Monetary Policy and Hedge Funds' Reaching for Beta*

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ABSTRACT

We uncover that hedge funds adjust their exposure to the equity market in response to monetary policy. Hedge funds decrease (increase) their exposure to the equity market following expansionary (contractionary) monetary policy in the previous month. Hedge funds with stronger response to monetary policy have higher gross and risk-adjusted returns. Hedge funds with higher measures of skills react to monetary policy more strongly. We explain these findings using the Fed Information Effect channel of government communication and rule out some other explanations: Hedge funds utilize the information in the FOMC announcements to update their predictions about the future of the market.

JEL Classification: G10, G12, E44, E52

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I. Introduction

Monetary policy has been shown to significantly impact both asset prices (Bernanke and Kuttner, 2005) and the broader economy (Nakamura and Steinsson, 2018; Romer and Romer, 2000; Gertler and Karadi, 2015). While some financial institutions, such as insurance companies, adjust their portfolios primarily to preserve target expected returns in response to monetary policy changes (Hanson and Stein, 2015; Ivashina and Becker, 2015), we investigate whether a more sophisticated group of institutional investors—hedge funds—utilize the information from monetary policy announcements to make more informed investment decisions.

This paper is the first to answer three important questions: *whether*, *how*, and *why* hedge funds respond to monetary policy. We uncover that hedge funds do respond to monetary policy by shifting their exposure to the equity market. They increase (decrease) their exposure to the equity market after FOMC announcements in which short-term interest rate increases (decreases). We show that hedge funds that do the *Reaching for Beta* have higher gross and risk-adjusted returns, and we provide a rational explanation for reaching for beta: we argue that hedge funds better utilize the public information in FOMC announcements, by complementing them with their proprietary information so that they can better predict the economy, consistent with the *Fed Information Effect* channel of monetary policy.

Our paper makes three main contributions. First, we uncover that hedge funds react to monetary policy by actively changing their exposure to the equity market. They increase equity market exposure following interest rate hike decisions and decrease equity market exposure following interest rate cut decisions. Specifically, the average hedge fund market beta increases from 0.36 to 0.47 following a rate hike decision and decreases to 0.24 following a rate cut decision. The 0.23 difference in beta following rate hikes and rate cuts is sizable compared to the average hedge fund beta of 0.36. The hedge funds' reaction to monetary policy continues for several months.

We call this hedge funds' reaching for beta and we argue that it is unique to hedge funds – we repeat our analysis on equity mutual fund returns or passive ETF returns, and we do not find that equity mutual funds or ETFs change their market exposure following monetary policy decisions. In our main analysis we use hedge fund returns to calculate betas in order to include beta changes originated from all hedge fund holdings including derivatives. We confirm the hedge funds' change in exposure not only by using their returns, but also by using hedge fund equity holdings. More specifically, we show that (i) a hedge fund's beta that is calculated using their equity positions increases (decreases) following short rate increase

(decrease) announcements and (ii) and hedge funds tend to purchase higher beta stocks when monetary policy becomes more tightening.

It is important to note the direction of the move with respect to the change in interest rates. With a decrease in interest rate, hedge funds buy lower beta stocks. This is very different with reaching for yield or duration in bond markets: with an interest rate decline, while insurance companies buy more risky high yield bonds to meet a reference rate for their investments, hedge funds buy less risky low beta stocks. We argue that unlike reaching for yield, this is not to simply meet a target rate, and instead, this is about utilizing the information in FOMC announcements in incorporation with the proprietary information available to hedge funds. We provide more pieces of evidence supporting this economic explanation.

Second, we document that hedge funds with stronger reaction to monetary policy tend to have higher risk-adjusted returns. We sort hedge funds into five quintile portfolios using past hedge funds' change in equity market exposure in response to monetary policy and show that the top portfolio significantly outperforms the bottom portfolio, both economically and statistically. This is the case both for total as well as risk-adjusted returns. The top quintile portfolio has a cumulative return of over 500% over the past 20 years, compared to the 200% return for the bottom quintile portfolio during the same time. After controlling for Fung and Hsieh (2001, 2004) seven risk factors, the top portfolio in our sample on average has a monthly out of sample alpha of 0.27% (3.24% annual) higher than the bottom quintile portfolio. The superior performance of top quintile group is also persistent over time, consistent with our explanation that the outperformance is information-driven.

We find that more skillful funds, measured by the fund's idiosyncratic volatility (Bali and Weigert, 2024) or past performances, tend to change their market exposure more strongly following monetary policy decisions. This is consistent with hedge funds' complementing their proprietary information with the information in FOMC announcement – more skillful hedge funds have richer proprietary data, which become even more useful after being complemented with FOMC announcement information. [1] Funds with higher management fees or longer redemption notice periods also tend to react to monetary policy more strongly.

Third, and finally, we propose an economic explanation for the risk-adjusted outperformance of hedge funds' reaching for beta and provide additional supporting evidence. We propose that hedge funds are

[1] One example of hedge funds' proprietary data is provided by Katona et al (2023). They put forward satellite data as a source of information and argue that because of the high acquisition and processing costs, hedge funds are their typical clients. In this paper we argue that any such data will be even more useful if complemented with macroeconomy outlook predictions that can be inferred from FOMC announcements.

benefiting from the *Fed Information Effect,* by increasing (decreasing) their exposure to the equity market and hence the economy when the Fed announces an interest rate hike (decline). In addition to the two main findings discussed before, that is, the sign of their reaction, and their risk-adjusted outperformance, we put forward several additional pieces of evidence to further support this explanation: (i) in the same spirit of Cieslak and Schrimpf (2019) we group FOMC announcements into ones that contain information about growth and ones that contain information about interest rates, and show that hedge funds' reaching for beta mainly happens after FOMC announcements that contain news about growth; (ii) to show that the hedge funds' reaching for beta is about information in FOMC announcements, and not any other change in short term rates, we split months into ones after FOMC announcements and other months and document that hedge fund change their beta mainly in the months after FOMC announcements; and (iii) we split FOMC announcement *surprises* to what could be predicted by publicly available information about economic conditions and the part that is orthogonal to it (Bauer and Swanson, 2023a and 2023b), and we show that hedge fund react to the part of FOMC surprises that is orthogonal to the other public information.[2]

We also rule out hedge funds' or other intermediaries' funding constraints as a reason for the hedge funds' reaching for beta, by showing that (i) more levered hedge funds actually reach for beta less strongly rather than more strongly; (ii) hedge funds' reaching for beta is not stronger when primary dealers tend to be more constrained, or when interbank lending market tends to be more constrained; and (iii) hedge fund's reaching for beta is not sensitive to fund flows.[3]

Our paper mainly contributes to three streams of literature. First, we contribute to the growing literature on monetary policy and institutional investors. Two streams of literature study the nature of information from the FOMC announcement. Romer and Romer (2000), and Nakamura and Steinsson (2018), among others, provide evidence consistent with Fed Information Effect Channel: they show that FOMC announcements provide information about central bank's assessment of economic growth and fundamentals. Therefore, rate cuts tend to be followed by weak economic assessment and poor equity market performance. On the other hand, Bauer and Swanson (2023a) provide an alternative channel that the federal reserve and market participant react to the same set of public information and set monetary policy accordingly. In this paper, specifically, we shed light on the nature of information from the FOMC announcement in the eyes of hedge funds, one of the most important and sophisticated participants in the

[2] Table A.I of the appendix shows the results for this.
[3] Table A.II of the appendix shows the results for fund flows.

financial market, and we show that interpret monetary policy as an assessment of future economic growth, consistent with Nakamura and Steinsson (2018).

Our findings are different from reaching for yield or reaching for duration in the low interest rate environment (Hanson and Stein, 2015; Ivashina and Becker, 2015). These channels suggest that some institutional investors will take more (credit or duration) risks to meet a pre-set target yield when the interest rate decreases. In contrast we show that hedge funds utilize information in FOMC announcements to improve their risk-adjusted returns – they tend to buy more risky assets when the interest rate increases rather than when it decreases, and this improves their risk-adjusted return. This is consistent with Fed Information Effect. We also rule out that hedge funds financial constraints derive their reaching for beta, by showing that the more levered hedge funds actually reach for beta less strongly. Instead, we provide a rational explanation for sophisticated investors' reaching for beta. Namely they correctly infer the future economic growth from the monetary policy announcements and make adjustment to their portfolio accordingly. If not about future economic growth, it is not obvious why funds will hold more risky stocks in response to tighter monetary policy. A wrong inference would make them suffer more when the market goes down, unless these funds can correctly infer interest rate hikes imply stronger economic growth and stock market performance in the future.

Second, we contribute to the literature on hedge fund performance. We document a new source of hedge fund alpha, namely reaching for beta following monetary policy tightening, and we only see such ability in hedge funds, not in equity mutual funds or passive ETFs, consistent with the observation hedge funds employ more dynamic and time-varying strategies than mutual funds (Fung and Hsieh, 1997; Patton and Ramadorai, 2013).

Our methodology borrows some of its structure from the hedge fund timing literature (Chen and Liang, 2007; Cao et al, 2012) to estimate a conditional CAPM model. Our results demonstrate that hedge funds use monetary policy announcements to update their expectations about the future of the economy and adjust consequently their exposure to the economy. This is consistent with hedge fund timing abilities, and also builds on the observation by Ferson and Schadt (1996) that adding macroeconomic variables to the estimation provides better performance. In line with the Fed Information Effect channel of government communication, we provide explanation for hedge funds' use of monetary policy information, and by building on Kacperczyk, Van Nieuwerburgh, and Veldkamp (2014), we show the relation between reaching for beta and hedge funds' skills. In particular, we uncover a novel case of hedge funds' ability, that is, predicting future market performance using the information in monetary policy announcements.

Finally, our paper also contributes the literature on using macroeconomic risk factors to explain hedge fund returns. Bali, Brown, and Caglayan (2014) show that hedge funds with greater exposure to macroeconomic uncertainty risk have higher returns. Avramov, Barras, and Kosowski (2013) show that future returns of individual hedge funds can be explained by macroeconomics variables such as volatility or default respread. While it is expected that negative macroeconomic shocks can reduce the returns of any asset class, we show that hedge funds uniquely react and change their risk exposure in response to past monetary policy, and their use of the information in monetary policy announcements affects their future performance.

The rest of the paper is organized as follows. Section II describes the data. Section III documents hedge funds' reaching for beta, using both the returns and the changes in positions. Section IV documents that outperformance of bet-reaching hedge funds and the link to skills. Section V provides economic explanation for reaching for beta. Section VI concludes.

