

# The Correlation Between the Federal Funds Rate and the U.S. Stock Market Performance

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**Abstract:** This paper aims at examining the relationship between interest rate and stock prices, using the Standard and Poor's 500 (S&P 500) index during the 2001 and 2022 periods to represent the stock market's performance.

**Keywords:** Interest Rate; Stock Prices; Stock Market

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## 1. Introduction

Since macroeconomics variables are crucial references for investors, a change in these determinants can cause high volatility in the stock market, affecting returns.

The interest rate is one of the tools that the Fed uses to control the money supply, stabilize the economy, and curb inflation. The Fed will tighten monetary policy when high inflation occurs, which lowers real money value, leads to higher expenses, and lower profits. This will possibly lower stock prices because bonds can be more profitable. On the contrary, when there is a recession, the Fed would lower the interest rate to increase liquidity and foster spending.

It can therefore be assumed that when interest rates are lower, stock prices will go up, and vice versa. However, further examination is required to 1) determine the existence of such a relationship, and 2) determine whether the relationship is causation or correlation.

## 2. Literature Review

Since the stock price is responsive to changes in money supply, and the interest rate is an indicator of money supply, it is assumed that the stock market is closely related to the targeted federal funds rate in three ways.

First, when the federal funds rate is charged at the lower end, the cheap borrowing cost for companies and individuals leads to increased spending, investing, and employment (U.S. Bank), all of which are conducive to stock price because of a more outstanding market cap (Leslie Kramer from Washington University).

In the study by Ben S. Bernanke and Kenneth N. Kuttner (2005), it is proven that an unexpected 25-basis-point-rate cut will result in a one percent increase in the stock market, indicating a correlation.

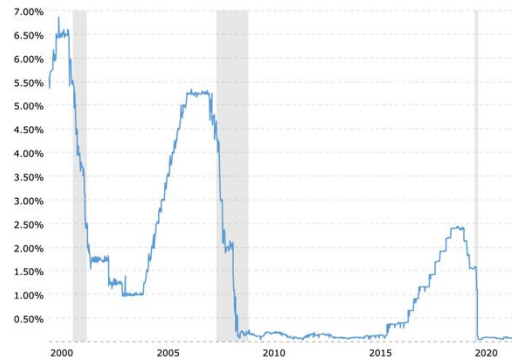
Second, when a lower federal funds rate is charged, demand push inflation occurs, yet numerous studies over the years have found negative correlations between inflation and stock market performances. According to Wadhvani (1986), inflation depresses stock values because it raises the possibility of bankruptcies and defaults, therefore leading to lower stock prices, not higher, as Ben S. Bernanke and Kenneth N. Kuttner (2005) proposed.

The studies presented above have conflicting conclusions because they are relatively outdated, with the United States banking system going through dramatic changes in the previous decades. Therefore, data for the last two decades is classified and analyzed in this paper to determine a more time-sensitive relationship and make future predictions.

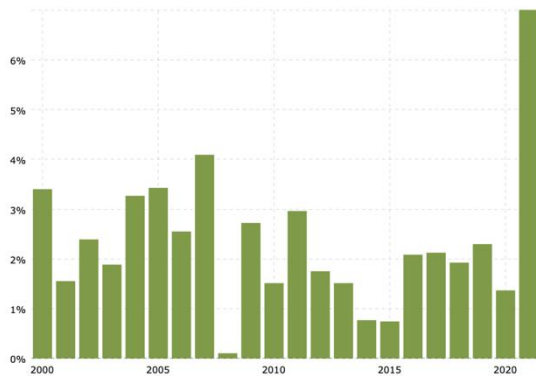
### 3. Research



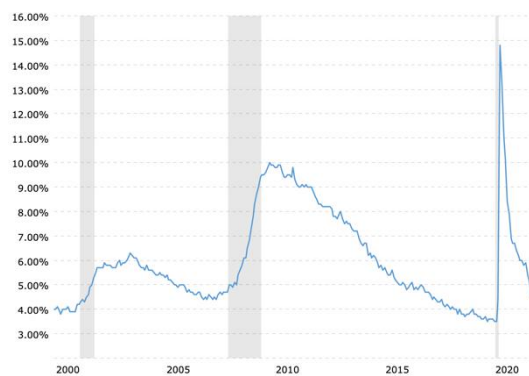
500S&P(^GSPC)



Federal Funds Rate



U.S. Inflation



U.S. National Unemployment

Classifications are made based on the status of the federal funds rate. First, as shown in the figure, three periods when sharp falls in the federal funds rate happened are January 2001 - November 2001, November 2007 - December 2008, and January 2020 - March 2020. Second, from June 2004 to May 2006 and December 2015 to December 2018, the federal funds rate increased steadily. Third, the federal funds rate is kept steadily low from January 2009 to November 2015 and from March 2020 to February 2022.

#### 3.1 Sharp Falls

The most dramatic fall happened in 2001 with the dot com bubble, followed by the 2008 mortgage crisis and the 2020 covid pandemic. The dot com bubble lasted in the 1990s due to the development of the internet industry. People believed that losses now mean higher profit in the future, so they invested blindly in internet companies even though the companies haven't even earned money yet. When the bubble burst, the S&P 500 fell from 2525.42 in August 2000 to 1294.366 in September 2002, a 48.7% decrease. The United States was in recession in March 2001, and the Federal Reserve responded by driving down the interest rate from 6.5 to 1.5 within a year.

