uncertainty		(0.140)		(1.299)		(0.133)
Observations	74	74	19	19	28	28
Adjusted R^2	0.056	0.235	0.137	0.023	0.026	0.496

Notes: This table reports the estimates of the empirical specification described in Eq. 1 and Eq. 2 where the dependent variable is the S&P 500 measured in a 30-minute window around FOMC announcements. MP surprise is the unexpected change in the FFR target rate, and Uncertainty is the one-day lagged VIX index. White heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 3: Asymmetric Responses to Positive and Negative Surprises

	S&P 500 index return (30 min. window)			
	Full sample		*Pre-GFC*	
	(1)	(2)	(3)	(4)
Positive MP surprise	-5.684^{***}	-12.563^{***}	-4.924^{***}	-7.238
	(1.458)	(4.355)	(1.457)	(4.789)
Negative MP surprise	-6.329^{***}	-0.423	-7.452^{***}	0.899
	(1.330)	(1.982)	(1.468)	(2.723)
Uncertainty		-0.027^{***}		-0.023^{***}
		(0.007)		(0.007)
Positive MP surprise $\times$		0.330^{*}		0.118
Uncertainty		(0.197)		(0.240)
Negative MP surprise $\times$		-0.250^{***}		-0.338^{***}
Uncertainty		(0.049)		(0.119)
Observations	192	192	118	118
Adjusted R^2	0.261	0.336	0.380	0.418

Notes: This table reports the estimates of the empirical specification described in Eq. 3, where the dependent variable is the S&P 500 measured in a 30-minute window around FOMC announcements. MP surprise is the unexpected change in the FFR target rate, and Uncertainty is the one-day lagged VIX index. White heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

movement with both positive and negative MP surprises. That is, an unexpected increase in the policy rate induces a fall in prices, while an unexpected decrease is related to an increase in prices.

Columns (2) and (4) present the results while also considering the impact of uncertainty. Interestingly, the effect of uncertainty significantly differs between positive and negative policy surprises. For the positive MP surprises, the policy coefficient (β_2^+) is negative in both samples and significant for the full sample. The interaction with the uncertainty measure (β_3^+) is positive for both samples and significant at a 10% level only for the full sample. The policy coefficient (β_2^-) is positive and significant for the negative policy surprise, while the interaction term (β_3^-) is negative and significant in both columns.

The results demonstrate an interesting asymmetry between periods of low and high financial uncertainty: During periods of low uncertainty, positive policy surprises will harm stock returns as expected by standard theory, but negative policy surprises will be ineffective. However, during periods of high uncertainty, the relationship changes, with negative policy changes inducing a strong positive reaction by the stock market and positive changes having little or even a counter-intuitive positive effect. These results align with the hypothesis that financial uncertainty has an amplifying impact on accommodative MP shocks and a mitigating effect or no effect on restrictive MP shocks.

4.2 Monetary Policy and Financial Uncertainty

The previous section established that periods of high financial uncertainty are associated with a stronger reaction of stock prices to MP surprises, and that this relation is especially relevant for accommodative policy changes (asymmetry). Therefore, the results suggest that MP decisions are at least partly transmitted to the stock market through their effect on uncertainty, and that this channel is stronger for periods of high uncertainty. In this section, we provide some evidence for this interpretation by examining how uncertainty in financial markets changes in the days around the policy decision.

Fig. 2 presents the average change in the VIX index in trading days around the FOMC decisions. Specifically, the figure displays the cumulative average changes in the natural log of VIX relative to the value of the announcement day in the five days before and after the announcement with 90% confidence intervals. The full sample is split into six groups based on the level of uncertainty (High/Low) and the direction of the policy change (positive/negative/neutral). An FOMC announcement is characterized as part of the "High uncertainty" level if the VIX at the beginning of the announcement day is higher than the full sample median, and as part of the "Low uncertainty" level otherwise. As before, the direction of the policy change is measured using the change in the 3-month FFR futures

around the FOMC decision.

