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TONE, TIMING, AND TURMOIL: HOW FOMC STATEMENTS AFFECTED THE STOCK MARKET DURING THE COVID-19 PANDEMIC

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Abstract:
This study examines how the Federal Open Market Committee (FOMC) statement tone influenced short-term stock price movements during the COVID-19 pandemic. Prior research suggests that hawkish or dovish language can drive market reactions, but this study uses manual sentiment analysis and an event window approach to evaluate tone more precisely. Results show dovish tones aligned with positive stock changes in stable periods, while hawkish tones correlated with market declines. However, during the height of the pandemic, tone effects were less predictable, suggesting that crisis conditions can mute or override typical tone-based impacts.

JEL: E52, G14, E58

Keywords: Federal Reserve, FOMC (Federal Open Market Committee), monetary policy, COVID-19 pandemic, sentiment analysis, event study, stock price reaction

1. Introduction/Literature Review

1.1 Introduction to Monetary Policy

The Federal Reserve serves as the central bank of the United States and is responsible for establishing monetary policies. Monetary policy involves the actions taken by the Federal Reserve to achieve two primary objectives for the U.S. economy: promoting maximum employment and maintaining stable prices (Federal Reserve). Within the Federal Reserve, the Federal Open Market Committee (FOMC) is a group of policymakers tasked with communicating the central bank's monetary policy to the public (Benchimol, Caspi, Kazinnik, 2023). Since the Great Recession of 2008, a global economic crisis that devastated the U.S. stock markets, the FOMC has made increased efforts to enhance its transparency and communicate its goals and actions. To convey their objectives, Doh et

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al. (2021) found that the "*Federal Reserve has increasingly used public statements to shape expectations about future policy actions*" (p. 354). The FOMC releases eight statements annually, which are presented as a written press release, discussing current economic conditions, future goals, and the rationale behind past policy decisions (Federal Bank of St. Louis, n.d.).

1.2 Impacts of FOMC Statements

The release of FOMC statements is known to cause extreme changes to the stock market. Doh, Song, and Yang (2020) found that these statements often lead to immediate spikes, as investors respond rapidly to the anticipation of the statements. Similarly, Carlo Rosa (2013) found that the prices were "*at least eight times more volatile on event days compared with non-event days*," indicating the impact the FOMC statements have on the stock market when they are released (p. 70). Swanson and Jayawickrema expanded on the idea, finding that price changes in FOMC ranged from 3% to 25%, indicating the magnitude of the impact across decades (2024). A key reason behind the dramatic shifts is not only the content of the statements but also the way the FOMC has communicated them, particularly through tone and word choices.

Bernanke and Kuttner (2005) found that even the "*slightest tone change can trigger more than 2.5% in stock prices in both directions*" (p. 16). Investors read FOMC statements as soon as they are released and often rely on keywords or rhetorical cues to see how the statements have changed from their prior release (2005). Benchimol asserted this idea, as he observed slight changes in wording compared to prior statements, such as replacing the word "moderate" with "strong," which can signal a shift in tone, triggering immediate stock price reactions as soon as investors react to the perceived changes (2021). Therefore, these subtle shifts signify how closely investors monitor the wording of FOMC statements, with even minor changes serving as powerful signals that immediately trigger stock prices. Within the public statements, the tones are classified into three main categories: hawkish, dovish, and neutral tones. As defined by Tadle (2022) and Gu (2022): 1) A hawkish stance is the negative tone that is portrayed in the FOMC statements, potentially indicating the downfall of the U.S. economy and 2) A dovish tone is when the statement is associated with a positive tone, praising the stable, rising economy.

1.3 COVID-19 Context

The COVID-19 pandemic created a unique environment for FOMC statements, characterized by the unanticipated global lockdown and economic disruption. The virus was first identified in Wuhan, China, in December 2019 (National Foundation for Infectious Diseases), and the U.S. formally declared the end of the pandemic on May 11, 2023 (U.S. Department of Labor). Therefore, 2019 to 2023 serves as the timeline for the FOMC statements analyzed in this research. Zheng and his team explored the idea by analyzing the percentage of the US stock market that consumer households owned. He found that during 2020, "*household equity ownership increased to 68.33% from 52.6% in 2019" (2022), advancing the idea that, despite the ongoing crisis, more individuals were investing in the* *stock market"*. In addition, Zheng observed that *"weekly trading intensity increased by 13.9%"* as the number of COVID-19 cases doubled (2022), further indicating that lockdowns and more time at home contributed to higher frequency trading. Not only does the evidence indicate that more households began to participate in the stock market, but the rate at which people traded also increased. As a result, with more individuals closely monitoring FOMC statements as a guide to the health of the economy, even slight changes in tone could have led to sharper and more immediate stock price reactions.

