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The Impact of Unexpected FOMC Actions on Corporate Earnings Expectations

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***Abstract*:** This paper fills a gap in the literature by examining the impact of unexpected Federal Open Market Committee (FOMC) actions on the market's expectations of U.S. corporate earnings by examining the sell-side analysts' quarterly earnings forecasts from 1989 to 2022. This paper reveals a significant negative correlation between analysts' earnings forecasts and unexpected changes in the target interest rate. This correlation weakened after the Federal Reserve's implementation of Forward Guidance as a monetary tool in 2004, which appears to enhance the market's ability to predict target rate adjustments. In addition, this paper shows that with a given amount of unexpected target rate changes, value firms display greater earnings forecast revisions from analysts than growth firms. Debt levels or profitability factors cannot fully explain this phenomenon. The findings of this paper contribute to the knowledge of how FOMC actions exert influence on equity valuations and the transmission mechanisms of monetary policies.

Keywords: Monetary policy, Federal Open Market Committee (FOMC), Analyst Earnings Forecasts, Federal Funds Rate

1. Introduction

The Federal Open Market Committee (FOMC) is the Federal Reserve's primary body that sets the Target Federal Funds Rate, a key short-term interest rate that influences other long-term interest rates [1]. Monetary policies, such as modifying the Target Federal Funds Rate (FOMC action in this paper), aim to affect macroeconomic variables to achieve the Federal Reserve's dual mandate: price stability and maximum sustainable employment [2]. However, the impact of monetary policies on these state variables is indirect. The most immediate and evident effects of monetary policy occur in the financial market as fluctuations in asset prices. By influencing asset prices, policymakers can alter economic behaviours through the wealth effect, thus achieving their ultimate macroeconomic objectives [3]. Therefore, aside from investment strategy implications, understanding the impact of monetary policies on asset prices is critical for understanding the policy transmission mechanism. Previous studies have examined the impact of FOMC actions on stock prices. For example, Bae [4] found that financial institutions' stock prices negatively reacted to unexpected FOMC actions. Bernanke and Kuttner [3] found that an unexpected 25-basis-point cut in the Federal funds rate target typically causes a 1% increase in broad stock indexes.

Despite these findings, no study has examined how unexpected FOMC actions alter the market's expectations about a company's earnings, the numerator in the earnings discount model. Bernanke

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and Kuttner [3] estimated the effect of unexpected FOMC actions on future dividends. However, they used the change in discounted future dividends as the independent variable instead of the market's spontaneous changes in the expectation of future dividends, so the result does not provide insight into the price discovery process accompanying unexpected FOMC actions. Besides, the dividend is a less optimal cash flow term since not all companies pay dividends, and market participants more intensively forecast earnings rather than dividends. This paper aims to study the effect of unexpected FOMC actions on the market's expectation of company earnings by using the earnings revision of analyst reports. Sell-side analysts act as stock critics, assisting investors in making informed decisions by delivering a comprehensive analysis report [5, 6]. Nissim and Penman [7] and Kothari et al. [8] demonstrated that interest rate changes significantly impact analysts' earnings expectations and subsequent market reactions. Thus, the earnings forecast revision of analysts serves as a proxy of the market's spontaneous altering in a company's earnings expectation. By studying the effect of unexpected FOMC actions on analysts' earnings forecasts, this paper intends to fill the gap in research on the impact of FOMC actions on stock pricing and contribute to the understanding of the transmission mechanisms of monetary policies.

2. Data

2.1. Company and Macroeconomic Data

For each company in the sample to ensure sufficient analyst coverage, a random selection was made from the historical list of S&P 500 companies for each year from 1989 to 2022. The quarterly earnings-per-share (EPS) forecasts by sell-side analysts for these 200 stocks are extracted from the Institutional Brokers' Estimate System (IBES). The historical list of S&P 500 companies and financial data of companies such as market capitalization, book-to-price ratio, and net profit margin are from the Center for Research in Security Prices (CRSP). The macroeconomic data, such as gross domestic product (GDP), consumer price index (CPI), and unemployment rate, are from the Federal Reserve Economic Data (FRED).

