

## Monetary Momentum

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# Monetary Momentum

## Abstract

We document a large return drift around monetary policy announcements by the Federal Open Market Committee. Stock returns start drifting up 25 days before expansionary monetary policy surprises, whereas they decrease before contractionary surprises. The cumulative return difference across expansionary and contractionary policy decisions amounts to 2.5% until the day of the policy move and continues to increase to more than 4.5% 15 days after the meeting. The return drift is a market-wide phenomenon, holds for all industries, and many international equity markets. In the cross section of stocks, size, value, profitability, and investment do not exhibit differential return drifts. Momentum is an exception, because past losers plummet around contractionary monetary policy surprises. A simple trading strategy exploiting the drift around FOMC meetings increases Sharpe ratios relative to a buy-and-hold investment by a factor of 4.

JEL-Codes: E310, E430, E440, E520, E580, G120.

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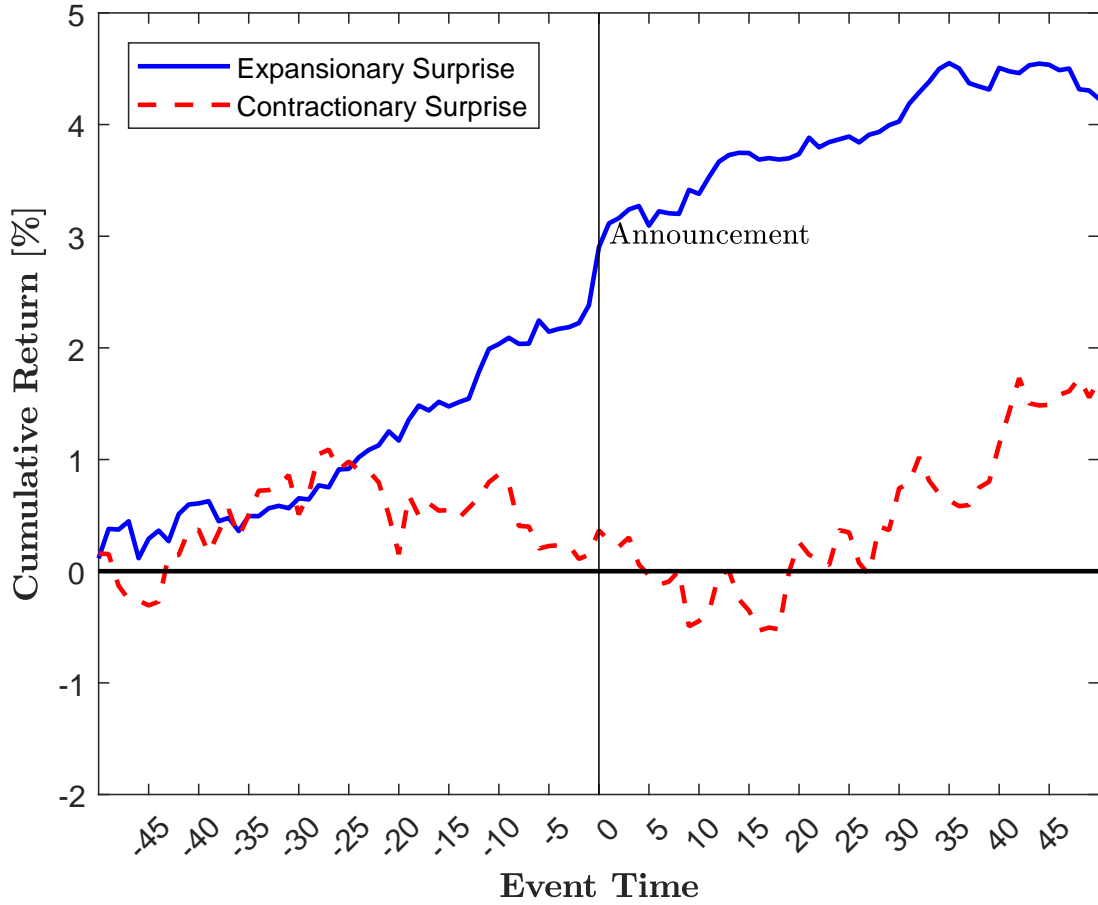
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# I Introduction

Figure 1 documents a novel fact for stock returns around monetary policy decisions by the Federal Open Market Committee (FOMC): starting around 25 days before the FOMC meeting, returns of the Center for Research in Security Prices (CRSP) value-weighted index drift upwards before expansionary monetary policy decisions (lower-than-expected federal funds target rates) and drift downwards before contractionary policy decisions. The difference in returns between expansionary and contractionary policy surprises amounts to 2.5% until the day before the announcement. On the day before the announcement, returns drift upwards independent of the direction of the monetary policy surprise, the pre-FOMC announcement drift of Lucca and Moench (2015). Around the announcement, contractionary monetary policy surprises result in negative returns, and expansionary surprises result in an increase in returns, consistent with a large literature, such as Bernanke and Kuttner (2005). Returns, however, continue to drift in the same direction for another 15 days, which is the novel fact we document in this paper. The continuation in returns is surprising, because the trading signal it builds on is publicly observable. On average, the difference in the drift from before until after the announcement across contractionary and expansionary surprises amounts to around 4.5%, which is large relative to an annual equity premium of 6%.

The differential drift around contractionary and expansionary FOMC announcements is a robust feature of the data and holds for samples with or without intermeeting policy decisions (policy decisions on unscheduled FOMC meetings), with or without turning points in monetary policy (changes in the federal funds target rate in the direction opposite

Figure 1: **Cumulative Returns around FOMC Policy Decisions**



*This figure plots cumulative returns in percent around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

to the previous move), or how we treat zero-changes in the federal funds target rate.

Our baseline sample runs from 1994, the first time when the FOMC started issuing press releases after meetings and policy decisions, until 2009, the start of the binding zero-lower bound (ZLB) period. Our results continue to hold when we stop our sample in 2004, as in Bernanke and Kuttner (2005).

We define expansionary and contractionary monetary policy shocks using federal funds futures (Kuttner (2001) surprises). Lower-than-expected federal funds target rates

(expansionary monetary policy surprises) do not necessarily coincide with cuts in the target rate. The market might assign a probability of less than 100% to a cut in target rates, and we would measure expansionary surprises whenever the FOMC indeed lowers target rates. But we would also measure an expansionary monetary policy surprise if the market assigns a positive probability to a tightening in target rates which does not materialize. We do not find similar return drifts when we sort on raw changes in the target rate. Instead, the FOMC seems to increase rates following positive stock returns and cut rates after negative stock returns, consistent with the idea of a *Greenspan Put* (see Cieslak, Morse, and Vissing-Jorgensen (2015) and Cieslak and Vissing-Jorgensen (2017)).

Market participants cannot observe whether target rate changes are expansionary or contractionary according to our definition until after the actual change in target rates. We show that the differential drift following expansionary versus contractionary policy shocks is still economically large and statistically significant when we start the event window on the *day after* the FOMC policy decision.

The pre- and post-drifts are largely a market-wide phenomenon. We do not find similar returns drifts around FOMC announcements for cross-sectional return premia, such as size, value, profitability, or investment, because all portfolios tend to drift in the same direction. Momentum is an exception: momentum returns are flat around FOMC announcements for expansionary monetary policy surprises. For contractionary surprises, however, we find an upward drift in momentum returns starting 15 days before the FOMC meeting and continuing for another 15 days subsequent to the target rate decision. Within this thirty-day trading period, momentum earns an excess return of 4%. When we decompose momentum into winners and losers, we see a flat momentum return

around expansionary monetary policy shocks, because both winners and losers appreciate in lock-step. Instead, for contractionary monetary policy shocks, past losers drop by 5% within days, whereas past winners appreciate slightly. This differential behavior around contractionary surprises holds for the full sample, but also for a sample ending in 2004.

We find drift behavior similar to the drift for the overall market at the industry level when we study returns following the Fama & French 17 industry classification with a return drift difference of around 4% around expansionary versus contractionary monetary policy surprises. *Machinery* is an exception with a return drift of almost 8% and *Mining* with no differential return drift at all, because mining stocks appreciate following contractionary monetary policy.

The return drift is not contained to the United States, but also occurs in international equity markets. We find a differential return drift for benchmark equity indexes around U.S. monetary policy decisions for Germany, Canada, French, Spain, Switzerland, and the U.K. with magnitudes which are comparable to the pattern in the United States. Japan is an exception, because returns are flat both for U.S. contractionary and expansionary monetary policy surprises.

We compare the Sharpe ratios of monetary momentum strategies to the Sharpe ratios of a buy-and-hold investor to gauge the economic significance of the return drift around FOMC meetings. We find increases in Sharpe ratios by a factor of four for a simple monetary momentum strategy which investors can implement in real time.

## A. Related Literature

A large literature at the intersection of macroeconomics and finance investigates the effect of monetary policy shocks on asset prices in an event-study framework. In a seminal study, Cook and Hahn (1989) examine the effects of changes in the federal funds rate on bond rates using a daily event window. They show that changes in the federal funds target rate are associated with changes in interest rates in the same direction, with larger effects at the short end of the yield curve. Bernanke and Kuttner (2005)—also using a daily event window—focus on unexpected changes in the federal funds target rate. They find that an unexpected interest rate cut of 25 basis points leads to an increase in the CRSP value-weighted market index of about 1 percentage point. Gürkaynak, Sack, and Swanson (2005) focus on intraday event windows and find effects of similar magnitudes for the S&P500. They argue that two factors, a target and path factor, are necessary to describe the reaction of notes with up to ten-year maturity to monetary policy shocks. Boyarchenko, Haddad, and Plosser (2017) extend the heteroskedasticity-based identification of Rigobon and Sack (2003) and also argue that two shocks best describe the reaction of financial instruments across a wide range of asset markets: a conventional monetary policy shock and a confidence shock. Leombroni, Vedolin, Venter, and Whelan (2016) decompose monetary policy shocks into a target and communication shock and find the latter is the main driver of yields around policy decisions. Boguth, Grégoire, and Martineau (2017) show that the market expects monetary policy actions in recent years only on FOMC meetings with subsequent press conferences. Ozdagli and Weber (2016) decompose the overall response of stock returns to monetary policy surprises into a direct



demand effect and higher-order network effects using spatial autoregressions, and find that more than 50% of the overall market response comes from indirect effects. Fontaine (2016) estimates a dynamic term structure model and finds that uncertainty about future rate changes is cyclical. Drechsler, Savov, and Schnabl (2015) provide a framework to rationalize the effect of monetary policy on risk premia.

Besides the effect on the level of the stock market, researchers have recently also studied cross-sectional differences in the response to monetary policy. Ehrmann and Fratzscher (2004) and Ippolito, Ozdagli, and Perez (2015), among others, show that firms with high bank debt, low cash flows, small firms, firms with low credit ratings, low financial constraints, high price-earnings multiples, and Tobin's  $q$  show a higher sensitivity to monetary policy shocks, which is in line with bank-lending, balance-sheet, and interest-rate channels of monetary policy. Gorodnichenko and Weber (2016) show that firms with stickier output prices have more volatile cash flows and high conditional volatility in narrow event windows around FOMC announcements. Weber (2015) studies how firm-level and portfolio returns vary with measured price stickiness, and shows that sticky-price firms have higher systematic risk and are more sensitive to monetary policy shocks.

We also contribute to a recent literature studying stock return patterns around FOMC announcements. The most closely related paper is Lucca and Moench (2015), who show that 60% to 80% of the realized equity premium since 1994 is earned in the 24 hours *before* the actual FOMC meeting. Their pre-FOMC announcement drift is independent of the sign of monetary policy shocks and is contained in the 24 hours before the policy decision. We build on their paper and show that a differential drift exists starting 25 days before the FOMC meeting and continuing for 15 days subsequent to the policy decision.

Cieslak et al. (2015) show a biweekly pattern for stock returns in FOMC calendar time. They find that the entire equity premium since 1994 is earned in even weeks in FOMC calendar time. They argue that the Fed decision-making process drives the timing of the return response and informal communication of Fed officials with the media. Cieslak and Vissing-Jorgensen (2017) build on this work and argue for a causal effect of low stock returns on FOMC policy via a *Fed Put*.

This line of research focuses on an pattern in stock returns independent of the sign of the monetary policy shock. We build on this line of work and document an extended pre- and post-FOMC drift which has signs opposite to the surprises in line with the event study literature we cite above: negative, that is, expansionary monetary policy shocks result in an upward drift in stock returns.

Moreover, the paper relates to the literature on the post-earnings-announcement drift (PEAD). Ball and Brown (1968) first documents PEAD which describes the tendency of stock returns to drift in the direction of a recent earnings' surprises. Fama (1998) points out that PEAD has undergone heavy scrutiny and holds up out-of-sample and is therefore "above suspicion." Livnat and Mendenhall (2006) show the robustness of PEAD to different ways of measuring surprises and also provide a nice overview of the literature. PEAD is, however, concentrated in smaller firms which raises concerns of its exploitability (see, e.g., Chordia et al. (2009)). We document a drift in returns around FOMC decisions in the direction opposite of the monetary-policy surprises. The drift occurs for market-wide indices and industry portfolios and is, therefore, not subject to high transaction costs.

Finally, our findings are reminiscent of, but distinct from, the time series momentum

strategy of Moskowitz, Ooi, and Pedersen (2012), who document that aggregate indices that did well over the previous twelve months positively predict future excess returns for up to twelve months. Our results provide out-of-sample findings to test behavioral theories of momentum, such as Barberis, Shleifer, and Vishny (1998); Daniel, Hirshleifer, and Subrahmanyam (1998); and Hong and Stein (1999) against rational theories, such as Berk, Green, and Naik (1999); Ahn, Conrad, and Dittmar (2003); and Sagi and Seasholes (2007).<sup>1</sup>

## II Data

### A. Stock Returns

We sample daily returns for the CRSP value-weighted index directly from CRSP. The index is an average of all common stocks trading on NYSE, Amex, or Nasdaq. We also sample returns for international stock indices from Datastream. Industry returns and factor returns are from the Fama&French data library.

### B. Federal Funds Futures Data

Federal funds futures started trading on the Chicago Board of Trade in October 1988. These contracts have a face value of \$5,000,000. Prices are quoted as 100 minus the daily average federal funds rate as reported by the Federal Reserve Bank of New York. Federal

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<sup>1</sup>There is, of course, also a large literature on cross-sectional momentum, that is, comparing the past performance of securities relative to the past performance of other securities. See, e.g., Jegadeesh and Titman (1993) for U.S. equities, Moskowitz and Grinblatt (1999) for industries, Asness, Liew, and Stevens (1997) for equity indices, Shleifer and Summers (1990) for currencies, Gorton et al. (2013) for commodities, and Asness, Moskowitz, and Pedersen (2013) for evidence across asset classes and around the world.

funds futures face limited counterparty risk due to daily marking to market and collateral requirements by the exchange. We use end-of-day data of the federal funds futures directly from the Chicago Mercantile Exchange (CME).

Our sample period starts in 1994 and ends in 2009. With the first meeting in 1994, the FOMC started to communicate its decision by issuing press releases after meetings and policy decisions. The liquidity trap and zero lower bound on nominal interest rates determine the end of our sample because there is little variation in federal funds futures-implied rates.

The FOMC has eight scheduled meetings per year and, starting with the first meeting in 1994, most press releases are issued around 2:15 p.m. E.T.

Let  $ff_{t,0}$  denote the rate implied by the current-month federal funds futures on date  $t$  and assume an FOMC meeting takes place during that month.  $t$  is the day of the FOMC meeting and  $D$  is the number of days in the month. We can then write  $ff_{t,0}$  as a weighted average of the prevailing federal funds target rate,  $r_0$ , and the expectation of the target rate after the meeting,  $r_1$ :

$$ff_{t,0} = \frac{t}{D}r_0 + \frac{D-t}{D}\mathbb{E}_t(r_1) + \mu_{t,0}, \quad (1)$$

where  $\mu_{t,0}$  is a risk premium.<sup>2</sup> Gürkaynak et al. (2007) estimate risk premia of 1 to 3 basis points, and Piazzesi and Swanson (2008) show that they only vary at business cycle frequencies. We focus on intraday changes to calculate monetary policy surprises and neglect risk premia in the following, as is common in the literature.