II. Data

Our sample covers the hedge funds from both the Lipper TASS (TASS) database, and the Hedge Fund Research (HFR) database. We remove duplicated funds covered in both databases. Following Cao, Chen, Liang and Lo (2013) we focus on US dollar denominated hedge funds that have at least 36 monthly observations with the average assets under management (AUM) of at least five million dollars.[4] We focus on hedge funds that belong to one of the following equity-oriented categories: Convertible Arbitrage (CA), Emerging Market (EM), Equity Market Neutral (EMN), Event Driven (ED), Fund of Funds (FOF), Global Macro (GM), Long/Short Equity (LSEH), and Multi Strategy (MS). We also identify a subset of hedge funds' holding information from 13F. Our final sample covers a total of 8761 unique hedge funds over the period between 1995 January to 2021 December. In line with Fung, Hsieh, Naik, and Ramadorai (2008), among others, we start the sample in 1995 to avoid survivorship biases induced by exclusion of dead funds in the data before this period.

[Table I here]

Table I summarizes the monthly raw returns and excess returns for our sample. Over the sample period, the average monthly raw return for all hedge funds is 0.68% per month, or 8.2% per year.

[4] We repeat the mains parts of our analysis using TASS or HFR datasets separately, and we get qualitatively similar results. We also test alternative thresholds such as 60 monthly observations or an average AUM of 10 million, and the results remain qualitatively the same.

III. Hedge Funds' Reaching for Beta

A. Hedge Funds Change in Return Beta

We first utilize hedge funds returns to test whether they change their exposure to the equity market in response to monetary policy changes. Using returns provides a more reliable measurement of hedge fund's change in betas compared with looking at their equity holdings, because hedge funds can build exposure to the equity market using many other financial instruments, for instance options and futures. Hedge fund returns should include the exposure of all hedge funds holdings, including equities, options, futures, and other instruments. Besides, using returns allows us to study the hedge funds' reaction to monetary policy at a higher frequency than holdings, because returns are available at monthly frequency while equity holdings are available at quarterly frequency.

We proxy hedge fund's market beta as a linear function of the past monetary policy decisions. This linear functional form is a first-order Taylor expansion of beta with respect to monetary policy changes (e.g., Shanken, 1990)

$$\beta_t \approx \delta_0 + \delta_1 MP_{t-1}, \tag{1}$$

where MP_{t-1} is the change in the monetary policy in previous month. By augmenting Equation (1) into the conditional CAPM model, we employ the following regression specification:

$$R_{i,t} - R_{f,t} = \alpha_i + \delta_0\left(R_{m,t} - R_{f,t}\right) + \delta_1\left(R_{m,t} - R_{f,t}\right) * MP_{t-1} + error_{i,t}, \tag{2}$$

where $R_{i,t} - R_{f,t}$ is hedge fund i's return in excess of the risk-free rate in month t, and $R_{m,t} - R_{f,t}$ is the excess return on the market portfolio. δ_1 would be our coefficient of interest as it measures how much hedge fund market exposure changes in response to monetary policy. Our baseline MP_{t-1}, is Federal Funds target rate change at the scheduled FOMC meetings in the previous month, and we use several other market-based measures for monetary policy as robustness checks.

[Table II here]

Table II shows the results estimating the regression settings of Equation (2). We include fund fixed effects to account for potential fund heterogeneity and report the t-statistics based on the Driscoll-Kraay (1998) standard errors with 4 lags. Column (1) in Panel A corresponds to the exact setting of Equation (2), in which MP_{t-1} is the change in the target rate in the previous month. The δ_1 coefficient is estimated as positive at 1% statistical significance, which indicates that hedge funds increase (decrease) their exposure to the equity market after interest rate increases (decreases). In other words, hedge funds are reaching for beta in response to contractionary monetary policy. Specifically, the average hedge fund market beta is 0.36

without taking into account the impact of monetary policy. Following an interest rate hike of 25 basis points, hedge fund beta on average rises to 0.45 (= 0.364+0.328*0.25); following a rate cut of 25 basis points, hedge fund beta on average declines to 0.28 (= 0.364-0.328*0.25). In Column (2) of Table II, we separately measure the effect of contractionary and expansionary monetary policy by using separate dummy variables when interest rates go up and down. The variables $1_{\{MP_{t-1}>0\}}$ and $1_{\{MP_{t-1}<0\}}$ are one where the monetary policy in the previous month was respectively contractionary and expansionary and zero otherwise. The coefficients for both variables are statistically significant and with the opposite sign, confirming that hedge funds respond to both expansionary and contractionary monetary policy by respectively decreasing and increasing their exposure to the equity market. On average, hedge fund beta rises to 0.47 (= 0.357+0.118) following interest rate hike decisions, and drops to 0.24 (= 0.357-0.121) following interest rate cut decisions. That is, monetary policy induces over 30% change in hedge fund market beta. To control any other risk factors, we also add the 6 remaining factors from Fung and Hsieh (2001, 2004) in Columns (3) and (4) and get similar results. Finally, Columns (5) and (6) show that our results hold if we exclude the great financial crisis period.

In Panel B of Table II, we estimate Equation (2) using market-based monetary policy surprise measures and we see similar positive reactions to monetary policy tightening. Hedge funds increase their market exposure both in response to the current interest rate hikes measured by the 30-min Kuttner (2001) surprises or the target rate factor (GSS PC1) in Gürkaynak, Sack, and Swanson (2005), as well as in response to the future monetary policy stance tightening measured by the surprise in Nakamura and Steinsson (NS 2018) or the path factor (GSS PC2) in Gürkaynak, Sack, and Swanson (2005).[5]

[Figure 1 here]

To study the potential heterogeneity across hedge fund strategies, we also separately estimate δ_1 for the hedge funds in each of the eight equity-oriented strategy categories. Figure 1 shows the estimates as well as the 95% confidence levels. The δ_1 coefficient is significant for all 8 categories, ranging between 0.2 and 0.4. The result suggests reaching for beta is common across all equity-based hedge fund strategies.

[Table III here]

[5] Although δ_1 appears smaller for shocks in Panel B, it is mainly because the surprise measures in Panel B are standardized by their standard deviation, whereas the target rate changes in Panel A are simply the rate changes. If we standardize the target rate changes in Panel A as well, we get a similar magnitude of δ_1. More specifically, we get a δ_1 of 0.328*0.18=0.059, where 0.18 is the standard deviation of target rate changes.

To provide more granularity, we also separately estimate Equation (2) for each hedge fund and tabulate the distribution of δ_1 t-statistic. Table III shows the results. Three important results emerge from the table. First, about 28.3% of all funds have statistically significant positive δ_1 at the 5% level. Second, only 3.2% of hedge funds have a negative statistically significant δ_1 at the 5% level, which is very close to a 2.5% expected type 1 error. Third, and finally, the percentage of positive and statistically significant δ_1 coefficients are higher than negative and statistically significant coefficients across all the eight hedge fund strategies. In sum, the results suggest that majority of hedge funds are reaching for beta in response to contractionary monetary policy. For the fund of funds (FOF) category, which consists of over 25% of the entire hedge funds in our sample, 45.2% of this category has statistically significant positive δ_1 at the 5% level.

[Table IV here]

To examine whether the change in exposure in response to monetary policy is unique to hedge funds, we repeat the analysis for other equity investments vehicles. More specifically, we estimate Equation (2) for passive index-tracking ETF for S&P 500 and the Russell 2000 index. We also test whether mutual funds change their equity exposure in response to monetary policy changes by examining the CRSP mutual fund returns. As shown in Table IV, δ_1 is only statistically significant for hedge funds. On average, equity mutual funds or portfolios have a market beta of 1, and they do not change their market exposure following monetary policy decisions. Therefore, reaching for beta is achieved by the active investment that hedge funds do.

[Figure 2 here]

To understand the persistence of hedge funds' reaction to monetary policy, we also extend the regression setting of Equation (2) by inclusion of monetary policy changes over several months before and after. More specifically, we estimate equation (3)

$$R_{i,t} - R_{f,t} = \alpha_i + \delta_0\left(R_{m,t} - R_{f,t}\right) + \sum_{k=-4}^{4} \delta_k^*\left(R_{m,t} - R_{f,t}\right) * MP_{t-k} + error_{i,t}, \quad (3)$$

where *k* shows how many months the returns lead the FOMC announcements. Negative *k* means the hedge fund return is before the FOMC month. Figure (2) shows the δ_k^* coefficients as well as their 95% confidence level. It seems that for hedge funds the largest change in the market exposure happens during the month right after FOMC announcement, and the change of such market exposure can be maintained to a good extent for about a quarter. Therefore, hedge funds react to monetary policy by actively changing their market exposure, instead of changing their market exposure in anticipation of future monetary policy changes.

B. Hedge Fund Change in Holdings

As a further corroboration of our analysis using monthly returns, we test whether hedge funds beta changes in response to monetary policy solely using the 13F equity holdings of a group of hedge funds identified in Cao, Chen, Goetzmann and Liang (2018). Although solely looking at equity holdings has the disadvantage of excluding other investment vehicles that hedge funds use and conducting analysis at a lower quarterly frequency, it can shed light on an important part of part of hedge funds' portfolios to understand their change in positions following monetary policy changes. Such analysis would complement previous subsection in which returns were used to incorporate information about all investment vehicles.

[Table V here]

We use two distinct settings with the 13F data to document whether hedge funds reach for beta following contractionary monetary policy. First, we follow Jiang, Yao and Yu (2007) and directly employ Equation (1) to test whether hedge funds beta changes using their equity holdings. Panel A of Table V shows the results for this analysis. Column (1) of the table documents that hedge funds beta based on equity holdings changes in response to the monetary policy change in the previous quarter. The smaller coefficient compared to results based on returns in Table II suggests that hedge funds use other investment vehicles in addition to stocks to build exposure on the equity market. We repeat the analysis for equity mutual funds in Column (2) and we do not see an economically or statistically significant response by mutual funds to monetary policy. Finally, in Column (3) we include both hedge funds and mutual funds to test whether their response to monetary policy is different. The difference in response is statistically significant and very similar in size to the total response on hedge funds documented in Column (1).

In the second setting, documented in Panel B of Table V, we study *changes* in holdings of hedge funds to directly examine whether they buy or sell high beta equities in response to previous monetary policy changes. More specifically, we employ the following regression setting at the fund-stock-time level:

$$\Delta HLD_{ist} = \gamma_0 \beta_{st} + \gamma_1 MP_t + \gamma_2 \beta_{st} * MP_t + error_{ist}, \quad (4)$$

where ΔHLD_{ist} is fund i's holding change in stock s at quarter t, divided by fund i's holding changes in absolute value for all stocks in quarter *t*. We try several different specifications including with fund fixed effects, time fixed effects and fund-time fixed effects. In all settings, γ_2 is significant at 1% level, consistent with hedge funds buying (selling) high-beta stocks following contractionary (expansionary) monetary policy. This provides further corroboration for hedge funds' reaching for beta by directly documenting that they *change* their equity positions in response to monetary policy changes.

