The Impact of Inflation and Interest Rates on the Stock Market

By Git Real

Hannah, Paul, Ryan, Uma, Zaid

Motivation and Topic

Motivation:

- Explore relationship between interest and inflation rates and the performance of the stock market to determine when it's beneficial to invest, as well as if/when certain companies or sectors perform better in different economic climates.

Research Questions:

- How have these rates (inflation and interest) historically impacted the returns of the stock market? How closely has the current performance of the market (the past two years) followed these historical trends?
- And does the current high-rate economic climate disproportionately affect some companies/sectors more than others? If so, why?

Introduction to Data

Part 1:

Historical and current-day analysis of S&P 500 returns, inflation rate, and federal funds rate

Part 2:

Company and sector analysis of year-to-date S&P 500 returns

Historical Trends

Variable	Definition
year	year in which observation was recorded
month	month in which observation was recorded
monthly_return	total stock market's monthly return
year_to_date_return	S&P 500's yearly return
mean_fed_funds_rate	mean annual interest rate set by the Federal Reserve
inflation rate	mean annual inflation rate
decade	represents decade in which observation was made

Macrotrends (collected from World Bank), Slickcharts, Official Data

Recent Trends

Variable	Definition
date	day on which observation was recorded
price	closing daily price for the S&P 500
open	opening daily price for the S&P 500
daily_percentage_change	daily percentage difference between opening and closing prices
daily_diff	daily numerical difference between opening and closing prices
gain	TRUE if daily_diff > 0 (positive return for the day), else FALSE

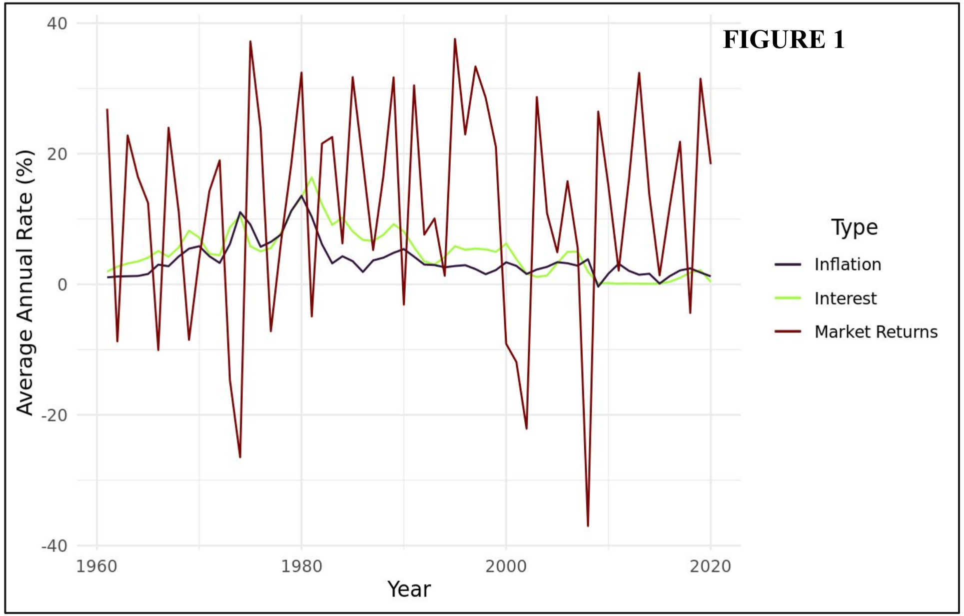
Investing.com (collected from financial-data providers)

Sector Trends

Variable	Definition
name	name of company in S&P 500
symbol	ticker symbol used to identify companies on stock exchange
weight	percentage weighting of company in S&P 500
original_price	price of company's stock at beginning of 2022
current_price	price of company's stock as of October 2022
ytd_return_num	company's year-to-date return percentage
sector	company's industry
return category	positive if ytd_return_num > 0 (positive return for the year), else negative

Data Hub (collected from S&P Dow Jones Indices), Slickcharts,

EDA Highlights



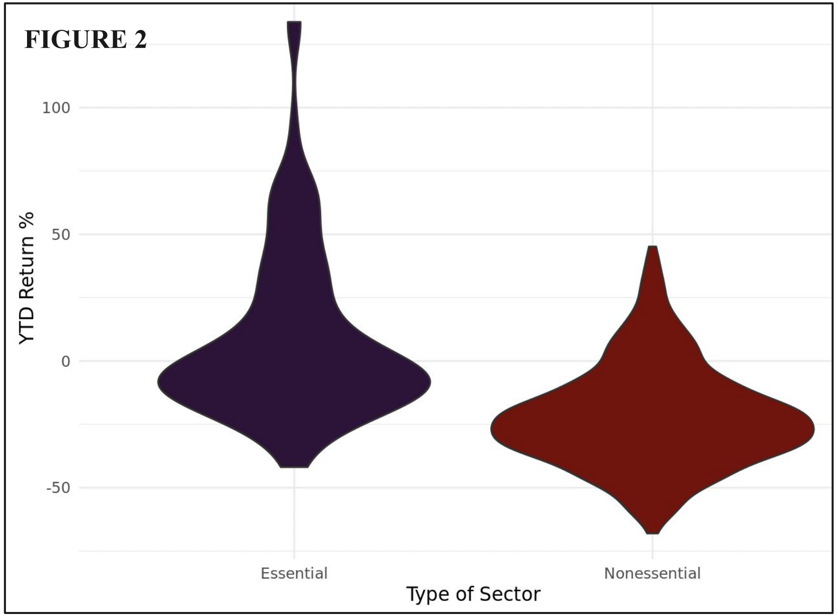


Figure 1: Mean annual rates of inflation rates, interest rates, and market returns 1960 ~ 2020