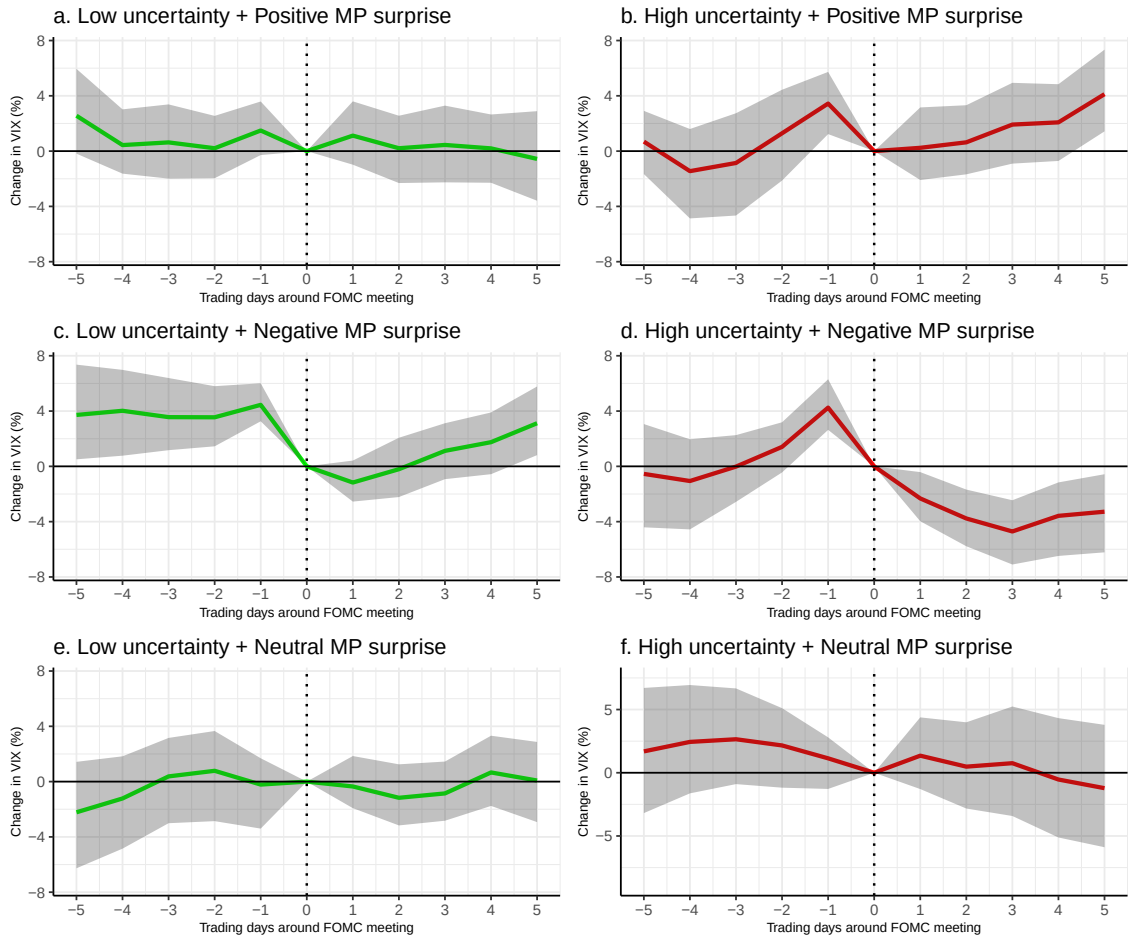
Fig. 2 illustrates that the decline in the VIX following FOMC announcement days is mostly associated with negative, i.e., accommodative policy changes. This result is in line with Äijö and Vähämaa (2011) and Fernandez-Perez et al. (2017), who find that the VIX declines following FOMC announcements, and this relationship is mostly driven by negative surprises.Panels (c) and (d) add another layer to these studies by distinguishing between negative surprises in periods of low and high uncertainty. The panels show that the negative impact on uncertainty following negative surprises is stronger and more significant during periods of high uncertainty. Therefore, Fig. 2 suggests that the results presented in the previous sections are at least partly driven by a reduction in financial stress following an accommodative MP surprise, and that this amplification channel is most relevant when the level of uncertainty is high.

4.3 Nonlinearities

The possible nonlinear impact of financial uncertainty on the relationship between stocks and MP is further investigated using quantile regression estimation. The quantile estimates of $\beta_3^{(\tau)}$ from estimating Eq. 4 over the full and pre-GFC samples are presented in Fig. 3. The plots also show the 10% confidence intervals and the OLS estimated parameter with its corresponding 90% confidence band. The x-axis shows the quantile, and the y-axis displays the size of the estimated coefficient. The negative interaction between MP surprises and uncertainty is statistically significant in the mid-upper range of the return distribution (Panel A, Fig. 3). Interestingly, at the low quantiles the interaction between MP and uncertainty is positive (albeit not significant) suggesting a positive relationship between MP and stock prices during periods of negative returns and high uncertainty, as was the case during the great recession. The quantile regression results indicate that the role of financial uncertainty in amplifying the sensitivity of stocks to MP shocks is state-dependent. That is, during periods of "normal" (around the median) returns, more uncertainty will straighten the negative relationship between stocks and policy rates. However, under extreme market conditions, more uncertainty can result in a weaker or even positive relationship between stocks and interest rates. As with the baseline estimation, the results are overall consistent for the full sample and the pre-GFC period.

