

**Interest Rates and Equity Market Performance:
An Empirical Study of the U.S. Market, 2000–2025**

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Abstract:

This study examines the relationship between the U.S. federal funds effective rate and annual S&P 500 total returns over the 2000–2025 period. The topic is important in finance because interest rates influence the discounting of expected cash flows, financing conditions, and investors' required returns. Previous research shows that monetary policy can affect equity prices, particularly when policy changes are unexpected, but the strength and timing of the relationship can vary depending on the measurement period and identification method. Using annual observations from the Federal Reserve Bank of St. Louis FRED database for the federal funds rate and published annual S&P 500 total returns, this study applies descriptive statistics, Pearson correlation, an ordinary least squares regression, and a one-year lagged-rate regression. The contemporaneous regression produces a negative coefficient of approximately 1.29 percentage points in annual S&P 500 total return for each one-percentage-point increase in the federal funds rate, but the coefficient is not statistically significant at conventional levels ($p = .480$). The correlation is also weakly negative ($r = -0.145$), and the model explains only about 2.1% of annual return variation. The lagged-rate specification produces a more negative coefficient (-2.75), but it also fails to reach conventional statistical significance ($p = .134$). These findings indicate that annual interest-rate levels alone do not adequately explain annual equity returns over this sample. The results are consistent with the broader literature emphasizing that stock-market responses depend on policy surprises, expectations, risk premiums, dividends, and other macroeconomic conditions.

Keywords:

Federal funds rate, S&P 500, monetary policy, equity returns, OLS regression, macroeconomics, asset valuation

Introduction:

Interest rates are an important part of financial markets because they influence borrowing costs, investment decisions, and the discount rate used when valuing future cash flows. In equity valuation, a change in the required return can therefore change the present value of expected dividends and other future cash flows. CFA Institute's current valuation material describes the discount rate as a central component of asset valuation and notes that changes in risk-free rates and risk premiums can affect market values. For this reason, the relationship between interest rates and stock returns is an important topic in finance.

However, the relationship is not as simple as saying that higher interest rates always lead to lower stock returns. Equity prices are forward-looking, so investors consider not only current interest rates but also expectations about future rates, inflation, economic growth, corporate earnings, and risk premiums. Bernanke and Kuttner (2005), for example, found a substantial stock-price response to unexpected Federal Reserve policy changes, while Durham (2003) found that results can differ when monetary policy is measured in alternative ways. More recent Federal Reserve research continues to emphasize that monetary-policy effects operate through several channels, including yields, equity risk premiums, and expectations.

Despite this extensive literature, a straightforward empirical question remains useful for an applied finance project: what does the annual historical data actually show about the relationship between the federal funds rate and S&P 500 total returns? The gap addressed in this project is therefore not a lack of research on monetary policy and equity prices. Instead, the study provides a simple and reproducible examination of a long annual sample using statistical methods that are practical for a finance student.

The study focuses on three research questions:

- RQ1: What is the direction and strength of the relationship between the annual federal funds rate and S&P 500 total returns from 2000 to 2025?
- RQ2: Does the annual federal funds rate statistically explain variation in S&P 500 total returns during the sample period?
- RQ3: Does the previous year's federal funds rate provide additional explanatory information about the following year's S&P 500 total return?

The objectives are to measure the correlation between the two variables, estimate a simple OLS model, examine a one-year lagged model, and compare the findings with established finance research.

Literature Review:

The literature review begins with the discounted-cash-flow approach to asset valuation. Under this framework, the value of an asset depends on expected future cash flows and the rate used to discount those cash flows. Consequently, changes in risk-free interest rates can influence required returns and valuations. CFA Institute (2026) presents this relationship directly in its discussion of the fundamental pricing equation and equity valuation.

Empirical research has found evidence that monetary policy and stock prices are connected, but the estimated relationship depends strongly on the research design. Bernanke and Kuttner (2005) used federal funds futures to distinguish expected from unexpected policy changes and reported that an unexpected 25-basis-point rate cut was associated with roughly a 1% increase in broad stock indexes. The authors also found that much of the response was associated with changes in

expected excess returns rather than a simple mechanical change in real interest rates. This is important because it suggests that investors respond to the information contained in a policy decision, rather than simply to the numerical level of the policy rate.