2. Gap in Literature

Despite advancements in understanding the impact of FOMC communications, significant gaps remain in the literature. While Bernanke and Kuttner (2005) previously analyzed tones in earlier FOMC statements, Bernanke's more recent study with Blanchard (2023) acknowledged a major limitation of their Covid-era analysis: "*overlooking the tone of the statements*" (p. 45). This suggests that the tone, rather than the content itself, could be a dominant factor in shaping stock market reactions during the crisis. Benchimol et al. (2023) also acknowledged the unique changes in FOMC statements posed by the COVID-19 pandemic, focusing primarily on content and its impact rather than the tone itself. Similarly, Thorebecke (2023) analyzed the policy outcomes from the FOMC statements but did not isolate tone as a factor of the policy actions. Collectively, these studies highlight a persistent gap: while FOMC statements are known to influence stock prices, their tone during the pandemic remains unexplored. To address this gap, this study focuses not on *what* the FOMC statements include but on *how* the tones portrayed within them influence short-term stock prices. In addition to the lack of tone analysis, existing studies also tend to overlook the immediate stock price changes following the release of FOMC statements. For instance, Doh et al. (2021) investigated the statements' influence on the U.S. stock market but failed to address the immediate changes in stock prices, instead choosing to analyze the long-term changes. Aizenman et al. (2024) further explored the tone of the FOMC statement's effects, but they also explored the year-long changes in the stock market.

Therefore, the research seeks to answer:

- To what extent does the tone of FOMC statements influence short-term stock price reactions during the COVID-19 pandemic?

3. Methodology

This study used a mixed-methods approach, combining qualitative sentiment scoring with quantitative event analysis to examine how FOMC statement tone influenced short-term stock price changes. Sixteen statements, four per year from 2019 to 2022, were randomly selected from the eight annual releases on the Federal Reserve's official archive to ensure objectivity and capture tone variability across different periods.

2019 1) January 30 2) June 19 3) July 31 4) December 11	**2020** 1) March 20 2) April 29 3) September 16 4) October 30
2021 1) March 17 2) June 16 3) September 22 4) November 3	**2022** 1) January 26 2) May 4 3) July 27 4) September 21

Caption: All 16 gathered FOMC statements based on a randomly generated selector

3.1 Implementing Financial Dictionary

According to Henry and Leone (2016), the standard English dictionary is unsuitable for categorizing tones in financial texts because words in English dictionaries have different meanings and connotations than in financial texts. For example, the word "confined" is classified as having a negative connotation in standard English dictionaries but conveys a positive sentiment in a financial context, as it refers to limiting negative economic data. Similarly, some words that might convey a tone in general dictionaries take on a more neutral role in financial contexts. For example, words like "crisis," often classified as negative in traditional dictionaries, are frequently used to reference historical events like the 2008 Financial Crisis without necessarily conveying a tone. Therefore, it was important to tailor the sentiment dictionary to the unique language of financial connotations as well as the contexts in which they were placed.

To identify the tones presented in the FOMC statements, a Dictionary Method of Sentiment Analysis was employed. The dictionary was adapted from Tadle's (2022) study since the words that he classified were terms frequently found in FOMC statements from 2004 to 2015, drawing from multiple years of FOMC communications. Tadle's dictionary categorized the words associated with hawkish or dovish tones.

Table 1. Keywords by type.

