

What Happens When Equity Investors Disagree with the FOMC?

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ABSTRACT

This study investigates the perspective of equity investors and their reaction to the Federal Open Market Committee (FOMC) announcements, when they disagree on Nominal Interest Rate level decisions. My evidence shows that investor expectations formulated prior to FOMC announcements have a significant impact on equity prices and that particularly when expectations are not aligned with the FOMC committee decision. My results reconcile past findings on the monetary policy surprise literature and more recent empirical findings on the effect of FOMC announcements on equity markets. A practical implication of my study is that monetary policy authorities should consider market expectations when formulating disclosure policy in order to improve alignment with financial market expectations and smooth out their economic consequences.

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1. INTRODUCTION

.... The effect of monetary policy on the economy today depends not only, or even primarily, on the FOMC's current target for the federal funds rate or the quantity of assets on its balance sheet, but rather on how the public expects the Federal Reserve to set the paths of these variables in the future.

(Remarks by Janet Yellen, Vice-Chair of Board of Governors of the Federal Reserve System, November 13, 2012)

As stated by Janet Yellen, the level of alignment of market expectations regarding future monetary policy decisions with the actual Federal Open Market Committee (FOMC) decisions reflects the effectiveness of monetary policy practices. As financial markets are a fundamental part of the monetary policy channel, they are inevitably influenced by it. In this research, I address the following question: does disagreement of investors towards monetary policy announcements affect the dynamics of equity markets? I develop a simple framework to analyse the expectations of investors regarding upcoming FOMC announcements and how these expectations are reflected in equity returns.

The methodology employed is inspired by the original research of Kuttner (2001) and Kuttner & Bernanke (2005). Kuttner (2001) analysed the interest rate changes deliberated by the FOMC to disentangle an expected from an unexpected component using the Federal Funds Futures and the Effective Federal Funds Rate.² Owens & Webb (2001) employ the assumptions of Kuttner (2001)

² Kuttner (2001) proposed two ways to disentangle the expected from the unexpected component of interest rate changes. A first methodology proposed the difference between the Federal Funds Futures and the average of the Effective Federal Funds rate throughout the month (see equation (5) in Kuttner, 2001). A second formula, also employed by Bernanke & Kuttner (2005), computes the change in the Federal Funds Futures around the FOMC announcement date.

to reconstruct the expected interest rate *after* the FOMC announcement,³ which in simple words is the sum of the current level of the Federal Funds Target rate and the change (or no change) expected by investors. They further propose a method to convert the changes expected by investors into probabilities.

Combining these two approaches, I compute the probabilities assigned by investors to interest rate changes. These probabilities are singularly computed each day, for the whole week before the FOMC announcements. This time period, the week before, is also defined as the “*blackout period*”, during which policy makers are forbidden from disclosing official information on the upcoming FOMC announcement. Investors should be therefore developing their expectations free from the influence of other monetary policy updates from institutional sources.⁴

I define the “disagreement” of market participants towards the FOMC announcement when their expectations (in form of probabilities) deviate from the FOMC decisions. Specifically, I postulate, that for each FOMC announcement, investors expect a change in the Federal Fund Target rate when the probability of an interest rate change is higher than 50% on the majority of days (3 over 5 days). Finally, “disagreement” is identified by combining the probabilities with the FOMC announcement content. If the probabilities yield an expected change in the Federal Fund Target rate and the change doesn’t occur, “disagreement” is observed (this also applies vice versa).

³ By “expected interest rate *after* the FOMC announcement” I intend the Federal Fund Target rate level that investors expect to be declared by the FOMC and that will be therefore the new (regardless whether it remains unchanged) reference level of the Federal Fund Target rate.

⁴ This method partially departs from Kuttner (2001) and Bernanke & Kuttner (2005), who consider the unexpected component of an interest rate change only the day before the FOMC announcement.

“Disagreement” then takes the form of a dummy variable that has value 1, for every FOMC announcement where I detect disagreement and zero otherwise. The analysis is then run with a standard event-study approach, while controlling for variables that might jointly affect equity returns around the FOMC announcements days. My findings report that disagreement is associated with a statistically significant 40 basis points (bps) averagely across my whole sample period (2000–2016). To give a reasonable basis to my findings, that position themselves between the literature of monetary economists (Cochrane & Piazzesi, 2002; Ehrmann & Fratzscher, 2004; Rigobon & Sack, 2004; Bernanke & Kuttner, 2005; Kontonikas, MacDonald & Saggi, 2013; Fausch & Sigonius, 2018) and the more recent literature on FOMC and macroeconomic announcements (Savor & Wilson, 2013; Lucca & Moench, 2015; Ai & Bansal, 2018; Wachter & Zhu, 2018), I analyse the time series of equity returns on FOMC announcement days.

To analyse the time series of equity returns on FOMC announcement days, I follow the empirical approach of Lucca & Moench (2015) and find several interesting results: first, my disagreement variable remains a positive and statistically significant explanation for the equity excess return across the analysis. Second, FOMC returns still present an asymmetric response with respect to the unemployment rate, as found by Boyd, Hu & Jagannathan (2005). Third, the “Kuttner Surprise”⁵ still represents a plausible explanation for a portion of the equity returns (in contrast with the results of Lucca & Moench, 2015). Last, FOMC equity returns are partially state dependent and influenced by the business cycle. Particularly when investors disagree with the decision of the FOMC, the

⁵ The “Kuttner Surprise” is the monetary policy surprise computed as in Kuttner (2001) and Bernanke & Kuttner (2005) and represents the unexpected component of a Federal Fund Target rate change.

equity impact is strong and negative during recession times. This last result is in line with the findings of Barsistha & Kurov (2008), Kurov (2010; 2012) and Kontonikas, MacDonald & Saggiu (2013), who report a significantly different response of the market to monetary policy statements and monetary policy surprises during and just after recession events.

To further corroborate these findings, I investigate a specific setting, generally overlooked in the literature, the Neutral Monetary Policy (NMP) analysis. The NMP analysis includes all the FOMC announcements where no interest rate change occurs. The NMP analysis is a natural environment to investigate two fundamental aspects of my research question: the power of expectations and the announcement effect. Since no interest rate change is announced, the economic condition remains unchanged. However, investors might disagree with this decision and, further, an unchanged interest rate level also implies important information on the state of the economy.

When I replicated my analysis, considering only the NMP FOMC announcements, I found that disagreement around FOMC meetings when no interest rate change was voted had an even stronger impact of about 50 bps. I provide two potential explanations for this additional equity premium: the first explanation looks at the interpretation that investors will give to NMP and is closely related to the information transmission theory of Tetlock (2011). As NMP FOMC announcements don't come with a "clear decision", but only with the disclosure of the economic outlook according to the FOMC, they might bring additional uncertainty to the market that results in an additional equity premium. This uncertainty will be even greater when investors disagree with the FOMC decisions and are left to wonder "when the inevitable will happen".

This additional level of uncertainty in "disagreement" with NMP FOMC announcements could be interpreted as follows. If investors were expecting a rise in interest rates, NMP could be perceived both as a sign that the economy is not sufficiently strong to absorb it and as worsening debt conditions for companies being delayed in time. Conversely, assuming markets expecting a loosening of monetary policy and a subsequent NMP takes place, the equity market reaction will

be positive as investors will forecast a state of the economy that could overcome the ups and downs without central bank interest rate interventions.

A second explanation is given by the “timing” and state dependence of NMP FOMC announcements. The NMP FOMC announcements have mainly happened after periods of crisis and severe bear market conditions. As reported by Kurov (2010), investors’ sentiment around monetary policy announcements has a strong impact on the stock market, particularly in bear market conditions, implying that perhaps a proportion of these equity premium might be due to the “timing” of the NMP FOMC announcements.

To analyse this aspect, I have examined the equity returns around NMP FOMC announcements and found two particularly interesting results: first returns around NMP FOMC announcements are, in line with expectations, strongly state dependent and second the magnitude of the “Kuttner Surprise” is doubled around these announcements. These two results have implications in two different directions. First, in the FOMC announcement literature this aspect should be taken into greater consideration. Lucca & Moench’s (2015) findings are based on the pre-announcement stock drift, claiming that the decision of the FOMC couldn’t represent a possible explanation for their findings, although perhaps the expectations of investors around NMP during the zero-lower bound period could be. The greater magnitude of the “Kuttner Surprise”, combined with my disagreement variable, could all together be interpreted as the additional uncertainty surrounding these announcements, and therefore investors overreacting to it.

After having established the equity premium associated with disagreement on broad market indexes, I follow the literature and investigate whether this response is homogenous across stocks. To do so, I first investigate whether the response to disagreement is in line with the CAPM predictions and, second, whether the response is homogenous across industries.

A recent part of the literature has, in fact, found compelling evidence that the CAPM predictions work very well around macroeconomic announcements, compared to “ordinary” trading days

(Savor & Wilson, 2014; Wachter & Zhu, 2018). In my analysis, I investigate the response of disagreement around FOMC announcements on equity portfolios sorted on their beta and find a high degree of proportionality in the response.

Further, following Bernanke & Kuttner (2005) and Lucca & Moench (2015) I extend the analysis to the Fama & French 10 Industries Portfolios. This last analysis allows me to both confirm the degree of proportionality of the previous analysis, but also to examine the response to disagreement across business sectors.

The response of the business sectors is quite heterogenous and interesting, with the High-Tech sector showing a strong response of around 70 bps to “disagreement” and the Durables, Energy and Wholesale/Retail sectors to “agreement” of 45, 32 and 33 bps, respectively. Although these results are slightly in contrast with my previous conclusions, they could be ascribed to the different sensitivity of the industries in relation to future expected dividends and debt conditions.

Altogether, the main contribution of this research is to provide an additional explanation for the excess equity returns associated with the FOMC announcements and reconcile the findings between the monetary economists and the macroeconomic announcements literature. This additional explanation corroborates the statement of Janet Yellen and highlights the importance of investors’ expectations in the monetary policy transmission channel. Indirectly, I contribute to the literature by providing a comprehensive analysis of the heterogenous response of investors and industries to FOMC announcements under different business cycle conditions.

The rest of the paper is organized as follows. Section 2 develops my hypothesis. Section 3 gives an overview of the Federal Reserve communication policy across the past two decades. Section 4 introduces my methodology. Section 5 presents my data and research design. Section 6 presents my empirical results and discussion. Section 7 provides some robustness checks and Section 8 concludes.

2. HYPOTHESIS DEVELOPMENT

Building upon two different strands of the literature, the motivation of this chapter relies on understanding the excess equity return associated with FOMC announcements. The seminal papers of Kuttner (2001) and Bernanke & Kuttner (2005) have directed the literature in understanding whether investors react to the surprise component of a change in the Federal Funds rate, rather than to the rate change itself. Their methodology effectively disentangles the expected from the unexpected (surprise) component of the interest rate changes and further evaluates the effect on stock returns.

These results feature an important finding: the expectations of investors are developed prior to the FOMC announcement. The methodology of Kuttner (2001) and Bernanke & Kuttner (2005), compute, in fact, the surprise component on the day prior to the announcement. What this methodology doesn't allow is to distinguish the FOMC announcements with respect to the expectations of investors and the outcome of the announcement. The outcome of the FOMC announcement and the announcement effect itself are, in fact, not specifically investigated in their seminal research.

On the other hand, more recent research has specifically focused on the information effect of the announcement, acknowledging that macroeconomic announcement days, are overall characterised by higher returns and generally lower volatility (Savor & Wilson, 2013; Lucca & Moench, 2015; Ai & Bansal, 2018). Their research shows that the average return on the S&P500 on days with macroeconomic announcements is around 11bps, which is considerably higher than the 1.3 bps found on non-announcement days (Ai & Bansal, 2018).

Both streams of the literature give different explanations for the excess return around announcement days and in particular the FOMC announcement. The FOMC announcement is, in fact, not only a monetary policy announcement, as it also conveys important information on the

current state of the economy and the future economic outlook. To explain the motivation and the hypothesis of my study I will first recall some stylised facts that apply to both streams of the literature:

- FOMC announcements are associated with considerably higher stock returns than the average trading day.
- FOMC announcements convey information on the future conduct of monetary policy, as well as on the outlook of the economy.
- FOMC announcements are (since 1994) pre-scheduled, and, among the most anticipated macroeconomic announcements.
- The expectations on the FOMC announcements are developed in advance.
- The reaction of investors is state-dependent.

These “*facts*” provide the ground for the main motivation of my study. The main hypothesis of my research is, in fact, on whether the reaction of investors to FOMC announcements is given by their previous expectations on the conduct of monetary policy and further modulated by the announcement that conveys not only information about the monetary policy, but also about the current and perspective economy outlook. The “disagreement” of investors, defined as the case when the FOMC committee takes a decision regarding the future of monetary policy which is totally in contrast with the expectations of investors, might be a plausible explanation for the strong reaction on FOMC announcement days.

In order to shed light on whether the expectations of investors, combined with the outcome of FOMC announcements are the trigger of equity excess returns, I postulate the following hypothesis:

H1: The disagreement of investors regarding FOMC announcements affects stock market returns.

3. THE FEDERAL RESERVE COMMUNICATION POLICY

The FOMC is the body of the US Federal Reserve System responsible for taking major decisions in regard to monetary policy. The FOMC is composed of 12 members, including the 7 members of the Board of Governors of the Federal Reserve System, the president of the Federal Reserve Bank of New York and 4 of the remaining 11 Reserve Bank Presidents. Policy decisions are taken under a majority rule during FOMC meetings.

Currently the FOMC holds 8 pre-scheduled meetings per year and less frequently unscheduled meetings are held, mostly in the form of conference calls. The FOMC gives appropriate detail of the decisions taken during the meetings, in order to enhance the accountability and transparency of the institution. Central banks worldwide have dedicated a considerable amount of time and effort in enhancing their communication policies over the last two decades, for both economic and non-economic reasons (the independence of central banks).

Regarding the FED and the FOMC this process began with the reforms in the early 1990s that progressed until the inclusion of the “Guidance” in 2003. Prior to 1994, the FOMC did not disclose policy actions and market participants had to infer them from the size and type of open market operations (OMOs). After 1994, the FOMC began to pre-schedule the meeting and the first post-meeting statement with a qualitative description of the change in policy was published. In August 1994, a rationale for the decision taken was added to the statement, and in 1995 it was finalised by including the numerical Federal Funds Target rate. The end of 1999 and the beginning of 2000 represented the first steps to enhance the transparency of the FOMC deliberations and lay the grounds for the inclusion of the “Guidance” in 2003.

In January 2000 two important steps were accomplished by the FOMC. On a January press release⁶, the FOMC announced that it approved the disclosure modifications discussed at the end of 1999⁷, taking effect as of the pre-scheduled FOMC meeting in February 2000. The modification in the FOMC disclosure policy included two major points: first, the committee determined that a statement will be issued to the public immediately after every FOMC meeting (the previous procedure was to release only in the event of a policy action or a major change in the committee's views). Second, the FOMC changed its language to describe future developments on the consensus around the newly approved "Balance of Risks" and the long-run goals of price stability and sustainable economic growth. The sample period that I employ in my study coincides with the approval of the revised disclosure procedure in 2000 (specifically with the pre-scheduled meeting of February 2000) and ends in 2016. Even though a number of statements were published in 1999, I started my sample in 2000, following the formalization of the procedure⁸ and the change in the language.

In 2002, the votes of the FOMC were made explicit, with the dissenters' names included in the statement. The inclusion of the "Guidance" in 2003 represented a further major step towards the level of predictability of the interest rates path, as it included clearer information on the likely directions of rates over an extended period. The Fed's communication policy has accomplished

⁶ Published the 19th January 2000 for immediate release. The revised disclosure procedures were proposed by the "Working Group on the Directive and Disclosure Policy," which was formed in August 1999. <https://www.federalreserve.gov/boarddocs/press/general/2000/20000119/default.htm>

⁷ The FOMC started to publish fuller statements after their meetings in May 1999, however, the language and the procedure were not formalized until 2000.