Durham (2003) provides a useful contrasting perspective. Using quarterly data and simultaneous-equation and error-correction methods, the study found that changes in an exogenous component of the federal funds rate affected Treasury yields but did not consistently affect stock returns, with the result being sensitive to the proxy used for monetary-policy stance. This suggests that the relationship between rates and equities may be weaker when the analysis focuses on the general interest-rate environment instead of short-term policy surprises.

Earlier literature focused on other variables to be significant on equity market performance, such as Audit (Saber & Sassine, 2022; Sawaya et al., 2026) and investor sentiment (Khalife et al., 2025).

Fama (1990) further shows why a single macroeconomic variable is unlikely to account for all equity-return variation. His analysis connects stock returns to expected returns and real economic activity and finds that variables associated with expected returns and production growth explain substantial portions of annual return variation. For this study, this means that interest rates should be considered one possible explanatory factor rather than a complete explanation of equity-market performance, as other factors such as ESG (Kaspard et al., 2026), Blockchain technology (Khalife et al., 2024), country governance (Athari et al., 2023), and even business experience and knowledge (Chaanine et al., 2023).

Recent Federal Reserve research reaches a similar methodological conclusion. Knox and Vissing-Jørgensen (2026) review evidence on the Federal Reserve's effect on the stock market and emphasize several channels, including monetary-policy surprises, pre-announcement effects, changes in yields, and changes in equity premia. Their review reinforces the distinction between a simple correlation involving the level of a policy rate and the market reaction to a policy surprise. Based on this literature, this project uses a simple annual model as a transparent baseline. It does not attempt to replace the more detailed event-study and time-series research. The present study does not attempt to replace the more sophisticated literature. Instead, it tests whether the basic annual data from 2000–2025 support a strong linear relationship and then compares the result with the conclusions of the broader literature.

Methodology:

Research design. The study uses a quantitative, non-experimental longitudinal design based on annual U.S. financial-market observations from 2000 through 2025. The unit of observation is the calendar year, producing 26 annual observations. The analysis is designed to be transparent and reproducible, with the same yearly observations used for the descriptive statistics, correlation, and regression analysis.

Data sources. The independent variable is the annual average federal funds effective rate, measured in percent. These data are from the Board of Governors of the Federal Reserve System as published through the Federal Reserve Bank of St. Louis FRED database. The dependent variable is the annual S&P 500 total return, which includes both price appreciation and dividends. The annual return series is taken from published historical S&P 500 return tables. Using total return is appropriate because it includes both capital gains and dividends instead of measuring only changes in the index price.

Variable definitions. The federal funds rate ($RATE_t$) is the annual average effective federal funds rate in year t . S&P 500 total return ($RETURN_t$) is the percentage total return earned by the index during year t . A lagged interest-rate variable, $RATE_{t-1}$, is also constructed to test whether the previous year's rate is associated with the next year's equity return.

Statistical models. First, Pearson's correlation coefficient is calculated to measure the linear association between $RATE_t$ and $RETURN_t$. Second, the following ordinary least squares model is estimated:

$$RETURN_t = \alpha + \beta RATE_t + \varepsilon_t$$

Third, a lagged specification is estimated:

$$RETURN_t = \alpha + \beta RATE_{(t-1)} + \varepsilon_t$$

The coefficient β represents the estimated change in annual S&P 500 total return associated with a one-percentage-point change in the relevant interest-rate variable. Statistical significance is evaluated using the conventional 5% threshold. R-squared is reported as a descriptive measure of the proportion of variation explained by the simple linear model.

Use of AI as a complementary tool. Artificial intelligence was used as a support tool for brainstorming the research question, organizing the structure, improving wording, and identifying possible research directions. The numerical dataset, calculations, regression estimates, and tables were independently generated from the cited data and statistical analysis. This distinction is important because the AI tool was not treated as a source of empirical evidence.

Results:

The sample contains 26 annual observations. The federal funds rate ranges from 0.08% in 2021 to 6.24% in 2000, while the S&P 500 total return ranges from -37.00% in 2008 to 31.49% in 2019. The sample therefore includes periods of very low rates, rapid monetary tightening, the 2008 financial crisis, the COVID-19 period, and the post-2021 tightening cycle.

Variable	Mean	Std. Dev.	Minimum	Maximum
Federal Funds Rate (%)	2.01	2.01	0.08	6.24
S&P 500 Total Return (%)	9.63	17.85	-36.55	32.15

Table 1. Descriptive statistics for the 2000–2025 sample.