2.2. FOMC data

The method established by Krueger and Kuttner [9] and Kuttner [1] is used to estimate the unexpected part of each FOMC action. $ZQ is the 30-day Federal Funds futures traded at the Chicago Mercantile Exchange (CME), which settles on the last day of a month at the monthly average Fed Funds Rate. The abrupt price fluctuations of the current month's $ZQ futures contract after the announcement of a FOMC action represent the influence of the unexpected part of this action. The formula for the unexpected FOMC action is as follows:

$$\Delta i^u = \frac{D}{D-d}(f_d - f_{d-1}) \tag{1}$$

where Δi^u is the unexpected part of a FOMC action, f_d is the closing price of the spot $ZQ futures at the date of the FOMC action, and f_{d-1} is the closing price of the $ZQ futures of the previous trading day. Since the settlement price of the monthly $ZQ futures is the daily average Fed Funds Rate of that month, the unexpected FOMC action is scaled by the remaining days in the month. As in Kuttner [1] and Bernanke & Kuttner [3], if a FOMC action occurs in the last five days of a month, the $ZQ futures of the following month are used without scaling to avoid excessive volatility. If a FOMC action takes place after the trading hours, the opening price of the next trading day is used as f_d instead of the closing price of the FOMC date. Four FOMC actions are excluded as outliers, all of which happened during the global financial crisis. On 10/29/2008, 1/28/2009, and 12/11/2007, the

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unexpected part of the FOMC actions was close to zero (-3.5bps, 0, -0.77 bps), but the changes in EPS were the three most negative in the sample, which is believed to be dominated by the negative impact of the financial crisis. On 1/21/2008, the unexpected rate increase was 50% larger than the second largest unexpected FOMC action, but the change in EPS forecast is close to zero. Below are the baseline statistics of the time-series data.

Table 1: Baseline Statistics for the Time-Series Data.

	N	Mean	Min	Max	S.D.	t-statistics	p-value (mean = 0)
Actual FOMC Action	263	-0.238	-100	75	23.486	-0.164	0.87
Unexpected FOMC action	263	1.768	-16.692	42.500	7.379	3.886	0.0001
dEPS* - first approach	263	-0.091	-0.335	0.225	0.086	-17.292	0
dEPS* - second approach	263	-0.059	-0.225	0.095	0.056	-17.004	0

Note: Four outliers during the Global Financial Crisis are excluded from the sample. The two approaches for calculating the change of EPS forecasts are elaborated in later parts of this paper.

The summary table shows some interesting phenomena. The mean value of actual FOMC actions is very close to and has no evidence of deviating from zero. However, the mean value of the unexpected FOMC actions is 1.77 bps. A small number as it is, the p-value for rejecting the null hypothesis that unexpected FOMC actions equals zero is highly significant. This means that the market tends to underestimate rate hikes and overestimate rate cuts. Besides, the mean value of changes in EPS forecasts from both approaches is significantly negative, which means that late reports are more pessimistic about the following earnings figures than earlier reports. The drifting of EPS forecast within a forecast cycle is beyond the topic of this research, but the distribution of unexpected FOMC actions requires further investigation. The time series of unexpected FOMC actions is plotted in Figure 1.