⁸ Ehrmann & Fratzscher (2007) also separate the events of 1999 from 2000, pointing out that January 2000 also represented a major shift in the disclosure policy, as the statements were no longer focusing on intermeeting period but on the foreseeable future.

major steps in the past two decades. This was also made possible by a series of strict rules that the FOMC members had to follow when addressing the public and when unveiling information related to monetary policy and economic conditions.

This set of rules is published in the “FOMC Policy on External Communications of Committee Participants”⁹ document and contains information on how FOMC members should act in regard to the disclosure of information to the public. A particularly relevant rule for the purpose of this research is included in point 7 of the “General Principles” and regulates the disclosure of information the week before a pre-scheduled FOMC meeting. This period will begin at the start of the second Saturday (midnight) Eastern Time before the beginning of the meeting and will end at midnight Eastern Time on the next day after the meeting and is named the “blackout period”. During this period, committee members refrain from expressing their views about macroeconomic developments or monetary policy issues with members of the public, in order to facilitate the effectiveness of the Committee’s policy deliberations and the clarity of its communications.¹⁰

As mention, unscheduled conference calls are much less frequent, and they have received much less acknowledgment in the literature compared to the pre-scheduled meetings.¹¹ Conference calls are mostly employed to review ongoing developments of the economic situation, however, in some cases they were also employed for changes in the Federal Fund Target Rate. Four interest rate cuts occurred during my sample period (2000-2016) out of 25 conference calls. Specifically, 2 in 2001

⁹ https://www.federalreserve.gov/monetarypolicy/files/FOMC_ExtCommunicationParticipants.pdf

¹⁰ The blackout period is explicitly set for pre-scheduled meetings, however, no specific detail is given for unscheduled conference calls.

¹¹ In their recent work on stock returns predictability around FOMC announcements, Du, Fung, & Loveland (2018) include the conference calls in their analysis.

and 2 in 2008. The FOMC publishes annually a “Federal Open Market Committee Rules and Authorizations”¹² document, including guidelines for the FOMC organization and code of practice, however, conference calls are not explicitly “regulated” in terms of format or content. Conference calls are explicitly cited to allow members to participate to an unscheduled meeting in electronic forms, when the notice of the meeting was given shortly before it.

4. METHODOLOGY

To test my hypothesis, I need to identify investors’ expectations prior to the FOMC announcement day and whether these expectations are aligned with the decision announced by the FOMC. When these expectations go against (are aligned with) the decisions of the FOMC, I define it as “disagreement” (“agreement”) towards the FOMC. My measure of “disagreement” is built in three different steps: (1) identify the investors’ expectations prior to the FOMC announcements; (2) quantify these expectations in the form of a probability assigned by investors to an interest rate change and (3) combine these probabilities with the outcome of the FOMC announcement.

To identify investors’ expectations, I extend the original work of Kuttner (2001) and Bernanke & Kuttner (2005). The methodology of Kuttner (2001), largely known in the literature as “interest rate surprises” employs the Federal Funds Futures to investigate the surprise component of Federal Funds Target rate changes. This measure of surprise is further employed to investigate its effect on

¹² https://www.federalreserve.gov/monetarypolicy/files/FOMC_RulesAuthPamphlet_201601.pdf

equity prices on the FOMC announcement day. I employ this measure of interest rate surprises to identify the Federal Fund Target rate expected by investors *after*¹³ the FOMC announcement.

To compute the expected Federal Fund Target rate *after* the FOMC announcements I follow the methodology proposed by Owens & Webb (2001) to complete the second step of my study. Owens & Webb (2001) present a methodology to infer the probability of an interest rate change that builds on the forecasting ability of Federal Fund Futures and their deviations from the current Federal Fund Target rate. The computational details are further presented in subsection 4.1.

The probabilities computed in the second step of my study cover the entire week before the FOMC announcement day, the “blackout period”. During this period, FOMC members refrain from expressing their opinions and therefore investors are left to formulate their expectations on the basis of previously acquired information and their own views. Lastly these probabilities are combined with the FOMC announcements to build my disagreement measure.

4.1.Step 1 and 2: Market-Based Probabilities

To infer the expectations of investors on the outcome of the upcoming FOMC meeting I, firstly, estimate the Federal Fund Target rate *expected* by investors *after* the FOMC meeting. Following Kuttner (2001)¹⁴, I compute the *expected* interest rate change by firstly take the difference of the monthly average Effective Fed Funds Rate ($R_{s,t}$) and the Future Federal Funds rate ($f_{s,t}$):

¹³ By “*after*” I intend once the FOMC has announced its decision regarding the level of the Federal Fund Target rate, which normally happens at the press conference held after the FOMC meeting. Details on the FOMC communication policy can be found in section 2.4.

¹⁴ See Section 3.2, equation (5) in Kuttner (2001)

$$\Delta r_t^e = R_{s,t} - f_{s,t} \quad [1]$$

Where time t represents the 5 days prior to the FOMC announcement day.

Then, following Owens & Webb (2011), I derive the Federal Fund Target rate *after* the FOMC announcement. The *expected* interest rate, *after* the FOMC meeting, (r_t^e) is, in fact, the *expected* interest rate change Δr_t^e (from Equation [1]) to the current Federal Fund Target rate (r_t):

$$r_t^e = \Delta r_t^e + r_t \quad [2]$$

The expected Federal Fund Target Interest rate, *after* the FOMC meeting (r_t^e), can be also re-written as the weighted probability \mathbf{p} of the current rate r_t plus the average change applied by the FOMC committee (Δr^T) and the probability $(1 - \mathbf{p})$ of the current rate remaining unchanged:

$$r_t^e = \mathbf{p}(r_t + \Delta r^T) + (1 - \mathbf{p}) r_t \quad [3]$$

Consequently,

$$\mathbf{p} = |(r_t^e - r_t) / \Delta r^T| \quad [4]$$

where \mathbf{p} is essentially computed as the ratio between the Federal Target rate change, in absolute value, expected by the market (the numerator of equation [4]) and the average change applied by the FOMC (Δr^T), assumed to be on average 25 bps.¹⁵ This last assumption, could be potentially responsible for some misspecification in the methodology, as across my sample period the changes applied by the FOMC were not limited to this magnitude.¹⁶ This last assumption was, however,

¹⁵ The probability “ \mathbf{p} ” is capped and ranges from 0 to 1. This assumption is reasonable to make for two main reasons. First, it is common that probabilities range from 0 to 1. Second in the further step of methodology (Step 3, combining investors’ expectations with the FOMC announcements) a threshold of 50% will be applied to investigate the single days’ probabilities.

¹⁶ The misspecification associated with this assumption (0.25% the standard change applied by the FOMC) is, however, limited in terms of observation. The interest rate changes applied by the FOMC, which are different from 25 bps in absolute value represent only 10% of my sample. Over a 161 FOMC announcements’ sample 27 were of the magnitude of 25 bps, 13 of 50 bps, 3 of 75 bps and 118 of 0 bps (no interest rate changes).

based on widely used industry tools that in the past decades have become the reference point of financial market actors.¹⁷

To further clarify the first two steps of my methodology and demonstrate what the output probability “**p**” looks like in practice, I show, in Figure 1, 4 examples of FOMC announcements: two interest rate changes (an interest rate cut in Panel A, and an interest rate hike in Panel B) and two FOMC announcements where the level of interest rates remained unchanged (Panel C and D). Along with the estimated probabilities (the grey line), I plot the expected Federal Target rate *after* the FOMC announcement (orange line), computed as in equation [2], and the current level of Federal Fund Target rate (blue line).

¹⁷ An example of these widely used tools is the “Fed Watch Tool” provided by the CME Group (www.cmegroup.com/trading/interest-rates/countdown-to-fomc.html), which releases ahead of the FOMC the probability of a Federal Fund Target rate change, computed with a similar background methodology as the one described in this chapter (www.cmegroup.com/education/demos-and-tutorials/fed-funds-futures-probability-tree-calculator.html). Bloomberg also offers a similar tool under the terminal function “WIRP”. Both tools have been recently acknowledged by the FED in the “FEDS notes” of September 2019, after the 25 bps interest rate cut (www.federalreserve.gov/econres/notes/feds-notes/new-way-to-visualize-the-evolution-of-monetary-policy-expectations-20190920.htm).

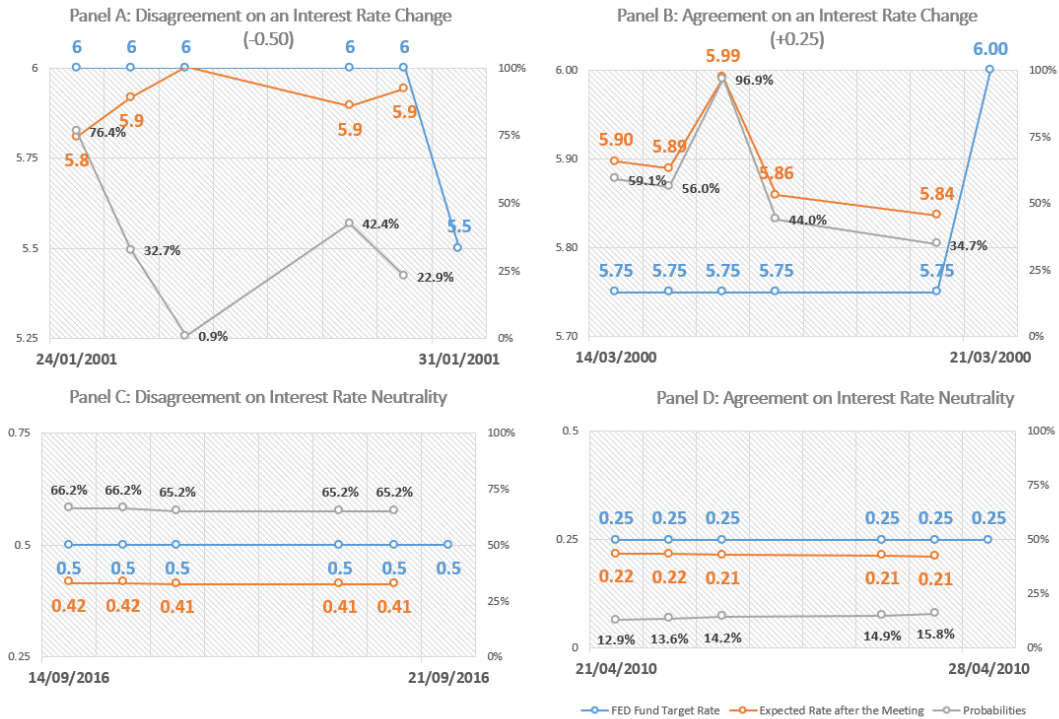


Figure 1: Expected FED Funds Target Interest Rate after FOMC announcement

The figure plots the Federal Funds Target Interest rate, the Expected Federal Funds Target Interest rate after the FOMC announcement and the related probabilities of a change in the Federal Funds Target Interest rate. There are four cases presented in the figure. Panel A presents the a case in which the market didn't expect a change in Federal Fund Target rate, conversely Panel B presents the case of an expected change. Panel C and B both present two cases where the level of the Federal Fund Target rate was left unchanged, and investors expect a change and didn't expect a change respectively.

Source: Federal Reserve Website, www.federalreserve.gov, Quandl dataset.

Panel A shows an interest rate cut of 50 bps unexpected by the market; Panel B, conversely, shows an expected interest rate hike of 25 bps. Two important elements arise from comparing these two situations: first, investors formulate their expectations relatively in advance of the FOMC announcement; second, probabilities are quite heterogeneous even in the few days before the announcement. The first element allows me to make a first direct comparison with the interest rate surprise methodology of Kuttner (2001). By observing Panel A, in fact, I could have infer both by including the 5 days before the announcement and by including only the day preceding the announcement that investors were not expecting an interest rate cut. Therefore, considering the

overall week before the announcement, differently from Kuttner (2001) and Bernanke & Kuttner (2005), seemed fruitless. Conversely, Panel B showed an expected interest rate hike, which couldn't have been defined or expected if it wasn't for the 5th, 4th and 3rd day before of the announcement. Panel C and D shows two FOMC announcements where the level of the Federal Fund Target rate was left unchanged. There is one common element between these two cases, investors' expectations remained constant across the week ahead of the meeting. The difference among the two cases, an interest rate changes (Panel A and B) and an unchanged interest rates (Panel C and D), could also be perhaps ascribed by the context in which these announcements were carried.¹⁸

4.2.Step 3: Combining Expectations with the FOMC announcement

Last but not least, to construct my measure of disagreement (I_t^D), I need to combine the market expectations, computed in Step 1 and 2 as the probabilities assigned by an investor to a Federal Fund Target rate change, with the outcome of the FOMC announcement. To put it simply, disagreement is realized when investors expect (don't expect) an interest rate change (the interest rate level to remain unchanged) and the interest rate remained unchanged (the interest level is changed). My measure of disagreement (I_t^D) takes the form of a dummy variable that has value 1 when disagreement is realised and 0 otherwise.

For each of the days where the probability value is over 50% I assign a value of 1 and 0 otherwise. If across the 5 considered trading days the majority of the days (3 days out 5) investors expect an

¹⁸ The context in which FOMC announcements are disclosed will be further discuss in the empirical results section (section 2.7), where other variables affecting investors' behaviour (reflected in equity prices) will be investigated.

interest rate change (the probability value is over 50%), I postulate that investors expect an interest rate change. In the case in which investors expect (don't expect) and interest rate change and the change doesn't (does) occur, disagreement is realised and my dummy variable (" I_t^D ") takes value of 1. Conversely, my variable will take the value of 0, if investors expect (don't expect) an interest rate change and the FOMC changes (leaves unchanged) the level of the interest rate.

4.3.A Comparison with the “Kuttner (2001) Surprise”

The methodology of Kuttner (2001) represents the ground methodology to infer first the Federal Fund Target rate level that investors expect to be disclosed during the FOMC announcement and second to compute the probability associated with expected Federal Fund Target rate. Two natural questions can arise from the previous analysis: the first is how my methodology differs from Kuttner's (2001) methodology and, second, what my variable captures that wasn't already captured by the “Kuttner Surprise”¹⁹. This discussion clarifies the purpose of extending a long-lasting methodology and also illustrates part of my study contribution.

To answer this question, I will refer to both the methodology of Kuttner (2001) and the results of Bernanke & Kuttner (2005) that successfully estimated the impact of the “Kuttner Surprise” on equity indexes. First, the initial purpose of the Kuttner (2001) methodology was to disentangle the expected from the unexpected component of a Federal Fund Target rate change across all the

¹⁹ The term “Kuttner Surprise” and “Kuttner (2001) Surprise” are referring to the same methodology and will be used interchangeably throughout the document.

“potential interest rate changes”.²⁰ The analysis employed by Bernanke & Kuttner (2005) was carried across all the FOMC announcement and identifies the response of the equity index to an unexpected component of the Federal Fund Target rate.

The purpose of my methodology is to investigate whether investors disagree (agree) with the Federal Target rate declared by the FOMC during the announcement. To do so, instead of disentangling the expected from unexpected component of a Federal Fund Target rate change, I estimate the Federal Fund Target rate that investors expect to be declared during the FOMC announcement. My purpose is to identify specific FOMC announcements where the disagreement is realised and identify the equity index response to it. Identifying specific FOMC announcements allows me to contribute two additional elements with respect to the “Kuttner Surprise”.

A second important difference with the “Kuttner Surprise” is the time frame considered in the analysis. Kuttner (2001) considers the variation in the Federal Fund Futures the day before the FOMC announcements, whereas my methodology to build a comprehensive analysis of investors’ expectations includes the overall “blackout period” ahead of the FOMC announcement. This difference is heterogeneously relevant across my sample. In Figure 1 presented in the previous section (4.1) this is evident in Panel B, where the probabilities are heterogeneous across the week and less relevant in Panel C and D.