Hawkish keywords			
business	*businesses*	*demand*	*economic*
economy	*employment*	*energy*	*equities*
equity	*expansion*	*financial*	*growth*
housing	*income*	*indicators*	*inflation*
inflationary	*investment*	*investments*	*labor*
manufacturing	*outlook*	*output*	*price*
prices	*production*	*recovery*	*resource*
securities	*slack*	*spending*	*target*
toll	*wage*	*wages*	
Dovish keywords			
	accommodation	*devastation*	
	downturn	*recession*	
	unemployment		

Caption: Words that are categorized as hawkish or dovish within the FOMC statements (Tadle, 2022)

After the categorization of tone, sentence-level sentiment scoring was used to minimize distractions from non-essential content. To retrieve the sentences, one criterion was applied from Tadle's study: The sentences must include any of the following hawkish or dovish words (listed above) and also incorporate associated positive or negative terms (listed below). If the terms are explicitly positive or negative in financial contexts, then it is easier to categorize them into hawkish or dovish tones.

Positive terms				
abating[a]	*accelerated*	*add*	*advance*	*advanced*
augmented	*balanced*	*better*	*bolsters*	*boom*
booming	*boost*	*boosted*	*eased*	*elevated*
elevating	*expand*	*expanding*	*expansionary*	*extend*
extended	*fast*	*faster*	*firmer*	*gains*
growing	*heightened*	*high*	*higher*	*improved*
improvement	*improving*	*increase*	*increased*	*increases*
increasing	*more*	*raise*	*rapid*	*rebounded*
recovering	*rise*	*risen*	*rising*	*robust*
rose	*significant*	*solid*	*sooner*	*spike*
spikes	*spiking*	*stable*	*strength*	*strengthen*
strengthened	*strengthens*	*strong*	*stronger*	*supportive*
up	*upside*	*upswing*	*uptick*	

Caption: Positive terms included within FOMC statements (Tadle, 2022)

Negative terms				
adverse	*back*	*below*	*constrained*	*contract*
contracting	*contraction*	*cooling*	*correction*	*dampen*
damping	*decelerated*	*decline*	*declined*	*declines*
declining	*decrease*	*decreases*	*decreasing*	*deepening*
depressed	*deteriorated*	*deterioration*	*diminished*	*disappointing*
dislocation	*disruptions*	*down*	*downbeat*	*downside*
drop	*dropping*	*ebbed*	*erosion*	*fade*
faded	*fading*	*fall*	*fallen*	*falling*
fell	*insufficient*	*less*	*limit*	*low*
lower	*moderated*	*moderating*	*moderation*	*reduce*
reduced	*reduction*	*reluctant*	*removed*	*restrain*
restrained	*restraining*	*restraint*	*resumption*	*reversed*
slack	*slow*	*slowed*	*slower*	*slowing*
slowly	*sluggish*	*sluggishness*	*slumped*	*soft*
softened	*softening*	*stimulate*	*strained*	*strains*
stress	*subdued*	*tragic*	*turmoil*	*underutilization*
volatile	*vulnerable*	*wary*	*weak*	*weakened*
weaker	*weakness*			

Caption: Negative terms included within FOMC statements (Tadle, 2022)

Words such as “rising”, “strengthened”, or “accelerated” portray a clear dovish tone, indicating the positive stance presented within the statements. On the other hand, words such as “slow, weak, turmoil” present a strong hawkish tone, presenting the negative tone associated with the statements. There were a total of 192 sentences for all documents, which are 9420 words to analyze.

3.2 Sentiment Formula

To score each sentence, the FSS sentiment formula was used, which is the most common way to manually score sentiments in a given financial text (Higano et al., 2023). After each sentence was analyzed using the formula, the individual sentiment scores were aggregated to determine the overall tone score of each FOMC statement. The sentiment score ranges from -1.0 to 1.0, where -1.0 represents an entirely negative sentence, 0 represents a neutral sentence (with no classified sentiment terms), and 1.0 represents a fully positive sentence. Scores falling between these values reflect varying degrees of sentiment, allowing for a more nuanced understanding of tone across each statement. The extracted sentences were also used to create codes that represent the most frequently discussed topics and were tallied. The identified codes were:

Code	Definition
Inflation	Mentions of rising or lowering prices (e.g., "*Lower oil prices are holding down consumers…*" - April 29, 2020)
Labor Market	Mentions of jobs, unemployment, or hiring (e.g., "*job gains have been solid, on average …*" - July 31, 2019)
Virus	Any reference to COVID-19 or its effects (e.g., "*The virus has caused tremendous economic hardship…*" - July 27, 2022)
Household/Business Spending	Mentions of consumer or business spending activity (e.g., "*Recent indicators of spending and production have softened.*" - July 27, 2022)
Global news	Mentions of international events or foreign economies (e.g., "*Russia's war against Ukraine is causing tremendous human and economic hardship*" - September 21, 2022)
Interest Rate	Mentions of changes in the cost of borrowing, typically from banks (e.g., "*… raise the target range for the federal funds rate to 2-1/4 to 2-1/2 percent*" - December 11th, 2019)

Caption: Code Descriptions Used to Identify Sentence Topics in FOMC Statements (Tadle, 2022)

3.3 Event Analysis

An event study analysis was conducted using the Bloomberg terminal to examine how FOMC statement tones affected short-term stock price movements. The S&P 500 was used as a benchmark, given its representation of major U.S. companies and overall market trends. A 15-minute event window before and after each statement release was applied to minimize the influence of external factors and better isolate the market's response to tone.

Figure 1: Bloomberg Terminal screenshot of the S&P 500 index, showing stock price movement 15 minutes before and after the March 20, 2020, FOMC statement release

4. Results, Findings, and Interpretation

4.1 Comparison of Average Tone to Individual Statements

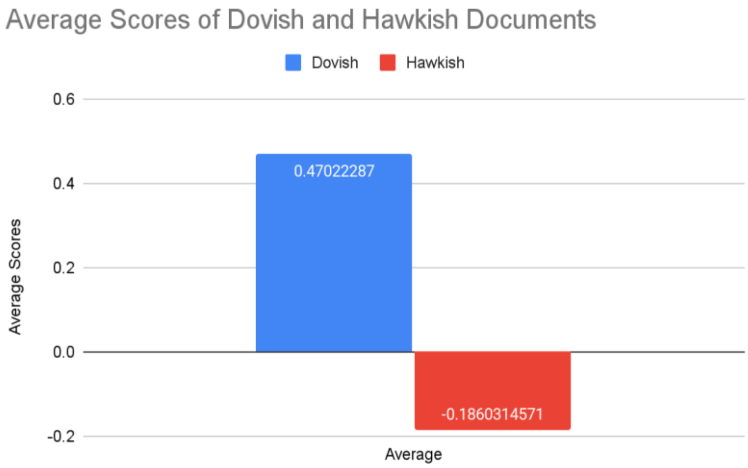

Figure 2: Average Scores of Dovish and Hawkish Documents using the Sentiment Formula

Figure 2 compares the average sentiment scores of the dovish and hawkish FOMC statements between 2019 and 2022, using the sentiment scoring formula. Out of sixteen statements analyzed, 10 were classified as dovish statements, having an average sentiment score of around 0.4702 with a standard deviation of 0.3435. This relatively high sentiment score indicates that, on average, the statements were portrayed with a strong positive tone. In contrast, the six hawkish statements had a low average sentiment score of around -0.1860 with a standard deviation of 0.0884. This indicates a slightly negative to even neutral tone, but more importantly, the low standard deviation indicates that the hawkish statements had high degrees of consistency. Unlike the positive fluctuations in dovish statements, hawkish statements presented a consistent tone throughout, often presenting the negative economic updates more directly and seriously.

