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Macroeconomic Drivers of Equity Risk Premium Dynamics: Evidence from U.S. Financial Markets

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Amaresh¹, Dr Harshit Sharma²,
Rajesh Kumar Agarwal³

¹Assistant Professor, Department of
Management Studies, Marketing
Sobhasaria Group of Institutions, Sikar,
Raj, Email Id: tyagi.amaresh@gmail.com,
Orcid: 0009-0000-7412-248X

²Assistant Professor, Management
Studies, Marketing and Finance,
Sobhasaria Group of Institutions, Sikar,
Rajasthan, Email Id:
professorharshitsharma@gmail.com,
Orcid Id: 0000-0002-5404-125X

³Assistant Professor, Department of
Management Studies, Accounts,
Sobhasaria Group of Institutions, Sikar,
Raj, Email Id:
rajeshforcommerce@gmail.com, Orcid:
0009-0001-4564-5676

Corresponding Author :
tyagi.amaresh@gmail.com

Abstract

Macroeconomics conditions are also important factors that influence financial market performance, investment risk and dynamics of equity return. By examining the correlation between economic indicators and the equity market, it is possible to assess financial stability and make informed investment decisions. This research investigated relationships between selected macroeconomic indicators, financial risk conditions and U.S equity market returns. Quantitative research was used with 523 monthly observations ranging from January 1981 to August 2024. Descriptive statistics, Pearson correlation, multiple linear regression, and historical period comparisons were performed on the secondary macro-financial data. Industrial production, retail sales, unemployment, housing starts, consumer sentiment and market volatility were analysed. The results showed that consumer sentiment was most positively correlated with S&P 500 returns ($r = 0.325$, $p < 0.001$) followed by retail sales growth ($r = 0.213$, $p < 0.001$). Market volatility was very negatively correlated ($r = -0.183$, $p < 0.001$). The regression model accounted for 18.4% of the variation in monthly returns. There was no significant difference between historical average return (1981-2000) and the average return for the last 24 years (2001-2024) ($p = 0.140$). The results provide insights into the importance of consumer expectations, economic activity, and financial uncertainty for the performance of the U.S. equity market. But the estimation of direct equity risk premium was constrained by the lack of similar risk-free returns so other financial indicators needed to be used.

Keywords: Equity Risk Premium; Macroeconomic Indicators; U.S. Financial Markets; Stock Market Returns; Market Volatility.

1.Introduction

Equity risk premium (ERP) is the return that investors demand or earn from equity investments over risk-free investments. It is an important concept in financial economics because it reveals the risk in the market, investors' expectations, and reflects the state of the economy and the stock market. Equity risk premiums play a vital role in investment decision making, asset valuation and portfolio management. The compensation demanded by the investors who hold risky assets can be affected by changes in the level of economic activity, monetary policy and financial uncertainty. Hence, how risk premiums vary with macro-financial conditions has been subject of much research in the financial literature (Adrian et al., 2023). The estimation of equity risk premium still has a significant role in analyzing long-term investment performance and financial market stability (Siegel & McCaffrey, 2023). Recent studies have also highlighted the evolving dynamics of U.S. equity risk premiums during times of economic turmoil and financial uncertainty (Bonelli, 2025). The equity market performance is affected by macro-economic situation as it affects the profitability of the companies, the economic expectations, the discount rates, and the investor confidence. Unemployment, industrial production, retail sales, housing activity and consumer sentiment are indicators that offer information on economic performance and possible shifts in investment risk. The effect of economic announcements on asset prices can be attributed to expectation shifts of future economic conditions and risk compensation (Ai et al., 2023). In addition, financial uncertainty can impact investment decisions and economic activity via shifts in the risk premium required (Bretscher et al., 2023). In the same way, monetary policy actions can impact the conditions of the financial market via interest rates, liquidity, and investor sentiment, which can, in turn, influence the valuations of equities and risk expectations (Kashyap & Stein, 2023).

