Asset Prices Around FOMC Meetings

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Abstract

In this paper, I uncover a significant pattern in the behavior of G10 currencies and equity implied volatility, which explains a substantial portion of their net returns from 1994 to 2019. The vast majority of the positive returns from a long-short position in G10 currencies and a substantial 90% of the cumulative negative returns in implied volatility are concentrated on the even weeks around U.S. FOMC meetings. In contrast, odd weeks, encompass on average nearly all the negative returns from such a long-short position in G10 currencies and all the increases in implied volatility. This interplay between these opposing dynamics explains most of the net returns of these assets over the 26-year period. U.S. equities show a similar pattern. Furthermore, I establish that this recurring even-odd weeks cycle is explained by a combination of repetitive calendar events at the beginning of the month (start of the month effect) and on the day-16 (day-16 effect), along with sporadic shocks primarily related to political news. This explanation also extends to equities, with evidence dating back to 1955. Recurring patterns in liquidity, tied to U.S. Treasury instrument cashflows and the interbank market, play a pivotal role in driving this phenomenon.

Keywords: FOMC, monetary policy, central bank, price regularities, Eurozone

JEL Classification: E52, E58, G12

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1 Introduction

In this paper, I reveal a significant pattern in the behavior of G10 currencies and equity implied volatility, which accounts for a substantial portion of their net returns from 1994 to 2019. The even weeks around FOMC meetings concentrate the vast majority of the positive returns of a long-short position in G10 currencies and nearly 90% of the cumulative negative returns experienced by implied volatility during this period. Conversely, the odd weeks concentrate on average all the negative returns from such a long-short position on G10 currencies and all the increases in implied volatility. This intriguing pattern, previously undocumented, closely mirrors a similar so called even-weeks pattern observed in U.S. equities. The interplay of these opposing even-odd weeks dynamics accounts for the majority of the net returns of these assets over the course of 26 years.

Specifically, while a long-short position in G10 currencies and a long position in implied volatility show a relatively flat net return over the entire period from 1994 to 2019, during the even weeks around FOMC meetings such long-short position in G10 currencies accumulates a 32% return, which then reverses by -18% during the odd weeks. In the case of implied volatility, during odd weeks, it accumulates a positive return exceeding 150,197% over the period 1994 to 2019, which then reverses by -92% during the even weeks around FOMC meetings. Furthermore, I establish that this recurring even-odd weeks cycle, also called even-weeks pattern, can be attributed to a combination of recurring calendar events at the beginning of the month and on day 16, along with sporadic shocks related to political news. I also show that this explanation holds true for equities, with evidence dating back to 1955. When considering the driving forces behind these regular calendar patterns, my analysis reveals that past liquidity associated to U.S. treasury instruments' cash flows and the interbank market plays a crucial role. For equities, these liquidity measures account for approximately 60% of the start-of-the-month effect and a substantial 90% of the day-16 effect. In the case of implied volatility, these liquidity measures directly explain roughly 20% of the start-of-the-month effect and 60% of the day-16 effect. Interestingly, in the case of G10 currencies, I do not find a direct connection to these liquidity measures.

This research topic is of relevance, given the ongoing academic and political debate in recent years regarding the impact of U.S. Federal Reserve FOMC policy decisions on asset prices. While most of the existing research has centered on the immediate effects during the day of the FOMC meeting, there is a relative scarcity of research on the medium term impacts of FOMC decisions

on asset prices, leaving several questions unanswered. Beyond the immediate effects, how do assets behave in the weeks surrounding these meetings?. Are there identifiable price patterns associated to the Federal Reserve monetary policy decisions?. To what extent are asset price cycles, characterized by booms and boosts, connected to these monetary policy decisions?. I contribute to addressing these questions by studying the behavior of currencies, equities and equity implied volatility during the weeks surrounding U.S. Federal Reserve FOMC policy meetings. Furthermore, I demonstrate the presence of other significant phenomena related to liquidity during the weeks surrounding these meetings, which play a crucial role.

While the U.S. Federal Reserve's primary mandate focuses on price stability (inflation) and employment rather than directly influencing financial markets, the policy measures undertaken at the FOMC meetings to achieve these objectives have an immediate impact on financial markets, as noted in various studies (Bernanke & Kuttner, 2005; He, 2006; Mueller et al., 2017; Wongswan, 2009). These effects subsequently ripple through the different markets and influence individuals' economic behavior. The primary channels through which monetary policy affects the markets include changes in the cost of capital, returns expectations, and overall valuations, this last often referred to as the "wealth effect".

Given the prominence and visibility of the immediate effects of FOMC meetings, it is not surprising that a significant portion of the existing financial research has primarily focused on how assets react on the actual day of these meetings, with limited attention given to the weeks surrounding these events. However, more recently, researchers have uncovered a puzzling recurring pattern in the behavior of equities during the even weeks surrounding FOMC meetings. While this pattern appears to coincide with the FOMC cycle, it does not align with major U.S. Federal Reserve events and presents challenges in terms of straightforward explanations. Moreover, it remains uncertain whether this phenomenon is unique to equities as an asset class or extends to other asset categories.

In this study, I use G10 currencies spot values against the U.S. dollar, G10 NEER rates, implied volatility gauged by the VIX and VXO indices, and equity returns proxied by the Fama French market factor to explore three specific hypotheses concerning the behavior of these assets during the weeks surrounding scheduled FOMC meetings. My first hypothesis H1 suggests that this even-weeks pattern is not confined to equities but it is also present in other assets, in concrete G10 currencies and implied volatility. My second hypothesis H2 posits that a substantial portion

of this pattern across assets can be explained by regular calendar effects and random shocks. My third hypothesis H3 proposes that this even-weeks pattern is connected to a liquidity phenomenon.

This study helps bridge the gap between the numerous previous studies that have centered on the immediate effects of the Federal Reserve FOMC meetings and those that have delved into the long term repercussions of the policy decisions made on these meetings. Moreover, it provides valuable insights into how periods marked by liquidity and flows regularities influence market prices across different assets.

The rest of the paper is organized as follows. In Section 2, I provide a summary of the existing relevant literature in the field. Section 3 provides an overview of the data employed, while Section 4 introduces the empirical methodology used. Section 5 presents the empirical evidence, demonstrating the presence of a recurring pattern in currencies, implied volatility, and U.S. equity during the even and odd weeks surrounding the FOMC meetings, the even-weeks pattern. Along with the significance of this pattern in the context of the net cumulative returns of these assets. Moving forward, in Section 6, I show how this pattern across assets can be explained by regular calendar effects at the beginning of the month, on day 16, and a small number of random shocks. I also validate this explanation for equity, considering an extended period from 1955 to 2019. Section 7 demonstrates how this pattern is associated to liquidity. Section 8 delves into the nature of the random shocks that contribute to this pattern, showing the preponderance of shocks associated to political news. Finally, in Section 9 I present my conclusions.

2 Related Literature

This paper fits into the body of literature that investigates how regular calendar events impact financial markets and liquidity, as well as the financial consequences resulting from U.S. FOMC monetary policy decisions.

In the context of the financial impact of monetary policy decisions, most of the existing literature focuses on the immediate effects, within short time frames, of Central Banks' monetary policy decisions on markets. Bernanke and Kuttner (2005) examines the same day reactions of equity prices to surprises in the federal funds target rate decisions. Lucca and Moench (2015) identifies the presence of positive average excess returns on U.S. equities twenty four hours before FOMC meetings for the period 1994 to 2011. Hanson and Stein (2015) uncovers substantial changes in

long term real interest rates on FOMC announcement days. M. J. Chen et al. (2014) reveals immediate spillover effects from U.S. monetary policy announcements into emerging markets exchange rates, bond yields, equity prices and capital flows. Mueller et al. (2017) also identifies significant effects on global currencies during scheduled FOMC meeting days.

Regarding the relationship between monetary policy decisions and risk perceptions, studies by Krieger et al. (2010) and Fernandez-Perez et al. (2017) have shown that the VIX volatility index tends to decrease on FOMC meeting days. Additionally, others like Bekaert et al. (2013) have argued that accommodative monetary policy can enhance risk appetite in financial markets. In a related context, Adrian et al. (2019), Maddaloni et al. (2009), Borio and Zhu (2012) have documented how monetary policy can stimulate risk taking behavior in banks, a phenomenon known as the risk-taking channel of monetary policy.

These studies share a common approach of using short time windows around monetary policy announcements. However, they do not investigate the possibility that additional pertinent information could be reaching the markets in the days surrounding the policy meetings or the potential interaction between these policy decisions and other regular market events.

Noteworthy studies that explore the impact of monetary policy decisions over extended time frames are those conducted by Cieslak et al. (2019) and Morse and Vissing-Jorgensen (2020). These studies reveal a statistically significant pattern in the S&P 500 returns and Treasury yields during the even weeks surrounding the FOMC meetings. They attribute these weekly patterns to information originating from the Federal Reserve. However, they do not find evidence of this pattern in other markets or asset flows beyond equities and Treasuries. Kroencke et al. (2015) complements this research by providing evidence of cross asset reallocation flow patterns during the weeks surrounding FOMC meetings.

In the context of regular calendar effects that might potentially coincide or interact with the FOMC policy decisions, the start-of-the-month also called turn-of-the-month effect stands out as one of the most recognized anomalies. This phenomenon spans across decades, countries and various financial assets. The existing literature indicates that several financial assets exhibit abnormal positive returns during the final days of the month and the initial days of the subsequent month. Such behavior challenges the Efficient Market Hypothesis (Fama, 1965). For U.S. equities, Lakonishok and Smidt (1988) identified this pattern in the Dow Jones Industrial Average from 1897 to 1986, confirming Ariel (1987) earlier findings. McConnell and Xu (2008) extended and

validated Lakonishok and Smidt (1988)'s work up to 2005. Examining the S&P 500 ETF SPY from 2001 to 2011, Liu (2013) found a similar effect, concentrated on the last four days of the month and the first two days of the following month. In a global equity context, Kunkel et al. (2003) identified a comparable effect in sixteen out of the nineteen worldwide stock markets they investigated. They concluded that the turn of the month effect in several countries is not a merely spillover from the U.S. stock market. Other studies have also identified this effect on global stock markets (Aziz & Ansari, 2018; Giovanis, 2009). Turning to other assets, Liano and Kelly (1995) found evidence of the turn of the month effect in currency futures, while Kumar (2015) observed it in the Indian currency market. Compton et al. (2006) documented that real estate investment trusts also exhibit this anomaly, and Chang (1988) documented its existence in the Dow Jones commodities spots and futures indices. Despite extensive exploration, the cause of this anomaly remains elusive. One proposed explanation (Burnett, 2017; Etula et al., 2020; Ogden, 1990) suggests that the effect arises from a month end regularity in payments that subsequently flows into financial markets. However, some authors like McConnell and Xu (2008) found no supporting evidence for this claim when examining fund flows. An alternative perspective from Nikkinen et al. (2009) attributes the effect to U.S. economic news releases, which predominantly occur at the end and start of each month. Meanwhile, Maher and Parikh (2013) posits that institutional investors' portfolio activities at month ends are the driving force behind this effect.

There is a lesser explored monthly anomaly on the calendar day sixteen, as pointed out by Ma and Pratt (2018), sharing similarities with the turn of the month effect. On the calendar day sixteen, the S&P 500 index usually exhibits abnormal positive returns. According to Ma and Pratt (2018), this effect is linked to the automatic pension contributions of U.S. private business workers with semimonthly payrolls.

In connection with the start of the month and day sixteen anomalies, a segment of the financial research literature has explored how calendar regularities influence the behavior of the U.S. funding market. This body of work has highlighted the end of the month and the calendar day fifteen as statistically significant periods in terms of transaction flows and funding conditions (Bech et al., 2012; Carpenter & Demiralp, 2006; Demiralp & Farley, 2005; Hamilton, 1996; Judson & Klee, 2010).

Additional documented calendar effects around the days of the FOMC meetings include those linked to futures and options expiration days. H. R. Stoll and Whaley (1990) present evidence

of increased volume and price volatility on quarterly S&P 500 futures and S&P 100 options expiration days. They also document price reversals on quarterly futures expiration days (H. R. Stoll & Whaley, 1987, 1990; H. Stoll & Whaley, 1986). Day and Lewis (1988) find evidence of recurrent options' implied volatility changes on quarterly and non-quarterly options expiration dates in the U.S. Ni et al. (2005) discover statistically significant clustering of stock prices around strike prices on options expiration days, a phenomenon observed in other countries as well. For instance, Chamberlain et al. (1989) report an expiration day effect for the TSE 300 Canadian Index. Additionally, Schlag (1996) find increased trading volume and price effects for the DAX Index on futures' expiration dates, while Chow et al. (2003) document price and volatility effects on the HSI Hong Kong Index during futures' and options' expiration dates.

Regarding routine economic announcements impacting market prices, McQueen and Roley (1993) discover that, contingent on the state of the economy, the S&P 500 responds to various economic news releases. In elevated states, the S&P 500 reacts to unanticipated news in industrial production, unemployment, the producer price index and M1. Conversely, in low states, there is no statistically significant evidence of any reaction. Examining the exposure of stock returns to systematic economic news, N.-F. Chen et al. (1986) identify that industrial production and inflation releases influence stock returns. Supporting the state dependent reaction of assets to economic news, Boyd et al. (2005) documented on average positive stock reactions to rising unemployment news during economic expansions and negative reactions during economic slowdowns. Analyzing U.S., German and British stock, bond, and foreign exchange markets, Andersen et al. (2003) and Andersen et al. (2007) find evidence of price jumps following the releases of U.S. economic news. Among the various economic releases studied, they highlight non-farm payrolls as one of the most impactful news type for all the markets under consideration. Consistent with other studies, they also note that adverse macroeconomic news have on average a positive impact on equities during expansion periods. Supporting the previous studies showing that economic announcements have immediate effects on assets, Savor and Wilson (2013) document that U.S. stock market indices tend to be higher on days with significant announcements regarding inflation, unemployment and interest rates. Additionally, Clements and Galvão (2017) find that upward revisions in U.S. GDP positively influence equity markets.

3 Data

In this section, I describe the various calendars and data series I used in this study. The majority of the data I employed is from the United States, given the focus of this study on the behavior of financial assets around scheduled U.S. Federal Reserve FOMC meetings. In addition to the FOMC meetings, I have also taken into account other recurring calendar events that have the potential to influence financial assets around these meetings dates, as well as unscheduled FOMC meetings.

My main data source is the U.S. Federal Reserve monetary policy meetings calendar from 1994 to 2019. This calendar is publicly available and serves as the main reference for identifying moments when information from the Federal Reserve might have affected the financial markets. It includes a total of 306 meetings, comprising both scheduled and unscheduled ones. On an annual basis, the Federal Reserve typically holds eight scheduled meetings, with the possibility of additional meetings based on prevailing market conditions and the economic situation. Over the period from 1990 to 2019, the yearly count of scheduled meetings varied, ranging from a peak of 18 in 1989 to the now standard of 8 meetings per year. The meetings calendar from 1994 to 2019 reveals a series of significant changes in how the Federal Reserve (FED) has shared information with the public. In February 1994, an important change took place as the FED began promptly disclosing the key meeting outcome, specifically the interest rate level, almost immediately to the public. Before 1994, this information was only made public after the subsequent meeting. In January 2000, the primary information release was augmented with an economic risk assessment. Moreover, starting in 2002, the meeting minutes began to include details about the individual votes of the board members. In December 2004, the Federal Reserve altered the timing for releasing the minutes of the latest policy meeting. The release schedule was advanced from the prior delay of six to eight weeks to just three weeks before the next meeting. Another noteworthy change occurred in 2011 when the Fed initiated press conferences after each policy meeting, and this practice was further expanded in 2019 to include every policy meeting.

In addition to the 1994-2019 calendar, I also consider an extended FOMC calendar spanning from 1955 to 2019. During this earlier era, from 1955 to 1993, the U.S. Federal Reserve typically held an average of 15 scheduled FOMC meetings per year, with a minimum of 9 meetings in 1979 and a maximum of 29 meetings during the economic downturn of 1958. The number of scheduled

meetings in this earlier period declined from a median of 18 meetings between 1955 and 1970, spaced roughly three weeks apart from each other, to a median of 12 meetings from 1970 to 1980. Since 1980, it has consistently remained at a median of 8 meetings per year. During the years from 1954 to 1993, scheduled meetings made up between 40% to 100% of the yearly meetings, with a median of 89%. Beyond changes in meeting frequency, there were other significant changes, such as the discontinuation of the executive committee responsible for the FOMC implementation and its minutes in 1955. Between 1955 and 1967, the only information available to the public was a Record of Policy Actions in the Federal Reserve Board Annual Report, summarizing policy decisions and their rationale. Full minutes were not made public until 1964, with a five year delay. In 1967, the FOMC minutes were divided into a non-public detailed Memorandum of Discussion and a Minutes of Actions section for public release. The Minutes of Actions provided information about the decisions made and additional details about topics discussed beyond monetary policy. Additionally, the release schedule for the Record of Policy Actions was shortened from an annual frequency to 90 days after the respective meeting. In 1976, the Record of Policy Actions was revamped to include more information, and its release delay was further reduced from 90 days to 45 days. The Memorandum of Discussion section was discontinued in 1967 (Danker & Luecke, 2005; FED, 2023; Lindsey, 2003; Siklos, 2020).

I also consider other regular monetary policy events, such as the ECB and the Bank of Japan monetary policy meetings dates. The ECB held meetings twice a month until October 2001, each accompanied by a monthly press conference. From November 2001 until the end of 2014, the ECB reduced its meeting frequency to once per month. However, since 2015 the ECB established a schedule of eight monetary policy meetings per year (Altavilla et al., 2019; Hartmann & Smets, 2018). The Bank of Japan's monetary policy meetings were held roughly twice a month before 2016, but since 2016 they have taken place approximately eight times per year (Keida & Takeda, 2019; Nakashima et al., 2023).

In addition to the above mentioned monetary policy meetings, I also analyze various economic data releases, including the U.S. ISM Manufacturing Index, the U.S. ISM Non-Manufacturing/Service Index, the U.S. ISM Employment report and the ADP employment report. These reports are typically published at the beginning of each month. Furthermore, I take into account the U.S. Department of Labor Initial Jobless Claims (ICSA), which are released weekly on Thursdays.

Other regular calendar events I examine include the expiration dates of S&P 500 futures and

monthly S&P options, which occur on the third friday of each month, as well as the expiration dates of quarterly S&P options, VIX options and IMM FX expiration dates. The monthly expiration dates of VIX options fall thirty days before the third friday of the following calendar month. The IMM (International Money Market) expiration dates take place on the third wednesday of each quarter-end month. These standard IMM expiration dates are widely used by various financial institutions, including the U.S. CME Exchange for FX and Eurodollar contracts. Furthermore, I analyze scheduled coupons, principal payments and pre-payments of all treasury bills, fixed-rate notes, nominal bonds and TIPS issued by the U.S. Treasury with expiration dates beyond first of january 1994. I source the list of these instruments from the U.S. Treasury website, specifically the Debt To Penny and Auctions sections, while information regarding payment calendars, outstanding amounts, and pre-payments is obtained from Thomson Reuters Refinitiv.

In terms of market prices, I use daily quotations of the Fama French market factor, the U.S. equity implied volatility as measured by the VIX and VXO indices, G10 exchange rates, copper prices as tracked by the LOCADY index, daily quotes of the TED rate and the U.S. stock market capitalization. The VIX index relies on the equity implied volatility methodology updated by the CBOE in 2003 and retroactively calculated back to 1990. On the other hand, the VXO index continues to adhere to the original CBOE implied volatility methodology introduced in 1993. In the context of currencies, this study centers on G10 currencies, which encompass USD, JPY, EUR, GBP, AUD, CAD, CHF, NZD, NOK, and SEK. I specifically consider spot exchange rates of these currencies against the U.S. dollar, spanning from 1994 to 2019. Additionally, I incorporate daily nominal effective exchange rates (NEERs) from the BIS, available since 1996. NEERs offer a medium to test the research hypotheses in the currency space using basket relative values, without being influenced by any specific currency numeraire effects. With the exception of the Fama French market factor data from the Kenneth R. French online data library, U.S. daily stock market capitalization figures from the FED Fred website, and daily exchange rates from the BIS, all other data series are obtained from Bloomberg.

4 Methodology

The methodology used in this work involves identifying and quantifying significant calendar effects and variables that explain the daily returns of assets during the weeks surrounding FOMC meetings

and throughout the year. Drawing from previous research (Cieslak et al., 2019; Morse & Vissing-Jorgensen, 2020) that identified even weeks around FOMC meetings as key calendar periods, I begin this section by describing how I followed this even-weeks methodology for analyzing the equity, implied volatility, and G10 FX returns from 1994 to 2019. Next, I describe the steps and regressions I used to investigate my hypothesis that the start of the month calendar effect and a calendar effect in the middle of the month explain a significant portion of these three assets returns, not only around FOMC meetings or even weeks but also throughout the year. In the last section, I describe the variables and regressions I used to validate my hypothesis that these calendar effects are associated to liquidity.

First, to separate the even weeks from the odd weeks around the FOMC meetings, I utilize a set of week dummies that mark the regular FOMC meetings cycle (Cieslak et al., 2019). This cycle is characterized by alternating meetings approximately at the beginning and the middle of the month, with consecutive meetings separated by approximately six to seven weeks. In this set of dummies, each week marks five consecutive business days and the weeks are anchored around the closest FOMC meeting. W_0 marks the five business day week containing the day before the FOMC meeting, the FOMC meeting day and the next three business days. W_1 marks the next five business days after the FOMC week W_0 and so on. W_{-1} marks the five business day period before each FOMC week W_0.

$$Week\ Dummies : \{I_{W-1},\ I_{W0},\ I_{W1},\ I_{W2},\ I_{W3},\ I_{W4},\ I_{W5},\ I_{W6}\} \tag{1}$$

$$Even - Weeks\ Dummy : I_{W246} = I_{W2} + I_{W4} + I_{W6} \tag{2}$$

In order to test for the existence of the FOMC even-weeks pattern on the asset returns, I start by estimating the following regressions.

$$R_{t,daily} = \alpha_{const} + \beta_{W0} + \beta_{W246} * I_{W246} + \varepsilon \tag{3}$$

$$R_{t,daily} = \alpha_{const} + \beta_{W0} * I_{02} + \beta_{W2} * I_{W2} + \beta_{W4} * I_{W4} + \beta_{W6} * I_{W6} + \varepsilon \tag{4}$$

In these regressions the weekly dummies indicate whether the daily returns fall in the same week of the central bank meeting (week-0), or a day spaced an even multiple of weeks away from the meeting (weeks-2-4-6). These dummies allow to identify and quantify any statistical significant even versus odd weeks pattern. The existence of any statistically significant difference between

odd versus even weeks around the FOMC meetings will be indicated by the statistical significance of the dummies $\{I_{W2},\ I_{W4},\ I_{W6}\}$.