Direct relationship between inflation and interest rate, weak relationship with market returns

Figure 2: Quantifiable difference between whether Essential or Non-Essential industries performed better.

Essential industries: higher density of values above zero, higher maximums and lower minimums, more clumped up data around a neutral zone. Essential companies' stocks lost less of their value and look as if they are more consistent.

Part 1 Analysis

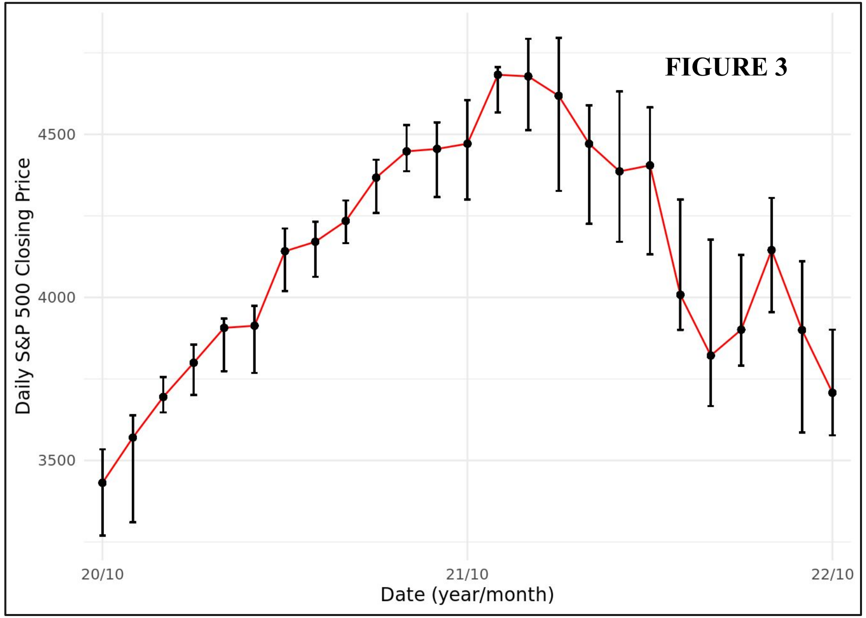
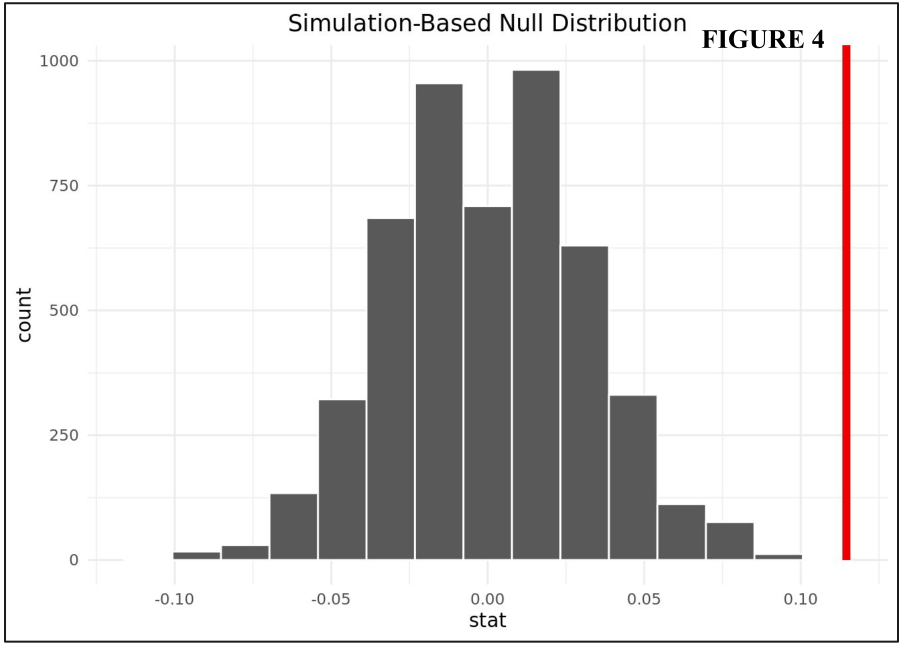


Figure 3: Daily closing prices for S&P index by month

Median monthly closing prices rose October 2020 to December 2021/January 2022 then declined through October 2022. Correlates with low rates in Covid-19 era.