Other factors that are also associated with changing equity risk premiums include financial market volatility and the uncertainty of the financial markets. In developed economies, investor sentiment and uncertainty indicators might affect the efficiency of the markets and financial asset pricing (Belhoula et al., 2024). Equity risk premiums also differ because of international financial conditions, such as global risk exposure, and interconnected capital markets (Londono & Xu, 2024). Moreover, the dynamics between the government bond market and the equity market can shift in different economic conditions, signifying investor behaviour adjustments and variations in financial market conditions (Tiwari et al., 2024). Another way of looking at financial risks and

expected returns along investment horizons is through the term structure of risk premiums (Bryzgalova et al., 2025).

Previous studies have focused on the equity risk premium and its factors, but there are important issues regarding the different relationships between macroeconomic indicators and the actual equity risk premiums. The results from emerging markets indicate that the predictability of equity risk premiums (ERP) can be affected by economic policy uncertainty (EPC) (Anshuman et al., 2022). Other studies have investigated the time-varying factors that affect equity risk premiums, leading to insights about the significance of shifting economic and financial conditions (Candemir & Karahan, 2024). In the cross-country literature, studies have also explored the role of macroeconomic indicators in predicting stock markets, but these two measures—stock returns and equity risk premiums—are different types of financial measures (Khan et al., 2024). The study of equity risk premiums (ERP) in Malaysian financial markets also reveals the significance of financial development and macroeconomic factors in comprehending the ERP.

But data from other countries does not necessarily shed light on the linkages that are found in U.S. financial markets. A better empirical understanding is thus required to evaluate the historical relationship between the realized U.S. equity risk premiums and the selected macroeconomic indicators. The relationship of these is examined using descriptive statistics, correlation analysis and multiple linear regression with the secondary macro-financial observations in the current study. The results should help to shed light on how economic factors affect financial risk compensation, as well as serve as building blocks for investors, financial analysts and policymakers.

Research Objectives

- To examine temporal patterns and variations in realized equity risk premiums in U.S. financial markets.
- To assess the relationships between selected macroeconomic indicators, including unemployment, industrial production, retail sales, and consumer sentiment, and equity risk premiums.
- To evaluate the statistical associations of macroeconomic and financial risk indicators with equity risk premiums using multiple linear regression.

2. Methodology

2.1 Research Design

The research design of the present study was a quantitative, retrospective design with the aim of exploring how macroeconomic indicators are related to equity risk premium dynamics in U.S. financial markets. Secondary financial and economic observations were made to investigate the relationship of the changes in economic activity, market conditions, and financial uncertainty with equity risk premiums. The statistical method used was the time-series analysis which enabled the financial market behaviour to be analysed during different economic periods. Descriptive statistics, Pearson correlation analysis and multiple linear regression were chosen to assess the direction, strength and statistical significance of the relationships between the variables studied. This analysis was focused on statistical relationships and not causal relationships.

2.2 Data Source and Study Period

This study relied on secondary data obtained from publicly available data on Zenodo: From Rotational to Scalar Invariance: Enhancing Identifiability in Score-Driven Factor Models, authored by Buccheri, Corsi, and Dzuverovic (FulvioCorsi, 2025). The uploaded archive had two information sources in the financial domain: a monthly macro-financial panel in the U.S., and a daily stock market observations data. The main data, Data_macro.csv, had 524 monthly observations from January 1981 to August 2024, and nine economic and financial variables. The second component consisted of 87 S&P 500 component firms' daily observations from January 2001 to December 2014. The macro-financial panel was chosen as a main indicator for the principal analysis as it contained long-term observations of economic indicators and of the state of the whole stock market as well. Market volatility information was built using observations from the S&P 500 while the underlying macroeconomic information came from the Federal Reserve's FRED-MD Database.