IV. Reaching for Beta and Hedge Funds' Performance

In the previous section, we document that hedge funds overall change their market exposure following monetary policy decisions. In this section, we study whether hedge funds that do this more strongly can outperform those funds that don't. We also study what kind of hedge funds tend to reach for beta more strongly, following the monetary policy tightening. Doing so allows us to see whether hedge funds' reaching for beta adds economic value to investors, and whether it represents a valuable managerial skill.

A. Hedge Funds' Performance

We first look at the performance of the hedge funds that reach for beta more strongly in response to monetary policy tightening. We estimate Equation (2) at the fund level using a 60 - month rolling window, while keeping funds with minimum of 6 months of observations.[6] Then each month we sort on $\delta_{1,t}$, form quintile portfolios, and hold these portfolios for 1 month, 3 months, 6, months, 9 months, and 12 months. Table VI shows the alphas of these portfolios relative to the Fung and Hsieh (2001, 2004) 7-factor model.

[Table VI here]

Table VI shows hedge fund performance depending on how strongly they change their market exposure following monetary policy changes. The top 20% portfolio delivers statistically and economically significant alphas in all holding periods. For the 1-month holding period, the top 20% portfolio's alpha is 0.303% per month, or 3.6% per year, with a t-statistic of 2.98. The top 20% portfolio also generates significantly higher out-of-sample alphas than the bottom portfolios. For instance, the spread in alpha between the top 20% and the bottom 20% portfolios are consistently above 0.25% per month, depending on the holding periods. That is, the top 20% portfolio outperforms the bottom 20% portfolio by more than 3.0% per year subsequently on a risk-adjusted basis.[7]

[Figure 3 here]

In Fig. 3, we plot the out-of-sample alphas for the top 20% portfolio versus the bottom 20% portfolio based on sorting on $\delta_{1,t}$ for different holding periods. It shows that the top 20% portfolio has an average alpha of more than six times as large as that of the bottom 20% portfolio in post-ranking periods.

[Figure 4 here]

[6] We also try alternative lengths for rolling windows and the results remain similar. Figure A.1 in Appendix A shows the result using a 36-month rolling window.

[7] We repeat this analysis using decile portfolios instead of quintile portfolios, and we find an even larger difference between top and bottom portfolio. The alpha spread between the top 10% and bottom 10% portfolios are about 5% annually.

The economic significance of the outperformance of the funds that reach for beta more actively following monetary policy tightening can be seen more directly from Fig. 4. In Fig. 4, we plot the cumulative returns on the top 20% portfolio (solid blue) and the bottom 20% portfolio (dashed red), respectively, for the 1-month holding period. Holding the top 20% portfolio yields a cumulative return of almost 500% from January 2000 to December 2021, and holding the bottom 20% funds generates a cumulative return of only 200% over the same period.

B. Hedge Funds' Skills

We examine which hedge fund characteristics are associated with hedge funds' reaching for beta, measured with δ_1. More specifically, we test whether more skillful hedge funds change their market exposure more strongly following monetary policy decisions. To do so, we run the following regression of δ_1 of hedge fund *i* in month *t* on several fund skill proxies and characteristics X_i.

$$\delta_{1i,t} = a_t + b_t\, Skill_{i,t} + \gamma_t\, X_{i,t} + error_{i,t}\,, \tag{5}$$

where we use different measures for hedge funds' $Skill_{i,t}$. We start with the hedge fund idiosyncratic volatility *IVOL* as our fund skill proxy. Bali and Weigert (2024) show that fund *IVOL* proxies for the fund managerial skill. We also use the fund's past 3-year alpha relative to the Fung and Hsieh (2001, 2004) 7-factor model, as well as the past 3-year cumulative returns before risk-adjustment as alternative proxies for the fund skill. Following Bali and Weigert (2024), our hedge fund characteristics include incentive fee, minimum investment, lockup period, redemption notice period, high water mark, and fund age. We report our regression results using the Fama-Macbeth (1973) methodology in Table VII.

[Table VII here]

The results in Table VII indicate that hedge funds with higher skills engage in reaching for beta more strongly following monetary policy tightening, for all proxies we used for fund skills. A 1% increase in the fund skill measured by *IVOL* or past alpha increases the reaching for beta coefficient δ_1 by 0.07%, and a 1% increase in the non-risk adjusted past returns increases the coefficient by almost 0.13%. Other fund characteristics that consistently show up at less than 5% significance levels across different skill proxies are the management fees and the redemption notice period, both with positive relationships. We see that funds that charge a higher management fee or require a longer redemption notice period have a higher δ_1. Therefore, better incentivized fund managers and those with more time flexibility of the fund money are more likely to actively change their market exposures following the monetary policy decisions.

V. Economic Explanation

We put forward an economic explanation based on the findings in previous sections, and we provide further corroborating evidence. We also rule out some alternative explanations.

A. Fed Information Effect

In previous section we showed that reaching for beta is profitable on a risk-adjusted basis, and more skillful hedge funds tend to reach for beta more strongly. This suggest that hedge funds – and even more so the more skillful hedge funds – utilize the information in FOMC announcements to make better predictions about the market. The natural question is what information hedge funds are able to infer from the FOMC announcements. More specifically, we examine whether (a) there is information about the economy in FOMC announcements that hedge funds use, that is, the *Fed Information Effect* (Romer and Romer, 2000; Nakamura and Steinsson, 2018, among others), or (b) hedge funds are changing their positions assuming that information solely in response to interest rate changes, without inferring any information about the economy from FOMC announcements, that is, they treat FOMC communications as *Fed Reacts to News* (Bauer and Swanson 2023a).

The results shown so far are consistent with the former, that is, the Fed Information Effect. Specifically, the sign of response to FOMC announcements – an increase in exposure to equity market following interest rate hike – is consistent with hedge funds' inference of better market conditions following contractionary monetary policy. Also, the ability to generate risk-adjusted profit by following this strategy is consistent with the announcements containing information that hedge funds can utilize.

We do several additional tests to understand the nature of information more precisely, and we find more corroborating evidence consistent with the Fed Information Effect. First, to test whether hedge funds' reaction is about interest rate changes in general versus information in announcements, we use changes in the 1-year Treasury yield as our monetary policy proxy. This allows us to have interest rate changes both in FOMC months and other months, and we test hedge funds' reaction to the interest changes following FOMC months and non-FOMC months separately. We do so by using an indicator variable $1_{\{FOMC\}}$, and $1_{\{noFOMC\}}$ to indicate whether a particular month includes FOMC announcements or not.

[Table VIII here]

Column (1) of Table VIII shows the results for separation of FOMC months and non-FOMC months. Hedge funds only reach for beta after the FOMC months: the δ coefficient for $\left(R_{m,t} - R_{f,t}\right) * MP_{t-1}$ is only positive and statistically significant after the FOMC months while it is marginally significant with

opposite sign after the non-FOMC month. The signs and significances are consistent with a reaction to information about the economy after FOMC months, and reaction to interest rate changes, if any, after non-FOMC months. As a robustness check, we exclude GFC period in Column (2), and the main results still holds – hedge funds' reaching for beta is only happening following FOMC announcements months. Hedge funds increase their market beta 0.061 (= 0.244*0.25) with a t-statistic of 3.19 after a 25-basis point increase in the 1-year Treasury during the FOMC months, while such an effect is essentially null following the non-FOMC month (-0.004) with a t-statistic of -0.36. Therefore, it is unlikely that hedge funds are reacting to public information in interest rates that are not related to the FOMC announcement.

Second, we further split the FOMC announcements into ones that mainly contain information about growth and ones that mainly contain monetary information, to test whether hedge funds' reaction to FOMC announcements is in response to the information about growth or discount rate changes. Specifically, in the same spirit of Cieslak and Schrimpf (2019), if the stock return and the bond yield change are positively correlated for a meeting, we consider it a meeting mainly containing growth information; and if they are negatively correlated, we consider it a meeting mainly containing monetary information. We use the indicator variable $1_{\{Monetary\}}$ ($1_{\{Growth\}}$), to test whether hedge funds reach for beta in response to each of these two meeting categories.

Column (3) in Table VIII shows the results for this. Hedge funds' reaction to FOMC announcements is only significant for the Growth meetings, while it is close to zero and statistically insignificant for the Monetary meetings. A 25-basis point increase in the 1-year Treasury during those meetings increases hedge funds' market beta by 0.092 (= 0.366*0.25) with a t-statistic of 3.85, which is 6 times the statistically insignificant effect during the pure monetary FOMC month. In Column (4), we repeat the same analysis using changes in the target rates instead of the 1-year Treasury, and we have the same findings. Hedge funds reach for beta after interest rate hikes because they see these decisions as signals of a sound economic fundamental and sustained growth, which will translate into better stock market performances in the subsequent months.

We also provide further corroboration for these findings in results provided in the Appendix Table A.I. Specifically, we split the surprises in the FOMC announcements into the part that is predictable using publicly available macroeconomy information, that is, the projection, and the part that is orthogonal to it, that is, the residual.[8] We show that that hedge funds react only to part of monetary policy surprises that is

[8] We use the publicly available information listed by Bauer and Swanson (2023b). We thank the authors for making the data available online.

orthogonal to publicly available information, and their reaction to the part that is projection of other public information about economy is insignificant. This further corroborates the Fed Information Effect.

B. Alternative Explanations

We examine alternative explanations for the results provided in previous sections. First, we examine whether other intermediaries are constrained after FOMC announcements and hedge funds' reaching for beta is a liquidity provision by hedge funds at the times that other intermediaries are constrained. Instead of the Fed information Effect, this alternative explanation is based on the potential frictions in the market and the hedge funds' compensation for liquidity provision. To examine this alternative explanation, we estimate the regression model provided in Equation (4), in which we interact hedge funds' reaching for beta with proxies that capture intermediary constraints.

$$R_{i,t} - R_{f,t} = \alpha_i + \delta_0\left(R_{m,t} - R_{f,t}\right) + \delta_1\left(R_{m,t} - R_{f,t}\right) * MP_{t-1} + \lambda_0 * Intermediary + \lambda_1 * \left(R_{m,t} - R_{f,t}\right) * Intermediary + \boldsymbol{\lambda_2\left(R_{m,t} - R_{f,t}\right) * MP_{t-1} * Intermediary} + error_{i,t}, \quad (6)$$

where the interaction term of interest is indicated with bold format. We use two different proxies for $Intermediary$ constraints. To capture primary dealers' constraints, we use the intermediary risk factor from He, Kelly, and Manela (2017), and to capture the interbank lending market frictions, we use the TED spread.[9] We also test both the concurrent intermediary constraint proxy, that is $Intermediary_t$, as well as past intermediary constraint proxy, that is $Intermediary_{t-1}$, to capture any potential concurrent or future effect of binding intermediary constraints.