The results of Lucca & Moench (2015) also report that the “Kuttner Surprise” is not a valuable explanation for the equity excess return associated with the FOMC announcement. The empirical

²⁰ I refer to “potential interest rate changes” because prior to 1994, the interest rate changes were unscheduled and investors needed to “infer” the change from interest rate movements.

analysis carried by Bernanke & Kuttner (2005) and Lucca & Moench (2005) are hard to compare, even though they both report an equity excess return associated with FOMC announcements. My methodology proposes a bridge between the two and allows me to partially include the analysis of Bernanke & Kuttner (2005) when investigating specific FOMC announcements.

5. EMPIRICAL RESEARCH DESIGN

In this section, I first present the data used in my research and next the empirical methodology adopted. The data and sample description will first include a description of my FOMC announcements sample, second the distribution of my disagreement measure across the FOMC announcements and lastly the equity data. The empirical methodology will include a description of the model and the settings in which I am testing my hypothesis.

5.1.Data and Sample Description

My sample period covers from year 2000 to year 2016 and includes 161 FOMC announcements. The selected time period was chosen based on the FED communication policy developments of the last two decades, as discussed in section 3. I retrieve data on the FOMC meeting dates and the related committee decisions from the Federal Reserve Website (www.federalreserve.gov). My sample, differently from Lucca & Moench (2015) includes both pre-scheduled meetings and conference calls held by the FOMC.²¹ Table 1 presents the FOMC sample employed in my analysis.

²¹ The emergency meeting held by the FOMC on 17th September in response to the terrorist attacks of the 11th September 2001 was excluded.

Column (1) presents the total number of announcements made by the FOMC, further split into Pre-Scheduled Announcements (column (2)) and Conference Calls (column (3)). Column (4) presents the FOMC announcements (including both pre-scheduled meetings and conference calls) where the Federal Target rate were maintained constant and column (5) presents the FOMC announcements where the FOMC voted a change in the level of the Federal Target rate.

By observing Table 1 a few elements can be immediately spotted: first the pre-scheduled meetings are a fixed number (8 meetings per year), whereas conference calls vary across the sample and are also much less frequent. Particularly in the first half of the sample, conference calls are less than an average frequency. Conference calls are included in my analysis²² to account for the fact that during some of these events the Federal Target rate was changed, which is a relevant component of my analysis²³.

²² Including conference calls in the analysis is in contrast with the seminal research on FOMC announcements of Lucca & Moench (2015)

²³ Out of 25 Conference Calls in 4 occasions an Federal Fund Target rate change was voted. Specifically, 2 occurred in 2001 (03/01/2001 and 18/04/2001) and where of the magnitude of 50 bps. The remaining 2 occurred in 2008 (21/01/2008 and 07/10/2008) and where of the magnitude of 75 and 50 bps, respectively.

Table 1: FOMC Announcements (2000–2016)

Years	FOMC Announcements (1)	Pre-Scheduled Announcements (2)	Conference Calls (3)	Announcements with NO interest rate changes (4)	Announcements with interest Rate Change (5)
2000	8	8	0	6	2
2001	11	8	3	1	10
2002	8	8	0	7	1
2003	12	8	4	11	1
2004	8	8	0	3	5
2005	8	8	0	0	8
2006	8	8	0	4	4
2007	11	8	3	8	3
2008	14	8	6	7	7
2009	11	8	3	11	0
2010	10	8	2	10	0
2011	10	8	2	10	0
2012	8	8	0	8	0
2013	9	8	1	9	0
2014	9	8	1	9	0
2015	8	8	0	7	1
2016	8	8	0	7	1
Total	161	136	25	118	43

Note: The table presents the FOMC announcements sample employed in the analysis. Column (1) presents the number of all the “FOMC announcements” per year throughout the sample periods, inclusive of pre-scheduled and conference calls. Columns (2) and (3) split the number of FOMC announcements presented in column (1) between “Pre-Scheduled Announcements” and “Conference Calls”. The “Pre-Scheduled Announcements” are analogous to the FOMC announcements employed by Lucca & Moench (2015). Columns (4) and (5) split the sample of “FOMC Announcements” between announcements where the Federal Fund Target Rate remained unchanged (“Announcements with NO interest rate changes”) and announcements where the Federal Fund Target Rate was changed (“Announcements with Interest Rate Change”) respectively. *Sources:* The Federal Reserve website, www.federalreserve.gov

To construct my measure of disagreement, I employ the Effective Federal Funds rates and the Federal Funds Rate Future prices. The Effective Federal Funds rates are obtained from the Federal Reserve Bank of New York (apps.newyorkfed.org) website. The daily data on Federal Funds Rate Future prices are from the Quandl Database (www.quandl.com). After computing my disagreement

variable, I have identified 59 meetings where the investors disagree with the FOMC meeting decisions. Table 2 presents the distribution of the “disagreement” and “agreement” dummy variables for both the pre-scheduled FOMC announcements (Panel A) and the conference calls (Panel B). As mentioned, the disagreement dummy variable doesn’t represent the majority of the sample, but it’s homogenously distributed across the sample, with the exception of the pre-scheduled meetings in 2014 (Panel A). Interestingly, the disagreement dummy variable doesn’t represent the majority of “events” despite the fact that conference calls are not pre-scheduled and might therefore carry an unexpected announcement.

Panel A: Pre-Scheduled Meetings				Panel B: Conference Calls			
Years	(1) N	(2) $I_t^D = 0$	(3) $I_t^D = 1$	Years	(1) N	(2) $I_t^D = 0$	(3) $I_t^D = 1$
2000	8	7	1	2000	0	0	0
2001	8	5	3	2001	3	0	3
2002	8	7	1	2002	0	0	0
2003	8	7	1	2003	4	4	0
2004	8	7	1	2004	0	0	0
2005	8	4	4	2005	0	0	0
2006	8	7	1	2006	0	0	0
2007	8	7	1	2007	3	1	2
2008	8	7	1	2008	6	3	3
2009	8	7	1	2009	3	2	1
2010	8	7	1	2010	2	2	0
2011	8	2	6	2011	2	0	2
2012	8	6	2	2012	0	0	0
2013	8	3	5	2013	1	0	1
2014	8	0	8	2014	1	0	1
2015	8	4	4	2015	0	0	0
2016	8	3	5	2016	0	0	0
Total	136	90	46	Total	25	12	13

Note: The table presents the distribution of my “disagreement” dummy variable for all the pre-scheduled meetings and conference calls held by the FOMC from 2000 till 2016. Panel A presents the data related to the pre-scheduled meetings, which are 8 per year throughout the sample and as established by the FOMC (column (1), “N”). Column (2) and (3) present the distribution of my “disagreement” dummy variable (column (3)) by comparing it to the agreement dummy variable (column (2)). The “agreement” dummy variable takes the value of

1 when the disagreement variable takes the value of 0 and vice versa. Panel B presents the data for the conference calls held by the FOMC throughout the sample period 2000–2016. Differently from the pre-scheduled meetings the number of conference calls per year varies across the sample (column (1), “N”). Column (2) and Column (3) presents the distribution of the “agreement” and “disagreement” variables respectively.

Sources: The Federal Reserve website, www.federalreserve.gov, Quandl Dataset.

To analyse the impact on equity returns, I compute the CRSP Value-Weighted Index daily returns around the FOMC announcements. The data are retrieved from the CRSP dataset on the Wharton Dataset. The daily return (H_t) is computed as:

$$H_t = \log (P_t / P_{t-1}) * 100 \quad [5]$$

Where P_t is the CRSP Value-Weighted Index adjusted closing price at time “t” (the FOMC announcement date) and P_{t-1} is the CRSP Value-Weighted Index adjusted closing price the day before. The summary statistics for the market returns are presented in Table 3. The summary statistics reported in Table 3 presents the average daily returns of the CRSP Value–Weighted Index for all the FOMC announcements (“All FOMC”, column (1)), in comparison to all the other days included in the sample period (“All NON FOMC”, column (4)). In line with findings on macroeconomic announcements (Savor & Wilson, 2013; Ai & Bansal, 2018), FOMC announcement days are associated with substantially higher returns than non-announcement days.

Table 3: Summary Statistics of Equity Returns (CRSP Value-Weighted Index) with Respect to FOMC Meeting Days

	(1)	(2)	(3)	(4)
	All FOMC	FOMC $I_t^D = 1$	FOMC $I_t^D = 0$	All NON FOMC
N	161	59	102	3998
μ	0.326	0.424	0.270	0.007
Σ	2.032	2.079	2.018	1.221
Median	0.209	0.113	0.307	0.045
Min	-5.818	-2.921	-5.818	-9.005
Max	5.099	5.045	5.099	11.513
Sk	0.043	0.991	-0.451	-0.012
K	3.358	1.843	4.103	8.676

Note: The table presents the summary statistics for the equity returns around “All FOMC” announcements in column (1), the FOMC announcements where disagreement is observed in column (2) (“FOMC $I_t^D = 1$ ”), the FOMC announcements where agreement is observed in column (3) (“FOMC $I_t^D = 0$ ”) and the average return for all the other days included in the sample period in column (4) (“All NON FOMC”). The summary statistics presented for each sample of equity returns are the number of days considered (“N”), the simple average (“ μ ”), the variance (“ Σ ”), the median (“Median”), the minimum value (“Min”), the maximum value (“Max”), the skewness (“Sk”) and the kurtosis (“K”).

Sources: [The Federal Reserve website \(www.federalreserve.gov\)](http://www.federalreserve.gov), [CRSP Dataset](#), [Wharton Database](#).

The average return on FOMC announcement days is 32 bps, whereas the returns on all the other days have an average return closer to zero. Columns (2) and (3) report the summary statistics of the equity returns around the FOMC announcements where disagreement is observed (“FOMC $I_t^D = 1$ ”) and when agreement is observed (“FOMC $I_t^D = 0$ ”). Notably the average return on disagreement day is the highest, with an average return of 43 bps, followed by the overall FOMC announcements (“All FOMC”) and the average returns when agreement is observed (“FOMC $I_t^D = 0$ ”). Considering the difference in the magnitude of average returns between FOMC announcements days and non-announcement days, I report the summary statistics per year in Table 4.

Table 4: Summary Statistics per year (2000–2016)- CRSP Value-Weighted Index

Panel A: FOMC Announcements						Panel B: Non-Announcements					
	(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
Year	N	μ	Max	Min	Σ	Year	N	μ	Max	Min	Σ
2000	8	0.261	2.477	-1.323	1.319	2000	242	-0.058	4.716	-5.939	1.987
2001	11	0.593	5.046	-2.427	4.871	2001	234	-0.062	4.391	-4.334	1.700
2002	8	-0.071	1.407	-2.181	1.740	2002	242	-0.093	5.752	-4.171	2.715
2003	12	0.440	1.516	-1.220	0.925	2003	240	0.082	3.553	-3.508	1.160
2004	8	0.254	1.290	-1.344	0.578	2004	239	0.035	1.622	-1.634	0.482
2005	8	-0.171	0.674	-1.011	0.414	2005	236	0.019	1.938	-1.667	0.404
2006	8	0.168	2.131	-0.639	0.775	2006	234	0.057	2.131	-1.825	0.375
2007	11	0.607	2.917	-2.524	1.847	2007	231	-0.022	2.922	-3.458	0.981
2008	14	0.216	5.099	-5.818	7.756	2008	232	-0.151	11.513	-9.005	6.407
2009	11	0.967	3.300	-1.323	2.178	2009	233	0.089	7.011	-4.861	2.708
2010	10	0.107	0.796	-0.599	2.217	2010	231	0.042	4.358	-3.866	1.305
2011	10	0.435	4.740	-2.921	4.818	2011	234	0.001	4.600	-6.667	2.088
2012	8	0.606	1.802	-0.323	0.813	2012	233	0.027	2.504	-2.475	0.624
2013	9	0.193	1.657	-1.392	1.185	2013	234	0.081	2.185	-2.503	0.445
2014	9	0.332	2.027	-1.028	0.955	2014	234	0.035	2.414	-2.296	0.509
2015	8	0.349	1.460	-1.342	0.939	2015	235	-0.018	3.910	-3.940	0.951
2016	8	-0.111	1.083	-1.089	0.531	2016	235	0.044	2.450	-3.573	0.684

Note: The table presents the summary statistics for the equity returns around “FOMC Announcements” days (Panel A) and “Non-Announcements” days (Panel B) for each year included in the sample period (2000-2016). The “FOMC Announcements” days include both pre-scheduled announcements and conference calls. The summary statistics provided for each year in both Panel A and B are: the number of considered days “N”, the average return “ μ ”, the maximum return value “max”, the minimum return value “min” and the variance of the returns “ Σ ”.

Sources: The Federal Reserve website, www.federalreserve.gov, CRSP Dataset, Wharton Database.

Consistent with the findings of Kontonikas, MacDonald & Saggi (2013), the descriptive statistics are different in magnitude between pre- and post-crisis. The highest average return on FOMC announcement days is observed in 2009 (almost 1%), after a series of interest rates cuts, therefore consistent with economic theory and past findings. Similarly, during the pre-crisis period in 2005, where interest rates were consistently hiked, the FOMC announcement returns are, on average, negative. With the exception of 2005 and 2016, however FOMC announcement days show a consistently higher average return than all the other. In 2012, among the 8 pre-scheduled meetings

the average return was about 60 bps, which is more in line with the magnitude found by Lucca & Moench (2015) in the 1994-2011 sample period. Conversely in 2016 the average return among the 8 pre-scheduled meetings is negative (-11 bps). Kurov, Gilbert, & Wolfe (2020) document a decline in the FOMC pre-announcement drift after the seminal paper of Lucca & Moench (2015), which is consistent with the summary statistics presented in Table 4.

5.2. Empirical Methodology

To investigate empirically my main hypothesis, I run the following regression model:

$$H_t = \beta_0 + \beta^D I_t^D + \beta^X X_t + \varepsilon_t \quad [6]$$

The dependent variable H_t is the 1-day return of the CRSP Value-Weighted index (equation [5]).

In the main specification, the explanatory variables are represented only by my measure of disagreement (I_t^D), which takes the form of a dummy variable and a constant term (β_0) that represents the “agreement” variable.

In additional specifications of the analysis, other control variables are included, to consider information that might jointly affect the stock returns on the FOMC announcement days, and are denoted by the vector of controls X_t that includes macroeconomic and financial markets’ variables. The macroeconomic variables included are: the unemployment rate change, The National Bureau of Economic Research (NBER) variable, the “Tight Cycle” variable, the “Easy Cycle”, the 12-months log change in the industrial production index and the 12-months log change in the consumer price index (CPI). The financial markets variables are the “Kuttner Surprise”, computed as in Bernanke & Kuttner (2005), and a measure of volatility represented by the level of the VIX index at the market close the day before the announcement.

The unemployment rate change is included in the analysis, following the findings of Boyd, Hu & Jagannathan (2005), which report a considerable response of the stock market to the unemployment rate monthly announcement of the Bureau of Labor Statistics. Specifically, they found that bad

news for unemployment normally means good news in the stock market. Further, the mandate of the FED explicitly includes the objective of full employment as the second goal to be achieved after price stability. In the analysis, I include the monthly percentage change of the unemployment rate released in the announcement immediately preceding the considered FOMC announcement.²⁴

The remaining listed control variables were included following the empirical analysis of Lucca & Moench (2015). The NBER dummy variable is a monthly dummy recession variable²⁵ that takes the value of 1 in “recession times” and zero elsewhere. The time series is an interpretation of the data provided by the NBER for the US business cycle expansion and contractions.²⁶

The “Tight Cycle” and “Easy Cycle” dummy variables are two variables that I constructed considering the current level of the Federal Target rate. Specifically, the “Tight Cycle” dummy variable takes the value of 1 during a tight monetary policy period and zero elsewhere. The cycle is “tight” when the Federal Target rate is above 2%. Conversely the “Easy Cycle” dummy variable is a variable that takes the value of 1 during an easy monetary policy period and zero elsewhere. The period is “easy” when the Federal Target rate is below 2%. I consider the 2% threshold, which is defined the equilibrium level for the Federal Target rate by the pioneer work of Taylor (1993).²⁷ These three variables were included to investigate whether the reaction to disagreement around the FOMC announcements is linked to the business and the monetary policy cycle. The 12-months log

²⁴ Summary statistics for macroeconomic variables, including the unemployment rate change, are included in the Appendix, Table A.1.