2.3 Study Variables and Measurements

The study took the realized equity risk premium as the dependent variable which is the difference between broad-market equity returns and the corresponding risk-free return. The uploaded file only included values for the S&P 500 index and not directly a series for the risk-free return. So, in order to calculate the equity risk premium, an additional series of Treasury bills is needed to match

the monthly observation frequency. Industrial production (INDPRO), unemployment (UNRATE), retail sales (RETAIL), housing starts (HOUST), consumer sentiment (UMCSENT), S&P 500 volatility (S&P500VOL), and corporate bond and Treasury related measures (BAA and T10Y) were all available in the primary file as the explanatory variables. These indicators were indicators of economic activity, employment status, consumer confidence and financial risk. Industrial production, retail sales were used as proxies for economic performance and unemployment and housing starts for labor market and economic conditions. Consumer sentiment was a measure of household economic expectations and market volatility, and bond related indicators, of financial uncertainty and credit market conditions.

2.4 Data Preparation and Processing

The uploaded monthly file was examined to identify variable names, observation frequency, chronological coverage, and the transformation instructions included in its first non-data row. Analytical observations were not made on this row. Missing observations, implausible entries and extreme values were checked for in the numerical variables, while the monthly dates were standardized. Appropriate transformations were used for economic indicators, including logs for industrial production and retail sales and transformations in unemployment as needed. The monthly S&P 500 returns have been calculated from the successive index values. The realized equity risk premium would be created by subtracting from the market return the realized risk-free return for each month, based on the following equation:

$$ERP_t = R_{m,t} - R_{f,t}$$

where (ERP_t) represents the realized equity risk premium, $(R_{m,t})$ represents the monthly S&P 500 return, and $(R_{f,t})$ denotes the risk-free return for the same month. A three-month Treasury bill rate could be obtained from FRED and converted into an equivalent monthly return. The final analytical sample would include only observations with complete and temporally aligned information.

2.5 Statistical Analysis

The selected variables were summarized in the form of descriptive statistics which included mean, standard deviation, minimum and maximum values. Temporal analysis was to be considered to see the equity risk premium changes in the study period. Signs and magnitudes of linear

correlations were obtained using Pearson correlation between equity risk premium and the macroeconomic indicators. Multiple linear regression was selected to test the influence of the selected explanatory variables on equity risk premiums, while maintaining other explanatory variables in the model. The regression coefficients, standard errors, t-statistics, p-values, and coefficients of determination were reported as measures of reporting. A p value of < 0.05 was considered statistically significant. For time-series data, the stationarity, residual autocorrelation, and multicollinearity of properties would be tested before making inferences from the regression estimates, using appropriate autocorrelation-robust standard errors.

2.6 Regression Model Specification

A multiple linear regression model was specified to examine the relationships between macroeconomic indicators, financial market conditions, and the realized equity risk premium. The proposed model was expressed as:

$$ERP_t = \beta_0 + \beta_1 UNEMP_t + \beta_2 INDPRO_t + \beta_3 RETAIL_t + \beta_4 SENT_t + \beta_5 VOL_t + \varepsilon_t$$

In this equation, (ERP_t) represents the realized equity risk premium, $(UNEMP_t)$ denotes the unemployment indicator, $(INDPRO_t)$ represents industrial production growth, $(RETAIL_t)$ indicates retail sales growth, $(SENT_t)$ represents consumer sentiment, and (VOL_t) denotes stock market volatility. The regression coefficients (β_1) to (β_5) represent the estimated associations between individual explanatory variables and equity risk premiums, while (ε_t) represents the error term. Treasury-related indicators, corporate credit spreads, and housing activity could be incorporated into additional specifications to examine the robustness of the findings. The final model would be estimated after completing variable transformations and aligning the equity return and risk-free return series.

3. Results

3.1 Descriptive Characteristics of Macroeconomic and Financial Variables

Descriptive statistics of the variables selected in the study are displayed in Table 1. The logged monthly returns for the S&P 500 averaged 0.711% and the standard deviation of these returns was 3.642%, showing that there were significant variations across the sample period. The average

monthly increase in retail sales (+0.399%) and industrial production (+0.135%) were positive. Average changes in the unemployment rates were -0.006 percentage points and housing starts varied significantly. There were also large month-to-month fluctuations in consumer sentiment. The results show that there was a significant variation in the economic activities and financial market conditions over the period under investigation. Table 1 shows the descriptive statistics of the macroeconomic indicators selected and the returns on the S&P 500, where differences in economic activity and the financial market environment are observed.

