Reactions to FOMC Decisions Across Sectors: Studying Investor Behavior in the US Stock Market

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Abstract

Using FOMC Federal Funds rate decisions over the past five years and executing event studies for ten representative firms of eleven stock market sectors, this paper attempts to identify patterns in trading reactions to the size of interest rate changes. Building on the theory of discounted cash flows ideated by Fisher (1930), the application of Fama (1965) is made to analyze the speed with which reactions occur most frequently. Using both the Mean Adjusted and Market Models for abnormal return calculations the Cumulative Abnormal Returns (CAR) are studied across a period from day 0 to day 3 post-event, as directed by the data. The magnitude of interest rate changes had little to no effect on the size of trading reactions for interest rate cuts but had a consistent and significant impact on that of interest rate hikes. The results of both the general OLS models and isolated samples of only 25 basis point changes, positive or negative, were in line with the loss-aversion theory of Kahneman and Tversky but also alluded to the overpowering of negative economic headwinds in driving trading reactions to rate hikes. Finally, differences in reactions across sectors were seen and fell in line with popular views about the fundamental business models specific to certain sectors and their respective dependence on interest rate levels.

Introduction

The Federal Reserve Bank's Federal Open Market Committee (FOMC) conducts numerous Federal Funds Rate cuts and hikes during their various annual meetings. In recent times, a period of economic uncertainty during the Global Pandemic, beginning in March of 2020, and recently high inflation has encouraged both sides of monetary policy from the Federal Reserve. In this same time frame, the S&P 500 has reached all-time highs (Rosen). The fight on economic changes by the Fed and the size of the stock market inspires the question of how the two are related. Specifically, in a market where the volume of trading increases surrounding major economic events due to trading reactions (French & Roll, 1987), how does the stock market react, reflected through prices, to FOMC decisions? Using the theory behind why the level of interest rates matters to businesses, it is understood that lower interest rates benefit firms and the opposite exists for higher interest rates. How does this principle show in the short-term trading reactions of stocks and in what ways do these reactions diverge across different types of businesses? This paper will address this two-part question by conducting event studies of various firms in the US stock market across the last 5 years of interest rate decisions by the FOMC.

Literature Review

Basic Theory

In his book, *The Theory of Interest* (1930), Irving Fisher first posited the role of the present value of future earnings in his discussion of interest rates as the "bridge" between capital and income. This theory would be expanded and formalized by John Burr Williams in *The Theory of Investment Value* (1938) where the present value of all future dividends, as a result of cash flows, uses the rate of interest to discount each year based on an inverse of the compound equation. Such an assumption assists the work by John Maynard Keynes, *The General Theory of Employment, Interest, and Money* (1936), which explains a decrease in rates of interest as spurring further investment by firms, a positive indication for investors. Within theory, interest rate changes will affect the perceived and/or expected value of equity investments.

In determining the reflection of changes in expected value within the market, one must look at the literature behind how new information is incorporated into the prices of firms in the stock market. Paul Samuelson confronted this question in his paper, Proof that Properly Anticipated Prices Fluctuate Randomly (1965), and found through his Theorem of Fair-Game Futures Pricing that when a market of buyers and sellers in futures contracts is efficient, such current prices are not determined by previous prices and exhibit a Random Walk behavior since the determinant of the next price is information unknown at the time. In furthering this line of research, Eugene Fama formalized this in *The Behavior of Stock-Market Prices* (1965), describing how the independence of prices with their lagged values is reflective of new information that may affect the prospects of a company in the eyes of traders. Within fundamental theories of arbitrage closing, Fama explains how this process is almost instantaneous as traders will react ever-faster to events–this became known as the Efficient Market Hypothesis.

In rejection of Fama, or at least a rejection of EMH's strongest form, behavioral finance has studied the role of irrational decision-making in price-setting and trading off new information. In their paper, Prospect Theory: An Analysis of Decision Under Risk (1979), Kahneman and Tversky reject the traditional Expected Utility Theory for decisions under risk, which stipulates symmetry in the incorporation of loss and win expectations, in favor of Prospect Theory which outlines the value function for evaluating potential losses and gains. When evaluating wins, this function is concave which stipulates that satisfaction of gains diminishes as expected gains increase and similarly, the function for losses is convex which stipulates a similar diminishing activity for dissatisfaction. However, the asymmetry comes into play as the function for losses is steeper than that of wins which forms the behavior of Loss Aversion theory: individuals have a tendency to avoid losses more than seek equivalent gains.

Looking back at the theory of Fisher, an interesting area of literature discusses divergent trading with respect to different sectors, reflective of industries, which maintain different perceptions in the eyes of investors. Fama and French (1993) wrote about the characteristics of such perceptions including price relationship to the overall stock market, firm size, and book-to-market equity which vary across such sectors. This study utilized the "beta" measure of market relationship and found that lower beta industries perform better in market downturns. Another study of this difference across sectors confronts changing macroeconomic conditions and was first discussed by Chopra, Lakonishok, and Ritter in their paper, Measuring abnormal performance: Do stocks overreact? (1992) which outlined that sector rotation is employed as a strategy because of perceived differences in the reaction of certain industries. Most notably the headwinds of high-growth sectors versus fundamentally valuable ones.

The most seminal study in relation to the short-term trading reactions of different sectors to interest rate decisions is by Bernanke and Kuttner (2005) which analyzes the effects of unexpected monetary policy on the stock market and finds that stock indices react at around a 1% change for a 25 basis point interest rate change. In describing the reasoning behind this effect, Bernanke and Kuttner find that these effects vary across sectors with industries such as tech and telecom having a larger response to that of energy and utilities. The surprising conclusion this paper comes to is that the effects on stock prices are mostly transitory and depend less than assumed on the investor's perspective of future corporate earnings or the present value of a firm's cash flows (Bernanke & Kuttner, 2005). This is an important paper in describing the value of understanding differing effects across sectors as it can provide signals as to whether market dynamics are transitory or reflect persistent investor sentiment–a conclusion that would support the theory of Shiller in describing irrational over--or under-reactions.

Event Study Methodology

In trying to estimate the portion of daily stock returns attributable to the new information provided to investors, an event study is conducted which considers the difference between actual and expected returns during a given event window. This idea of abnormal returns was created by Fama et. all in 1969 when trying to describe the cumulative abnormal behavior surrounding stock splits. This estimation of abnormal returns has multiple methods but the most accepted version was created by Brown and Warner in the early 1980s.

Dyckman, Philbrick, and Stephan explore event study models by simulating daily stock returns, and in their paper summarize the estimation models for abnormal returns as being one of the mean-adjusted returns, market-adjusted returns, and the market model. In the mean-adjusted returns model, general market factors and risks are unaccounted for and the average return during the estimation period is simply subtracted from a given event period return. In the original market-adjusted returns model, the expected return is the average market return assuming no variance of the firm/security away from the market. Finally, the market model, created and pioneered by Brown and Warner, considers this variance such that the expected stock return is modified by an OLS beta and intercept of the firm against the market and then subtracted from the event period return(s) (Dyckman et. al., 1984).