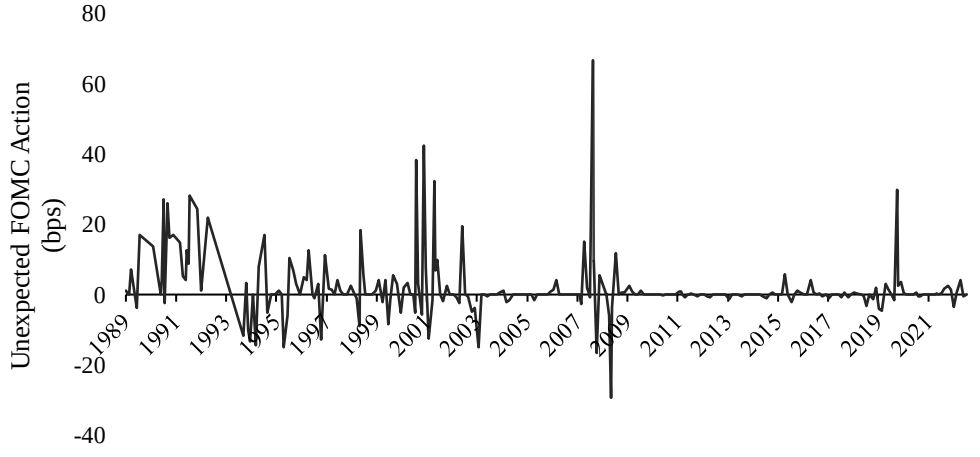

Figure 1: Time-Series of Unexpected FOMC Actions

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Firstly, Chart I shows that for significant unexpected FOMC actions, there are more positive ones than negative ones. During the rate-cut cycle from 1989 to 1994, the unexpected part of each FOMC action was primarily positive. Meanwhile, during the internet bubble burst around 2001, accompanied by the sharp rate cuts, there were significant, unexpected rate hikes. This historical bias could be why the mean value of unexpected actions is significantly positive. Besides, the time series of unexpected FOMC actions shows vital structural changes across time. The first change occurred in 1994 when the Fed started to announce FOMC actions after FOMC meetings, with relatively fewer unscheduled FOMC actions. This is in sharp comparison with the pre-1994 period, since before 1994, most of the FOMC actions happened between two FOMC actions, and if the target rate were unchanged, no announcement would be made, which resulted in more significant but infrequent unexpected FOMC actions [1]. Thus, later in this paper, the pre-1994 sample is treated as a subsample for regression analysis. The second change occurred in the early 2000s when the Fed started using forward guidance as a monetary tool. Before the 2004 rate hikes, the Fed used a sequence of changes in its statement language to signal that it was approaching the time when tightening monetary policy was warranted [10]. The result is a more transparent target rate adjustment process and a better market target rate prediction ability. Therefore, 2004 is a pivot point to divide the post-1994 sample into two subsamples.

3. Models and Findings

Time series and panel regressions are conducted to reveal the influence of unexpected FOMC actions on the analysts' earnings forecast for the general equity market and whether analysts respond differently to firms with various characteristics. The hypothesis is raised that analysts tend to reduce their earnings forecasts following an unexpected FOMC rate hike and increase their forecasts after an unexpected rate cut. The rational logic is that a higher interest rate is associated with a higher cost of capital for corporates and a higher cost of borrowed consumption by consumers and thus has a negative impact on the company's bottom line [11, 12, 13] The behavioral postulation could be that an unexpected FOMC rate increase dampens analysts' sentiment and renders the latter more pessimistic about the earnings prospect of companies [14, 15]. However, no priori hypothesis is held regarding whether analysts respond differently to firms with different characteristics, such as size and value.

3.1. Time Series Regression

For the time-series model, two approaches are employed to estimate the revision of the analyst's EPS forecast. The first approach assumes that the change in EPS forecast for a single stock before and after a FOMC action is the difference between the average next-quarter EPS forecast for that stock from the last FOMC action to this very FOMC action and the average next-quarter EPS forecast from this very FOMC action to the following FOMC action. For example, there was respectively one FOMC action on 1/30/2021, 3/20/2021, and 1/5/2021. For the stock $AAPL, there were ten analysts' forecasts for its Q2 earnings from 1/30/2021 to 3/20/2021 and 15 analysts' forecasts from 3/20/2021 to 1/5/2021. The first approach considers the difference between the average of the 15 EPS forecasts after 3/20/2021 and the 10 EPS forecasts before 3/20/2021 as the change in EPS forecasts for $AAPL. The change in EPS forecasts of the 200 stocks in the sample are taken average again to obtain the change in EPS forecasts for the very FOMC action. The formal formula is as follows,

$$dEPS_t^* = \frac{1}{n}\sum_{i=1}^{n} \frac{\frac{1}{n_{post}}\sum_{j=1}^{n_{post}} EPS^*_{j,i,post} - \frac{1}{n_{pre}}\sum_{k=1}^{n_{pre}} EPS^*_{k,i,pre}}{\sigma_i} \quad (2)$$