In a second step, I conduct the following regressions to test my hypothesis that a significant portion of the equity, G10 FX and implied volatility (VIX, VXO) returns can be explained by regular calendar effects at the start of the month (I_{MS}) and on the middle of the month (day 16, I_{D16}), plus a small number of shocks. These regressions incorporate a dummy variable denoted as I_{FOMCW} to control for the four days after each scheduled FOMC meeting, commencing from the closing day of the respective meeting. Another dummy variable denoted as I_{Shocks} controls for relevant shocks I identified. I conduct this analysis for the period 1994-2019. Leveraging the long equity data available, I also replicate the analysis for the broader equity time frame of 1955-2019.

$$R_{t,daily} = \alpha_{const} + \beta_{FOMCW} * I_{FOMCW} + \beta_{MS} * I_{MS} + \beta_{D16} * I_{D16} + \beta_{Shocks} * I_{Shocks} + \varepsilon \qquad (5)$$

In a third step, I test if the even-weeks cycle remains present after controlling for the explanatory calendar effects and shocks I identified. My hypothesis is that the FOMC even-weeks cycle is part of this larger pattern caused by regular calendar effects at the start and the middle of each month. To do so, I estimate the following regression model.

$$R_{t,daily} = \alpha_{const} + \beta_{W0} * I_{W0} + \beta_{FOMCW} * I_{FOMCW} + \beta_{W246} * I_{W246} + \sum_{i\ \epsilon\ \{MS,\ D16,\ Shocks\}} \beta_i * I_i * I_{W246} + \varepsilon \quad (6)$$

For a valid hypothesis, with relevant explanatory calendar effects and shocks, this regression should show that the mean of the coefficient β_{W246} and its statistical significance disappear once I add the explanatory dummies $\{I_{MS}, I_{D16}, I_{Shocks}\}$. To complement this analysis, I also make a returns attribution of the assets returns by grouping them in according to the explanatory days I hypothesized cause this pattern. If the hypothesis is correct, this specific group of explanatory days should concentrate most of the pattern returns, while the rest of the days in terms of returns should be non significant or have on average opposite sign.

Finally, I validate my hypothesis that the identified explanatory calendar effects might be associated to liquidity patterns in the U.S. financial system (Demiralp & Farley, 2005; Judson & Klee, 2010; Ogden, 1990). I use as explanatory liquidity variables the detrended average ratio of U.S. Treasury instruments' cash flows to equity market size ($T.Flows_i$) and the TED ratio (TED_i). The regressions rely only on past readings of these liquidity measures. I measure these

variables on the last 5 days of each month and on day 15, then I copy them forward to the start of the next month and day 16 respectively. I perform the regression below for the period 1994 to 2019.

$$R_{t,daily} = \alpha_{const} + \sum_{i \ \epsilon \ \{MS,\ D16\}} \beta_{T.Flows_i} * \ T.Flows_i + \sum_{i \ \epsilon \ \{MS,\ D16\}} \beta_{TED_i} * \ TED_i + \beta_{FOMCW} * I_{FOMCW} + \beta_{MS} * I_{MS} + \beta_{D16} * I_{D16} + \beta_{Shocks} * I_{Shocks} + \varepsilon \quad (7)$$

The statistical significance of the liquidity explanatory variables $\{T.Flows_i, TED_i\}$ and at the same time a decrease of the statistical and economic significance of the dummies $\{I_{MS}, I_{D16}\}$ would indicate that the regular calendar effects on assets at the start of the month and on the middle of the month, specifically day 16, are associated to liquidity conditions.

5 Pattern Empirical Evidence

This chapter introduces the even-weeks pattern in the context of equity, foreign exchange (G10 FX), and implied volatility. It highlights the significance of this pattern by decomposing the cumulative returns of these assets from 1994 to 2019. Subsequently, I present aggregate regression results confirming the hypothesis H1 about the existence of this pattern across all three markets. I follow with a detailed explanation of how this pattern materializes in each market. The existence of this pattern in the FX market and in implied volatility is a novel contribution of this research, while the equity market results corroborate previous results obtained by (Cieslak et al., 2019) for the period 1994-2015.

Below, Figure 1 illustrates the cumulative returns of equity, FX and implied volatility from 1994 to 2019, categorized by weeks. This figure provides key insights into the performance of these assets during specific weeks, underscoring the importance of the even weeks (2,4,6) in terms of returns. In the context of the equity, FX and the VXO index, the even weeks (2,4,6) category stands out as the primary source of positive returns for the former two and negative returns for the latter. When it comes to the VIX index, even weeks (2,4,6) play a significant role in its reversions, closely trailing the impact of the FOMC week (W_0). In contrast, odd weeks yield the opposite effect for the FX, VXO and the VIX indices. For the equity index, the odd weeks lead to a relatively insignificant cumulative return over the 1994-2019 period. In concrete, the FX index accumulates a 33% positive return during the even weeks (2,4,6) over the 1994-2019

period, while showing a cumulative -38% negative return during the odd weeks around FOMC meetings. Equity mirrors this trend, with the equity index amassing a 310% positive return during the even weeks (2,4,6), which is ten times bigger than the 29% return accumulated during the odd weeks. Even weeks (2,4,6) and the FOMC week (W_0) collectively represent roughly 80% of the total cumulative equity returns from 1994 to 2019. The implied volatility indices, VIX and VXO, exhibit a similar pattern, but in opposite direction. On average, even weeks (2,4,6) and the FOMC week (W_0) account for all the reversions experienced by these indices from 1994 to 2019. In contrast, odd weeks explain on average all the increases in implied volatility during the period. During odd weeks, the VIX and VXO index show a cumulative increase of 17,087% and 150,197%, respectively over the period 1994 to 2019, increases that are almost entirely reversed during the even weeks (2,4,6) and the FOMC week (W_0). Together, these last two weeks groups result in a combined reversion effect of approximately -99%.

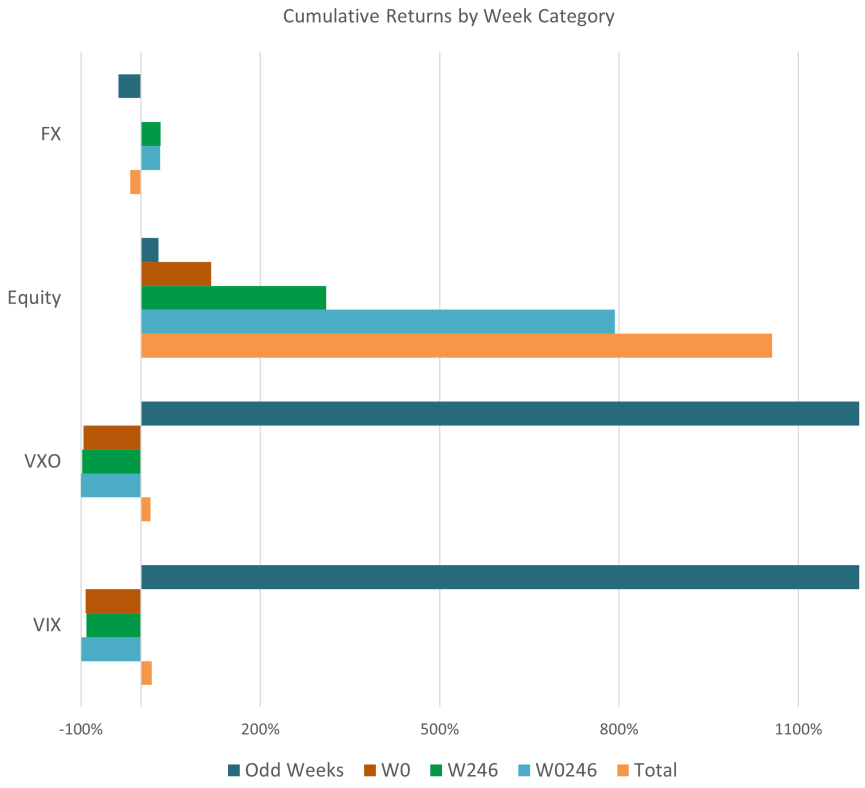

Figure 1. Cumulative Returns by Week Category from 1994 to 2019. This graph shows the cumulative returns of each asset by week category. *Total* represents all days and weeks. The category W_{0246} represent the FOMC week (W_0) and the even weeks (2,4,6) combined. The *Odd Weeks* category represents the cumulative returns on weeks that are not a FOMC week or an even week (2,4,6). The cumulative returns of the VIX and VXO indices on the *Odd Weeks* category go beyond the upper range of the figure.

Table 1. Pattern Across Assets.

Regression of the daily returns of the Fama French equity factor, VIX, VXO equity implied volatility indices, and the FX index (details in 5.1) on the week dummies I_{W0} and I_{W246} for the period 1994 to 2019. I_{W0} marks the five business days containing the FOMC meeting and I_{W246} marks the even weeks around each FOMC meeting. In parenthesis Newey-West autocorrelation robust t-stats. The units are in percentages, where 0.36 means 0.36%.

	EQUITY	VIX	VXO	FX
c	0.01	0.36***	0.49***	-0.01
	(0.75)	(3.44)	(4.26)	(-1.56)
$\mathrm{I_{W0}}$	0.07*	-0.38*	-0.51**	0.01
	(1.83)	(-1.66)	(-2.04)	(0.81)
$\mathrm{I_{W246}}$	0.06**	-0.24	-0.40*	0.03**
	(2.01)	(-1.27)	(-1.91)	(2.13)
N	6546	6546	6546	6546
R_a^2	0.000	0.000	0.001	0.000

The results in Table 1 indicate that, on average, the equity market and risk-rich currencies (G10 FX index) tend to rise during the even weeks around FOMC meetings (I_{W246}), while implied volatility shows a reversal. Specifically, during these even weeks (2,4,6) around FOMC meetings, the equity market tends to increase by 0.06%, risk-rich currencies by 0.03% relative to strong currencies, and equity implied volatility indices reverse between a -0.24% (VIX) to -0.40% (VXO) per day in comparison to the odd weeks (c constant). For each set of even weeks (2,4,6), this corresponds to an average cumulative return of 0.90% for equities, -3.6% to -6% for implied volatility, and 0.45% for FX. These impacts exhibit statistical significance across all indices, supported by t-stats exceeding 1.91, except for the VIX implied volatility index. In contrast, as indicated by the regression constant $\{c\}$, odd weeks see a surge in implied volatility, with average daily changes between 0.36% and 0.49%. Simultaneously, these odd weeks concentrate the downward movements of the FX index, with an average change of -0.01% per day, and for equities show a statistically insignificant marginal return of 0.01% per day.

The results above also show that during the FOMC week itself (I_{W0}), on average, the equity market tends to increase by 0.07%, the FX index by 0.03% and implied volatility reverses between a -0.38% to -0.51% per day in comparison to the odd weeks. For detailed regression results please refer to Appendix A.

5.1 Currency Pattern

In this section, I begin by describing the FX index I use in this work to analyze the currency market. Then I provide a detailed explanation of how the even-weeks pattern manifests on this FX index.

In this study I focus on the G10 currency set: U.S. Dollar (USD), Japanese Yen (JPY), Euro (EUR), British Pound (GBP), Australian Dollar (AUD), Canadian Dollar (CAD), Swiss Franc (CHF), Swedish Krone (SEK), Norwegian Krone (NOK) and New Zealand Dollar (NZD). To capture the primary dynamics among these currencies, I construct a long-short spot FX index. This index groups the equally weighted G10 currencies according to their 1st Principal Component. The 1st Principal Component explains around 32% of these currencies daily variation and represents the most relevant and representative common factor behind their daily movements. It reveals how G10 currencies tend to behave as two subgroups that move in opposite directions, often referred to as "Risk-On" and "Risk-Off" (Smales, 2016; Williams et al., 2012). Further details can be found in the Appendix.

Figure 2 displays the 1st Principal Component of the G10 currency set, calculated from NEER exchange rates (BIS) over the period 1994 to 2019. These NEER exchange rates are derived from currency baskets and are not linked to a specific base numeraire currency. The figure shows that the U.S. Dollar, Japanese Yen, and Swiss Franc (in blue) tend to move together in the opposite direction of the other currencies (in orange). Several of these currencies in orange belong to commodity exporting countries such as Canada, Australia and New Zealand. According to this 1st Principal Component statistics (Appendix), approximately 32% of the variance in this G10 currency set can be explained by such movements.

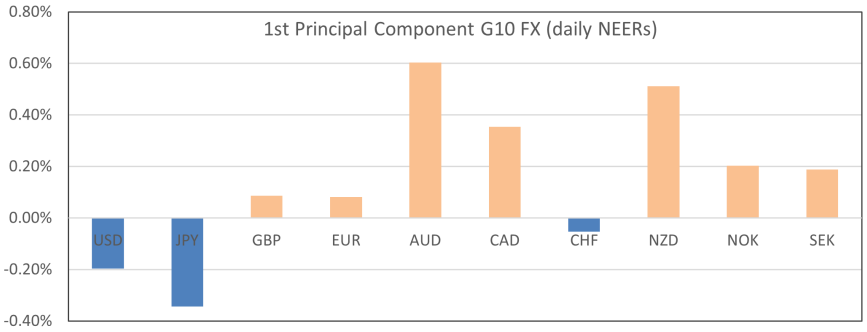

Figure 2. G10 Currencies First Principal Component This graph represents the direction of the 1st FX Principal Component according to daily NEER exchange rates. The currencies considered are (USD, JPY, GBP, EUR, AUD, CAD, CHF, NZD, NOK, SEK).

On average, a daily relative (NEER) depreciation of -0.20% in the U.S. Dollar, -0.34% in the Japanese Yen and -0.05% in the Swiss Franc is accompanied by an appreciation of 0.09% in the British Pound, 0.08% in the Euro, 0.60% in the Australian Dollar, 0.35% in the Canadian Dollar, 0.51% in the New Zealand Dollar, 0.20% in the Norwegian Krone and 0.19% in the Swedish Krona.

Based on this information about the dynamics of these G10 currencies, I build a long-short spot FX index (denoted by FX in the paper) that represents the 1st Principal Component of this currency set. The long leg comprises the currencies in orange (GBP, EUR, AUD, CAD, NZD, NOK, SEK), while the short leg represents the currencies in blue (JPY, CHF, USD). In both legs the different currencies are equally weighted and are measured against the U.S. Dollar. Tables 1 and A.3 in Appendix-A reveal the presence of the even-weeks pattern in both the long-short FX Index (FX) and the principal component calculation that uses NEERs (uses the 1st PC score time series). According to these regression results, during the even weeks (2,4,6) around FOMC meetings, the risk-rich currencies in orange (GBP, EUR, AUD, CAD, NZD, NOK, SEK) tend to appreciate on average by 0.03% daily relative to the currencies in blue (JPY, CHF, USD).

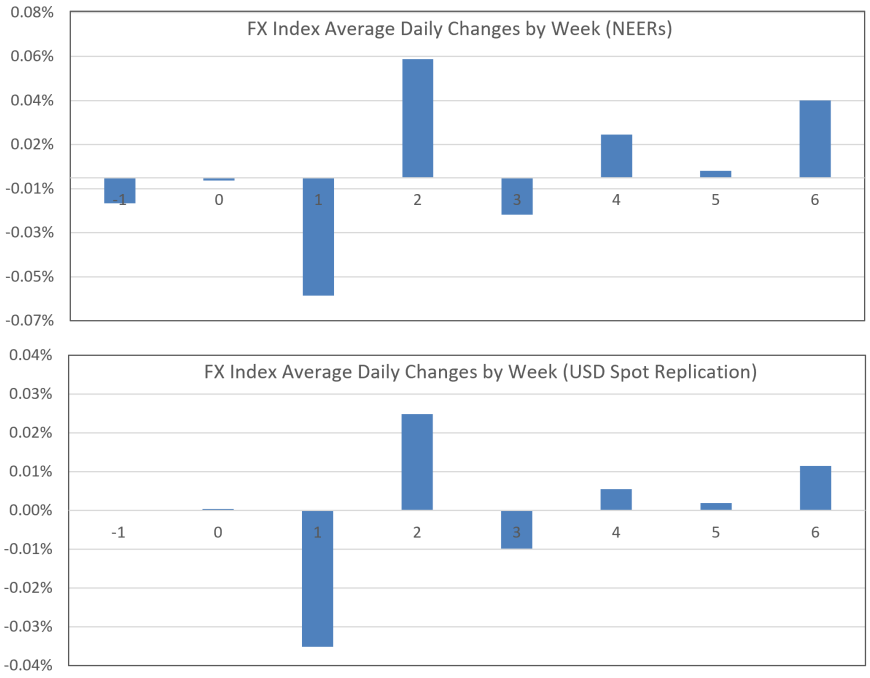

Figure 3. FX Even-Weeks Pattern The first panel represents the average daily change (%) of the G10 NEER exchange rates projection on their 1st Principal Component (score), grouped by week. The second panel at the bottom represents the average daily change of the long-short spot FX index representing the G10 1st Principal Component (measured in U.S. Dollars).

Figure 3 above and Table A.3 in Appendix A show that the economic effect of the even weeks

portion of the pattern is concentrated mainly on weeks 2 and 6. During these weeks, the FX index tends to appreciate by 0.03% on a daily basis. Conversely, on the odd weeks, the FX index experiences an average daily reversion of -0.01%, with the exception of odd week 5, where the average daily change is slightly positive but still below that of the even weeks (2,4,6).

5.2 Equity Implied Volatility Pattern

In this section, I describe in detail how the even-weeks pattern manifests on equity implied volatility. I start by describing the two equity implied volatility indices (VIX and VXO) used in the analysis. Then I present the key numerical results.

The VXO index corresponds to the original CBOE equity implied volatility methodology introduced in 1993 for the S&P 100 equity index. The VXO methodology employs the Black-Scholes formula to derive 30-day implied volatility readings from options with strikes immediately above and below the S&P 100 Index's spot price. On the other hand, the VIX index, initiated in 2003, assesses equity implied volatility using the model-free implied volatility formula introduced by Britten-Jones and Neuberger (2000). This formula covers the entire spectrum of S&P 500 out-of-the-money options. This last methodology refrains from assuming a specific distribution for underlying returns, setting it apart from models rooted in geometric brownian motion. A key distinction between these two indices lies in the range of options considered. While the VXO predominantly measures at-the-money implied volatility, the VIX also accounts for extreme out-of-the-money implied volatilities.

According to the results in Table 1 here and Table A.2 in Appendix A, implied volatility tends to decline during the even-weeks surrounding FOMC meetings and on the FOMC weeks themselves, while it increases on odd-weeks. During these even weeks, the VXO index shows a statistically significant decay rate of -0.40% per day. Similarly, the VIX index registers an average daily decay rate -0.24% on these even weeks, though this last number lacks statistical significance (p-value around 20%).

In Figure 4 below, we can observe the average daily movements of the VXO and VIX indices per week. During the odd weeks around FOMC meetings, VXO movements range from 0.29% to 0.78% per day, while even weeks see movements in the range of -0.07% to 0.27% per day. After the FOMC week itself (W_0), weeks 2 and 6 exhibit the most significant average daily declines in implied volatility. Moreover, average daily changes on odd weeks consistently surpass those of the

even weeks. Similarly, the VIX index shows positive average daily movements ranging from 0.20% to 0.58% on the odd weeks around FOMC meetings, and smaller average movements ranging from -0.06% to 0.24% during the even weeks around FOMC meetings. While the average implied volatility daily changes during the even weeks may not seem significant, their compounded effect produces the pronounced implied volatility reversions depicted in Figure 1 above.

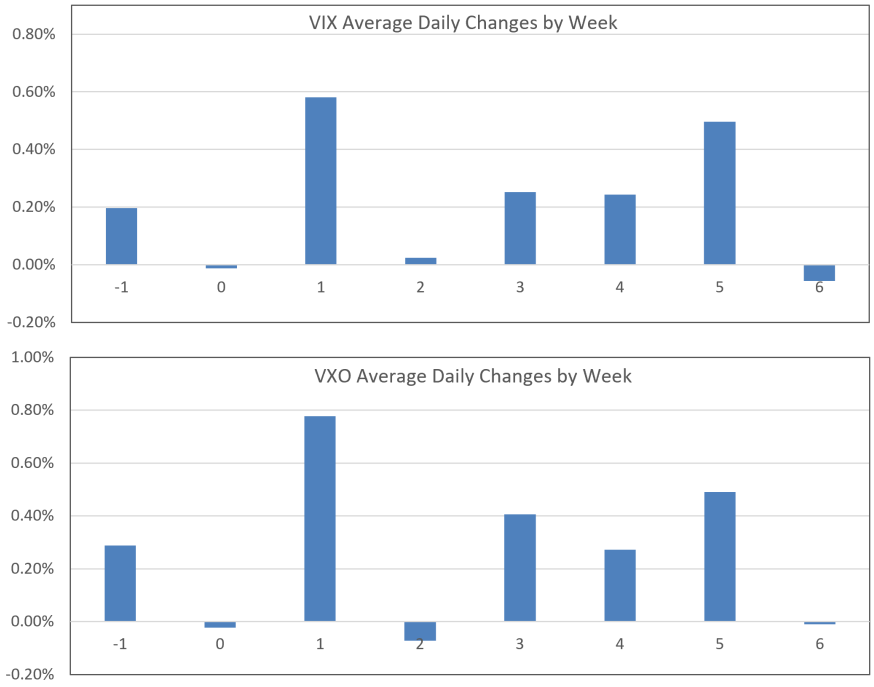

Figure 4. Implied Equity Volatility Pattern. Average daily percentage changes of the VIX and the VXO indices grouped by week for the period 1994 to 2019.