Brown and Warner used monthly data in 1980 to explore event studies but transitioned to daily return data in 1984 due to the value of larger sample sizes. However, Eugene Fama argues that daily data is more non-normal than monthly data and Scholes and Williams argue in 1977 that estimating beta is extremely difficult with daily data in a nonsynchronous trading environment. Though, when extending to daily data, Brown and Warner found that using a market model is much stronger at identifying abnormal returns than any mean-adjusted version. This was important as the market model required enough points of data such that normal assumptions about returns could be assumed, so daily returns were used.

The market model is the agreed-upon method of measuring abnormal returns within the literature and while extensions of the model have been created, a study of many different large-cap stocks requires a market and risk measure that is general to every observed company, and as such the market model with a beta to the S&P 500 is the best choice for studying US firms.

Typically seen within the literature is the use of a CAR or CAAR, Cumulative Abnormal Returns and Cumulative Average Abnormal Return respectively. These are used to measure the abnormal activity across the entirety of the event window. Due to the fact that the goal of this study is to view the total abnormal activity across event windows, and not desiring to see or compare average daily activity between windows of different sizes, the simpler CAR will be used in which the sum of daily abnormal returns is calculated.

Estimation and Event Windows in the Literature

Many different windows have been created by researchers depending on the type of event studied or the data available. During the time when only monthly data was available consistently, Fama et. all began with a 60-month window from -29 months to +30 months in relation to the event month. However, when daily returns became available, Brown and Warner used a 250-day window which included a 5-day buffer before the event due to the problem of expectations clouding the period before the event window. This creates an event period that is 11 days long from -5 to +5 and an estimation period that is 239 days long. There is conflict within the literature in terms of event windows. Dyckman, Philbrick, and Stephan (1984) reference two main strategies of either estimating abnormal returns on only the event day or across a three-day event period spanning from 1 day prior to 1 day later. Typically there is seen to be a post-event window as well which extends from the end of the event window to a time equidistant of the event date as the estimation window, though this window is only seen when a study is choosing to explore a difference in returns between the event window and a period directly after. There is also discussion over whether the barrier created between the event window and the end of the estimation period, as to stray from expectations influence, should represent a fine line between the estimation and event as in Brown and Warner, or whether a separate gap should exist between the event and estimation as in Singh and Padmakumari, 2020.

However, the consensus of Patell (1976), Dyckman, Philbrick, and Stephan (1984), and Brown and Warner (1984), is that at least 120 days is recommended for the total recorded return data. While an estimation window that fits such a recommendation will overlap with prior events in the case of interest rate changes, the abnormality of the targeted event is revealed through averaging during estimation.

Research Design Informed by the Literature

This study will apply Fama to Fisher in studying the incorporation of interest rate decision information into stock prices and analyzing the existence of Prospect Theory as detailed by Kahneman & Tversky. Furthermore, reactions to interest rate decisions will be analyzed across sectors in order to study investor perceptions of differing firm characteristics. Federal Funds Rate changes resulting from the Federal Reserve's FOMC meetings will be utilized as the events within numerous event studies across individual stocks. These individual stocks will be chosen in groups of ten as firms that represent a respective industry and/or sector group. The level of abnormal returns experienced by these firms in the stock market will be measured using the S&P 500 as the controlling measure of market risk and return. However, both the Mean Adjusted and the Market Model will be utilized in order to view any differences between the trading reactions relative to previous trading of any given stock and the trading reactions relative to the market. In studying the differences across these various groups, conclusions can be made about the ways in which investors believe interest rate changes will affect the earnings potential and future prospects of firms in certain industries.

In attempting to study effects across sectors, this study will utilize the Global Industry Classification Standards (GICS) by MICS. This standard outlines 11 different sectors including Energy, Materials, Industrials, Consumer Discretionary, Consumer Staples, Healthcare, Financials, Information Technology, Communication Services, Utilities, and Real Estate. US stocks are widely classified into these categories, providing the ability to find popular public exchange-traded fund information surrounding companies within such sectors.

This study will utilize an estimation period of 99 days in length beginning at -105 and ending at -6 in relation to the event date. Then an eleven-day event period will be measured at -5 to +5 around the event (interest rate change). Finally, the post-event period will span from +6 to +15. This estimation period will allow for a small window for studying reactions while at the same time providing sufficient data points to make statistically sound conclusions. Reactions will be studied in the days following the event and will all consider a time span longer than just the day of the decision as the decisions are not made at the same time of day throughout the sample and a longer span is required in order to have a more consistent studied window.

Data and Methodology

Due to the computation time and processing power of the Microsoft Excel spreadsheet application, a limited scope of event studies from the FOMC decision on July 31, 2019, to the decision on September 18, 2024, was used. For every rate decision, the size of the Federal Funds Rate change on one side of the Fed's target range was recorded. However, during the final data formatting, the rate hold decisions were expelled from the study as the goal was to determine the reaction of traders to interest rate changes. Further research into the reactions around hold decisions may be valuable as expectations of the public and the market vary around what the Fed will do.

In finding representative firms widely traded and recognized Exchange Traded Funds (ETFs) which have a focus on the target sectors were used. The Standard and Poor's Depositary Receipts (SPDR) ETFs are trademarked by Standard and Poor's Financial Services, a subsidiary of S&P Global, and managed by State Street Global Advisors. This ETF provider maintains an ETF for each GICS classification/sector comprised of major US stocks in such sectors. Since S&P Global is the patron of the S&P 500, the most agreed-upon measurement index of the overall US stock market and the chosen market benchmark of these event studies, utilizing its subsidiary ETFs for determining sector-specific firms is plausible. For each ETF the top ten holdings of the fund were chosen as the ten representative firms with the exception of a few omissions–in such cases the eleventh and closest-sized holdings were chosen as replacements. First, within the Communications sector, GOOG was replaced with the eleventh holding T as both of Alphabet's publicly traded stocks were in the top ten, and one was required to be replaced when trying to consider ten different firms. Second, in the Financials sector, the stock V was replaced with PGR as V has not been listed during the entire span of this study. This was also the reasoning behind the following other replacements: In the Healthcare sector AMGN was replaced with PFE, in the Industrials sector UBER was replaced with BA, in the Materials sector CTVA was replaced with NEM, as well as in the Utilities sector where CEG was replaced with XEL and D was replaced with EXC. After doing this filtering, the sample contains 35 FOMC decisions and 110 firms making 3850 observations. One aspect of these observations is the distribution of rate decisions across positive and negative signs and sizes. Looking at Table 1 in Appendix A, one can see that within the 5-year timespan, there are 1210 positive rate events and 660 negative ones. While this may cause robustness differences between studies on positive versus negative rate changes, there is not an easy solution and with over 100 observations per size of rate change, this issue is negligible.