Estimating the quantile regression separately for the positive (Panel C) and negative (Panel D) surprises, it seems that the exemplifying impact of uncertainty is much stronger and more significant for the negative surprises versus the positive surprises. Again, the results align with the hypothesis that the level of uncertainty will not significantly impact the connection between positive MP surprises and will strengthen the impact of negative surprises. The quantile regression also

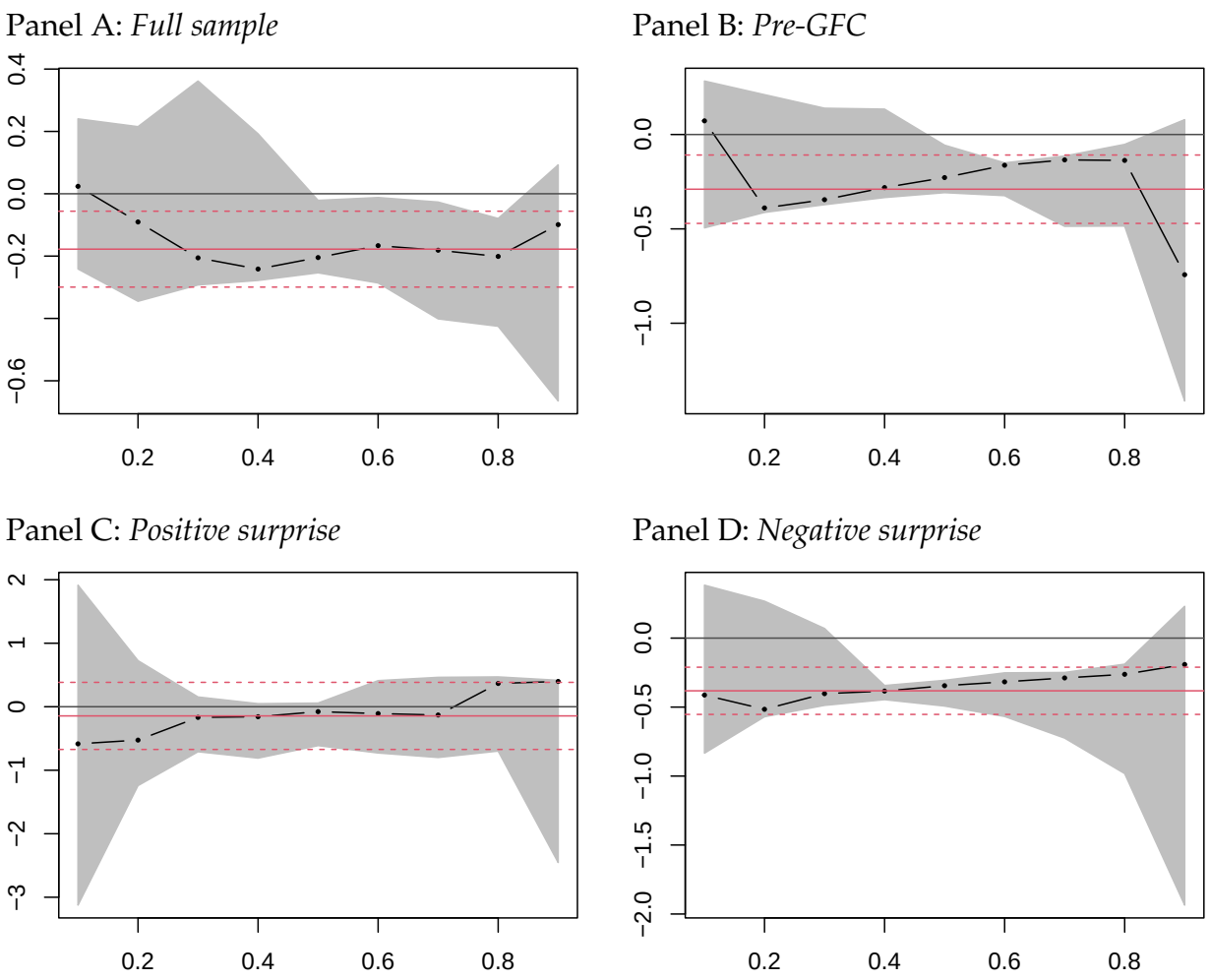
Figure 2: Changes in Uncertainty around Monetary Policy Decisions



