# Relationship between S&P 500 Stock Index and the U.S. Economy

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## ABSTRACT

We present three main parts: 1 Give an introduction to the stock index and the reason we choose S&P 500. 2 Talking about the history of S&P 500 from two aspects, the components and calculation methods, by which can help us have a deeply understanding about the relationship between stock index, stock market and economies of the U.S.. 3 Give a brief introduction to the economic indicators and explore the relationship between the S&P 500 and economic indicators to further see the relationship between stock market and economy of the U.S..

## OBJECTIVES

The first objective is to analyze the advantages of the S&P 500 index over other indexes, as well as the development of the S&P 500 index, including the evolution of the composition, calculation formula.

This second objective is to analyze the relationship between the S&P 500 index and some relevant US economic factors, such as gross domestic product, the consumer price index, the industrial production index, the unemployment rate and long-term interest rates.

## MATERIALS and METHODS

Why the S&P 500?

The S&P 500 has a clear advantage over the Dow Jones Industrial Average (DJIA) because the DJIA simply has too few companies and has a much lower level of diversification. It is an infrequently revised listing of thirty stocks chosen by editors of the Wall Street Journal. This index can deviate significantly from representing actual breakdown of the economy as a whole because it only contains thirty stocks and never has utility or transportation companies.

One of the problems with the NASDAQ Index is that it contains too many companies from the Technology sector. This often leads to large swings in the index when the Technology sector is either performing very well or very poorly. In addition, the NASDAQ has smaller companies in the index. This will lead to increased riskiness of the index and often a less accurate representation of the overall economy.

Components of S&P 500

In 1957, the S&P 500 index followed the performance of 85% industrial, 5% rail and 10% utility stocks. At that time, the U.S. economy was completely dominated by manufacturing, which was inseparable from the background of world war II. In 1976, independent financial sector appeared for the first time, heralding the beginning of the financial era, and the railway was replaced by the transportation. The S&P 500 index followed the performance of 86% industrial, 1.6% transportation, 6.1% finance and 6.5% utility stocks. In 2001, the S&P 500 index had more than eight major components. This is the beginning of a new era, an era of diversity. In the glittering year for the IT industry, it jumped to the biggest proportion in the S&P 500 index with 20.8%.
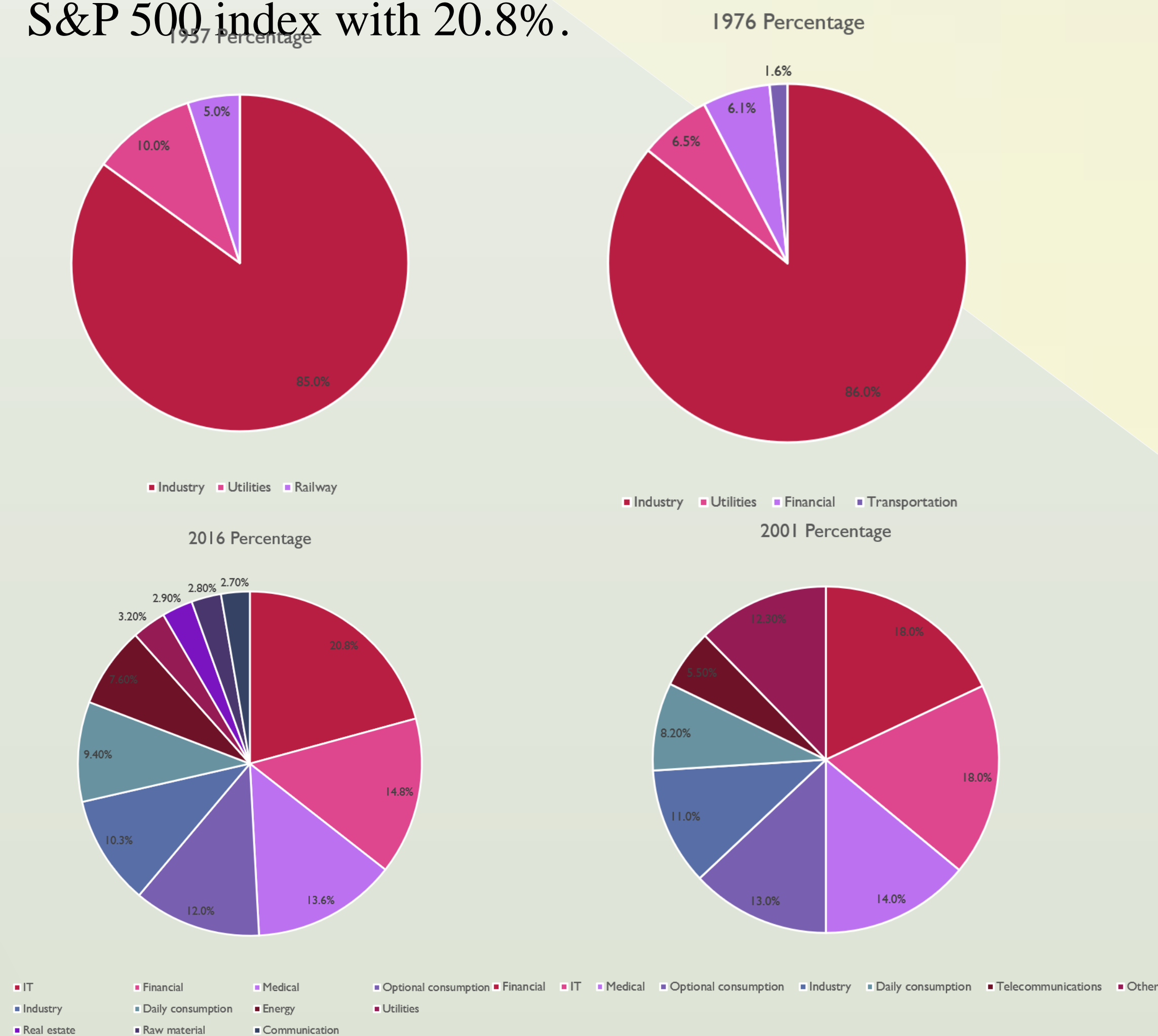