When performing event studies the same 99-day estimation window was conducted for all events though for 4 specific FOMC decisions, this window was farther back than ending 5 days prior to the event. These are the FOMC decisions of March 16th, 19th, 23rd, and 31st in 2020 which were all uniquely close to their previous decisions–the 16th being 13 days after the first decision of the run on March 3rd. These decisions were made quickly as the COVID-19 Lockdown was beginning and quick decision-making by the Fed was required. For these 4 decisions, the estimation window of March 3rd was used. This causes an unavoidable limitation in the study as the repeated nature of these 5 total events may cause a unique difference in reactions between them unseen after other FOMC decisions.

Determination of the Event Window

A general OLS regression model was run with the dependent variable being the CAR and the independent variable being the size of rate change by the fed. The dependent CAR was varied between Mean Adjusted and Market Models and across 3 different event window time frames including day 0 to day 1, day 0 to day 3, and day 0 to day 5. This was done for positive and negative interest rate changes respectively. The results from the Mean Adjusted model can be used to determine which event window is most representative of an abnormal reaction across the market–The Market Model is not considered, though it is regressed, as these regressions are viewing all 110 firms from different sectors across the market in these results so the market adjustment is not necessary. In the case that an event window looking farther out has a larger CAR, this indicates that the trading reaction has continued past the end of the shorter window, taking longer and rejecting the strongest form of Fama. This test will allow a determination of the appropriate event window for the study across sectors in this paper.

Looking at Table 2 in Appendix A, one can see that for the Mean Adjusted model, the coefficient of CAR across day 0 to day 3 is higher than that of day 0 to day 1 for both positive and negative rate changes. This indicates that the consistency of a trading reaction in the form of abnormal returns continues into the 3rd day after the rate change and the day 0 to 3 event window should be chosen as more trading time studied can lead to a greater perception of a unified market reaction without a loss of significance in this case. While the coefficient of CAR is higher for day 0 to day 5 than to day 3 for rate decreases, it is not significant within a 95% confidence interval for rate increases. Furthermore, for the rate change of March 16th, 2020, a day 0 to day 5 event window would overlap the next event on the 19th and then the two days following, and an event window to day 3 after would only overlap by 1 day. The results of these regressions indicate that an event window of day 0 to day 3 is most representative of an abnormal trading reaction and is used within the sector-specific study of this paper.

Results in Table 2 of Appendix A would imply that the instantaneous nature of pricing is untrue as the consistency of a price increase or decrease occurs for over a trading day. The sign on the positive rate change regression coefficients is consistent with the theory that as rates go up investors will become pessimistic about a firm's future earnings and the stock will trade down. The regression coefficient of -1.66 with a constant of essentially 0 indicates that for an interest rate hike of 25 basis points a stock will experience an abnormal increase in returns of 0.415% from the day to the event through trading on the 3rd day after. This is a lower reaction than expected by Bernanke and Kuttner. However, these results are not accurate in reflecting market reactions as the pool of firms is equally distributed across sectors regardless of market capitalizations or stock-specific trading volume. Further, looking at Figure 1 in Appendix A, it can be seen that not only are CARs noisy around 0 for positive rate changes, for negative rate changes an outlier utility stock drives the predicted mean for the -25 basis points rate cut upward, leading to a steeper than desired coefficient. The result of a coefficient of around +13.96 for every 100 basis points less of a decrease for rate cuts is inconsistent with Fisher.

Statistical Model

By performing an OLS regression with the size of the rate change as the causal variable and interacting with the stock's sector, one can analyze differences in the magnitude of trading reactions across sectors in terms of the dependent variable, CAR. This is done for negative and positive rate changes separately such that any asymmetry can be seen; for negative rate changes the absolute value of the rate change is used so that the coefficients reflect growing negative values as opposed to smaller and smaller rate cuts.

For rate increases:

$$\text{MeanAdjCAR} = \beta 0 + \beta 1 \cdot (\text{RateChange} \times \text{Sector}) + \epsilon \text{ if RateChange} > 0$$

$$\text{MarketAdjCAR} = \beta 0 + \beta 1 \cdot (\text{RateChange} \times \text{Sector}) + \epsilon \text{ if RateChange} > 0$$

For rate decreases:

$$\text{MeanAdjCAR} = \beta 0 + \beta 1 \cdot (\text{AbsoluteValue(RateChange)} \times \text{Sector}) + \epsilon \text{ if RateChange} < 0$$

$$\text{MarketAdjCAR} = \beta 0 + \beta 1 \cdot (\text{AbsoluteValue(RateChange)} \times \text{Sector}) + \epsilon \text{ if RateChange} < 0$$

The separate rate change variable is not included in the regressions as each sector is to be analyzed separately. The coefficient is uninterpretable in the case of this model since the rate hold observations are removed but the inclusion provides a valuable extra level of specificity to the model. The null hypothesis is that the sector classification of stock does not have any impact on that stock's reaction to an interest rate decision and the alternative is that a reaction depends on a stock's sector classification. A 95% confidence interval will be used to determine statistical significance and anything outside but within a 90% confidence can be seen as suggesting significance.

The summary statistics table, Table 3 in Appendix A, shows that the mean, standard deviation, minimum, and maximum of CARs for the Mean Adjusted and Market Model are incredibly similar indicating that the data is well distributed and utilizing one model type will not bring an innate bias into the study–beyond the nature of the mean adjustment versus the market adjustment.

Results

The following outputs below in Table 1 are the results of all four regressions. In looking at the signs of the coefficients between rate increases and rate decreases, the rate cuts have generally large negative signs and the rate increases have smaller but still negative signs with the exception of consumer staples for both the mead adjusted and market models as well as industrials and technology when measured with the market model.

Table 1

Regression Results of Mean and Market Models

VARIABLES	rate cuts mean adjusted CAR	rate cuts market adjusted CAR	rate increases mean adjusted CAR	rate increases market adjusted CAR
meanzt3				
sector#ratechange				
communications	-11.73***	-8.445***	-2.782***	-1.361
	(-7.420)	(-5.771)	(-2.716)	(-1.483)
consumer discretionary	-16.08***	-12.50***	-1.492	-0.00624
	(-10.17)	(-8.539)	(-1.457)	(-0.00680)
consumer staples	-9.428***	-7.181***	0.373	1.522*
	(-5.966)	(-4.907)	(0.365)	(1.658)
energy	-20.24***	-15.56***	-4.937***	-3.621***
	(-12.81)	(-10.63)	(-4.821)	(-3.945)
financials	-17.23***	-13.01***	-1.703*	-0.222
	(-10.90)	(-8.890)	(-1.662)	(-0.242)
healthcare	-11.57***	-8.021***	-1.166	-0.0446
	(-7.323)	(-5.481)	(-1.139)	(-0.0486)
industrials	-16.98***	-12.54***	-0.0676	1.252
	(-10.75)	(-8.571)	(-0.0660)	(1.364)
materials	-12.51***	-9.280***	-2.197**	-0.840
	(-7.918)	(-6.342)	(-2.145)	(-0.915)
real estate	-16.62***	-15.22***	-1.994*	-0.648
	(-10.52)	(-10.40)	(-1.947)	(-0.706)
technology	-11.98***	-7.383***	-0.545	1.190
	(-7.580)	(-5.046)	(-0.532)	(1.297)
utilities	-9.248***	-7.414***	-1.782*	-0.554
	(-5.852)	(-5.067)	(-1.740)	(-0.604)
Constant	0.0306***	0.0229***	0.000159	-0.00563*
	(6.863)	(5.540)	(0.0493)	(-1.951)
Observations	660	660	1,210	1,210
R-squared	0.345	0.276	0.028	0.028
r2_a	0.334	0.264	0.0195	0.0195
F	31.08	22.45	3.191	3.181
rss	2.153	1.846	2.731	2.194