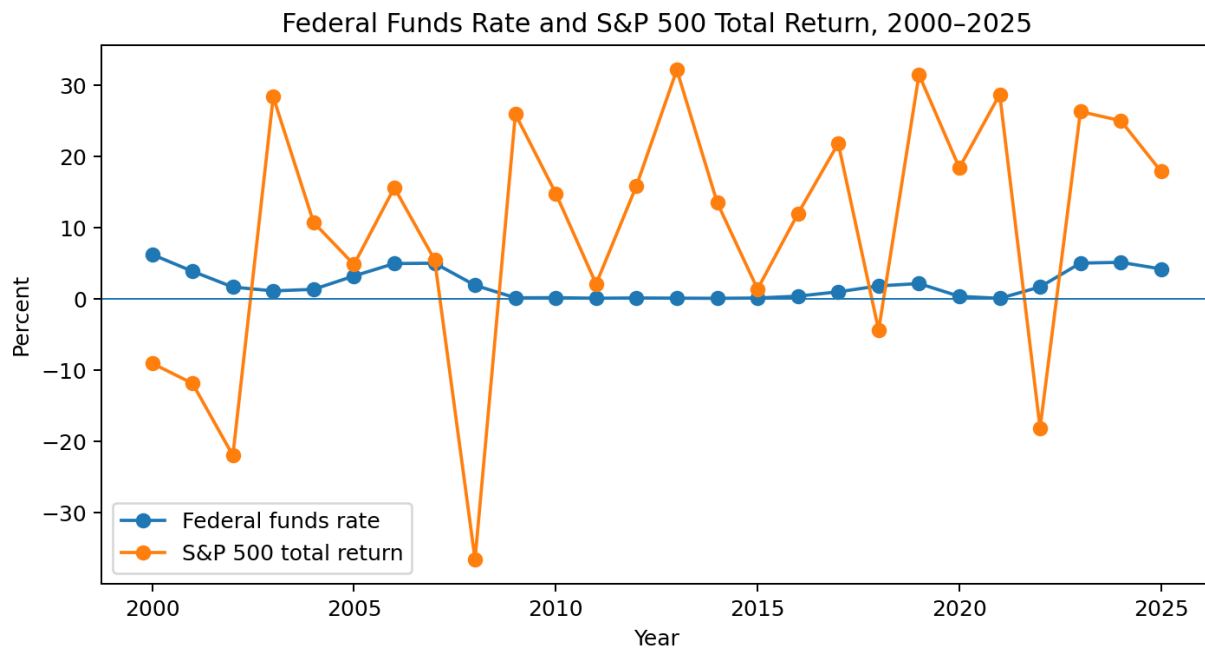


Figure 1. Annual federal funds rate and S&P 500 total return, 2000–2025.

The figure shows that large positive and negative stock-market returns occurred during both relatively low- and relatively high-rate periods. For example, the 2008 market decline occurred while the annual average federal funds rate was 1.92%, whereas the S&P 500 also recorded strong positive returns in years with materially higher rates, including 2017–2019. This pattern suggests that the annual interest-rate level alone is not enough to explain equity performance.

Measure	Estimate	p-value	R ²
Contemporaneous OLS	$\beta = -1.288$	0.480	0.021
Lagged-rate OLS	$\beta = -2.746$	0.134	0.095

Table 2. Regression results.