Table 1. Descriptive Statistics of Macroeconomic Indicators and S&P 500 Returns

Variable	N	Mean	SD	Minimum	Maximum
S&P 500 return (%)	523	0.711	3.642	-22.804	11.352
Industrial production growth (%)	523	0.135	0.983	-14.205	6.377
Retail sales growth (%)	523	0.399	1.663	-15.690	17.207
Unemployment change (pp)	523	-0.006	0.510	-2.200	10.400
Housing starts growth (%)	523	-0.025	8.056	-30.674	25.672
Consumer sentiment change	523	-0.007	3.992	-17.300	17.300
S&P 500 volatility	523	0.006	0.013	0.000	0.170

3.2 Temporal Dynamics of U.S. Equity Market Returns

Monthly returns of the S&P 500 for the period studied are shown in figure 1. There were also significant variations in this series, with losses in several market downturns and gains in the subsequent recoveries. During periods of extreme market volatility, especially large negative observations became apparent. As can be seen from the figure, the returns of U.S. equities were not uniform over time and there were significant positive and negative return shocks throughout the sample.

Figure 1. Temporal Trends in U.S. Equity Market Returns (1981–2024)

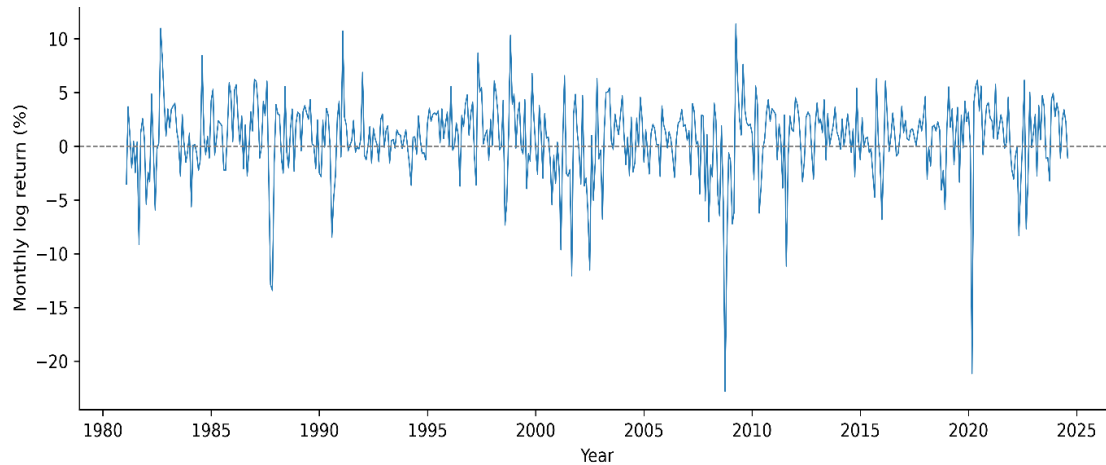


Figure 1 illustrates the substantial temporal variations in monthly U.S. equity market returns across the observation period.

3.3 Correlation Between Macroeconomic Indicators and Equity Market Returns

Pearson correlation analysis revealed that there were several significant relationships between macroeconomic indicators and returns of the S&P 500. Consumer sentiment changes exhibited the strongest positive correlation ($r = 0.325$, $p < 0.001$), followed by retail sales growth ($r = 0.213$, $p < 0.001$) and housing starts growth ($r = 0.121$, $p = 0.006$). There was a strong negative correlation ($r = -0.183$, $p < 0.001$) with market volatility. Market returns were not significantly correlated with the growth of industrial production and changes in unemployment. These results indicate that the expectations and retailing behaviour of consumers were closer to the contemporaneous equity performance than some other indicators. Table 2 shows the Pearson correlation coefficients between macroeconomic indicators and returns on the S&P500, and this reveals significant positive and negative correlation.