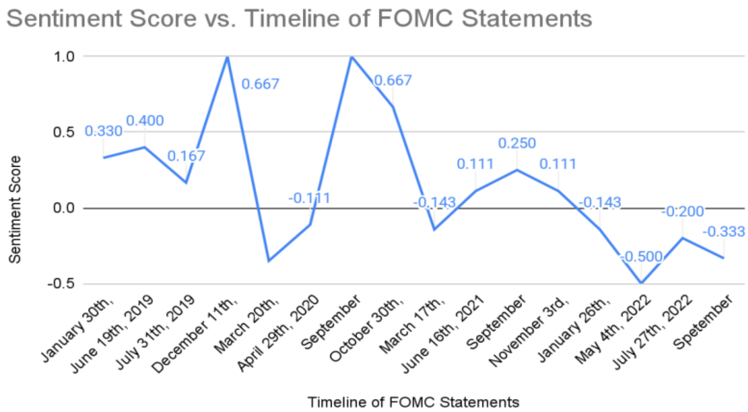

Figure 3: Sentiment Score of FOMC Statements throughout 2019-2022

Figure 3 examines all document scores, examining how the tone evolved over the pandemic. Early releases, such as those on January 30 and June 19, 2019, vary in positive tone (~0.33 and ~0.4), a period when economic growth was sustainable, prices were stable, and virus threats were virtually non-existent. By December 11, 2019, the sentiment jumped to even a score of 1.0, the strongest dovish confidence. Phrases such as "*job gains have been solid,*" "*the unemployment rate has remained low,*" and "*the labor market remains strong*" reflect the strong economic conditions that coincide with the tone of the phrases. During this time, the COVID-19 pandemic had not yet been introduced to the United States; therefore, the statements reflect a confident and optimistic economic outlook. As the pandemic progressed, however, the tone remained dovish but gradually incorporated more cautious language. The key deviation took place in March 2020, when the tone was still dovish (~0.6667) but conflicted with a record-setting global health crisis, when the COVID-19 pandemic was first introduced in the United States.

Despite assurances by the FOMC, stating they seek "*... to achieve maximum employment and inflation*," this moment represented a key finding: even when the tone remained dovish, the impact of the introduction of a global pandemic intensified. During periods of intense crisis, public attention shifts away from the FOMC communications, making the sentiment tone less impactful regardless of content. This shift illustrates that even despite a positive tone in the dovish statements, the growing concerns over the pandemic cannot calm the public when a crisis emerges. From mid-2020 to 2021, FOMC statement tones fluctuated between slightly positive and negative, reflecting uncertainty over how to address the pandemic. Some statements highlighted improving economic conditions, while others expressed concern over the ongoing public health crisis. By late 2021 and early 2022, sentiment scores turned sharply negative, with May 2022 statements clearly signaling a hawkish tone. This shift from optimism to caution reflects how external crises, especially the pandemic, influenced FOMC communication. Rather than using purely hawkish language, the FOMC employed a strategic blend of tones to maintain steady and responsive messaging.