²⁵ The NBER dummy variable is available at a monthly frequency, on the Federal Reserve, Bank of St. Louis Economic Research dataset (Federal Reserve Economic Data, FRED, fred.stlouisfed.org/series/USREC).

²⁶ The distribution of the NBER dummy variable across my sample period is provided in the Appendix, Table A.2.

²⁷ The distribution of the “Tight Cycle” and “Easy Cycle” dummy variables is included in the Appendix, Table A.3 and A.4.

change of the industrial production index and of the CPI were also included following Lucca & Moench (2015).²⁸

The financial markets' variable included are the "Kuttner Surprise" as a measure of interest rate surprise, computed as in Kuttner (2001) and Bernanke & Kuttner (2005).²⁹ Lastly, I include a measure of volatility, represented by the level of the VIX index the day before the FOMC announcement day. All the analyses are conducted following a standard event-study approach and estimated with the OLS methodology. My analysis is carried in two specific settings, firstly including all the FOMC announcements (comprehensive of both pre-scheduled meetings and conference calls, as described in section 2.6.1) and also on the FOMC announcements where the FOMC has decided to leave the level of the Federal Target rate unchanged. This specific analysis, which I will further define as the "Neutral Monetary Policy (NMP) Analysis" is further described and explained in detail in the next subsection.

After testing empirically my hypothesis on a "general" equity index, I investigate whether the results are homogenous across less broader indexes. First, I investigate whether the response of disagreement is in line with the CAPM predictions as recent literature has found around macroeconomic announcements (Savor & Wilson, 2014; Wachter & Zhu, 2018). To do so, I employ equity returns of portfolios sorted on the betas³⁰ as the dependent variable of equation [6].

²⁸ The 12-months log change of the Industrial production and CPI are both available on the Federal Reserve, Bank of St. Louis Economic Research dataset (Federal Reserve Economic Data, FRED, fred.stlouisfed.org). Summary statistics on the 12-months log change of the industrial production and CPI are available in the Appendix, Table A.1.

²⁹ Summary statistics on the "Kuttner Surprises" around FOMC announcements are provided in the Appendix, Table A.5.

³⁰ The portfolios sorted on the beta are available on the CRSP, Wharton dataset; data on the returns and on the average beta are both available. Summary statistics on the portfolios are provided in the Appendix, Table A.6.

Following the findings of Bernanke & Kuttner (2005) on the Fama & French Industry portfolios, I test my main hypothesis on the Fama & French 10 Industry portfolios,³¹ to investigate whether the response of disagreement is homogenous across industries. Bernanke & Kuttner (2005) found that the responses of industries were modestly in line with the industry betas and therefore perhaps in line with the CAPM predictions.

5.2.1. When No Action is Still an Action: The Neutral Monetary Policy Analysis (NMP)

This section presents a “special case” of my hypothesis of the “Neutral Monetary Policy Analysis” (NMP), which consists of all the FOMC announcements where the level of the Federal Fund Target rate was left unchanged. As the “information transmission literature” predicts, “no news” is still consider a signal to the market. As Tetlock (2011) shows, stale information still affects stock prices. But, are NMP FOMC announcements a “no news”?

As showed by the recent literature on “information shocks” (Gertler & Karadi, 2015; Altavilla et al., 2019; Jarocinski & Karadi, 2020), FOMC announcements convey a large amount of information on the future economic outlook, which are as influential as the information regarding the level of the Federal Fund Target rate.

My claim is that NMP FOMC announcements carry an additional level of uncertainty with respect to the general FOMC announcements, particularly when investors disagree with it, due to the asymmetric component of investors’ interpretations. Furthermore, investors’ interpretations are not

³¹ The Fama & French Industry Portfolios are available from Kenneth French’s webpage (mba.tuck.dartmouth.edu/pages/faculty/ken.french/). Summary statistics on the 10 Industry Portfolios are provided in the Appendix, Table A.7.

only built once the FOMC has disclosed their decision to leave the level of interest rates unchanged and the economic outlook, but also in advance when they “weight” the potential outcomes of the announcement. The reasoning behind this is summarised in Figure 2.

Potential Outcomes		Meeting Outcome	Market Expectations on the Outcome*	Combined Market Expectations with the Meeting's Outcome**
t - 1		t	t + 1	
Investors formulate their expectations		1	1	x
	Tight MP 1			0
			0	-1
		0	1	x
	Neutral MP 0			1
			0	-1
		-1	1	x
	Expand MP -1			1
			0	0

Investors revised their expectations according to the outcome and conditional to their expectations formulated at time t -1

* 1 = market agrees, 0 = market disagrees

**0 = market disagrees and expected neutrality, -1 = market disagrees and expected a cut, 1 = market disagrees and expected a hike, x = market agrees, therefore no other scenarios are in place

Figure 2: Monetary Policy Outcome and Market Opinions

Figure 2 displays, the link between FOMC meeting outcomes and investors' opinions regarding it. At t-1 investors are aware of the potential outcomes, tight monetary policy (1), expansionary monetary policy (-1) and neutrality (0). Between t-1 and t, investors formulate their opinions on the possible outcomes. At time t (the meeting date) the outcome is public. When combining market opinions with the outcomes there are two additional paths to consider, market agreement (1) and market disagreement (0). When the market agrees, we expect the reaction of the meeting to be embedded already in stock prices, therefore the node closes (x). If the market disagrees, there are two further paths to consider, related to the outcome that the market actually expected at t-1. The further market reaction is in fact based on market interpretation of the outcome at time t, conditional to expectations formulated at time t-1.

As shown in Figure 2, at time $t-1$ investors are aware of the potential outcomes, tight monetary policy (1), expansionary monetary policy (-1) and neutrality (0). The likelihood of occurrence of three possible FOMC decisions is, however, rationally distributed only on two possible combinations: a hike and neutrality, or a cut and neutrality. This assumption is based on the fact that the probability of the outcome is based also on the current state of the economy. In other words, it is highly unlikely that within the same meeting both an interest rate hike and an interest rate cut could be expected. Between time $t-1$ and t (the meeting date), investors formulate their opinions on the possible outcomes. At time t the outcome is public.

When combining market opinions with the outcomes there are two additional paths to consider, market agreement (1) and market disagreement (0). When the market agrees, we expect the reaction to the announcement to be embedded already in stock prices, therefore the node closes (x). If the market agrees with the outcome of the meeting the impact should be close to irrelevant, according to the Efficient Market Hypothesis (EMH), as the expectations of the market should be already embedded in the stock prices.

If the market disagrees, there are two further paths to consider, conditional to the expectations formulated at time $t-1$. When the FOMC committee votes an interest rate hike and the market disagrees, the alternative is that the market hoped for neutrality. Similarly, if an interest rate cut is voted, the alternative is that the market hoped for neutrality. When the market disagrees with an interest rate hike, potentially it considers the economy not yet enough “strong” to absorb less favourable debt conditions. Similarly, an “unwanted” interest rate cut could be interpreted as a current worse economic condition than expected. The first case can be positively interpreted as a better current economic condition, although worsening in the future. The second case is a worse current economic condition but a more positive forward-looking scenario. Regardless of which one is the case, both send a signal to the market on the current state of the economy and resolve the question: “When is the central bank going to change the level of interest rates?”

Conversely, disagreement on neutrality leaves investors with an additional level of uncertainty. Investors will, in fact, not only question the current and future state of the economy but also debate on when the central bank will change the level of interest rates. If the market disagrees with neutrality, two cases have to be considered. If the market was expecting an interest rate hike, and the FOMC votes for neutrality, it could be interpreted as a bad signal. In other words, the economy is not yet strong enough to absorb an interest rate hike, therefore the current situation is worse than expected and a future hike will mean even worse conditions for stock prices expected in the future. If the market was expecting a cut, but neutrality is voted, it might be considered that the current economy condition is better than expected.

To summarise, my prediction is that around FOMC announcements where the level of the Federal Fund Target rate is unchanged the equity response might differ from the other cases and be either higher or lower. From a theoretical perspective, as the level of the Federal Fund Target rate is unchanged the equity response should be driven by the economic outlook disclosed during the FOMC announcement. According to the macroeconomic announcements' literature announcements (Savor & Wilson, 2013; Ai & Bansal, 2018), the equity premium should be still higher than on "ordinary" trading days. Bernanke & Kuttner (2005) also find that "no rate change" in the interest rate is positively associated with equity returns,³² offering as explanation that the failure to move at any specific FOMC meeting may be viewed as postponing the inevitable, which is partially in line with the additional uncertainty that I attribute to these announcements.

³² See Table IV in section D in Bernanke & Kuttner (2005)

To investigate this prediction, I estimate the model presented in equation [2.6] only on the FOMC announcement where the level of the Federal Fund Target rate remains unchanged, although there is an important aspect that needs to be considered in the context of my sample period (2000–2016). My sample period encompasses the so-called “zero lower-bound” period after the financial crisis (2009–2015), on top of the shortest post-crisis period (2002–2003). These two periods are also partially included in Lucca & Moench’s (2015) sample period, although they don’t attribute to the content of the announcement a potential driver of the equity premium.

Figure 3 shows the yearly sum of equity premium realised around FOMC announcement days included in my sample period, which both includes pre-scheduled meetings and conference calls. This figure shows the overall premium realised around all the FOMC announcements (yellow bars) and the premium realised only around the NMP FOMC announcements.³³

³³ The entire distribution per year of the NMP FOMC announcements can be found in Table 2.1 (column 4), and shows that the concentration of NMP FOMC announcements falls in the post crisis periods. In particular, out of the 118 NMP FOMC announcements 75 occurred between 2002-2003 (18 of 75) and 2009-2014 (57 of 75).

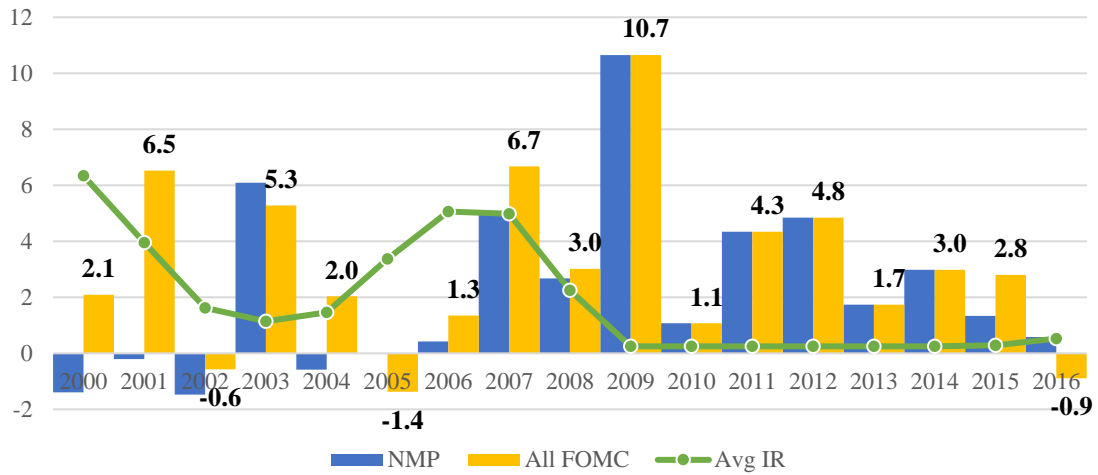


Figure 3: Distribution of the equity return across FOMC announcements

The graph presents the yearly cumulated returns around the FOMC announcements in my sample (2000-2016), including both pre-scheduled meetings and conference calls. The cumulated returns are computed with the 1-day return (equation [2.5]) of the CRSP Value-Weighted index. The blue bars represent the cumulated returns around FOMC where the level of the Federal Fund Target rate was left unchanged, whereas the yellow bars represent the cumulated returns across all the FOMC announcements. The data label indicates the overall cumulated returns across all the FOMC announcements. The green line describes the average Federal Fund Target rate path across my sample period.

Sources: The Federal Reserve website, www.federalreserve.gov, CRSP-Wharton Database

The blue bars represent the cumulated contribution of the NMP returns to the overall FOMC cumulated returns. Obviously, the frequency of NMP FOMC announcements determines the amount of returns associated with them. Within the post-2008 financial crisis period, notably in 2003 (also a post-crisis period) the overall positive cumulated returns are entirely made by the NMP FOMC announcement. Only one Target rate change was voted in 2003 and resulted in a negative return of 80 bps.

The proportion of NMP FOMC announcements is an important element to further interpret the empirical results related to this section. As previously mentioned and consistent with literature findings (Kurov, 2010; 2012) investors' beliefs around economic uncertainty change. Kurov (2010; 2012) claims, in fact, that the reaction to FOMC statements is state dependent and linked to

forward-looking guidance of the FOMC. Kontonikas, MacDonald & Saggu (2013) also claim that the response of the market to FOMC announcements has become increasingly asymmetric during the 2008 financial crisis.

More recently, Sinha (2015) found compelling evidence that around 2012-2013 the FOMC statements that extended the zero-lower bound regime were found to increase the ex-ante uncertainty for the ten-year Treasury yield at the 30–90 day horizon. The explanation provided, in line with my previous statement, focuses on the fact that investors might have interpreted this statement as indicating a worse economic situation than expected.

6. EMPIRICAL RESULTS

Table 5 reports the results related to the main specification of the empirical methodology presented in equation [6]. The results, in line with expectations, report an additional equity premium associated with FOMC announcements where “disagreement” is realised. Furthermore, the “Constant” in my regression represents all the FOMC announcements where investors “agree” with the decision taken by the FOMC.

Table 5: Main Results	
I_t^D	0.423** (0.186)
Constant	0.268* (0.141)
Obsv (# FOMC meetings)	161
R ²	0.053

Note: This table presents the results for the dummy regression analysis presented in equation [6], excluding the vector of controls X_i . The dependent variable is represented by the daily returns on the CRSP Value-Weighted Index, computed as presented in equation [5]. The dummy variable (I_t^D) is computed following the methodology outlined in section 4. The constant represents the events where investors agree with the decision of the FOMC. The event study encompasses the 2000–2016 period and includes 161 FOMC meetings. Standard Errors are reported in brackets.

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, Wharton-CRSP Database, US Labor Statistics websites.

My findings indicate that the FOMC decisions, which show a marked dissimilarity with investors’ expectations have a significant (at 5%) and economically important excess return of 42 bps on the announcement day. The remaining events, where investors “agree” with the FOMC decisions (represented by the Constant in Table 5) are mildly significant (at 10%) at represent a smaller excess return of almost 27 bps. All together the results point out that, even though FOMC announcement as whole carry an important equity premium compared to non announcement days (the average non-announcement equity return is around 1bps as reported in Table 3), this equity premium differs across events according to expectations of investors.

The return pre-announcement drift of Lucca & Moench (2015) was reported to be around 50 bps, although the more recent findings of Kurov, Gilbert & Wolfe (2020) demonstrate that the equity premium associated with the FOMC has considerably reduced and is closer to 30 bps.³⁴ My findings place themselves in the middle of these two results but they provide an additional explanation to the FOMC equity.

What my variable captures is the resolution of the uncertainty ahead of the FOMC announcements and the realisation of investors’ expectations once the announcement is disclosed. Kurov, Gilbert & Wolfe (2020) claim that as investors become more accurate in estimating the next move of the FOMC and as the communication policy of central banks improves, the equity premium associated

³⁴ The analysis was also carried out on other broad equity indexes and yielded similar results. The results can be found in Appendix, Table A.8, Panel A.

with these announcement is reduced. This last finding is consistent with the results related to the FOMC announcements where investors agree with the FOMC. In line with Kurov, Gilbert & Wolfe (2020) interpretation, FOMC announcements where perhaps investors have been more accurate in predicting the FOMC actions carried a smaller equity premium compared to the others.