5.3 Equity Pattern

In this section, I explore the manifestation of the even-weeks pattern in the equity market utilizing the Fama French market factor as a proxy.

The above Table 1 illustrates that from 1994 to 2019, equity returns exhibited a tendency to increase by 0.06% per day during the even weeks (2,4,6) around the FOMC meetings, in comparison to the odd weeks (c constant). With an average of eight scheduled FOMC meetings per year in this timeframe, this translates to an approximate 7.2% yearly return differential for the even weeks around the FOMC meetings. This is particularly meaningful given that between 1994 and 2019, the Fama French market factor's average annual return was around 9.8%.

Figure 5 below and Table A.2 in Appendix A show that the positive returns during the even

weeks portion of the pattern were mainly concentrated on weeks 6 and 2. On these weeks, the equity market tended to appreciate by 0.13% and 0.06% per day. In contrast, on the odd weeks 1 and 5 the equity market tended to depreciate by -0.002% and -0.01% per day. Week 3 and -1 concentrated the lowest average positive returns during the period.

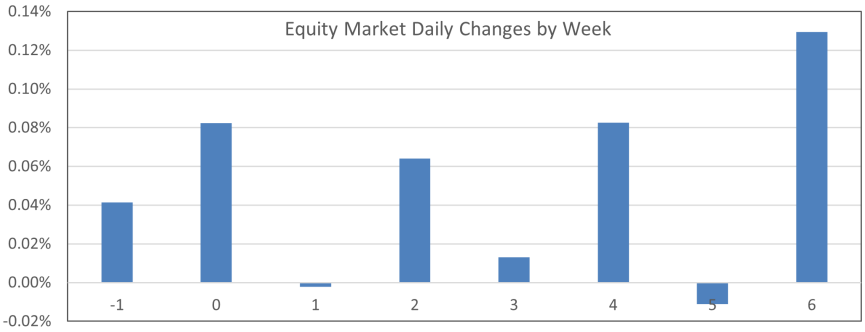

Figure 5. Equity Pattern. Average daily returns of the Fama French market factor grouped by week for the period 1994 to 2019.

6 What Causes this Pattern

In this chapter, I explore my hypothesis H2 that a significant portion of the positive even-weeks returns that give rise to this even-weeks pattern around FOMC meetings arises from routine calendar effects both at the beginning and middle of each month, coupled with a few random shocks. These calendar effects are the start of the month anomaly and a similar anomaly near the day 16th.

In the following lines, I elaborate on this hypothesis and provide numerical evidence to support it. I commence by explaining in Section (6.1) below, how these special days mentioned earlier give rise to the observed pattern. Following that, I present the empirical evidence backing this explanation for the period 1994-2019 in Section (6.2). Finally, in Section (6.3), I demonstrate how these special days explain the majority of the Equity index positive returns over the longer period 1955-2019. The main outcome reveals that once these unique days are taken into account, the coefficient for the even-weeks pattern in the equity, VIX, and VXO indices undergoes a reversal in sign. Conversely, for the FX index, it decreases to a third of its original value. Furthermore, the statistical significance across all four indices vanishes. The even-weeks pattern disappears.

6.1 Explanation

Considering that FOMC meetings have consistently taken place at two distinct points in each month since 1994 – the month's beginning and its midpoint – the subsequent even weeks following these meetings align with two calendar anomalies: the "Start Of the Month" and the "Day 16th" anomalies. This correlation is illustrated in the figure below.

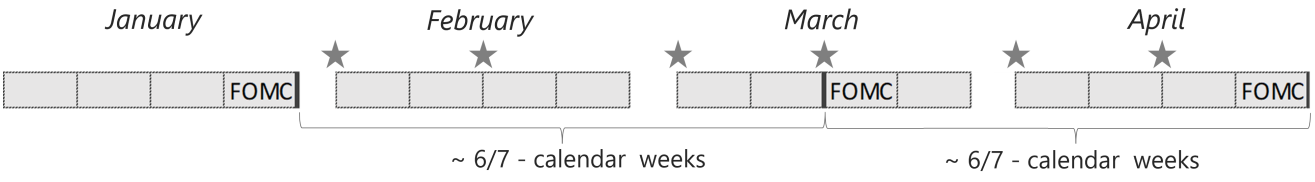

Figure 6. FOMC Meetings and the Start of the Month and Day-16. Illustrative figure of how the Start of the Month and Day-16 (marked by stars) are approximately spaced an even number of weeks away of the latest FOMC meeting.

On average, FOMC meetings held at the month's start are separated by approximately 2 weeks

from the subsequent day-16, 4 weeks from a Start of the Month, and 6 weeks from another Day-16. Conversely, the remaining FOMC meetings, which occur around the middle of the month, are roughly 2 weeks away from an upcoming start of the month, 4 weeks away from a day-16, and 6 weeks away from another start of the month. This interplay between the two calendar anomalies, the start of the month and day-16, establishes a 2-week frequency cycle that aligns with the even weeks following the FOMC meetings.

These periods of the month that contribute to this 2-week frequency cycle have been documented in literature as distinctive days, anomalies, or recurring calendar effects, marked by substantial payment flows (Armantier et al., 2008; Carpenter & Demiralp, 2006; Judson & Klee, 2010) and generally favorable market conditions. Concerning the Start of the Month calendar effect, extensive literature indicates that equities tend to rise on these days (Lakonishok & Smidt, 1988), not only within the US but also across various other markets (Kunkel et al., 2003). Additionally, currencies appreciate relative to the US dollar (Liano & Kelly, 1995), and real estate funds (REITs) also exhibit positive returns (Compton et al., 2006). Day-16 likewise demonstrates a favorable impact on equities, although the existing literature regarding its effects on assets remains limited (Ma & Pratt, 2018).

6.2 Empirical Evidence Across Assets

In this section, I provide numerical evidence that supports the explanation attributing the even-weeks pattern primarily to two anomalies: the start of the month and day-16, along with occasional shocks. I begin by presenting the regression results, followed by a series of explanatory graphs illustrating the returns attribution of the equity, VIX, VXO, and FX indices during the even weeks around FOMC meetings for the period 1994-2019.

I start by conducting the regression below to demonstrate that a substantial portion of the daily positive returns of the equity and FX indices, along with the negative returns of the VIX and VXO indices throughout the year, are centered on the start of the month and day-16 anomalies. Moreover, a handful of days affected by random shocks, in addition to the four days following each FOMC meeting, contribute to shaping the remaining returns of these indices. The regression results are displayed in Panel A of Table 2 below.

$$R_{t,daily} = \alpha_{const} + \beta_{WFOMC} * I_{WFOMC} + \beta_{MS} * I_{MS} + \beta_{D16} * I_{D16} + \beta_{Shocks} * I_{Shocks} + \varepsilon$$

Turning to Panel B, I conduct the original even-weeks pattern regression (including week dummies W_0 and W_{246}) and incorporate controls for the days identified in panel A as significant anomalies influencing the returns of the equity, FX, VIX, and VXO indices. This approach seeks to evaluate the extent to which the even-weeks pattern is accounted for by the days highlighted in Panel A.

$$R_{t,daily} = \alpha_{const} + \beta_{W0} + \beta_{FOMCW} + \beta_{W246} * I_{W246} + \sum_{i \ \epsilon \ \{MS,\ D16,\ Shocks\}} \beta_i * I_i * I_{W246} + \varepsilon$$

Results

The findings in Panel A of Table 2 show that, on average, the start of the month, day-16, random shocks, and the FOMC week (spanning 4 days) constitute the major contributors to the positive returns of the equity and FX indices, as well as to the reversions of the VIX and VXO indices. This importance is evidenced by the economic and statistical significance of the respective explanatory dummies $\{I_{WFOMC}, I_{MS}, I_{D16}, I_{Shocks}\}$, along with the average mean returns of the remaining days captured by the constant term c: -0.01% for equity, 0.62% for VIX, 0.66% for VXO and -0.02% for FX. According to Panel A results, the start of the month averages daily equity returns of 0.08%, FX returns of 0.04% and VXO drops by -0.75% in relation to the remaining days encompassed by the constant term c. For the VIX index, the start of the month also holds economic significance, showing an average change of -0.37% per day, albeit lacking statistical significance (p-value nearing 19%). Similarly, day-16 possesses both statistical and economic relevance for the equity, the VIX and the VXO indices. On this day, the equity index records an average increase of +0.26%, while the VIX and VXO indices each exhibit declines of -1.60% and -1.95% per day, respectively, in relation to the rest of the days captured by c. Other days of economic importance and statistical significance comprise a sequence of shocks identified through the dummy variable I_{Shocks}, detailed in Section 8. During these days, the equity index demonstrates an average increase of 2.48%, the FX index an increment of +0.51%, while the VIX and VXO indices exhibit reversions of -18.39% and -19.45% per day, respectively in relation to the rest of the days captured by c. The four days following the conclusion of each FOMC meeting also exhibit economic significance for the equity, VIX, and VXO indices. However, they are statistically significant solely for the VIX index. On these days, the equity index demonstrates an average increase of 0.06%, while the VIX and VXO indices display reversions of -0.93% and -0.34% per day, respectively , in relation to the rest of

the days captured by c.

The results presented in Panel B of the same table uncover that once the days contributing to the even-weeks pattern are considered: the start of the month anomaly, the day-16 anomaly and the days with shock, the coefficient of the even-weeks pattern experiences a reversal in sign for the Equity, VIX, and VXO indices. Furthermore, the coefficient for the FX index diminishes to one third of its original value, and across all four indices the statistical significance disappears. For the Equity index, the even-weeks pattern coefficient W_{246} shifts from its initial value of 0.06% per day in Table 1 to -0.00% in this Panel B. Likewise, the coefficient W_{246} for the VIX and VXO indices transitions from the initial values of -0.24% and -0.40% in Table 1 to 0.13% and 0.03%, respectively. In the case of the FX index, the coefficient shifts from the original 0.03% per day in Table 1 to 0.01%. These findings demonstrate that the returns of these assets during the even weeks (2,4,6) around FOMC meetings are largely influenced by the start of the month, day-16 anomalies and a few isolated random shocks. More in depth insights into these random shocks are provided in Section 8 below. Detailed regression results can be found in Appendix C.

In Figure 7 below, I visually illustrate the influence of the aforementioned special days on the returns of equity, FX, VIX, and VXO during the even weeks (2,4,6) around FOMC meetings. This figure showcases a return attribution analysis of these indices for the even weeks (2,4,6) categorized by day. For each asset and day category (indicated by color), the lines illustrate the cumulative returns resulting from investing in the asset on a particular day-category within the even weeks. The figure demonstrates that a significant portion of positive equity and FX returns, as well as VIX and VXO reversions are coming from the start of the month and Day-16 anomalies (blue line), along with days featuring shocks (green line). Conversely, the remaining days within these even weeks (2,4,6) (black line) result in a cumulative return close to zero for equity, negative for FX, and positive for the VIX and VXO indices. The topmost equity panel demonstrates that an initial investment of 100 in 1994 would have grown to only 108 by 2019 if one would have excluded the start of the month, day-16, and days with shocks. In contrast, a strategy solely invested in the start of the month and day-16 days within the even weeks (2,4,6) would have yielded a final value of 193 by 2019. Similarly, investing exclusively in the identified shock days would have resulted in a final value of 196 by 2019. The other indices follow a similar pattern, although the impact is more pronounced for the volatility indices due to the prevalence of implied volatility jumps on the remaining days (black color).

Table 2. Pattern Drivers

This tables summarize the regressions of the asset returns on dummies marking the start of the month, day-16 and relevant shocks, for the period 1994 to 2020. The regressuions include all days and weeks.

	EQUITY	VIX	VXO	FX
Panel A: Returns Explanation by Regular Calendar Effects and Shocks				
c	-0.01	0.62***	0.66***	-0.02**
	(-0.53)	(7.04)	(7.02)	(-2.54)
I_{WFOMC}	0.06	-0.93***	-0.34	-0.00
	(1.55)	(-4.17)	(-1.39)	(-0.00)
I_{MS}	0.08*	-0.37	-0.75***	0.04**
	(1.91)	(-1.42)	(-2.68)	(2.34)
I_{D16}	0.26***	-1.60***	-1.95***	-0.04
	(3.62)	(-4.25)	(-4.66)	(-1.29)
I_{Shocks}	2.48***	-18.39***	-19.45***	0.51***
	(9.57)	(-40.26)	(-28.78)	(7.20)
N	6543	6543	6543	6543
R_a^2	0.049	0.074	0.066	0.030
Panel B: W246 Cycle Explanation by Regular Calendar Effects and Shocks				
c	0.01	0.36***	0.49***	-0.01
	(0.75)	(3.44)	(4.26)	(-1.56)
I_{W0}	-0.03	2.42***	-0.10	0.00
	(-0.39)	(4.73)	(-0.19)	(0.11)
I_{W246}	-0.00	0.13	0.03	0.01
	(-0.04)	(0.63)	(0.14)	(0.84)
I_{W0}* I_{WFOMC}	0.12	-3.50***	-0.52	0.01
	(1.33)	(-6.21)	(-0.88)	(0.33)
I_{W246}* I_{MS}	0.13*	-0.48	-0.79*	0.04*
	(1.72)	(-1.03)	(-1.65)	(1.68)
I_{W246}* I_{D16}	0.29***	-2.06***	-2.53***	-0.07
	(2.73)	(-3.54)	(-3.85)	(-1.27)
I_{W246}* I_{Shocks}	2.60***	-18.26***	-18.67***	0.43***
	(5.85)	(-25.72)	(-18.71)	(3.84)
N	6543	6543	6543	6543
R_a^2	0.022	0.035	0.025	0.008

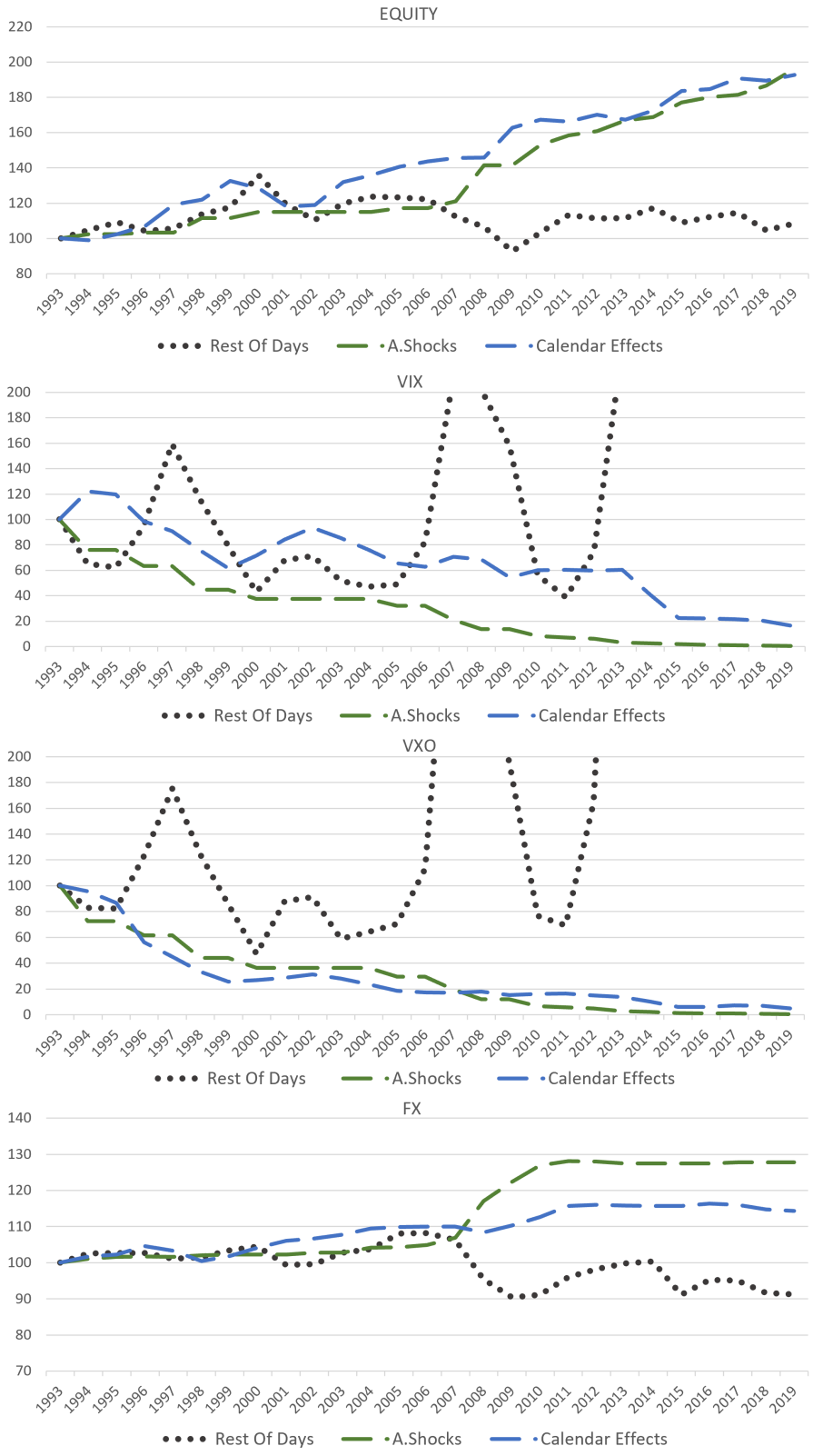

Figure 7. W246 Pattern Explanation by Regular Calendar Effects Evolution of assets by day-category on the even weeks (2,4,6) around FOMC meetings for the period 1994 to 2019.

6.3 Empirical Evidence For Equity Since 1955

In this section, I present numerical evidence highlighting two key findings. First, I show that the majority of positive returns observed in the equity index (Fama French market factor) since 1955 can be attributed to two specific anomalies: the start of the month anomaly and the day-16 anomaly, in addition to a few random shocks. Second, I illustrate that these specific days significantly contribute to the majority of positive returns during the even weeks (2,4,6), regardless of the actual FOMC calendar. I demonstrate this through a counterfactual analysis where I retroactively apply the FOMC 1994-2019 even weeks dummies to the period preceding 1994, reaching as far as 1955, fully independent of the real FOMC calendar before 1994. The driving forces behind the positive returns within these artificially constructed even weeks remain these aforementioned special days.

I begin by conducting the two regressions below. The primary aim is to assess the mean average return of the equity index and to evaluate the influence of the aforementioned calendar anomalies and shocks on the returns of this index. These regressions take into account a structural shift from day-15 to day-16 around the year 1970. I examine the entire 1955-2019 period as well as two subperiods: 1994-2019 and 1955-1980. The latter corresponds to a time when a substantially different meetings calendar was in effect before the shift to an average of 8 scheduled meetings per year in the early 1980s. The outcomes of these regressions are presented in Table 3.

$$R_{t,daily} = c + \varepsilon \tag{8}$$

$$\begin{aligned} R_{t,daily} = \alpha_{const} + \beta_{FOMCW} * I_{FOMCW} + \beta_{MS} * I_{MS} + \beta_{D15} * I_{D15} + \beta_{D16} * I_{D16} + \\ \beta_{D15Y1970} * I_{D15} * I_{Y\geq 1970} + \beta_{D16Y1970} * I_{D16} * I_{Y\geq 1970} + \beta_I * I_{Shocks} + \varepsilon \end{aligned} \tag{9}$$

Subsequently, in Figure 8 below, I visually depict the results of investing exclusively in the equity index on the start of the month and day-16 (day-15 pre-1970) anomalies, as well as days with shocks, and the 4-day period commencing at the closing of each FOMC meeting.

Lastly, I conduct the following regressions for the three time periods: 1955-2019, 1994-2019, and 1955-1980. These regressions aim to demonstrate that most of the positive equity returns within the even weeks (2,4,6) are explained across all three periods by three types of days: the start of the month, day-16 and random shocks. I also account for a structural shift from day-15

to day-16 around 1970. The results of these regressions are presented in Table **??** below.

$$R_{t,daily} = \alpha_{const} + \beta_{W0} * I_{W0} + \beta_{W246} * I_{W246} + \varepsilon \tag{10}$$

$$R_{t,daily} = \alpha_{const} + \beta_{W0} * I_{W0} + \beta_{FOMCW} + \beta_{W246} * I_{W246} + \sum_{i \ \epsilon \ \{MS,\ D15,\ D16,\ D15*I_{Y\geq 1970},\ D16*I_{Y\geq 1970},\ Shocks\}} \beta_i * I_i * I_{W246} + \varepsilon \tag{11}$$

Results

The results in Panel A of Table 3 highlight a statistically significant equity index average return of 0.04% per day from 1955 to 2019, supported by a t-stat above 5. Panel B reveals that the start of the month, day-16 (day-15 pre-1970), a selection of random shocks, and the 4-day interval following each FOMC meeting accounted for approximately three-quarters of the returns over this period. The constant term c, which represents the average daily returns on the remaining days, shifts from 0.04% in panel A to a statistically non significant 0.01% in panel B once I control for these explanatory days. This pattern also holds true for the subperiods 1994-2019 and 1955-1980, despite this last period having a completely different FOMC meeting schedule. Between 1955 and 2019, the equity index exhibited a 0.10% higher average daily return during the start of the month compared to the remaining days represented by the constant term c. Similarly, on day-15 before 1970 and day-16 after 1970, the equity index demonstrated average returns 0.15% and 0.17% larger than the rest of the days represented by c. Other notable days encompass the 4-day period following each FOMC meeting, showcasing returns 0.05% higher than those represented by c. Additionally, the days corresponding to the shocks discussed in Section D below experienced returns 2.30% larger than those of the remaining days captured by c.

Figure 8 below illustrates the cumulative returns resulting from investing in the equity index from 1955 till 2019, categorized by days. According to these findings, the blue line shows that an initial investment of 100 in 1955 allocated exclusively on the start of the month and day-16 (day-15 pre-1970) anomalies, would have grown to 1588 by 2019. Similarly, investing solely on the 4-day period following each FOMC meeting (including the last FOMC day) would have resulted in a final value of 624 in 2019. Days marked by random shocks are also relevant. An investor who exclusively invested on these days with shocks would have achieved a final investment of 571 by 2019. It is important to note that since the identification of shocks relies on the VIX index, which commenced in 1990, this final value could potentially be even higher. In contrast, someone who

invested on the remaining days, which constitute the majority of days, would have just reached 117 by 2019. The positive equity index returns between 1955 and 2019 are concentrated on the start of the month and the day-16 (day-15 pre-1970) anomalies.

