

# Midcourse Portfolio Performance Assessment

Data 618  
October 2023  
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# Scenario

- Below reads the provided randomly assigned scenario:

*Dave is a 40-year-old divorcee. Dave owns a successful business and has recently received an \$ 8 M buyout offer from a competitor that he wants to accept. Dave's remaining assets are stocks of companies that are his suppliers valued today at \$1.2 M and cash in several accounts totaling \$62,000.*

# Investment Strategy



# Investment Strategy - Overall

- Portfolio allocations tracked by [spreadsheet](#).

| Total Assets    | Investment Allocation | Cash Allocation |
|-----------------|-----------------------|-----------------|
| \$ 9,262,000.00 | \$ 8,000,000.00       | \$ 1,262,000.00 |

- Portfolio includes stock, crypto, bond, and cash allocations:

| Allocation Type | % Allocation of total Assets | % Allocation of Investments | Total Investment |
|-----------------|------------------------------|-----------------------------|------------------|
| Stocks          | 64.78%                       | 75.00%                      | \$ 6,000,000.00  |
| Crypto          | 4.32%                        | 5.00%                       | \$ 400,000.00    |
| Bonds           | 17.27%                       | 20.00%                      | \$ 1,600,000.00  |
| Cash            | 13.63%                       | N/A                         | \$ 1,262,000.00  |

- Driving considerations:
  - Dave is still pretty young.
  - Dave lives alone, but that might change in the future. Unclear if he has kids.
  - Dave is currently not working, but that will likely not be the case for too long.
  - Dave would like to retire comfortably.

# Investment Strategy - Cash

- **Priority #1:** Without a steady income, Dave will need cash on hand in order afford his living expenses. Depending on his lifestyle, the \$62,000 he has in the bank will not last him an incredibly long period of time.
- **Buy Dave some time:** Newly divorced and newly out of a job, it is likely that Dave will need some time to figure out what he wants to do next in life.
- **Separate entirely:** Selling the stocks in his supplier's companies will give him considerable cash on hand, and will allow him to move on to the next part of his life. Since he is no longer in charge of the company, this also mitigates risk from any decisions the new company owners choose to make.

# Investment Strategy - Cash

- **Worst case scenario:** Even if Dave chooses to lead a lavish lifestyle, he can still support himself for a considerable number of years.

| Monthly Costs                                                                                     | Price                  |
|---------------------------------------------------------------------------------------------------|------------------------|
| Rent/Mortgage Payment                                                                             | \$ 7,500.00            |
| Car Payment                                                                                       | \$ 1,500.00            |
| Child care/payments                                                                               | \$ 5,000.00            |
| Food (groceries/restaurants)                                                                      | \$ 3,000.00            |
| Other Essentials                                                                                  | \$ 4,000.00            |
| Non-Essentials                                                                                    | \$ 4,000.00            |
| <b>Price Per Month</b>                                                                            | <b>\$ 25,000.00</b>    |
|                                                                                                   |                        |
| <b>COH</b>                                                                                        | <b>\$ 1,262,000.00</b> |
| <b>Years with COH (assuming no other sources of income nor sale of stocks, crypto, and bonds)</b> | <b>4.21</b>            |

# Investment Strategy - Stocks

- **Good time to buy:** Not fully recovered from early 2023, but still far below November 2021 peaks.
- **Still some overall market concern:** Recession/inflation concerns has potential to impact economically sensitive exposures on short time scale, but investing for long-term growth.
- **Dave is capable of owning above average risk:** Still young“ish”, playing the long game, has a large cash pool to fall back on.
- **Diversification:** Mitigate risk by splitting investments into companies spanning all GCIS sectors in both US and International markets.

# Investment Strategy - Stocks

- Individual stock justifications found [here](#)