4.2 Comparison of Sentiment Scores to Stock Prices

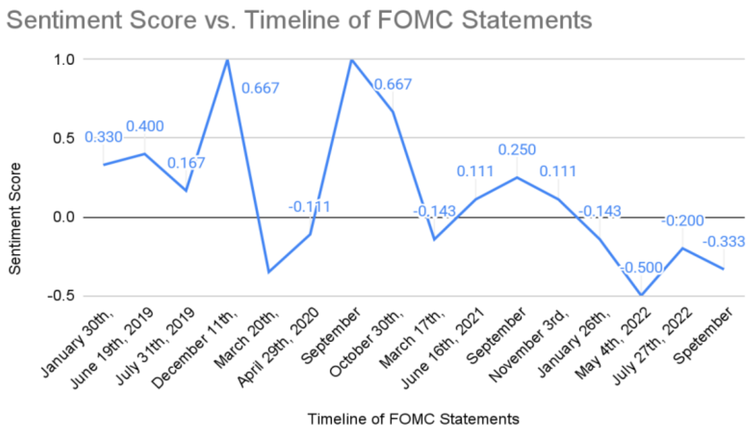

Figure 3: Sentiment Score of FOMC Statements throughout 2019-2022 Timeline

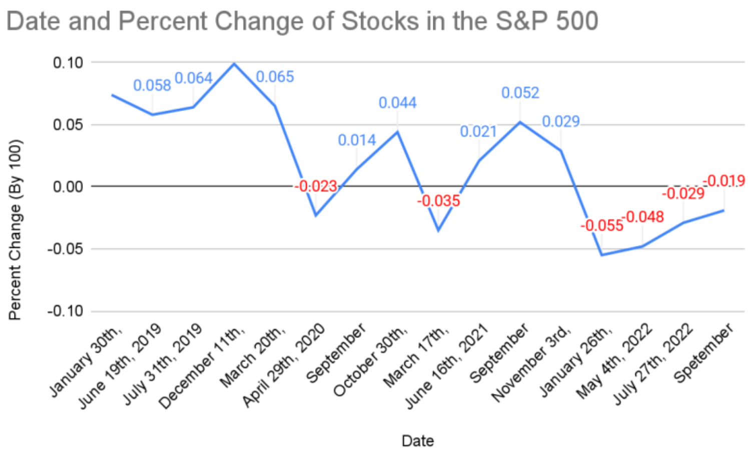

Figure 4: Stock Price Changes 15 mins pre/post release of FOMC Statements

Figure 4 pairs each FOMC statement with changes in stock market percentages, showing how stock prices responded as the tone shifted over time. On average, dovish statements were associated with a +5.2% increase in stock prices, while hawkish statements resulted in an average of -3.5% decrease. A general pattern for dovish statements was that in 2019, dovish tones were associated with positive stock price changes. For example, the early 2019 statement sees consistent increases in the data (+5.8% on June 19, +6.4% on July 31) in response to dovish statements. A +9.9% spike follows December 2019's high dovish statement (with a score of 1.0 as shown in Figure 2x), reinforcing the idea that a positive tone drives positive stock price change. Phrases such as "*job gains have been robust*" and "*the unemployment rate has remained low*" contributed to the confidence. However, March 20, 2020, breaks this pattern. The tone remained dovish (+0.6667 sentiment), and stock prices initially rose by 6.5%. Yet the content reflected growing caution about the pandemic, and as virus concerns intensified, the market reversed, dropping to -2.3%. This shows that even a supportive tone may fail to sustain gains during a crisis. A similar deviation occurred in September 2020 with a -0.11 sentiment score and a 1.4% price increase, reflecting market optimism despite a slightly hawkish tone. The FOMC's note that "*overall financial conditions have improved recently*" likely drove this reaction. These deviations suggest that investors prioritize key phrases over the overall sentiment score when interpreting FOMC statements.

4.3 Codes of FOMC Statements

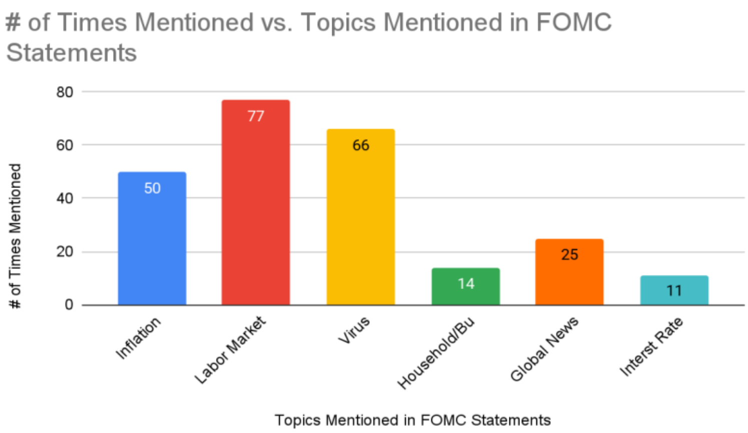

Figure 5: Total number of topics mentioned in FOMC statements

Figure 5 mentions the frequency of codes in FOMC statements. The most frequent mentions were labor market and virus, with the total mentions being 77 and 66, respectively (Figure 5). The codes "Labor Market" (mentioned 2, 5, 5, 5) and "Inflation" (mentioned 3,3,2,3) were generally associated with positive terms, as they dominated 2019 statements, reinforcing the narrative of steady prices for economic growth and strong employment. This pattern corresponded with highly dovish tones and positive stock market reactions in 2019 (Figure 1 and Figure 3). Four mentions of the "virus" in March 2020 marked a dramatic introduction of the pandemic in the United States. Figures 2 and 3 confirm the clear shift in the FOMC's tone from dovish to hawkish. The mention of the virus coincided with a hawkish and negative stock loss, indicating that the term "virus" is associated with negative market sentiment. By March 17, 2021, "virus" was mentioned six times, and appeared 14 times across 2022, aligning with a more hawkish tone and negative stock price. Another pattern that emerged was the increased mention of "Global News," an introduction to the Russian-Ukrainian war, which was mentioned 25 times just in 2022 alone. The unprecedented geopolitical event led to a decrease in stock prices as well as a hawkish tone in the statements, confirming the existing hawkish trend in 2022. Both terms are associated with a hawkish stance, indicating that the FOMC statements acknowledged the pandemic and global risks.