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Starting with the rate cuts, the coefficients are large and every sector has a significant coefficient. These large negative numbers indicate that when rates are cut, the larger the rate cut (remembering that the absolute value of the rate change is considered for rate cuts) the more negative the abnormal returns are. This is completely inconsistent with the literature because rate cuts are theoretically good signs for investors. For the smallest negative coefficients, this regression would indicate that utilities stocks experience a negative cumulative abnormal return of -0.0230435,

-2.3%, for a 25 basis point rate cut relative to its previous trading history and an equivalent further decrease in abnormal returns for an equivalently larger rate cut. Even when controlling for the overall market, the smallest negative coefficient is that of consumer staples stocks which have a -0.01789525, -1.79%, cumulative abnormal return for a 25 basis point rate cut controlling for the S&P 500. Heading to the residual plots of both the mean adjusted CAR prediction and market model CAR prediction in Figures 1 and 2 of Appendix B respectively, we can see that residuals are fairly even across predicted values and have similar distribution of residuals throughout.

For the rate increases the signs are more in line with the literature, however, less significance exists. In terms of trading reactions relative to recent trading activity communications and technology stocks both experience significant negative cumulative abnormal returns. This is in line with the theory that investors discourage higher rates. For a 25 basis point rate increase, communications stocks are expected to experience cumulative abnormal returns of -0.0069546025, -0.695%, relative to the way these stocks had been trading before the interest rate event. Similarly, technology stocks are expected to decrease relative to how they have been trading by a CAR of -0.0123421025, -1.23%, and are expected to decrease relative to the markets trading during that event window by a CAR of -0.009066575, -0.9%. Looking at the residual plots for the Mean Adjusted and Market Models in Figures 3 and 4 of Appendix B respectively, a similar consistency of distribution is seen for the residuals as seen in the rate cut regressions. For robustness purposes, in the regression outputs, the p-value of the f-stats for all four models is significant despite the fact that the f-stats for the rate increases are seemingly low.

Studying a Single Rate Change Magnitude

In trying to determine any asymmetry and control for the odd results of the previously executed models, the impact of the categorical sector variable was regressed against the CAR for 25 basis point rate cuts and increases only. 25 basis points was the chosen metric because when looking at Table 1 of Appendix A, there is an equal number of this sized cut as there are increases. It should be noted that the f-stats for all four of these added models remained significant.

Table 2

Mean and Market Models for 25 Basis Point Rate Changes

VARIABLES	rate decreases mean adjusted CAR	rate decreases market adjusted CAR	rate increases mean adjusted CAR	rate increases market adjusted CAR
meanzt3				
consumer discretionary	-0.0041	-0.00389	-0.0105	-0.011
	(-0.341)	(-0.366)	(-1.435)	(-1.610)
consumer staples	-0.00268	-0.00493	-0.0139*	-0.0152**
	(-0.222)	(-0.464)	(-1.894)	(-2.218)
energy	0.00664	0.00642	-0.0145**	-0.0155**
	-0.551	-0.604	(-1.976)	(-2.264)
financials	0.00223	0.00259	-0.00923	-0.0109
	-0.185	-0.244	(-1.257)	(-1.596)
healthcare	0.0125	0.01	-0.0127*	-0.0149**
	-1.033	-0.945	(-1.733)	(-2.175)
industrials	0.00853	0.00738	-0.0176**	-0.0191***
	-0.708	-0.694	(-2.400)	(-2.790)
materials	0.00323	0.00164	-0.0171**	-0.0213***
	-0.268	-0.154	(-2.323)	(-3.107)
real estate	0.00952	0.00689	-0.0183**	-0.0190***
	-0.79	-0.648	(-2.486)	(-2.778)
technology	-0.00491	-0.00149	-0.000267	-0.000984
	(-0.407)	(-0.140)	(-0.0363)	(-0.144)
utilities	0.0342***	0.0336***	-0.0234***	-0.0236***
	-2.84	-3.164	(-3.188)	(-3.440)
Constant (communications)	-0.0221***	-0.0172**	0.0157***	0.0133***
	(-2.597)	(-2.292)	-3.024	-2.748
Observations	330	330	550	550
R-squared	0.05	0.058	0.035	0.044
r2_a	0.0199	0.0289	0.017	0.0264
F	1.669	1.977	1.95	2.487
rss	0.695	0.541	0.727	0.632

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Within these regressions, the significance has switched from rate cuts to rate increases. For rate cuts though, one of the two significant sectors was utilities and when adjusted by the constant has a positive predicted abnormal return for both the Mean Adjusted and Market Models which is in line with the theory that lower interest rates are positive indications for investors. However, the reference category of communications does have negative signs for its significant coefficients, the communications sector reaction relative to the market being only suggestive. When viewing the residual plots for these two models an outlier for the highest predicted CAR exists in both the Mean Adjusted and Market Model. However, beyond this outlier which would actually indicate a closer consistency to the theory, the residuals are pretty evenly distributed.

Looking at the 25 basis point only regressions for rate decreases, there is suggested significance of an abnormal reaction amongst four sectors for reactions relative to recent trading including energy, industrials, materials, and real estate, and full significance for utilities and communications stocks. In relation to the market's activity over the event window, five sectors have fully significant reactions including industrials, materials, real estate, utilities, and communications stocks as well as energy and healthcare stocks having suggestive significance. Similar to that of the unrestricted regressions in the previous section, the signs on coefficients in these two models are consistent with the theory that higher interest rates are negative indications and would induce negative coefficients as seen in these models. The residual plots for these two models, Figures 7 and 8 of Appendix B, show hints of heteroskedasticity as the distribution of residuals expands as the magnitude of predicted values increases. However, the literature notes that this is to be expected within stock returns. This inconsistency of variance also further underscores a possible behavioral distinction between different reactions.