| GCIS Sector                | Name                         | Ticker | Country   | Initial Investment | Stock Allocation % | Total Allocation % |
|----------------------------|------------------------------|--------|-----------|--------------------|--------------------|--------------------|
| Energy                     | Exxon Mobil Corp             | XOM    | U.S.      | \$ 400,000.00      | 6.6667             | 5.0000             |
| Energy                     | PetroChina Co Ltd            | PCCYF  | China     | \$ 400,000.00      | 6.6667             | 5.0000             |
| Energy                     | NextEra Energy Inc.          | NEE    | U.S.      | \$ 200,000.00      | 3.3333             | 2.5000             |
| Materials                  | BHP Group Ltd                | BHP    | Australia | \$ 100,000.00      | 1.6667             | 1.2500             |
| Materials                  | Air Products & Chemicals Inc | APD    | U.S.      | \$ 100,000.00      | 1.6667             | 1.2500             |
| Industrials                | Raytheon                     | RTX    | U.S.      | \$ 200,000.00      | 3.3333             | 2.5000             |
| Industrials                | Union Pacific Corp           | UNP    | U.S.      | \$ 200,000.00      | 3.3333             | 2.5000             |
| Consumer Discretionary     | Amazon.com Inc.              | AMZN   | U.S.      | \$ 300,000.00      | 5.0000             | 3.7500             |
| Consumer Discretionary     | Tesla                        | TSLA   | U.S.      | \$ 100,000.00      | 1.6667             | 1.2500             |
| Consumer Discretionary     | Hermes International S.A.    | HESAY  | France    | \$ 100,000.00      | 1.6667             | 1.2500             |
| Consumer Staples           | Anheuser-Busch InBev SA      | BUD    | Belgium   | \$ 300,000.00      | 5.0000             | 3.7500             |
| Consumer Staples           | Procter and Gamble           | PG     | U.S.      | \$ 400,000.00      | 6.6667             | 5.0000             |
| Consumer Staples           | Hims & Hers Health Inc.      | HIMS   | U.S.      | \$ 100,000.00      | 1.6667             | 1.2500             |
| Health Care                | Pfizer, Inc.                 | PFE    | U.S.      | \$ 300,000.00      | 5.0000             | 3.7500             |
| Health Care                | Elekta                       | EL     | Sweden    | \$ 100,000.00      | 1.6667             | 1.2500             |
| Financials                 | Berkshire Hathaway Inc.      | BRK-A  | U.S.      | \$ 500,000.00      | 8.3333             | 6.2500             |
| Financials                 | Bank of China                | IDCBY  | China     | \$ 250,000.00      | 4.1667             | 3.1250             |
| Financials                 | Royal Bank of Canada         | RY     | Canada    | \$ 250,000.00      | 4.1667             | 3.1250             |
| Information Technology     | Microsoft                    | MSFT   | U.S.      | \$ 400,000.00      | 6.6667             | 5.0000             |
| Information Technology     | Tencent Holdings Ltd         | TCEHY  | China     | \$ 200,000.00      | 3.3333             | 2.5000             |
| Information Technology     | Snowflake                    | SNOW   | U.S.      | \$ 200,000.00      | 3.3333             | 2.5000             |
| Telecommunication Services | Alphabet Inc                 | GOOGL  | U.S.      | \$ 250,000.00      | 4.1667             | 3.1250             |
| Telecommunication Services | América Móvil, S.A.B. de C.V | AMX    | Mexico    | \$ 50,000.00       | 0.8333             | 0.6250             |
| Utilities                  | National Grid PLC            | NG     | England   | \$ 150,000.00      | 2.5000             | 1.8750             |
| Utilities                  | Iberdrola SA                 | IBDRY  | Spain     | \$ 150,000.00      | 2.5000             | 1.8750             |
| Real Estate                | Prologis Inc                 | PLD    | U.S.      | \$ 150,000.00      | 2.5000             | 1.8750             |
| Real Estate                | Public Storage Operating CO  | PSA    | U.S.      | \$ 150,000.00      | 2.5000             | 1.8750             |



# Investment Strategy - Crypto

- **Highly volatile, but large potential** - Crypto prices are known to sway between huge extremes on relatively small timescales, but have the potential to pay out considerably large returns.
- **Crypto isn't going anywhere:** Becoming more mainstream, companies will continue to invest.
- **Just enough for skin in the game:** Want to have a small have enough skin in the game to be part of any potential long term gains, but not have it be core portion of Dave's investment portfolio.
- **Avoid hype:** Crypto bears love to “hype up” the newest crypto or blockchain technology - not worth the risk in this case.

# Investment Strategy - Crypto

- **Stick to the basics:** Only invest in the most established of the cryptos, bitcoin and ethereum.
- Individual justifications can be found [here](#).

| Crypto Name | Symbol  | Initial Investment | Crypto Allocation % | Total Allocation % |
|-------------|---------|--------------------|---------------------|--------------------|
| Bitcoin     | BTC-USD | \$ 200,000.00      | 50.00%              | 2.50%              |
| Ethereum    | ETH-USD | \$ 200,000.00      | 50.00%              | 2.50%              |

# Investment Strategy - Bonds

- **Interest Rates have risen:** Due to rising inflation, the Federal Funds Rate has been raised many times in 2023, and has the potential to be raised again. This means bond prices are at a relative low.
- **Help to mitigate risk:** Bonds and bond funds tend to be lower risk compared to variable income assets, such as stocks.
- **Matches well with long-term strategy:** Dave's strategy emphasizes long term growth, which is the primary benefit of bonds given they pay out over relatively large timescales.