My result shows that there is still room for improvement as there is still a considerable amount of uncertainty surroundings these days, that still “produces” a considerable equity premium. Nonetheless, these result also highlight the progress of central banks’ communication and the reduction of uncertainty, as the announcements where disagreement is realised represent only 37% of the sample.

6.1.Persistence

The results presented in Table 5 similar to the analysis provided by Lucca & Moench (2015), assumes that the equity returns should not be reversed on subsequent days and further are not offset by statistically significant negative returns on the day before, that partially also includes the pre-announcement FOMC returns. Table 6 summarises the results for equation [6], where the dependent variable is represented by the daily returns on the CRSP Value Equity Index the day before and the subsequent 3 days after the FOMC announcement day.

The results show that the variable is not statistically significant on the day before and the days after the FOMC announcement day, consistent with expectations and the past literature (Lucca & Moench, 2015). This result corroborates the findings that the additional equity returns on my “disagreement” variable are not reverse in other days around the FOMC announcement day.

Table 6: Persistency

Days	Const.		I_t^D		Obsv
-1	0.026	(0.161)	-0.108	(0.222)	
0	0.268*	(0.141)	0.423**	(0.186)	
+1	-0.033	(0.157)	-0.005	(0.216)	161
+2	-0.091	(0.131)	-0.037	(0.180)	
+3	0.041	(0.136)	0.066	(0.186)	

Note: This table reports results for the main specification of my analysis (equation [6]) for the returns on the CRSP Value-Weighted Index on the day prior and on the 3 days after the FOMC meeting dates. The sample ranges (2000–2016) are analogous to the main analysis. The day “0” represents the FOMC meeting date (the result presented in Table 5). The regression includes my “disagreement” measure (I_t^D) and a constant term. Standard Errors are presented in brackets.

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, Wharton - CRSP Database, US Labor Statistics websites.

6.2. Time series analysis of the FOMC announcements

The literature provides different explanations for FOMC announcement equity returns, such as the surprise component of the interest rate changes (Ehrmann & Fratzscher, 2004; Bernanke & Kuttner, 2005; Fausch & Sigonius, 2018), the information content on the future economic outlook and realization of uncertainty (Savor & Wilson, 2013; Lucca & Moench, 2015, Ai & Bansal, 2018) and to the current state of the economy (Kontonikas, MacDonald & Saggu, 2013). In Table 5, I provided empirical evidence that FOMC announcements, where disagreement is observed, are responsible for a considerable amount of the equity excess return attributed to these events. In this section, I also include a series of control variables to investigate additional factors that might contribute to the result. The control variables included in the analysis (representing the vector of controls X_t in equation [6]) are constructed as described in detail in section 5.2 and include both macroeconomic and financial markets variables.

The macroeconomic variables included are: the unemployment rate change (v_Δ), the NBER dummy variable (NBER), the “Tight Cycle” variable (Tight C.), the “Easy Cycle” (Easy C.), the 12-months

change in the industrial production index ($\Delta^{12} \text{Log (IP)}$) and the 12-months change in the CPI index ($\Delta^{12} \text{Log (CPI)}$).³⁵ The financial markets' variables are Kuttner Surprise (Kuttner S.), computed as in Bernanke & Kuttner (2005) and a measure of volatility represented by the level of the VIX index at the market close the day before the announcement (Vol_{t-1}).³⁶

The results are presented in Table 7 and include interaction terms between the above-mentioned variables and my measure of “disagreement”. My measure of “disagreement” remains positive and statistically significant in most cases, with the only exception represented by the regression that includes the VIX index (Vol_{t-1}). Nonetheless the interaction variables between my “disagreement” variable and the VIX index is positive and statistically significant. This result can be ascribed to the additional volatility that might be present in the market due to the realised “disagreement” between market actors and the FOMC.

The constant represents the “agreement” variable, and therefore the FOMC announcements where investors' expectations are aligned with FOMC decisions. These events represents the majority in my sample, nevertheless the constant is only positive and statistically significant in a handful of cases and consistently smaller in magnitude compared to the “disagreement” variable.

³⁵ The macroeconomic variables were included following the empirical analysis of Lucca & Moench (2015).

³⁶ Lucca & Moench (2015) also include two additional financial market variables. The “SPX surprise” (see Lucca & Moench, 2015, section H, p. 355), which is the 2-3 pm FOMC announcement return on the S&P500 index and the moving average of the pre-FOMC returns over the past 8 meetings. The two variables aren't included in my analysis, for two different reasons. The SPX surprise is computed employing intra-day data, which are not currently available to me. The moving average of the pre-FOMC returns variable is in line with Lucca & Moench (2015) that includes all the FOMC announcements, although it is unfitted to the purpose of my analysis, that aims to investigate specific FOMC announcements which are not necessarily sequential.

Among the variables included in the analysis, the interaction variable between the unemployment change and my measure of disagreement ($I_t^D \times v_{\Delta}$, presented in Panel A, column (2)) is positive and statistically significant. The change in the unemployment rate is included because generally unemployment rate variations are reported closely to the FOMC announcements and it is known both in the industry and in the literature to be one of the most influential macroeconomic announcements. Boyd, Hu & Jagannathan (2005) analysed the effect of unemployment news, finding a strong positive reaction of stock returns on rising unemployment during economic expansion and a negative reaction during economic contractions. Unemployment rate announcements are particularly relevant for the US economy as the mandate of the FED explicitly includes “full employment” as the second goal to be achieved after the inflation target. A rise in unemployment during a contractionary state of the economy could potentially lead to an interest rate cut and more favourable discount rate conditions in the future. The uncertainty related to a positive change in the unemployment rate, which by construction of the variable would have been disclosed before the upcoming FOMC announcement, could be consistent with investors revising their expectations in light of macroeconomic news.

The interaction variable between the disagreement measure and the NBER dummy is negative and statistically significant. The NBER dummy, the recession variable, takes a value of 1 during recession periods and zero elsewhere. The relationship between recession and disagreement has a strong negative impact on equity returns. This result is in line with the discussion of Kurov (2010: 2012) and Kontonikas, MacDonald & Saggi (2013), who point out that during recession period traders rely on institutions to support the economy through financial markets. If investors expect to be supported by institutions and this is not the case the economic impact is negative and bigger in magnitude than the equity premium associated with the FOMC announcement itself (about 50 bps). Another interesting result is related to the Kuttner Surprise, which I expected to be correlated with my disagreement measure as the Kuttner (2001) methodology represents the first step in building

my variable. The Kuttner Surprise is per se statistically insignificant; on the contrary, the interaction variable with my measure of “disagreement” is strongly significant and negative. The Kuttner Surprise remains therefore a valuable explanation for the equity excess returns associated with the FOMC announcements, although limited to the FOMC announcements where investors’ expectations are in contrast with the FOMC decisions.

Overall, the analysis confirms that FOMC announcements where disagreement is observed are associated with a positive and significant equity return even when controlling for macroeconomic and financial market factors that might jointly affect equity returns around the announcement days. To summarise, the other three relevant results, in line with the literature, are related to the change in the unemployment rate, recession times and the Kuttner Surprise. Disagreement and a change in the unemployment rate are associated with a positive impact on equity prices, in line with the findings of Boyd, Hu & Jagannathan (2005). A negative news on unemployment during uncertainty is a positive news for stock prices, as it might lead to an interest rate cut. Second, during a time of recession, monetary policy announcements have a stronger impact on financial markets (Kontonikas, MacDonald & Saggi, 2013), particularly because investors expect support from the institutions. Lastly the Kuttner Surprise remains a valuable explanation for the equity return associated with the FOMC announcements. A positive surprise (interest rate hike) combined with the disagreement of investors in regards to the interest rate hike is associated with a negative impact on stock price of almost 40bps.

Table 7: Time Series Analysis of FOMC Meetings' Returns

Panel A								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I_t^D	0.440** (0.201)	0.493** (0.202)	0.401** (0.203)	0.508** (0.213)	0.487** (0.207)	0.398* (0.226)	0.249 (0.282)	0.545 (0.411)
v_Δ	0.009 (0.034)	-0.053 (0.050)						
$I_t^D \times v_\Delta$		0.119* (0.069)						
NBER			0.215 (0.305)	0.520 (0.360)				
$I_t^D \times \text{NBER}$				-1.083* (0.649)				
Tight C.					-0.238 (0.262)	-0.419 (0.317)		
$I_t^D \times \text{Tight C.}$						0.575 (0.565)		
Easy C.							0.238 (0.262)	0.419 (0.317)
$I_t^D \times \text{Easy C.}$								-0.575 (0.565)
Const.	0.226* (0.146)	0.192 (0.146)	0.179 (0.156)	0.119 (0.160)	0.291* (0.163)	0.340** (0.171)	0.053 (0.235)	-0.071 (0.266)
Obsv.	161							
R ²	0.056	0.104	0.059	0.069	0.058	0.092	0.058	0.092
Panel B								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I_t^D	0.428** (0.198)	0.416** (0.194)	0.086 (0.326)	-0.644 (0.530)	0.516** (0.210)	0.430* (0.243)	0.470** (0.193)	0.441** (0.205)
Kuttner S.	-0.079 (0.067)	0.048 (0.080)						
$I_t^D \times \text{Kuttner S.}$		-0.386*** (0.141)						
Vol_{t-1}			0.016 (0.012)	0.003 (0.014)				
$I_t^D \times \text{Vol}_{t-1}$				0.048* (0.027)				
$\Delta^{12} \text{Log (CPI)}$					-0.027 (0.028)	-0.041 (0.035)		
$I_t^D \times \Delta^{12} \text{Log (CPI)}$						0.042 (0.059)		
$\Delta^{12} \text{Log (IP)}$							-0.071 (0.055)	-0.081 (0.060)
								0.064

$I_t^D \times \Delta^{12} \text{Log (IP)}$								
Const.	0.212 (0.144)	0.227 (0.141)	-0.157 (0.318)	0.145 (0.360)	0.339** (0.157)	0.375** (0.166)	0.269* (0.139)	0.269* (0.139)
Obsv.	161							
R ²	0.05	0.077	0.053	0.068	0.058	0.061	0.062	0.064

Note: The table presents the results of the regressions described in equation [6], including the vector of controls X_t . The variables included in the analysis are both macroeconomic and financial market variables. Panel A presents the analysis that includes: the unemployment rate change (v_Δ), the NBER dummy variable (NBER), the “Tight Cycle” variable (Tight C.), the “Easy Cycle” (Easy C.) and interaction variables between my measure of disagreement (I_t^D) and the control variables ($I_t^D \times v_\Delta$, $I_t^D \times \text{NBER}$, $I_t^D \times \text{Tight C.}$ and $I_t^D \times \text{Easy C.}$). Panel B presents the analysis that includes: the Kuttner Surprise (Kuttner S.), the volatility level the day before the announcement, represented by the level of the VIX index at the market close the day before the announcement (Vol_{t-1}), the 12-months log change in the industrial production index ($\Delta^{12} \text{Log (IP)}$) and the 12-months log change in the CPI index ($\Delta^{12} \text{Log (CPI)}$)³⁷, and interaction variables between my measure of disagreement (I_t^D) and the control variables ($I_t^D \times \text{Kuttner S.}$, $I_t^D \times \text{Vol}_{t-1}$, $I_t^D \times \Delta^{12} \text{Log (CPI)}$, $I_t^D \times \Delta^{12} \text{Log (IP)}$). The dependent variable, H_t , is represented by the 1-day return of the CRSP Value-Weighted Index computed as presented in equation [5]. Standard Errors are presented in brackets. The sample period is (2000–2016).

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1 .

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, Wharton-CRSP Database, Federal Reserve Bank of St.Louis-Economic Research website, fred.stlouisfed.org

³⁷ The macroeconomic variables were included following the empirical analysis of Lucca & Moench (2015).

6.3. The Neutral Monetary Policy (NMP) Analysis

As discussed in subsection 5.2.1 there are a number of reasons for which exploring separately the FOMC announcements where interest rates were left unchanged is in line with the purpose of this paper. In a nutshell, NMP FOMC announcements give me the chance to study the impact of the FOMC statements aside from the economic impact of changes in interest rates. The response to NMP FOMC announcements should therefore revolve around the economic outlook normally disclosed by the FOMC in the form of forward-guidance to the public.

As previously clarified, these announcements, might reflect an additional level of uncertainty, experienced by investors, because of their non-decisional aspect. Sinha (2015) reports this additional uncertainty during the zero-lower bound period (2012-2013), which was reflected in the 10-year short term treasury yield. Bernanke & Kuttner (2005) report a positive effect of “no change” in interest rates, explaining that the market was mildly responding to “inactions” and interpreting them as “postponing the inevitable”.

A drawback of this analysis is related to when these FOMC announcements normally take place. As previously discussed, the NMP FOMC announcements are mostly concentrated right after crisis periods including, therefore, a state dependent element. The results of Kurov (2012) and Kontonikas, MacDonald & Saggi (2013) report, in fact, that the response to monetary policy statements and monetary policy surprises is strongly affected by the business cycle. These last elements of the discussion should therefore be taken into consideration when interpreting the results related to this sub-sample of FOMC announcements.

In Table 8, I report the results related to NMP FOMC announcements, which display a higher magnitude and statistical significance of the equity premium, compared to the main results in Table

5, associated with disagreements around these announcements.³⁸ These result is in line with the expectations and confirms a higher degree of uncertainty around these announcements.³⁹ The constant, representing the “agreement” variable remains mildly significance and considerably smaller also in this case.

I_t^D	0.495*** (0.184)
Const.	0.245* (0.133)
Obsv.	118
R ²	0.082

Note: This table presents the results for the dummy regression analysis presented in equation [6]. The dependent variable is represented by the daily returns on the CRSP Value-Weighted Index, computed as presented in equation [5]. The dummy variable (I_t^D) is computed following the methodology outlined in section 5. The event study encompasses the 2000–2016 period and includes only the FOMC meetings, where no interest rate change occurred, the NMP analysis. For completeness, the number of meetings where disagreement is observed is reported.

Standard Errors are presented in brackets.

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, Wharton-CRSP Database, US Labor Statistics websites.

³⁸ The analysis was also carried out on other broad equity indexes and yielded similar results. The results can be found in the Appendix, Table A.8, Panel B.

³⁹ The “Persistence” analysis of section 6.1 to assess whether the equity premium associated with disagreement around the FOMC announcements was not reversed on subsequent or previous days has been also carried out on the NMP FOMC announcements’ subsample and confirms the previous findings. The results can be found in the Appendix, Table A.9.

To answer the question on whether this uncertainty is merely related to the “timing” and therefore state dependent, I replicate the analysis of Table 7 and investigate other possible explanations for this equity premium around the NMP FOMC announcements. The results are presented in Table 9. At first glance, a particularly important control variable to investigate whether the equity premium around NMP FOMC announcements is the NBER recession dummy. The NBER recession dummy variable takes the value of 1 during a recession period and zero otherwise. The unemployment rate change, the 12-months logarithm change in the CPI and industrial production index are also all macroeconomic variables that could potentially shed light on how investors interpret the economic outlook disclosed around the announcements. First, it needs to be acknowledged that this equity premium is partially state dependent, due to the positive significance of the NBER dummy (NBER), and particular the negative effect associated with the interaction between the NBER variable and my disagreement dummy. The “Kuttner Surprise” (Kuttner S.) mimics the results of Table 7 in terms of statistical significance, although the interaction variable is also statistically insignificant. An interesting result, different from the general case is related to the industrial production index ($\Delta^{12} \text{Log}(\text{IP})$), which presents an interesting asymmetric result. In columns (7) and (8) in Panel B the two regressions are presented, including first the industrial production index variable, and second the regression including the industrial production index variable and the interaction between my disagreement measure and the industrial production index variable. The industrial production variable is associated per se with a negative equity premium. It needs to be recalled that the industrial production index is a 12-months change of the log of the index, which means that a positive change in the 12-months industrial production index is associated with a negative equity premium. Conversely, disagreement and positive news on industrial production is associated with a positive equity premium around NMP FOMC announcements.