[Table IX here]

Table IX shows the results for this analysis. We do not find the interaction of reaching for beta and $Intermediary$ to be significant in any of the settings we tried, that is, the coefficient for $\lambda_2\left(R_{m,t} - R_{f,t}\right) * MP_{t-1} * Intermediary$ is not statistically significant in any of the settings. Therefore, hedge funds do not seem to reach for beta any more, or any less, when other intermediaries are more constrained.

The second alternative explanation that we examine is whether hedge funds reach for beta as a substitute for borrowing and building exposure by leverage, when borrowing becomes more expensive, that is, when interest rates increase. Several findings that we provided in earlier sections are inconsistent with this explanation. (i) We document reaching for beta both using holdings and returns. If hedge funds substituted high exposure achieved by borrowing and leverage with high exposure achieved by holding

[9] See Brunnermeier, Nagel, and Pedersen (2008), among others. We also use change in VIX as an alternative proxy, to capture overall market sentiment, and our results remain similar.

high beta stocks, this would only cause change in holding-based measurement of beta, and not in return-based measurement.[10] (ii) If hedge funds were simply substituting cheaper borrowing with buying high-beta stocks, it is unclear why they could make risk-adjusted profit and outperform other hedge funds. In fact, buying higher beta stocks solely in substitution for cheap borrowing should have resulted in poorer performance instead of better performance (Frazzini and Pedersen, 2014).

Additionally, we also directly test whether more levered hedge funds, which are the ones facing higher borrowing expenditures, reach for beta more strongly. To do so, we use a subset of funds with the average and maximum leverage information available in our data, and test whether the more levered ones change their market exposure more actively following interest rate decisions.

[Table X here]

Table X shows the results. The results suggest that more levered hedge funds tend to reach for beta less strongly, instead of more. For an average fund with average leverage information available in our sample, a 25-basis point increase in the target rate induces such funds to increase their market exposure by 0.09 (=0.37*0.25). For funds with an average leverage larger than the median in our sample, a 25-basis point interest rate hike only induces those levered funds to increase market exposure by 0.06 (=(0.37-0.14)*0.25), and the difference is statistically significant at 1% level.

Finally, we test the hypothesis whether hedge funds are changing their positions because of change in their fund flows. Fang (2024) and Kuong, O'Donovan, and Zhang (2024) document that bond mutual fund flows react strongly to monetary policy. It is therefore important to test whether hedge funds may have more flow-induced trading following interest rate decisions. We show in Table A.II in the Appendix that unlike bond mutual funds, hedge fund flows do not react to monetary policy.

VI. Conclusion

We provided new insights into the behavior of hedge funds in response to monetary policy announcements and the economic mechanisms underlying their market positioning. By analyzing both returns and equity holdings, we find that hedge funds adjust their exposure to the equity market following monetary policy

[10] To illustrate this point, consider the following numerical example. Suppose a fund currently has $500 investment in a stock with a beta of 0.10, where $400 is borrowed and the net asset value (NAV) is $100. To replace the borrowing and keep the same fund beta, the fund would need to sell all (some) of its 0.1-beta stocks and buy stocks with a beta equal to (above) 0.5. While this would cause change in holdings, the change in beta for the fund would be zero. Because we observe increase in beta using both changes in holdings and changes in returns, it is implausible that the hedge funds are just replacing borrowing with more high-beta funds to keep the same target fund beta.

announcements. This reaching for beta behavior is most pronounced after contractionary monetary policies, signaling that hedge funds interpret these announcements as containing valuable information about future growth.

We show that hedge funds that respond to monetary policy more strongly achieve superior risk-adjusted returns, demonstrating the economic value of the FOMC announcement information for them. We show the link between reaching for beta and skills by documenting that more skilled hedge funds, identified by characteristics such as past performance and idiosyncratic volatility, reach for beta more strongly. The skilled hedge funds with proprietary information can complement their information with the information in FOMC announcements and make better predictions about the market. Importantly, this outperformance is unique to hedge funds and absent among other equity investment vehicles, such as mutual funds or ETFs.

Our findings provide a new and novel angle for the Fed Information Effect, by showing how sophisticated investors react to FOMC announcements. This research contributes to the literature on hedge fund performance, monetary policy, and institutional trading.

References

Avramov, Doron, Laurent Barras, and Robert Kosowski, 2013, Hedge Fund Return Predictability under the Magnifying Glass, *The Journal of Financial and Quantitative Analysis* 48, no. 4: 1057–83.

Bali, Turan G., Stephen J. Brown, and Mustafa O. Caglayan, 2014, Macroeconomic risk and hedge fund returns, *Journal of Financial Economics*, Volume 114, Issue 1, Pages 1-19,

Bali, Turan G., and Florian Weigert, 2024, Hedge funds and the positive idiosyncratic volatility effect, Review of Finance, Volume 28, Issue 5, Pages 1611–1661.

Bauer, M. D., and E. T. Swanson, 2023a, An Alternative Explanation for the "Fed Information Effect", *American Economic Review*, 113 (3): 664-700.

Bauer, M. D., and E. T. Swanson, 2023b, A Reassessment of Monetary Policy Surprises and High-Frequency Identification, *NBER Macroeconomics Annual*, 3: 87:155.

Becker, Bo, and Victoria Ivashina, 2015, Reaching for yield in the bond market, *Journal of Finance* 70, 1863–1902.

Bernanke, B. S., and K. N. Kuttner, 2005, What explains the stock market's reaction to Federal Reserve policy? *Journal of Finance* 60:1221–1257.

Brunnermeier, Markus K., Stefan Nagel, and Lasse H. Pedersen, 2008, Carry trades and currency crashes, NBER Macroeconomics Annual 2008 23, 313–347.

Cao, Charles, Yong Chen, William N. Goetzmann, and Bing Liang, 2018, Hedge funds and stock price formation, *Financial Analysts Journal* 74, no. 3: 54-68.

Cao, Charles, Yong Chen, Bing Liang, and Andrew W. Lo, 2013, Can hedge funds time market liquidity? *Journal of Financial Economics*, Volume 109, Issue 2, Pages 493-516.

Chen, Yong, and Bing Liang, 2007, Do Market Timing Hedge Funds Time the Market? *The Journal of Financial and Quantitative Analysis* 42, no. 4: 827–56.

Cieslak, Anna, and Andreas Schrimpf, 2019, Non-Monetary News in Central Bank Communication, *Journal of International Economics* 118:293–315.

Cieslak, A., A. Morse, and A. Vissing-Jorgensen, 2019, Stock returns over the FOMC cycle, *Journal of Finance* 74:2201-2248

Driscoll, J. C., and A. C. Kraay, 1998, Consistent covariance matrix estimation with spatially dependent panel data, *Review of Economics and Statistics* 80:549–560.

Fama, Eugene F., and James D. MacBeth, 1973, Risk, return, and equilibrium: Empirical tests, *Journal of political economy* 81, no. 3: 607-636.

Fang, Chuck, 2024, Monetary Policy Amplification through Bond Fund Flow, *Working Paper*.

Ferson, W. E., and R.W. Schadt, 1996, Measuring Fund Strategy and Performance in Changing Economic Conditions, *The Journal of Finance*, 51: 425-461.

Frazzini, Andrea, and Lasse Heje Pedersen, 2014, Betting against beta, *Journal of financial economics* 111, no. 1: 1-25.

Fung, William, and David A. Hsieh, 1997, Empirical Characteristics of Dynamic Trading Strategies: The Case of Hedge Funds, *The Review of Financial Studies*, Volume 10, Issue 2, Pages 275–302.

Fung, William, and David A. Hsieh, 2001, The risk in hedge fund strategies: Theory and evidence from trend followers*, The Review of Financial Studies* 14, no. 2: 313-341.

Fung, William, and David A. Hsieh, 2004. Hedge Fund Benchmarks: A Risk-Based Approach. *Financial Analysts Journal*, *60*(5), 65–80.

Fung, William, David A. Hsieh, Narayan Y. Naik, and Tarun Ramadorai, 2008, Hedge funds: Performance, risk, and capital formation, *The Journal of Finance* 63, no. 4: 1777-1803.

Gertler, Mark, and Peter Karadi, 2015, Monetary policy surprises, credit costs, and economic activity, *American Economic Journal: Macroeconomics* 7, no. 1: 44-76.

Gürkaynak, Refet, Brian Sack, and Eric T. Swanson, 2005, Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements, *International Journal of Central Banking* 1 (1): 55–93.

Hanson, Samuel, and Jeremy Stein, 2015, Monetary Policy and Long-Term Real Rates, *Journal of Financial Economics* 115 (3): 429–48.

He, Zhiguo, Bryan Kelly, and Asaf Manela, 2017, Intermediary asset pricing: New evidence from many asset classes, *Journal of Financial Economics* 126, no. 1: 1-35.

Jiang, George J., Tong Yao, and Tong Yu, 2007, Do mutual funds time the market? Evidence from portfolio holdings, *Journal of Financial Economics* 86, no. 3: 724-758.

Kacperczyk, Marcin, Stijn Van Nieuwerburgh, and Laura Veldkamp, 2014, Time-varying fund manager skill, *The Journal of Finance* 69.4: 1455-1484.

Katona, Zsolt, Marcus O. Painter, Panos N. Patatoukas, and Jean Zeng, 2024, On the capital market consequences of big data: Evidence from outer space, *Journal of Financial and Quantitative Analysis*: 1-29.

Kuong, John Chi-Fong, James O'Donovan, and Jinyuan Zhang, 2024, Monetary policy and fragility in corporate bond mutual funds, *Journal of Financial Economics* 161: 103931.

Kuttner, K., 2001, Monetary policy surprises and interest rates: Evidence from the Fed funds futures market, *Journal of Monetary Economics* 47:523–544.

Nakamura, Emi, and Jón Steinsson, 2018, High-Frequency Identification of Monetary Non-Neutrality: The Information Effect, *The Quarterly Journal of Economics*, Volume 133, Issue 3, Pages 1283–1330

Newey, W. K., and K. D. West, 1987, A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix, *Econometrica* 55:703–708.

Patton, A. J., and T. Ramadorai, 2013, On the High-Frequency Dynamics of Hedge Fund Risk Exposures, *The Journal of Finance*, 68 (2): 597–635.