# Investment Strategy - Bonds

- **Diversify:** Use bond ETFs to take part in bonds issued by U.S. and international governments and companies.
- Individual justifications can be found [here](#).

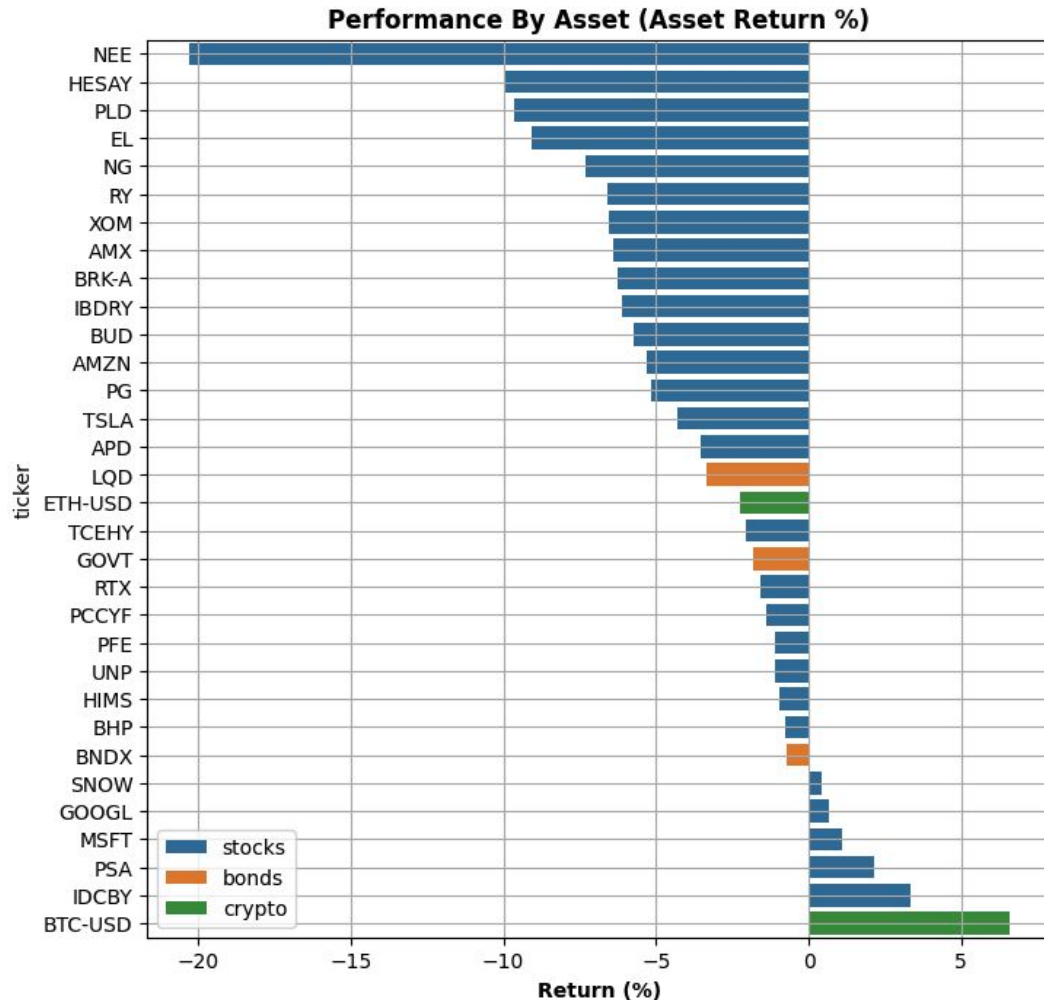
| Bond Name                                            | Bond(s) Origin | Symbol | Initial Investment | Bond Allocation \$ | Total Allocation % |
|------------------------------------------------------|----------------|--------|--------------------|--------------------|--------------------|
| iShares US Treasury Bond ETF                         | U.S.           | GOVT   | \$ 500,000.00      | 25.00%             | 6.25%              |
| Vanguard Total International Bond ETF                | International  | BNDX   | \$ 500,000.00      | 25.00%             | 6.25%              |
| iShares iBoxx \$ Investment Grade Corporate Bond ETF | U.S.           | LQD    | \$ 600,000.00      | 30.00%             | 7.50%              |