Table 2. Pearson Correlation Between Macroeconomic Indicators and S&P 500 Returns

Macroeconomic indicator	Pearson r	p-value	Significance
Industrial production growth	0.052	0.234	Not significant
Retail sales growth	0.213	<0.001	Significant
Unemployment change	-0.038	0.387	Not significant
Housing starts growth	0.121	0.006	Significant

Consumer sentiment change	0.325	<0.001	Significant
S&P 500 volatility	-0.183	<0.001	Significant

Figure 2 presents the correlation heatmap of the selected macroeconomic and financial variables, providing a visual comparison of the direction and magnitude of their pairwise relationships.

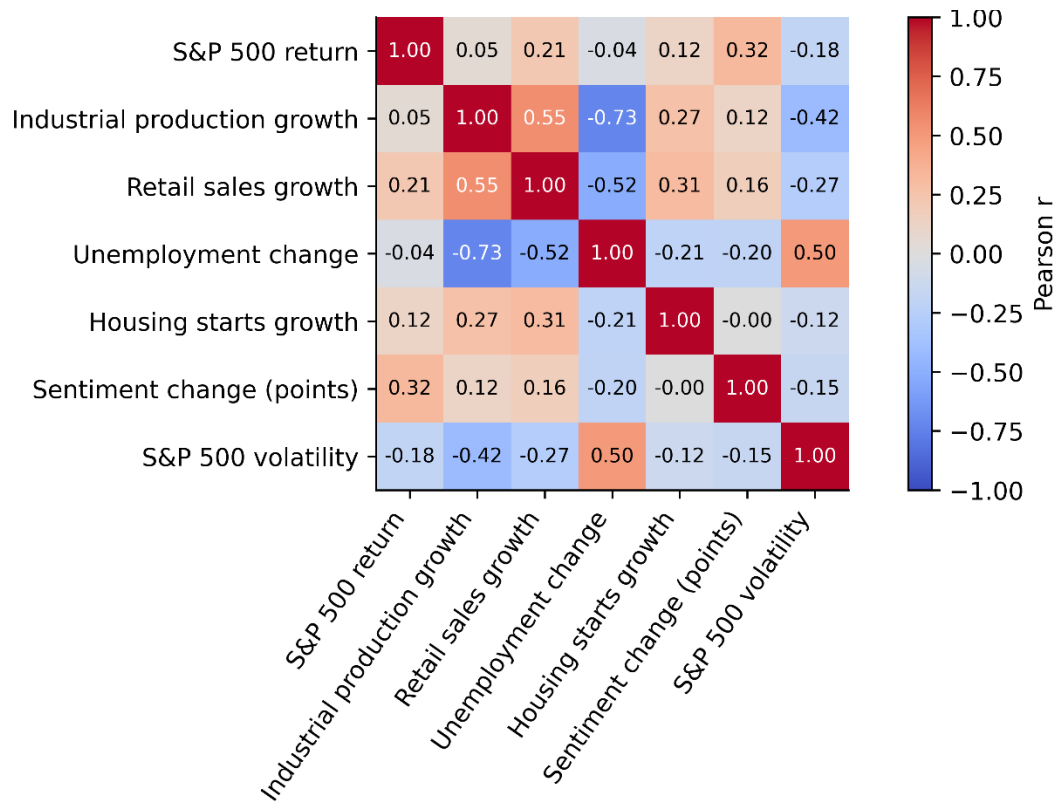


Figure 2. Correlation Heatmap of Macroeconomic and Financial Variables

3.4 Multiple Linear Regression Analysis

Multiple linear regression was done to investigate the simultaneous relationship between the chosen macroeconomic indicators and the S&P 500 monthly returns. In addition to the variables included in the model, it is important to note that there was data on market volatility and changes in consumer sentiment. Standard errors with 12 lags were used, and they are heteroskedasticity- and autocorrelation-consistent (HAC). The model accounted for 18.4% of the variation in the monthly market returns ($R^2 = 0.184$; adjusted $R^2 = 0.175$). Consumer sentiment was the single largest positive coefficient ($\beta = 0.281$, $p < 0.001$) followed by retail sales growth ($\beta = 0.499$, $p =$

0.004). The conditional association ($\beta = 1.561$, $p = 0.043$) for unemployment changes was also positive. Market volatility had a highly significant negative coefficient ($\beta = -55.408$, $p = 0.001$). However, no statistically significant growth was found in the production of industry or the growth in housing starts was close but did not achieve the 0.05 level of significance. The results of multiple linear regressions are shown in Table 3 where the statistical relationship between selected macroeconomic and financial indicators and the returns on the S&P 500 are presented.