Table **??** begins with Panel A displaying the even-weeks regression for the original 1994-2019 period, as well as the counterfactual periods created by retroactively applying the 1994-2019 even weeks dummies W_{246} back to 1955. The regression outcomes indicate that the even-weeks pattern (dummy W_{246}) is present both in the original 1994-2019 period and the extended 1955-2019 period. This pattern although does not appear in the period 1955-1980. On average between 1955 and 2019, the equity index returns were 0.03% higher per day during the even weeks (2,4,6)* around FOMC meetings compared to the remaining days captured by the constant c. (* These even weeks are the ones from the 1994-2019 period artificially copied backwards till 1955). Moving to Panel B of the same table, we observe that across all periods 1955-2019, 1994-2019, 1955-1980, the positive returns during the even weeks (2,4,6) are concentrated on the start of the month, day-16 (day-15 pre-1970) anomalies, and a few random shocks. For the extended 1955-2019 period, the even-weeks dummy I_{W246} transitions from an average return of 0.03% per day in Panel A to an average return of -0.01% per day in Panel B after controlling for these anomalies and shocks. Similarly, for the original 1994-2019 period, the even weeks dummy I_{W246} shifts from an average return of 0.06% per day in Panel A to +0.00% in Panel B. In the period 1955-1980, the even-weeks dummy I_{W246} changes from an average return of -0.01% per day in Panel A to -0.02% per day in Panel B. Concerning the days outside even weeks (2,4,6), days represented by c in Panel A of Table 4, the panels B of Tables 3 and 4 combined demonstrate that over three quarters of the positive returns associated with the constant c can be explained by the start of the month and day-16 anomaly days, days with shocks and the 4-day period following each FOMC meeting.

These findings reveal two main insights: (1) Thestart of the month, day-16 (day-15 pre-1970) anomalies, and a handful of random shocks account for the majority of positive returns of the equity index, irrespective of the FOMC calendar structure. (2) It is possible to artificially recreate the FOMC even-weeks pattern back to 1955 by retroactively copying the 1994-2019 FOMC calendar, regardless of the actual FOMC schedule from 1955 to 1993.

Table 3. Equity Backtest

This table shows the regression of the equity index returns on dummies marking the calendar anomalies start of the month, day-16 and a small number of relevant shocks for the three periods 1955-1980, 1994-2019 and 1955-2019. In this table, the return 0.04 means 0.04% per day.

	1955-1980	1994-2019	1955-2019
Panel A: Constant			
c	0.04***	0.04***	0.04***
	(3.49)	(3.51)	(5.89)
N	6528	6546	16362
R_a^2	0.000	0.000	0.000
Panel B: FOMC Week (4 Days) and Calendar Dummies			
c	0.01	-0.01	0.01
	(0.58)	(-0.56)	(0.63)
$\mathrm{I}_{\mathrm{WFOMC}}$	0.04*	0.06	0.05**
	(1.69)	(1.55)	(2.53)
I_{MS}	0.13***	0.08*	0.10***
	(4.24)	(1.91)	(4.62)
$\mathrm{I}_{\mathrm{D15}}$	0.15**		0.15***
	(2.56)		(2.61)
$\mathrm{I}_{\mathrm{D16}}$	-0.02		-0.02
	(-0.33)		(-0.34)
$\mathrm{I}_{\mathrm{D15}}{}^*\ \mathrm{I}_{\mathrm{Y}\geq 1970}$	-0.14	0.01	-0.15**
	(-1.63)	(0.12)	(-2.04)
$\mathrm{I}_{\mathrm{D16}}{}^*\ \mathrm{I}_{\mathrm{Y}\geq 1970}$	0.09	0.26***	0.17***
	(0.87)	(3.65)	(2.59)
$\mathrm{I}_{\mathrm{Shocks}}$		2.48***	2.30***
		(9.57)	(9.77)
N	6525	6543	16359
R_a^2	0.004	0.049	0.029

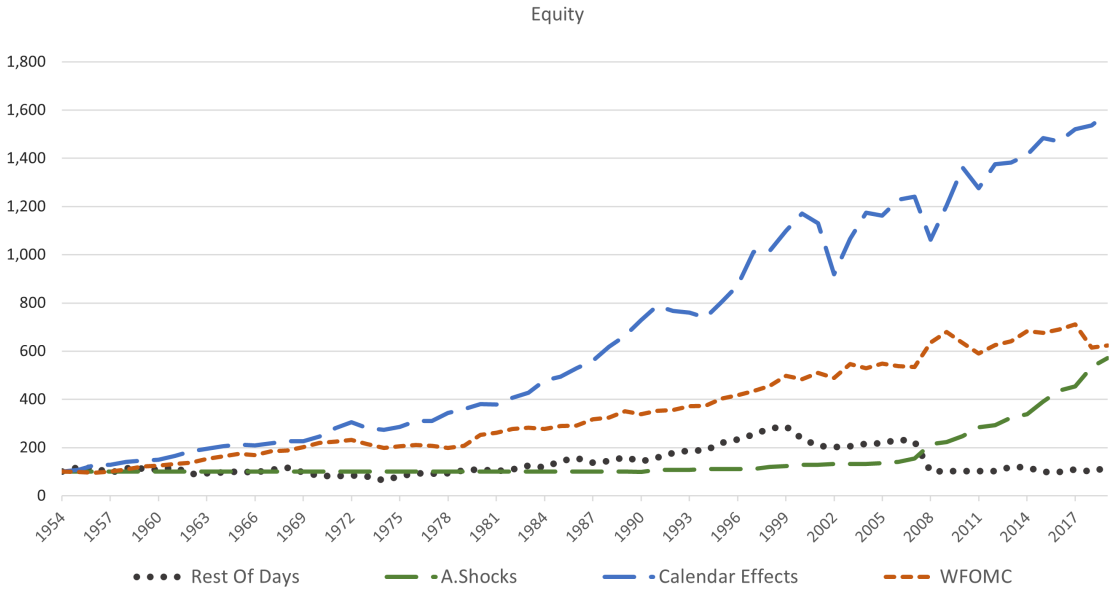

Figure 8. Equity Historic Returns and Calendar Effects. This graph shows the result of investing an initial position of 100 on the equity index from 1955 till 2019 exclusively on specific groups of days. These groups of days are the start of the month and day-16 (day-15 pre 1970) calendar effects/calendar anomalies, the 4-days period starting at the closing of each FOMC meeting, a small group of days with shocks and the rest of the days that do not fall in any of the previous categories (represents the majority of the days).

Table 4. Equity Backtest and W246

This table shows the results of regressing the equity index returns on the even weeks (2,4,6) dummy and dummies marking the start of the month anomaly, the day-16 anomaly (day-15 pre 1970) and a small number of relevant shocks for the three periods 1955-1980, 1994-2019 and 1955-2019. In this table 0.05 means a return of 0.05% per day.

	1955-1980	1994-2019	1955-2019
Panel A: W0 and W246 (1994-2019 repeated calendar)			
c	0.05***	0.01	0.03***
	(3.04)	(0.75)	(3.02)
I_{W0}	-0.02	0.07*	0.03
	(-0.77)	(1.83)	(1.24)
I_{W246}	-0.01	0.06**	0.03*
	(-0.40)	(2.01)	(1.68)
N	6528	6546	16362
R_a^2	0.000	0.000	0.000
Panel B: W0, W246 (1994-2019 repeated calendar) and Calendar Dummies			
c	0.04**	0.01	0.03**
	(2.23)	(0.72)	(2.37)
I_{W0}	-0.02	-0.03	0.01
	(-0.77)	(-0.44)	(0.48)
W_{FOMC}	0.03	0.13	0.05**
	(1.40)	(1.42)	(2.54)
I_{W246}	-0.02	0.00	-0.01
	(-0.84)	(0.12)	(-0.55)
I_{W246}* I_{MS}	0.08	0.12	0.15***
	(1.55)	(1.63)	(3.67)
I_{W246}* I_{D15}	0.16		0.19**
	(1.63)		(2.32)
I_{W246}* I_{D15}* $I_{Y\geq1970}$	-0.06	-0.09	-0.25**
	(-0.45)	(-0.70)	(-2.16)
I_{W246}* I_{D16}	-0.03		-0.08
	(-0.40)		(-1.07)
I_{W246}* I_{D16}* $I_{Y\geq1970}$	-0.15	0.28***	0.20*
	(-0.92)	(2.72)	(1.95)
I_{W246}* I_{Shocks}		2.60***	2.47***
		(5.85)	(6.27)
N	6525	6543	16359
R_a^2	0.000	0.022	0.014

7 The Liquidity Link Start of the Month and Day-16

In this chapter, I investigate the hypothesis H3 that both the day-16 and start of the month calendar anomalies are linked to previous day liquidity conditions. Specifically, I demonstrate that the month end liquidity resulting from cash flows coming from U.S. Treasury instruments (notes, nominal bonds, TIPS and bills) account for an important portion of the start of the month anomaly on equity and implied volatility. Additionally, I illustrate how interbank liquidity, as measured by the TED spread, and liquidity stemming from U.S. Treasury instruments cash flows on day-15 contribute to explain the day-16 effect on equities and implied volatility. I begin by introducing the liquidity metrics utilized in the analysis, outline the regression models employed to quantify their impact on these calendar anomaly days, and subsequently present the findings.

I start by constructing a daily liquidity metric linked to U.S. Treasury instruments cash flows, metric which I call $T.Flows$. This metric is calculated as the ratio of U.S. Treasury instrument cash flows to the size of the U.S. equity market size from the previous year. It encompasses coupons, principal payments, and pre-payments from all outstanding Treasury bills, fixed-rate notes, nominal bonds, and TIPS issued by the U.S. Treasury over the period from 1994 to 2019. You can see this metric visualized in the top two panels of Figure 9 below. The second panel of the figure illustrates that the gross flows (debt cash flows) payed by the U.S. Treasury tend to increase during the final days of the month and on day-15. Examining the primary sources of these two rises in cashflows, we observe that they primarily originate from notes, with relatively smaller amounts coming from bills and TIPS. The figure also illustrates how payments initially scheduled for the month's end and day-15, if they coincide with holidays, are deferred to the subsequent business days. Additionally, I utilize the TED spread as an explanatory variable to proxy for U.S. interbank liquidity. The TED series is presented in the bottom panel of Figure 9 below. To enhance the robustness of the regression analysis, I winsorized the TED spread series, excluding the top and bottom 0.05% extremes. I create explanatory variables from each of these liquidity series by averaging each liquidity metric over the final five days of each month. I then copy forward the last values of these variables to the following start of the month, denoting these explanatory variables as $\{T.Flows_{MS}, TED_{MS}\}$. I do something similar for day-16, by copying forward both liquidity series from day-15 to day-16, I denote these explanatory variables as $\{T.Flows_{D16}, TED_{D16}\}$. Days that are neither the start of the month nor day-16 are assigned

a value of zero.

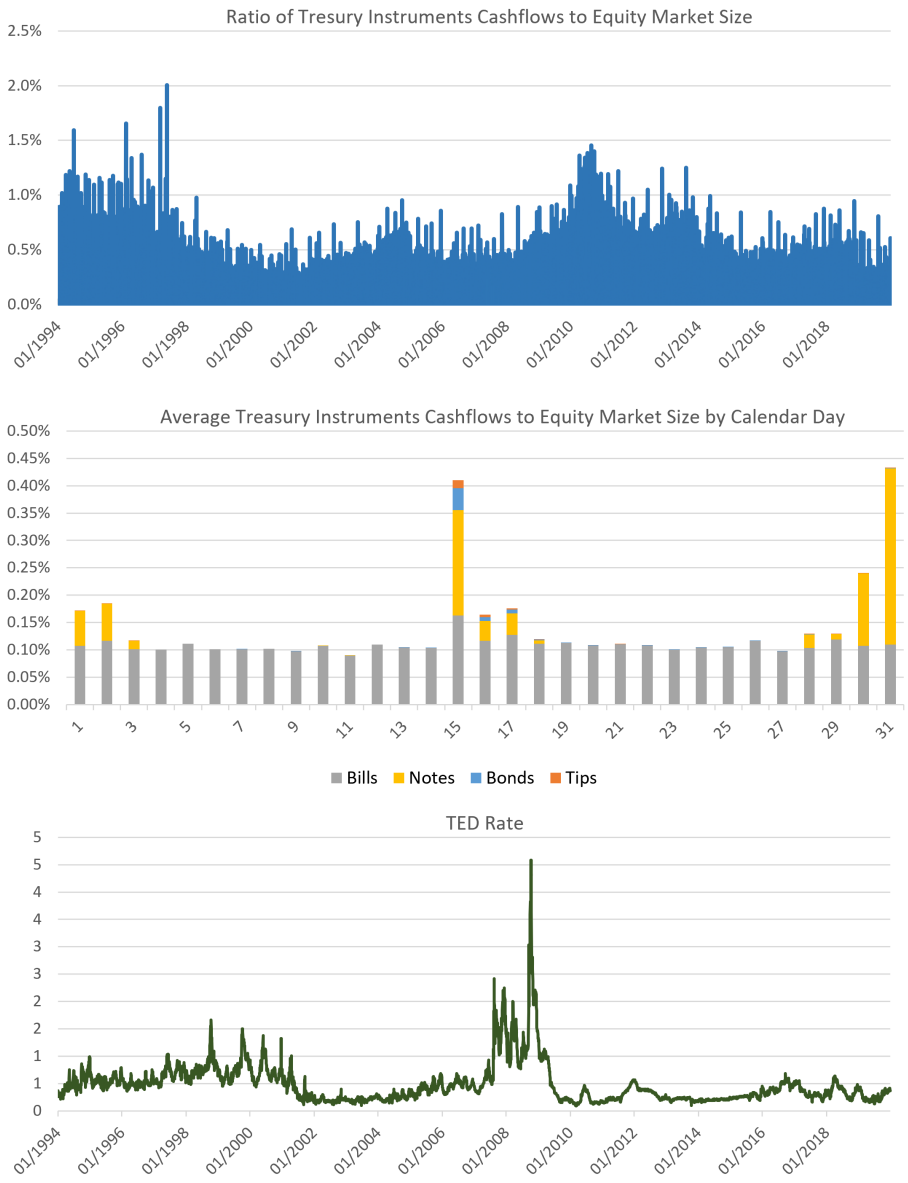

Figure 9. Liquidity Series. The first top panel represents the ratio of Treasury instruments cashflows stemming from coupons, principal payments and prepayments divided by the U.S. equity market size (lagged one year). The second panel represents the average of the same liquidity metric grouped by calendar day. The third bottom panel represents the TED rate. Both series cover the period 1994-2019.

I begin the analysis by conducting the regression below to identify and quantify any significant patterns in the liquidity series $T.Flows$ and TED rate around the commencement of each month and day 16. In this regression, I employ the following dummy variables: I_{5dEOM}, which marks the last five days at the end of each month; I_{MS}, marking the initial three days of each month; I_{D15},

denoting calendar day-15 of each month; and I_{D16}, marking day-16.

$$Liquidity = \alpha_{const} + c + \beta_{5dEOM} * I_{5dEOM} + \beta_{MS} * I_{MS} + \beta_{D15} * I_{D15} + \beta_{D16} * I_{D16} + \varepsilon$$

In the second part of the analysis, I regress the daily returns of the equity, VIX, VXO, and FX indices on the previously mentioned liquidity explanatory variables $\{T.Flows_{MS}, TED_{MS}, T.Flows_{D16}, TED_{D16}\}$. I assess each liquidity measure independently, in conjunction with the other liquidity measure, and alongside dummies controlling for the start of the month effect, the day-16 effect, the FOMC 4-day week and shocks.

$$R_{t,daily} = \alpha_{const} + \beta_{T.Flows_{MS}} * T.Flows_{MS} * I_{MS} + \beta_{T.Flows_{D16}} * T.Flows_{D16} * I_{D16} + \varepsilon \quad (12)$$

$$R_{t,daily} = \alpha_{const} + \beta_{TED_{MS}} * TED_{MS} * I_{MS} + \beta_{TED_{D16}} * TED_{D16} * I_{D16} + \varepsilon \quad (13)$$

$$R_{t,daily} = \alpha_{const} + \sum_{L \ \epsilon \ \{T.Flows,\ TED\}} \beta_{L_{MS}} * L_{MS} * I_{MS} + \sum_{L \ \epsilon \ \{T.Flows,\ TED\}} \beta_{L_{D16}} * L_{MS} * I_{D16} + I_{FOMCW} + I_{Shocks} + \varepsilon \quad (14)$$

$$R_{t,daily} = \alpha_{const} + \sum_{L \ \epsilon \ \{T.Flows,\ TED\}} \beta_{L_{MS}} * L_{MS} * I_{MS} + \sum_{L \ \epsilon \ \{T.Flows,\ TED\}} \beta_{L_{D16}} * L_{MS} * I_{D16} + I_{FOMCW} + I_{MS} + I_{D16} \quad (15)$$

$$+ I_{Shocks} + \varepsilon \quad (16)$$

Results

The results in Table 6 below, when compared to the previous findings in Table 2 of Section 6, indicate that the treasury instruments flows ($T.Flows$) and the TED rate explanatory variables account for approximately 60% of the start of the month effect and 90% of the day-16 effect on the equity index. As for the VIX index, these variables explain roughly 20% of the start of the month effect and 60% of the day-16 effect. While not statistically significant, the treasury flows variable at the start of the month and the TED rate on day-16 also demonstrate economically significant impacts on the VXO index. However, for the FX index, these results do not reveal any substantial relationship between these liquidity measures and the start of the month or day-16 returns.

In concrete, the results in Panel A, Panel C, and Panel D of Table 6 below demonstrate a statistically and economically significant relationship between the average Treasury instruments flows at the end of the month and the subsequent returns of the equity and VIX indices at the beginning of the month. These findings indicate that a 1% increase in the average past Treasury

instrument flows to equity market size ratio during the last 5 days of the previous month is associated with a positive daily equity returns effect between 1.14% to 1.40% during the start of the month days (first 3 days in the case of equity), even after accounting for all control variables in Panel D. As for the VIX index, a 1% increase in the same Treasury instruments flows average is linked to a daily -6.85% to -9.18% decrease during the start of the month days (first two days for implied volatility). Similarly, for the VXO index, a 1% increase of this explanatory average exhibits a comparable negative returns daily effect between -5.54% to -9.01% during the start of the month days (first two days for implied volatility). However,the statistical significance of this effect on the VXO index diminishes in Panel D after introducing a dummy to control for the start of the month effect. In contrast, this explanatory variable does not exhibit a statistically significant impact on the FX index. Regarding the impact on day-16 of the Treasury flows variable measured on the preceding day-15, the results consistently demonstrates a statistically significant effect on the VIX index. The effect spans across all panels, indicating a reduction effect in the index ranging from -1.99% to -3.16% (Panel D) for every 1% increase of the explanatory Treasury flows variable, even when accounting for all control variables. For the VXO index, the effect is less pronounced, being less than half of the effect observed for the VIX index, and it loses its statistical significance in Panel B after including the TED rate as explanatory variable. As for the equity index, the same Treasury flows variable, when combined with the TED rate explanatory variable in Panel C and Panel D, exhibits a -0.51% statistically significant negative effect on the day-16 equity returns per 1% increase. For the FX index this variable does not show a statistically significant impact on the day-16 returns.

Regarding the impact of the TED rate explanatory variable, Panels B, C, and D reveal that a 1% increase of the TED rate level is associated to a statistically significant 0.65% to 0.87% positive effect on the day-16 equity index returns. Though not statistically significant, a 1% increase of this explanatory variable demonstrates economically meaningful negative effects of -1.15% and -1.16% on the day-16 returns of the VIX and VXO indices, respectively. For the FX index, the results do not indicate any significant impact.

The novel liquidity evidence presented here aligns with prior findings, indicating a connection between the start of the month effect and liquidity (Burnett, 2017; Etula et al., 2020; Ogden, 1990). Furthermore, my findings are consistent with earlier studies examining Fedwire transactions data and funding conditions in the United States. These studies (Bech et al., 2012; Carpenter &

Demiralp, 2006; Demiralp & Farley, 2005; Hamilton, 1996; Judson & Klee, 2010) have identified calendar patterns in flows at month-ends and day-16. In summary, the findings presented here demonstrate the existence of a link between the start of the month effect, day-16 effect and liquidity conditions for equity and implied volatility. For FX although the results do not suggest a direct link with liquidity conditions.

Table 5. Liquity Series Cyclicality

This table presents the results of regressing the daily liquidity series T.Flows and TED on dummies marking the five days at the end of the month (5dEOM), the three days at the start of the month (MS), the day-15 (D15) and the day-16 (D16). It includes all days and weeks from 1994 to 2019.

	T.Flows	TED
Panel A: Series in Levels		
c	-0.02***	0.45***
	(-7.61)	(39.73)
I_{5dEOM}	0.04***	-0.00
	(7.78)	(-0.11)
I_{MS}	0.00	-0.00
	(0.52)	(-0.16)
I_{D15}	0.29***	-0.00
	(13.21)	(-0.37)
I_{D16}	0.05***	0.00
	(2.73)	(0.27)
N	6548	6548
R_a^2	0.047	-0.001
Panel B: Series In First Differences		
c	-0.01*	-0.00
	(-1.92)	(-0.88)
I_{5dEOM}	0.05***	0.00
	(8.65)	(0.79)
I_{MS}	-0.07***	-0.00
	(-8.03)	(-0.18)
I_{D15}	0.30***	0.01*
	(10.31)	(1.71)
I_{D16}	-0.18***	0.01
	(-5.38)	(1.64)
N	6547	6547
R_a^2	0.036	0.000

Table 6. Liquidity Explanation of Calendar Effects

This table summarizes the regressions of the equity, VIX, VXO and FX indices daily returns on the liquidity variables described above and on day dummies marking the 4-day FOMC week (FOMCW), the start of the month (MS), day-16 (D16) and days with shocks (Schocks). It includes all days and weeks from 1994 to 2019.