# Performance



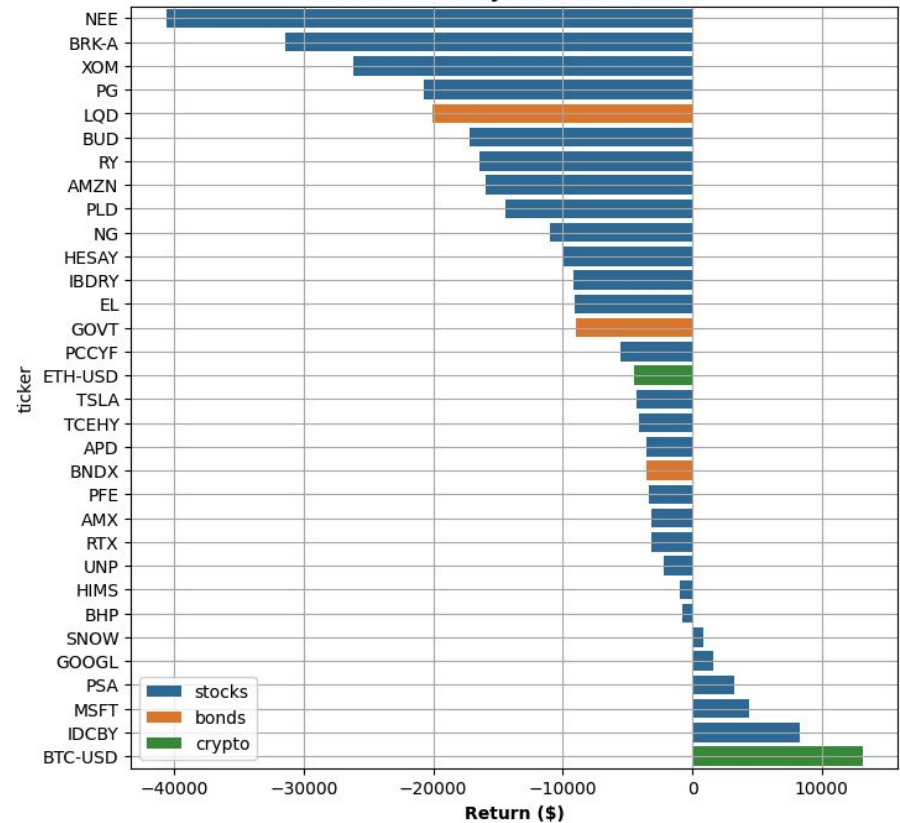
# Performance

- As of 10/16/23, all but 5 assets have generated positive returns.
- Losses likely driven by investor's fears of even higher interest rates and Israeli-Palestinian conflict.

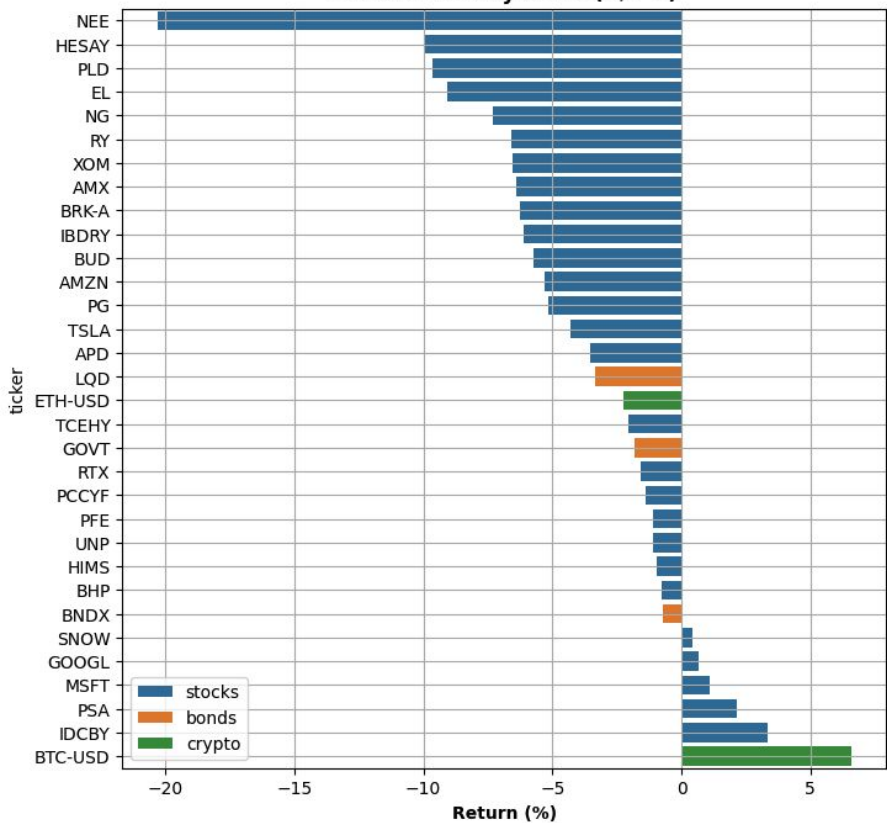


# Performance

Performance By Asset (G/L Value)