Economic Variables

GDP = Consumption + Investment + Government expenditure + (Exports – Imports)

The Consumer Price Index (CPI) is a measure that examines the weighted average of prices of a basket of consumer goods and services.

The Industrial Production Index (IPI) is an economic indicator published by the Federal Reserve Board of the United States that measures the real production output of manufacturing, mining, and utilities.

The unemployment rate is the share of the labor force that is jobless, expressed as a percentage. Long-term interest rates refer to government bonds maturing in ten years. Rates are mainly determined by the price charged by the lender, the risk from the borrower and the fall in the capital value.

## RESULTS

There is a relationship between GDP and S&P 500 index, although it is not conclusive. However, we find a clear positive relationship between the two variables. Furthermore, this preliminary analysis may confirm the hypothesis that the S&P 500 is ahead of the economy—that is, the index is ahead of US Real GDP. Hence, the S&P 500 index could be considered a leading indicator of the growth of the real economy.



In the case of the Industrial Production Index, again, Figure 8 indicates that there is a strongly positive relationship between the S&P 500 index and the IPI. Similarly, the S&P 500 index is also ahead of IPI index.
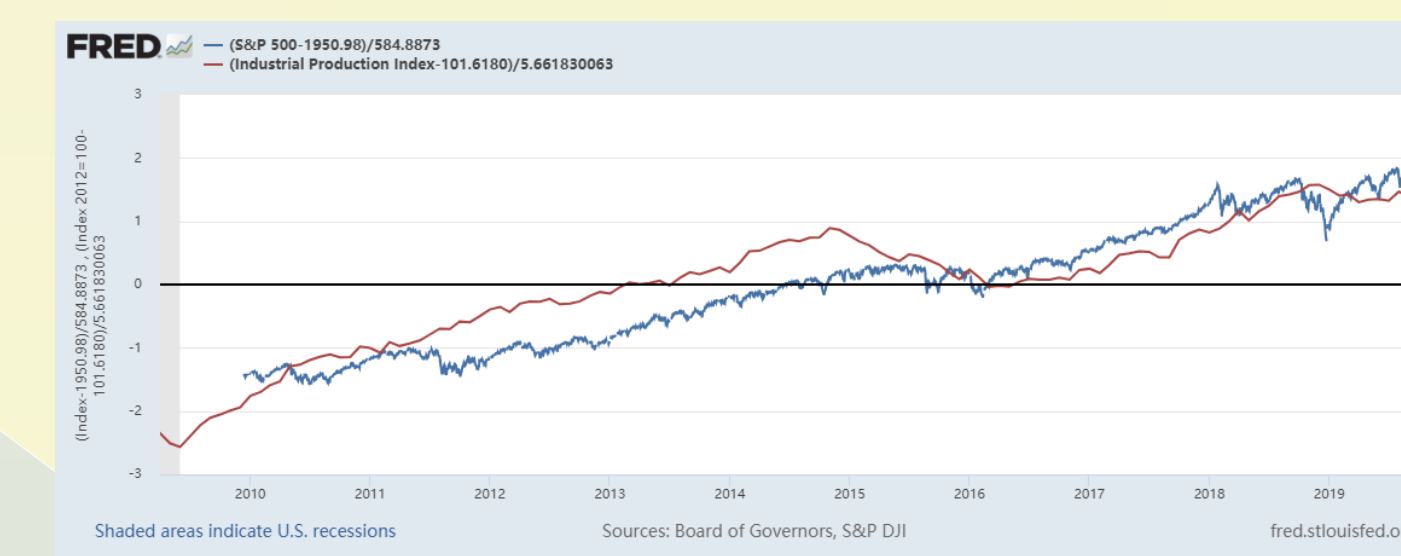


By studying the relationship between the CPI and the S&P 500 index, we find a positive effect. Figure 9 shows that both evolutions have a very similar pattern and close values, which seem to indicate a very strong positive relationship. Specially, the S&P 500 index and the CPI are moving simultaneously, which means there is almost no time lag.
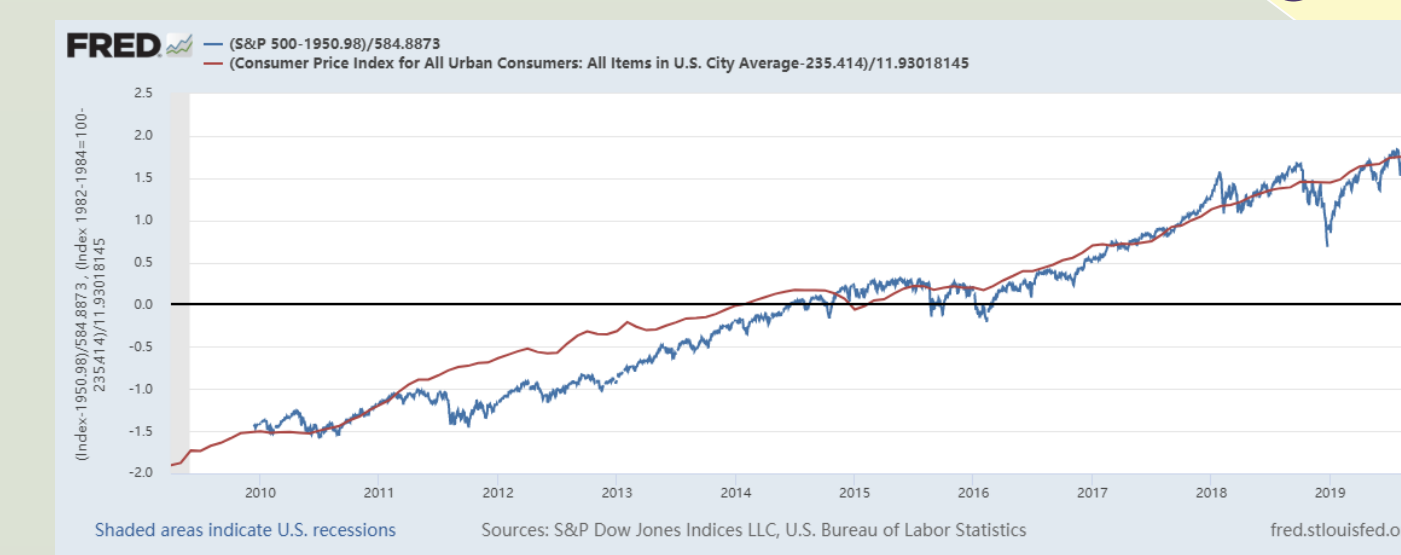