Table 3. Multiple Linear Regression Analysis of Macroeconomic Indicators Associated With S&P 500 Returns

Variable	Coefficient (β)	HAC SE	p-value
Constant	0.877	0.218	<0.001
Industrial production growth	-0.211	0.292	0.471
Retail sales growth	0.499	0.174	0.004
Unemployment change	1.561	0.772	0.043
Housing starts growth	0.040	0.021	0.051
Consumer sentiment change	0.281	0.049	<0.001
S&P 500 volatility	-55.408	16.362	0.001

Figure 3 displays the estimated regression coefficients and their 95% confidence intervals. The visualization highlights the positive associations of consumer sentiment and retail sales growth with market returns and the negative association of volatility. Because predictors are measured on different scales, coefficient magnitudes should not be interpreted as standardized measures of relative importance.

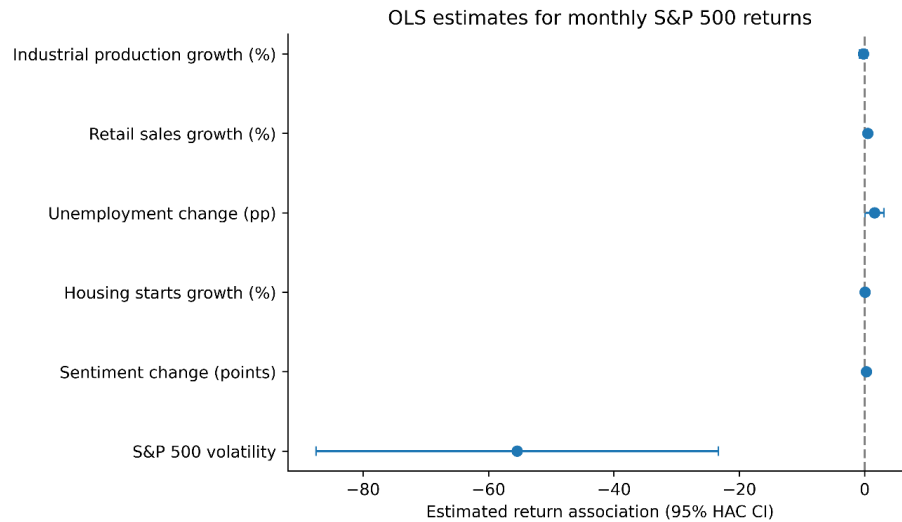


Figure 3. Regression Coefficients of Macroeconomic Determinants of U.S. Equity Returns

3.5 Comparison of Equity Market Returns Across Historical Periods

The observations were segmented into two historical periods: 1981-2000 and 2001-2024 to analyse the differences in the market's performance over these periods. The former span had an average monthly return of 0.964% while the latter had an average monthly return of 0.498%. The variability of the market returns was higher in the later period with the standard deviation value of 3.875% as compared to 3.336% in the earlier period. Welch's independent-samples t-test results, however, did not show that this difference in average returns was significant ($t = 1.476$, $p = 0.140$). These results suggest that whilst the historical periods were descriptively different, there was not enough evidence to suggest that there was a difference between the mean monthly returns. Table 4 shows the average returns and variability in the U.S. equity market during 1981–2000 compared to 2001–2024.

Table 4. Comparison of U.S. Equity Market Returns Across Historical Periods

Period	N	Mean return (%)	SD (%)	p-value
1981–2000	239	0.964	3.336	—
2001–2024	284	0.498	3.875	—
Between-period comparison	523	—	—	0.140

Figure 4 compares the distributions of monthly returns between the two periods. Both periods displayed substantial variability, with the later period exhibiting greater dispersion. The visualization complements the statistical comparison by demonstrating differences in the distribution of market returns over time.