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<sup>2</sup>We implicitly assume date  $t$  is after the previous FOMC meeting. Meetings are typically around six to eight weeks apart.

We can calculate the surprise component of the announced change in the federal funds rate,  $v_t$ , as:

$$v_t = \frac{D}{D-t}(ff_{t+\Delta t^+,0} - ff_{t-\Delta t^-,0}), \quad (2)$$

where  $t$  is the time when the FOMC issues an announcement,  $ff_{t+\Delta t^+,0}$  is the fed funds futures rate shortly after  $t$ ,  $ff_{t-\Delta t^-,0}$  is the fed funds futures rate just before  $t$ , and  $D$  is the number of days in the month.<sup>3</sup> The  $D/(D-t)$  term adjusts for the fact that the federal funds futures settle on the average effective overnight federal funds rate.

We follow Gürkaynak et al. (2005) and use the unscaled change in the next-month futures contract if the event day occurs within the last seven days of the month. This ensures small targeting errors in the federal funds rate by the trading desk at the New York Fed, revisions in expectations of future targeting errors, changes in bid-ask spreads, or other noise, which have only a small effect on the current-month average, are not amplified through multiplication by a large scaling factor.

### III Empirical Results

#### A. Methodology

We follow a large event-study literature focusing on the conditional reaction of stock returns around contractionary and expansionary monetary policy shocks by the FOMC.

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<sup>3</sup>We implicitly assume in these calculations that the average effective rate within the month is equal to the federal funds target rate and that only one rate change occurs within the month. Due to changes in the policy target on unscheduled meetings, we have six observations with more than one change in a given month. As these policy moves were not anticipated, they most likely have no major impact on our results. We nevertheless analyze intermeeting policy decisions separately in our empirical analyses.

Contrary to the recent literature studying intraday event windows of 30 to 60 minutes, we focus on drifts in returns several days up to a few weeks before and after the announcement. Specifically, the FOMC policy day constitutes event day 0, and we then study the reaction of returns in event time before and after the announcement, separating expansionary from contractionary monetary policy shocks.

## **B. Baseline**

Figure 1 plots the return movements around FOMC announcements separately for expansionary and contractionary monetary policy surprises, which we calculate following equation (2). Expansionary monetary policy shocks are all surprises which are smaller or equal to zero, whereas we define positive surprises as contractionary monetary policy shocks. In line with the recent literature, we focus on regular FOMC meetings and exclude FOMC policy decisions occurring on unscheduled meetings, so-called intermeeting policy decisions. Faust et al. (2004) argue that intermeeting policy decisions are likely to reflect new information about the state of the economy, and hence, the stock market might react to news about the economy rather than changes in monetary policy. We show robustness checks regarding the sample below.

We see in Figure 1 that stock returns start drifting upwards around 25 days before expansionary monetary policy decisions (blue-solid line), whereas stock returns are flat or drift down slightly before contractionary monetary policy decisions (red-dashed line). For both types of events, we see a positive return on the day before the FOMC meeting, the pre-FOMC announcement drift of Lucca and Moench (2015). For expansionary monetary policy events, stock returns continue to increase. Following contractionary shocks, instead,

we see flat or slightly decreasing returns for the next 20 days. The difference in cumulative return drifts around contractionary and expansionary monetary policy surprises amounts to 4.5%.

The sensitivity of stock returns to monetary policy shocks varies across types of events. Ozdagli and Weber (2016) find larger sensitivities of stock returns to monetary policy shocks on turning points in monetary policy compared to regular meetings. Turning points are target-rate changes in the direction opposite to the previous target-rate change. Turning points signal changes in the current and future stance on monetary policy (Jensen, Mercer, and Johnson (1996); Piazzesi (2005); Coibion and Gorodnichenko (2012)). Figure 2 shows very similar drift patterns when we also exclude turning points in monetary policy in addition to intermeeting policy moves, both in sign and magnitude, and Figure 3 shows the same drift pattern in returns when we exclude neither of the two types of events.

So far, we assign meeting dates with zero monetary policy shock to the expansionary monetary policy shocks sample. Figure 4 shows this definition does not drive our findings. When we exclude all events with zero policy surprises, we confirm our baseline findings.

The figures so far plot cumulative returns from 50 days before until 50 days after the FOMC meeting. The choice of the window implies that part of the window overlaps with previous and subsequent FOMC meetings. Figure 5 repeats our event-window analysis, but focuses on 15 days before and after the event, ensuring no overlap with other FOMC meetings. The figure documents similar return patterns in the narrow event window with a cumulative return difference between expansionary and contractionary policy shocks of 2%.

Our baseline sample lasts until the start of the binding ZLB, whereas a large event

study literature stops in the early 2000s. Figure 6 shows results for a sample ending in 2004 which confirm our baseline finding.

Cieslak and Vissing-Jorgensen (2017) document a Fed Put; that is, the FOMC tends to lower federal funds target rates following weak stock returns. Figure 7 plots cumulative returns for the CRSP value-weighted index when we split events by actual changes in federal funds target rates. We find stock returns tend to be lower before the FOMC lowers its target rate and higher before increases in target rates. Returns tend to remain flat when we condition on either positive or negative changes in the actual target rates. These results for actual changes in target rates are consistent with Cieslak and Vissing-Jorgensen (2017), but it is unlikely that a Fed Put explains our findings, because we show that stock returns drift *upwards* before *lower-than-expected* federal funds target rates, whereas returns tend to drift *downwards* before *cuts in actual* target rates.

So far, our analysis relies on graphs and eyeball econometrics. Table 1 reports regression estimates for different event windows around FOMC policy decisions ranging from  $-15$  until  $+15$  days around the meetings. Specifically, we regress cumulative returns of the CRSP value-weighted index from  $t^- = -15$  until  $t^- + s$ , with  $s$  running from 1 until  $+30$  and  $s = 15$  being the event day,  $r_{t^-, t^- + s}$ , on a constant and a dummy variable which equals 1 around expansionary monetary policy surprises,  $\mathcal{D}^{exp}$ :

$$r_{t^-, t^- + s} = \beta_0 + \beta_1 \times \mathcal{D}^{exp} + \varepsilon_{t^-, t^- + s}. \quad (3)$$

$\beta_0$  reports the average cumulative return around contractionary monetary policy surprises, whereas  $\beta_1$  reports the average differential cumulative return around expansionary



monetary policy surprises relative to cumulative returns on contractionary policy meetings. We report robust t-statistics in parenthesis.

Panel A reports results for our baseline sample excluding intermeeting policy releases. We see returns drift upward before expansionary surprises relative to contractionary surprises, but the differential drift is not statistically significant before the policy release. Including the day of the release, the differential drift is 1.5% and statistically significant at the 10% level. Returns continue to drift upward differentially, resulting in a difference in cumulative returns of 2% five days after the meeting and doubling to 3% 15 days after the meeting. All post-meeting estimates of  $\beta_1$  are significant at the 5% level.

In Panels B to D, we see economically and statistically similar results for samples with intermeetings when we exclude both intermeetings and turning points, or when we exclude all events with zero monetary policy surprises: returns start drifting upwards before expansionary monetary policy surprises, the cumulative return differential reaches around 1.5% on the day of the meeting, and increases to about 3% over the course of the next 15 days.

Table 2 adds control variables to the previous specifications. Specifically, we add dummies which equal 1 if an FOMC meeting corresponds to an intermeeting or turning point in monetary policy. We see that cumulative returns tend to be negative around intermeeting policy decisions, consistent with findings in the literature with no differential drift around turning points in monetary policy and no effect of actual changes in the target rate on cumulative returns. Importantly, our baseline results continue to hold in a sample with these additional controls.

Table 3 also adds the level of the federal funds rate in addition to the previous

controls, because stock markets might be differentially sensitive at different stages of the business cycle. Contrary to this hypothesis, we never find a statistically significant effect of the level of the federal funds rate on cumulative stock returns around FOMC meetings and no effect on the differential return drift around positive versus negative surprises.

A large literature focuses on the reaction of stock returns to monetary policy shocks using scaled changes in current months' federal funds futures implied target rates, but stock returns might also react to changes in expectations about the future path of target rates (see Neuhierl and Weber (2017) for similar arguments). Table 4 uses the path factor of Gürkaynak, Sack, and Swanson (2005) as an additional covariate which is available until 2004. A positive path factor tends to be associated with lower cumulative stock returns of around 10 basis points, but controlling for it does not change the economic message on the paper.

### **C. Cross-Sectional Factors**

So far, we have focused on the drift of a broad market index around expansionary and contractionary monetary policy surprises, but the reaction of the CRSP value-weighted index might camouflage large cross-sectional variation. We first study the reaction of the five Fama and French (2015) factors.

Figure 8 plots the drift around FOMC announcements for the size factor. Cumulative excess returns are close to zero around both expansionary and contractionary monetary policy surprises. The non-response of the size factor might reflect the insignificant

unconditional size premium during our sample period.<sup>4</sup>

Figure 9 plots the drift for the value factor, Figure 10 plots the drift for the profitability factor, and Figure 11 plots the drift for the investment factor. Overall, little drift occurs neither before nor after the announcement for all three factors for expansionary monetary policy surprises. Before contractionary monetary policy surprises, we see an upward drift of value firms relative to growth firms, high-profitability relative to low-profitability firms, and low- relative to high-investment firms, but the drift levels off at the announcement and is smaller than the drift for the overall market.

Lastly, Figure 12 plots the drift for the momentum factor. We see little return drift for expansionary monetary policy surprises. Around contractionary monetary policy surprises, however, we see a large upward drift for the momentum factor: starting 20 days before the announcement, excess returns drift upwards, reaching 2% on the day of the announcement, but continue to drift for another 20 days, and a cumulative drift of 4% for the 40-day window centered around contractionary monetary policy surprises. The 4% cumulative return is large relative to an average annual excess return of the momentum factor of 6.12% between 1994 and 2009 and 10% when we end the sample in 2008 and exclude the momentum crash (see Daniel and Moskowitz (2016)).

An upward drift of past winners or a downward drift of past losers might drive the large upward drift of the momentum factor around contractionary monetary policy surprises. Figure 13 plots the cumulative excess returns around contractionary and expansionary monetary policy surprises separately for past winners and losers. We define

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<sup>4</sup>Asness, Frazzini, Israel, Moskowitz, and Pedersen (2015) show that firm size is highly correlated with other firm characteristics and once they condition on these, the size effect reappears. This result is consistent with evidence in Freyberger, Neuhierl, and Weber (2017), who find that the size effect conditional on other firm characteristics is strongest in the modern sample period.

past winners to be portfolio 10 in the ten momentum-sorted portfolios of Fama & French and past losers to be portfolio 1. For expansionary monetary policy announcements, we see no large drift for the momentum factor, because both past winners and losers tend to drift upwards in parallel. Around contractionary surprises, however, we see a pronounced downward drift in returns: starting 10 days before the announcement, past losers start drifting downwards, reaching a cumulative return of -2% on the FOMC meeting day and continue drifting down for another 10 days and a cumulative return of -5% within these 25 days. In Figure 14, we see a similar pattern in a sample until 2004, indicating a momentum crash is unlikely to explain these patterns.

## **D. Industry Returns**

Industries might react differentially to monetary policy shocks, because of demand effects or different sensitivities to monetary policy. Durable goods demand is particularly volatile over the business cycle, and consumers can easily shift the timing of their purchases, thus making monetary policy sensitivity especially high (see, e.g., D’Acunto, Hoang, and Weber (2017)). Figure 15 to Figure 18 plot the cumulative industry returns following the Fama & French 17 industry classification for expansionary monetary policy shocks in blue and for contractionary monetary policy shocks in red.

For all but one industries, we see a differential drift around expansionary versus contractionary monetary policy surprises which averages around 4% consistent with the overall results for the CRSP value-weighted index. The mining industry is an exception, because returns also drift upwards around contractionary monetary policy shocks (see Figure 17). We observe the largest differential drift for the machinery industry with a

cumulative return difference of more than 7% (see Figure 16).

## ***E.* International Equity Returns**

We now study international equity returns around FOMC meetings to see whether similar returns patterns are present around the world. Lucca and Moench (2015) already document that their pre-FOMC announcement drift is a global phenomenon in that international stock indices appreciate in the 24 hours before the announcement of U.S. monetary policy decisions.

Figure 19 plots the cumulative returns of the German DAX 30 index around expansionary and contractionary monetary policy decisions. Similar to the evidence for the United States, we see stock returns drifting differentially before expansionary versus contractionary surprises starting around 20 days before the U.S. monetary policy decision. The return gap between the two types of events increases to around 3.5% on the day of the FOMC meeting. Returns of the DAX index, however, continue to drift in the same direction, so that the return gap widens to 6% 15 days after the FOMC meeting.

We find similar evidence for the Canadian TSX Composite index in Figure 20, for the French CAC40 in Figure 21, the Spanish IBEX 35 index in Figure 22, the Swiss SMI index in Figure 23, and the British FTSE100 in Figure 24, but to a lesser extent. The Japanese Nikkei 225 in Figure 25 is an exception with almost zero return drift. The non-result for the Nikkei is consistent with Lucca and Moench (2015), who also do not find any pre-FOMC return drift for Japan.

## **F. Trading Strategy**

We report daily mean returns, standard deviations, and Sharpe ratios in Table 6, to benchmark the economic significance of the differential drift of the CRSP value-weighted index around FOMC monetary policy decisions across expansionary and contractionary policy surprises. Specifically, we compare the Sharpe ratios of monetary momentum strategies to the ones for a buy-and-hold strategy for event windows around the FOMC meeting  $t$  of different lengths in trading days. The event window in columns (1) and (2) starts 15 days before the FOMC meeting and ends 15 days after the FOMC meeting. The monetary momentum strategy invests in the market when the monetary policy shock is expansionary, and shorts the market when the monetary policy shock is contractionary. We calculate the annualized Sharpe ratio as the ratio of the daily mean excess return and the daily standard deviation multiplied by the square root of 252.

We see in column (1) that holding the market in the 30 days around the FOMC meeting results in an annualized Sharpe ratio of 0.20. The baseline monetary momentum strategy, instead, has a Sharpe ratio of 0.61 which is more than three times larger than the Sharpe ratio of the passive long-only strategy.

Lucca and Moench (2015) document large returns in the 24 hours before the FOMC meeting. These large returns cannot explain the increase in Sharpe ratios by a factor of three, because the buy-and-hold strategy automatically harvests these returns. In columns (3) and (4), we nevertheless study event windows which exclude the day of and the day before the FOMC meeting.<sup>5</sup> We see that a passive buy-and-hold strategy earns a negative Sharpe ratio when we exclude the large returns before the FOMC meeting. The monetary

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<sup>5</sup>We work with daily returns and both days cover part of that pre-FOMC drift window.

momentum strategy, instead, still earns an economically meaningful Sharpe ratio of 0.43.

So far, we might not be able to implement the monetary momentum strategies we study, because we do not know the sign of the monetary policy surprise 15 days before the FOMC meeting.<sup>6</sup> We now study event windows which start only the day after the FOMC meeting in columns (5) and (6). The passive buy-and-hold strategy has a Sharpe ratio of 0.13 only. A strategy which starts investing in market for 15 days whenever the monetary policy surprise was negative on the previous day instead earns an annualized Sharpe ratio of 0.52, which is larger by a factor of 4.

Columns (5) and (6) compare the Sharpe ratio of a strategy which holds the market throughout the year with a *buy-and-hold strategy plus* which shorts the market for 15 days following any contractionary monetary policy surprise. We see that this simple timing strategy which is implementable in real time increases annualized Sharpe ratios by 65%.

For comparison, Panel B lists annualized Sharpe ratios for the five Fama & French factors. We see that the simple market timing rule monetary momentum strategies imply results in Sharpe ratios which are comparable with the Sharpe ratios of leading risk factors and do not require frequent rebalancing or the trading of a large number of stocks.