Performance By Asset (G/L %)



# Performance

- Use the S&P 500 index exchange traded fund (ETF) (symbol: SPY) as a benchmark to track the performance of the portfolio.
- **Reminder:** Starting portfolio value = \$8,000,000

|           | Current Position | G/L Value     | G/L %  |
|-----------|------------------|---------------|--------|
| Portfolio | \$7,741,349.40   | -\$258,620.60 | -3.23% |
| Benchmark | \$7,863,129.25   | -\$136,870.75 | -1.71% |

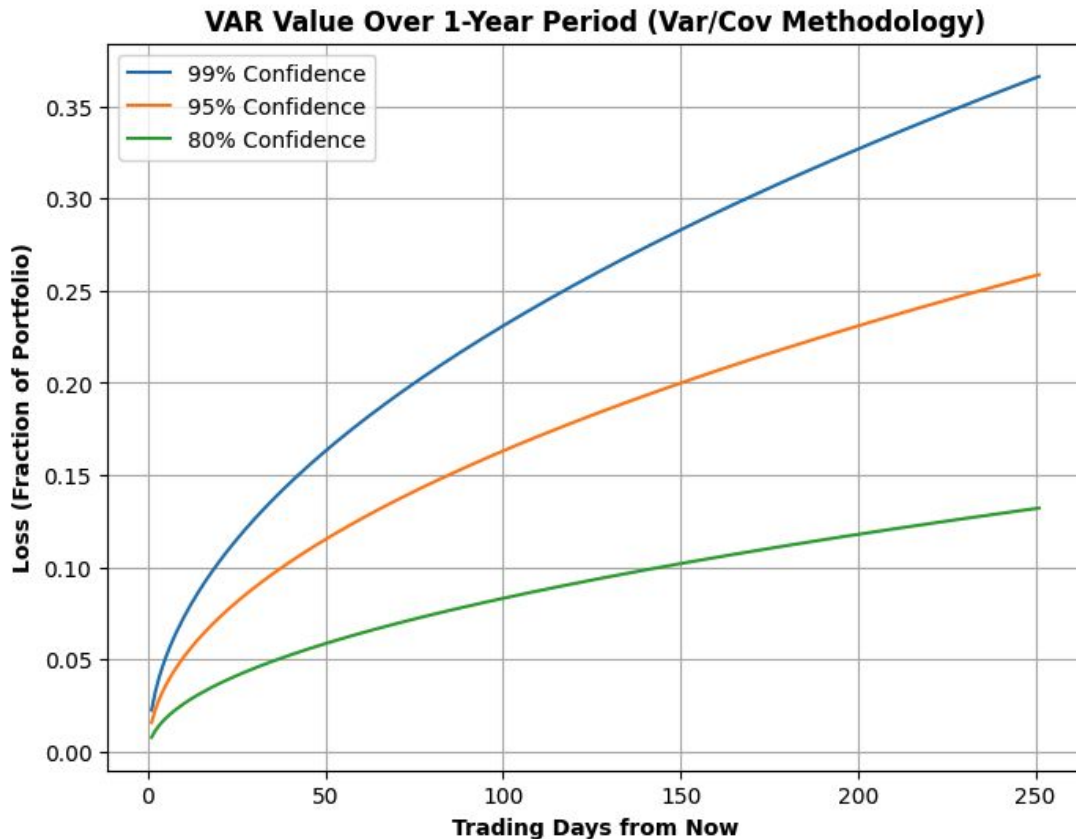


# Analysis



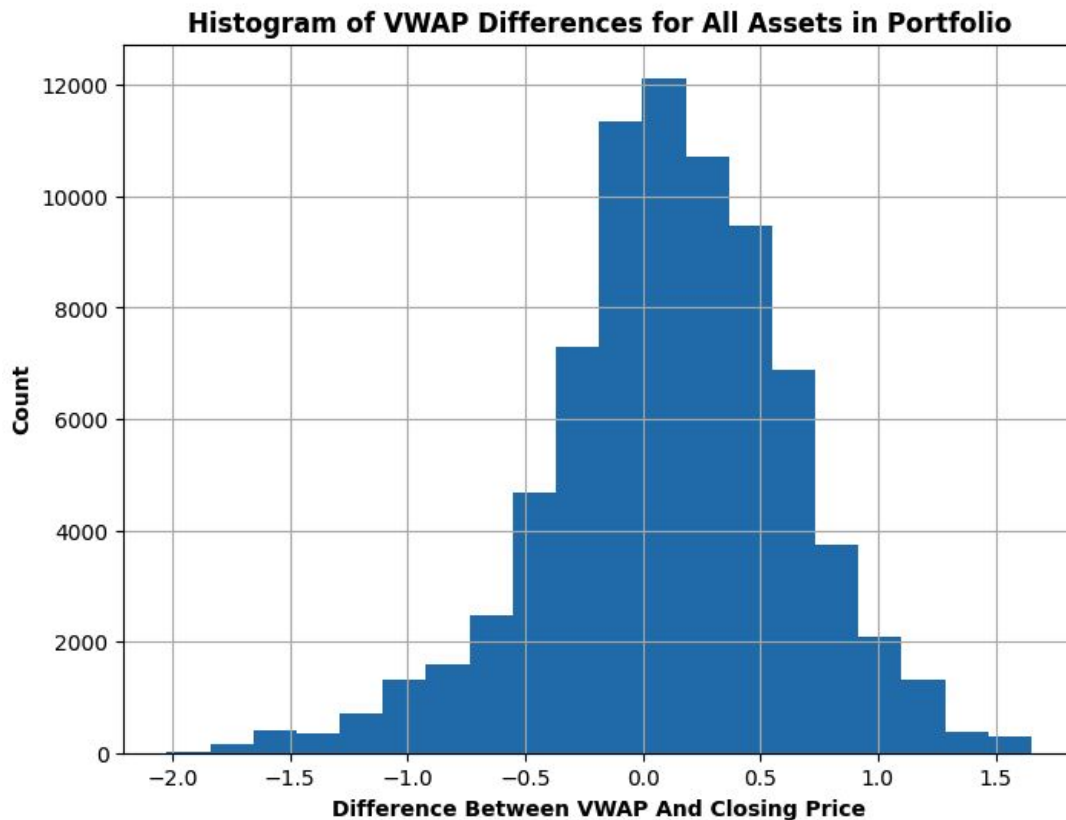
# VAR

- VAR calculated using a variance/covariance methodology.
- Concludes with 99% confidence that portfolio will not lose more than ~37% of its value over the course of a year.
- [Calculation details](#)