5. Conclusion and Future Directions

5.1 Conclusion

Using a mixed-methods approach, the findings provided two key insights: 1) Dovish tones were generally associated with positive stock prices (5.2%), while hawkish tones corresponded to negative stock price shifts (3.5%). 2) Since the pandemic introduced an unprecedented event of the virus and the global war, the tone and stock market can be derived from one another, confirming that tone itself is not the only factor that impacts stock prices. These findings build on Bernanke and Kuttner's (2005) claim that the smallest changes in the tone can shift stock prices by more than 2.5%, corroborated by the low hawkish sentiment scores still impacting stocks. Additionally, the findings support this idea, as the change in stocks passed the 2.5% threshold for both positive and negative stock changes. These results support, as Doh et al. (2021) emphasize, that subtle shifts can have a profound impact on the stock market, which was generally true when the tones followed the same direction as the economic conditions. However, the findings challenge Rosa's (2013) claim that FOMC statements consistently change up to 8 times in stock prices. In the study, stock prices rose dramatically when the tone aligned with the economic conditions, but the pattern was not consistent across all statements. As shown by deviations in March 20th and September of 2020, the evidence refines the existing literature by illustrating the *potential* effect of the tone on stock prices, but only when it aligns with economic conditions.

5.2 Limitation

In this study, there are potential factors that warrant additional consideration. First, geopolitical events such as the Russian-Ukrainian war coincided with FOMC announcements, potentially overestimating the influence of the tone and stock price movement. In addition, a 15-minute event window is intended for short-term stock price changes, but it cannot completely eliminate the market rumors and simultaneous external news events that still influence the data. Even with a 15-minute time frame, it is difficult to isolate tone as an exact influence on stock movements. Lastly, by solely focusing on the S&P 500, the findings may not be generalizable to the entire smaller companies operating in a smaller market, making them more vulnerable to extreme stock price changes. Therefore, future research could address these limitations and provide more comprehensive insights.

5.3 Implications

As shown by the study's findings and previous sources, small changes in the tone of FOMC statements can cause significant movements in stock prices. Investors, especially those who rely on the statements as their guide, may misunderstand the tone if not analyzed correctly. Consequently, this leads to poor financial decisions and trading at inopportune times based on misunderstood cues (Tadle, 2022). This means that investors must understand that the tone is not the sole factor in changing stock prices, but also consider broader factors such as employment data and inflation reports within the statements. Therefore, it is crucial for the FOMC to also craft statements that help minimize unintended reactions from investors, which include the transparency and clear communication that the FOMC wants the public to understand. Especially in times of crisis, the statements must be tailored to reassure the stock market and prevent poor financial decisions. Additionally, the tone of FOMC statements is crucial in providing banks, businesses, and the general public with predictions about the Federal Reserve's actions regarding interest rates, which represent the cost of borrowing money from a bank. A hawkish tone indicates an increase in interest rates, prompting banks to raise their lending rates accordingly. This shift leads to higher costs for mortgage rates, credit cards, and student loans; facing steeper repayment costs also prevents homebuyers from qualifying for loans or managing monthly payments (Foster and Khan, 2025). Lastly, small businesses facing similar borrowing costs may postpone hiring workers in the labor market (Federal Reserve). Thus, the FOMC's tone impacts the whole economy; therefore, an understanding of the tone is needed to make prepared financial decisions.

5.4 Future Directions

One potential direction from this study is analyzing the tones in statements provided by foreign banks, such as the European Central Bank. Comparing statements worldwide in response to the COVID-19 pandemic could reveal differences in tone and word choices. Additionally, employing an automated sentiment analysis such as VADER along with human coders could refine the current scoring techniques, reducing subjective bias. Lastly, analyzing the FOMC statements after the COVID-19 pandemic can strengthen the collective understanding of how the tone functions as a powerful tool for stock prices. In times of crisis, stock price reactions are influenced by the tone of FOMC statements, demonstrating that it's not only *what* the statements include but also *how* they are communicated.

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Disclosure of Interest Statement

The author reports there are no competing interests to declare.

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