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where $dEPS_t^*$ is the change in EPS forecast for the FOMC action at time t, n_{post} is the number of analysts forecast after the FOMC action, and n_{pre} is the number before the FOMC action. By taking an average of individual analyst forecasts, $\frac{1}{n_{pre}}\sum_{j=1}^{n_{post}} EPS_{j,i,post}^*$ is the mean EPS forecast for stock i after the FOMC action, and $\frac{1}{n_{pre}}\sum_{k=1}^{n_{pre}} EPS_{k,i,pre}^*$ is the mean EPS forecast for stock i before the FOMC action. The change in mean EPS forecast for stock i after the FOMC action is normalized by σ_i, the standard deviation of all the analysts' EPS forecast for stock i in the year of the FOMC action. If there is no analyst forecast for stock i either before or after the FOMC action, the stock is not considered for this FOMC action. Lastly, the change in EPS forecast around the FOMC action at time t for the 200 stocks in the sample is taken as an average to get the change in EPS forecast for the FOMC action at time t.

The second approach only considers the revision of single analysts before and after FOMC actions, with the formula as below, where $n_{revision}$ is the number of same-analyst revisions of stock i before and after the FOMC action at time t.

$$dEPS_t^* = \frac{1}{n}\sum_{i=1}^{n} \frac{\frac{1}{n_{revision}}\sum_{j=1}^{n_{revision}} revision_{j,i}}{\sigma_i} \quad (3)$$

For example, there was one FOMC action on 1/30/2021, 3/20/2021, and 1/5/2021, respectively. For example, for the stock $AAPL, five analysts published an analyst report with earnings forecasts before the FOMC action and published revisions again after the FOMC action. This approach takes the average of their revision as the change in EPS forecast for $AAPL around the 3/20/2021 FOMC action, which is normalized by the standard deviation of the EPS forecast of $AAPL in 2021.

$$dEPS_t^* = a + b_0\Delta i_t + b_1\Delta i_t^u + b_2 * X_{i,n} + \varepsilon_t \quad (4)$$

With a time series of FOMC actions and the change in EPS forecast around every FOMC action, a regression of the change in EPS forecasts on the actual and unexpected part of FOMC actions is constructed as above, where i_t is the actual FOMC action, Δi_t^u is the unexpected part of i_t and $X_{i,n}$ is a vector of control variables including the quarterly change in GDP growth rate, the quarterly change in CPI growth rate and the quarterly change in the unemployment rate. Contrary to Kuttner [1] and Bernanke and Kuttner [3], which exclude all inactions in the FOMC action sample, the sample in this study includes all FOMC actions, including those with no change in the target fed funds rate that constitutes a large portion of all sample. For a zero actual FOMC action, the expected and unexpected FOMC actions would be opposite numbers and contribute to their higher correlation (-0.55). Therefore, the actual FOMC action is included in the regression model instead of the expected FOMC action for its moderate correlation with the unexpected FOMC action (-0.25). The regression results of the whole sample and four subsamples are shown in Table 2.

The regression results from the two approaches are consistent. Columns (1) and (5) show the regression result of the entire sample using the first approach of calculating a change in EPS forecast. After controlling the state variables, the actual FOMC action is positively correlated with the change in EPS forecast, and the unexpected FOMC action is negatively associated with the change in EPS forecast at 0.01 level. The positive correlation between the actual FOMC action and analyst earnings forecasts is consistent with the empirical findings of Nissim & Penman [7] that both expected and unexpected interest rate changes are positively correlated with the company's subsequent quarterly earnings. However, the negative correlation between the unexpected FOMC action and the change in EPS forecast contradicts their findings but is consistent with the hypothesis that analysts tend to reduce their earnings forecast with an unexpected interest rate increase. Since, in this study, unexpected FOMC actions occur in the same quarter of the quarterly earnings reports, it is unlikely

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that a change in the short-term interest rate significantly affects the actual earnings of a company within less than four months, the negative correlation between unexpected FOMC actions and analysts forecast raises doubt whether such negative response of analysts is based on rational economic reasons or behavioral bias.

Table 2: Time-Series Regression of Analyst Response to FOMC Actions.