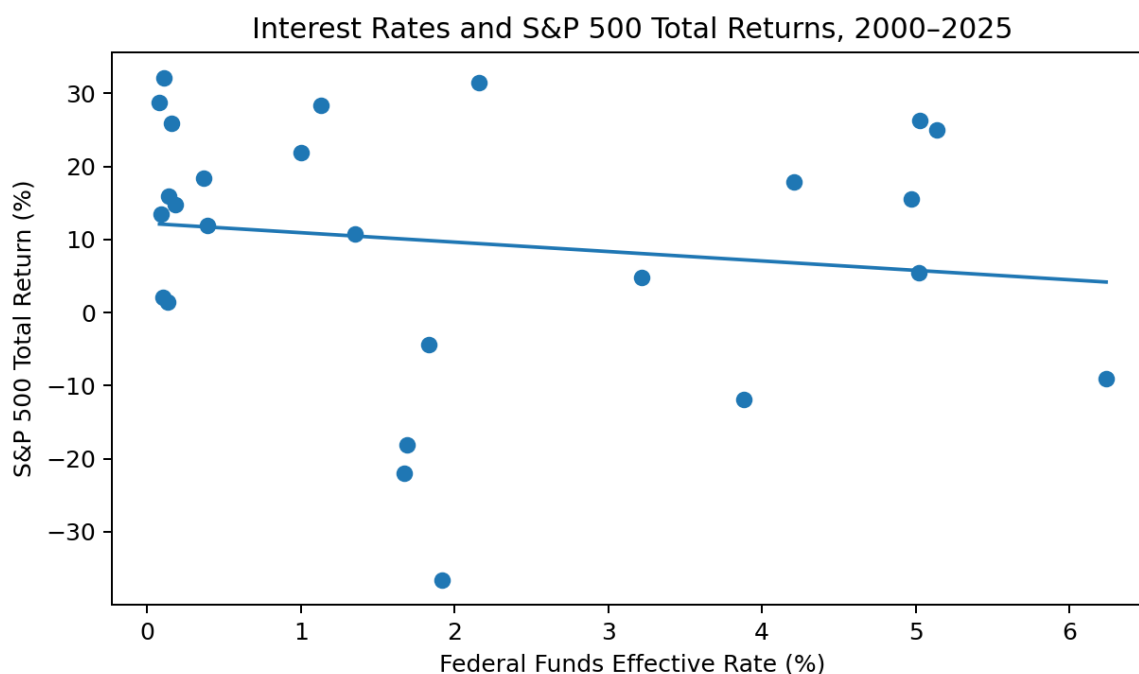


Figure 2. Scatterplot and fitted OLS line.

The contemporaneous regression estimates a coefficient of -1.288 . In other words, within this sample, a one-percentage-point increase in the annual federal funds rate is associated with an estimated 1.288-percentage-point lower S&P 500 total return. However, the coefficient is not statistically significant ($p = .480$), and the R^2 of .021 means that the model explains only about 2.1% of annual return variation. The Pearson correlation is -0.145 , indicating a weak negative linear association.

The lagged-rate model produces a coefficient of -2.746 , suggesting a more negative descriptive relationship between the previous year's rate and the following year's return. Nevertheless, the coefficient is also not statistically significant at the 5% level ($p = .134$), and the R^2 is .095. Thus, the lagged specification provides somewhat more explanatory power than the contemporaneous specification, but it still does not provide strong statistical evidence that the previous year's rate alone explains subsequent annual S&P 500 returns.

These results should be interpreted as descriptive rather than as evidence that interest-rate changes have no effect on stock prices. Instead, they show that the annual federal funds rate is a relatively weak standalone predictor of annual S&P 500 total returns in this sample. This is consistent with research showing that policy surprises, expectations, risk premiums, dividends, and wider economic conditions can all affect equity prices.

Discussion and Conclusion:

2000 to 2025. The main empirical result is that the simple annual relationship is weak. The contemporaneous correlation was -0.145 , and the OLS coefficient was -1.288 , but the coefficient was not statistically significant. The lagged-rate model produced a more negative coefficient of -2.746 , but this result also failed to reach conventional statistical significance.

From a finance perspective, the findings show that the relationship between interest rates and equity markets is more complicated than a one-variable model suggests. Stock prices reflect expectations about future cash flows, discount rates, inflation, economic growth, and risk premiums. Consequently, the annual federal funds rate can provide useful context for market conditions without being sufficient to explain annual equity performance on its own.

Practical implications. For finance students, investors, and analysts, the results suggest that interest rates are more useful when considered as part of a broader valuation and market-analysis framework rather than as a standalone signal. For example, an analyst could combine interest-rate information with earnings growth, inflation, credit spreads, volatility, and valuation multiples when evaluating equity-market conditions.

Theoretical implication. The findings support the broader asset-pricing literature in treating monetary policy as one component of a larger transmission mechanism. The results are also compatible with the evidence of Bernanke and Kuttner (2005) and Knox and Vissing-Jørgensen (2026), which emphasizes that policy surprises and changes in risk premiums can be important channels.

Limitations. The main limitation is the relatively small annual sample of 26 observations. Annual data also conceal short-term market reactions that can occur within hours or days of monetary-policy announcements. The regression contains only one explanatory variable and therefore omits potentially important factors such as inflation, GDP growth, earnings expectations, Treasury yields, credit spreads, and volatility. Finally, the analysis is observational and does not establish causality; changes in interest rates and stock returns can both respond to broader economic conditions.

Future research could use monthly or daily observations, distinguish expected from unexpected monetary-policy changes, and include several explanatory variables. An event-study design around FOMC announcements would be especially useful because it could isolate market reactions to policy surprises. A future project could also compare the response of different sectors, such as technology, financials, utilities, and energy, to determine whether interest-rate sensitivity differs across industries.