## IV Concluding Remarks

Momentum is a pervasive feature across asset classes, countries, and sample periods. We document novel time-series momentum strategies around monetary policy decisions in the United States. Starting 20 days before expansionary monetary policy announcements,

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<sup>6</sup>There is a recent literature arguing that monetary policy shocks are predictable; see, e.g., Miranda-Agrippino (2016). In fact, we could use information in federal funds futures before the meeting possibly to predict the surprise.

stock returns start drifting up. Before contractionary monetary policy surprises, instead, returns drift downwards. The differential drift continues after the policy decision for another 15 days and amounts to 4% per year within 30 days of the monetary policy decision.

The differential drift we document is largely a market-wide phenomenon and holds for all industries, but we find little differential drift for cross-sectional asset pricing factors. Momentum is an exception: around contractionary policy shocks we find large momentum returns, because loser stocks tend to plummet. The drift we document is a global phenomenon, and major stock indices around the world exhibit the differential drift around U.S. contractionary and expansionary monetary policy decisions.

A simple market-timing strategy which exploits the monetary momentum strategy we document improves on the Sharpe ratio of a buy-and-hold investor by a factor of 4, and investors can implement the strategy in real time.



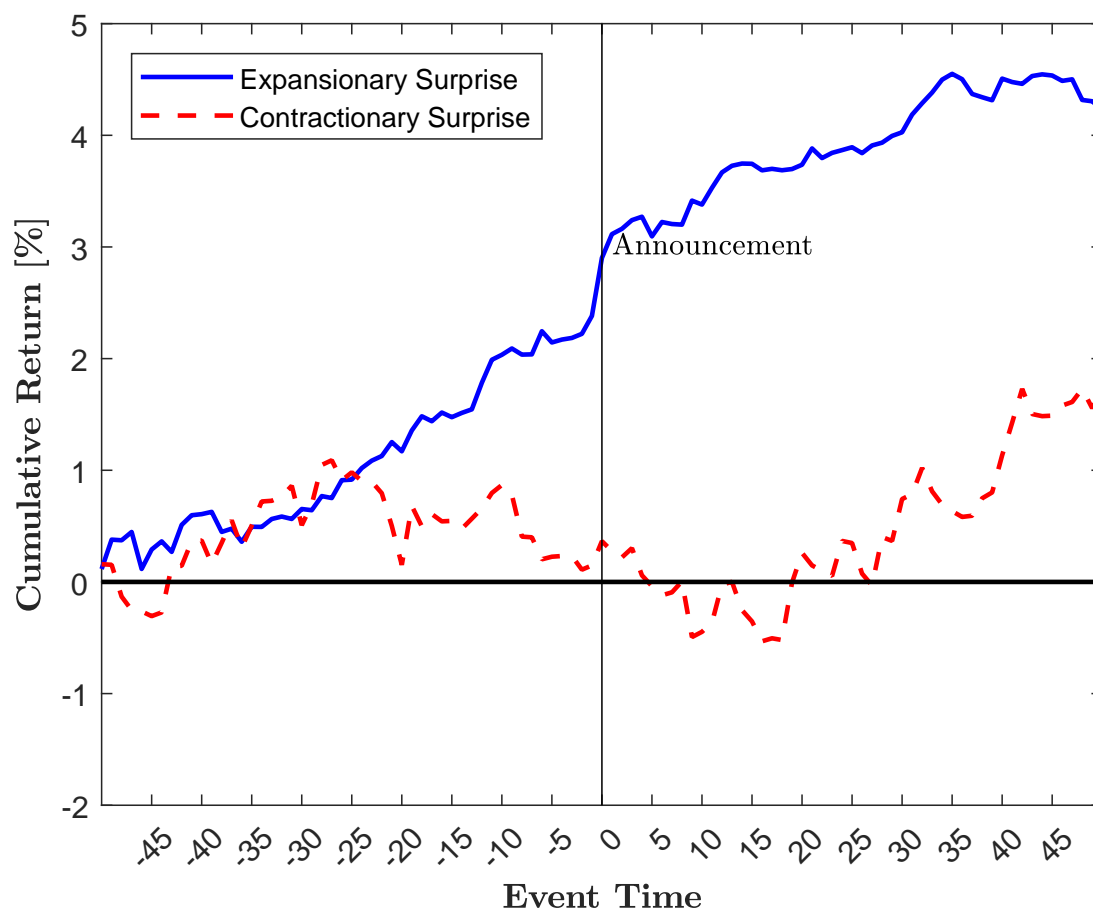
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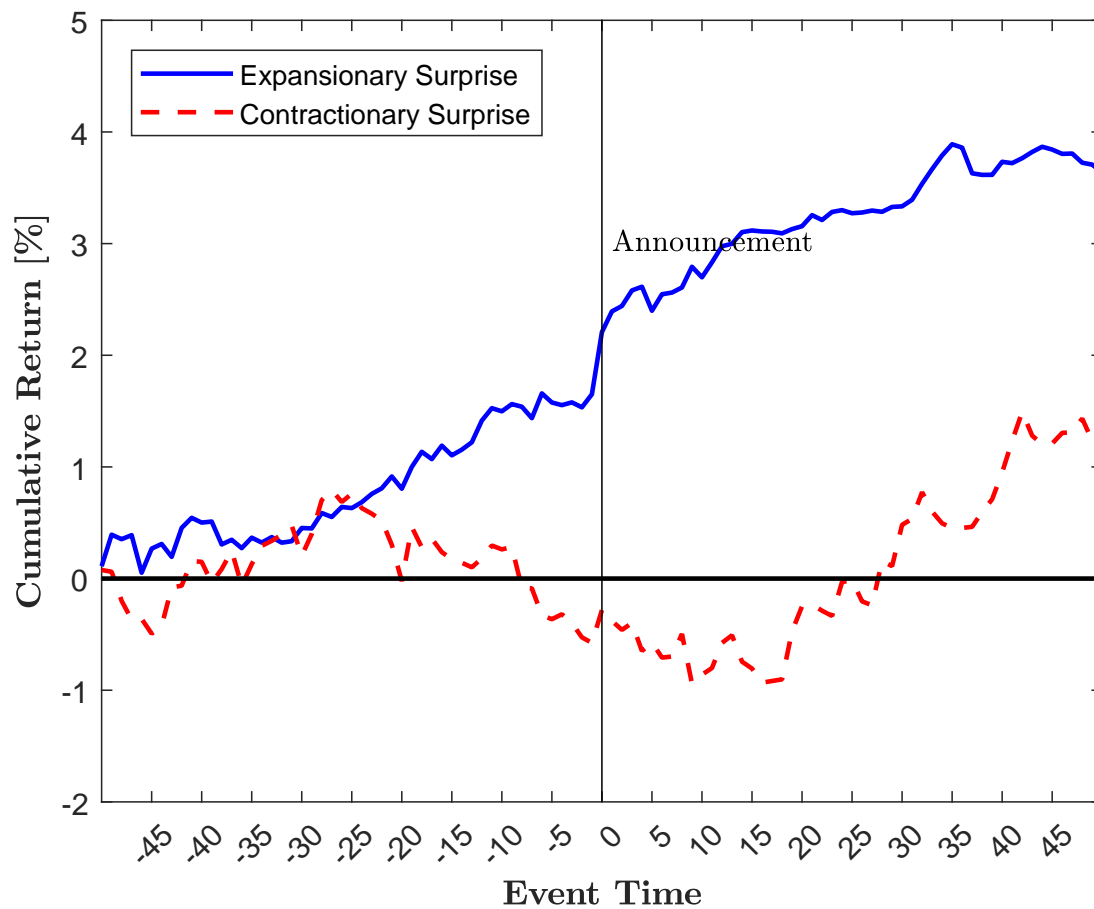
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Figure 2: **Cumulative Returns around FOMC Policy Decisions: No Turning Points**



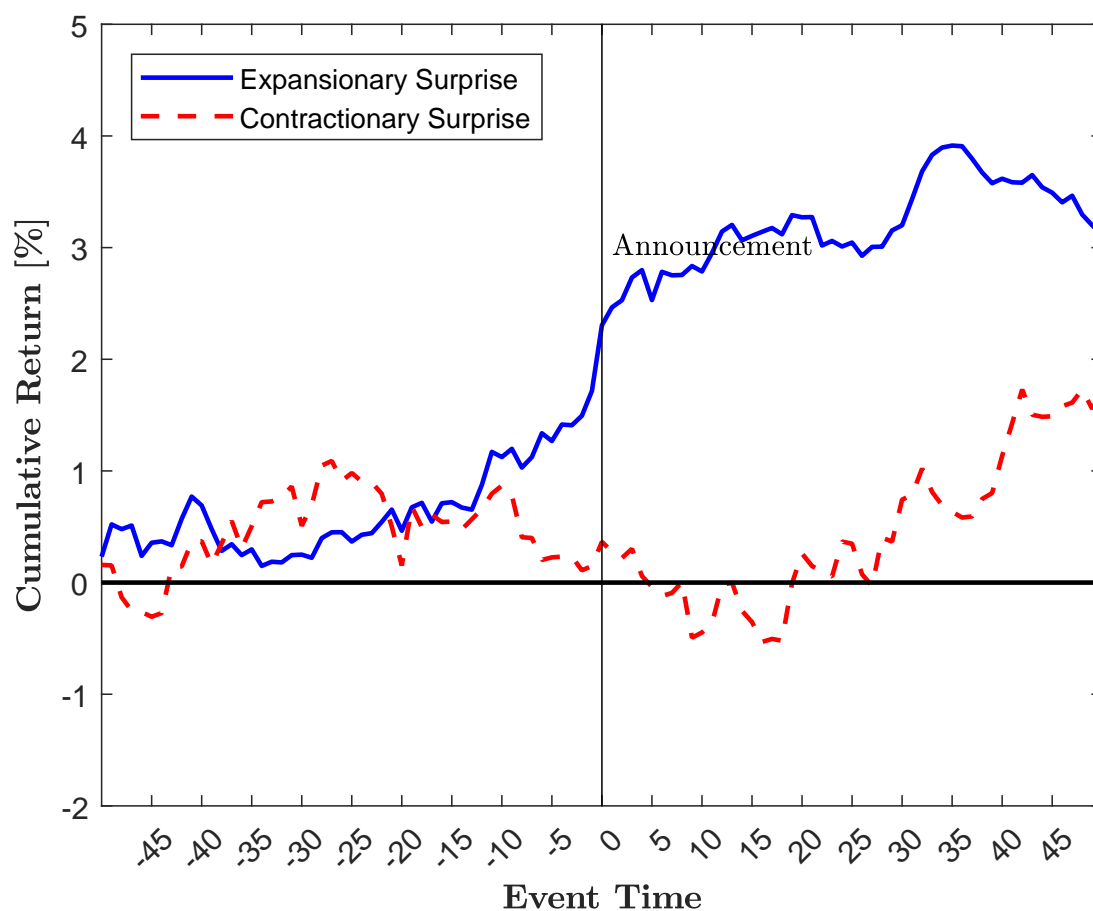
*This figure plots cumulative returns in percent around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. We exclude turning points in federal funds target rates. The sample period is from 1994 to 2009.*

Figure 3: **Cumulative Returns around FOMC Policy Decisions: Including Intermeeting Decisions**



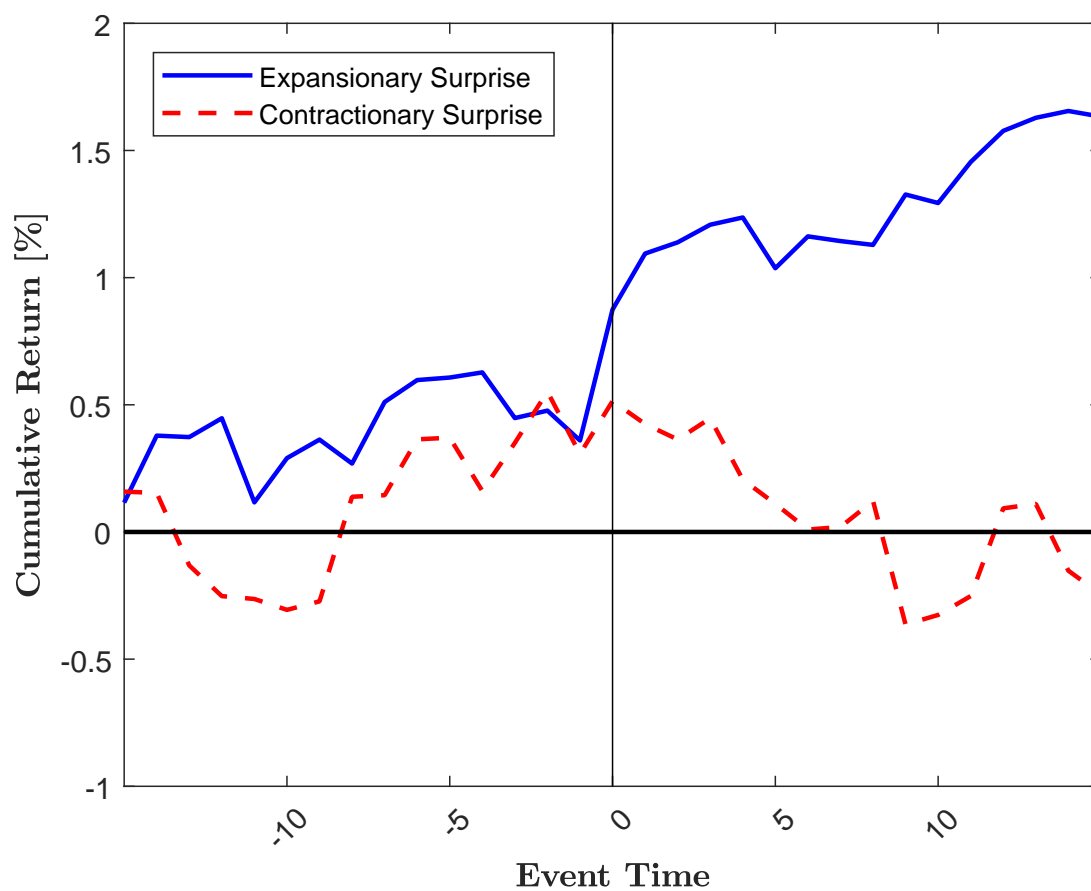
*This figure plots cumulative returns in percent around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. We add intermeeting policy decisions to the sample. The sample period is from 1994 to 2009.*

Figure 4: **Cumulative Returns around FOMC Policy Decisions: No Zero Surprises**



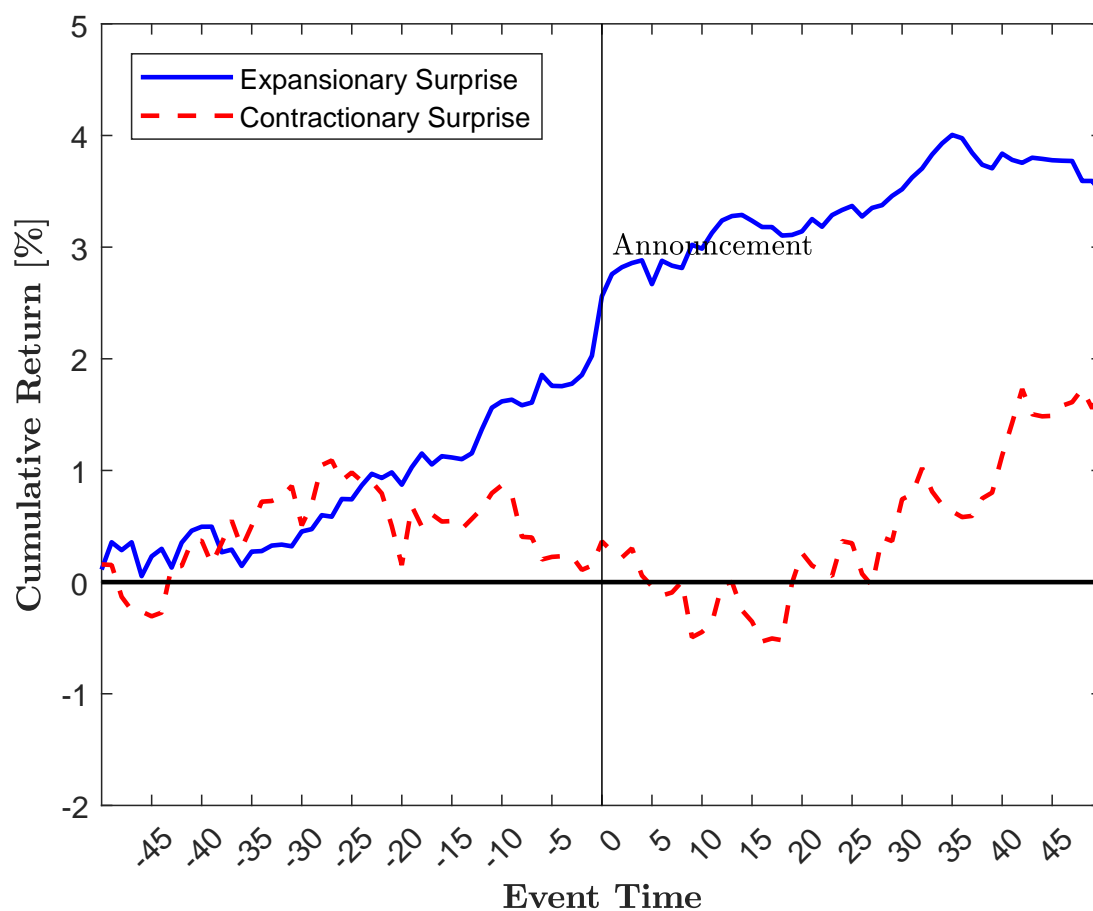
*This figure plots cumulative returns in percent around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. We exclude zero monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 5: Cumulative Returns around FOMC Policy Decisions: Short Window