	Dependent variable:							
	Approach 1				Approach 2			
	Full Sample	Pre-1994	1994 to 2004	Post-2004	Full Sample	Pre-1994	1994 to 2004	Post-2004
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Actual	0.001***	-0.003	0.001**	0.001**	0.0005***	-0.001	0.001***	0.001**
	(0.0002)	(0.003)	(0.0003)	(0.0003)	(0.0001)	(0.002)	(0.0002)	(0.0002)
Unexpected	-0.003***	-0.003	-0.002***	-0.003	-0.001***	-0.001	-0.001***	-0.001
	(0.001)	(0.002)	(0.001)	(0.002)	(0.0005)	(0.001)	(0.001)	(0.001)
GDP growth rate	0.011	0.012	0.005	0.014	0.007	-0.002	-0.020	0.010
	(0.009)	(0.098)	(0.031)	(0.010)	(0.006)	(0.067)	(0.022)	(0.007)
CPI growth rate	0.021*	0.131	0.040	0.017	0.013	0.107	0.003	0.012
	(0.012)	(0.164)	(0.027)	(0.014)	(0.008)	(0.111)	(0.019)	(0.010)
Unemployment rate	0.042***	-0.147	0.014	0.065***	0.025**	-0.052	0.002	0.040***
	(0.014)	(0.105)	(0.019)	(0.020)	(0.010)	(0.071)	(0.013)	(0.014)
Constant	-0.094***	-0.259***	-0.113***	-0.083***	-0.061***	-0.112*	-0.057***	-0.059***
	(0.006)	(0.080)	(0.015)	(0.008)	(0.004)	(0.054)	(0.010)	(0.005)
Observations	263	24	85	154	263	24	85	154
R^2	0.186	0.276	0.218	0.149	0.131	0.141	0.202	0.120
Adjusted R^2	0.170	0.074	0.169	0.120	0.114	-0.098	0.152	0.090
Residual Std. Error	0.078	0.094	0.065	0.080	0.053	0.064	0.045	0.055
F Statistic	11.756***	1.369	4.411***	5.190***	7.738***	0.591	4.002***	4.031***

Note: Four FOMC actions during the Global Financial Crisis are excluded as outliers. In the parentheses are unadjusted standard errors. For the subsamples, heteroskedasticity is assumed. For the whole sample. Heteroskedasticity-consistent errors do not change any inferences (*p**p***p<0.01).

The other columns show the regression results of the subsamples where the correlations between the change in EPS forecast and the actual and unexpected FOMC actions are significant only in the 1994-2004 period. Since the pre-1994 sample is much smaller than the other samples, the regression

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shows that the significance of the correlations in the entire sample is not sensitive to including the pre-1994 data. However, the insignificance of correlations in the post-2004 sample is consistent with and might be due to the observation that after the Fed started 'Forward Guidance' in the early 2000s, the unexpected part of FOMC actions declined significantly and had less impact on analysts' forecasts. The increase in policy transparency was likely to enhance the investors' ability to predict the future target rate adjustments.

3.2. Panel Regression

$$dEPS_{i,t}^{*} = a + b_0\Delta i_t + b_1\Delta i_t^u + b_2 * X_{i,n} + b_3 * \left(X_{i,n} * \Delta i_t^u\right) + \varepsilon_t \quad (5)$$

The time-series regressions reveal the negative correlation between the unexpected FOMC actions and the change in analysts' EPS forecast. It is possible that analysts respond differently to firms with different styles.

Table 3: Panel Regression of Analyst Response to FOMC Actions.

	Dependent variable: Change in EPS forecast $dEPS_t^*$		
	(1)	(2)	(3)
Actual FOMC action	0.001***(0.0001)	0.001***(0.0001)	0.001***(0.0001)
Unexpected FOMC action	-0.002*** (0.0004)	-0.002***(0.0004)	-0.001***(0.0004)
Market Capitalization	0.004**(0.002)		
Book-to-Price Ratio	-0.025***(0.003)	-0.026***(0.003)	-0.025***(0.003)
Debt-to-Equity ratio		-0.0002 (0.002)	
Net Profit Margin		-0.004 (0.004)	
Current to Long-term Debt			-0.004(0.003)
Free to Operating Cashflow			-0.0003 (0.003)
BP ratio * Unexpected	-0.001***(0.0004)	-0.001***(0.0004)	-0.001***(0.0004)
Market Cap * Unexpected	0.0001(0.0003)		
DE ratio * Unexpected		0.0005(0.001)	
NPM * Unexpected		0.00002(0.001)	
CL Ratio * Unexpected			-0.001(0.0004)
FO Ratio * Unexpected			0.002**(0.001)
Constant	-0.089***(0.002)	-0.089***(0.002)	-0.079***(0.003)

Note: Four FOMC actions during the Global Financial Crisis are excluded as outliers. In the parentheses are heteroscedasticity-consistent standard errors (*p**p***p<0.01).