This relationship may be negative; therefore, a decrease in S&P 500 index could be accompanied by an increase in unemployment rate, which would in turn generate a negative scenario for investors and vice versa.
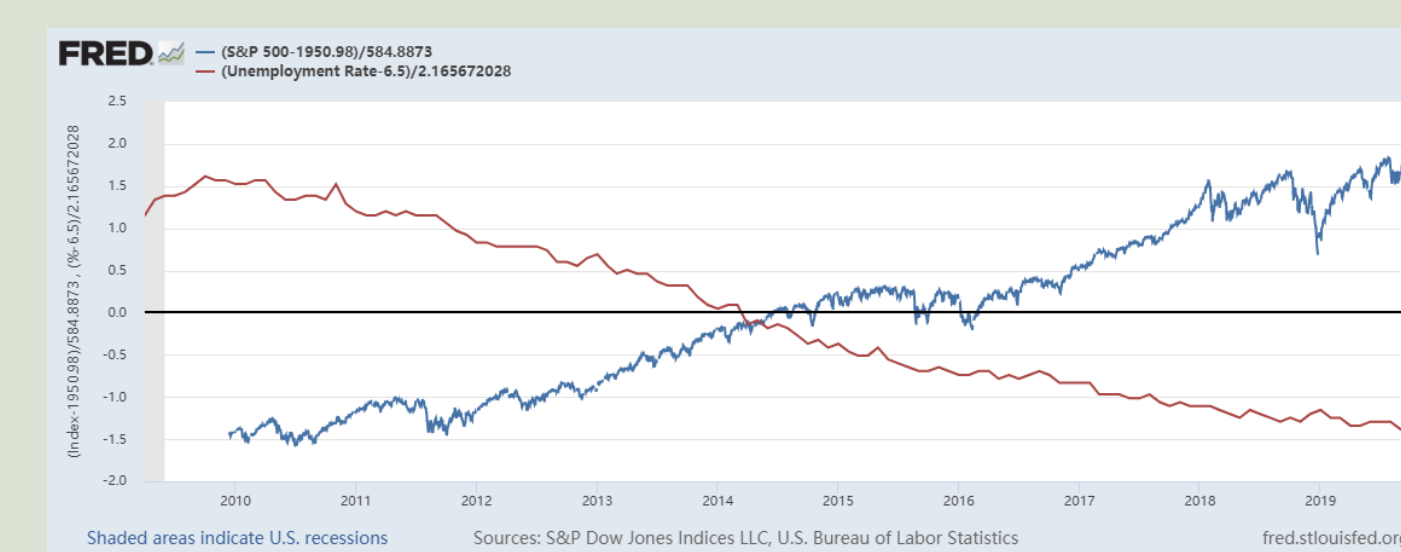