*This figure plots cumulative returns in percent around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

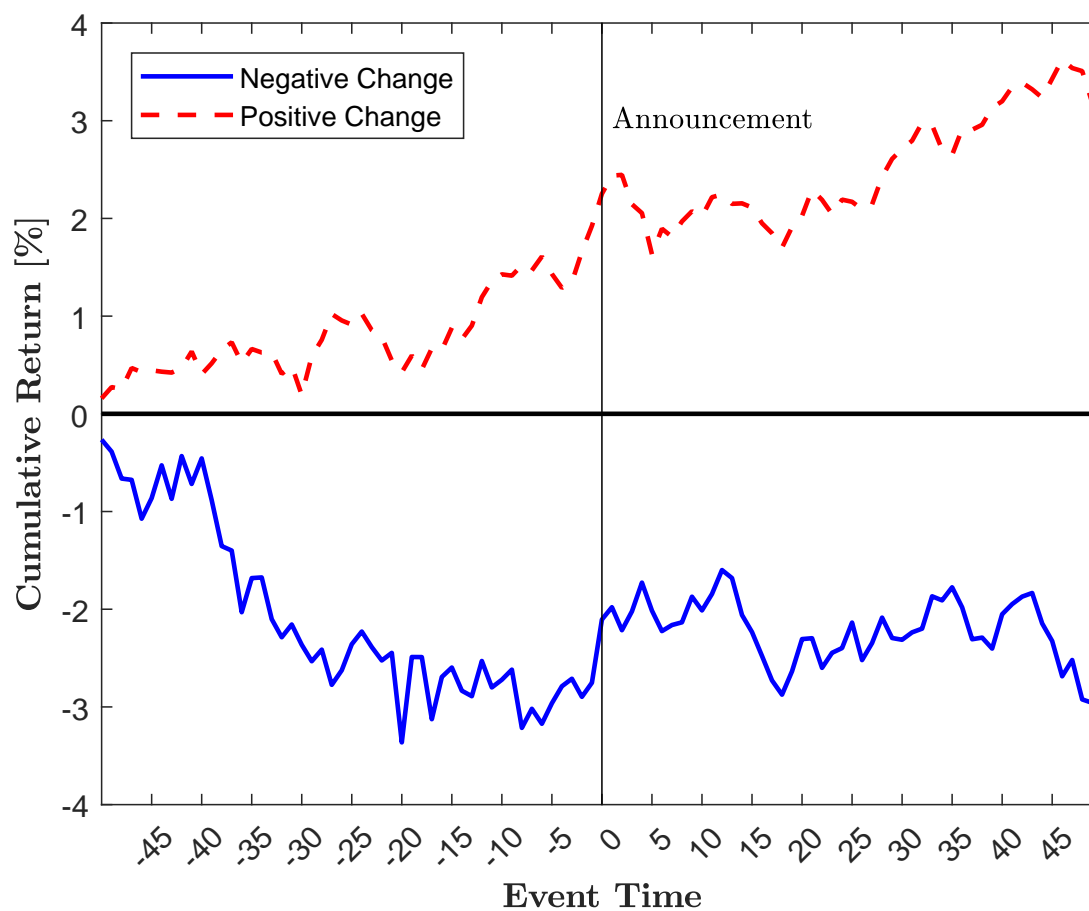
Figure 6: **Cumulative Returns around FOMC Policy Decisions: 1994–2004**



*This figure plots cumulative returns in percent around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2004.*

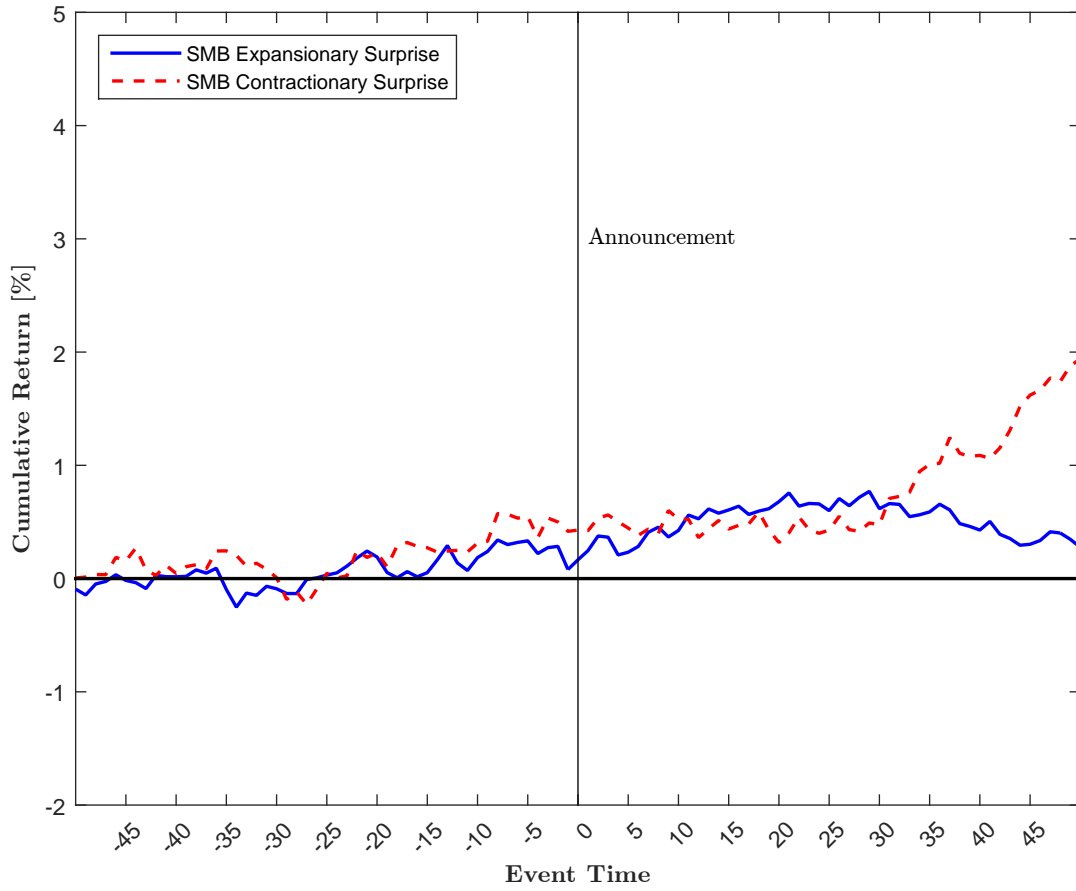


Figure 7: **Cumulative Returns around FOMC Policy Decisions: Actual Change**



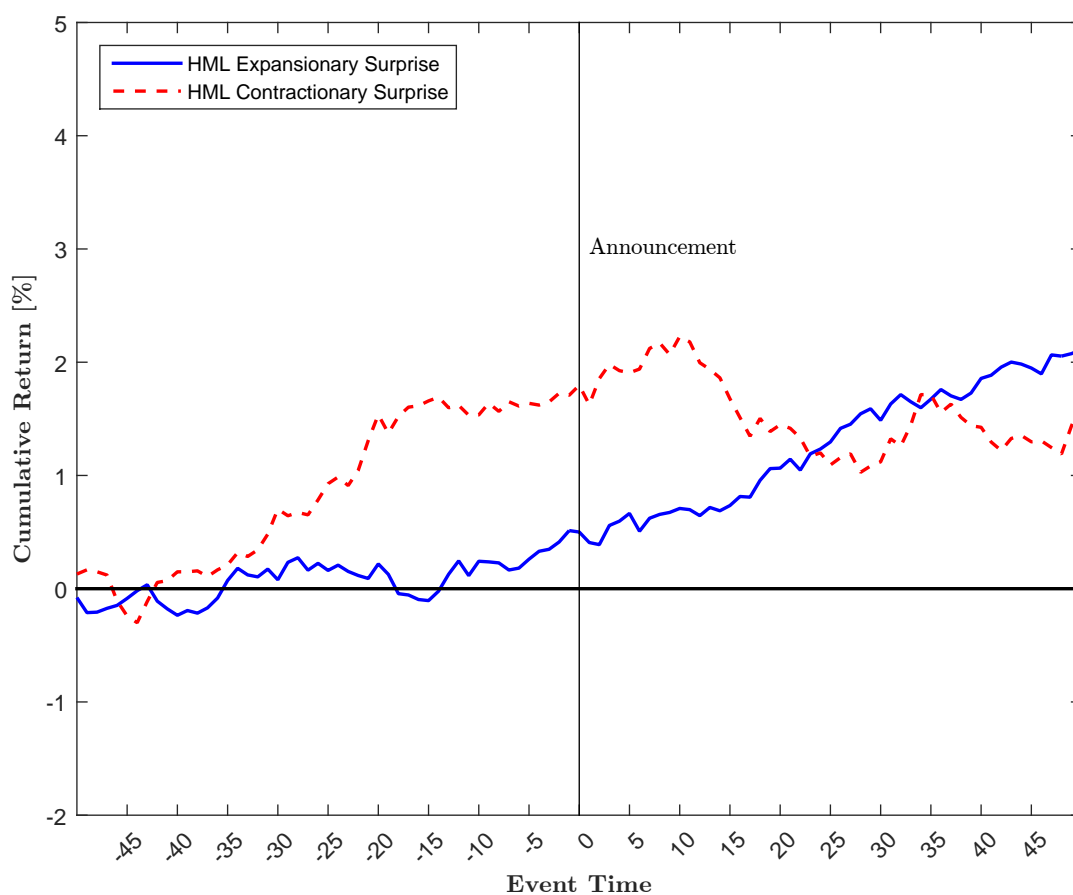
*This figure plots cumulative returns in percent around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) changes in actual federal funds target rates. The sample period is from 1994 to 2009.*

Figure 8: Cumulative Returns around FOMC Policy Decisions: SMB



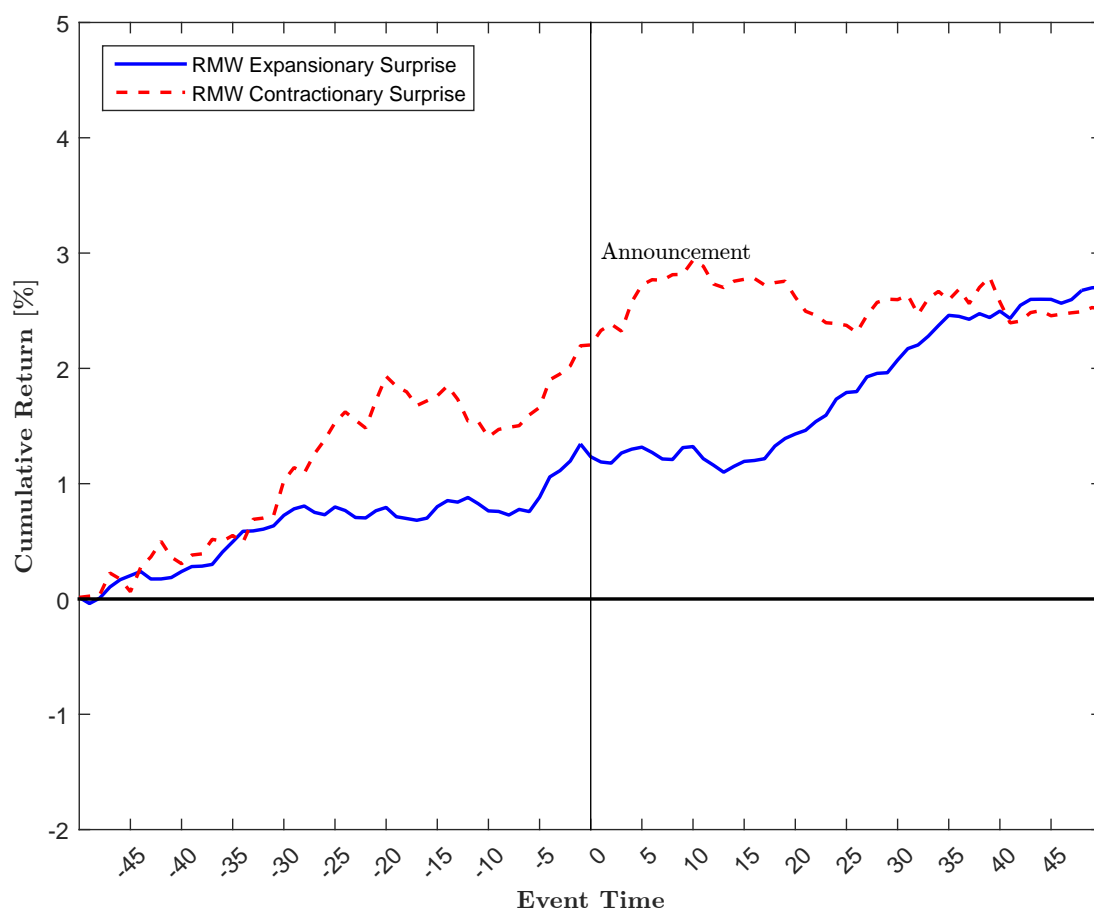
*This figure plots cumulative returns in percent for the SMB factor around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 9: Cumulative Returns around FOMC Policy Decisions: HML