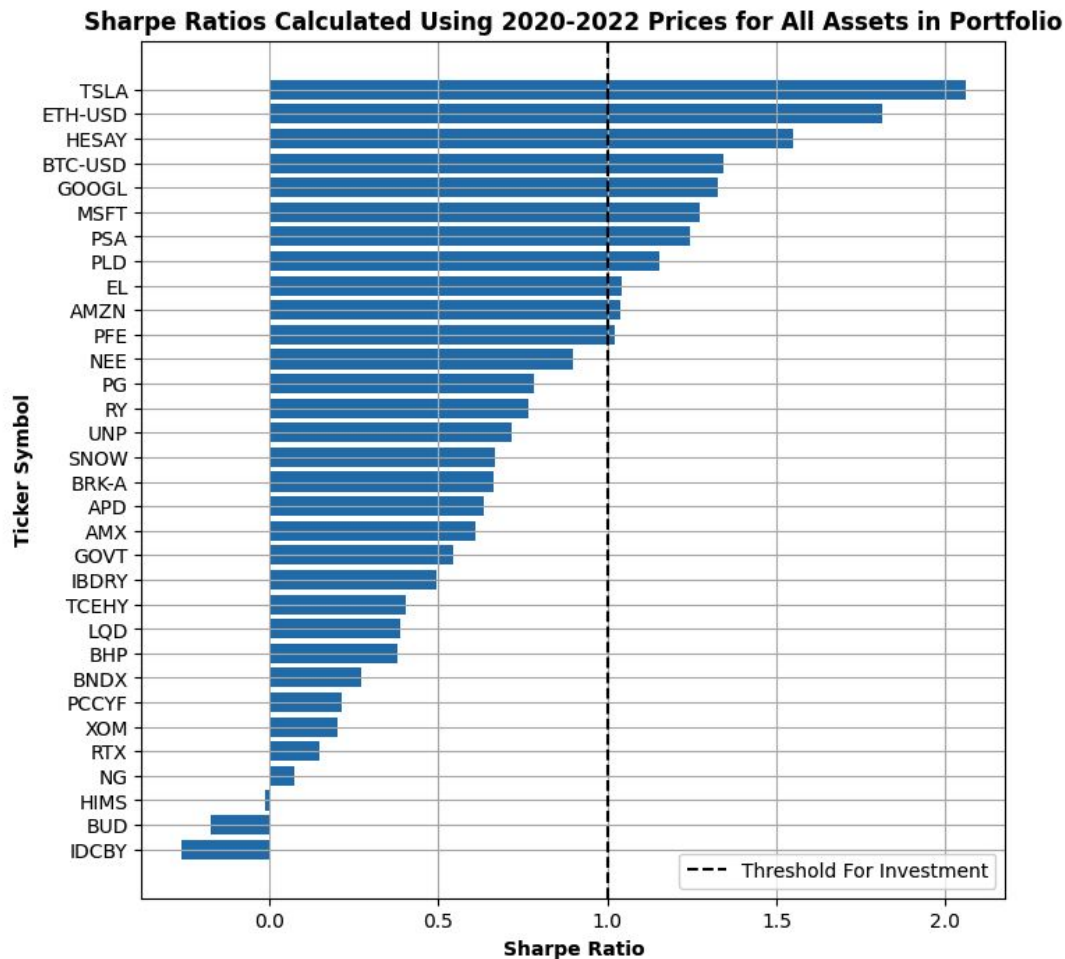
# VWAP

- Includes VWAP differences (VWAP - price) for all assets during 5m intervals of each included trading day.
- Instances when VWAP > price: 46,976
- Instances when VWAP < price: 30,400
- [Calculation details](#)