Romer, C. D., and D. H. Romer, 2000, Federal Reserve information and the behavior of interest rates, *American Economic Review* 90, 429–457.

Shanken, J., 1990, Intertemporal asset pricing: An Empirical Investigation, *Journal of Econometrics*, Volume 45, Issues 1–2, Pages 99-120.

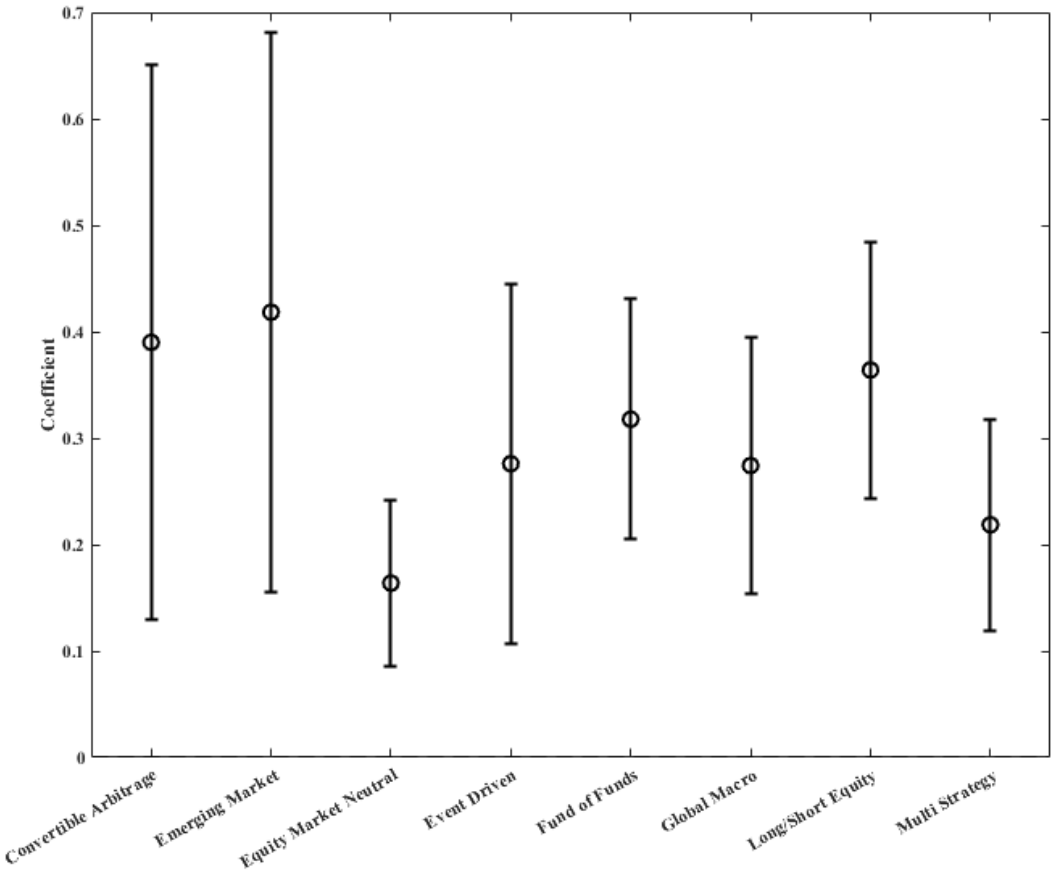


Figure 1. Different Hedge Fund Strategies and Changes in Market Exposure in Response to Monetary Policy
This figure plots the coefficients δ_1 from the following regression:

$$R_{i,t} - R_{f,t} = \alpha_i + \delta_0(R_{m,t} - R_{f,t}) + \delta_1(R_{m,t} - R_{f,t}) * MP_{t-1} + error_{i,t},$$

where $R_{i,t} - R_{f,t}$ is fund *i*'s return in excess of the risk-free rate in month *t*, and $R_{m,t} - R_{f,t}$ is the excess return on the market portfolio. MP_{t-1} is the change in the target rate in the previous month. We estimate this regression for each hedge fund strategy category. 95% confidence intervals based on the Driscoll and Kraay (1998) standard errors with 4 lags are plotted in error bars.

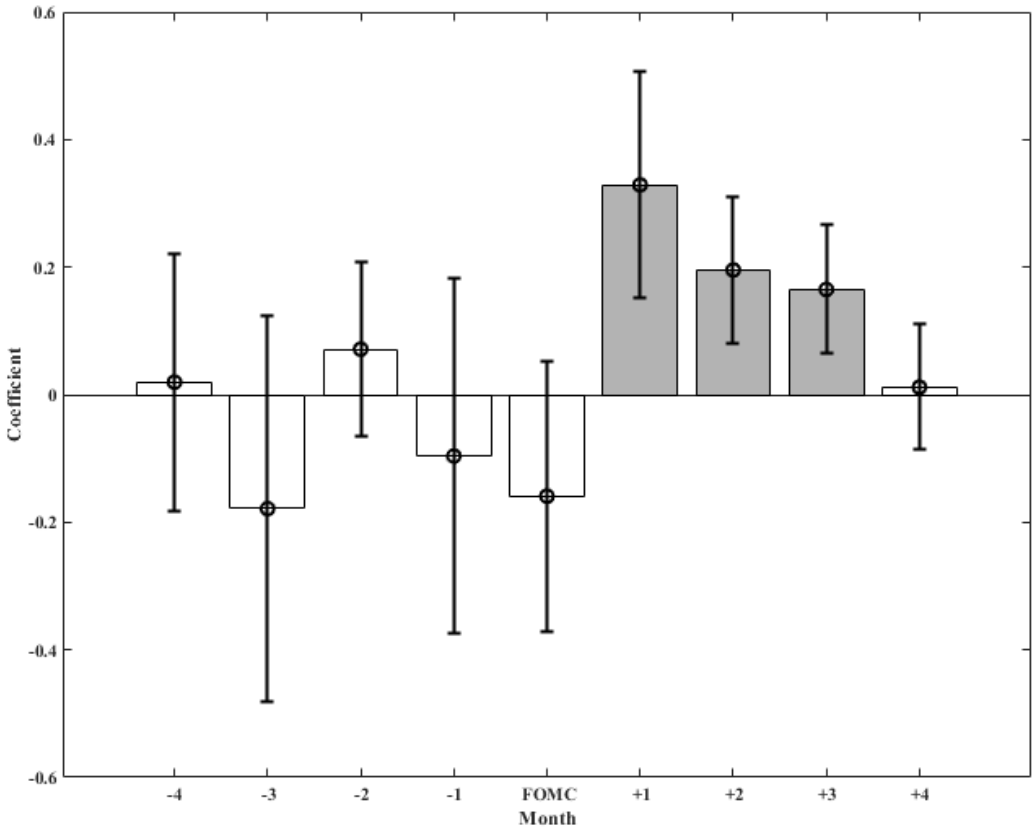


Figure 2. Change in Exposure to Equity Market around FOMC Announcements

This figure plots the coefficients δ_k^* from the following regression in a bar chart:

$$R_{i,t} - R_{f,t} = \alpha_i + \delta_0(R_{m,t} - R_{f,t}) + \sum_{k=-4}^{4} \delta_k^*(R_{m,t} - R_{f,t}) * MP_{t-k} + error_{i,t},$$

where k shows how many months the returns lead the FOMC announcements. Negative k means the hedge fund return is before the FOMC month. $R_{i,t} - R_{f,t}$ is fund i's return in excess of the risk-free rate in month *t*, and $R_{m,t} - R_{f,t}$ is the excess return on the market portfolio. MP_{t-k} is the change in the target rate in the month *t-k*. 95% confidence intervals based on the Driscoll and Kraay (1998) standard errors with 4 lags are plotted in error bars.

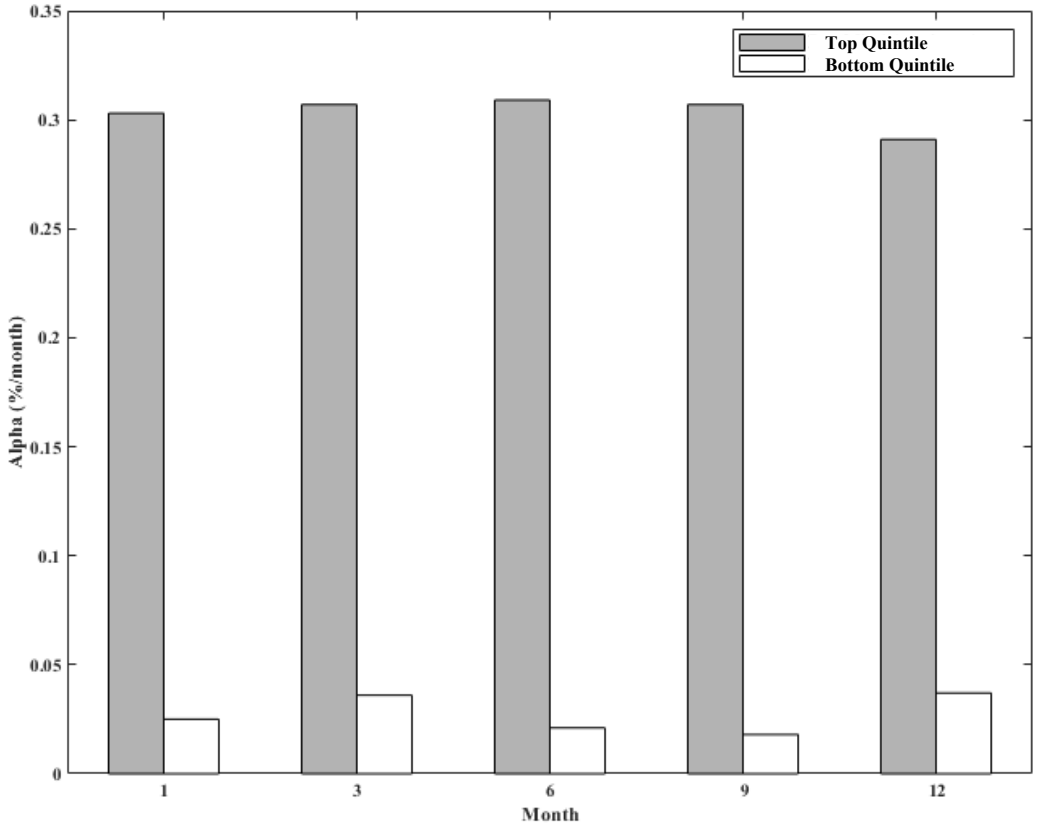


Figure 3. Alphas for Top and Bottom Quintile Portfolios Sorted by Response to Monetary Policy
This figure plots the monthly out-of-sample alphas for the top 20% portfolio verses the bottom 20% portfolio for a holding period of 1, 3, 6, 9, or 12 months. In each month we form the portfolios based on hedge funds' $\delta_1$coefficient estimated from the past 60 months.