Discussion

The results of the rate cut regressions within the first set of models are inconsistent with the theory but may be consistent with the loss aversion hypothesis and are most likely due to the circumstances of the sampled rate cuts. Multiple of the rate cuts sampled, of which there were very few already, occurred during the COVID-19 pandemic when the economy was shuttering and the stock market was plummeting. This would cause abnormal returns to be naturally negative and the general headwinds of a declining economy most likely overpower the positive indications of rate cuts. Though, as rate cuts are generally implemented in times when monetary policy is required to lift or restart the economy, the nature of this sample may not have been unique in its consideration of economic downturns. These results would indicate that rate cuts are not as impactful on short-term trading outcomes since the headwinds of the economy, when such FOMC decisions are made, overpower the positive indication of lower discount rates. Furthermore, this supports the loss aversion hypothesis in its relative consistency with the results for rate increases as it represents a behavior of investors reacting more “correctly” to negative prospects than positive ones.

For rate increases, results indicate that for energy firms there is a consistent and market-divergent reaction relative to the size of the rate change. Energy firms have betas that sit relatively in the middle across sectors but more importantly, the business model of these firms is such that macroeconomic conditions affect expected profits significantly as daily business relies on the global price of energy commodities which are subject to a highly efficient, arbitrage closing electronic market. However, external reasons may explain why some sectors have small market-divergent reactions. The nature of significance for communications stocks may be related to the size of such firms within the calculation of the market indices. The “Magnificent 7” stocks are majority communications firms and make up a wildly disproportionate share of the S&P 500 so the divergence from market-wide reactions may be harder to see when using the market model. This may be the same reason why these firms also have magnitude-dependent reactions to interest rate increases; the popularity and trading volume of these firms is higher and as such there may be a larger reflection of investor sentiment about interest rates within these firms than others.

Furthermore, communications firms are generally growth firms with high betas which rely on persistent investment to continue operating while at a loss until profitability is reached.

When dialing into the 25 basis point changes specifically, the instance of a positive reaction to rate cuts is a good sign for theory. These rate cuts are less critically placed in difficult macroeconomic moments during the sampling time period which may explain why they fall more in line with theory than in the overall model. However, significance is still not as prevalent as with the other side of monetary policy. Rate increases show a lot of significance and the negative coefficients are in line with the theory. However, considering suggestive and fully significant coefficients alike amongst the mean and market models, the smallest negative coefficients are healthcare stocks which had a +0.003, +0.3%, expected change relative to previous trading, and the same for trading relative to the market was communications firms with a +1.33% abnormal reaction. Though these two sectors are not in line with theory, the growth aspect of their perception in the market, as mentioned before for communications firms, could be the reasoning behind this "incorrect" reaction. Investors may be overly positive about these firms into the future and negative rate changes in the present may not affect their expectations of future growth much. The largest changes across the mean and market model for 25 basis point rate increases are seen in the utilities sector. This is interesting as utilities firms are known to have some of the lowest betas and are seen as fundamentally valuable companies rather than having growth prospects. This view of the utilities business model as one of fundamental cost-cutting may indicate to investors that rate increases are more impactful on such businesses rather than on communications stocks.

Conclusion

Asymmetry is seen between rate cuts and rate increases and this may both be indicative of the economic headwinds at the time of rate cuts or the loss aversion theory of Kahneman and Tversky with which these results are aligned. This is seen in the consistency of significant and sentimentally negative reactions to rate hikes but inconsistent positive reactions to rate cuts as seen in Table 1. Furthermore, there is a difference in the trading reaction within the determined event window in terms of the sector category of stocks which falls in line with the popular understanding of the fundamental business models and market positions of such firms. In evaluating companies as either value or growth stocks, wherein a business model relies on consistent cash flow versus top-line growth respectively, we can map our results from both Table 1 and Table 2 further. These findings are consistent with that of Bauman and Miller (1997) whose research concluded behavioral irrationality in the reaction of investors to earnings announcements between growth and value stocks. Examples of these phenomena, located in Table 2, include the smaller negative reaction of healthcare and communications stocks to rate increases and the largest negative reaction to rate increases in utilities stocks as healthcare and communications are growth companies and utility companies have fundamental business models. Further research with a longer timespan would be valuable in evaluating the significance of these findings across more moments in the US economic history. Furthermore, proof of any extension of Bauman and Miller into the realm of interest rate events would also require an application of Shiller (1981) which would seek to find differences between the event window and the post-event window. An understanding of the full reaction including the post-event window may reveal signs of over and underreactions that can further confirm behavioral conclusions made within the event window. An evolution of these behaviors over time or an oscillation between fully rational and fully irrational decision-making may exist and warrant the expansion of the study's timespan.

References

Bauman, W. S., & Miller, R. E. (1997). Investor expectations and the performance of value stocks versus growth stocks. Journal of Portfolio Management, 23(3), 57–68. https://www.proquest.com/scholarly-journals/investor-expectations-performance-value-stocks/docview/56706857/se-2

Bernanke, B. S., & Kuttner, K. N. (2005). What explains the stock market's reaction to Federal Reserve policy? The Journal of Finance, 60(3), 1221–1257.

Brown, S. J., & Warner, J. B. (1985). Using daily stock returns: The case of event studies. Journal of Financial Economics, 14(1), 3–31.

Chopra, N., Lakonishok, J., & Ritter, J. R. (1992). Measuring abnormal performance: Do stocks overreact? Journal of Financial Economics, 31(2), 235–268.

Cowan, A. R., & Sergeant, A. M. (1996). Trading frequency and event study test specification. Journal of Banking & Finance, 20(10), 1731–1757.

Dyckman, T., Philbrick, D., & Stephan, J. (1984). A comparison of event study methodologies using daily stock returns: A simulation approach. Journal of Accounting Research, 22, 1–30. JSTOR. https://doi.org/10.2307/2490855

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. Journal of Financial Economics, 33(1), 3–56.

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of stock prices to new information. International Economic Review, 10(1), 1–21.

French, K. R., & Roll, R. (1986). Stock return variances: The arrival of information and the reaction of traders. Journal of Financial Economics, 17(1), 5–26.

Kahneman, D., & Tversky, A. (2013). Prospect theory: An analysis of decision under risk. In L. C. MacLean & W. T. Ziemba (Eds.), Handbook of the fundamentals of financial decision making: Part I (pp. 99–127).

Patell, J. M. (1976). Corporate forecasts of earnings per share and stock price behavior: Empirical test. Journal of Accounting Research, 246–276.

Rosen, P. (2024). Why the S&P 500 keeps crushing record highs in 2024. Business Insider. https://markets.businessinsider.com/news/stocks/stock-market-outlook-sp500-record-highs-investors-finance-wall-street-2024-2

Scholes, M., & Williams, J. (1977). Estimating betas from nonsynchronous data. Journal of Financial Economics, 5(3), 309–327.

Shiller, R. J. (1981). Do stock prices move too much to be justified by subsequent changes in dividends?