Table 9: Time Series Analysis of NMP FOMC Meetings' Returns

Panel A								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I_t^D	0.498** (0.203)	0.473** (0.224)	0.423** (0.183)	0.566*** (0.186)	0.518*** (0.189)	0.494** (0.188)	0.227 (0.332)	-0.135 (0.826)
v_Δ	0.006 (0.039)	0.021 (0.054)						
$I_t^D \times v_\Delta$		-0.045 (0.080)						
NBER			0.623* (0.320)	1.176*** (0.363)				
$I_t^D \times$ NBER				-1.984** (0.690)				
Tight C.					-0.380 (0.312)	-0.357 (0.337)		
$I_t^D \times$ Tight C.						-0.172 (0.915)		
Easy C.							0.380 (0.312)	0.357 (0.337)
$I_t^D \times$ Easy C.								0.172 (0.915)
Const.	0.250* (0.138)	0.257* (0.141)	0.154 (0.140)	0.075 (0.138)	0.314** (0.147)	0.304** (0.149)	0.027 (0.269)	0.064 (0.284)
Obsv.								118
R ²	0.082	0.083	0.112	0.172	0.092	0.093	0.089	0.091

Panel B								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I_t^D	0.479*** (0.185)	0.471** (0.185)	-0.337 (0.330)	-0.377 (0.458)	0.464** (0.195)	0.339 (0.212)	0.509*** (0.182)	0.532*** (0.186)
Kuttner S.	0.063 (0.153)	0.665 (0.587)						
$I_t^D \times$ Kuttner S.		-0.645 (0.608)						
Vol $_{t-1}$			0.028** (0.012)	0.017 (0.016)				
$I_t^D \times$ Vol $_{t-1}$				0.003 (0.026)				
Δ^{12} Log (CPI)					0.002 (0.027)	-0.005 (0.035)		
$I_t^D \times \Delta^{12}$ Log (CPI)						0.017 (0.055)		
Δ^{12} Log (IP)							-0.104** (0.049)	-0.132** (0.053)
$I_t^D \times \Delta^{12}$ Log (IP)								0.201 (0.132)
Const.	0.241* (0.138)	0.225 (0.141)	-0.379 (0.140)	-0.122 (0.138)	0.250* (0.147)	0.285* (0.149)	0.245* (0.269)	0.245* (0.284)

	(0.134)	(0.136)	(0.299)	(0.400)	(0.142)	(0.147)	(0.131)	(0.131)
Obsv.	118							
R ²	0.084	0.088	0.123	0.134	0.082	0.089	0.117	0.135

Note: The table presents the results of the regressions described in equation [6], including the vector of controls X_t . The variables included in the analysis are both macroeconomic and financial market variables. Panel A presents the analysis that includes: the unemployment rate change (v_Δ), the NBER dummy variable (NBER), the “Tight Cycle” variable (Tight C.), the “Easy Cycle” (Easy C.) and interaction variables between my measure of disagreement (I_t^D) and the control variables ($I_t^D \times v_\Delta$, $I_t^D \times$ NBER, $I_t^D \times$ Tight C. and $I_t^D \times$ Easy C.). Panel B presents the analysis that includes: the Kuttner Surprise (Kuttner S.), the volatility level the day before the announcement is represented by the level of the VIX index at the market close the day before the announcement (Vol_{t-1}), the 12-months log change in the industrial production index ($\Delta^{12} \text{Log (IP)}$) and the 12-months log change in the CPI index ($\Delta^{12} \text{Log (CPI)}$), and interaction variables between my measure of disagreement (I_t^D) and the control variables ($I_t^D \times$ Kuttner S., $I_t^D \times Vol_{t-1}$, $I_t^D \times \Delta^{12} \text{Log (CPI)}$, $I_t^D \times \Delta^{12} \text{Log (IP)}$). The dependent variable, H_t , is represented by the 1-day return of the CRSP Value-Weighted Index computed as presented in equation [5]. Standard Errors are presented in brackets. The sample period is (2000–2016) and includes only the FOMC announcements where the interest rate level has remained unchanged.

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, Wharton - CRSP Database, Federal Reserve Bank of St.Louis – Economic Research website, fred.stlouisfed.org

This asymmetric response is in line with the results on the state dependent response to monetary policy announcements and monetary policy surprises. A positive news on industrial production might lead to a future increase in the Federal Fund Target rate, whereas if disagreement is realised, it means that investors perhaps expected an interest rate hike, and positive news on industrial production makes this event more likely to happen.⁴⁰

⁴⁰ The distribution of disagreement on the NMP FOMC announcements is quite heterogeneous, with a preponderance of disagreement about interest rates cuts within the 2008 crisis and post-crisis period, whereas expectations towards an interest rate hike are related to the 2000, 2005 and 2007 years and after 2015.

6.4.Portfolios Analysis

Early studies (Black, 1972; 1993; Black, Jensen & Scholes, 1972; Fama & French, 1993) find a very small relation between equity excess returns and the beta, even though the beta should be an important determinant of the risk premium. Bernanke & Kuttner (2005) also propose an analysis on industry portfolios (Fama & French Industry Portfolios) around monetary policy announcements, although they don't find a strong relationship with the average portfolios' beta and the response to interest rate change surprises.

On the contrary, more recent studies on macroeconomic announcements find that the behaviour of asset prices during these days is much easier to reconcile with standard asset pricing theories. Savor & Wilson (2014) found compelling evidence that stock market betas are strongly economically and statistically significantly related to returns around macroeconomic announcement days and specifically on pre-scheduled FOMC announcements. More recently, Wachter & Zhu (2018) developed a theoretical model to explain this relationship and propose a different explanation. They infer that as macroeconomic announcements convey information on the economic outlook, this additional information updates investors on future economic risk. Investors require, therefore, an additional risk premium to hold the equity during these days. A second explanation proposed is that these days might themselves create the risk by reflecting the competence of the Federal Reserve. They conclude that the security market line appears on days with macroeconomic announcements. Building on these findings, I investigate my main hypothesis (equation [6]) on equity portfolios sorted based on their betas and on the Fama & French 10 industry portfolios.

6.4.1. Beta Portfolios

This section presents the results for equation [6] where the dependent variable H_t is represented by the daily returns of ten equity portfolios sorted on beta deciles.⁴¹ The results of this analysis are presented in Table 10. Regression estimates to the I_t^D variable show a high level of proportionality in the disagreement response. In particular, when the coefficients from the 7th to the 1st decile portfolios are estimated, both the magnitude and statistical significance are almost monotonically aligned with CAPM predictions and so proportional to portfolio market beta. This result is in line with the findings of Savor & Wilson (2014), who demonstrate that the CAPM holds well for FOMC announcements.

The results in Table 10 show that in line with the literature and expectations the response of equity returns to FOMC announcements is strongly related to the stock betas. Column (1) reports the average returns for the portfolios on FOMC announcement days, column (2) reports the average portfolios' betas. The coefficients for my test (equation [6]) are presented in column (3). In line with expectations and the literature, the magnitude of the response is strongly related to the average portfolios' beta, although, variable I_t^D shows a higher statistical significance on low betas portfolios, along with a higher difference with the overall returns of the FOMC announcements. This result can be ascribed to the interpretation of the I_t^D variable itself.

⁴¹ The portfolios' returns, sorted in stock betas, are available on the CRSP Wharton Dataset, and are computed with the same data of the CRSP Value-Weighted Index. Data on the average portfolios' beta are also available.

Table 10: Beta Portfolio Analysis - Whole Sample (2000–2016)

Port.	(1)	(2)	(3)		(4)		R ²	Obsv
	μ	B	Const.	I_t^D	I_t^D	I_t^D		
			<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>		
1	0.704	1.7	0.528*	(0.277)	1.084***	(0.372)	0.072	161
2	0.571	1.4	0.441*	(0.221)	0.884***	(0.288)	0.078	
3	0.435	1.2	0.344*	(0.190)	0.662***	(0.248)	0.063	
4	0.398	1.0	0.331*	(0.174)	0.610***	(0.227)	0.064	
5	0.321	0.9	0.225	(0.156)	0.572***	(0.205)	0.059	
6	0.299	0.8	0.216	(0.138)	0.497***	(0.181)	0.060	
7	0.264	0.7	0.205	(0.125)	0.447***	(0.164)	0.053	
8	0.201	0.6	0.137	(0.104)	0.391***	(0.140)	0.049	
9	0.138	0.4	0.068	(0.070)	0.282***	(0.092)	0.061	
10	0.142	0.2	0.060	(0.052)	0.289***	(0.069)	0.107	

Note: This table presents the results of the dummy variable regression reported in equation [6] where the dependent variable is represented by the returns on the CRSP Value-Weighted Market Portfolios sorted on their beta. The portfolios are ordered from the 1st till the 10th beta deciles. The control variables are represented by my measure of disagreement (“ I_t^D ”), in column (4), and constant (“Const”) in column (3). The “*Est*” column presents the estimate of the coefficients, along with the significant code for both column (3) and (4). The column *SE* presents the standard error of the estimate in brackets. Along with the empirical results, the average returns on the FOMC meeting dates are reported in column (1) for comparison, along with average portfolio beta in column (2). The sample period (2000–2016) includes all the FOMC meeting dates.

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, Wharton - CRSP Database, US Labor Statistics websites.

When disagreement is observed ($I_t^D = 1$) investors have to re-update their beliefs on the future economic outlook, which they would also do around all the FOMC announcements. The main difference between these two situations is that, if disagreement is observed, investors have wrongly interpreted the information collected before the meeting on the state of the economy, which could result in them perceiving additional risk that could be reflected in future expectations on the risk-free rate and expectations on future companies’ cash flows (Kontonikas, MacDonald & Saggiu, 2013). This result can also be ascribed to the high idiosyncratic risk, that could result in stocks being more impacted by future uncertain expectations on cash flows.

This explanation is supported by the difference between the average FOMC announcements returns (column (1)) and FOMC announcements returns when $I_t^D = 1$ (column (4)). On average the magnitude of the coefficients when $I_t^D = 1$ is higher on average, although the difference between the two is particularly prominent on low beta portfolios. Portfolio 10 has an average return around FOMC announcements (“ μ ”) of 14 bps, whereas for FOMC announcements where $I_t^D = 1$ the coefficient is around 30 bps.

In line with the findings of Savor & Wilson (2014), who build their findings across all major macroeconomic announcement days, I also find some degree of response to the “agreement” measure (represented by the constant) in high-beta (and therefore more responsive) portfolios. The magnitude of the response is considerably smaller (about a half of the bps compared to the disagreement measure) and only mildly significant.

Further to this, to investigate the “announcement effect”, I replicate the work on the NMP analysis. The results of this test are presented in Table 11. This test confirms the results of Table 10, showing, however, a much stronger response in the magnitude of the coefficients. In column (1), I report the average FOMC announcement return around the NMP analysis. The magnitude in the difference between the average FOMC announcements’ return and the FOMC announcement where disagreement is observed is higher with respect to the previous results (Table 2.10), ranging between 20 to 40 bps. Again the I_t^D variable is statistically significant across all the portfolios, although more strongly in low beta portfolios.

A further relevant difference with the previous analysis (Table 10) is that the “agreement” measure is only mildly significance in the first portfolio (Port. 1), confirming previous results (Tables 5 and 8) and providing empirical evidence that across NMP FOMC announcements, “agreement” around NMP reduces uncertainty and resolves into the absence of a statistically significant equity premium.

	(1)	(2)	(3)	(4)	(5)	(6)	
Port.	μ	B	Const.	I_t^D		R^2	Obsv
			<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>	
1	0.733	1.7	0.485	(0.311)	1.145***	(0.421)	0.078
2	0.564	1.4	0.347	(0.247)	0.889***	(0.335)	0.075
3	0.457	1.2	0.275	(0.211)	0.735**	(0.286)	0.069
4	0.412	1.0	0.239	(0.192)	0.670**	(0.263)	0.067
5	0.356	0.9	0.181	(0.172)	0.617***	(0.235)	0.067
6	0.340	0.8	0.207	(0.149)	0.576***	(0.204)	0.078
7	0.286	0.7	0.165	(0.137)	0.497***	(0.188)	0.068
8	0.221	0.6	0.101	(0.117)	0.424***	(0.160)	0.063
9	0.143	0.4	0.042	(0.083)	0.318***	(0.114)	0.065
10	0.108	0.2	0.017	(0.066)	0.279***	(0.090)	0.077

Note: This table presents the results of the dummy variable regression reported in equation 6 where the dependent variable is represented by the returns on CRSP Value–Weighted Market Portfolios sorted on their beta. The portfolios are ordered from the 1st till the 10th beta deciles. The control variables are represented by my measure of disagreement (“ I_t^D ”), in column (4), and constant (“Const”) in column (3). The “*Est*” column presents the estimate of the coefficients, along with the significant code for both column (3) and (4). The column *SE* presents the standard error of the estimate in brackets. Along with the empirical results, the average returns on the FOMC meeting dates are reported in column (1) for comparison, along with average portfolio beta in column (2). The sample period (2000–2016) includes all the FOMC meeting dates where no interest rate change occurred, the NMP analysis.

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, Wharton - CRSP Database, US Labor Statistics websites.

Overall, the results feature two important findings. First, in line with the literature and expectations, the response of equity returns to FOMC announcements shows a high degree of proportionality with respect to the market beta (Savor & Wilson, 2014; Wachter & Zhu, 2018). Second, FOMC meetings where disagreement is observed show an even higher degree of response, particularly in the NMP analysis. Last, but not least, the impact of disagreement is statistically more significant in stocks, bearing a plausible higher idiosyncratic risk, showing that investors require an additional premium for bearing additional risk on stocks with a higher likelihood of uncertainty on future cash flows (Jensen & Mercer, 2002; Ehrmann & Fratzscher, 2004).

6.4.2. Fama & French Industry Portfolios

Following the reasoning of the previous section on the results of Bernanke & Kuttner (2005), I replicate the previous analysis of the 10 Fama & French industry portfolios.⁴² The results of the analysis covering all the FOMC announcements are presented in Table 12, whereas Table 13 presents the results when only the NMP FOMC announcements are considered.

Bernanke & Kuttner (2005) found that the most responsive industries to interest rate surprises are high-tech and telecommunications. In Table 12 I presents the average returns for FOMC announcements' days (column (1)), the average beta of the portfolios (column (2)), computed as in Bernanke & Kuttner (2005) by regressing the returns of the industry portfolios over the CRSP Value-Weighted Index returns, a constant term (column (3)) and the coefficients for my dummy variable I_t^D , along with standard errors (column (4)).

This analysis, compared to the previous one, allows me to make inference not only on the proportionality of the industry, but also to investigate the response across business sectors. At first glance, I also find some degree of proportionality in the industry response (e.g. the highest premium is associated with the high-tech industry, which also shows the highest beta among the others). In line with the results of Bernanke & Kuttner (2005) the high-tech is the most responsive industry in regard to my “disagreement” measure, although I find also some degree of response to the “agreement” measure (also represented in this case by the constant term). For instance, durables

⁴² The Fama & French Industry Portfolios are available from Kenneth French's webpage (mba.tuck.dartmouth.edu/pages/faculty/ken.french/). The betas of the portfolios are estimated by regressing the portfolios returns over the market returns, represented by the CRSP Value-Weighted Index (Bernanke & Kuttner, 2005).

see a positive equity premium of 45 bps only around “agreement”, like energy and health-care sectors. What is a plausible explanation for these findings?