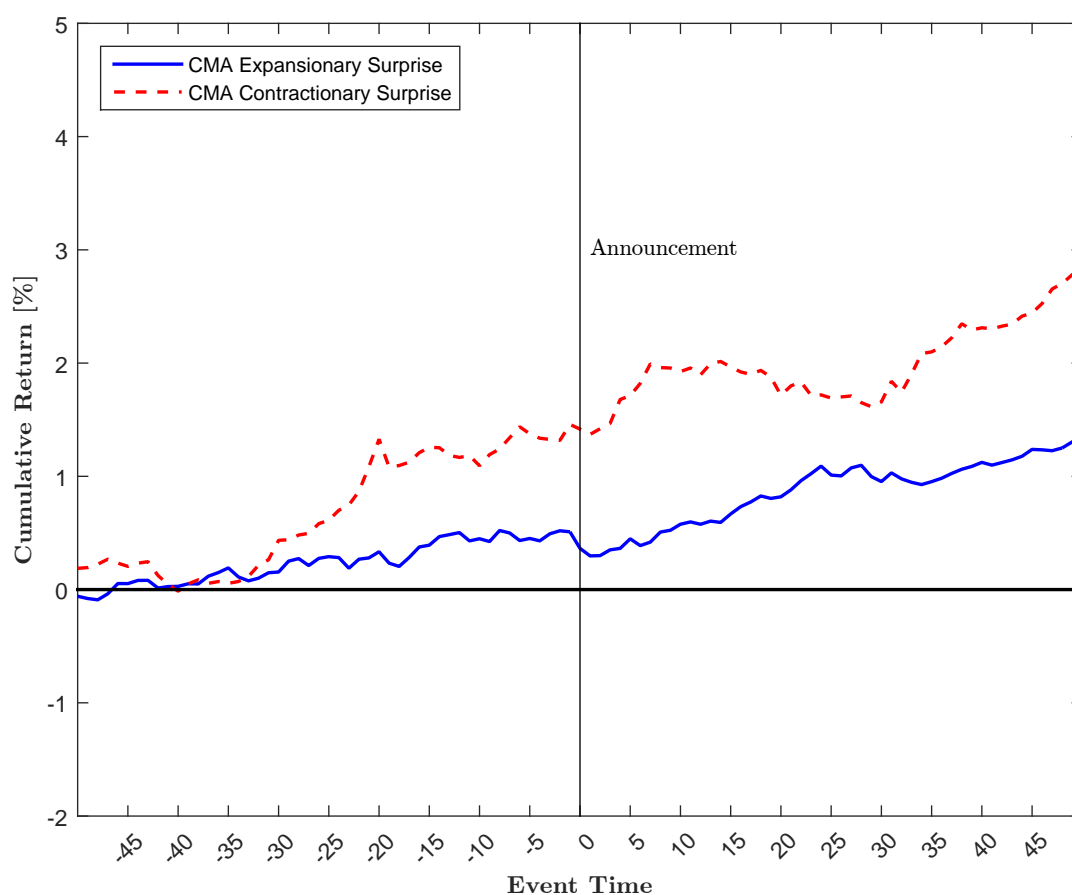
*This figure plots cumulative returns in percent for the HML factor around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 10: Cumulative Returns around FOMC Policy Decisions: RMW



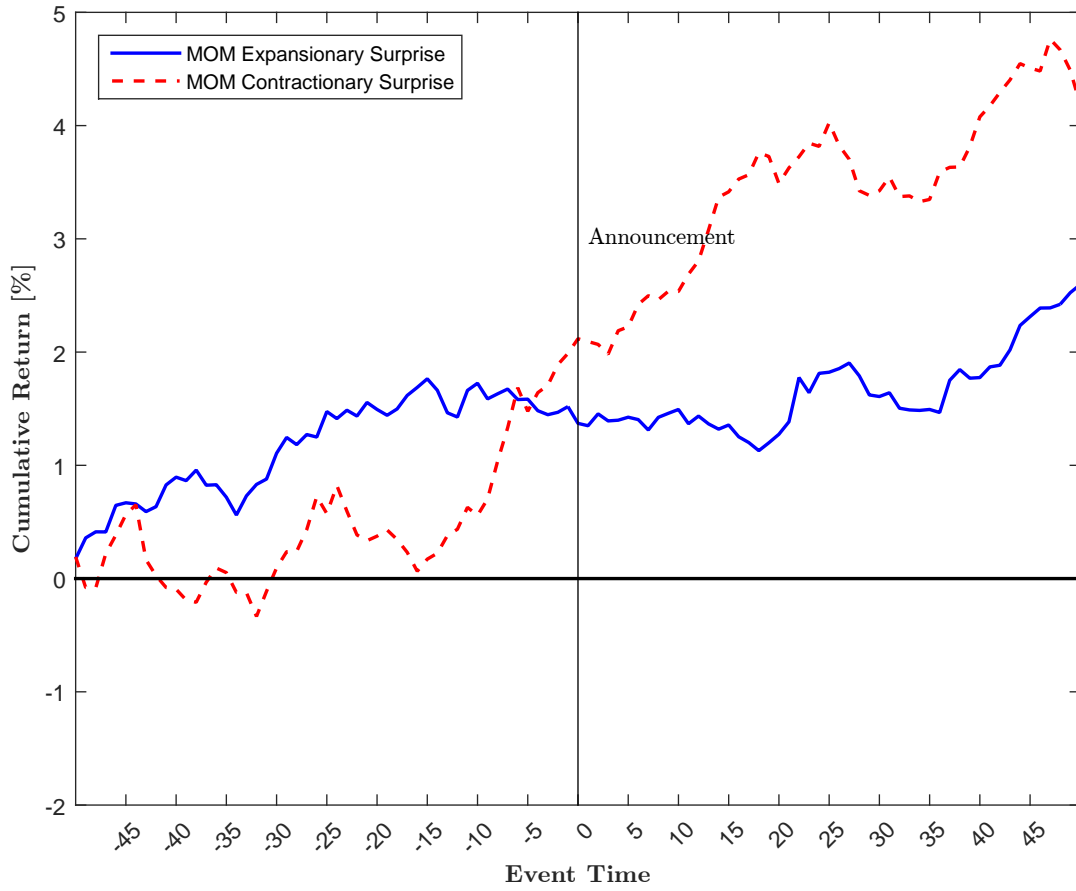
*This figure plots cumulative returns in percent for the RMW factor around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 11: Cumulative Returns around FOMC Policy Decisions: CMA



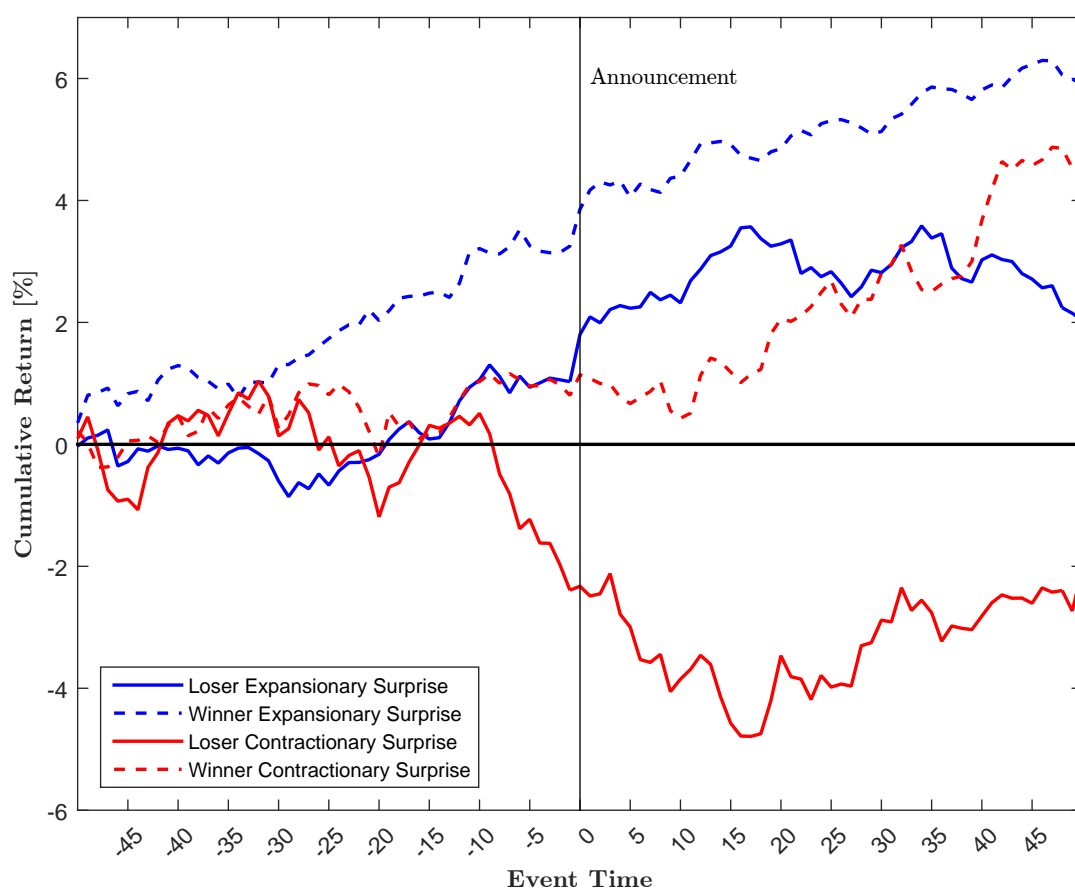
*This figure plots cumulative returns in percent for the CMA factor around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 12: **Cumulative Returns around FOMC Policy Decisions: Momentum**



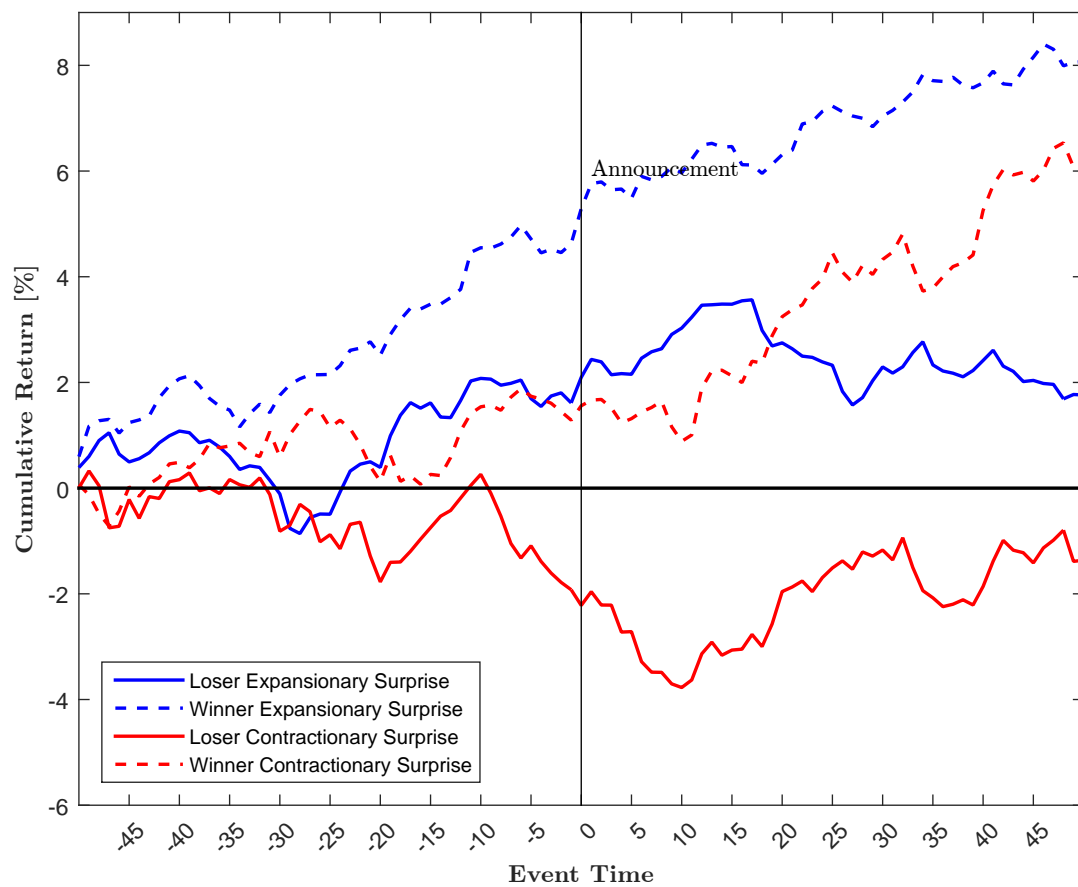
*This figure plots cumulative returns in percent for the Momentum factor around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 13: **Cumulative Returns around FOMC Policy Decisions: Winners vs Losers**



*This figure plots cumulative returns in percent for past winners and losers around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

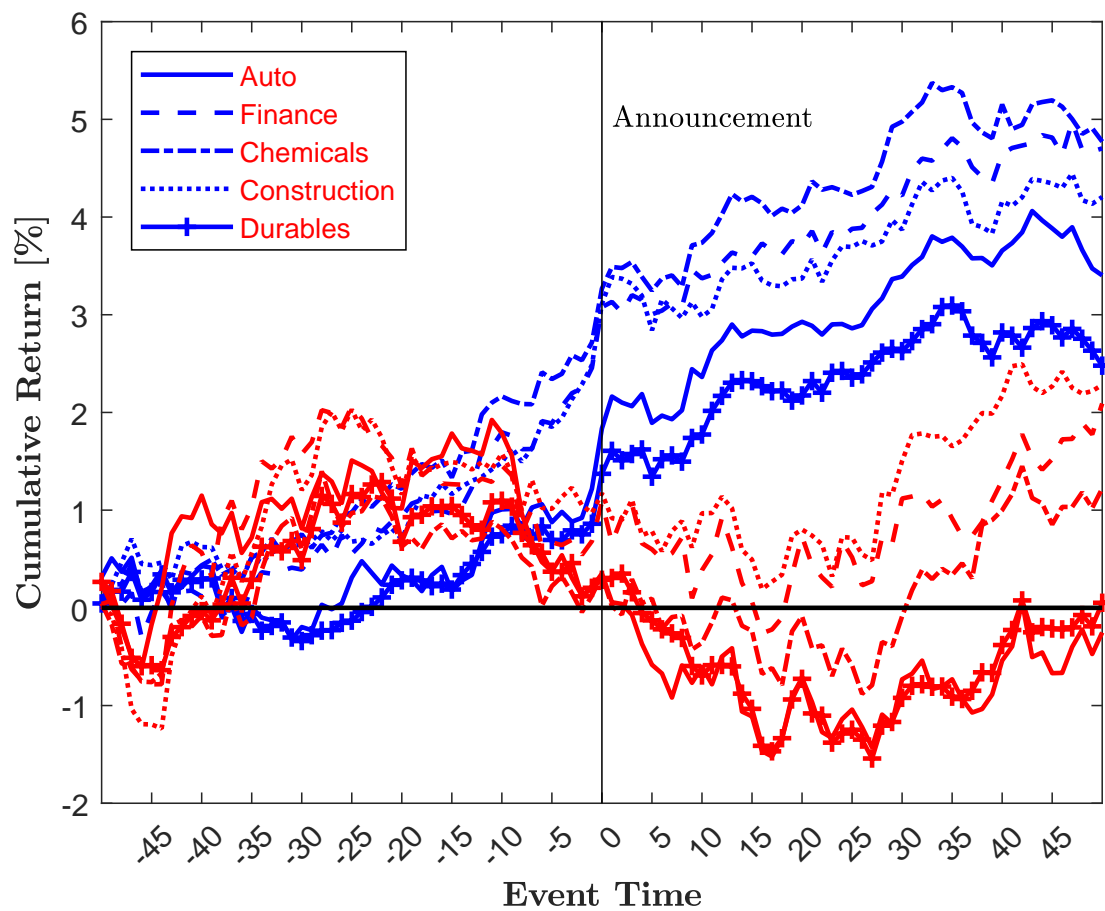
Figure 14: **Cumulative Returns around FOMC Policy Decisions: Winners vs Losers (1994–2004)**



*This figure plots cumulative returns in percent for past winners and losers around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2004.*