Notes: This figure shows the average change in MP uncertainty on trading days around the FOMC decisions, relative to the day before the FOMC decision day. The full sample includes 192 FOMC decisions between February 1994 and December 2016. The full sample is split into six samples by the level of financial uncertainty and direction of the policy change. The level of uncertainty is measured using the VIX at the beginning of the announcement day relative to the sample median (High/Low uncertainty). The direction of the policy change (positive/negative MP surprise) is measured as the change in the 3-month FFR futures around the FOMC decision. The shaded gray region shows 90% bootstrap confidence intervals. Number of announcements per panel: (a), 28; (b), 30; (c), 34; (d), 47; (e), 34; and (f), 19.

shows that the amplifying impact is specifically relevant for periods of "normal" to high returns on stock markets.

Figure 3: Quantile Regression Estimates



Notes: Quantile regression estimates for $\beta_3^{(\tau)}$ in Eq. 4, where $\tau = 0.1, 0.2, \cdots, 0.9$. The shaded areas represent the 90% confidence intervals. The solid red line represents the OLS estimated parameter with corresponding 90% confidence intervals.

5 Robustness and Sensitivity Checks

In this section, we show that our conclusions are robust to several sensitivity tests.

5.1 Alternative Measures of Uncertainty

One might be concerned that a broader measure should represent financial market uncertainty than the one addressed by the implied volatility of the stock market. A

further concern is that higher volatility may be critical in high-frequency analysis. Finally, it is possible that the results found in the paper are not specific to financial uncertainty but also hold for other category-specific measures.[13]

To address these concerns, we test if the results hold when using alternative financial and nonfinancial uncertainty measures. For alternative measures of financial uncertainty, we use the newspaper-based Equity Market Volatility (EMV) measure developed by Baker et al. (2019) and the financial uncertainty measure developed by Jurado et al. (2015). For nonfinancial measures, we use the macro and real uncertainty indices also developed by Jurado et al. (2015). The empirical specification is the same as Eq. 2 with U_{t-1} corresponding to one of the alternative uncertainty measures. Note that since the alternative measures are only available monthly we use the measure in the month before each announcement.[14]

Results when using the alternative financial uncertainty measures are presented in Table 4. Panel A presents results for all surprises, Panel B for the positive MP surprises, and Panel C for negative MP surprises. For each panel, column (1) presents the results using the EMV uncertainty measure, and columns (2) to (4) present the results for Jurado et al. (2015). For each measure of uncertainty, we present results for the full sample.[15] For negative MP surprises, the interaction between the MP surprise and the financial uncertainty measures is negative and highly significant for all uncertainty measures. Thus, the results align with the baseline specification, suggesting they are not only driven by VIX.

5.2 Recession and Bear Markets

As explained in the introduction, many papers have found that the impact of MP on stock prices is stronger during "bad times", such as recessions or bear markets.[16] Since these periods are associated with higher levels of financial uncertainty, an additional concern is that the results presented in this paper are picking up the same impact as these previous studies. Furthermore, suppose the results are specific to extreme macroeconomic and financial conditions. In that case, it raises questions about interpreting the specific role of uncertainty, as these periods may have other unique characteristics that may cause the stock market to be more sensitive to MP changes. Consequently, we re-estimate Eq. 1 and Eq. 2, ex-

[13]Unlike analyzing financial uncertainty, some studies analyze other uncertainty types. For instance, Bauer et al. (2022) show that low MP uncertainty increases the effect of MP surprises on asset prices.

[14]These measures are regularly updated. The EMV index is available at policyuncertainty.com/EMV_monthly.html. Jurado et al. (2015) measures are available at sydneyludvigson.com/data-and-appendixes.

[15]Pre- and Post-GFC results are available upon request.

[16]Central banks often change policy rates in the face of high financial stress (Baxa et al., 2013).