These results can, perhaps, be ascribed to the disagreement around changes in expected future dividends and changes in the companies’ debt conditions, as suggested by Bernanke & Kuttner (2005). The explanation of these results relies again, perhaps, in the middle between monetary economists and the announcement effect. Future expectations on the dividend are surely relevant in interpreting the overall responses of industry portfolios to monetary policy, although the difference among the average return on all the FOMC announcements days, compared to when disagreement is realised, must be ascribed to other elements. Sectors which have been more largely impacted by the financial crisis respond perhaps more harshly to monetary policy uncertainty and institutions’ decisions (Kontonikas, MacDonald, & Saggiu, 2013), given the information conveyed on the future economic outlook (Savor & Wilson, 2013). Conversely, sectors that benefit from stability and continuity in monetary policy would respond positively to FOMC decisions which are in line with expectations and therefore a revision of the expectations is not necessary.

Table 12: Fama & French industry Portfolios Analysis – Whole Sample (2000–2016)

Port.	(1)	(2)	(3)		(4)		R ²	Obsv
	μ	B	Const.	I_t^D	I_t^D	I_t^D		
			<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>		
High – Tech	0.458	1.20	0.325	(0.214)	0.758***	(0.282)	0.048	
Durables	0.337	1.16	0.450**	(0.191)	0.348	(0.251)	0.018	
Other	0.420	1.16	0.413**	(0.196)	0.547**	(0.257)	0.029	
Energy	0.263	0.99	0.312*	(0.164)	0.160	(0.216)	0.011	
Manufacturing	0.299	0.98	0.342**	(0.138)	0.342**	(0.181)	0.029	161
Telecommunications	0.191	0.98	0.144	(0.154)	0.339*	(0.203)	0.017	
Wholesale / Retail	0.315	0.86	0.332**	(0.145)	0.400**	(0.191)	0.035	
Health Care	0.199	0.73	0.238	(0.157)	0.159	(0.154)	0.018	
Utilities	0.112	0.66	0.126	(0.131)	0.119	(0.173)	0.004	
Non-Durables	0.090	0.61	0.105	(0.101)	0.081	(0.133)	0.003	

Note: This table presents the results related to the main hypothesis on the Fama & French 10 Industry portfolios. Column (1) reports the average returns around my NMP FOMC announcements sample for each industry (“ μ FOMC”). The betas of the portfolios are estimated by regressing the portfolios returns over the market returns, represented by the CRSP Value-Weighted Index and reported in column (2). This analysis is comparable to the Bernanke & Kuttner (2005) analysis. The control variables are represented by my measure of disagreement (I_t^D), in column 4, and a constant (“Const.”), in column (3). For both the control variables the coefficients estimates (“*Est*”) is presented along with the significant code. The column *SE* presents the standard error of the estimate in brackets. The sample period (2000–2016) includes all the FOMC meeting dates.

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, French website (mba.tuck.dartmouth.edu/pages/faculty/ken.french/), CRSP Database, Wharton.

It needs to be said that the response to “disagreement” is among all the statistically significant cases always bigger in magnitude compared to “agreement”.

I investigate further the response of the industries around NMP FOMC announcements. Although the limitations of this specific subsampling are made explicit, I believe the response of single industries to the NMP and to the economic outlook disclosed by the FOMC is relevant. In such times (after 2001 and after 2008), the response to the economic outlook could shed some light on how industries responded to expectations on future dividends and debt conditions.

Table 13: Fama & French industry Portfolios Analysis - NMP analysis - 2000 -2016

Port.	(1)	(2)	(3)		(4)		R ²	Obsv
	μ	β	Const.	I_t^D	I_t^D	I_t^D		
			<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>		
High-Tech	0.446	1,20	0.392**	(0.161)	0.601***	(0.220)	0.099	
Durables	0.367	1,16	0.398*	(0.205)	0.284	(0.286)	0.039	
Other	0.456	1,16	0.333*	(0.198)	0.698**	(0.272)	0.074	
Energy	0.357	0,99	0.281	(0.174)	0.554**	(0.238)	0.057	
Manufacturing	0.301	0,98	0.246*	(0.145)	0.401**	(0.198)	0.056	
Telecommunications	0.213	0,98	0.096	(0.153)	0.406*	(0.212)	0.034	118
Wholesale / Retail	0.279	0,86	0.258*	(0.139)	0.343*	(0.190)	0.054	
Health Care	0.269	0,73	0.196	(0.124)	0.368**	(0.170)	0.055	
Utilities	0.244	0,66	0.171	(0.134)	0.392**	(0.184)	0.042	
Non-Durables	0.150	0,61	0.128	(0.105)	0.180	(0.144)	0.026	

Note: This table presents the results related to the main hypothesis on the Fama & French 10 Industry portfolios. Column (1) reports the average returns around my NMP FOMC announcements sample for each industry (“ μ FOMC”). The betas of the portfolios are estimated by regressing the portfolios returns over the market returns, represented by the CRSP Value-Weighted Index and reported in column (2). This analysis is comparable to the Bernanke & Kuttner (2005) analysis. The control variables are represented by my measure of disagreement (I_t^D), in column 4, and a constant (“Const.”), in column (3). For both the control variables the coefficients estimates (“*Est*”) is presented along with the significant code. The column *SE* presents the standard error of the estimate in brackets. The sample period (2000–2016) includes all the NMP FOMC meeting dates.

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, French website (mba.tuck.dartmouth.edu/pages/faculty/ken.french/), CRSP Database, Wharton

The response around NMP FOMC announcements is virtually similar to the response related to the overall FOMC announcements, showing the same asymmetries around sectors. One relevant difference is represented by the energy industry, which in the general case was not responsive with respect my disagreement variable. Around NMP, the energy sector not only shows a positive equity premium with respect to disagreement of about 55 bps. The average response to NMP FOMC announcements “ μ ” (column (1)) of the energy sector is slightly above 35 bps, which means that disagreement is associated with an additional 25 bps equity premium.

A similar tale can be observed in the case of the health care sector that shows a positive statistically significant equity premium associated with disagreement around NMP FOMC announcement. The

response to agreement is, however, lower than the average response to the FOMC announcements (“ μ ”), whereas disagreement presents a 10 bps premium compared to the overall FOMC announcements (“ μ ”). A more homogenous industry response to FOMC announcements around NMP (energy, health-care and high-tech) can be perhaps ascribed to “timing” of NMP previously discussed and strongly correlated to post-crisis periods.

6.5. Discussion

In the previous subsections, several analyses were presented to validate the hypothesis postulated in section 2. In this section, I summarise the interpretations and possible explanations for the results. The main result, shown in Table 5, points out a relevant equity premium associated with FOMC announcement days, where the market disagrees with the outcome decided by the FOMC. The dummy model shows an average of 42 bps returns around these days, in comparison to the 32 bps yield on normal FOMC announcement days. The FOMC announcements where investors agree with the FOMC decisions present an equity premium of around 27 bps and mildly significant (at 10%).

Lucca & Moench (2015) found that the pre-announcement stock drift, which materialises during the trading day before the actual meeting time (they include intra-day return 24 hours before the meeting time, which on average occurs around 2 pm), is of about 50 bps. They associate the announcement stock drift with several explanations that could apply also to the present study. Lucca & Moench (2015) infer that the additional equity premium associated with the upcoming FOMC announcement is explained by the additional information, conveyed in the announcements on the future economic outlook and the additional risk compensation that investors require to hold the stock during these days. To interpret my results in relation to their findings, I analyse the time series of FOMC announcements returns against a series of economic, monetary policy surprises and financial market-based variables. The result presented in Table 7 feature important findings

which are partly in line with the findings of Lucca & Moench (2015) and partly in line with the findings of the seminal paper of Bernanke & Kuttner (2005).

When analysing the whole returns' series, I find some evidence that FOMC returns, are state dependent and influenced by the economic outlook disclosed by the FOMC and by the current economic conditions (these results are inferred from the unemployment change variable and the NBER dummy variable). My disagreement variable remains positive and statistically significance throughout the analysis, featuring two important results. First, the FOMC announcements equity premium might not be associated with "any" FOMC announcements as could be inferred from the results of Lucca & Moench (2015). Second, the premium associated with the realization of investors' expectations around the announcement are an important driver of the FOMC equity premium. A possible explanation for this result can be found in the literature on disagreement among investors and its effect on stock market prices, trading volume and volatility.

Investors update their beliefs upon information arrival (French & Roll, 1986), although FOMC announcements are among the most highly anticipated announcements around the world, leading one to infer that investors would also react to the content of the announcements influenced by their prior beliefs. An extensive theoretical literature on disagreement (Varian, 1985; 1989; Abel, 1989) implies that disagreement and divergence of opinions should lead to a positive risk premium. Carlin, Longstaff & Matoba (2014) find recent empirical evidence that disagreement among financial market participants is associated with higher expected return, volatility and trading volume. The literature on macroeconomic announcements (Savor & Wilson, 2013; Lucca & Moench, 2015) doesn't provide evidence of additional market volatility during FOMC announcements. On the contrary, my analysis of the FOMC announcement returns shows that, when subsampling the time series with respect to the expectations of market participants, the volatility variable shows an interesting asymmetric result, more in line with the results of Carlin, Longstaff & Matoba (2014).

These results are further bolstered by the work on the “NMP analysis”. This analysis is novel in the literature on macroeconomic announcements (Savor & Wilson, 2013; Lucca & Moench, 2015; Ai & Bansal, 2018), which differentiates among macroeconomic and monetary policy announcements, although FOMC announcements haven’t been analysed on the basis of the FOMC decision. The NMP analysis represents a natural setting to investigate the announcement effect, without any change in the current economic condition. My results on this subsample feature a higher equity premium associated with these days. When investors disagree with the FOMC on neutrality, the equity premium associated with these announcements is on the magnitude of 50 bps, similar in magnitude to the findings of Lucca & Moench (2015).

Bernanke & Kuttner (2005) partially analysed the effect of “no change” in the Federal Fund Target rate level and suggested that the market was reacting to the FOMC failing to take action and just “postponing the inevitable”. Compared to their study, my sample period encompasses both the post-crisis years of 2000–2001 and the more prolonged zero-lower bound after the 2008 financial crisis. These should be taken into consideration when interpreting the additional equity premium associated with NMP FOMC days, considering also earlier findings in the literature (Barsista & Kurov, 2008; Kurov, 2012; Kontonikas, MacDonald & Saggi, 2013) who suggested that the response to monetary policy statements and surprises is state dependent and stronger during a recession period.

Overall, these results contribute also to the stream of literature that analyses the communication policy of institutions. Kurov, Gilbert & Wolfe (2020) claim, in fact, that since the end of Lucca & Moench’s (2015) sample of analysis (2011), the pre-announcement drift has started to progressively “disappear”, consistent with the explanation of reduced uncertainty. Ultimately, this “reduced uncertainty” is linked to the “communication reform” begun many years ago for the FED (1994) and still continuing (Blinder, et al. 2001; 2008; Faust and Svensson, 2001), with the precise aim of

being as transparent as possible with regards to the public and improve the accountability of the FOMC actions.

My results on portfolio analysis are in line with the findings of Savor & Wilson (2014) and Wachter & Zhu (2018). I find a high degree of proportionality in the equity response with respect to their systematic risk factor, in line with CAPM predictions. The magnitude of the response is in line with past findings, although the significance of the response shows a relevant asymmetry between high and low beta portfolios. This result is marginally also in line with the findings on sector analysis. The response of portfolios sorted by sector (the Fama & French 10 Industry Portfolios) is heterogeneous and not consistently in line with the average beta of the portfolio. This asymmetry could perhaps be imputed to the considered sample (2000–2016) that encompasses the financial crisis and the subsequent zero-lower bound interest rate period. Industries who have been more impacted by the financial crisis would react more strongly to upcoming information (even more disappointing information) on the future of monetary policy. The findings of Boyd, Hu & Jagannathan (2005), Barsistha & Kurov (2008), Kurov (2012) and Kontonikas, MacDonald & Saggi (2013), in fact link the equity reaction on macroeconomic announcements to the state of the economy and the business cycle. This explanation applies specifically to industry sectors and even more to those sectors characterised by seasonality in cash flows (Ehrmann & Fratzscher, 2004). To summarise the results show, in line with the explanations provided in the literature, that the expectations of investors on the content of the FOMC announcements and realised on the announcement day play an important role in the equity premium associated with these days.

7. ROBUSTNESS

7.1. Liquidity and Volatility Risk

Lucca & Moench (2015) assess the role of volatility and liquidity, with the specific purpose of understanding why most of the returns are realised in advance of the announcement. My sample period (2000–2016) partially includes the pre-announcement effect. I, therefore, also assess the role of the liquidity and volatility risk. My explanation for this additional equity premium is given by the expectations of investors, formulated prior to the meeting. I, therefore, decompose the measures of liquidity and volatility into an innovation given by these expectations and a $t-1$ measurable component using simple univariate AR(1) models. The results of this analysis are shown in Table 14.

As a benchmark in this time series analysis, the dummy variable I_t^D is positive and statistically significant at a 5% confidence level with an average response of 38 bps, in line with previous results. The “Vix Lag” is the level of the VIX index on the before the trading day, similarly the “Volume Lag” is the logarithm of the total volume of the day before. The variables “Vix I_t^D Inn” and “Volume I_t^D Inn” are the decomposed measures of innovation for volatility and liquidity, respectively. The two measures of innovations are both statistically significant, negative in the case volatility and positive in the case of volumes.

Table 14: Liquidity and Volatility Risk

	(1)	(2)	(3)	(4)
I_t^D	0.380** (0.167)	0.384** (0.167)	0.371** (0.167)	0.394*** (0.138)
Vix Lag	0.005** (0.002)		0.006** (0.002)	0.010*** (0.002)
Vix I_t^D Inn				-0.418*** (0.010)
Volume Lag		0.003 (0.099)	-0.100 (0.108)	-0.127 (0.089)
Volume I_t^D Inn				-0.056 (0.170)
Constant	-0.091* (0.049)	-0.011 (0.893)	0.795 (0.950)	0.948 (0.784)
R ²	0.002	0.001	0.002	0.320
Observations	4157			

Note: The table presents the results for the regression in equation [6], at a daily frequency, when controlling for measures on liquidity and volatility. Column (1) presents the results for the time series daily analysis including the disagreement dummy variable (I_t^D) and the “Vix Lag”, which is the lagged value of the Vix on the previous day. Column (2) presents the results for the regression including my the disagreement dummy variable (I_t^D) and the “Volume Lag”, which denotes the logarithm of the trading volume on the day before. Column (3) presents the regression analysis that includes the disagreement dummy variable (I_t^D) and both the “Vix Lag” and the “Volume Lag”. Column (4) presents the regression that includes all the variables included in column (3), plus the “Vix (I_t^D inn)” and “Volume (I_t^D inn)” variables. The “Vix (I_t^D inn)” is the residual from an AR(1) regression of the daily Vix Index on a constant, the value of the Vix the day before and the disagreement dummy variable (I_t^D). The “. The “Volume (I_t^D inn)” is the residual from an AR(1) regression of the logarithm of the daily volume on a constant, the logarithm of the volumes the day before and the disagreement dummy variable (I_t^D). Standard Errors are presented in brackets.

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.

Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, Wharton-CRSP Database, US Labor Statistics websites, Bloomberg.

The two variables show that part of the returns associated with FOMC announcements, conditional to the expectations on such announcements, is explained by lower volatility and higher market liquidity. The asymmetric results between the “Vix Lag” and the “Vix I_t^D Inn” are in line with the findings of Lucca & Moench (2015). The higher volatility associated with the day before the announcement (“Vix Lag”) is in line with the Lucca & Moench (2015) stock drift and possibly

explained by the attendance created around the outcome of the FOMC announcement. Consequently, the realization of the expectations is associated with lower volatility on the announcement day and higher liquidity, which is consistent with investors re-updating their beliefs and revising their positions.