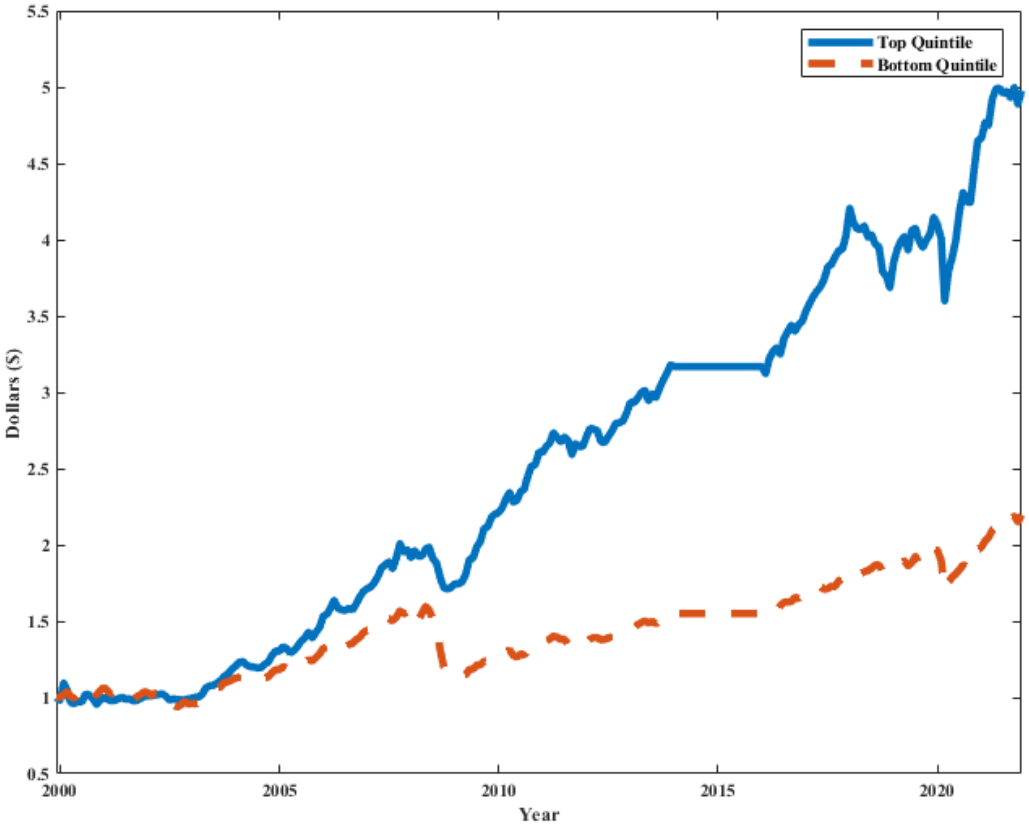


Figure 4. Cumulative Returns for Top and Bottom Quintile Portfolios sorted by Response to Monetary Policy
This figure plots the cumulative returns of the top 20% (solid blue) versus the bottom 20% (dashed red) portfolios for a 1-month holding period. In each month we form portfolios based on hedge funds' $\delta_1$coefficients estimated from the past 60 months. These portfolios are then held for 1 month subsequently.

Table I. Summary Statistics

This table provides the summary statistics for the main variables used in the analysis. The raw return and excess return summary statistics are based on the entire fund * month panel, Minimum Investment, management fee, incentive fee, redemption notice (period), and lockup period are reported at the fund level. Target rate changes are reported at the level of the FOMC meetings. The sample period is from 1995 January to 2021 December.

	No. observations	Mean	SD	1%	Median	99%
Raw Returns (%)	975,871	0.68	4.56	-12.16	0.64	13.80
Excess Returns (%)	975,871	0.51	4.56	-12.36	0.47	13.60
Minimum Investment (100,000)	8,660	13.89	126.35	0.001	5	100
Management Fee (%)	8,677	1.39	0.56	0	1.50	3
Incentive Fee (%)	8,568	15.27	7.49	0	20	25
Redemption Notice (days)	8,655	43.30	31.45	0	33	120
Lockup Period (months)	8,618	3.93	6.95	0	0	30
Scheduled Target Rate Change (%)	215	0	0.18	-0.50	0	0.25

Table II. Hedge Funds Equity Market Exposure and Monetary Policy.

This table shows the results for the regression of Equation (2):

$$R_{i,t} - R_{f,t} = \alpha_i + \delta_0(R_{m,t} - R_{f,t}) + \delta_1(R_{m,t} - R_{f,t}) * MP_{t-1} + error_{i,t} ,$$

where $R_{i,t} - R_{f,t}$ is fund i's return in excess of the risk-free rate in month t, and $R_{m,t} - R_{f,t}$ is the excess return on the market portfolio. MP_{t-1} is the change in the monetary policy in the previous month. *t*-statistics based on the Driscoll and Kraay (1998) standard errors with 4 lags are reported in parentheses.

Panel A. Monetary Policy and Change in Market Exposure

	(1) $R_{i,t} - R_{f,t}$ Target	(2) $R_{i,t} - R_{f,t}$ Target	(3) $R_{i,t} - R_{f,t}$ Target	(4) $R_{i,t} - R_{f,t}$ Target	(5) $R_{i,t} - R_{f,t}$ Target Excl GFC	(6) $R_{i,t} - R_{f,t}$ Target Excl GFC
$(R_{m,t} - R_{f,t}) * MP_{t-1}$	0.328***		0.269***		0.311***	
	(6.47)		(5.84)		(4.22)	
$(R_{m,t} - R_{f,t}) * 1_{\{MP_{t-1}>0\}}$		0.118**		0.117***		0.102**
		(2.20)		(2.62)		(2.18)
$(R_{m,t} - R_{f,t}) * 1_{\{MP_{t-1}<0\}}$		-0.121***		-0.114***		-0.117***
		(-2.65)		(-3.61)		(-2.96)
$R_{m,t} - R_{f,t}$	0.364***	0.357***	0.287***	0.279***	0.291***	0.288***
	(16.70)	(14.40)	(20.08)	(17.05)	(19.21)	(16.51)
Constant	0.274***	0.281***	0.294***	0.300***	0.339***	0.340***
	(3.43)	(3.44)	(4.74)	(4.82)	(6.01)	(5.99)
Fund FE	Y	Y	Y	Y	Y	Y
7-Factor Controls	N	N	Y	Y	Y	Y
Observations	975,871	975,871	975,871	975,871	865,881	865,881
Number of groups	8,761	8,761	8,761	8,761	8,761	8,761
R^2_{within}	0.122	0.121	0.136	0.136	0.121	0.121

Panel B. Alternative Monetary Policy Measures

	(1) $R_{i,t} - R_{f,t}$ NS	(2) $R_{i,t} - R_{f,t}$ GSS PC1	(3) $R_{i,t} - R_{f,t}$ GSS PC2	(4) $R_{i,t} - R_{f,t}$ 30-Min Kuttner
$(R_{m,t} - R_{f,t}) * MP_{t-1}$	0.061***	0.036***	0.049***	0.036***
	(4.43)	(3.20)	(2.87)	(2.63)
$R_{m,t} - R_{f,t}$	0.350***	0.340***	0.359***	0.345***
	(19.56)	(15.82)	(17.09)	(16.31)
Constant	0.287***	0.308***	0.284***	0.302***
	(3.73)	(3.93)	(3.47)	(3.86)
Fund FE	Y	Y	Y	Y
Observations	975,871	975,871	975,871	975,871
Number of groups	8,761	8,761	8,761	8,761
R^2_{within}	0.122	0.120	0.120	0.120

Table III. Individual Hedge Fund Regression Coefficients *t*-statistics

This table shows the results for the regression of Equation (2), estimated separately for individual hedge funds:

$$R_{i,t} - R_{f,t} = \alpha_i + \delta_{i,0}(R_{m,t} - R_{f,t}) + \delta_{i,1}(R_{m,t} - R_{f,t}) * MP_{t-1} + error_{i,t},$$

where $R_{i,t} - R_{f,t}$ is fund *i*'s return in excess of the risk-free rate in month *t*, and $R_{m,t} - R_{f,t}$ is the excess return on the market portfolio. MP_{t-1} is the change in the federal funds rate in the previous month. *T*-statistics are based on the Newey and West (1987) standard errors with 4 lags.

Category	Number of Funds	Percentage					
		$t \leq -1.96$	$-1.96 \leq t \leq -1.645$	$-1.645 \leq t \leq 0$	$0 \leq t \leq 1.645$	$1.645 \leq t \leq 1.96$	$1.96 \leq t$
All	8761	3.2%	1.4%	20.3%	39.7%	7.2%	28.3%
CA	213	0.9%	1.4%	12.2%	42.3%	11.3%	31.9%
ED	808	3.6%	1.0%	21.3%	44.9%	6.9%	22.3%
EM	395	2.8%	1.3%	20.3%	42.5%	7.1%	26.1%
EMN	505	5.0%	3.8%	26.5%	43.0%	5.5%	16.2%
FOF	2431	1.3%	0.4%	11.2%	33.6%	8.4%	45.2%
GM	619	6.3%	2.6%	24.9%	39.9%	5.7%	20.7%
LSEH	3205	3.8%	1.6%	24.9%	41.3%	6.8%	21.6%
MS	585	3.3%	1.4%	24.3%	43.2%	6.3%	21.5%

Table IV. Response of Different Equity-based Investment Vehicles to Monetary Policy

This table compares the results for the regression of Equation (2) for different equity market investment types.

$$R_{i,t} - R_{f,t} = \alpha_i + \delta_0(R_{m,t} - R_{f,t}) + \delta_1(R_{m,t} - R_{f,t}) * MP_{t-1} + error_{i,t},$$

where $R_{i,t} - R_{f,t}$ is fund *i*'s return in excess of the risk-free rate in month *t*, and $R_{m,t} - R_{f,t}$ is the excess return on the market portfolio. MP_{t-1} is the change in the federal funds rate in the previous month. In Columns (1) and (4), we estimate Equation (2) with fund fixed effects and t-statistics based on Driscoll and Kraay (1998) standard errors with 4 lags are reported in parentheses. In Columns (2) and (3), we estimate Equation (2) using a single time series regression with t-statistics based on the Newey and West (1987) standard errors with 4 lags.