Table 4: Alternative Measures of Uncertainty

	S&P 500 index return (30 min. window)			
	Equity Market Volatility (1)	Financial Uncertainty (2)	Macroeconomic Uncertainty (3)	Real Economic Activity Uncertainty (4)
Panel A. All surprises				
MP surprise	−1.575	1.581	−2.433	1.026
	(2.041)	(3.544)	(4.456)	(6.547)
Uncertainty	−0.017***	−0.499**	−0.634	−0.195
	(0.006)	(0.239)	(0.567)	(1.103)
MP surprise ×	−0.174***	−7.673**	−5.518	−11.333
Uncertainty	(0.063)	(3.585)	(6.079)	(10.055)
Observations	192	192	192	192
Adjusted R^2	0.310	0.287	0.265	0.260
Panel B. Positive surprise				
MP surprise	−3.690	−0.569	−6.460	22.071*
	(5.071)	(7.547)	(11.975)	(11.547)
Uncertainty	0.001	0.077	0.019	4.163**
	(0.011)	(0.511)	(1.749)	(1.637)
MP surprise ×	−0.105	−5.594	0.505	−45.061***
Uncertainty	(0.222)	(7.286)	(17.624)	(17.120)
Observations	58	58	58	58
Adjusted R^2	0.080	0.083	0.077	0.127
Panel C. Negative surprise				
MP surprise	3.415	13.212***	4.564	14.858**
	(3.280)	(4.800)	(4.777)	(6.707)
Uncertainty	−0.041***	−1.743***	−1.828*	−2.801
	(0.009)	(0.411)	(1.078)	(1.971)
MP surprise ×	−0.377***	−19.530***	−16.394***	−33.790***
Uncertainty	(0.098)	(4.529)	(5.981)	(9.817)
Observations	81	81	81	81
Adjusted R^2	0.423	0.385	0.283	0.280

Notes: This table reports the estimates of the empirical specification described in Eq. 2, where the dependent variable is the S&P 500 measured in a 30-minute window around FOMC announcements. The full sample (February 1994-December 2016) is used in Panel A, while positive and negative MP surprises are used in Panels B and C, respectively. Uncertainty is the one-month-lagged financial uncertainty index constructed by Baker et al. (2019) in column (1), and the financial, macro and real uncertainty indices developed by Jurado et al. (2015) in columns (2),(3) and (4). White heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

cluding any announcement that happened during a recession or a bear market.[17]

Table 5 presents the results where the NBER recession periods are excluded (Panel A), and where bear market states are excluded (Panel B). Results are consistent with the baseline estimation. This suggests that the impact of uncertainty revealed in this paper is not specific to extreme market conditions. That is, the uncertainty level also significantly impacts the connection between negative MP surprises and stock markets in "normal time".

5.3 Non-Scheduled Announcements

We also check if a few specific unscheduled policy announcements drive the results. It is possible that these announcements, which were not anticipated by the markets, caused large movements that may have significantly impacted the results and interpretation. Table 6 presents the results of estimating Eq. 1 and Eq. 2 with the scheduled announcement sample only. While some of the significance is lost for the full sample, the results are robust overall, with a negative coefficient on the interaction between negative MP surprises and the level of uncertainty.

5.4 Comparative Analysis

This section aims to investigate whether Israeli data also supports the baseline US results. To that end, we use the same empirical specification described in Section 2 to test the reaction of Israeli stocks to the Bank of Israel (BoI) policy surprises. Our primary measure of stock return is the log change in Tel Aviv 100 (TA-100) stock index. The measure of BoI policy shocks is borrowed from Kutai (2020), who calculated the surprise component of the interest rate change using the change in the 1-month Telbor rate in a 24-hour window around each BoI policy decision. Finally, we use the daily implied volatility of TA-25 index options to measure financial uncertainty in Israel.

One issue with Israeli data is that until April 2014, BoI interest rate announcements were at 17:30, after the Tel Aviv stock market close. As a result, until April 2014, the impact of the policy change was only reflected a day after the announcement. We, therefore, use the overnight returns (i.e., the log difference between the opening prices of the day after the announcement and the closing prices of the announcement day). Alternatively, we also consider the return over a full-day window, which starts at the close of the announcement day and ends at the close of the next trading day. Our final Israeli sample includes 75 policy announcements

[17] Recessions are identified using the contraction period identified by the NBER dates. The dates of bull and bear market states are from the website accompanying Zakamulin (2017) available at vzakamulin.weebly.com/the-book.html. Specifically, we take the dates that are found using the method defined by Pagan and Sossounov (2003).

Table 5: Controlling for *Bad* and *Good* Times

	S&P 500 index return (30 min. window)					
	Full sample		Positive surprise		Negative surprise	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Excluding recessions						
MP surprise	-7.568^{***}	-0.981	-6.722^{***}	0.861	-8.271^{***}	3.326
	(1.884)	(2.665)	(2.120)	(5.791)	(2.817)	(4.194)
Uncertainty		-0.018^{***}		0.001		-0.037^{***}
		(0.006)		(0.010)		(0.007)
MP surprise ×		-0.277^{**}		-0.376		-0.453^{***}
Uncertainty		(0.128)		(0.254)		(0.168)
Observations	170	170	51	51	68	68
Adjusted R^2	0.259	0.309	0.109	0.098	0.267	0.382
Panel B. Excluding bear market						
MP surprise	-6.214^{***}	-2.345	-9.085^{***}	1.462	-5.022^{***}	3.906^{*}
	(1.199)	(2.331)	(3.483)	(8.912)	(1.800)	(2.372)
Uncertainty		-0.009		0.013		-0.028^{**}
		(0.006)		(0.014)		(0.012)
MP surprise ×		-0.157^{**}		-0.491		-0.356^{***}
Uncertainty		(0.072)		(0.356)		(0.066)
Observations	146	146	44	44	54	54
Adjusted R^2	0.221	0.231	0.130	0.106	0.206	0.302