The size factor and value factor popularized by Fama & French [16], debt-level factors, and profitability factors are tested here, and the regression model is constructed as above where $dEPS_{i,t}^{*}$ is the change in EPS forecast for stock i around the FOMC action at time t, calculated with the first approach (see the time series section). $X_{i,n}$ is a vector of control variables and $X_{i,n} * \Delta i_t^u$ is a vector of interaction terms. All the control variables are normalized by the whole sample standard deviations. The regression result is reported in Table 3.

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Column (1) is the panel regression result of the sample controlling size and value. The correlation between the FOMC actions and the change in EPS forecasts is consistent with the result of the time-series regressions. Besides, the negative correlation between the BP ratio * Unexpected FOMC action and $dEPS_t^*$ indicates that analysts are more responsive to unexpected FOMC actions when their evaluated firm has a higher Book-to-Price ratio. When there is an unexpected target rate increase, analysts tend to reduce the earnings forecast for value firms more than growth firms. It is postulated that the higher sensitivity of analysts toward value firms might be related to higher debt levels and profitability since firms with higher debt burdens will be more impacted by interest rate changes [17] while firms with higher profitability will be less impacted. Two sets of debt-level and profitability factors are tested in model (2) and model (3). The results in column (2) and (3) show that there is no evidence that the debt-to-equity ratio, net profit margin, and current debt to long-term debt ratio have an impact on analysts' responses to unexpected FOMC actions. The interaction term of the free cashflow to operating cashflow ratio and the unexpected FOMC action is positively correlated with $dEPS_t^*$ at the 0.05 level but it does not reduce the significance of BP ratio * Unexpected FOMC action. The reason why analysts respond more to value firms when there is an unexpected FOMC action requires further study.

4. Conclusions

Understanding how monetary policies impact asset prices is crucial to the understanding of policy transmission mechanisms and the formulation of efficient investment strategies. However, there is a gap in the study of the Federal Open Market Committee's (FOMC) actions on how the decision of the FOMC to change the target fed funds rate impacts the market's expectation of company earnings. This paper uses sell-side analysts as the proxy of the investment community and empirically examines the impacts of unexpected FOMC actions on analysts' earnings forecasts from 1989 to 2022. This paper reveals that an unexpected target rate change by the FOMC is negatively correlated with analysts' earnings forecasts. This negative correlation disappeared in the post-2004 period when the Fed started using Forward Guidance as a monetary tool, which increased the transparency of policymaking and the policy prediction ability of the market. Meanwhile, this paper examines whether analysts react differently toward firms with different characteristics, such as size and value, in response to unexpected FOMC actions. It shows that firms with a higher book-to-price ratio are more sensitive to analyst revisions when there is an unexpected FOMC action. In another way, when there is an unexpected target rate increase, analysts tend to reduce their earnings forecast more than growth firms. There is no evidence that company size influences analysts' earnings forecasts.

Nonetheless, there are limitations in this paper. Firstly, this study could not explain the positive correlation between the actual FOMC action and the change in analyst earnings forecast, which might signal omitted variable bias in the models. Secondly, although this study finds that analysts respond negatively to earnings forecasts towards unexpected FOMC actions, it is uncertain whether this negative response is due to rational economic reasons or behavioral bias. Lastly, this study does not explain why analysts respond more to value firms when encountering an unexpected FOMC action after controlling debt level and profitability.

In conclusion, this paper attempts to fill the gap in the research of FOMC actions by studying the impact of unexpected FOMC actions on the market's expectation of company earnings. This paper contributes to the knowledge of how monetary policies affect asset prices and the policy transmission mechanism. With the limitations in this study, the findings are inconclusive and require further research on this topic.

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