8. CONCLUSIONS

This research shows in a novel way how disagreement regarding FOMC committee decisions can impact the equity markets. When the market agrees with FOMC decisions I find a small or no significant impact on stock market excess returns. We can think of these cases as FOMC meetings being similar to the “anticipated events” that we observe in many other instances in the continuous evolution of financial markets. Thus, consistent with market efficiency theory as well as with a vast empirical literature, information contained in the FOMC subsequent meeting release is largely incorporated in equity returns, resulting in small consequences on market outcomes. However, when investors disagree with FOMC committee decisions I find the effects on stock excess returns highly significant. Furthermore, my results highlight that market expectations will play an important role in the post-meeting reaction, rather than a monetary policy innovation. This result is particularly evident when analysing the NMP analysis. Although no action is taken from the FOMC committee, the impact is strong and consistent when the market was actually expecting them to take a stand. The NMP analysis is a natural experiment that further confirms predictions of the EMH. As no change in interest rates occurs, the effects I find are entire to be credited to ex-ante price quality and investors’ information set. As this research shows, anticipated information doesn’t have a significant impact on financial market metrics. Thus, central bank institutions could improve their disclosure policy particularly during economic downturns, when the risks of

announcing unexpected decisions could bring unpleasant consequences on financial market stability and investors' trust.

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APPENDIX

Table A.1 – Macroeconomic Variables Summary Statistics

The table presents the summary statistics for the macroeconomic variables included in the empirical analysis section 5.2. The variables included are the unemployment rate, the 12-months change in the industrial production index and the 12-month change in the CPI. The summary statistics presented for each sample of equity returns are the number of days considered (“N”), the simple average (“ μ ”), the variance (“ Σ ”), the median (“median”), the minimum value (“min”) and the maximum value (“max”). Values are presented in percentage(%).

Sources: FRED Economic Data, fred.stlouisfed.org.

	N	μ	median	max	min	Σ
Unemployment rate	161	6.253	5.700	9.900	3.900	3.061
Unemployment rate (Δ)	161	0.134	0.000	12.308	-7.463	9.948
Industrial Production index (12-months log change)	161	0.172	0.929	3.292	-7.161	4.206
CPI (12-months log change)	161	2.755	2.605	11.108	-6.953	15.979

Table A.2 –NBER Dummy Variable

The table presents the time series of the “NBER dummy variable” included in my analysis, across the 2000–2016 sample period. This time series is an interpretation of US Business Cycle Expansions and Contractions data provided by The National Bureau of Economic Research (NBER). The NBER identifies months and quarters of turning points without designating a date within the period that the turning points occurred. A value of 1 is a recessionary period, while a value of 0 is an expansionary period.

Sources: FRED Economic Data, fred.stlouisfed.org

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000		0	0		0	0		0		0	0	0
2001	0		0	1	1	1		1		1	1	0
2002	0		0		0	0		0	0		0	0
2003	0		0	0	0	0		0	0	0		0
2004	0		0		0	0		0	0		0	0
2005		0	0		0	0		0	0		0	0
2006	0		0		0	0		0	0	0		0
2007	0		0		0	0		0	0	0		0
2008	1		1	1		1	1	1	1	1		1
2009	1	1	1	1		1		0	0		0	0
2010	0		0	0	0	0		0	0	0	0	0
2011	0		0	0		0		0	0		0	0
2012	0		0	0		0		0	0	0		0
2013	0		0		0	0	0		0	0		0
2014	0		0	0		0	0		0	0		0
2015	0		0	0		0	0		0	0		0
2016	0		0	0	0		0		0		0	0

Table A.3 – Tight Cycle Dummy Variable

The table presents the time series of the “Tight Cycle Dummy Variable” employed in my analysis across the 2000–2016 sample period. This time series is a dummy variable, similar to the one employed by Lucca & Moench (2015), constructed on the basis of the average level of the Federal Funds Target Rate. The variable takes value 1, on the months where the average level of Federal Funds Target Rate is above 2%. The 2% threshold is based on the assumption of Taylor (1993), who stated that 2% is the equilibrium interest rate level for the United States.

Sources: Federal Reserve website (www.federalreserve.gov)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000		1	1		1	1		1		1	1	1
2001	1		1	1	1	1		1		0	0	0
2002	0		0		0	0		0	0		0	0
2003	0		0	0	0	0		0	0	0		1
2004	1		1		1	1		1	1		1	1
2005		1	1		1	1		1	1		1	1
2006	1		1		1	1		1	1	1		1
2007	1		1		0	0		0	0	0		0
2008	0		0	0		0	0	0	0	0		0
2009	0	0	0	0		0		0	0		0	0
2010	0		0	0	0	0		0	0	0	0	0
2011	0		0	0		0		0	0		0	0
2012	0		0	0		0		0	0	0		0
2013	0		0		0	0	0		0	0		0
2014	0		0	0		0	0		0	0		0
2015	0		0	0		0	0		0	0		0
2016	0		0	0	0		0		0		0	0

Table A.4 – Easy Cycle Dummy Variable

The table presents the time series of the “Easy Cycle Dummy Variable” employed in my analysis across the 2000–2016 sample period. This time series is a dummy variable, similar to the one employed by Lucca & Moench (2015), constructed on the basis of the average level of the Federal Funds Target rate. The variable takes the value 1, in the months where the average level of the Federal Funds Target rate is below 2%. The 2% threshold is based on the assumption of Taylor (1993), who stated that 2% is the equilibrium interest rate level for the United States.

Sources: Federal Reserve website (www.federalreserve.gov)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000		0	0		0	0		0		0	0	0
2001	0		0	0	0	0		0		1	1	1
2002	1		1		1	1		1	1		1	1
2003	1		1	1	1	1		1	1	1		0
2004	0		0		0	0		0	0		0	0
2005		0	0		0	0		0	0		0	0
2006	0		0		0	0		0	0	0		0
2007	0		0		1	1		1	1	1		1
2008	1		1	1		1	1	1	1	1		1
2009	1	1	1	1		1		1	1		1	1
2010	1		1	1	1	1		1	1	1	1	1
2011	1		1	1		1		1	1		1	1
2012	1		1	1		1		1	1	1		1
2013	1		1		1	1	1		1	1		1
2014	1		1	1		1	1		1	1		1
2015	1		1	1		1	1		1	1		1
2016	1		1	1	1		1		1		1	1

Table A.5 – Kuttner Surprise

The table presents the Kuttner (2001) surprises across the whole sample period (2000–2016) and for each of the 161 FOMC announcements included in my analysis. The surprises are computed following the pioneer methodology of Kuttner (2001) and further employed by Bernanke & Kuttner (2005).

Sources: Federal Reserve website (www.federalreserve.gov) and Quandl Database.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000		-0.054	-0.031		0.052	0.075		-0.017		0	0	0.058
2001	-5.347		0.06	-0.205	-0.078	0.072		0.015		-0.069	-0.1	0
2002	0		-0.031		0	0		0.035	0.025		-0.195	0
2003	-0.077		0.063	0.128	0.075	-0.18		0.034	0.225	0.155		-0.021
2004	0.375		0.093		0.012	3.3		-0.103	0.183		-0.202	0.064
2005		-0.108	0.327		-0.022	5.115		0.049	0.045		0.253	0.141
2006	6.2		1.912		-0.266	1.5		-0.067	-0.129	-0.052		0.026
2007	-0.465		0.033		-0.049	0.29		-0.068	0.952	0.93		0.209
2008	-4.482		0.448	-1.5		-0.45	0.199	-0.054	-2.941	-2.453		-0.093
2009	0.209	-0.013	-0.012	0.3		0.054		-0.02	-0.032		-0.017	-0.01
2010	0.073		0.057	0	-0.018	-0.021		0	0.058	-0.005	0.017	-0.009
2011	0		-0.005	-0.145		-0.037		0.037	0.025		-0.108	-0.018
2012	0.052		0.018	0		0		-0.028	0.023	-0.022		0.02
2013	-0.62		0		-0.008	0.086	-0.155		-0.006	-0.155		0.012
2014	-0.039		0.006	0.037		0.013	-0.078		0	0.039		0.022
2015	-0.15		0	0.225		0.023	0.155		-0.058	-0.075		-0.15
2016	0.58		0.005	0.109	0.018		0.073		-0.033		0.015	-0.234

Table A.6 – “Beta-Sorted” Portfolios Summary Statistics

The table presents the summary statistics for the daily equity returns of the portfolios sorted according to their market beta. The daily equity returns considered are the ones around the 161 FOMC announcements included in my sample period (2000-2016). The portfolios were directly sourced from the CRSP Wharton dataset. Panel A presents the summary statistics for the whole FOMC announcements sample. Panel B presents the summary statistics for the NMP FOMC announcements subsample. The summary statistics presented for each sample of equity returns are the number of days considered (“N”), the simple average (“ μ ”), the standard deviation (“ σ ”), the median (“median”), the minimum value (“min”), the maximum value (“max”), the skewness (“Sk”) and the kurtosis (“K”). *Sources:* CRSP- Wharton Database.

Panel A: FOMC Whole Sample (2000-2016)								
	N	μ	σ	median	min	max	Sk	K
port1	161	0.744	2.784	0.590	-7.000	13.945	0.856	3.306
port2	161	0.611	2.218	0.503	-5.594	11.666	1.007	4.427
port3	161	0.470	1.905	0.293	-4.905	10.322	1.129	5.340
port4	161	0.433	1.747	0.296	-3.946	10.115	1.410	6.410
port5	161	0.353	1.573	0.251	-3.890	9.009	1.254	6.136
port6	161	0.320	1.388	0.197	-3.519	8.196	1.381	6.954
port7	161	0.279	1.259	0.212	-2.816	7.904	1.648	8.650
port8	161	0.215	1.054	0.155	-2.695	6.871	1.706	10.079
port9	161	0.147	0.713	0.063	-1.168	5.408	2.876	17.728
port10	161	0.144	0.537	0.062	-1.236	3.067	1.326	5.391
Panel B: FOMC NMP Subsample (2000-2016)								
	N	μ	σ	Median	min	max	Sk	K
port1	118	0.720	2.698	0.643	-7.000	13.945	0.914	4.349
port2	118	0.550	2.148	0.556	-5.594	11.666	1.034	5.635
port3	118	0.448	1.835	0.353	-4.309	10.322	1.226	6.351
port4	118	0.404	1.691	0.331	-3.946	10.115	1.572	8.272
port5	118	0.348	1.512	0.334	-3.306	9.009	1.545	7.999
port6	118	0.335	1.316	0.301	-2.928	8.196	1.756	9.693
port7	118	0.281	1.210	0.279	-2.624	7.904	2.008	11.971
port8	118	0.213	1.034	0.172	-2.218	6.871	2.140	13.157
port9	118	0.138	0.738	0.095	-1.168	5.408	3.233	20.456
port10	118	0.108	0.589	0.010	-1.236	3.067	1.434	5.055

Table A.7 – Fama & French 10- Industries Portfolios Summary Statistics

The table presents the summary statistics for the daily equity returns of Fama & French 10 Industries Portfolios. The daily equity returns considered are the ones around the 161 FOMC announcements included in my sample period (2000-2016). Panel A presents the summary statistics for the whole FOMC announcements sample. Panel B presents the summary statistics for the NMP FOMC announcements subsample. The summary statistics presented for each sample of equity returns are the number of days considered (“N”), the simple average (“ μ ”), the standard deviation (“ σ ”), the median (“median”), the minimum value (“min”), the maximum value (“max”), the skewness (“Sk”) and the kurtosis (“K”).

Source: Kenneth French’s webpage (mba.tuck.dartmouth.edu/pages/faculty/ken.french/)

Panel A: FOMC Whole Sample (2000-2016)								
	N	μ	Σ	Median	min	max	Sk	K
Non-Durables	161	0.096	1.017	0.110	-3.120	2.900	-0.111	0.622
Durables	161	0.412	1.920	0.300	-6.360	6.430	0.106	1.973
Manufacturing	161	0.342	1.390	0.290	-5.050	5.160	0.147	2.401
Energy	161	0.282	1.657	0.150	-5.640	4.730	-0.187	1.013
High – Tech	161	0.504	2.168	0.380	-5.960	16.040	2.498	17.099
Telecommunications	161	0.216	1.556	0.180	-5.230	8.050	0.501	4.858
Wholesale / Retail	161	0.357	1.459	0.280	-5.100	5.280	0.408	1.955
Health Care	161	0.209	1.183	0.120	-3.340	3.910	-0.106	0.985
Utilities	161	0.123	1.321	0.170	-4.300	4.530	-0.214	1.108
Other	161	0.462	1.971	0.270	-8.330	8.030	0.450	4.372
Panel B: FOMC NMP Subsample (2000-2016)								
	N	μ	Σ	Median	min	max	Sk	K
Non-Durables	118	0.146	0.918	0.175	-2.390	2.740	-0.080	-0.003
Durables	118	0.358	1.800	0.190	-5.620	6.430	0.271	2.291
Manufacturing	118	0.294	1.264	0.255	-3.670	5.140	0.295	1.873
Energy	118	0.345	1.522	0.165	-4.040	4.730	0.110	0.887
High – Tech	118	0.436	1.406	0.500	-3.990	4.690	-0.117	0.907
Telecommunications	118	0.204	1.342	0.185	-5.230	4.620	-0.311	2.238
Wholesale / Retail	118	0.277	1.214	0.245	-2.620	4.840	0.416	1.251
Health Care	118	0.259	1.085	0.170	-3.280	3.780	-0.142	1.148
Utilities	118	0.230	1.173	0.210	-2.630	4.530	0.276	0.859
Other	118	0.446	1.733	0.300	-4.680	7.050	0.855	3.057

Table A.8 – Robustness Check: Alternative Equity Indexes in the Main Specification and in the NMP subsample.

The table presents the results for the main analysis and the robustness check on different equity indexes. The main analysis refers to the empirical analysis presented in section 2.6.1. The analysis is conducted on the SP500 index daily returns and the CRSP Equally- Weighted Index daily returns. Panel A presents the analysis considering the whole sample of FOMC meetings across (2000–2016), which accounts for 161 meetings. Panel B only considers the FOMC meetings where no interest rate change has occurred in the NMP analysis, which accounts for 118 meetings across the (2000–2016) period.

Panel A: Whole Sample (2000 -2016)		
	SPX Returns	CRSP Equally- Weighted Index
I_t^D	0.092 (0.089)	0.463** (0.205)
Const.	0.056 (0.067)	0.346** (0.156)
R^2	0.000	0.058
Obsv.	161	
Panel B: Neutral Monetary Policy - Whole Sample (2000 -2016)		
	SPX Returns	CRSP Equally- Weighted Index
I_t^D	0.258 (0.166)	0.399** (0.214)
Const.	0.191 (0.224)	0.219 (0.166)
R^2	0.026	0.061
Obsv	118	
<i>Signif. codes:</i> ‘****’ 0.01 ‘***’ 0.05 ‘**’ 0.1 ‘.’ 1		
<i>Source:</i> Federal Reserve website, www.federalreserve.gov , Quandl dataset, Wharton - CRSP Database.		

Table A.9 – Persistency Analysis on Neutral Monetary Policy

The table presents a robustness test for the “persistency analysis” across the NMP FOMC announcements. By “persistency analysis” I intend the effect of disagreement, represented by the dummy I_t^D variable. The results presented in section 6.1 show that the effect of disagreement towards the FOMC decision is not reversed to statistically significant negative returns the day after or before the FOMC meeting day. The dependent variable is presented by the CRSP Value-Weighted Index daily returns, computed the day before (-1), the day after (+1), two days after (+2) and three days after (+3) the FOMC announcement date. Consistent with past results neither the variables are statistically significant, in line with past findings on the FOMC announcements. The additional return observed on the market is not reversed on the subsequent days, nor on the day before.

	-1	1	2	3
I_t^D	-0.124 (0.228)	0.058 (0.269)	0.147 (0.194)	0.021 (0.237)
Const.	-0.032 (0.166)	-0.125 (0.196)	-0.050 (0.142)	0.166 (0.173)
Obsv.				118

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘*’ 0.1.
Source: Federal Reserve website, www.federalreserve.gov, Quandl dataset, Wharton - CRSP Database, US Labor Statistics websites.