	Equity	VIX	VXO	FX
Panel A: Treasury flows				
c	0.04***	0.27***	0.32***	-0.00
	(3.19)	(3.91)	(4.32)	(-0.37)
$\text{T.Flows}_{\text{MS}}$	1.40**	-9.18**	-9.01**	0.15
	(2.50)	(-2.48)	(-2.30)	(0.74)
$\text{T.Flows}_{\text{D16}}$	-0.04	-3.61***	-2.83***	-0.01
	(-0.26)	(-3.44)	(-2.66)	(-0.07)
N	6546	6546	6546	6546
R_a^2	0.001	0.002	0.001	0.000
Panel B: TED Spread				
c	0.03**	0.29***	0.38***	-0.00
	(2.04)	(3.94)	(4.84)	(-0.64)
TED_{MS}	0.10	-0.44	-1.09*	0.06
	(1.13)	(-0.86)	(-1.94)	(1.55)
TED_{D16}	0.65***	-2.86***	-3.40***	-0.12
	(3.87)	(-4.16)	(-4.72)	(-1.18)
N	6546	6546	6546	6546
R_a^2	0.003	0.001	0.002	0.001
Panel C: Treasury Flows and TED Spread				
c	-0.01	0.61***	0.63***	-0.02**
	(-0.42)	(6.94)	(6.82)	(-2.29)
$\text{T.Flows}_{\text{MS}}$	1.26**	-7.52**	-6.94*	0.14
	(2.20)	(-2.03)	(-1.77)	(0.70)
TED_{MS}	0.09	-0.35	-1.04*	0.05
	(1.00)	(-0.70)	(-1.89)	(1.32)
$\text{T.Flows}_{\text{D16}}$	-0.51***	-2.27**	-1.04	0.07
	(-2.76)	(-2.10)	(-0.93)	(0.79)
TED_{D16}	0.84***	-2.11***	-3.09***	-0.15
	(4.22)	(-2.89)	(-3.96)	(-1.35)
I_{FOMCW}	0.06	-0.92***	-0.33	-0.00
	(1.53)	(-4.10)	(-1.33)	(-0.05)
I_{Shocks}	2.49***	-18.41***	-19.50***	0.51***
	(9.62)	(-40.92)	(-29.28)	(7.21)
N	6543	6543	6543	6543
R_a^2	0.052	0.075	0.066	0.030

Table 6. Liquidity Explanation of Calendar Effects (continuation)

This table summarizes the regressions of the equity, VIX, VXO and FX indices daily returns on the liquidity variables described above and on day dummies marking the 4-day FOMC week (FOMCW), the start of the month (MS), day-16 (D16) and days with shocks (Schocks). It includes all days and weeks from 1994 to 2019.

	Equity	VIX	VXO	FX
Panel D: Treasury Flows, TED Spread and Day Dummies				
c	-0.01	0.62***	0.66***	-0.02**
	(-0.53)	(7.02)	(7.01)	(-2.54)
$\text{T.Flows}_{\text{MS}}$	1.14*	-6.85*	-5.54	0.05
	(1.93)	(-1.74)	(-1.35)	(0.25)
TED_{MS}	0.01	0.13	-0.03	-0.02
	(0.04)	(0.13)	(-0.03)	(-0.26)
$\text{T.Flows}_{\text{D16}}$	-0.51***	-1.99*	-0.48	0.06
	(-2.70)	(-1.75)	(-0.40)	(0.63)
TED_{D16}	0.87**	-1.15	-1.11	-0.19
	(2.52)	(-0.83)	(-0.77)	(-0.85)
I_{FOMCW}	0.06	-0.92***	-0.34	-0.00
	(1.54)	(-4.12)	(-1.36)	(-0.02)
I_{MS}	0.05	-0.31	-0.64	0.04
	(0.59)	(-0.57)	(-1.07)	(1.32)
I_{D16}	-0.02	-0.65	-1.34	0.03
	(-0.13)	(-0.80)	(-1.46)	(0.31)
I_{Shocks}	2.49***	-18.39***	-19.46***	0.51***
	(9.58)	(-40.54)	(-28.98)	(7.21)
N	6543	6543	6543	6543
R_a^2	0.052	0.075	0.066	0.030

8 Shocks

In this chapter, I investigate the hypothesis that the majority of the shocks influencing the even-weeks pattern in the equity, VIX, VXO, and FX indices are aleatory in nature an do not have a direct connection to the Federal Reserve. I begin by outlining my methodology for identifying and categorizing these shocks. Subsequently, I analyze how these shocks contribute to the returns of each index during the 1994-2019 even weeks around FOMC meetings. The results reveal a cumulative equity index return of 93% related to shocks during the even weeks around FOMC meetings. The most impactful schock category is politics, contributing a substantial 38% return. In contrast, only a modest 8% return is directly linked to shocks associated with the Federal Reserve. The VIX and VXO implied volatility indices exhibit a similar pattern, reflecting a -86%

return tied to political shocks out of a total -99% shock related return during the even weeks around FOMC meetings. In contrast, only about a -44% return is linked to shocks associated with the Federal Reserve. Likewise, in the context of the FX index, political shocks take the lead, contributing to a 10% return out of a total 28% shock related return during the even weeks around FOMC meetings. Conversely, shocks directly tied to the Federal Reserve explain a mere 6% return. In summary, politically related shocks emerge as the primary shock category across these four indices during the 1994-2019 even weeks around FOMC meetings.

To identify significant shocks in the equity and implied volatility markets for the even weeks period from 1994 to 2019, I focused on the bottom 1% quantile of daily movements of the VIX index. For the currency market, I pinpointed relevant shocks by examining the top 2.5% quantile of daily movements in copper prices as quoted by the LOCADY Index. This process revealed twenty five equity related shocks and fifty five copper related shocks during the specified period. Furthermore, I categorized each equity and copper shock based on the Bloomberg News reports from the day of the shock or the following day. For equities, I employed four main categories: Earnings Announcements, Federal Reserve (FED), Politics and Statistics. In the case of identified copper shocks, I utilized five main categories: Federal Reserve (FED), Politics, Statistics, Supply, Demand. For more detailed information please refer to Appendix D.

Results

The results in Figure 10 below indicate that, in terms of the nature or category of shocks influencing the equity index during even weeks from 1994 to 2019, the primary contributors were shocks associated with political news or announcements. These shocks accounted for a cumulative return of approximately 38% during the period. In the context of single category shocks, they were followed by FED related shocks with a return contribution of 8%, statistical releases shocks with a return contribution 6%, and earnings announcements shocks with a return contribution of 4%. Shocks associated with more than one type of category had a cumulative impact of 19%. The detailed table in Appendix D reveals that shocks not related to the Federal Reserve had a cumulative return impact more than 2.5 times greater than shocks with any kind of connection to the Federal Reserve

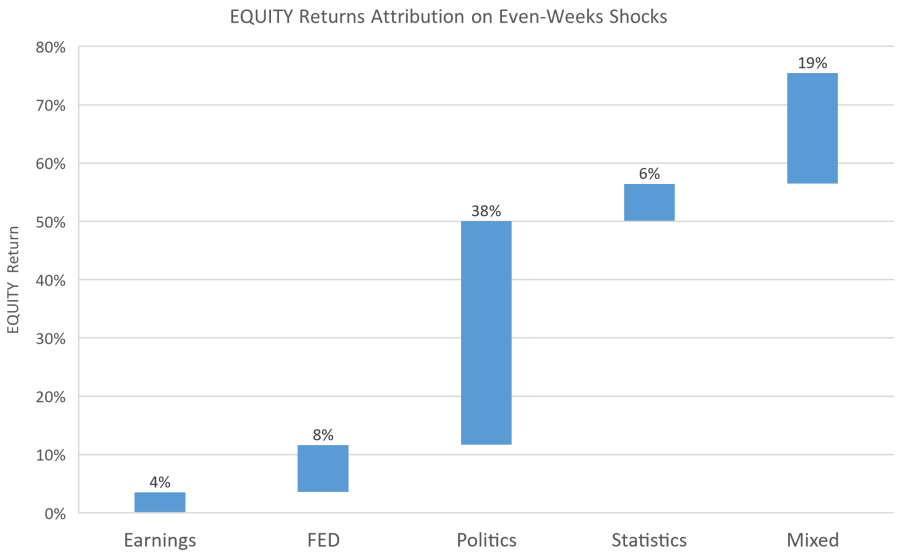

Figure 10. Equity Returns Attribution on Shocks. This figure represents the cumulative equity index returns per shock category for all the equity relevant shocks identified during the 1994-2019 even weeks.

The results in Figure 11 below indicate that for the VIX and VXO implied volatility indices, the politics shock category also plays a significant role in explaining the daily changes of these indices during the 1994-2019 even weeks. On average, politically related shocks accounted for a -86% implied volatility cumulative return. Among single category shocks, the second most influential category was shocks related to statistical releases, with a cumulative return effect of -49% and -54% for the VIX and the VXO index respectively. Days with shocks attributed to multiple categories also made a substantial return contribution to implied volatility on these even weeks, with a cumulative return effect of -75% and -80% for the VIX and VXO index respectively. The detailed table in Appendix D reveals that shocks not related to the Federal Reserve had a cumulative return impact approximately 1.3 times greater on implied volatility than shocks with any sort of connection to the Federal Reserve.

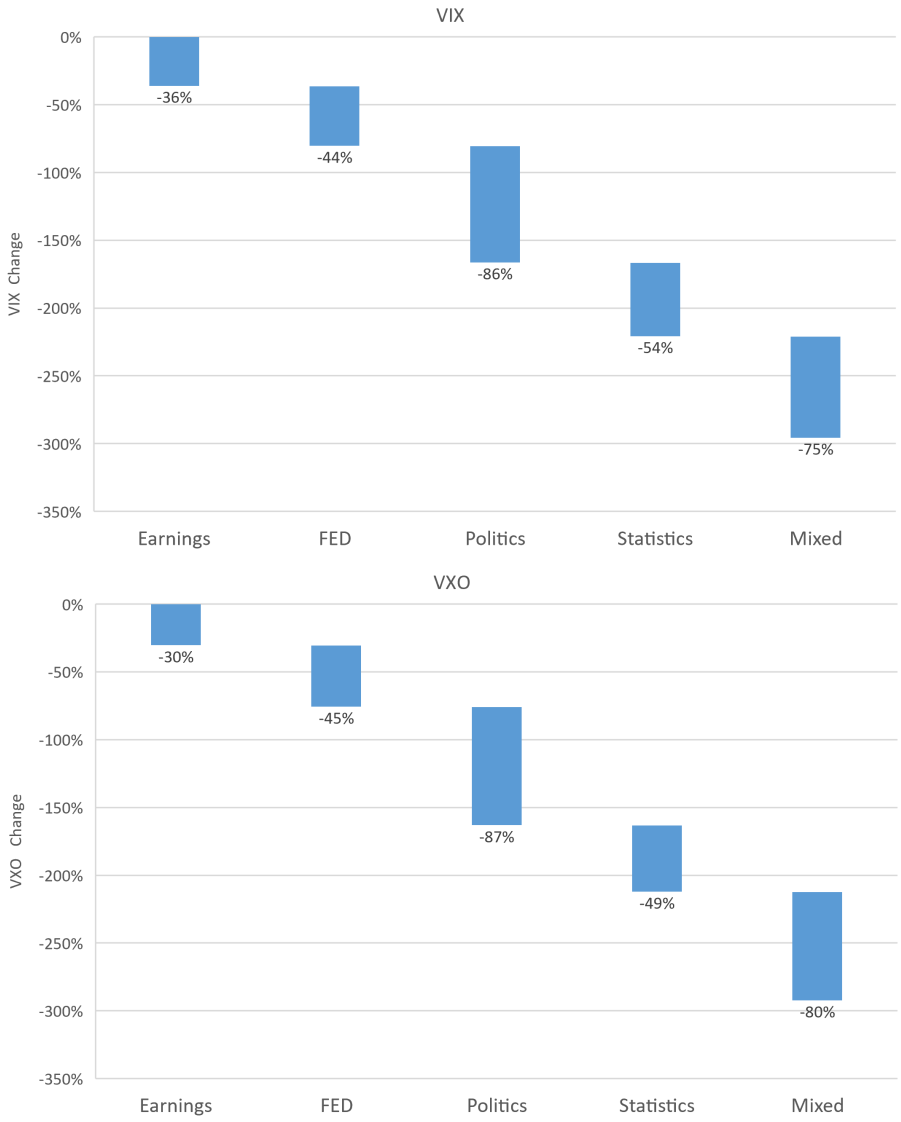

Figure 11. FX Attribution on Shocks. This figure represents the cumulative returns of the VIX and VXO indices per shock category during the 1994-2019 even-weeks.

In the context of the FX index returns during the 1994-2019 even weeks, the attribution analysis in Figure 12 below reveals that political shocks are the most important ones. These shocks explain a cumulative FX index return of 10%, surpassing the effect of shocks associated to the Federal Reserve. Taking into account all shocks categories, Appendix D reveals that the impact of shocks not related to the Federal Reserve had a cumulative return impact on the FX index returns more than three times greater than those associated with the Federal Reserve. Similarly as with the equity and implied volatility indices, shocks related to statistical releases also hold a crucial position among the top three sources of shocks influencing the FX index, contributing with a cumulative return impact of about 4%.

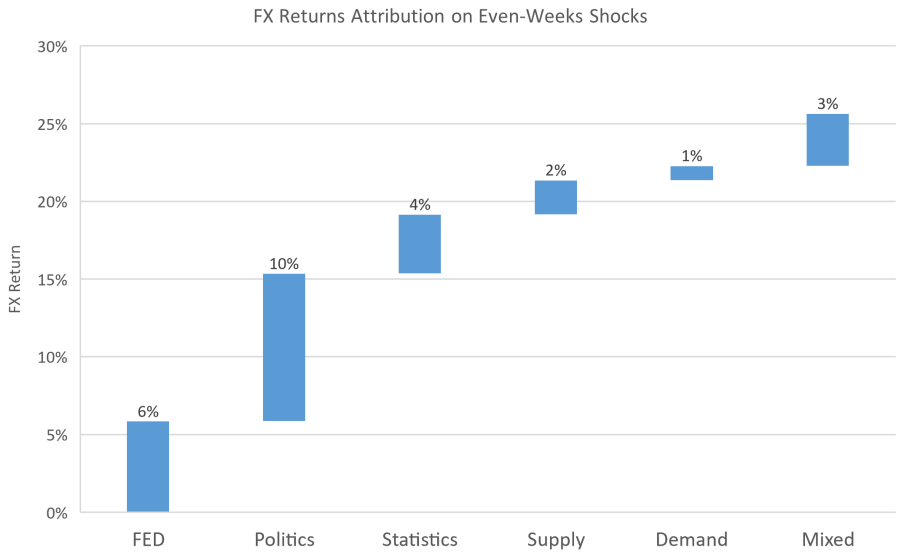

Figure 12. FX Attribution on Shocks. This figure represents the cumulative returns of the FX index per shock category during the 1994-2019 even weeks.

9 Conclusions

In this study I show the existence of a significant pattern in the behavior of G10 currencies and equity implied volatility, which accounts for a substantial portion of their net returns from 1994 to 2019. The even weeks around FOMC meetings concentrate the vast majority of the positive returns of a long-short position in G10 currencies, as well as nearly 90% of the cumulative negative returns experienced by implied volatility. Conversely, odd weeks concentrate on average all the negative returns from such a long-short position in G10 currencies and all the increases in implied volatility. This previously undocumented pattern closely mirrors a similar one in U.S. equities. The interplay between these opposing even-odd weeks dynamics explains most of these assets returns over the 1994 to 2019 period.

Specifically, a long-short position in G10 currencies and a long position in implied volatility exhibit a relatively flat cumulative net return over the entire period from 1994 to 2019. However, during the even weeks around FOMC meetings, a long-short position in G10 currencies consistently appreciates, with an average daily increase of 0.03%, accumulating a 32% return over these 26 years. This trend reverses during the odd weeks, resulting in a total decline of -18%. This suggests that G10 risk-rich currencies consistently yield higher returns compared to safe-haven currencies during the even weeks surrounding FOMC meetings. Regarding implied volatility, it records a

positive return exceeding 150,197% during the odd weeks around FOMC meetings, followed by a systematic decrease ranging from 0.24% to 0.40% per day during the even weeks. This results in a total reversion below -92% during the even weeks around FOMC meetings.

Furthermore, I establish that this recurring even-odd weeks cycle, also called even-weeks pattern in this study, is explained by a combination of recurring calendar events at the beginning of the month (start of the month effect) and on day-16 (day-16 effect), along with sporadic shocks related mostly to political news. I also show that this explanation also holds true for equities, with evidence dating back to 1955. When considering the driving forces behind these regular calendar patterns, my analysis reveals that past liquidity associated to U.S. treasury instruments' cash flows and the interbank market plays a crucial role. For equities, these liquidity measures account for approximately 60% of the start of the month effect and a substantial 90% of the day-16 effect. In the case of implied volatility, these liquidity measures directly explain roughly 20% of the start of the month effect and 60% of the day-16 effect. Interestingly, in the case of G10 currencies, I do not find a direct connection to these liquidity measures. Regarding the origin of the cyclicality, I demonstrate that the end of the month and day-15 concentrate a significant portion of the scheduled cash flows from U.S. Treasury instruments. Additionally, a statistically significant recurring increase in the TED rate occurs on day-15.

This research contributes to the understanding of how cyclical patterns and unexpected events impact equity, implied volatility and G10 currencies. It also provides valuable insights into how periods marked by liquidity and flows regularities influence market prices across different assets.

Appendix A Cyclical Pattern Empirical Evidence

Table A.1. Assets Cumulative Returns by Week Category (1994-2019)

This table shows the cumulative returns of each asset by week category. Total represents all days and weeks. The category W_{0246} represent the FOMC week (W_0) and the even-weeks (2,4,6) surrounding it. The Odd Week category represents the cumulative returns on weeks that are not a FOMC week or an even-week (2,4,6).

	EQUITY	VIX	VXO	FX
Total	1056%	18%	16%	-18%
W_{0246}	793%	-99%	-100%	32%
W_0	118%	-92%	-96%	-1%
W_{246}	310%	-91%	-98%	33%
Odd Weeks	29%	17087%	150197%	-38%

Table A.2. Pattern Across Assets

Regressions of daily returns on a constant and dummies for the periods 1994-2019 and 1994-2019. Week dummies mark the even weeks 2,4,6 around FOMC meetings.

	EQUITY	VIX	VXO	FX
Panel A: Regression with W0 and W246 dummies				
c	0.01	0.36	0.49	-0.01
	(0.71) (0.71) (0.75)	(3.10) (3.10) (3.44)	(3.74) (3.74) (4.26)	(-1.58) (-1.59) (-1.56)
	[0.48] [0.48] [0.46]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.11] [0.11] [0.12]
I_{W0}	0.07	-0.38	-0.51	0.01
	(1.70) (1.70) (1.83)	(-1.53) (-1.53) (-1.66)	(-1.87) (-1.87) (-2.04)	(0.78) (0.78) (0.81)
	[0.09] [0.09] [0.07]	[0.13] [0.13] [0.10]	[0.06] [0.06] [0.04]	[0.44] [0.44] [0.42]
I_{W246}	0.06	-0.24	-0.40	0.03
	(1.97) (1.97) (2.01)	(-1.27) (-1.27) (-1.27)	(-1.86) (-1.86) (-1.91)	(2.15) (2.14) (2.13)
	[0.05] [0.05] [0.04]	[0.21] [0.20] [0.20]	[0.06] [0.06] [0.06]	[0.03] [0.03] [0.03]
N	6546	6546	6546	6546
R_a^2	0.000	0.009	0.001	0.000
Panel B: Regression with W0, W2, W4, and W6 separate dummies				
c	0.01	0.36	0.49	-0.01
	(0.71) (0.71) (0.75)	(3.10) (3.10) (3.44)	(3.74) (3.74) (4.26)	(-1.58) (-1.59) (-1.56)
	[0.48] [0.48] [0.46]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.11] [0.11] [0.12]
I_{W0}	0.07	-0.38	-0.51	0.01
	(1.70) (1.70) (1.83)	(-1.53) (-1.53) (-1.66)	(-1.87) (-1.87) (-2.04)	(0.78) (0.78) (0.81)
	[0.09] [0.09] [0.07]	[0.13] [0.13] [0.10]	[0.06] [0.06] [0.04]	[0.44] [0.44] [0.42]
I_{W2}	0.05	-0.34	-0.56	0.04
	(1.23) (1.23) (1.32)	(-1.36) (-1.36) (-1.43)	(-2.02) (-2.02) (-2.23)	(2.23) (2.23) (2.44)
	[0.22] [0.22] [0.19]	[0.17] [0.17] [0.15]	[0.04] [0.04] [0.03]	[0.03] [0.03] [0.01]
I_{W4}	0.07	-0.12	-0.22	0.02
	(1.63) (1.64) (1.58)	(-0.47) (-0.47) (-0.48)	(-0.76) (-0.76) (-0.79)	(1.06) (1.06) (0.94)
	[0.10] [0.10] [0.12]	[0.64] [0.64] [0.63]	[0.45] [0.45] [0.43]	[0.29] [0.29] [0.35]
I_{W6}	0.12	-0.42	-0.50	0.02
	(1.10) (0.99) (1.66)	(-0.66) (-0.66) (-0.68)	(-0.70) (-0.70) (-0.68)	(0.55) (0.50) (0.71)
	[0.27] [0.32] [0.10]	[0.51] [0.51] [0.50]	[0.48] [0.48] [0.50]	[0.58] [0.61] [0.48]
N	6546	6546	6546	6546
R_a^2	0.000	0.000	0.000	0.000

Table A.3. FX Pattern

Regressions of daily returns on a constant and dummies for the periods 1994-2019 and 1994-2019. Week dummies mark the even weeks 2,4,6 around FOMC meetings.