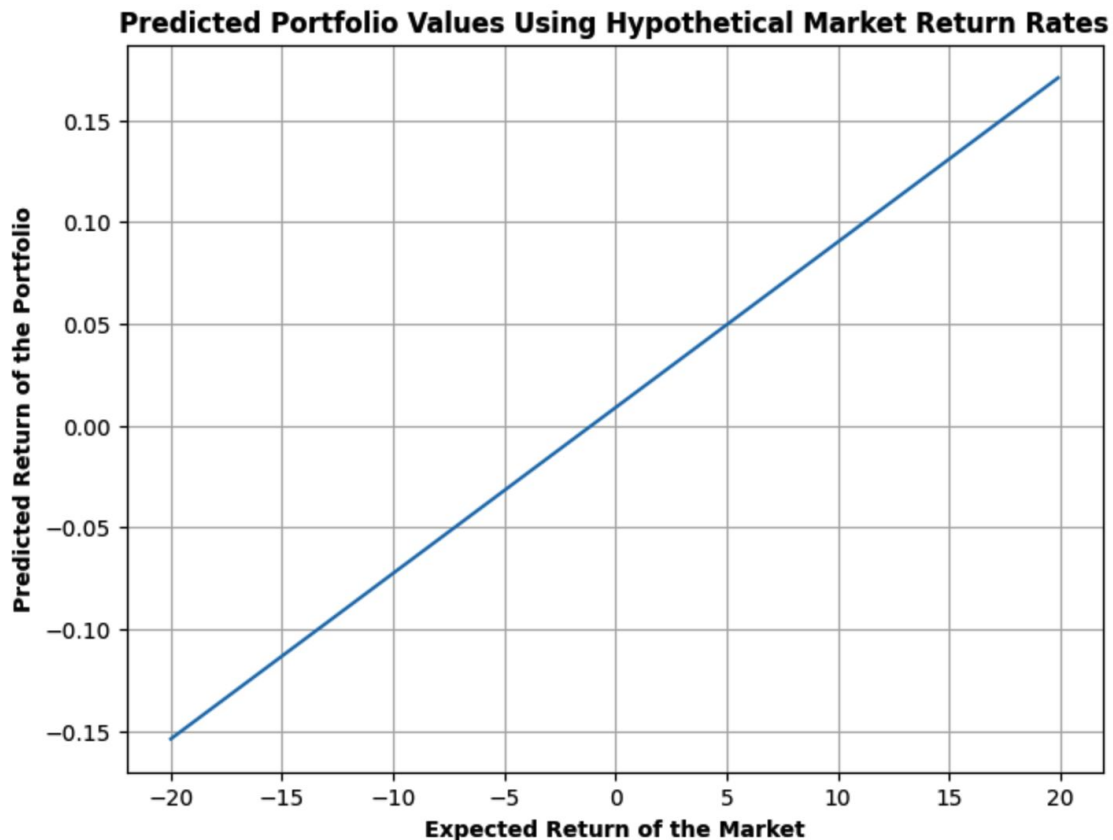
# Sharpe Ratio

- Used historical data to generate sharpe ratios for each asset.
- Sharpe ratio of portfolio as a whole: -119.45. Not useful to interpret - portfolio has lost value.
- [Calculation details](#)