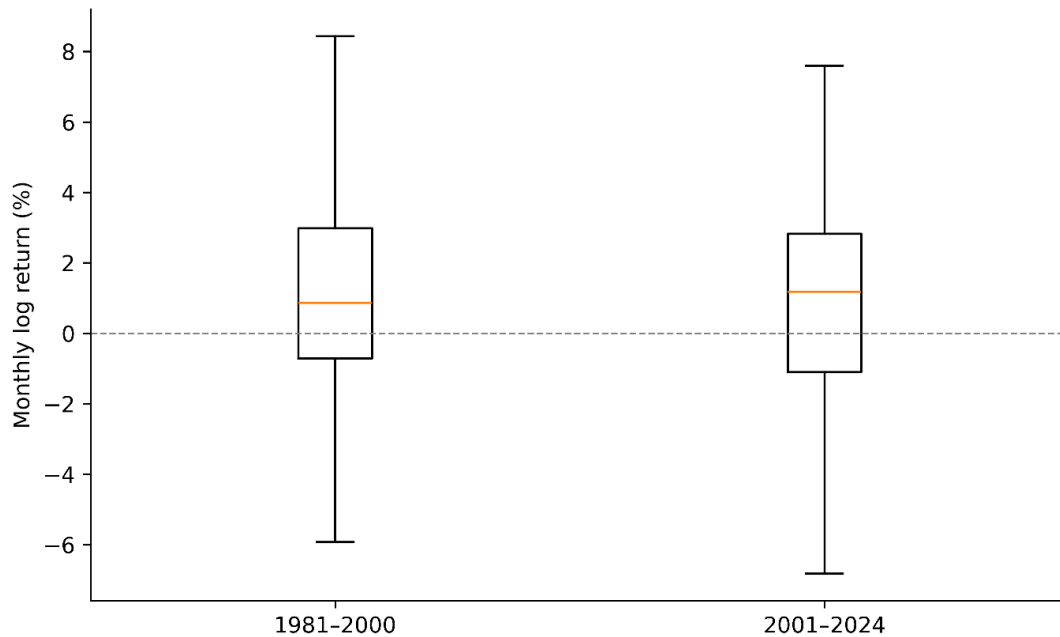


Figure 4. Distribution of S&P 500 Returns Across Historical Periods

The study of 523 monthly data showed that there were significant relationships between the selected macroeconomic indicators and the U.S. equity market returns. Consumer sentiment, retail sales growth and market volatility were all highly correlated and highly related to the monthly returns in both the correlation and regression analysis. About 18.4% of the variation in the observed returns can be attributed to the multiple regression model. Historical comparisons indicated that there are differences with respect to average return, but not significant differences in the mean return in the two periods selected and in the volatility.

4. Discussion

This study explored the macro-financial market-return dynamics for monthly data from 1981 to 2024. The results showed that there were significant relationships among market returns and selected economic variables, especially consumer sentiment, retail sales growth and market

volatility. The regression analysis accounted for 18.4% of the variance of the monthly S&P 500 returns, suggesting that macroeconomic and financial variables explain a part of the movement of the equity markets, but a great deal is still left unexplained. These findings align with those highlighting the importance of inflation, monetary policy, and financial conditions on the performance of the U.S. stock market (Abid, 2025). The potential connection between economic indicators and equity markets' valuation has been explored in other developed markets showing the general applicability of economic conditions with equity markets' performance (Ali et al., 2025; Wong et al., 2025).

The consumer sentiment was the only variable that showed a significant positive correlation with equity returns ($r = 0.325$, $p < 0.001$), with retail sales growth also showing a positive correlation ($r = 0.213$, $p < 0.001$). These findings indicate that better consumer expectations and economic activity are related to positive market performance in the present. However, individual correlations for industrial production growth and unemployment were not significant. The study of financial markets has also shown that macroeconomic conditions and monetary policy transmission are key factors influencing the valuation of financial assets (Aloui & Ben Maatoug, 2024). The research on macroeconomic determinants and financial risk in various cross-country markets also shows that economic dynamics can vary based on market conditions and financial risks (Baek & Song, 2025). These discrepancies highlight the need to understand U.S. financial market activity in the context of the U.S. economy.