Singh, G., Padmakumari, L., & McMillan, D. (2020). Stock market reaction to inflation announcement in the Indian stock market: A sectoral analysis. Cogent Economics & Finance, 8(1). https://doi.org/10.1080/23322039.2020.1723827

Fisher, I. (1930). The theory of interest: As determined by impatience to spend income and opportunity to invest it. Macmillan Company. FRASER. https://fraser.stlouisfed.org/title/6255

Appendix A

Table 1

Frequency of Various Rate Changes

Frequency of Various Rate Changes	
Negative	
-0.01	110
-0.005	220
-0.0025	330
Total	**660**
Positive	
0.0025	550
0.005	220
0.0075	440
Total	**1210**

Figure 1

Mean Adjusted CAR From Day 0 to Day 3 Across Rate Changes

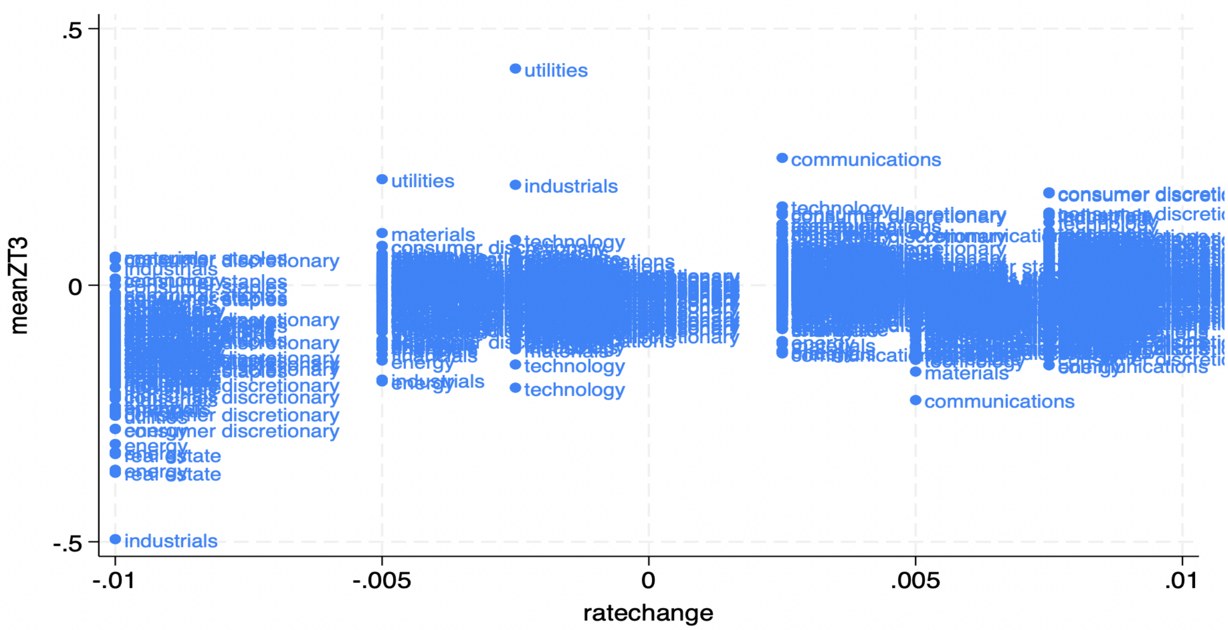

Table 2

Regressions of Range Change Against Abnormal Returns Across Event Windows

Regressions of Range Change Against Abnormal Returns Across Event Windows Abnormal Return=β0+β1(Rate Change)+ϵ						
decision	regression	Event Window	coeff/std. error	ratechange	Constant	Observations
Rate Increases	1	day 0-1 MeanAdj.	b	-1.366791	0.0004021	1210
			se	0.455593	0.0024039	
			p	.0027549***	0.8672002	
	2	day 0-1 MarketAdj.	b	-0.2081245	-0.0050451	1210
			se	0.4177654	0.0022043	
			p	0.6184443	.0222677**	
	3	**day 0-3 MeanAdj.**	**b**	**-1.662997**	**0.0001588**	**1210**
			se	0.6145188	0.0032425	
			p	.0069021***	0.9609514	
	4	day 0-3 MarketAdj.	b	-0.3030402	-0.0056294	1210
			se	0.55231	0.0029142	
			p	0.5833281	.0536314*	
	5	day 0-5 MeanAdj.	b	-0.6751641	-0.0032453	1210
			se	0.6913687	0.003648	
			p	0.3289817	0.3738458	
	6	day 0-5 MarketAdj.	b	0.5717337	-0.0084715	1210
			se	0.6355556	0.0033535	
			p	0.3685226	.0116583**	
Rate Decreases	7	day 0-1 MeanAdj.	b	8.949963	0.02829	660
			se	0.6860575	0.0036384	
			p	9.25e-35***	2.91e-14***	
	8	day 0-1 MarketAdj.	b	5.968018	0.0171439	660
			se	0.6427366	0.0034086	
			p	2.31e-19***	6.35e-07***	
	9	**day 0-3 MeanAdj.**	**b**	**13.96491**	**0.0306105**	**660**
			se	0.8761668	0.0046466	
			p	1.32e-48***	9.15e-11***	
	10	day 0-3 MarketAdj.	b	10.59573	0.0228782	660
			se	0.8088089	0.0042894	
			p	5.22e-35***	1.32e-07***	
	11	day 0-5 MeanAdj.	b	23.78063	0.056836	660
			se	1.079121	0.0057229	
			p	4.99e-81***	9.42e-22***	
	12	day 0-5 MarketAdj.	b	18.26625	0.0472583	660
			se	0.9983754	0.0052947	
			p	9.21e-61***	4.38e-18***	

Table 3

Summary Statistics of Interest Rate Changes and CARs

Variable	Obs	Mean	Std. dev.	Min	Max
ratechange	1,870	0.001471	0.005079	-0.01	0.0075
mean adjusted CAR from day0-3	1,870	-0.01682	0.058428	-0.4949	0.42233
market adjusted CAR from day0-3	1,870	-0.01364	0.05149	-0.4458	0.4182