	FX	FX Long Leg	FX Short Leg	FX (NEERs)
Panel A: Regression with W0 and W246 dummies				
c	-0.01	-0.01	0.00	-0.02
	(-1.51) (-1.51) (-1.48)	(-1.30) (-1.30) (-1.31)	(0.05) (0.05) (0.05)	(-1.43) (-1.44) (-1.42)
	[0.13] [0.13] [0.14]	[0.19] [0.19] [0.19]	[0.96] [0.96] [0.96]	[0.15] [0.15] [0.16]
I_{W0}	0.01	0.02	0.01	0.02
	(0.72) (0.72) (0.75)	(0.94) (0.94) (0.88)	(0.44) (0.44) (0.41)	(0.65) (0.65) (0.65)
	[0.47] [0.47] [0.45]	[0.35] [0.35] [0.38]	[0.66] [0.66] [0.68]	[0.52] [0.52] [0.51]
I_{W246}	0.03	0.03	0.01	0.06
	(1.81) (1.81) (1.79)	(2.03) (2.03) (2.13)	(0.62) (0.62) (0.60)	(2.27) (2.27) (2.28)
	[0.07] [0.07] [0.07]	[0.04] [0.04] [0.03]	[0.54] [0.54] [0.55]	[0.02] [0.02] [0.02]
N	5973	5973	5973	5973
R_a^2	0.000	0.000	0.000	0.001
Panel B: Regression with W0, W2, W4, and W6 separate dummies				
c	-0.01	-0.01	0.00	-0.02
	(-1.51) (-1.51) (-1.48)	(-1.30) (-1.30) (-1.31)	(0.05) (0.05) (0.05)	(-1.43) (-1.44) (-1.42)
	[0.13] [0.13] [0.14]	[0.19] [0.19] [0.19]	[0.96] [0.96] [0.96]	[0.15] [0.15] [0.16]
I_{W0}	0.01	0.02	0.01	0.02
	(0.72) (0.72) (0.75)	(0.94) (0.94) (0.88)	(0.44) (0.44) (0.41)	(0.65) (0.65) (0.65)
	[0.47] [0.47] [0.45]	[0.35] [0.35] [0.38]	[0.66] [0.66] [0.68]	[0.52] [0.52] [0.51]
I_{W2}	0.03	0.03	-0.00	0.08
	(1.93) (1.93) (2.12)	(1.55) (1.56) (1.65)	(-0.22) (-0.22) (-0.23)	(2.25) (2.26) (2.42)
	[0.05] [0.05] [0.03]	[0.12] [0.12] [0.10]	[0.83] [0.83] [0.82]	[0.02] [0.02] [0.02]
I_{W4}	0.02	0.03	0.01	0.04
	(0.82) (0.82) (0.73)	(1.39) (1.39) (1.41)	(0.95) (0.95) (0.85)	(1.22) (1.22) (1.15)
	[0.41] [0.41] [0.47]	[0.17] [0.17] [0.16]	[0.34] [0.34] [0.39]	[0.22] [0.22] [0.25]
I_{W6}	0.03	0.06	0.04	0.06
	(0.55) (0.49) (0.74)	(1.15) (1.05) (1.53)	(0.95) (0.91) (1.09)	(0.63) (0.56) (0.80)
	[0.58] [0.63] [0.46]	[0.25] [0.29] [0.13]	[0.34] [0.36] [0.28]	[0.53] [0.57] [0.42]
N	5973	5973	5973	5973
R_a^2	0.000	0.000	0.000	0.000

Appendix B Pattern Explanation

Table B.1. Pattern Explanation by Regular Calendar Effects

Regressions of daily returns on a constant and dummies for the periods meetings.

	EQUITY	VIX	VXO	FX
Panel A: Returns Explanation by Regular Calendar Effects and Shocks				
c	-0.01	0.62	0.66	-0.02
	(-0.54) (-0.54) (-0.53)	(6.62) (6.63) (7.04)	(6.30) (6.30) (7.02)	(-2.77) (-2.78) (-2.54)
	[0.59] [0.59] [0.60]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.01] [0.01] [0.01]
I_{WFOMC}	0.06	-0.93	-0.34	-0.00
	(1.53) (1.53) (1.55)	(-3.77) (-3.77) (-4.17)	(-1.24) (-1.24) (-1.39)	(-0.00) (-0.00) (-0.00)
	[0.13] [0.13] [0.12]	[0.00] [0.00] [0.00]	[0.21] [0.21] [0.17]	[1.00] [1.00] [1.00]
I_{MS}	0.08	-0.37	-0.75	0.04
	(1.93) (1.93) (1.91)	(-1.30) (-1.30) (-1.42)	(-2.39) (-2.40) (-2.68)	(2.20) (2.20) (2.34)
	[0.05] [0.05] [0.06]	[0.19] [0.19] [0.16]	[0.02] [0.02] [0.01]	[0.03] [0.03] [0.02]
I_{D16}	0.26	-1.60	-1.95	-0.04
	(3.41) (3.41) (3.62)	(-3.46) (-3.46) (-4.25)	(-3.77) (-3.77) (-4.66)	(-1.39) (-1.39) (-1.29)
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.16] [0.16] [0.20]
I_{Shocks}	2.48	-18.39	-19.45	0.51
	(18.04) (17.86) (9.57)	(-22.32) (-22.33) (-40.26)	(-21.12) (-21.14) (-28.78)	(14.12) (11.84) (7.20)
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]
N	6543	6543	6543	6543
R_a^2	0.049	0.074	0.066	0.030
Panel B: V246 Cycle Explanation by Regular Calendar Effects and Shocks				
c	0.01	0.36	0.49	-0.01
	(0.71) (0.72) (0.75)	(3.16) (3.16) (3.44)	(3.78) (3.79) (4.26)	(-1.59) (-1.59) (-1.56)
	[0.47] [0.47] [0.46]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.11] [0.11] [0.12]
I_{W0}	-0.03	2.42	-0.10	0.00
	(-0.37) (-0.37) (-0.39)	(4.97) (4.97) (4.73)	(-0.18) (-0.18) (-0.19)	(0.10) (0.10) (0.11)
	[0.71] [0.71] [0.70]	[0.00] [0.00] [0.00]	[0.86] [0.86] [0.85]	[0.92] [0.92] [0.91]
I_{W246}	-0.00	0.13	0.03	0.01
	(-0.04) (-0.04) (-0.04)	(0.65) (0.65) (0.63)	(0.14) (0.14) (0.14)	(0.84) (0.84) (0.84)
	[0.97] [0.97] [0.97]	[0.52] [0.52] [0.53]	[0.89] [0.89] [0.89]	[0.40] [0.40] [0.40]
I_{W0}* I_{WFOMC}	0.12	-3.50	-0.52	0.01
	(1.40) (1.41) (1.33)	(-6.61) (-6.61) (-6.21)	(-0.87) (-0.87) (-0.88)	(0.33) (0.33) (0.33)
	[0.16] [0.16] [0.18]	[0.00] [0.00] [0.00]	[0.38] [0.38] [0.38]	[0.74] [0.74] [0.74]
I_{W246}* I_{MS}	0.13	-0.48	-0.79	0.04
	(1.77) (1.78) (1.72)	(-0.95) (-0.95) (-1.03)	(-1.39) (-1.39) (-1.65)	(1.53) (1.54) (1.68)
	[0.08] [0.07] [0.09]	[0.34] [0.34] [0.30]	[0.16] [0.16] [0.10]	[0.13] [0.12] [0.09]
I_{W246}* I_{D16}	0.29	-2.06	-2.53	-0.07
	(2.35) (2.39) (2.73)	(-2.79) (-2.79) (-3.54)	(-3.06) (-3.06) (-3.85)	(-1.29) (-1.32) (-1.27)
	[0.02] [0.02] [0.01]	[0.01] [0.01] [0.00]	[0.00] [0.00] [0.00]	[0.20] [0.19] [0.21]
I_{W246}* I_{Shocks}	2.60	-18.26	-18.67	0.43
	(11.67) (11.78) (5.85)	(-13.60) (-13.61) (-25.72)	(-12.43) (-12.43) (-18.71)	(6.90) (6.00) (3.84)
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]
N	6543	6543	6543	6543
R_a^2	0.022	0.035	0.025	0.008

Table B.2. Pattern Explanation by Regular Calendar Effects

Regressions of daily returns on a constant and dummies for the periods meetings.

	1955-1980	1994-2019	1955-2019
Panel A: Constant			
c	0.04	0.04	0.04
	(4.23) (4.23) (3.49)	(3.12) (3.12) (3.51)	(5.96) (5.96) (5.89)
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]
N	6528	6546	16362
R_a^2	0.000	0.000	0.000
Panel B: FOMC Week (4 Days) and Calendar Dummies			
c	0.01	-0.01	0.01
	(0.71) (0.71) (0.58)	(-0.55) (-0.55) (-0.56)	(0.68) (0.68) (0.63)
	[0.48] [0.48] [0.56]	[0.58] [0.58] [0.57]	[0.50] [0.50] [0.53]
I_{WFOMC}	0.04	0.06	0.05
	(1.82) (1.83) (1.69)	(1.53) (1.53) (1.55)	(2.47) (2.47) (2.53)
	[0.07] [0.07] [0.09]	[0.13] [0.12] [0.12]	[0.01] [0.01] [0.01]
I_{MS}	0.13	0.08	0.10
	(4.76) (4.77) (4.24)	(1.94) (1.94) (1.91)	(4.84) (4.84) (4.62)
	[0.00] [0.00] [0.00]	[0.05] [0.05] [0.06]	[0.00] [0.00] [0.00]
I_{D15}	0.15		0.15
	(2.21) (2.31) (2.56)		(1.75) (1.81) (2.61)
	[0.03] [0.02] [0.01]		[0.08] [0.07] [0.01]
I_{D16}	-0.02		-0.02
	(-0.24) (-0.25) (-0.33)		(-0.19) (-0.20) (-0.34)
	[0.81] [0.81] [0.74]		[0.85] [0.84] [0.74]
I_{D15}* $I_{Y\geq1970}$	-0.14	0.01	-0.15
	(-1.38) (-1.38) (-1.63)	(0.12) (0.12) (0.12)	(-1.57) (-1.60) (-2.04)
	[0.17] [0.17] [0.10]	[0.90] [0.90] [0.91]	[0.12] [0.11] [0.04]
I_{D16}* $I_{Y\geq1970}$	0.09	0.26	0.17
	(0.86) (0.85) (0.87)	(3.41) (3.41) (3.65)	(1.82) (1.84) (2.59)
	[0.39] [0.40] [0.39]	[0.00] [0.00] [0.00]	[0.07] [0.07] [0.01]
I_{Shocks}		2.48	2.30
		(18.03) (17.86) (9.57)	(21.39) (21.75) (9.77)
		[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]
N	6525	6543	16359
R_a^2	0.004	0.049	0.029

Table B.3. All days and W246 Equity returns explained by Regular Calendar Effects

Regressions of daily returns on a constant and dummies for the periods meetings.

	(1) 1955-1980	(2) 1994-2019	(3) 1955-2019
Panel C: V0 and V246			
c	0.05	0.01	0.03
	(3.59) (3.59) (3.04)	(0.71) (0.71) (0.75)	(3.03) (3.04) (3.02)
	[0.00] [0.00] [0.00]	[0.48] [0.48] [0.46]	[0.00] [0.00] [0.00]
V_0	-0.02	0.07	0.03
	(-0.86) (-0.86) (-0.77)	(1.70) (1.70) (1.83)	(1.24) (1.24) (1.24)
	[0.39] [0.39] [0.44]	[0.09] [0.09] [0.07]	[0.22] [0.22] [0.21]
V_{246}	-0.01	0.06	0.03
	(-0.45) (-0.45) (-0.40)	(1.97) (1.97) (2.01)	(1.77) (1.77) (1.68)
	[0.66] [0.66] [0.69]	[0.05] [0.05] [0.04]	[0.08] [0.08] [0.09]
N	6528	6546	16362
R_a^2	0.000	0.000	0.000
Panel D: W0, V246 and Calendar Dummies			
Intercept	0.04	0.01	0.03
	(2.73) (2.73) (2.23)	(0.70) (0.70) (0.72)	(2.43) (2.43) (2.37)
	[0.01] [0.01] [0.03]	[0.49] [0.49] [0.47]	[0.02] [0.01] [0.02]
V_0	-0.02	-0.03	0.01
	(-0.86) (-0.86) (-0.77)	(-0.42) (-0.42) (-0.44)	(0.47) (0.46) (0.48)
	[0.39] [0.39] [0.44]	[0.67] [0.67] [0.66]	[0.64] [0.64] [0.63]
I_{WFOMC}	0.03	0.13	0.05
	(1.53) (1.53) (1.40)	(1.50) (1.50) (1.42)	(2.42) (2.40) (2.54)
	[0.13] [0.12] [0.16]	[0.13] [0.13] [0.16]	[0.02] [0.02] [0.01]
V_{246}	-0.02	0.00	-0.01
	(-0.93) (-0.94) (-0.84)	(0.12) (0.12) (0.12)	(-0.57) (-0.57) (-0.55)
	[0.35] [0.35] [0.40]	[0.90] [0.90] [0.90]	[0.57] [0.57] [0.58]
V_{246}* I_{MS}	0.08	0.12	0.15
	(1.61) (1.61) (1.55)	(1.69) (1.70) (1.63)	(3.91) (3.89) (3.67)
	[0.11] [0.11] [0.12]	[0.09] [0.09] [0.10]	[0.00] [0.00] [0.00]
V_{246}* I_{D15}	0.16		0.19
	(1.47) (1.53) (1.63)		(1.47) (1.49) (2.32)
	[0.14] [0.13] [0.10]		[0.14] [0.14] [0.02]
V_{246}* I_{D15}* $I_{Y\geq1970}$	-0.06	-0.09	-0.25
	(-0.40) (-0.39) (-0.45)	(-0.77) (-0.76) (-0.70)	(-1.68) (-1.69) (-2.16)
	[0.69] [0.70] [0.65]	[0.44] [0.45] [0.48]	[0.09] [0.09] [0.03]
V_{246}* I_{D16}	-0.03		-0.08
	(-0.31) (-0.33) (-0.40)		(-0.60) (-0.62) (-1.07)
	[0.76] [0.74] [0.69]		[0.55] [0.53] [0.28]
V_{246}* I_{D16}* $I_{Y\geq1970}$	-0.15	0.28	0.20
	(-0.88) (-0.86) (-0.92)	(2.30) (2.35) (2.72)	(1.35) (1.38) (1.95)
	[0.38] [0.39] [0.36]	[0.02] [0.02] [0.01]	[0.18] [0.17] [0.05]
V_{246}* I_{Shocks}		2.60	2.47
		(11.67) (11.77) (5.85)	(14.29) (14.94) (6.27)
		[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]
N Obs	6525	6543	16359
Adj R2	0.000	0.022	0.014

Appendix C Pattern Explanation

Table C.1. Liquidity Cyclicality

Regressions of liquidity series on a constant and day dummies between 1994 to 2019, includes all days and weeks.

	T.Flows	TED
Panel A: Series in Levels		
c	-0.02	0.45
	(-5.23) (-5.23) (-7.61)	(103.41) (103.51) (39.73)
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]
I_{5dEOM}	0.04	-0.00
	(5.20) (5.20) (7.78)	(-0.17) (-0.17) (-0.11)
	[0.00] [0.00] [0.00]	[0.87] [0.87] [0.92]
I_{MS}	0.00	-0.00
	(0.38) (0.38) (0.52)	(-0.21) (-0.21) (-0.16)
	[0.70] [0.70] [0.60]	[0.83] [0.83] [0.87]
I_{D15}	0.29	-0.00
	(17.63) (17.64) (13.21)	(-0.25) (-0.25) (-0.37)
	[0.00] [0.00] [0.00]	[0.80] [0.80] [0.71]
I_{D16}	0.05	0.00
	(2.90) (2.90) (2.73)	(0.19) (0.19) (0.27)
	[0.00] [0.00] [0.01]	[0.85] [0.85] [0.79]
N	6548	6548
R_a^2	0.047	-0.001
Panel B: Series In First Differences		
c	-0.01	-0.00
	(-0.82) (-0.82) (-1.92)	(-0.76) (-0.76) (-0.88)
	[0.41] [0.41] [0.05]	[0.45] [0.45] [0.38]
I_{5dEOM}	0.05	0.00
	(4.20) (4.20) (8.65)	(0.74) (0.74) (0.79)
	[0.00] [0.00] [0.00]	[0.46] [0.46] [0.43]
I_{MS}	-0.07	-0.00
	(-5.14) (-5.14) (-8.03)	(-0.15) (-0.15) (-0.18)
	[0.00] [0.00] [0.00]	[0.88] [0.88] [0.86]
I_{D15}	0.30	0.01
	(11.52) (11.53) (10.31)	(1.75) (1.75) (1.71)
	[0.00] [0.00] [0.00]	[0.08] [0.08] [0.09]
I_{D16}	-0.18	0.01
	(-6.96) (-6.97) (-5.38)	(1.72) (1.72) (1.64)
	[0.00] [0.00] [0.00]	[0.08] [0.09] [0.10]
N	6547	6547
R_a^2	0.036	0.000

Table C.2. Liquidity Explanation pf Regular Calendar Effects

Regressions of daily returns on a constant and dummies for the periods meetings.

	Equity	VIX	VXO	FX
Panel A: Treasury flows				
c	0.04	0.27	0.32	-0.00
	(2.87) (2.86) (3.19)	(3.12) (3.12) (3.91)	(3.31) (3.31) (4.32)	(-0.36) (-0.36) (-0.37)
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.72] [0.72] [0.71]
$\text{T.Flows}_{\text{MS}}$	1.40	-9.18	-9.01	0.15
	(2.41) (2.59) (2.50)	(-2.14) (-2.14) (-2.48)	(-1.88) (-1.88) (-2.30)	(0.63) (0.68) (0.74)
	[0.02] [0.01] [0.01]	[0.03] [0.03] [0.01]	[0.06] [0.06] [0.02]	[0.53] [0.50] [0.46]
$\text{T.Flows}_{\text{D16}}$	-0.04	-3.61	-2.83	-0.01
	(-0.21) (-0.22) (-0.26)	(-3.13) (-3.14) (-3.44)	(-2.21) (-2.21) (-2.66)	(-0.08) (-0.08) (-0.07)
	[0.83] [0.82] [0.79]	[0.00] [0.00] [0.00]	[0.03] [0.03] [0.01]	[0.94] [0.94] [0.95]
N	6546	6546	6546	6546
R_a^2	0.001	0.002	0.001	0.000
Panel B: TED Spread				
c	0.03	0.29	0.38	-0.00
	(1.83) (1.82) (2.04)	(3.22) (3.22) (3.94)	(3.80) (3.80) (4.84)	(-0.61) (-0.61) (-0.64)
	[0.07] [0.07] [0.04]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.54] [0.54] [0.52]
TED_{MS}	0.10	-0.44	-1.09	0.06
	(1.37) (1.14) (1.13)	(-0.79) (-0.79) (-0.86)	(-1.76) (-1.78) (-1.94)	(1.93) (1.61) (1.55)
	[0.17] [0.26] [0.26]	[0.43] [0.43] [0.39]	[0.08] [0.08] [0.05]	[0.05] [0.11] [0.12]
TED_{D16}	0.65	-2.86	-3.40	-0.12
	(4.32) (3.66) (3.87)	(-3.13) (-3.13) (-4.16)	(-3.34) (-3.36) (-4.72)	(-2.02) (-1.72) (-1.18)
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.04] [0.09] [0.24]
N	6546	6546	6546	6546
R_a^2	0.003	0.001	0.002	0.001
Panel C: Treasury Flows and TED Spread				
c	-0.01	0.61	0.63	-0.02
	(-0.43) (-0.43) (-0.42)	(6.57) (6.57) (6.94)	(6.12) (6.13) (6.82)	(-2.52) (-2.52) (-2.29)
	[0.67] [0.67] [0.67]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.01] [0.01] [0.02]
$\text{T.Flows}_{\text{MS}}$	1.26	-7.52	-6.94	0.14
	(2.22) (2.33) (2.20)	(-1.80) (-1.80) (-2.03)	(-1.49) (-1.49) (-1.77)	(0.62) (0.64) (0.70)
	[0.03] [0.02] [0.03]	[0.07] [0.07] [0.04]	[0.14] [0.14] [0.08]	[0.54] [0.52] [0.48]
$\text{T.Flows}_{\text{D16}}$	0.09	-0.35	-1.04	0.05
	(1.23) (1.01) (1.00)	(-0.65) (-0.65) (-0.70)	(-1.72) (-1.75) (-1.89)	(1.57) (1.31) (1.32)
	[0.22] [0.31] [0.32]	[0.52] [0.52] [0.49]	[0.08] [0.08] [0.06]	[0.12] [0.19] [0.19]
TED_{MS}	-0.51	-2.27	-1.04	0.07
	(-2.50) (-2.55) (-2.76)	(-1.84) (-1.84) (-2.10)	(-0.75) (-0.75) (-0.93)	(0.85) (0.86) (0.79)
	[0.01] [0.01] [0.01]	[0.07] [0.07] [0.04]	[0.45] [0.45] [0.35]	[0.40] [0.39] [0.43]
TED_{D16}	0.84	-2.11	-3.09	-0.15
	(5.13) (4.26) (4.22)	(-2.16) (-2.17) (-2.89)	(-2.83) (-2.86) (-3.96)	(-2.24) (-1.89) (-1.35)
	[0.00] [0.00] [0.00]	[0.03] [0.03] [0.00]	[0.00] [0.00] [0.00]	[0.03] [0.06] [0.18]
I_{FOMCW}	0.06	-0.92	-0.33	-0.00
	(1.51) (1.52) (1.53)	(-3.71) (-3.71) (-4.10)	(-1.20) (-1.20) (-1.33)	(-0.05) (-0.05) (-0.05)
	[0.13] [0.13] [0.13]	[0.00] [0.00] [0.00]	[0.23] [0.23] [0.18]	[0.96] [0.96] [0.96]
I_{Shocks}	2.49	-18.41	-19.50	0.51
	(18.12) (17.94) (9.62)	(-22.35) (-22.37) (-40.92)	(-21.16) (-21.19) (-29.28)	(14.09) (11.83) (7.21)
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]
N	6543	6543	6543	6543
R_a^2	0.052	0.075	0.066	0.030

Table C.3. Liquidity Explanation pf Regular Calendar Effects

Regressions of daily returns on a constant and dummies for the periods meetings.