The mortgage crisis happened similarly when people invested in mortgage-backed securities that were not stable. When default occurred, and the supply of houses became much higher than the demand, house pricing dropped, and investment banks were left with worthless dwellings and could not pay the investors. As investors lost their confidence in the market, the S&P 500 lost 50.8% of its value in less than 15 months. Accordingly, the federal funds rate decreased from around 5% to the 0% range.

In the recent global recession caused by the coronavirus, S&P500 lost 27.2% of its value from January to March, from 3953.23 to 2879.23. The federal funds rate decreased from 1.5% to 0% shortly after the virus started to spread the

unemployment rate skyrocketed from 3.5% to 14.8% due to virus infection and the fall in the market demand. Companies went from making a profit to losing money, the lack of market cap led to a fall in the company's value, and investors sold their stocks. The government, therefore, lowered the federal funds rate to support the economy. Neither the stock market nor the federal funds rate directly causes the other in all three events. External bubbles or shocks severely damage the investor's confidence and the fall in the aggregate supply and demand in the market.

### **3.2 Kept Stable**

Since the relationship between the federal funds rate and stock market performance is found not to be the causation during sharp falls, it is more meaningful to look at how the stock market reacted to the federal funds rate after the fall. From January 2009 to November 2015 and March 2020 to February 2022 (after the mortgage crisis and the covid-19 recession), the federal funds rate was kept at 1% and 0%, respectively. During the first period, the S&P 500 experienced a 3139.02 to 996.5 – a 215% increase. During the second period, the 2879.23 to 4913.93 – a 70.6% increase.

The low federal funds rate indicates more money supply in the economy. Because the federal funds rate is the rate banks charge each other when borrowing or lending excess reserves, they will set an equal prime rate to prevent losses. Banks do not charge higher prime rates since the banking system is a form of monopolistic competition, and banks don't have strong bargaining power in terms of price. Eventually, the interest rate individuals and companies are charged in the market depends on the federal funds rate, so keeping it low makes money more accessible for investment and consumption. Consumption increases revenues for companies, and investment increases revenues for companies under a longer time frame; both contribute to the company's market cap, therefore pushing the stock price or at least the intrinsic value higher.

Another explanation is the forces of supply and demand in the market. When the interest rate is kept low, the inflation rate is usually high. Inflation reached 7.04% in 2021 when the federal funds rate was kept at 0%-0.25%. Saving money in the bank will lead to a loss in purchasing power as high as 7%. Since the 1-year treasury rate was also revolving around 0%, investors are forced to look for better and riskier investments to maintain the purchasing power of their money. As a result, a dramatic increase is observed in the stock market even though the unemployment rate is still higher than it used to be before the pandemic.

### **3.3 Steadily Increasing**

From June 2004 to May 2006 and December 2015 to December 2018, the federal funds rate increased by 4.25% and 2.5%. However, as shown in the figure, the stock prices were not tumbled in both periods by the tightening policy.

Theoretically, the higher federal funds rate indicates a higher cost for businesses, reducing the revenue and causing the stock price to decrease. However, according to Brian O'Connell and Benjamin Curry, even though the cost of production is higher, increases in the federal funds rate won't necessarily have negative impacts on the stock price since contractionary policies are generally employed only when the economy is overheating – which means that the economy is doing well and keep on performing well even without expansionary policies. In 2021, the inflation rate will be as high as 7.04%, and the unemployment rate will be at 3.6% in March 2022, which is healthy and provides space for contractionary policies and protects the stock price from falling.

However, even though the employment rate is ideal, the stock market is highly overvalued (107% to 175%, depending on the indicator), like the dot com bubble. If the federal funds rate is raised in the future, it is expected that the stock market will fall moderately since its current price is based on the forces of supply and demand rather than the value of the companies.

## 4. Conclusion

This paper examines if there is a relationship between the interest rate and the US stock prices, using the S&P 500 index from the 2001 – 2022 era. The empirical evidence above reveals a strong, negative correlation between the changes in interest rates and US stock prices.

External shocks and bubbles can cause the interest rates and stock prices to fall. When the federal funds rate is kept stably low, it will increase stock prices. However, there are times in history when higher interest rates can help, not hinder, stocks, such as from December 2015 to December 2018, as discussed above.

In theory, higher interest rates should lower stock prices because future cash flows with a higher rate are discounted (*Ceteris Paribus*). Although this logic holds, the model ignores that higher rates are generally accompanied by faster economic and earnings growth. Thus, while a higher rate can temporarily disrupt the economy and market prices, earnings growth will boost stock prices.

Even though the Fed has just increased the interest rate and plans to continue in the future, the recovery of employment is satisfying. It is predicted that the stock market will continue to grow steadily after a temporary fall. However, this prediction fails to consider the current high inflation due to supply chain problems. Therefore, the stock market's future is still unclear, yet it is certain that stock prices will start to rise again after the current status of the supply chain is adapted.

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