Appendix B

Figure 1

Mean Adj. Model Negative Rate Changes

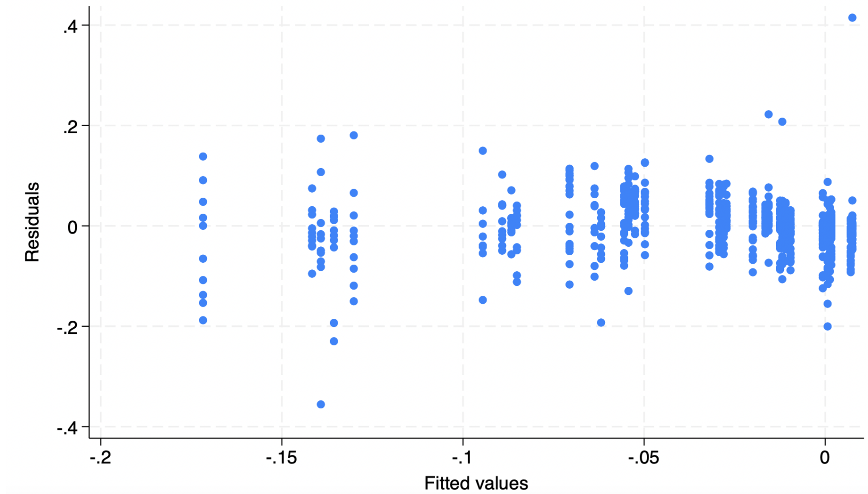

Figure 2

Market Model Negative Rate Changes

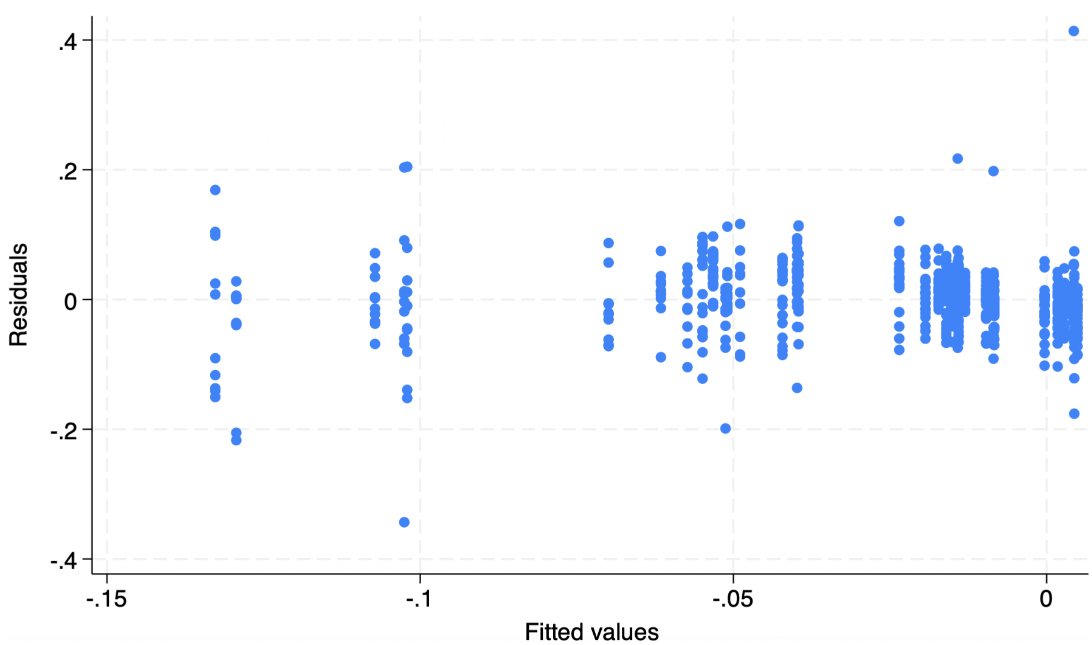

Figure 3

Mean Adjusted Positive Rate Changes

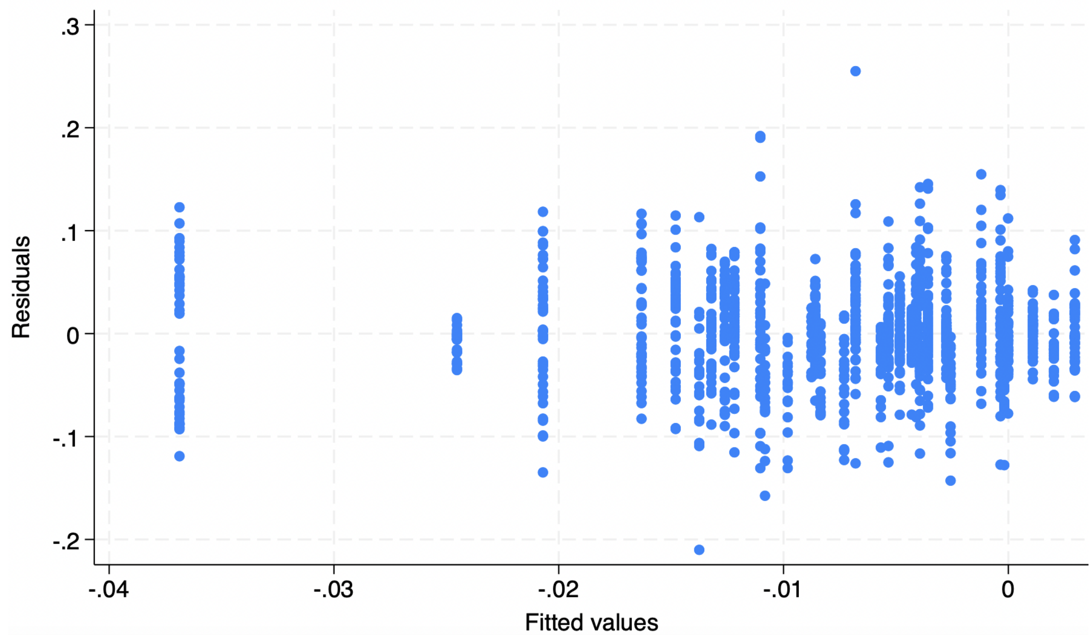

Figure 4

Market Model Positive Rate Changes