Notes: This table reports the estimates of the empirical specification described in Eq. 1 and Eq. 2, excluding NBER recession periods (columns (1) and (2)) and bear market states (columns (3) and (4)). The dependent variable is the S&P 500 measured in a 30-minute window around FOMC announcements. MP surprise is the unexpected change in the FFR target rate, and Uncertainty is the one-day lagged VIX index. White heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

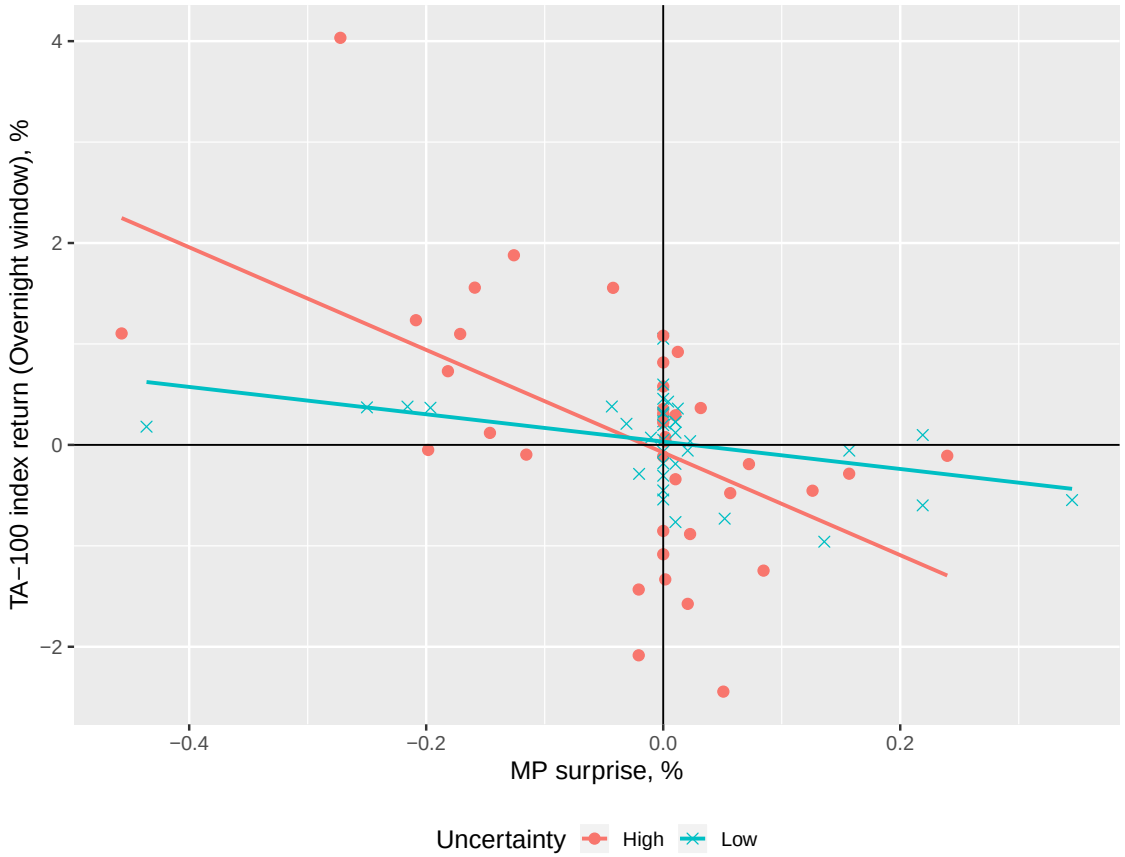
Table 6: Excluding Unscheduled Announcements