References

- 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. <https://doi.org/10.1111/j.1540-6261.2005.00760.x>
- Board of Governors of the Federal Reserve System. (2026). Federal funds effective rate [Data set]. Federal Reserve Bank of St. Louis, FRED. <https://fred.stlouisfed.org/series/FEDFUNDS>
- CFA Institute. (2026). Economics and investment markets. CFA Institute. <https://www.cfainstitute.org/insights/professional-learning/refreshers-readings/2026/economics-and-investment-markets>
- Durham, J. B. (2003). Does monetary policy affect stock prices and Treasury yields? An error correction and simultaneous equation approach. Finance and Economics Discussion Series, 2003-10. Board of Governors of the Federal Reserve System. <https://www.federalreserve.gov/econres/feds/does-monetary-policy-affect-stock-prices-and-treasury-yields-an-error-correction-and-simultaneous-equation-approach.htm>
- Fama, E. F. (1990). Stock returns, expected returns, and real activity. *The Journal of Finance*, 45(4), 1089–1108. <https://doi.org/10.1111/j.1540-6261.1990.tb02428.x>
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Knox, B., & Vissing-Jørgensen, A. (2026). The effect of the Federal Reserve on the stock market: Magnitudes, channels and shocks. Finance and Economics Discussion Series, 2026-023. Board of Governors of the Federal Reserve System. <https://doi.org/10.17016/FEDS.2026.023>
- Slickcharts. (2026). S&P 500 total returns by year. <https://www.slickcharts.com/sp500/returns>
- Khalife, D., Subrahmanyam, S., & Farah, A. (2024). A Sustainable Circular Business Model to Improve the Performance of Small and Medium-sized Enterprises Using Blockchain Technology. *J. Wirel. Mob. Networks Ubiquitous Comput. Dependable Appl.*, 15(2), 240-250.
- Kaspard, J., Kamel, C., Khalil, F., & Beainy, R. (2026). Financial Performance, Risk, and Market Integration of Sustainability-Oriented Equity Indices: Implications for the Sustainability Transition (2010–2025). *Risks*, 14(5), 99.
- Athari, S. A., Saliba, C., Khalife, D., & Salameh-Ayanian, M. (2023). The role of country governance in achieving the banking sector's sustainability in vulnerable environments: New insight from emerging economies. *Sustainability*, 15(13), 10538.
- Chaanine, N., Mhanna, R. Y., Verdie, J. F., & Beainy, R. (2023). Leveraging business experience and knowledge to boost entrepreneurial achievement. *International Journal of Work Innovation*, 4(2), 104-115.
- Sawaya, C., Khalil, F. C., Jabbour Al Maalouf, N., & Kaspard, J. (2026). Revolutionizing audit practice in emerging economies: the role of Artificial Intelligence in enhancing the audit of consolidated financial statements. *Cogent Business & Management*, 13(1), 2625974.

- Khalife, D., Yammine, J., El Bazi, T., Zaki, C., & Jabbour Al Maalouf, N. (2025). Analyzing the impact of investor sentiment on S&P 500 prices using deep learning models. *Journal of Financial Reporting and Accounting*, 23(4), 1365-1386.
- Saber, A. M., & Sassine, M. E. (2022). Reflections on internal control and internal audit roles for ensuring financial transparency toward Lebanese NGOs financial donors. *EuroMed Journal of Management*, 4(3), 186-198.

Appendix A. Annual Research Dataset

Year	Federal Funds Rate (%)	S&P 500 Total Return (%)
2000	6.24	-9.03
2001	3.88	-11.85
2002	1.67	-21.97
2003	1.13	28.36
2004	1.35	10.74
2005	3.22	4.83
2006	4.97	15.61
2007	5.02	5.48
2008	1.92	-36.55
2009	0.16	25.94
2010	0.18	14.82
2011	0.10	2.10
2012	0.14	15.89
2013	0.11	32.15
2014	0.09	13.52
2015	0.13	1.38
2016	0.39	11.96
2017	1.00	21.83
2018	1.83	-4.38
2019	2.16	31.49
2020	0.37	18.40
2021	0.08	28.71
2022	1.69	-18.11
2023	5.03	26.29
2024	5.14	25.02
2025	4.21	17.88

Source: Federal Reserve Bank of St. Louis FRED for the federal funds rate; published historical S&P 500 return data for total returns. See References.