	(1) Hedge Funds Returns	(2) SP500 Index Returns	(3) Russell 2000 Returns	(4) Mutual Funds Returns
$(R_{m,t} - R_{f,t}) * MP_{t-1}$	0.328***	-0.066	0.054	-0.052
	(6.47)	(-1.30)	(0.25)	(-1.06)
$R_{m,t} - R_{f,t}$	0.364***	0.945***	1.133***	0.926***
	(16.70)	(94.51)	(33.40)	(64.24)
Constant	0.274***	0.027	-0.260*	-0.141***
	(3.43)	(0.73)	(-1.79)	(-3.35)
Fund F.E.	Y	N/A	N/A	Y
Observations	975,871	324	324	2,378,401
Number of groups	8,761	N/A	N/A	18,598
R^2	0.122	0.973	0.790	0.213

Table V. Equity Holding-Based Response

This table shows the results based on the 13F equity holdings. In Panel A, we estimate Equation (1): $\beta_t \approx \delta_0 + \delta_1 MP_{t-1}$, where β_t is the fund beta in quarter *t* based on its equity holdings, and MP_{t-1} is the change in the target rate in the previous quarter. *t*-statistics are based on the Driscoll and Kraay (1998) standard errors with 4 lags. In Panel B, we estimate Equation (4): $\Delta HLD_{ist} = \gamma_0 \beta_{st} + \gamma_1 MP_t + \gamma_2 \beta_{st} * MP_t + error_{ist}$, where ΔHLD_{ist} is fund i's holding rebalance in stock s at quarter t, normalized by fund i's total stock holding rebalances in absolute value in quarter t. β_{st} is the beta of stock *s* in quarter *t*. Standard errors are clustered at the fund level and the stock level.

Panel A. Change in Fund-Level Beta based on Equity Holdings.

VARIABLES	(1) Holding-Based Beta Hedge Funds	(2) Holding-Based Beta Equity Mutual Funds	(3) Holding-Based Beta Hedge Funds and Mutual Funds
MP_{t-1}	0.040***	-0.000	-0.000
	(3.27)	(-0.03)	(-0.03)
$MP_{t-1} * 1_{\{Hedge\ Fund\}}$			0.040***
			(3.72)
$1_{\{Hedge\ Fund\}}$			Absorbed in FE
Constant	1.101***	1.002***	1.044***
	(96.24)	(286.72)	(165.08)
Fund FE	Y	Y	Y
Observations	60,325	83,240	143,565
Number of groups	1,405	2,945	4,350
R^2_{within}	0.006	0.000	0.004

Panel B. Equity Holding Changes of Hedge Funds

	(1) ΔHLD	(2) ΔHLD	(3) ΔHLD	(4) ΔHLD	(5) ΔHLD
$\beta_{s,t} * MP_t$	0.200***	0.158***	0.199***	0.158***	0.122***
	(4.68)	(4.10)	(4.59)	(4.05)	(4.66)
$\beta_{s,t}$	0.010	0.003	0.021**	0.011	0.015*
	(0.81)	(0.27)	(2.01)	(1.12)	(1.89)
MP_t	0.123***		0.123***		
	(6.46)		(6.52)		
Fund FE	N	N	Y	Y	N
Time FE	N	Y	N	Y	N
Fund*Time FE	N	N	N	N	Y
Constant	0.191***	0.186***	0.178***	0.177***	0.171***
	(7.52)	(7.41)	(13.57)	(13.96)	(16.50)
Observations	2,138,387	2,138,387	2,138,387	2,138,387	2,138,364
R^2_{within}	0.001	0.000	0.001	0.000	0.000

Table VI. Hedge Fund Performance Based on Portfolios Sorted by Monetary Policy Exposure Change

This table presents the out-of-sample alphas for the portfolios consisting of the hedge funds at different levels of market exposure following monetary policy changes (δ_1). In each month, we form five quintile portfolios based on the δ_1 coefficient estimated from the past 60 months, and then hold these portfolios for a different period of 1, 3, 6, 9, and 12 months. We report the out-of-sample alphas (in percent per month) relative to the Fung and Hsieh (2001, 2004) seven factor model. *t*-statistics based on Newey and West (1987) standard errors with four lags are reported in parentheses.

	1 Month	3 Month	6 Month	9 Month	12 Month
Top Quintile Portfolio	0.303***	0.307***	0.309***	0.307***	0.291***
	(2.98)	(2.94)	(3.07)	(3.18)	(3.06)
	0.275***	0.253***	0.250***	0.245***	0.238***
	(4.49)	(4.23)	(4.27)	(4.20)	(3.98)
	0.201***	0.204***	0.197***	0.194***	0.193***
	(3.01)	(3.06)	(2.97)	(2.97)	(2.97)
	0.115*	0.119*	0.132*	0.137**	0.140**
	(1.81)	(1.79)	(1.97)	(1.99)	(2.12)
Bottom Quintile Portfolio	0.025	0.036	0.021	0.018	0.037
	(0.29)	(0.41)	(0.24)	(0.21)	(0.48)
Top-Bottom Difference	0.278**	0.272**	0.288**	0.280**	0.254***
	(2.55)	(2.21)	(2.48)	(2.27)	(2.65)

Table VII. Hedge Fund Reaching for Beta and Characteristics

This table shows the results for the regression of Equation (5).

$$\delta_{1i,t} = a_t + b_t\, Skill_{i,t} + \gamma_t\, X_{i,t} + error_{i,t},$$

where $\delta_{1i,t}$ is estimated from Equation (2) at the fund level using the past 36-month hedge fund returns. $Skill_{i,t}$ is proxied by the fund idiosyncratic volatility (Bali and Weigert 2024) in Column (1), by the alpha of the past 36 months relative to the Fung and Hsieh (2001, 2004) seven factor model in Column (2), and by the past 36-month average returns in Column (3). We report estimates based on the Fama and MacBeth (1973) regressions with the Newey and West (1987) standard errors with 4 lags.

	(1)	(2)	(3)
	δ_t	δ_t	δ_t
VARIABLES	IVOL as *Skill*	Alpha as *Skill*	Return as *Skill*
Skill	0.074***	0.069**	0.129***
	(3.75)	(2.37)	(3.72)
Management Fee	0.062***	0.088***	0.074***
	(3.32)	(3.95)	(3.36)
Incentive Fee	-0.004*	-0.003***	-0.002
	(-1.82)	(-2.96)	(-1.47)
Minimum Investment	0.000**	0.000	0.000
	(2.46)	(0.86)	(1.42)
Lockup Period	0.000	-0.000	0.000
	(0.02)	(-0.03)	(0.20)
Redemption Notice	0.002***	0.001**	0.001***
	(3.83)	(2.22)	(2.75)
High Water Mark	-0.050	-0.035	-0.049
	(-1.50)	(-1.14)	(-1.43)
Age	0.006	0.013**	0.012***
	(1.34)	(2.53)	(3.01)
Observations	694,144	694,144	694,144
R^2_{within}	0.012	0.007	0.005

Table VIII. FOMC vs non-FOMC months

This table shows the results for an extended version of Equation (2), $R_{i,t} - R_{f,t} = \alpha_i + \delta_0(R_{m,t} - R_{f,t}) + \delta_1(R_{m,t} - R_{f,t}) * MP_{t-1} + error_{i,t}$, where MP_{t-1} is the change in the 1-year Treasury yield in the previous month in Columns (1)-(3), and the target rate change in Column (4). We categorize each month into either an FOMC month or a NoFOMC month in Columns (1) and (2). In Columns (3) and (4), for each FOMC month, we further categorize the meetings into a Growth meeting month, or a pure Monetary meeting month based on Cieslak and Schrimpf (2019). *t*-statistics based on the Driscoll and Kraay (1998) standard errors with 4 lags are reported in parentheses.

	(1) $R_{i,t} - R_{f,t}$ 1 year Treasury	(2) $R_{i,t} - R_{f,t}$ 1 year Treasury	(3) $R_{i,t} - R_{f,t}$ 1 year Treasury	(4) $R_{i,t} - R_{f,t}$ Target
	Entire Sample	Excl GFC	Excl GFC	Excl GFC
$(R_{m,t} - R_{f,t}) * MP_{t-1} * 1_{\{NoFOMC_{t-1}\}}$	-0.105*	-0.015	-0.015	
	(-1.71)	(-0.36)	(-0.35)	
$(R_{m,t} - R_{f,t}) * MP_{t-1} * 1_{\{FOMC_{t-1}\}}$	0.202**	0.244***		
	(2.48)	(3.19)		
$(R_{m,t} - R_{f,t}) * MP_{t-1} * 1_{\{Growth_{t-1}\}}$			0.366***	0.436***
			(3.85)	(5.37)
$(R_{m,t} - R_{f,t}) * MP_{t-1} * 1_{\{Monetary_{t-1}\}}$			-0.060	0.226
			(-0.25)	(1.30)
$(R_{m,t} - R_{f,t}) * 1_{\{NoFOMC_{t-1}\}}$	0.355***	0.386***	0.386***	0.388***
	(9.94)	(9.49)	(9.48)	(9.79)
$(R_{m,t} - R_{f,t}) * 1_{\{FOMC_{t-1}\}}$	0.370***	0.344***		
	(13.45)	(16.55)		
$(R_{m,t} - R_{f,t}) * 1_{\{Growth_{t-1}\}}$			0.350***	0.338***
			(14.59)	(13.43)
$(R_{m,t} - R_{f,t}) * 1_{\{Monetary_{t-1}\}}$			0.344***	0.344***
			(11.26)	(11.34)
$1_{\{FOMC_{t-1}\}}$	0.278**	0.247*		
	(1.99)	(1.79)		
$1_{\{Growth_{t-1}\}}$			0.182	0.164
			(1.10)	(1.02)
$1_{\{Monetary_{t-1}\}}$			0.260*	0.276*
			(1.82)	(1.90)
Constant	0.096	0.158	0.158	0.158
	(0.86)	(1.33)	(1.33)	(1.33)
Observations	975,871	865,881	865,881	865,881
Number of groups	8,761	8,761	8,761	8,761
R^2_{within}	0.121	0.107	0.108	0.108

Table IX. Intermediary Frictions and Hedge Funds Response

This table presents the results for Equation (6):

$$R_{i,t} - R_{f,t} = \alpha_i + \delta_0(R_{m,t} - R_{f,t}) + \delta_1(R_{m,t} - R_{f,t}) * MP_{t-1} + \lambda_0 * Intermediary + \lambda_1 * (R_{m,t} - R_{f,t}) * Intermediary + \lambda_2(R_{m,t} - R_{f,t}) * MP_{t-1} * Intermediary + error_{i,t},$$

where MP_{t-1} is the change in the target rate in the previous month. The *Intermediary* constraint is proxied by the He, Kelly and Manela (2017) risk factor in Columns (1) and (2), or by the TED spread in Columns (3) and (4). *t*-statistics based on the Driscoll and Kraay (1998) standard errors with 4 lags are reported in parentheses.