	S&P 500 index return (30 min. window)					
	Full sample		Positive Surprise		Negative Surprise	
	(1)	(2)	(3)	(4)	(5)	(6)
MP surprise	-5.231^{***}	-1.770	-8.233^{***}	1.050	-4.556^{***}	4.421^{**}
	(1.013)	(2.386)	(2.217)	(8.726)	(1.572)	(1.869)
Uncertainty		-0.023^{***}		0.008		-0.050^{***}
		(0.006)		(0.013)		(0.007)
MP surprise $\times$ Uncertainty		-0.156^{*}		-0.375		-0.406^{***}
		(0.091)		(0.341)		(0.047)
Observations	183	183	55	55	75	75
Adjusted R^2	0.154	0.253	0.148	0.132	0.105	0.475

Notes: This table reports the estimates of the empirical specification described in Eq. 3, where the dependent variable is the S&P 500 measured in a 30-minute window around FOMC announcements. MP surprise is the unexpected change in the FFR target rate, and Uncertainty is the one-day lagged VIX index. White heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

between October 2006 to April 2014.

Figure 4: MP Surprises and Stock Prices in Israel



Notes: The figure shows a scatter plot of the change in the TA-100 stock index between the closing prices of the announcement day and the opening prices of the day after the announcement against the surprise component of the policy decision. The level of financial uncertainty splits observations, measured using the daily implied volatility of the TA-25 index option on the day before the announcement relative to the full sample median.

Fig. 4 presents a scatter plot of the Israeli data along the lines of Fig. 1. That is, it presents the change in the stock market against the MP surprise in the 75 announcements, looking separately at periods of high and low uncertainty.[18] In line with the US data, the negative relationship between MP surprises and the stock market return is stronger when financial uncertainty is high.

Table 7 presents the baseline results with Israeli data. The level of financial uncertainty appears related to not only the magnitude of the stock market response to policy surprises but also the direction of the response. The results suggest that while periods of medium-to-high levels of uncertainty are characterized by a neg-

[18] A point is defined as low uncertainty if the VIX on the day before the decision was below the full sample median, and high otherwise.

Table 7: Responses of Stock Returns to Unexpected Interest Rate Changes: Controlling for Uncertainty in Israel

	TA-100 index return			
	Overnight window		One day window	
	(1)	(2)	(3)	(4)
MP surprise	-3.167^{***}	4.752^{***}	-1.751	5.968^{**}
	(0.906)	(1.413)	(1.211)	(2.417)
Uncertainty		-0.025		-0.023
		(0.020)		(0.027)
MP surprise ×		-0.398^{***}		-0.386^{***}
Uncertainty		(0.083)		(0.136)
Observations	75	75	75	75
Adjusted R^2	0.190	0.451	0.024	0.164

Notes: This table reports the estimates of the empirical specification described in Eq. 1 and Eq. 2 using Israeli data. The dependent variable is the TA-100 index return in an overnight window (columns (1) and (2)) and one-day window (columns (3) and (4)) around BoI announcements. MP surprise is the unexpected change in the interest rate, and Uncertainty is the one-day lagged TA-25 implied volatility index. White heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

ative relation between unexpected interest rate changes and stock prices, the relation is positive during periods of low uncertainty. We also examine the possible asymmetry response to positive and negative shocks.

The results for the asymmetric response are presented in Table 8. Like the US, the results show that uncertainty plays a much larger role in accommodative policy changes than in restrictive changes. This suggests that, in Israel, MP shocks will have the most significant impact on stock prices during periods of high financial uncertainty and when the policy stance is accommodative. The online appendix contains several robustness tests for the Israeli data. We show that results are robust to using the Tel Aviv 25 stock price as an alternative stock price index. We also show that the results are robust to using a survey-based measure of MP shocks, calculated as the difference between the actual MP decisions and the mean of experts' forecasts.

Table 8: Asymmetric Responses to Positive and Negative Surprises in Israel

	TA-100 index return			
	Overnight window		One day window	
	(1)	(2)	(3)	(4)
Positive MP surprise	-2.124^{***}	2.948	-0.028	-5.052
	(0.796)	(6.957)	(1.152)	(7.764)
Negative MP surprise	-3.711^{***}	5.176^{***}	-2.649	7.056^{**}
	(1.414)	(1.537)	(1.861)	(2.858)
Uncertainty		-0.028		-0.039
		(0.023)		(0.034)
Positive MP surprise ×		-0.305		0.303
Uncertainty		(0.441)		(0.472)
Negative MP surprise ×		-0.414^{***}		-0.465^{***}
Uncertainty		(0.093)		(0.158)
Observations	75	75	75	75
Adjusted R^2	0.186	0.436	0.023	0.155

Notes: This table reports the estimates of the empirical specification described in Eq. 3 using Israeli data. The dependent variable is the TA-100 index return in an overnight window (columns (1) and (2)) and one-day window (columns (3) and (4)) around BoI announcements. MP surprise is the unexpected interest rate change, and Uncertainty is the one-day-lagged TA-25 implied volatility index. White heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

6 Policy Implications

Our results highlight the importance of monitoring uncertainty and the stock market before MP decisions. For instance, a sharp and surprising decrease in the policy rate when uncertainty in the financial markets is high may trigger an aggressive reaction on the part of stock market prices. This could increase excessive risk-taking and asset price bubble risk. As financial stability is one of the primary objectives of any central bank,[19] such unintended consequences that may lead to complementary conventional or unconventional interventions may weaken the central bank's credibility. We highlighted the possible adverse effects of failing to monitor uncertainty by policymakers.

