

# final\_report\_notebook

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## 1 Team Members

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## 2 Project Overview

### 2.1 Goals

The goal of our analysis is to identify stock attributes and performance trends which are indicative of resilience during economic downturns. To do so, we leverage data for securities in the S&P 500 during several ‘down markets’ - identifying the stocks which outperform the market and analyzing the traits they have in common (e.g. industry, company size, etc).

## 2.2 Approach

The metric we use to identify outperformance is Jensens Alpha. We run a standard Jensen’s Alpha regression:

$$Return_{Stock} - Return_{rf} = \alpha_{stock} + B_1[Return_{sp500} - Return_{rf}]$$

For each period, we identify the top 30% of positive alpha stocks and code them as outperformers. This output becoemes the target of a logistic regression to identify features predective of that good performance:

$$Outperform_{stock} = B_0 + B_1 * [LTMReturns] + B_2 * [LTMVolatility] + B_3 * [IsFinance?] + B_4 * [IsIndustrials?] + B_4 * [IsRealEstate?] + B_5 * [UnemploymentRate] + B_6 * [InterestRate]$$

Variables that survive backwards-selection and are statistically significant will be deemed features that predict outperformance.

## 2.3 Initial Hypothesis

Through this research, we have formed several hypotheses about which types of companies might outperform in recession. We have identified two papers, (Woszczyk 2019) and (Ozkan 2009), which explore investment strategy during economic downturns. Researchers suggest that ‘vice stocks’ tend to outperform as folks resort to ‘bad habits’ (e.g. drinking, smoking, gambling) during times of unemployment Sources 2 (Ozkan 2009). They also find that healthcare companies are resilient, as demand can be relatively inelastic for medical care (Woszczyk 2019).

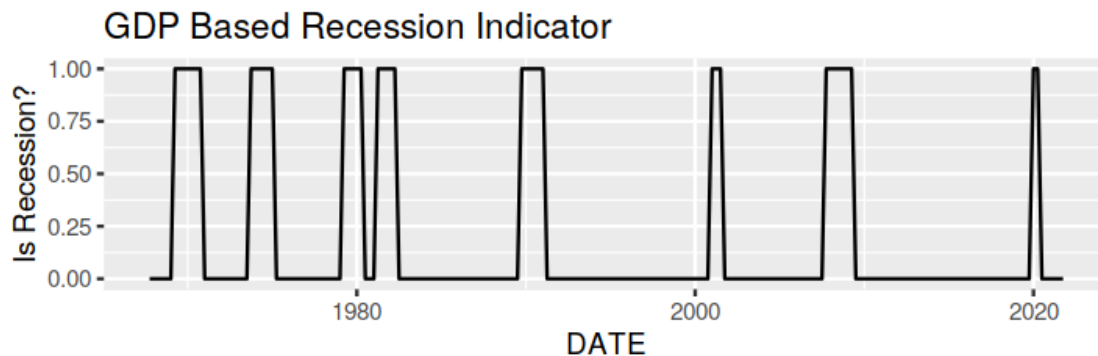
## 3 Overview of Data

Most of the data for this analysis was from sources that were relatively clean. The key componets we needed for the analysis:

- For identifying outperformers
  - Data to identify recessionary periods
  - Stock and index returns
  - Index components
- For identifying attributes that predict outperformance
  - Stock specific attributes (industry, common factor exposures, etc)
  - Macroeconomic factors

### 3.1 Identifying recessions

We observe market performance during several recession periods in the United States as idenfitted by the [Federal Reserve GDP based recession indicator](#).



Due to limitations in access to historical data, we evaluate performance to the three most recent recessions:

- January 2001 - October 2001
- December 2007 - June 2009
- January 2020 - September 2020

## 3.2 Stock returns

Corporate action adjusted stock and index prices were pulled from yahoo via the tidyquant R package. From this data, monthly returns were calculated. S&P500 Index components were identified from publicly available sources.

## 3.3 Stock specific attributes and Macroeconomic factors

Stock sectors were pulled from Yahoo via tidyquant. Macroeconomic factors such as interest rate and unemployment rate were pulled from Federal Reserve Bank of St. Louis (FRED), also via tidyquant.

# 4 Overview of Modeling

## 4.1 Identifying outperformers

## 4.2 Identifying predictors of outperformance

## 4.3 Findings

## 4.4 Challenges and Future Direction

# 5 Conclusion

# 6 Sources

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9. Hamilton, James, Dates of U.S. recessions as inferred by GDP-based recession indicator [JHDUSRGDPBR], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/JHDUSRGDPBR>, July 18, 2022 ([link](#))

# 7 Code