	HKM as Intermediary		ΔTED as Intermediary	
	(1)	(2)	(3)	(4)
$R_{m,t} - R_{f,t}$	0.362***	0.351***	0.360***	0.339***
	(17.17)	(10.07)	(17.11)	(20.28)
$(R_{m,t} - R_{f,t}) * MP_{t-1}$	0.380***	0.368***	0.321***	0.296***
	(5.44)	(5.32)	(5.20)	(4.47)
$Intermediary_{t-1}$	4.028***	3.854***	-0.372	-0.697*
	(3.95)	(4.15)	(-0.91)	(-1.74)
$(R_{m,t} - R_{f,t}) * Intermediary_{t-1}$	0.057	0.093	0.013	0.039
	(0.22)	(0.36)	(0.54)	(1.23)
$(R_{m,t} - R_{f,t}) * MP_{t-1} * Intermediary_{t-1}$	0.571	0.633	0.107	0.202
	(0.70)	(0.69)	(1.00)	(1.26)
$Intermediary_t$		0.367		-1.481***
		(0.17)		(-3.20)
$(R_{m,t} - R_{f,t}) * Intermediary_t$		-0.303**		0.048
		(-2.13)		(0.88)
$(R_{m,t} - R_{f,t}) * MP_t * Intermediary_t$		-0.486		0.297
		(-0.91)		(1.14)
Constant	0.270***	0.338***	0.283***	0.314***
	(3.58)	(3.71)	(3.65)	(4.67)
Observations	975,871	975,871	975,871	975,871
Number of groups	8,761	8,761	8,761	8,761
R^2_{within}	0.126	0.127	0.122	0.130

Table X. Hedge fund leverage

This table shows the results for and extended version of the regression of Equation (2), $R_{i,t} - R_{f,t} = \alpha_i + \delta_0(R_{m,t} - R_{f,t}) + \delta_1(R_{m,t} - R_{f,t}) * MP_{t-1} + error_{i,t}$, where MP_{t-1} is the change in target rate in the previous month. We group each hedge fund depending on whether its average (or maximum) leverage is above the sample (Med)ian or not. The median average leverage is 150% and the median maximum leverage is 200%. *t*-statistics based on the Driscoll and Kraay (1998) standard errors with 4 lags are reported in parentheses.

Panel A. Average Leverage		Panel B. Maximum Leverage	
$(R_{m,t}$ - $R_{f,t})$	0.399***	$(R_{m,t}$ - $R_{f,t})$	0.414***
	(21.54)		(21.12)
$(R_{m,t}$ - $R_{f,t})$* MP_{t-1}	0.370***	$(R_{m,t}$ - $R_{f,t})$* MP_{t-1}	0.360***
	(7.11)		(6.43)
$(R_{m,t}$ - $R_{f,t})$*$1_{\{AvgLvg_i>Med\}}$	-0.180***	$(R_{m,t}$ - $R_{f,t})$*$1_{\{MaxLvg_i>Med\}}$	-0.196***
	(-14.63)		(-15.98)
$(R_{m,t}$ - $R_{f,t})$* $MP_{t-1} * 1_{\{AvgLvg_i>Med\}}$	-0.140***	$(R_{m,t}$ - $R_{f,t})$* $MP_{t-1} * 1_{\{MaxLvg_i>Med\}}$	-0.139***
	(-2.72)		(-2.75)
$1_{\{AvgLvg_i>Med\}}$	Absorbed by FE	$1_{\{MaxLvg_i>Med\}}$	Absorbed by FE
Constant	0.336***	Constant	0.324***
	(4.85)		(4.28)
Fixed Effects	Y	Fixed Effects	Y
Observations	248,831	Observations	311,986
Number of groups	2,170	Number of groups	2,704
R^2_{within}	0.119	R^2_{within}	0.120

Appendix A. Additional Tables and Figures

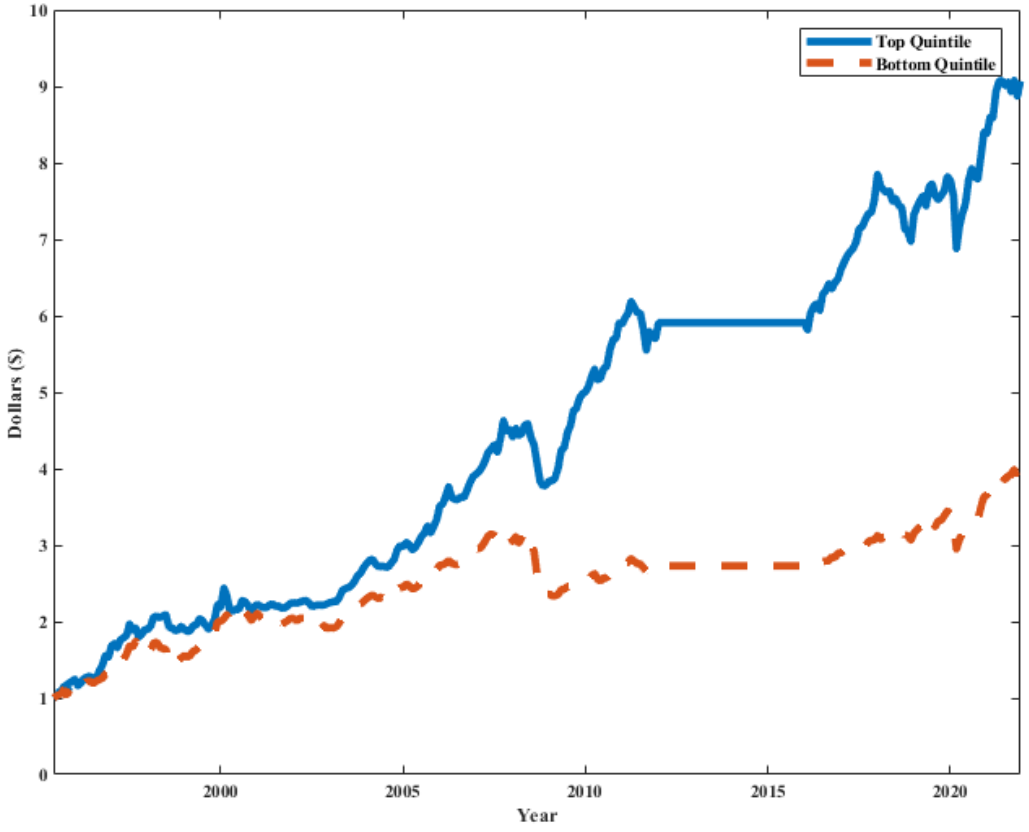


Figure A.1. Cumulative Returns for Top and Bottom Quintile Portfolios Sorted by Response to Monetary Policy
This figure plots the cumulative returns of the top 20% (solid blue) versus the bottom 20% (dashed red) portfolios for a 1-month holding period. In each month we form portfolios based on hedge funds' $\delta_1$coefficients estimated from the past 36 months. These portfolios are then held for 1 months subsequently.

Table A.I. Monetary policy projection and residuals w.r.t other macroeconomy variables

This table shows the results for a regression analogous to the one specified in Equation (2) of the paper, with different specifications for monetary policy changes. More specifically, the monetary policy measure has been split into a projection and a residual with respect to other macroeconomy variables. The projection and residual are defined with the following regression setting:

$$MP_t = c + \boldsymbol{a}\, Macro_t + error_t,$$

where MP_t is the change in target rate, for Columns (1)-(3), and the monetary policy shocks specified in Bauer and Swanson (2023), for Columns (4)-(6). $Macro_t$ indicates the macroeconomy variables specified by Bauer and Swanson (2023). The projection, $MP_{t-1}|Macro$, is defined as $c + \boldsymbol{a}\, MacroVariables_{t-1}$ in regression above, and the residual, $MP_{t-1} \perp Macro$, is defined as $error_{t-1}$ in the regression above. The *t*-statistics based on the Driscoll and Kraay (1998) standard errors with 4 lags are reported in parentheses.

	Target Rate as MP_{t-1}			Bauer and Swanson (2023) Shocks as MP_{t-1}		
	(1)	(2)	(3)	(4)	(5)	(6)
	$R_{i,t} - R_{f,t}$	$R_{i,t} - R_{f,t}$	$R_{i,t} - R_{f,t}$	$R_{i,t} - R_{f,t}$	$R_{i,t} - R_{f,t}$	$R_{i,t} - R_{f,t}$
$(R_{m,t} - R_{f,t}) * MP_{t-1}$	0.317***			1.131***		
	(6.30)			(5.24)		
$(R_{m,t} - R_{f,t}) * MP_{t-1}\|Macro$		0.160			0.933	
		(1.22)			(1.17)	
$(R_{m,t} - R_{f,t}) * MP_{t-1} \perp Macro$			0.396***			0.947***
			(4.58)			(3.53)
$(R_{m,t} - R_{f,t})$	0.354***	0.348***	0.336***	0.336***	0.353***	0.323***
	(15.91)	(16.18)	(16.82)	(19.37)	(17.52)	(15.21)
Constant	0.280***	0.292***	0.313***	0.299***	0.287***	0.322***
	(3.39)	(3.56)	(4.11)	(3.76)	(3.56)	(3.97)
Observations	939,453	939,453	939,453	939,453	939,453	939,453
Number of groups	8,761	8,761	8,761	8,761	8,761	8,761
R^2_{within}	0.117	0.114	0.117	0.117	0.114	0.116

Table A.II. Hedge Fund Flows after FOMC Announcements

This table shows the results for the following regression:

$$Flow_{i,t} = c + a\,MP_t + b\,\delta_{i,t} + error_{i,t},$$

where MP_t is the change in target rate, and $\delta_{1i,t}$ is estimated from Equation (2) at the fund level using the past 36-month hedge fund returns. In Column (1), t-statistics based on the Driscoll and Kraay (1998) standard errors with 4 lags are reported in parentheses. In Columns (2) and (3), t-statistics based on standard errors clustered at the fund and at the year levels are reported in parentheses.

	(1)	(2)	(3)
	Flows	Flows	Flows
MP_t	1.170		1.476
	(1.16)		(1.39)
$\delta_{i,t}$		-0.023	-0.044
		(-0.91)	(-1.29)
$MP_t * \delta_{i,t}$			-0.027
			(-0.25)
Constant	0.830***	0.858***	0.876***
	(5.36)	(59.40)	(3.38)
Observations	800,931	662,677	662,677
Fund FE	Y	N	N
Time FE	N	Y	N
R^2_{within}	0.00	0.00	0.00