MP surprises can also be useful to boost equity prices, especially under financial stress periods (Kurov and Gu, 2016). Stock markets react more positively after a negative MP surprise under high uncertainty, which could be related to market makers' knowledge in Fig. 2, panel (d). Consequently, uncertainty and the risk premium will decrease, and stock market prices will rise. Alternatively, the public, and thus market makers, expect less restrictive policies in good times, as displayed in Fig. 2, panel (c).

Interestingly, our results also suggest that restrictive MP will be an ineffective tool to cool down stock market prices if policymakers are concerned that they deviate from fundamentals, in line with Galí and Gambetti (2015).

MP committees sometimes decide to surprise the market. In most cases, the MP committee knows its announcement will surprise market players. Although the outcomes of MP surprises are undetermined, they are part of the policy toolkit and instruments central bank committees have at their disposal. Such a committee is committed to the central bank's objectives (usually, inflation target, output growth, and financial stability). As such, their decision to surprise is not necessarily intentional. Our results allow the policymaker to better understand the transmission channel and determine these outcomes on stock market prices depending on the financial uncertainty level of the financial markets.

While the following policy recommendations depend on the central bank's credibility, limiting their frequent use, this instrument may also influence real activity in two ways. First, MP surprises may change public opinion and expectations, which influence uncertainty levels and, thus, stock prices (Di Bella and Grigoli, 2019). Second, the relation between stock market returns and real activity assessed in the literature (Fama, 1990; Schwert, 1990; Jay Choi et al., 1999), and our results, provide a new perspective to policymakers.[20] Depending on the financial

[19] Although the complex trade-off between monetary and financial stability (De Graeve et al., 2008), MP tightening surprises do not necessarily reduce the systemic risk (Laséen et al., 2017).

[20] Recent studies have shown that the effect of MP shocks on real economic activity is lower in the US and the eurozone during periods of high uncertainty (Aastveit et al., 2017; Pellegrino,

uncertainty level, they can use MP surprises to influence future (real) activity. In both cases, our paper provides background for MP committees regarding how and when to use the MP surprise instrument to influence the real economy.

Finally, our results could highlight a liquidity transmission channel. According to Nagel (2012), the return from liquidity provision is highly predictable with the VIX index. In response to FOMC announcements, Chung et al. (2013) report that liquidity disruption lasts for approximately 1.5 hours, with variability proportional to the information content of the FOMC announcement, larger effects being associated with unscheduled announcements and scheduled announcements with larger policy surprises. Following a substantial market downturn, Hameed et al. (2010) find that bid-ask spreads and reversal strategy returns increase weeks following large stock market declines. The FOMC announcement effects associated with extremely elevated VIX levels do not necessarily support the "downside risk channel" hypothesis. In this scenario, *liquidity evaporation* may be the dominant mechanism.

7 Conclusion

State-of-the-art shock identification and high-frequency stock market data are used to analyze the effect of MP on stock prices under financial uncertainty. Specifically, this paper investigates to what extent the level of financial uncertainty influences the effect of MP surprises on the US stock market. The results suggest that, in general, MP shocks have a more considerable impact on the stock market during uncertain times. This finding aligns with recent studies that suggest that MP affects stock prices through its effect on uncertainty and the equity risk premium. That is, the evidence points to an uncertainty channel of the transmission of MP to the stock market.

The response of stock prices to MP shocks is found to be asymmetric concerning the direction of the policy change–restrictive vs. accommodative. While financial uncertainty is related to a stronger reaction to accommodative shocks, it has little impact on the response to positive surprises. The movements of the VIX around the days on which FOMC decisions are announced suggest that the uncertainty channel is indeed most relevant for periods of high uncertainty. Overall, the results indicate that monitoring market conditions and the level of financial uncertainty is crucial if policymakers are concerned with the reaction of the stock market.

2018). However, we focus on the role of financial uncertainty in the transmission of MP to the stock market, i.e., whether the state of uncertainty affects the reaction of equity prices to MP shocks.

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