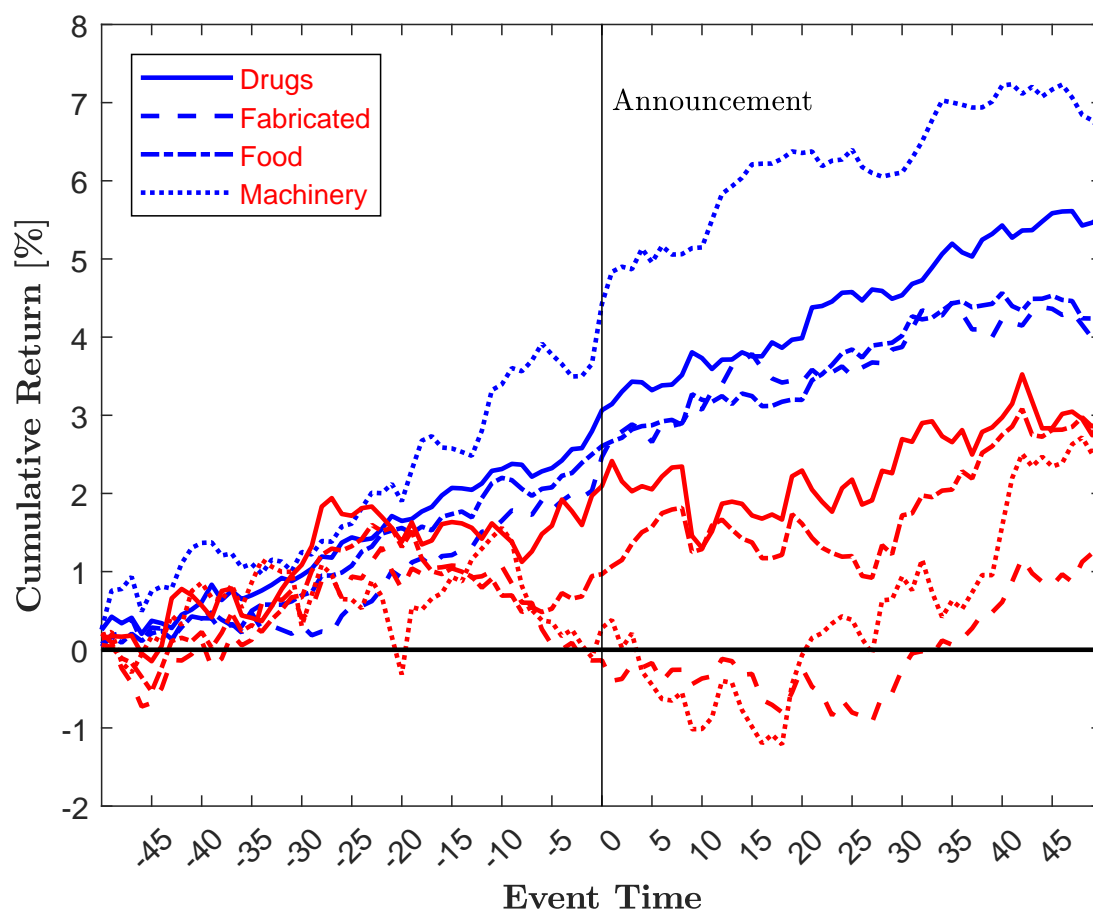


Figure 15: Cumulative Returns around FOMC Policy Decisions: Industry Returns I



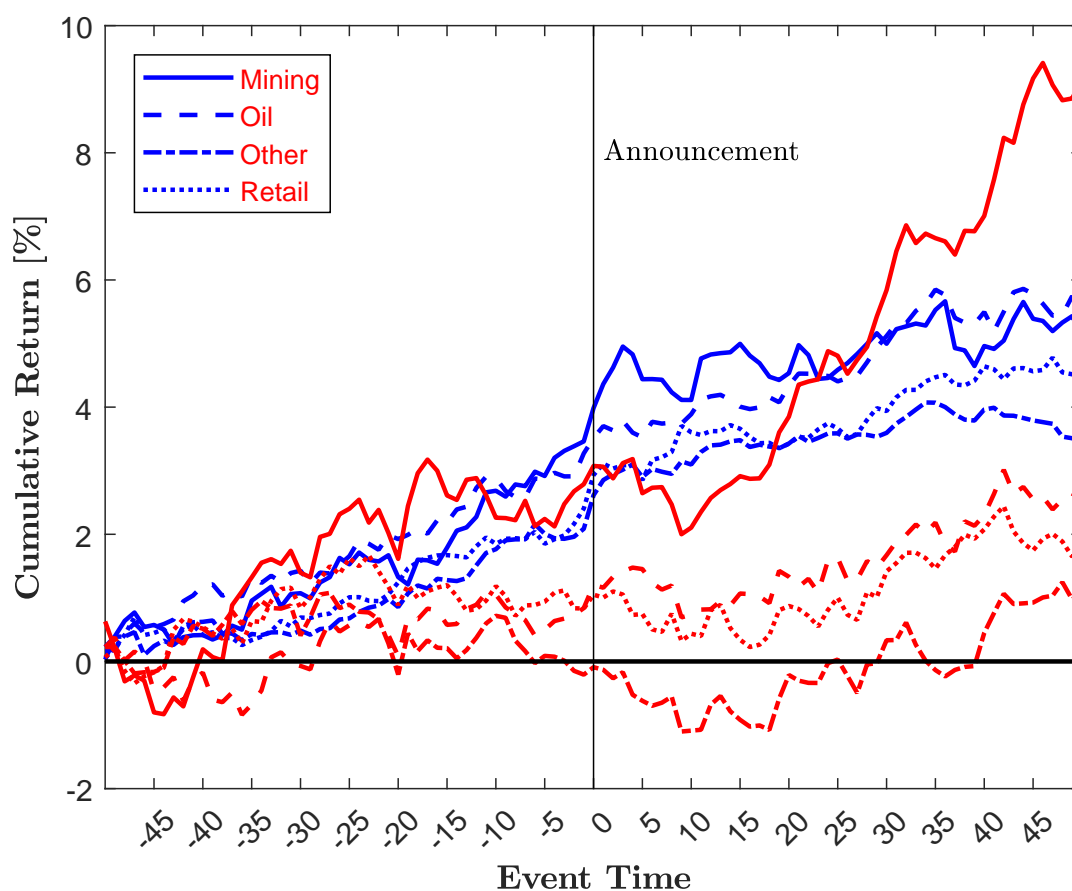
*This figure plots cumulative returns in percent at the industry level around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 16: Cumulative Returns around FOMC Policy Decisions: Industry Returns II



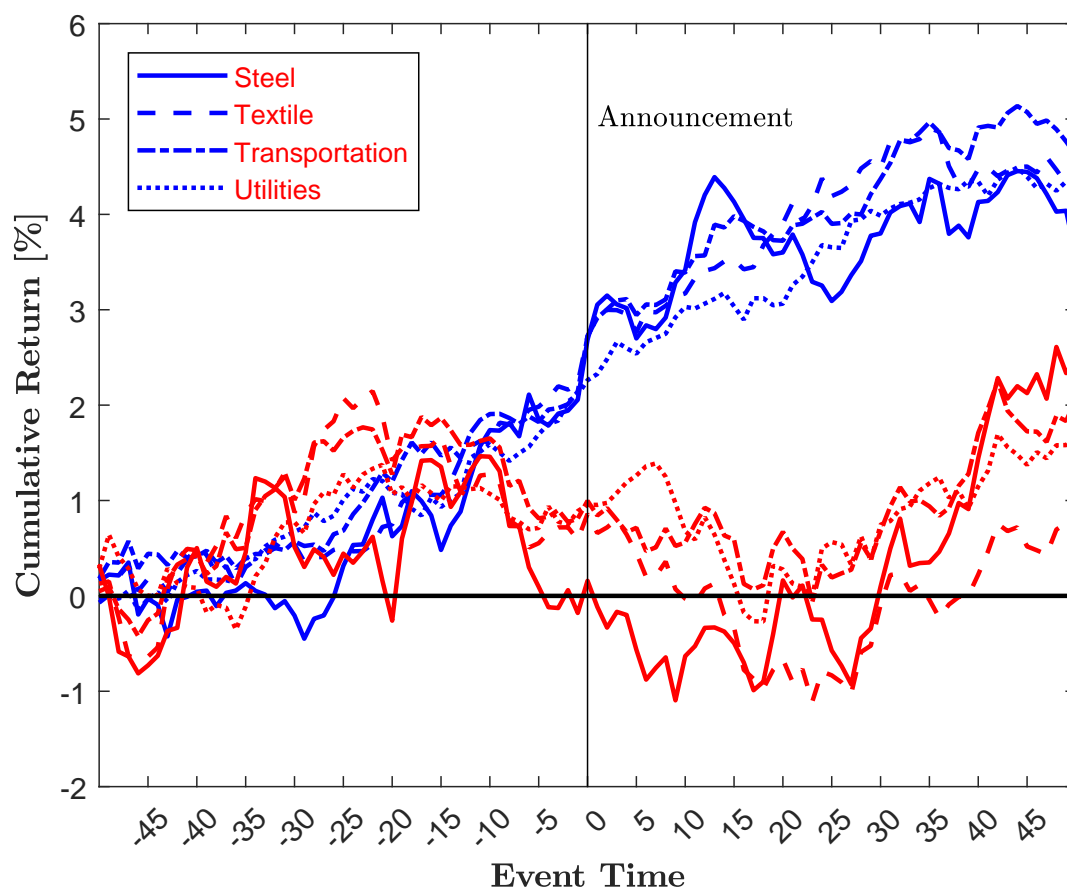
*This figure plots cumulative returns in percent at the industry level around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 17: Cumulative Returns around FOMC Policy Decisions: Industry Returns III



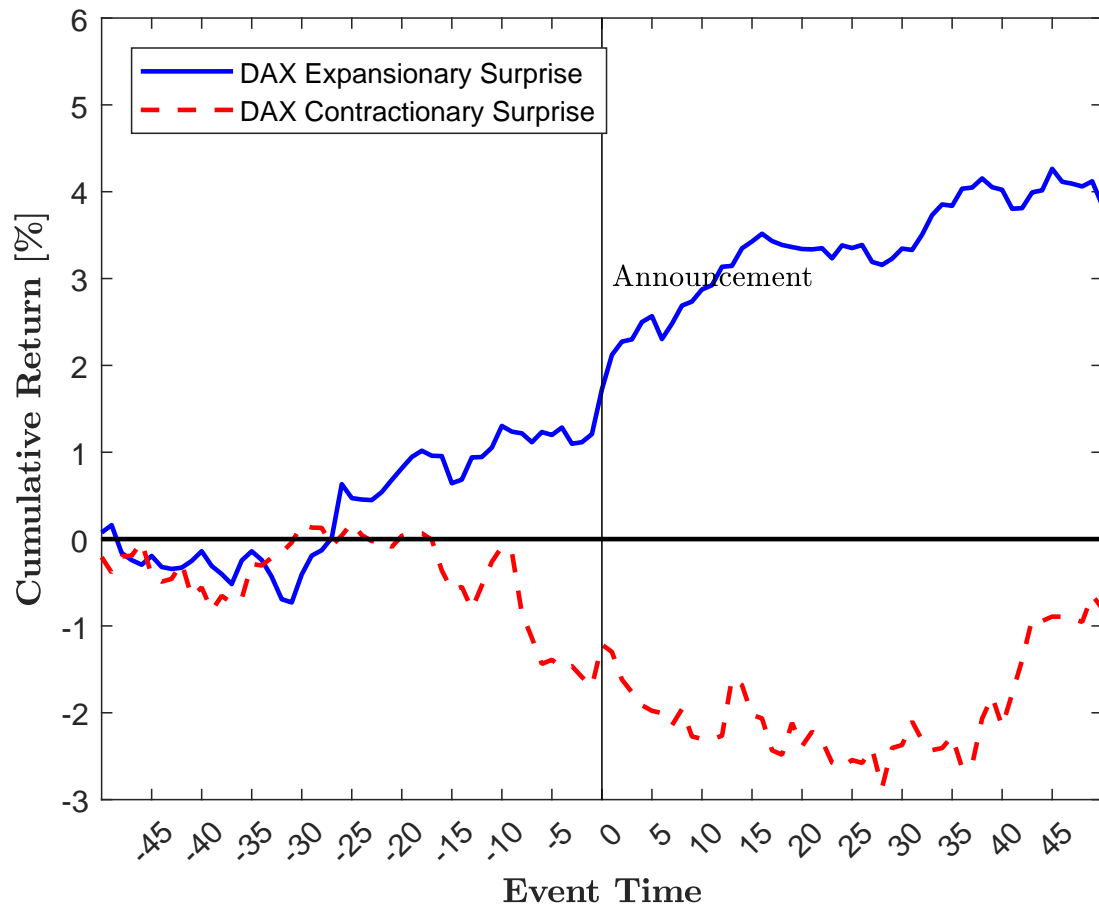
*This figure plots cumulative returns in percent at the industry level around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 18: Cumulative Returns around FOMC Policy Decisions: Industry Returns IV



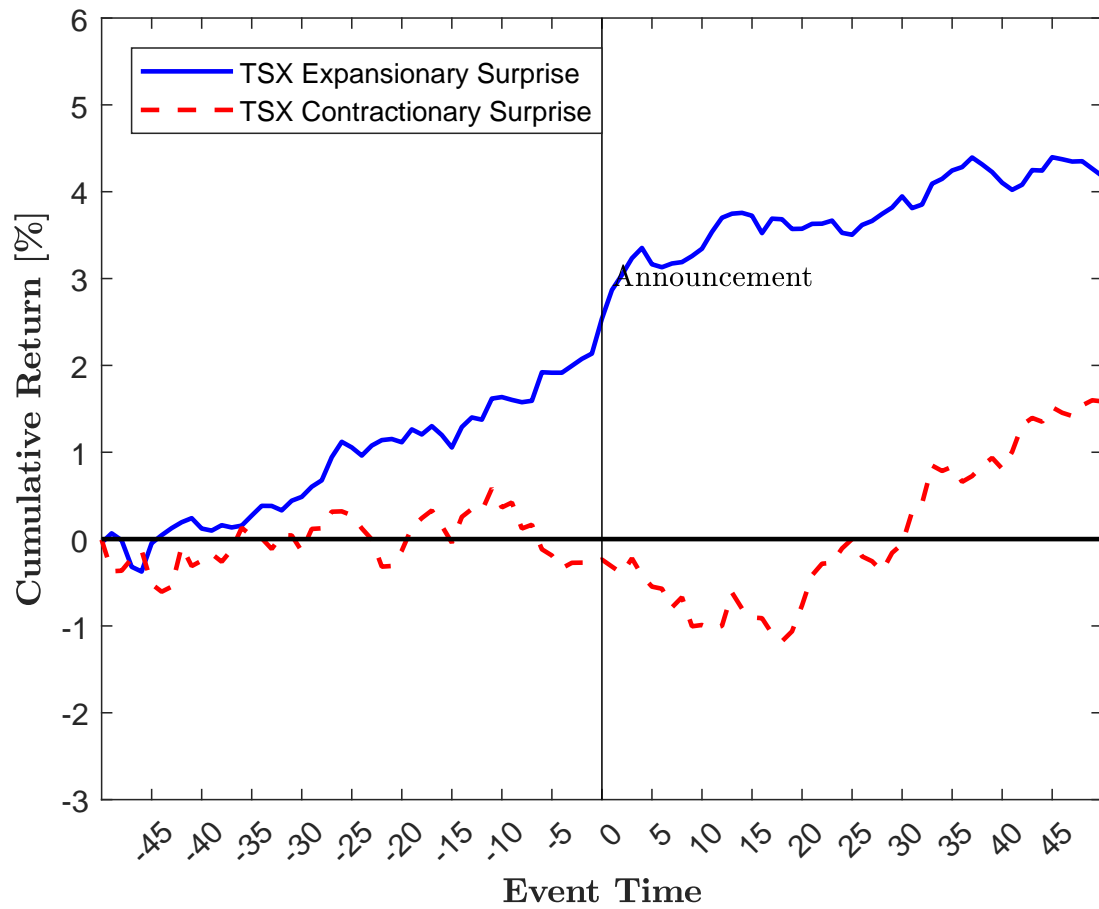
*This figure plots cumulative returns in percent at the industry level around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 19: **Cumulative Returns around FOMC Policy Decisions: DAX 30**