Figure 4: Hypothesis Testing

Tested whether or not companies generally perform better in low-rate environments (proportion of companies with positive returns in low vs. high-rate environments). Tested to be statistically significant.



Part 2 Analysis

FIGURE 5

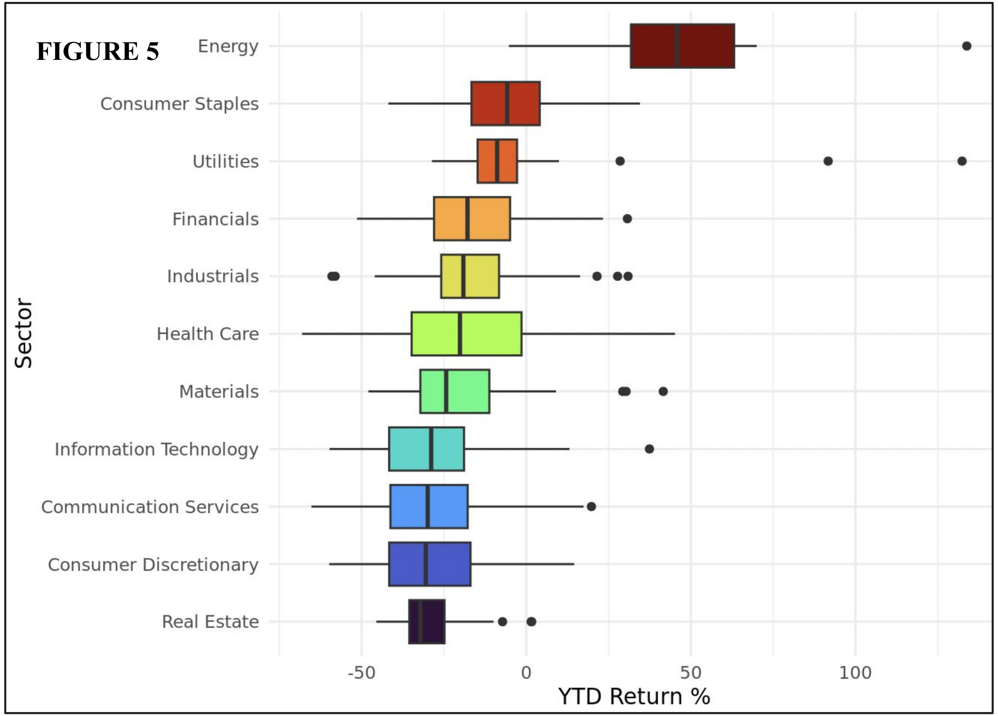


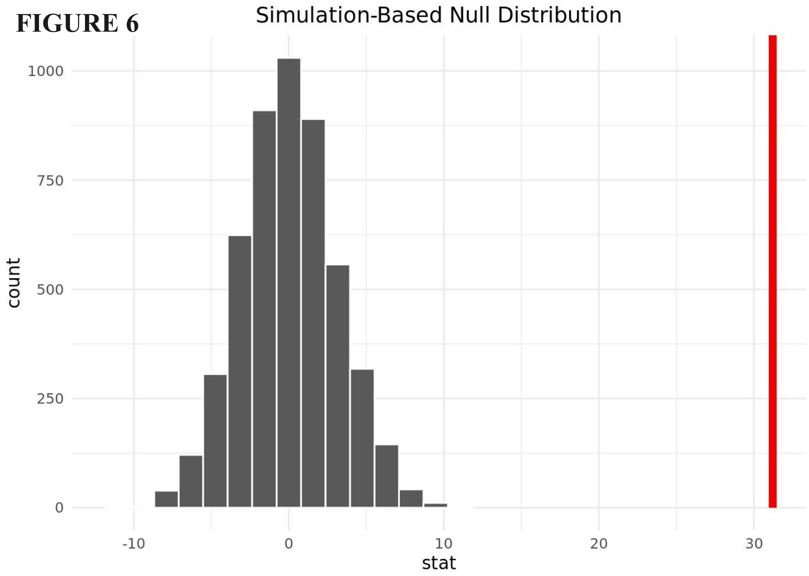
Figure 5: Mean return of all stocks from each sector from best to worst indicating the exact increase/decrease range per sector.

Lowest: Consumer Discretionary, IT and Consumer Services.
Highest: Energy, Utilities and Consumer Staples.

Figure 6: Quantifiable difference between whether Essential or Non-Essential industries performed better.

Hypothesis Test: Tested whether or not the year to date returns were greater for essential industries. Proven to be statistically significant.

FIGURE 6



Conclusions & Future Work

Part 1 Conclusion:

- Low interest and inflation rates generally correlate with higher returns
- Lower returns can't be explained as easily
- Current-day shows that performance would be hurt by high inflation and interest rates

Part 2 Conclusion:

- "Essential sectors" had higher returns than "non-essential"

Future Work:

- Incorporate state of market into data during certain time period
- Explore other indexes and compare findings to S&P 500
- Zoom in on specific sectors, comparing success under during different market conditions