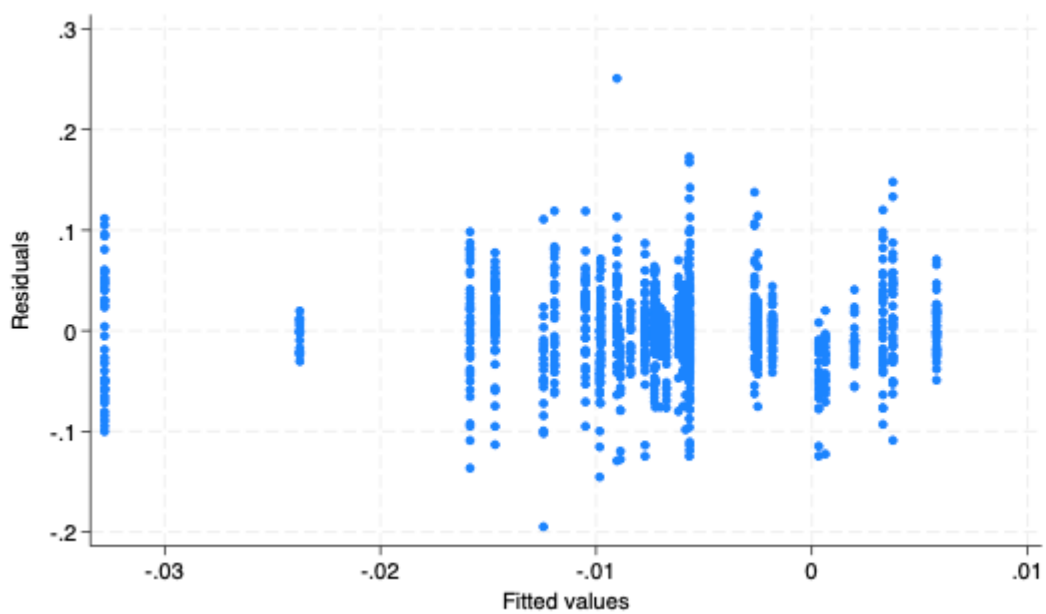

Figure 5

Mean Adjusted Negative 25 bps

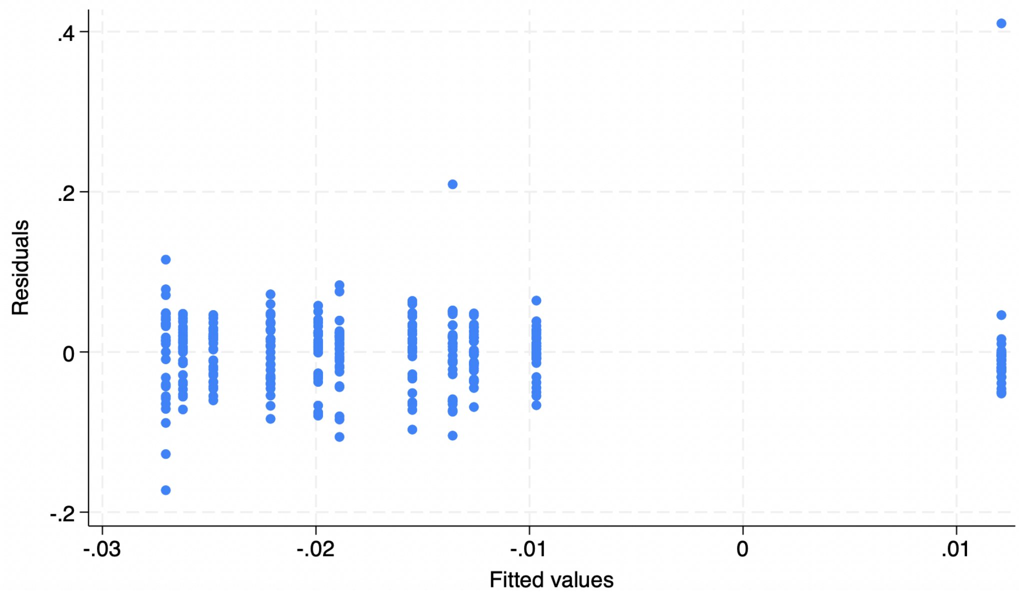

Figure 6

Market Model Negative 25 bps

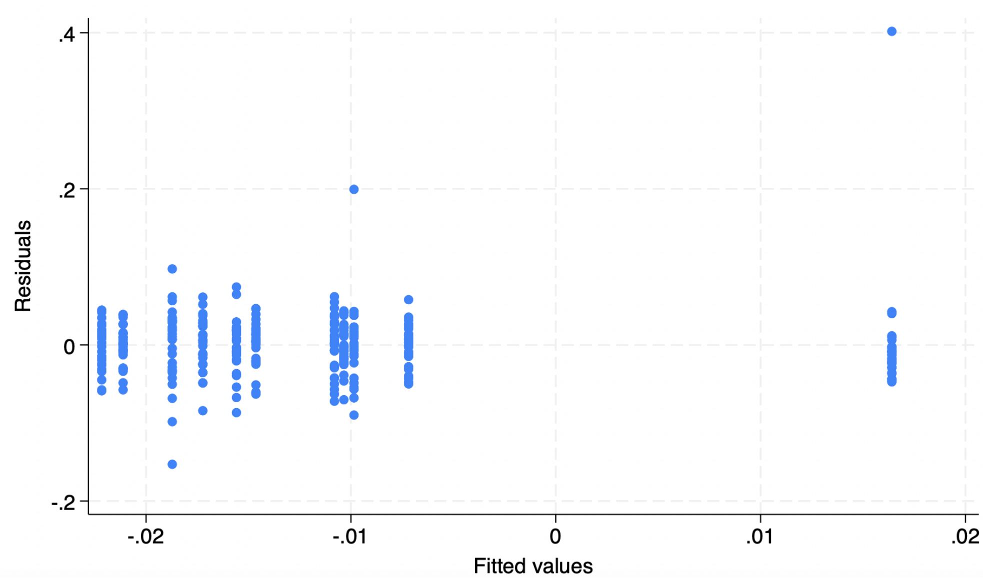

Figure 7

Mean Adjusted Positive 25 bps

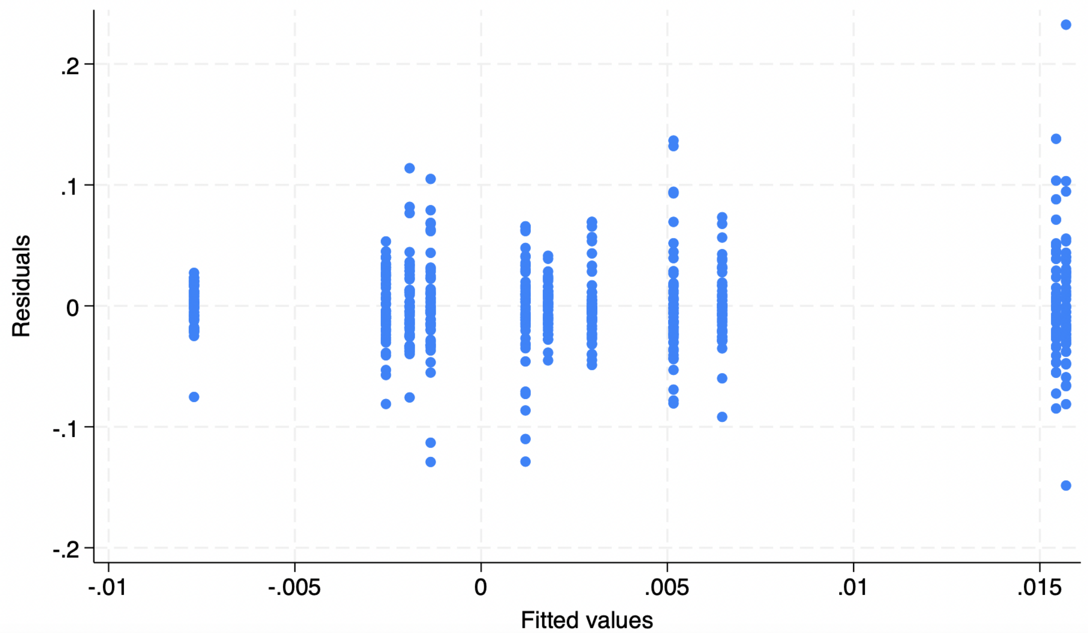

Figure 8

Market Model Positive 25 bps