	Equity	VIX	VXO	FX
Panel A: Treasury Flows, TED Spread and Day Dummies				
c	-0.01	0.62	0.66	-0.02
	(-0.55) (-0.55) (-0.53)	(6.61) (6.61) (7.02)	(6.29) (6.29) (7.01)	(-2.77) (-2.78) (-2.54)
	[0.58] [0.58] [0.59]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.01] [0.01] [0.01]
$\text{T.Flows}_{\text{MS}}$	1.14	-6.85	-5.54	0.05
	(1.93) (2.03) (1.93)	(-1.58) (-1.58) (-1.74)	(-1.14) (-1.14) (-1.35)	(0.21) (0.22) (0.25)
	[0.05] [0.04] [0.05]	[0.12] [0.12] [0.08]	[0.25] [0.26] [0.18]	[0.84] [0.83] [0.80]
TED_{MS}	0.01	0.13	-0.03	-0.02
	(0.05) (0.04) (0.04)	(0.13) (0.13) (0.13)	(-0.03) (-0.03) (-0.03)	(-0.33) (-0.27) (-0.26)
	[0.96] [0.97] [0.97]	[0.90] [0.90] [0.90]	[0.98] [0.98] [0.98]	[0.74] [0.79] [0.79]
$\text{T.Flows}_{\text{D16}}$	-0.51	-1.99	-0.48	0.06
	(-2.34) (-2.43) (-2.70)	(-1.54) (-1.54) (-1.75)	(-0.33) (-0.33) (-0.40)	(0.68) (0.70) (0.63)
	[0.02] [0.02] [0.01]	[0.12] [0.12] [0.08]	[0.74] [0.74] [0.69]	[0.50] [0.48] [0.53]
TED_{D16}	0.87	-1.15	-1.11	-0.19
	(3.03) (2.45) (2.52)	(-0.67) (-0.67) (-0.83)	(-0.58) (-0.59) (-0.77)	(-1.61) (-1.33) (-0.85)
	[0.00] [0.01] [0.01]	[0.50] [0.50] [0.41]	[0.56] [0.56] [0.44]	[0.11] [0.18] [0.40]
I_{FOMCW}	0.06	-0.92	-0.34	-0.00
	(1.53) (1.53) (1.54)	(-3.72) (-3.72) (-4.12)	(-1.21) (-1.21) (-1.36)	(-0.02) (-0.02) (-0.02)
	[0.13] [0.13] [0.12]	[0.00] [0.00] [0.00]	[0.22] [0.22] [0.17]	[0.99] [0.99] [0.99]
I_{MS}	0.05	-0.31	-0.64	0.04
	(0.70) (0.65) (0.59)	(-0.55) (-0.55) (-0.57)	(-1.03) (-1.04) (-1.07)	(1.38) (1.28) (1.32)
	[0.48] [0.52] [0.56]	[0.58] [0.58] [0.57]	[0.30] [0.30] [0.29]	[0.17] [0.20] [0.19]
I_{D16}	-0.02	-0.65	-1.34	0.03
	(-0.12) (-0.12) (-0.13)	(-0.69) (-0.69) (-0.80)	(-1.26) (-1.27) (-1.46)	(0.44) (0.42) (0.31)
	[0.90] [0.91] [0.90]	[0.49] [0.49] [0.43]	[0.21] [0.20] [0.15]	[0.66] [0.68] [0.76]
I_{Shocks}	2.49	-18.39	-19.46	0.51
	(18.11) (17.94) (9.58)	(-22.31) (-22.33) (-40.54)	(-21.11) (-21.13) (-28.98)	(14.13) (11.88) (7.21)
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]
N	6543	6543	6543	6543
R_a^2	0.052	0.075	0.066	0.030

Appendix D Asset Returns Shocks Attribution on W246

Table D.1. Equity Shocks Identified Using VIX On Even-Weeks.

List of equity shocks on even-weeks (2,4,6) identified by marking the extreme 1% downward changes of the VIX index during the period 1994-2019.

Date	Earnings	FED	Politics	Statistics	$\text{Mixed}_{\text{Any}}$	$\text{Mixed}_{\text{NoFED}}$	$\text{Mixed}_{\text{FED}}$	$\text{All}_{\text{NoFED}}$	All_{FED}	All
05/04/1994		1							1	1
06/09/1996				1				1		1
01/09/1998			1					1		1
15/10/1998		1							1	1
07/01/2000				1				1		1
21/04/2005					1		1		1	1
28/02/2007				1				1		1
13/11/2007	1							1		1
30/09/2008			1					1		1
13/10/2008			1					1		1
10/05/2010			1					1		1
27/05/2010			1					1		1
23/08/2011					1		1		1	1
12/04/2012		1							1	1
16/04/2013					1	1		1		1
19/04/2013					1	1		1		1
16/10/2013			1					1		1
18/07/2014					1	1		1		1
13/07/2015			1					1		1
26/08/2015					1		1		1	1
28/06/2016			1					1		1
19/05/2017	1							1		1
14/02/2018				1				1		1
12/10/2018					1	1		1		1
04/01/2019					1		1		1	1
13/08/2019			1					1		1

Table D.2. FX Shocks Identified Using Copper Prices On Even-Weeks.

List of currency relevant shocks on even-weeks (2,4,6) identified by marking the extreme 2.5% upward changes of copper prices (LOCADY Index) during the period 1994-2019.

Date	FED	Earnings	Politics	Statistics	Supply	Demand	MixedAny	$\text{Mixed}_{\text{NoFED}}$	$\text{Mixed}_{\text{FED}}$	$\text{All}_{\text{NoFED}}$	All_{FED}	All	Strike
16/02/1994							1	1		1		1	
20/07/1994					1					1		1	
30/11/1994					1					1		1	
06/09/1995						1				1		1	
07/06/1996					1					1		1	
26/11/1996					1					1		1	
23/04/1997					1					1		1	1
24/04/1997					1					1		1	1
14/07/1997						1				1		1	
03/03/1998				1						1		1	
15/04/1998							1	1		1		1	
14/07/1998			1							1		1	
16/04/1999				1						1		1	
15/07/1999					1					1		1	
08/01/2002				1						1		1	
09/01/2004					1					1		1	
12/02/2004	1										1	1	
21/05/2004							1	1		1		1	1
03/06/2005							1	1		1		1	
02/03/2006					1					1		1	1
21/04/2006							1	1		1		1	1
25/04/2006					1					1		1	1
26/04/2006							1	1		1		1	
23/05/2006						1				1		1	
11/07/2006					1					1		1	1
25/07/2006					1					1		1	1
15/02/2007							1		1		1	1	
01/03/2007							1	1		1		1	
03/04/2007							1	1		1		1	1
20/08/2007	1										1	1	
29/11/2007				1						1		1	
27/12/2007			1							1		1	
09/01/2008						1				1		1	
14/10/2008			1							1		1	
10/11/2008			1							1		1	
14/11/2008							1	1		1		1	
24/11/2008			1							1		1	
26/11/2008			1							1		1	
09/01/2009			1							1		1	
14/01/2009				1						1		1	
25/02/2009							1		1		1	1	
31/03/2009							1	1		1		1	
02/04/2009				1						1		1	
15/04/2009							1	1		1		1	
24/08/2009	1										1	1	
28/08/2009				1						1		1	
22/10/2009	1										1	1	
10/05/2010	1										1	1	
09/06/2010	1										1	1	
21/07/2010						1				1		1	
13/05/2011				1						1		1	
06/10/2011			1							1		1	
14/11/2011			1							1		1	
01/12/2011							1		1		1	1	
12/01/2012						1				1		1	
13/02/2017					1					1		1	1

Table D.3. Asset returns on W246 Shocks

Asset returns on W246 Shocks.

	EQUITY	VIX	VXO	FX
Panel A: VIX Shocks				
Earnings	3.5%	-36.3%	-30.4%	1.2%
FED	8.1%	-44.2%	-45.4%	-0.5%
Politics	38.4%	-86.1%	-87.5%	3.4%
Statistics	6.4%	-54.3%	-48.9%	-0.9%
$\text{Mixed}_{\text{All}}$	19.0%	-74.9%	-80.3%	1.2%
$\text{Mixed}_{\text{NoFED}}$	5.0%	-51.2%	-57.1%	0.9%
$\text{Mixed}_{\text{FED}}$	13.3%	-48.5%	-54.1%	0.3%
All	93.4%	-99.3%	-99.4%	4.4%
$\text{All}_{\text{NoFED}}$	57.8%	-97.6%	-97.7%	4.7%
All_{FED}	22.5%	-71.3%	-74.9%	-0.2%
Panel B: Copper Shocks				
FED	4.5%	-42.4%	-42.4%	5.9%
Politics	6.0%	-8.5%	-9.5%	9.5%
Statistics	-1.5%	18.3%	28.4%	3.8%
Supply	-0.1%	5.7%	11.6%	2.2%
Demand	0.3%	4.6%	7.5%	0.9%
$\text{Mixed}_{\text{All}}$	-2.1%	-9.0%	1.8%	3.4%
$\text{Mixed}_{\text{NoFED}}$	-0.9%	-6.0%	-2.2%	2.5%
$\text{Mixed}_{\text{FED}}$	-1.2%	-3.3%	4.1%	0.8%
All	7.0%	-37.3%	-18.2%	28.3%
$\text{All}_{\text{NoFED}}$	3.7%	12.5%	36.3%	20.2%
All_{FED}	3.2%	-44.3%	-40.0%	6.7%
Strikes	2.1%	-6.2%	-6.1%	0.9%

Appendix E Alternative Explanations

Table E.1. Altenative Explanatory Variables

Alternative Explanations for Equity

Name	Description
No Explanatory (x)	Empty
TED_{MS}	TED Rate average of the last 5-days of the previous month copied forward to the start of the next month
$T.Flows_{MS}$	Detrended average ratio of Treasury instrument flows to GDP measured on the last 5-days of the previous month copied forward to the start of the next month
I_{ECB}	Dummy ECB monetary policy meeting
$I_{ECB\ (t+1)}$	Dummy next day after ECB monetary policy meeting
$\triangle PMI_{US}$	Change (%) of US ISM Manufacturing Index
$SURP_{PMI\ US}$	Suprise actual versus expected US PMI
$\triangle EMP1_{US}$	Change (%) ISM Employment US Index
$\triangle EMP2_{US}$	Change (%) ADP Nonfarm Private US Payrolls
$\triangle SMI_{US}$	Change (%) of US ISM Services Index
$\triangle JOBC_{US}$	Change (%) US ICSA Jobless Claims Release (weekly)
$SURP_{JOBC\ US}$	Suprise actual versus expected US ICSA Jobless Claims (weekly)
TED_{D16}	TED Rate measures on day 15 and moved forward 1-day
$T.Flows_{D16}$	Detrended ratio of Treasury instrument flows to GDP measured on day 15 and moved forward 1-day
$I_{JP\ (t+1)}$	Dummy next day BoJ monetary policy meeting
$I_{VIX\ Options}$	Dummy VIX options and futures expiration days
$I_{VIX\ Options\ (t-1)}$	Dummy previous day to VIX options and futures expirations
$I_{M\ S\&P\ Options}$	Dummy monthly S&P 500 options expiration day
$I_{M\ S\&P\ Options\ (t-1)}$	Dummy previous day to S&P 500 monthly options expirations
$I_{Q\ S\&P\ Options}$	Dummy quarter S&P 500 options expiration day
$I_{Q\ FX\ Options}$	Dummy quarter FX futures expiration day

Table E.2. Alternative Explanatories on Monthstart

Alternative Explanations for Equity

	α	$\beta_{I_{Shock}}$	β_x	N	R_a^2
Panel A: EQUITY					
No Explanatory	0.13	3.04		296	0.063
	(1.98) (1.98) (2.26)	(4.56) (4.94) (9.20)			
	[0.05] [0.05] [0.02]	[0.00] [0.00] [0.00]			
TED_{MS}	0.31	3.05	-0.34	296	0.072
	(2.80) (2.48) (2.29)	(4.60) (4.95) (8.75)	(-2.00) (-1.52) (-1.45)		
	[0.01] [0.01] [0.02]	[0.00] [0.00] [0.00]	[0.05] [0.13] [0.15]		
$T.Flows_{MS}$	0.09	3.09	1.86	296	0.073
	(1.34) (1.33) (1.55)	(4.66) (5.04) (11.60)	(2.08) (2.18) (2.39)		
	[0.18] [0.18] [0.12]	[0.00] [0.00] [0.00]	[0.04] [0.03] [0.02]		
I_{ECB}	0.15	3.02	-0.25	296	0.063
	(2.20) (2.22) (2.52)	(4.52) (4.90) (9.10)	(-1.05) (-1.01) (-1.10)		
	[0.03] [0.03] [0.01]	[0.00] [0.00] [0.00]	[0.30] [0.31] [0.27]		
$\triangle PMI_{US}$	0.13	3.04	1.44	296	0.06
	(1.93) (1.94) (2.17)	(4.55) (4.94) (9.19)	(0.40) (0.38) (0.45)		
	[0.05] [0.05] [0.03]	[0.00] [0.00] [0.00]	[0.69] [0.70] [0.66]		
$SURP_{PMI\ US}$	0.13	3.07	3.28	296	0.063
	(1.93) (1.94) (2.18)	(4.59) (4.99) (8.86)	(0.96) (0.85) (1.01)		
	[0.05] [0.05] [0.03]	[0.00] [0.00] [0.00]	[0.34] [0.40] [0.32]		
$\triangle EMP1_{US}$	0.13	3.02	1.95	296	0.061
	(1.95) (1.96) (2.24)	(4.52) (4.90) (9.36)	(0.76) (0.64) (0.70)		
	[0.05] [0.05] [0.03]	[0.00] [0.00] [0.00]	[0.45] [0.52] [0.48]		
$\triangle SMI_{US}$	0.14	3.04	6.40	296	0.066
	(2.07) (2.08) (2.38)	(4.56) (4.94) (9.19)	(1.39) (1.32) (1.49)		
	[0.04] [0.04] [0.02]	[0.00] [0.00] [0.00]	[0.17] [0.19] [0.14]		
$\triangle EMP2_{US}$	0.13	3.04	-7.13	296	0.06
	(1.97) (1.95) (2.28)	(4.55) (4.94) (9.18)	(-0.08) (-0.06) (-0.10)		
	[0.05] [0.05] [0.02]	[0.00] [0.00] [0.00]	[0.94] [0.95] [0.92]		
$\triangle JOBC_{US}$	0.15	3.03	-3.95	296	0.064
	(2.14) (2.17) (2.54)	(4.54) (4.93) (9.23)	(-1.14) (-1.08) (-1.37)		
	[0.03] [0.03] [0.01]	[0.00] [0.00] [0.00]	[0.26] [0.28] [0.17]		
$SURP_{JOBC\ US}$	0.19	2.99	-0.37	296	0.072
	(2.61) (2.64) (3.11)	(4.49) (4.85) (9.19)	(-1.98) (-1.91) (-1.87)		
	[0.01] [0.01] [0.00]	[0.00] [0.00] [0.00]	[0.05] [0.06] [0.06]		

Table E.2. Alternative Explanations for Monthstart (continuation)

Alternative Explanations for VIX

	α	$\beta_{I_{Shock}}$	β_x	N	R_a^2
Panel B: VIX					
No Explanatory (x)	0.05	-20.88		205	0.087
	(0.12) (0.12) (0.14)	(-4.51) (-4.54) (-8.78)			
	[0.91] [0.91] [0.89]	[0.00] [0.00] [0.00]			
TED_{MS}	-0.63	-21.06	1.42	205	0.085
	(-0.68) (-0.68) (-0.76)	(-4.54) (-4.58) (-9.58)	(0.84) (0.85) (1.24)		
	[0.50] [0.50] [0.45]	[0.00] [0.00] [0.00]	[0.40] [0.40] [0.22]		
$\text{T.Flows}_{\text{MS}}$	0.34	-21.55	-12.97	205	0.103
	(0.72) (0.72) (1.00)	(-4.69) (-4.72) (-7.22)	(-2.17) (-2.19) (-3.12)		
	[0.47] [0.47] [0.32]	[0.00] [0.00] [0.00]	[0.03] [0.03] [0.00]		
I_{ECB}	0.11	-20.94	-0.86	205	0.083
	(0.24) (0.24) (0.29)	(-4.51) (-4.56) (-8.76)	(-0.48) (-0.48) (-0.61)		
	[0.81] [0.81] [0.77]	[0.00] [0.00] [0.00]	[0.63] [0.63] [0.54]		
$\triangle\text{PMI}_{\text{US}}$	0.04	-20.88	3.94	205	0.082
	(0.09) (0.10) (0.12)	(-4.50) (-4.54) (-8.77)	(0.19) (0.19) (0.24)		
	[0.92] [0.92] [0.91]	[0.00] [0.00] [0.00]	[0.85] [0.85] [0.81]		
$\text{SURP}_{\text{PMI US}}$	0.04	-20.80	7.30	205	0.083
	(0.10) (0.10) (0.12)	(-4.48) (-4.52) (-8.49)	(0.38) (0.38) (0.47)		
	[0.92] [0.92] [0.91]	[0.00] [0.00] [0.00]	[0.71] [0.71] [0.64]		
$\triangle\text{EMP1}_{\text{US}}$	0.06	-20.77	-7.20	205	0.083
	(0.13) (0.14) (0.17)	(-4.47) (-4.51) (-8.36)	(-0.49) (-0.50) (-0.50)		
	[0.89] [0.89] [0.87]	[0.00] [0.00] [0.00]	[0.62] [0.62] [0.61]		
$\triangle\text{EMP2}_{\text{US}}$	0.06	-20.89	-117.12	205	0.082
	(0.12) (0.12) (0.15)	(-4.50) (-4.55) (-8.76)	(-0.20) (-0.20) (-0.30)		
	[0.90] [0.90] [0.88]	[0.00] [0.00] [0.00]	[0.84] [0.84] [0.77]		
$\triangle\text{JOBC}_{\text{US}}$	0.06	-20.89	-3.30	205	0.082
	(0.13) (0.13) (0.16)	(-4.50) (-4.54) (-8.75)	(-0.12) (-0.12) (-0.16)		
	[0.90] [0.89] [0.87]	[0.00] [0.00] [0.00]	[0.90] [0.90] [0.87]		
$\text{SURP}_{\text{JOBC US}}$	0.11	-20.94	-0.42	205	0.083
	(0.22) (0.22) (0.27)	(-4.51) (-4.55) (-8.73)	(-0.30) (-0.31) (-0.36)		
	[0.83] [0.83] [0.79]	[0.00] [0.00] [0.00]	[0.76] [0.76] [0.72]		

Table E.2. Alternative Explanations for Monthstart (continuation)

Alternative Explanations for VXO

	α	$\beta_{I_{Shock}}$	β_x	N	R_a^2
Panel C: VXO					
No Explanatory (x)	-0.26	-22.31		205	0.084
	(-0.53) (-0.53) (-0.67)	(-4.45) (-4.49) (-6.11)			
	[0.60] [0.60] [0.50]	[0.00] [0.00] [0.00]			
TED_{MS}	-0.91	-22.48	1.35	205	0.082
	(-0.90) (-0.91) (-1.05)	(-4.47) (-4.52) (-6.39)	(0.74) (0.74) (0.94)		
	[0.37] [0.37] [0.29]	[0.00] [0.00] [0.00]	[0.46] [0.46] [0.35]		
$\text{T.Flows}_{\text{MS}}$	-0.07	-22.75	-8.51	205	0.087
	(-0.14) (-0.14) (-0.20)	(-4.53) (-4.58) (-5.60)	(-1.30) (-1.32) (-1.80)		
	[0.89] [0.89] [0.84]	[0.00] [0.00] [0.00]	[0.19] [0.19] [0.07]		
I_{ECB}	-0.40	-22.17	1.99	205	0.084
	(-0.78) (-0.78) (-0.96)	(-4.42) (-4.46) (-6.05)	(1.02) (1.03) (1.09)		
	[0.44] [0.44] [0.34]	[0.00] [0.00] [0.00]	[0.31] [0.31] [0.28]		
$\triangle\text{PMI}_{\text{US}}$	-0.27	-22.31	3.03	205	0.08
	(-0.54) (-0.54) (-0.68)	(-4.44) (-4.49) (-6.10)	(0.13) (0.14) (0.18)		
	[0.59] [0.59] [0.50]	[0.00] [0.00] [0.00]	[0.89] [0.89] [0.85]		
$\text{SURP}_{\text{PMI US}}$	-0.25	-22.40	-7.56	205	0.08
	(-0.50) (-0.51) (-0.64)	(-4.45) (-4.51) (-6.17)	(-0.36) (-0.36) (-0.48)		
	[0.61] [0.61] [0.52]	[0.00] [0.00] [0.00]	[0.72] [0.72] [0.63]		
$\triangle\text{EMP1}_{\text{US}}$	-0.25	-22.16	-9.12	205	0.081
	(-0.50) (-0.51) (-0.64)	(-4.40) (-4.46) (-5.90)	(-0.58) (-0.57) (-0.69)		
	[0.62] [0.61] [0.52]	[0.00] [0.00] [0.00]	[0.56] [0.57] [0.49]		
$\triangle\text{EMP2}_{\text{US}}$	-0.26	-22.31	109.13	205	0.08
	(-0.53) (-0.53) (-0.68)	(-4.44) (-4.49) (-6.09)	(0.17) (0.17) (0.32)		
	[0.60] [0.59] [0.50]	[0.00] [0.00] [0.00]	[0.86] [0.87] [0.75]		
$\triangle\text{JOBC}_{\text{US}}$	-0.32	-22.25	25.15	205	0.083
	(-0.64) (-0.65) (-0.78)	(-4.43) (-4.49) (-6.07)	(0.86) (0.87) (1.18)		
	[0.52] [0.52] [0.44]	[0.00] [0.00] [0.00]	[0.39] [0.39] [0.24]		
$\text{SURP}_{\text{JOBC US}}$	-0.58	-21.99	2.51	205	0.093
	(-1.10) (-1.11) (-1.53)	(-4.40) (-4.44) (-6.00)	(1.70) (1.71) (1.92)		
	[0.27] [0.27] [0.13]	[0.00] [0.00] [0.00]	[0.09] [0.09] [0.06]		