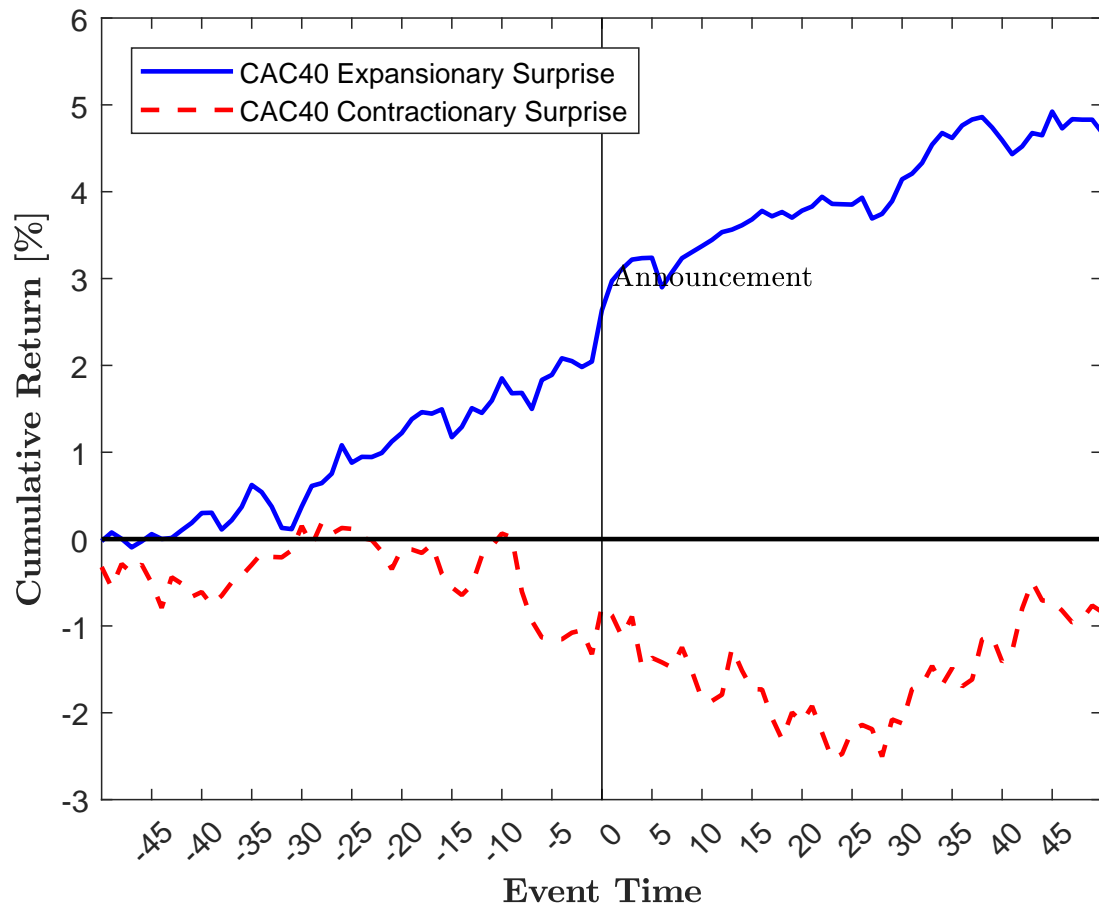
*This figure plots cumulative returns in percent for the DAX 30 around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 20: **Cumulative Returns around FOMC Policy Decisions: TSX 300**



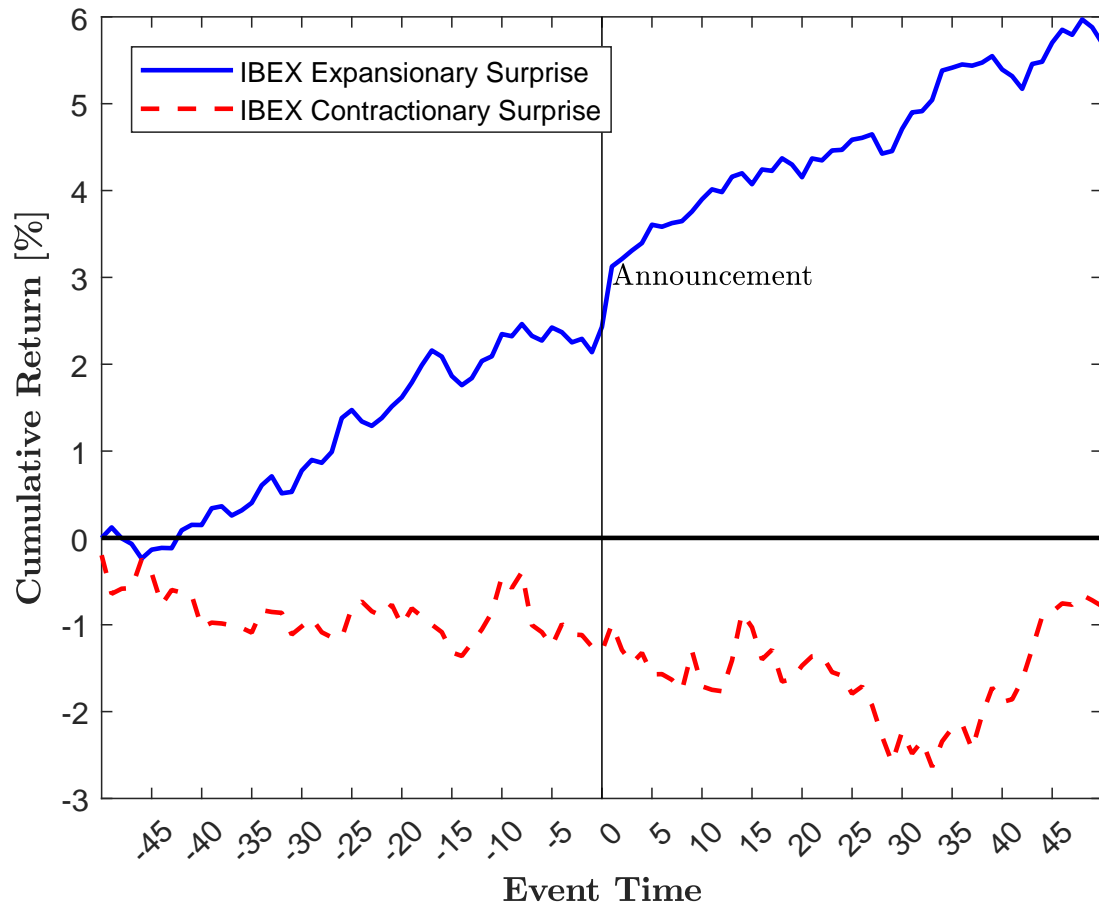
*This figure plots cumulative returns in percent for the TSX 300 around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 21: **Cumulative Returns around FOMC Policy Decisions: CAC 40**



*This figure plots cumulative returns in percent for the CAC 40 around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

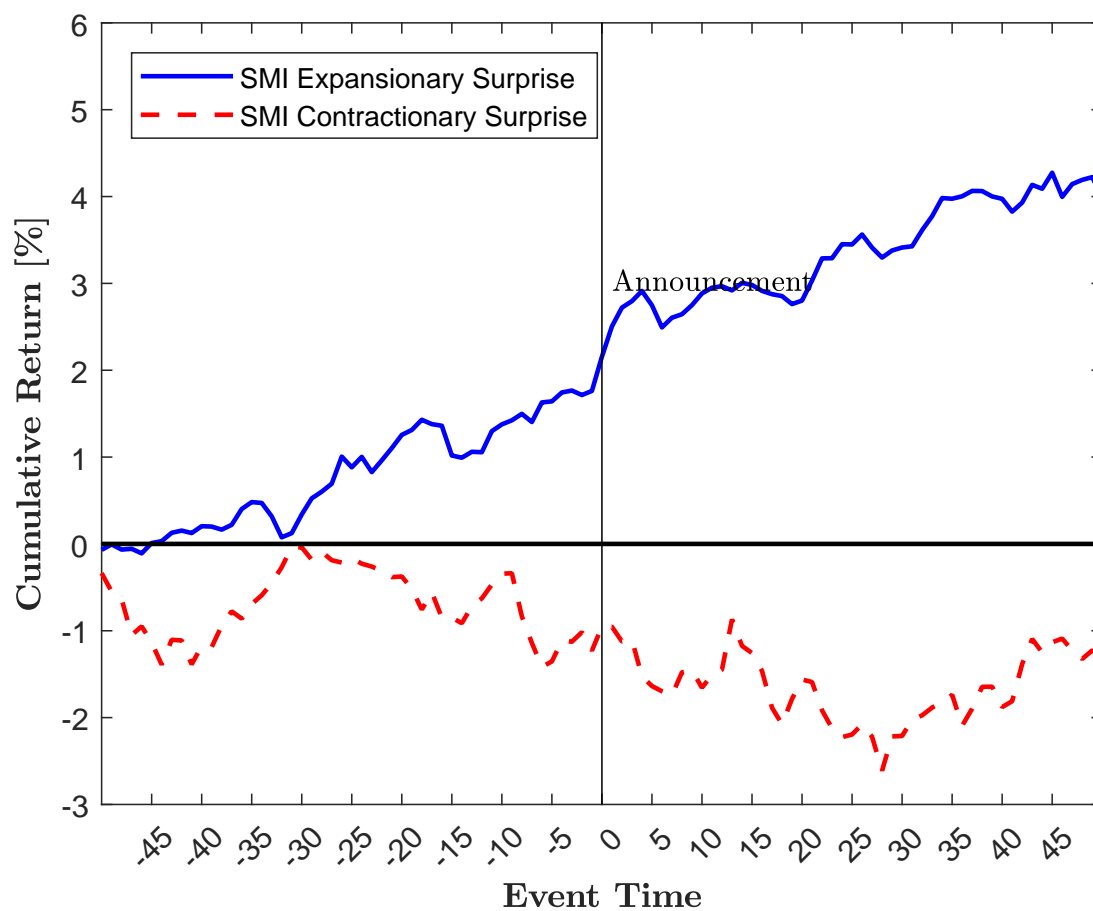
Figure 22: Cumulative Returns around FOMC Policy Decisions: IBEX 35



*This figure plots cumulative returns in percent for the IBEX 35 around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

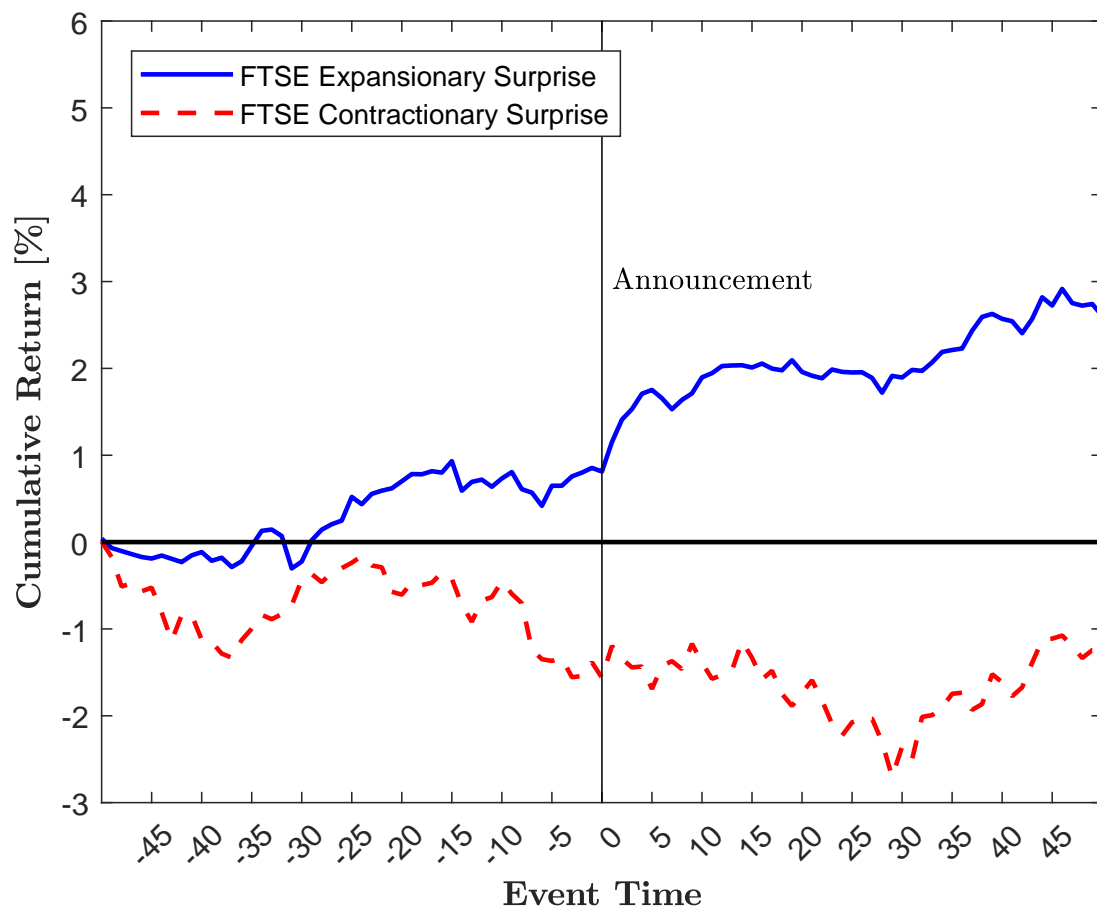


Figure 23: Cumulative Returns around FOMC Policy Decisions: SMI



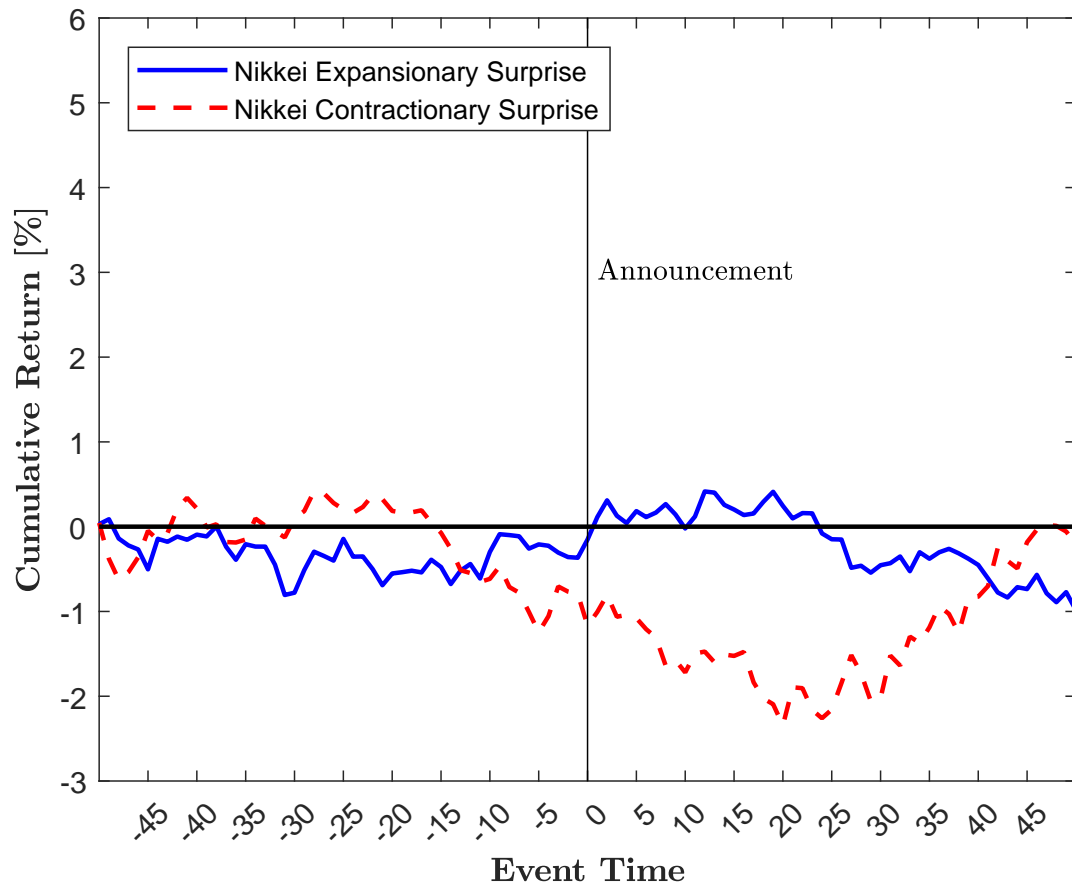
*This figure plots cumulative returns in percent for the SMI around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 24: Cumulative Returns around FOMC Policy Decisions: FTSE 100



*This figure plots cumulative returns in percent for the FTSE 100 around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Figure 25: Cumulative Returns around FOMC Policy Decisions: Nikkei 225



*This figure plots cumulative returns in percent for the Nikkei 225 around FOMC policy decisions separately for positive (contractionary; red-dashed line) and negative (expansionary; blue-solid line) monetary policy surprises. The sample period is from 1994 to 2009.*

Table 1: Cumulative Returns around FOMC Decisions

Panel A reports the cumulative return of the CRSP value-weighted index around FOMC policy decisions, excluding policy decisions on intermeetings.  $\mathcal{Q}^{exp}$  is a dummy which equals 1 if the monetary policy surprise is negative (expansionary). 0 is the day of the FOMC meeting. Panel B adds intermeeting policy dates, Panel C excludes intermeetings and turning points in monetary policy, and Panel D excludes events with zero monetary policy surprises. The sample period is from 1994 until 2009.