seems to exhibit a negative relationship between the S&P 500 index and the interest rate factor. Sometimes, however, they change in the same direction. Therefore, we cannot intuitively get their correlation from images alone, and further analysis is needed.
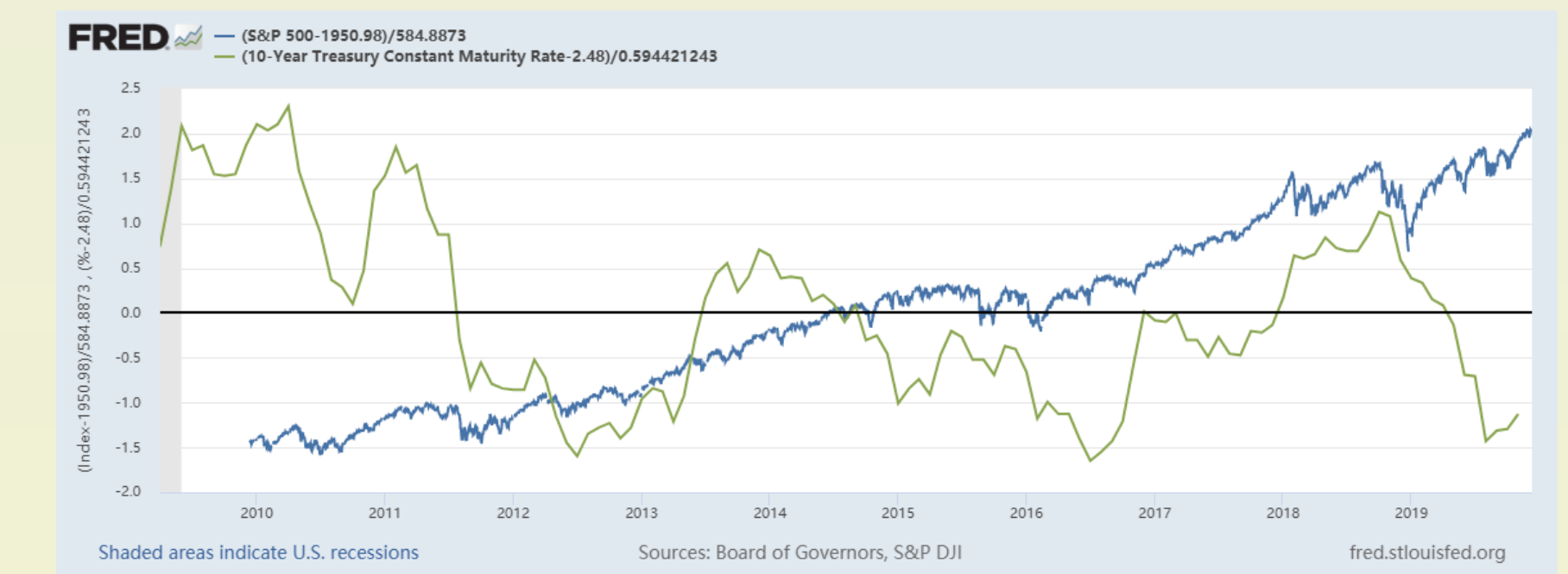


## CONCLUSION

The purpose of this project is to examine the development of the U.S. economy and see if the S&P 500 was able to reflect this evolution. The first step to do this is introduce the S&P 500 index and the economic variables. Here we explain the S\&P 500's advantages over other indexes, and focus on its calculation and divisor adjustments. For economic factors, this project selects five representative factors for analysis.

Furthermore, This project presents five graphs of the relationship between five economic factors and the S\&P 500 index. It then intuitively summarizes the relationship between the S\&P 500 index and various economic variables.

Finally, these relationships have been analyzed from a statistical perspective with the calculation of correlation coefficients, which show whether these relationships are statistically significant. This analysis shows that the S\&P 500 index exhibits a positive and significant relationship with the Real GDP, CPI, and IPI, a negative and statistically significant relationship with the unemployment rate.

## REFERENCE

A New Stock Index to Better Predict the United States' Real GDP

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