In the regression analysis, consumer sentiment was found to be significantly and positively associated ($\beta = 0.281$, $p < 0.001$), retail sales growth ($\beta = 0.499$, $p = 0.004$), and market volatility ($\beta = -55.408$, $p = 0.001$). This indicates that better consumer conditions and higher market returns go together, while greater financial uncertainty is linked to lower market returns. The connection between sovereign risk premiums and macroeconomic conditions has been studied in the past with more general results in terms of the association between economic instability and financial risk compensation (Botey-Fullat et al., 2025). There is also evidence related to bond term premiums that risk, liquidity, and behavioral conditions play a significant role in financial market pricing (Karahan & Soykök, 2022). The analysis of global financial risk and interest parity premiums also indicates that international financial conditions can have an impact on the risk-related market realignment (Janus, 2025). Studies on climate financial volatility also indicate the potential impact of risk environment change on asset market performance (Ghani & Qin, 2025).

The comparison of 1981-2000 and 2001-2024 showed that the 1981-2000 period had a higher average monthly return, but it was not statistically significant ($p = 0.140$). This suggests that historical mean return differences are not evidence that the market has changed. Sovereign risk premiums have been seen to be important in explaining differences in risk exposure in the context of international research (Amewu et al., 2024). A comparison of emerging and developed equity markets also reveals the differences in characteristics of the market risks (Menshchikova, 2024). Political uncertainty is also a factor that may impact investment risk, especially in emerging financial markets (Sonenshine & Aboulhosn, 2025). The evidence of clean energy markets also indicates that there can be complicated relationships between economic conditions and financial risks between market sectors (Li et al., 2024).

The results are relevant to investors and financial analysts in the understanding of the effect of macroeconomic factors on equity performance. The inclusion of consumer sentiment, retail activity, and volatility indicators can be used to help assess financial risk, but these are contemporaneous relationships and are not necessarily associated with forecasting accuracy. AI-driven financial analysis also provides other methods for analysing market risks and aiding investment decisions (Hossain, 2025). The study on the volatility of the stock market and macroeconomic factors also highlights the importance of economic information in understanding financial volatility (Xia, 2025). Evidence from other asset markets, however, shows that risk-return relationship could be different for different asset classes making the findings of the present study hard to generalize (Dunbar & Owusu-Amoako, 2022). Importantly, the present analysis employed realized S&P 500 returns instead of equity risk premiums as there was no matching risk-free returns series. Therefore, the results cannot make a direct relationship with ERP dynamics. There is a need for future studies to include the proper Treasury bill returns, further economic variables, and time-series models to consider equity risk premiums more thoroughly.

5. Conclusion

This study investigates the linkages between macroeconomic indicators, financial market conditions, and U.S. equity market returns using monthly observations for 1981–2024. The results showed that the consumer sentiment, retail sales growth, and market volatility were found to be statistically significant in explaining the stock market performance. Equity returns positively correlated with consumer sentiment and retail sales, indicating that positive economic outlook and

enhanced consumer spending are associated with improved equity returns. However, there was a significant negative correlation with market volatility, indicating that financial uncertainty is important for market volatility. The regression model explained 18.4% of the variation in the monthly returns, which suggested that other economic and financial factors impact the behaviour of the market. The differences in average returns and the difference in variability through the comparison of historical periods were found, however the difference in average returns was not statistically significant. These results underscore the need to use a set of macroeconomic indicators for assessing financial market conditions. The study will be useful for investors, financial analysts, and policy makers to understand the economic indicators relating to the equity performance. However, no series of a risk-free return over the same time was found, so the S&P 500 return was used instead. Therefore, it is not possible to draw any definite conclusions about the equity risk premium dynamics. Future research is needed that includes risk-free returns, other macroeconomic measures, and sophisticated time-series techniques to help determine the equity risk premium and the implications for financial decision-making.

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