Table E.2. Alternative Explanations for Monthstart (continuation)

Alternative Explanations for FX

	α	$\beta_{I_{Shock}}$	β_x	N	R_a^2
Panel D: FX					
No Explanatory (x)	0.05	0.38		297	0.018
	(1.96) (1.97) (2.03)	(2.56) (2.49) (1.43)			
	[0.05] [0.05] [0.04]	[0.01] [0.01] [0.15]			
TED_{MS}	0.07	0.38	-0.04	297	0.016
	(1.38) (1.35) (1.47)	(2.56) (2.50) (1.42)	(-0.47) (-0.44) (-0.51)		
	[0.17] [0.18] [0.14]	[0.01] [0.01] [0.16]	[0.64] [0.66] [0.61]		
$\text{T.Flows}_{\text{MS}}$	0.04	0.38	0.21	297	0.016
	(1.71) (1.70) (1.97)	(2.57) (2.51) (1.45)	(0.65) (0.67) (0.82)		
	[0.09] [0.09] [0.05]	[0.01] [0.01] [0.15]	[0.52] [0.51] [0.41]		
I_{ECB}	0.05	0.38	0.00	297	0.015
	(1.87) (1.88) (1.90)	(2.53) (2.49) (1.45)	(0.04) (0.04) (0.05)		
	[0.06] [0.06] [0.06]	[0.01] [0.01] [0.15]	[0.97] [0.97] [0.96]		
$\triangle\text{PMI}_{\text{US}}$	0.05	0.38	-0.10	297	0.015
	(1.96) (1.97) (2.02)	(2.55) (2.49) (1.44)	(-0.08) (-0.08) (-0.09)		
	[0.05] [0.05] [0.04]	[0.01] [0.01] [0.15]	[0.94] [0.94] [0.93]		
$\text{SURP}_{\text{PMI US}}$	0.05	0.38	-0.97	297	0.017
	(1.98) (1.99) (2.01)	(2.60) (2.54) (1.48)	(-0.79) (-0.74) (-1.05)		
	[0.05] [0.05] [0.05]	[0.01] [0.01] [0.14]	[0.43] [0.46] [0.30]		
$\triangle\text{EMP1}_{\text{US}}$	0.05	0.38	-0.27	297	0.015
	(1.96) (1.98) (2.03)	(2.55) (2.50) (1.44)	(-0.30) (-0.27) (-0.40)		
	[0.05] [0.05] [0.04]	[0.01] [0.01] [0.15]	[0.77] [0.79] [0.69]		
$\triangle\text{SMI}_{\text{US}}$	0.05	0.37	-0.76	297	0.016
	(1.93) (1.94) (2.02)	(2.52) (2.46) (1.44)	(-0.46) (-0.45) (-0.33)		
	[0.05] [0.05] [0.04]	[0.01] [0.01] [0.15]	[0.64] [0.65] [0.74]		
$\triangle\text{EMP2}_{\text{US}}$	0.05	0.38	12.06	297	0.015
	(1.91) (1.90) (1.97)	(2.56) (2.50) (1.43)	(0.37) (0.31) (0.45)		
	[0.06] [0.06] [0.05]	[0.01] [0.01] [0.15]	[0.71] [0.76] [0.66]		
$\triangle\text{JOBC}_{\text{US}}$	0.05	0.38	-0.38	297	0.015
	(1.98) (2.00) (2.05)	(2.57) (2.51) (1.47)	(-0.31) (-0.30) (-0.43)		
	[0.05] [0.05] [0.04]	[0.01] [0.01] [0.14]	[0.76] [0.77] [0.67]		
$\text{SURP}_{\text{JOBC US}}$	0.07	0.42	-0.13	297	0.027
	(2.52) (2.55) (2.80)	(2.84) (2.78) (1.61)	(-1.88) (-1.85) (-2.08)		
	[0.01] [0.01] [0.01]	[0.00] [0.01] [0.11]	[0.06] [0.07] [0.04]		

Table E.3. Alternative Explanatories on D16

Alternative Explanations for Equity

	α	$\beta_{I_{Shock}}$	β_x	N	R_a^2
Panel A: EQUITY					
No Explanatory (x)	0.33	1.09		89	0.018
	(3.30) (3.33) (3.93)	(1.61) (1.85) (12.17)			
	[0.00] [0.00] [0.00]	[0.11] [0.07] [0.00]			
TED_{D16}	-0.04	1.31	0.78	89	0.055
	(-0.21) (-0.20) (-0.15)	(1.95) (2.18) (7.15)	(2.11) (1.80) (1.32)		
	[0.84] [0.84] [0.88]	[0.05] [0.03] [0.00]	[0.04] [0.08] [0.19]		
$\text{T.Flows}_{\text{D16}}$	0.47	1.18	-0.60	89	0.051
	(3.90) (3.89) (4.59)	(1.77) (2.04) (10.32)	(-2.00) (-2.08) (-2.11)		
	[0.00] [0.00] [0.00]	[0.08] [0.04] [0.00]	[0.05] [0.04] [0.04]		
$\text{I}_{\text{VIX Options}}$	0.34	1.09	-0.01	89	0.006
	(2.97) (3.00) (4.10)	(1.59) (1.85) (8.71)	(-0.04) (-0.04) (-0.05)		
	[0.00] [0.00] [0.00]	[0.12] [0.07] [0.00]	[0.97] [0.97] [0.96]		
$\text{I}_{\text{VIX Options (t-1)}}$	0.39	1.43	-0.79	89	0.055
	(3.78) (3.81) (4.15)	(2.09) (2.44) (5.59)	(-2.10) (-2.43) (-3.25)		
	[0.00] [0.00] [0.00]	[0.04] [0.02] [0.00]	[0.04] [0.02] [0.00]		
$\text{I}_{\text{M S\&P Options}}$	0.42	1.00	-0.35	89	0.031
	(3.62) (3.64) (4.31)	(1.49) (1.72) (10.38)	(-1.47) (-1.53) (-1.55)		
	[0.00] [0.00] [0.00]	[0.14] [0.09] [0.00]	[0.14] [0.13] [0.12]		
$\text{I}_{\text{M S\&P Options (t-1)}}$	0.29	1.13	0.17	89	0.013
	(2.38) (2.43) (2.31)	(1.67) (1.92) (8.59)	(0.74) (0.75) (0.53)		
	[0.02] [0.02] [0.02]	[0.10] [0.06] [0.00]	[0.46] [0.46] [0.60]		
$\text{I}_{\text{Q S\&P Options}}$	0.36	1.06	-0.97	89	0.03
	(3.50) (3.54) (4.22)	(1.58) (1.84) (11.98)	(-1.44) (-1.68) (-8.60)		
	[0.00] [0.00] [0.00]	[0.12] [0.07] [0.00]	[0.15] [0.10] [0.00]		
$\text{I}_{\text{Q FX Options}}$	0.31	1.11	0.79	89	0.029
	(3.00) (3.03) (3.42)	(1.66) (1.94) (11.85)	(1.43) (1.67) (1.55)		
	[0.00] [0.00] [0.00]	[0.10] [0.06] [0.00]	[0.16] [0.10] [0.13]		
$\triangle\text{JOBC}_{\text{US}}$	0.32	1.10	-4.92	89	0.027
	(3.21) (3.28) (4.16)	(1.63) (1.87) (13.21)	(-1.36) (-1.36) (-1.33)		
	[0.00] [0.00] [0.00]	[0.11] [0.07] [0.00]	[0.18] [0.18] [0.19]		
$\text{SURP}_{\text{JOBC US}}$	0.28	1.14	0.26	89	0.019
	(2.42) (2.49) (2.41)	(1.69) (1.93) (9.23)	(1.07) (1.05) (0.70)		
	[0.02] [0.01] [0.02]	[0.10] [0.06] [0.00]	[0.29] [0.30] [0.48]		
$\text{I}_{\text{ECB (t+1)}}$	0.36	1.06	-0.86	89	0.034
	(3.56) (3.59) (4.46)	(1.58) (1.83) (12.17)	(-1.56) (-1.81) (-2.02)		
	[0.00] [0.00] [0.00]	[0.12] [0.07] [0.00]	[0.12] [0.07] [0.05]		
$\text{I}_{\text{JP (t+1)}}$	0.33	1.09	0.01	89	0.006
	(3.13) (3.22) (3.80)	(1.60) (1.85) (11.87)	(0.04) (0.03) (0.08)		
	[0.00] [0.00] [0.00]	[0.11] [0.07] [0.00]	[0.97] [0.97] [0.94]		

Table E.3. Alternative Explanatories on D16 (continuation)

Alternative Explanations for VIX

	α	$\beta_{I_{Shock}}$	β_x	N	R_a^2
Panel B: VIX					
No Explanatory (x)	-1.56	-18.61		89	0.215
	(-2.80) (-2.83) (-2.44)	(-5.01) (-5.01) (-34.78)			
	[0.01] [0.01] [0.02]	[0.00] [0.00] [0.00]			
TED_{D16}	-1.89	-18.41	0.69	89	0.207
	(-1.64) (-1.68) (-0.97)	(-4.87) (-4.91) (-15.00)	(0.33) (0.34) (0.23)		
	[0.10] [0.10] [0.34]	[0.00] [0.00] [0.00]	[0.74] [0.73] [0.82]		
$\text{T.Flows}_{\text{D16}}$	-1.56	-18.61	0.01	89	0.206
	(-2.31) (-2.36) (-3.18)	(-4.97) (-5.00) (-25.47)	(0.01) (0.01) (0.01)		
	[0.02] [0.02] [0.00]	[0.00] [0.00] [0.00]	[0.99] [0.99] [0.99]		
$\text{I}_{\text{VIX Options}}$	-1.39	-18.34	-0.88	89	0.21
	(-2.23) (-2.27) (-1.93)	(-4.89) (-4.91) (-34.19)	(-0.64) (-0.65) (-0.75)		
	[0.03] [0.03] [0.06]	[0.00] [0.00] [0.00]	[0.53] [0.52] [0.46]		
$\text{I}_{\text{VIX Options (t-1)}}$	-1.93	-20.96	5.45	89	0.267
	(-3.48) (-3.54) (-3.31)	(-5.67) (-5.71) (-13.50)	(2.68) (2.70) (4.13)		
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.01] [0.01] [0.00]		
$\text{I}_{\text{M S\&P Options}}$	-1.54	-18.63	-0.10	89	0.206
	(-2.41) (-2.45) (-2.64)	(-4.97) (-5.01) (-34.49)	(-0.07) (-0.07) (-0.08)		
	[0.02] [0.02] [0.01]	[0.00] [0.00] [0.00]	[0.94] [0.94] [0.94]		
$\text{I}_{\text{M S\&P Options (t-1)}}$	-1.20	-18.97	-1.24	89	0.215
	(-1.82) (-1.85) (-1.60)	(-5.08) (-5.13) (-30.20)	(-1.01) (-1.03) (-1.10)		
	[0.07] [0.07] [0.11]	[0.00] [0.00] [0.00]	[0.32] [0.31] [0.27]		
$\text{I}_{\text{Q S\&P Options}}$	-1.68	-18.49	5.11	89	0.223
	(-2.99) (-3.04) (-2.58)	(-5.00) (-5.04) (-34.29)	(1.38) (1.39) (1.61)		
	[0.00] [0.00] [0.01]	[0.00] [0.00] [0.00]	[0.17] [0.17] [0.11]		
$\text{I}_{\text{Q FX Options}}$	-1.41	-18.76	-4.26	89	0.224
	(-2.50) (-2.55) (-2.10)	(-5.08) (-5.12) (-33.22)	(-1.40) (-1.42) (-1.52)		
	[0.01] [0.01] [0.04]	[0.00] [0.00] [0.00]	[0.16] [0.16] [0.13]		
$\triangle\text{JOBC}_{\text{US}}$	-1.53	-18.63	11.67	89	0.209
	(-2.74) (-2.78) (-2.40)	(-5.00) (-5.03) (-34.61)	(0.58) (0.59) (1.18)		
	[0.01] [0.01] [0.02]	[0.00] [0.00] [0.00]	[0.56] [0.55] [0.24]		
$\text{SURP}_{\text{JOBC US}}$	-1.30	-18.87	-1.18	89	0.213
	(-2.06) (-2.09) (-1.85)	(-5.06) (-5.10) (-33.62)	(-0.88) (-0.90) (-0.91)		
	[0.04] [0.04] [0.07]	[0.00] [0.00] [0.00]	[0.38] [0.37] [0.36]		
$\text{I}_{\text{ECB (t+1)}}$	-1.62	-18.55	1.79	89	0.209
	(-2.85) (-2.90) (-2.42)	(-4.97) (-5.00) (-33.08)	(0.58) (0.59) (0.64)		
	[0.01] [0.00] [0.02]	[0.00] [0.00] [0.00]	[0.56] [0.56] [0.53]		
$\text{I}_{\text{JP (t+1)}}$	-1.39	-18.77	-2.05	89	0.215
	(-2.40) (-2.44) (-2.17)	(-5.05) (-5.10) (-33.24)	(-1.00) (-1.03) (-1.28)		
	[0.02] [0.02] [0.03]	[0.00] [0.00] [0.00]	[0.32] [0.31] [0.20]		

Table E.3. Alternative Explanatories on D16 (continuation)

Alternative Explanations for VXO

	α	$\beta_{I_{Shock}}$	β_x	N	R_a^2
Panel C: VXO					
No Explanatory (x)	-2.06	-16.19		89	0.134
	(-3.25) (-3.29) (-3.00)	(-3.82) (-3.81) (-13.53)			
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]			
TED_{D16}	-2.50	-15.93	0.91	89	0.125
	(-1.91) (-1.96) (-1.38)	(-3.70) (-3.70) (-8.87)	(0.38) (0.41) (0.36)		
	[0.06] [0.05] [0.17]	[0.00] [0.00] [0.00]	[0.70] [0.69] [0.72]		
$\text{T.Flows}_{\text{D16}}$	-1.99	-16.15	-0.31	89	0.124
	(-2.59) (-2.65) (-3.32)	(-3.78) (-3.79) (-11.85)	(-0.16) (-0.16) (-0.18)		
	[0.01] [0.01] [0.00]	[0.00] [0.00] [0.00]	[0.87] [0.87] [0.86]		
$\text{I}_{\text{VIX Options}}$	-2.00	-16.09	-0.33	89	0.124
	(-2.82) (-2.87) (-2.43)	(-3.75) (-3.76) (-12.58)	(-0.21) (-0.21) (-0.23)		
	[0.01] [0.01] [0.02]	[0.00] [0.00] [0.00]	[0.84] [0.83] [0.82]		
$\text{I}_{\text{VIX Options (t-1)}}$	-2.48	-18.82	6.10	89	0.189
	(-3.91) (-3.98) (-3.62)	(-4.46) (-4.47) (-7.24)	(2.62) (2.63) (4.87)		
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.01] [0.01] [0.00]		
$\text{I}_{\text{M S\&P Options}}$	-2.04	-16.22	-0.12	89	0.124
	(-2.80) (-2.85) (-3.04)	(-3.79) (-3.80) (-14.20)	(-0.08) (-0.08) (-0.09)		
	[0.01] [0.01] [0.00]	[0.00] [0.00] [0.00]	[0.94] [0.93] [0.93]		
$\text{I}_{\text{M S\&P Options (t-1)}}$	-1.81	-16.45	-0.88	89	0.128
	(-2.40) (-2.44) (-2.25)	(-3.85) (-3.87) (-12.58)	(-0.62) (-0.63) (-0.57)		
	[0.02] [0.02] [0.03]	[0.00] [0.00] [0.00]	[0.54] [0.53] [0.57]		
$\text{I}_{\text{Q S\&P Options}}$	-2.26	-16.00	8.40	89	0.163
	(-3.57) (-3.64) (-3.22)	(-3.84) (-3.85) (-13.17)	(2.02) (2.02) (2.50)		
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.05] [0.05] [0.01]		
$\text{I}_{\text{Q FX Options}}$	-1.87	-16.39	-5.61	89	0.15
	(-2.92) (-2.97) (-2.56)	(-3.90) (-3.91) (-13.27)	(-1.63) (-1.63) (-1.54)		
	[0.00] [0.00] [0.01]	[0.00] [0.00] [0.00]	[0.11] [0.11] [0.13]		
$\triangle\text{JOBC}_{\text{US}}$	-2.05	-16.21	6.81	89	0.125
	(-3.20) (-3.25) (-2.97)	(-3.81) (-3.81) (-13.49)	(0.30) (0.30) (0.57)		
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.77] [0.76] [0.57]		
$\text{SURP}_{\text{JOBC US}}$	-1.88	-16.38	-0.86	89	0.127
	(-2.60) (-2.64) (-2.52)	(-3.84) (-3.85) (-12.82)	(-0.56) (-0.57) (-0.49)		
	[0.01] [0.01] [0.01]	[0.00] [0.00] [0.00]	[0.58] [0.57] [0.63]		
$\text{I}_{\text{ECB (t+1)}}$	-2.10	-16.15	1.17	89	0.125
	(-3.24) (-3.30) (-2.94)	(-3.79) (-3.80) (-13.16)	(0.34) (0.34) (0.46)		
	[0.00] [0.00] [0.00]	[0.00] [0.00] [0.00]	[0.74] [0.74] [0.64]		
$\text{I}_{\text{JP (t+1)}}$	-1.91	-16.35	-1.95	89	0.131
	(-2.87) (-2.92) (-2.75)	(-3.85) (-3.86) (-13.80)	(-0.83) (-0.86) (-0.99)		
	[0.01] [0.00] [0.01]	[0.00] [0.00] [0.00]	[0.41] [0.39] [0.32]		

Table E.3. Alternative Explanatories on D16 (continuation)

Alternative Explanations for FX

	α	$\beta_{I_{Shock}}$	β_x	N	R_a^2
Panel D: FX					
No Explanatory (x)	-0.06	0.36		89	0.001
	(-1.25) (-1.26) (-1.67)	(1.05) (1.33) (7.63)			
	[0.21] [0.21] [0.10]	[0.30] [0.19] [0.00]			
TED_{D16}	0.08	0.38	-0.31	89	0.02
	(0.80) (0.74) (0.88)	(1.12) (1.42) (7.51)	(-1.65) (-1.22) (-1.50)		
	[0.43] [0.46] [0.38]	[0.27] [0.16] [0.00]	[0.10] [0.23] [0.14]		
$\text{T.Flows}_{\text{D16}}$	-0.05	0.36	-0.06	89	-0.009
	(-0.83) (-0.81) (-0.95)	(1.03) (1.33) (8.31)	(-0.36) (-0.37) (-0.45)		
	[0.41] [0.42] [0.34]	[0.30] [0.19] [0.00]	[0.72] [0.71] [0.66]		
$\text{I}_{\text{VIX Options}}$	-0.10	0.30	0.20	89	0.018
	(-1.82) (-1.84) (-2.27)	(0.87) (1.11) (4.68)	(1.58) (1.64) (2.10)		
	[0.07] [0.07] [0.03]	[0.39] [0.27] [0.00]	[0.12] [0.10] [0.04]		
$\text{I}_{\text{VIX Options (t-1)}}$	-0.05	0.34	-0.21	89	0.003
	(-0.89) (-0.89) (-1.30)	(1.00) (1.29) (7.50)	(-1.10) (-1.39) (-0.91)		
	[0.38] [0.38] [0.20]	[0.32] [0.20] [0.00]	[0.27] [0.17] [0.37]		
$\text{I}_{\text{M S\&P Options}}$	-0.05	0.37	-0.05	89	-0.008
	(-0.91) (-0.91) (-1.14)	(1.08) (1.39) (7.58)	(-0.43) (-0.45) (-0.47)		
	[0.37] [0.36] [0.26]	[0.28] [0.17] [0.00]	[0.67] [0.65] [0.64]		
$\text{I}_{\text{M S\&P Options (t-1)}}$	-0.07	0.36	0.00	89	-0.011
	(-1.07) (-1.10) (-1.94)	(1.04) (1.33) (8.72)	(0.04) (0.04) (0.03)		
	[0.29] [0.27] [0.06]	[0.30] [0.19] [0.00]	[0.97] [0.97] [0.98]		
$\text{I}_{\text{Q S\&P Options}}$	-0.07	0.37	0.33	89	0.0
	(-1.38) (-1.39) (-1.88)	(1.07) (1.37) (7.88)	(0.96) (1.23) (3.09)		
	[0.17] [0.17] [0.06]	[0.29] [0.17] [0.00]	[0.34] [0.22] [0.00]		
$\text{I}_{\text{Q FX Options}}$	-0.07	0.36	0.17	89	-0.006
	(-1.34) (-1.35) (-1.87)	(1.06) (1.36) (7.83)	(0.62) (0.79) (1.29)		
	[0.18] [0.18] [0.07]	[0.29] [0.18] [0.00]	[0.54] [0.43] [0.20]		
$\triangle\text{JOBC}_{\text{US}}$	-0.06	0.35	1.65	89	-0.001
	(-1.18) (-1.22) (-1.66)	(1.03) (1.32) (7.73)	(0.89) (0.88) (0.74)		
	[0.24] [0.23] [0.10]	[0.30] [0.19] [0.00]	[0.38] [0.38] [0.46]		
$\text{SURP}_{\text{JOBC US}}$	-0.06	0.35	-0.04	89	-0.01
	(-0.96) (-1.01) (-1.59)	(1.01) (1.29) (8.04)	(-0.29) (-0.28) (-0.21)		
	[0.34] [0.32] [0.12]	[0.31] [0.20] [0.00]	[0.77] [0.78] [0.83]		
$\text{I}_{\text{ECB (t+1)}}$	-0.08	0.38	0.59	89	0.04
	(-1.65) (-1.66) (-1.99)	(1.13) (1.47) (7.62)	(2.14) (2.78) (1.79)		
	[0.10] [0.10] [0.05]	[0.26] [0.14] [0.00]	[0.04] [0.01] [0.08]		
$\text{I}_{\text{JP (t+1)}}$	-0.07	0.36	0.04	89	-0.01
	(-1.26) (-1.30) (-1.76)	(1.05) (1.35) (7.63)	(0.22) (0.19) (0.30)		
	[0.21] [0.20] [0.08]	[0.30] [0.18] [0.00]	[0.83] [0.85] [0.77]		

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