	-15	-10	-5	-1	0	1	2	3	4	5	10	15
<b>Panel A. No Intermeetings</b>												
$\mathcal{Q}^{exp}$	-0.05 (-0.17)	0.06 (0.10)	0.83 (1.22)	1.11 (1.35)	1.46* (1.78)	1.75** (2.01)	1.85** (2.13)	1.83** (2.05)	2.10** (2.29)	2.02** (2.19)	2.68** (2.52)	2.92** (2.32)
Constant	0.02 (0.07)	0.43 (0.96)	-0.23 (-0.40)	-0.26 (-0.35)	-0.07 (-0.09)	-0.15 (-0.19)	-0.21 (-0.27)	-0.11 (-0.15)	-0.36 (-0.45)	-0.46 (-0.60)	-0.87 (-0.96)	-0.76 (-0.69)
Nobs	129											
Adjusted $R^2$	-0.01	-0.01	0.00	0.01	0.02	0.03	0.03	0.03	0.04	0.03	0.04	0.04
<b>Panel B. With Intermeetings</b>												
$\mathcal{Q}^{exp}$	-0.02 (-0.07)	0.14 (0.26)	0.88 (1.30)	1.14 (1.37)	1.45* (1.74)	1.73* (1.93)	1.84** (2.05)	1.91** (2.12)	2.19** (2.39)	1.89** (2.03)	2.45** (2.33)	2.79** (2.28)
Constant	-0.05 (-0.24)	0.12 (0.26)	-0.52 (-0.95)	-0.70 (-1.00)	-0.42 (-0.62)	-0.52 (-0.70)	-0.60 (-0.81)	-0.53 (-0.70)	-0.78 (-1.02)	-0.70 (-0.96)	-0.99 (-1.19)	-0.91 (-0.90)
Nobs	137											
Adjusted $R^2$	-0.01	-0.01	0.01	0.01	0.01	0.0	0.02	0.03	0.04	0.02	0.03	0.03
<b>Panel C. No Intermeetings &amp; Turningspoints</b>												
$\mathcal{Q}^{exp}$	0.06 (0.22)	0.28 (0.51)	1.03 (1.47)	1.36 (1.63)	1.59* (1.89)	1.84** (2.04)	1.85** (2.04)	1.82* (1.98)	2.04** (2.15)	1.91** (2.00)	2.58** (2.33)	3.03** (2.33)
Constant	-0.10 (-0.44)	0.26 (0.57)	-0.36 (-0.62)	-0.43 (-0.58)	-0.22 (-0.30)	-0.25 (-0.31)	-0.18 (-0.23)	-0.06 (-0.08)	-0.27 (-0.33)	-0.35 (-0.43)	-0.81 (-0.86)	-0.88 (-0.78)
Nobs	122											
Adjusted $R^2$	-0.01	-0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.04
<b>Panel D. No Zero Surprises</b>												
$\mathcal{Q}^{exp}$	0.01 (0.03)	-0.05 (-0.08)	0.75 (0.99)	1.25 (1.43)	1.69* (1.92)	1.94** (2.09)	2.04** (2.21)	2.15** (2.27)	2.46** (2.54)	2.28** (2.33)	2.91** (2.59)	3.12** (2.32)
Constant	0.02 (0.07)	0.43 (0.96)	-0.23 (-0.40)	-0.26 (-0.35)	-0.07 (-0.09)	-0.15 (-0.19)	-0.21 (-0.27)	-0.11 (-0.15)	-0.36 (-0.45)	-0.46 (-0.60)	-0.87 (-0.96)	-0.76 (-0.69)
Nobs	103											
Adjusted $R^2$	-0.01	-0.01	0.00	0.01	0.03	0.04	0.04	0.04	0.05	0.04	0.06	0.04

Table 2: Cumulative Returns around FOMC Decisions: Including Controls

The table reports the cumulative return of the CRSP value-weighted index around FOMC policy decisions, excluding policy decisions on intermeetings.  $\mathcal{D}^{exp}$  is a dummy which equals 1 if the monetary policy surprise is negative (expansionary).  $\mathcal{D}^{inter}$  indicates an intermeeting policy move,  $\mathcal{D}^{turn}$  indicates a turning point in monetary policy, and  $\Delta FTR$  is the actual change in federal funds target rates. 0 is the day of the FOMC meeting. The sample period is from 1994 until 2009.

	-15	-10	-5	-1	0	1	2	3	4	5	10	15
$\mathcal{D}^{exp}$	-0.09 (-0.34)	0.08 (0.15)	0.83 (1.23)	1.09 (1.30)	1.34 (1.60)	1.63* (1.76)	1.78* (1.94)	1.80** (1.99)	2.05** (2.22)	1.79* (1.88)	2.45** (2.23)	2.82** (2.25)
$\mathcal{D}^{inter}$	-0.91 (-1.30)	-3.99*** (-3.24)	-4.19*** (-2.72)	-6.69*** (-3.14)	-5.82** (-2.17)	-6.16* (-1.88)	-6.28* (-1.89)	-5.92** (-2.36)	-6.03** (-2.45)	-5.37 (-1.62)	-4.21 (-1.14)	-3.68 (-1.00)
$\mathcal{D}^{turn}$	0.80 (1.19)	0.58 (0.53)	0.13 (0.10)	0.30 (0.18)	1.41 (1.03)	0.88 (0.67)	-0.27 (-0.18)	-0.72 (-0.42)	-0.74 (-0.45)	-0.71 (-0.43)	0.35 (0.22)	1.21 (0.56)
$\Delta FTR$	-0.23 (-0.27)	1.17 (0.87)	1.28 (0.65)	2.39 (1.21)	1.58 (0.66)	1.78 (0.74)	2.04 (0.95)	1.29 (0.63)	1.01 (0.54)	1.18 (0.61)	1.85 (0.70)	2.15 (0.74)
Constant	0.00 (-0.00)	0.39 (0.85)	-0.23 (-0.38)	-0.25 (-0.33)	-0.05 (-0.07)	-0.11 (-0.13)	-0.14 (-0.17)	-0.05 (-0.06)	-0.28 (-0.34)	-0.27 (-0.33)	-0.72 (-0.75)	-0.74 (-0.66)
Nobs	137											
Adjusted $R^2$	0.01	0.10	0.07	0.15	0.11	0.11	0.11	0.10	0.10	0.06	0.05	0.04

Table 3: Cumulative Returns around FOMC Decisions: Including Federal Funds Rate

The table reports the cumulative return of the CRSP value-weighted index around FOMC policy decisions, excluding policy decisions on intermeetings.  $\mathcal{Q}^{exp}$  is a dummy which equals 1 if the monetary policy surprise is negative (expansionary).  $\mathcal{Q}^{inter}$  indicates an intermeeting policy move,  $\mathcal{Q}^{turn}$  indicates a turning point in monetary policy,  $\Delta FFR$  is the actual change in federal funds target rates, and  $FFR$  is the actual federal funds rates. 0 is the day of the FOMC meeting. The sample period is from 1994 until 2009.

	-15	-10	-5	-1	0	1	2	3	4	5	10	15
$\mathcal{Q}^{expan}$	-0.09 (-0.35)	0.08 (0.15)	0.82 (1.22)	1.07 (1.30)	1.32 (1.59)	1.61* (1.75)	1.76* (1.92)	1.79* (1.98)	2.03** (2.21)	1.78* (1.87)	2.43** (2.21)	2.80** (2.25)
$\mathcal{Q}^{inter}$	-0.92 (-1.33)	-4.03*** (-3.23)	-4.31*** (-2.78)	-6.87*** (-3.29)	-5.97** (-2.26)	-6.32* (-1.94)	-6.45* (-1.96)	-6.04** (-2.43)	-6.16** (-2.54)	-5.48* (-1.66)	-4.37 (-1.19)	-3.86 (-1.06)
$\mathcal{Q}^{turn}$	0.77 (1.15)	0.49 (0.45)	-0.16 (-0.13)	-0.14 (-0.08)	1.05 (0.79)	0.50 (0.39)	-0.69 (-0.47)	-1.01 (-0.60)	-1.06 (-0.66)	-0.99 (-0.60)	-0.05 (-0.04)	0.77 (0.37)
$\Delta FFR$	-0.26 (-0.31)	1.09 (0.83)	1.03 (0.53)	2.02 (1.01)	1.27 (0.53)	1.45 (0.61)	1.68 (0.77)	1.05 (0.51)	0.73 (0.39)	0.94 (0.49)	1.51 (0.58)	1.77 (0.62)
$FFR$	2.81 (0.42)	7.15 (0.51)	21.90 (1.19)	32.80 (1.64)	26.90 (1.28)	28.70 (1.29)	31.10 (1.41)	21.10 (0.91)	24.00 (1.05)	21.00 (0.85)	30.20 (1.05)	33.30 (1.02)
Constant	-0.10 (-0.28)	0.12 (0.16)	-1.04 (-1.04)	-1.47 (-1.28)	-1.05 (-0.92)	-1.17 (-0.95)	-1.29 (-1.07)	-0.83 (-0.64)	-1.17 (-0.90)	-1.05 (-0.79)	-1.84 (-1.22)	-1.98 (-1.07)
Nobs	137											
Adjusted $R^2$	0.01	0.09	0.08	0.16	0.11	0.11	0.12	0.10	0.10	0.06	0.05	0.04

Table 4: Cumulative Returns around FOMC Decisions: Including Path Factor

The table reports the cumulative return of the CRSP value-weighted index around FOMC policy decisions, excluding policy decisions on intermeetings.  $\mathcal{Q}^{exp}$  is a dummy which equals 1 if the monetary policy surprise is negative (expansionary).  $\mathcal{Q}^{inter}$  indicates an intermeeting policy move,  $\mathcal{Q}^{turn}$  indicates a turning point in monetary policy,  $\Delta FFR$  is the actual change in federal funds target rates,  $FFR$  is the actual federal funds rates. 0 is the day of the FOMC meeting, and Path factor is the path factor of Gürkaymak, Sack, and Swanson (2005). The sample period is from 1994 until 2004.

	-15	-10	-5	-1	0	1	2	3	4	5	10	15
$\mathcal{Q}^{exp}$	-0.01 (-0.04)	-0.05 (-0.08)	0.50 (0.63)	0.97 (0.98)	1.46 (1.41)	1.70 (1.58)	1.94* (1.79)	1.67 (1.51)	1.81 (1.62)	1.64 (1.51)	2.94** (2.23)	2.39* (1.71)
$\mathcal{Q}^{inter}$	0.03 (0.03)	-7.00*** (-6.46)	-5.40 (-1.61)	-3.79 (-1.28)	-1.75 (-0.51)	-1.31 (-0.35)	-1.49 (-0.42)	-1.70 (-0.61)	-2.09 (-0.89)	-1.05 (-0.43)	1.43 (0.43)	1.63 (0.53)
$\mathcal{Q}^{turn}$	1.11 (1.45)	-0.16 (-0.13)	-0.46 (-0.34)	-0.58 (-0.32)	0.46 (0.33)	-0.41 (-0.34)	-1.73 (-1.45)	-2.24 (-1.59)	-2.31* (-1.90)	-2.46** (-2.11)	-1.37 (-1.05)	-0.79 (-0.40)
$\Delta FFR$	0.23 (0.37)	1.41 (1.02)	1.73 (0.87)	2.15 (0.97)	2.04 (0.89)	2.19 (0.93)	2.96 (1.26)	2.34 (1.05)	1.70 (0.76)	0.64 (0.29)	2.43 (0.98)	1.36 (0.53)
$FFR$	0.99 (0.14)	7.26 (0.53)	16.70 (0.90)	28.30 (1.21)	31.20 (1.31)	26.30 (1.07)	28.30 (1.14)	37.80 (1.40)	42.90 (1.52)	33.70 (1.21)	27.10 (0.82)	29.00 (0.88)
$Path factor$	0.00 (0.43)	-0.06** (-2.48)	-0.03 (-1.09)	-0.06 (-1.49)	-0.06* (-1.88)	-0.08** (-2.09)	-0.09** (-2.20)	-0.10** (-2.35)	-0.11** (-2.39)	-0.12*** (-2.94)	-0.10* (-1.82)	-0.09** (-2.00)
Constant	-0.09 (-0.23)	0.51 (0.72)	-0.33 (-0.32)	-1.00 (-0.77)	-1.19 (-0.92)	-0.87 (-0.68)	-1.03 (-0.80)	-1.28 (-0.87)	-1.62 (-1.06)	-1.18 (-0.80)	-1.81 (-1.05)	-1.12 (-0.66)
Nobs	92											
Adjusted $R^2$	-0.02	0.18	0.04	0.02	0.02	0.03	0.06	0.06	0.07	0.07	0.05	0.02

Table 5: **Cumulative Returns after FOMC Decisions: post Announcement**

*The table reports the cumulative return of the CRSP value-weighted index following FOMC policy decisions, excluding policy decisions on intermeetings.  $\mathcal{D}^{exp}$  is a dummy which equals 1 if the monetary policy surprise is negative (expansionary). 0 is the day of the FOMC meeting. The sample period is from 1994 until 2009.*

	1	2	3	4	5	10	15
$\mathcal{D}^{exp}$	0.31 (1.26)	0.40 (1.25)	0.37 (0.99)	0.64 (1.50)	0.53 (1.13)	1.21** (2.18)	1.47** (1.98)
Constant	-0.09 (-0.46)	-0.14 (-0.56)	-0.05 (-0.15)	-0.29 (-0.84)	-0.38 (-0.99)	-0.82* (-1.81)	-0.74 (-1.22)
Nobs	129						
Adjusted $R^2$	0.00	0.00	0.00	0.01	0.00	0.03	0.02



Table 6: Trading Strategies and Sharpe Ratios

The table reports daily mean excess returns, standard deviations, and annualized Sharpe ratios of buy-and-hold strategies and monetary momentum strategies for different event windows in trading days around FOMC policy decisions, excluding policy decisions on intermeetings, in Panel A, and for the five Fama&French factors plus momentum in Panel B.  $t$  indicates the FOMC meeting. The monetary momentum strategy is invested in the market when the monetary policy shock is expansionary and shorts the market for contractionary monetary policy surprises. The sample period is from 1994 until 2009.

Panel A. Market Returns and Monetary Momentum									
	$t-15 - t+15$		$t-15 - t+15$ , excl $t-1$ & $t=0$		$t+1 - t+15$		Annual		
	Buy and hold	Monetary Momentum	Buy and hold	Monetary Momentum	Buy and hold	Monetary Momentum	Buy and hold	Buy and hold +	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Mean	0.02	0.05	0.00	0.04	0.01	0.04	0.02	0.04	
Std	(1.31)	(1.31)	(1.30)	(1.30)	(1.30)	(1.30)	(1.24)	(1.24)	
$SR_{annualized}$	0.20	0.61	-0.02	0.43	0.13	0.52	0.31	0.46	
Panel B. Factor Returns									
	CRSP VW		HML	Prof	Invest	Mom			
	(1)	(2)	(3)	(4)	(5)	(6)			
Mean	0.02	0.01	0.02	0.02	0.02	0.04			
Std	(1.24)	(0.61)	(0.63)	(0.55)	(0.49)	(0.89)			
$SR_{annualized}$	0.29	0.15	0.47	0.71	0.55	0.77			