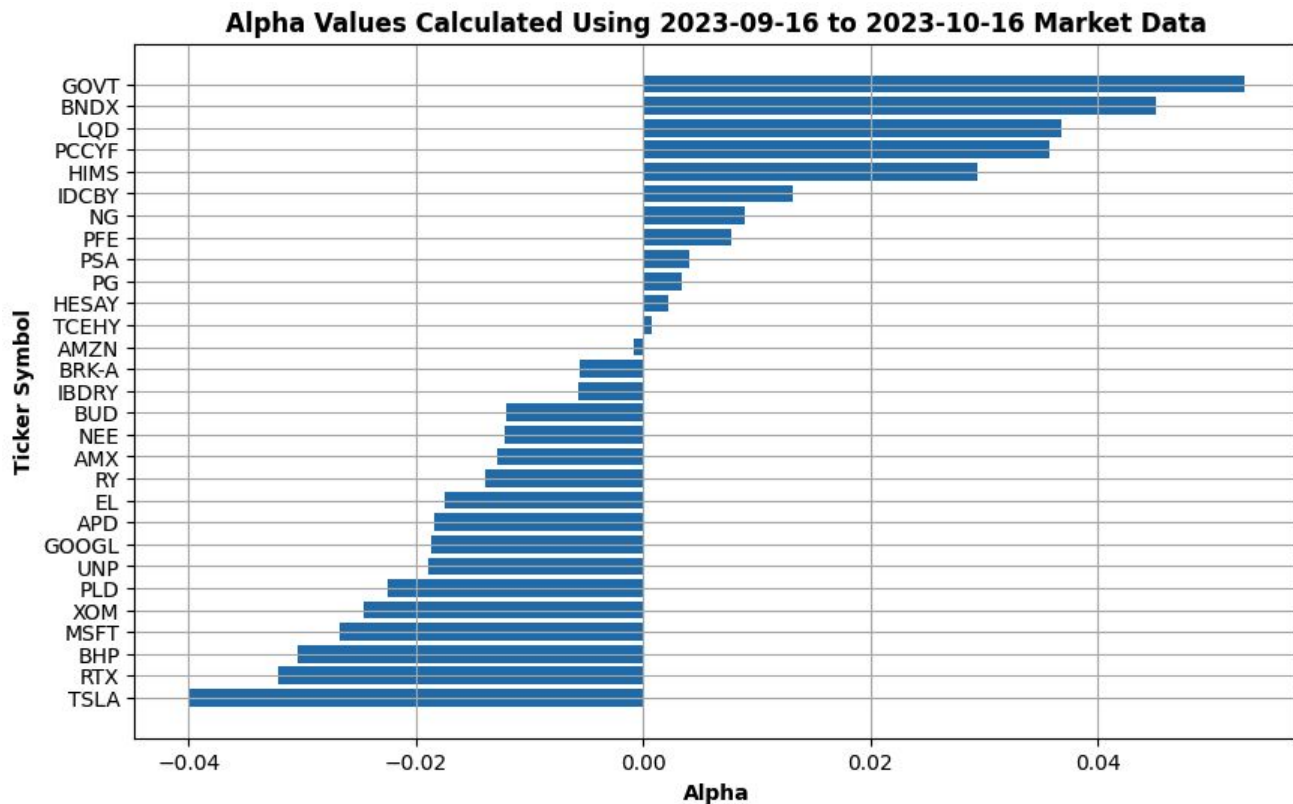
# CAPM

- Using calculated alpha values for different market (SPY) returns, predict portfolio value.
- Gains from market outpace gains from portfolio at ~5%: slope  $< 1$ .
- [Calculation details](#)



# CAPM - Alpha Values Sample

- Uses market data from when portfolio was created until current date (10/16/23).



# Conclusion



# Interpretations

- **VWAP:** likely least useful model - helpful for traders working within daily timescales.
- **Sharpe Ratio:** Not very helpful as a whole since portfolio has lost value, but helps to give an idea as to which assets are underperforming/worth dropping.
- **CAPM:** Likely least useful results. Predicts that portfolio gains will be outpaced by the market in the long term.

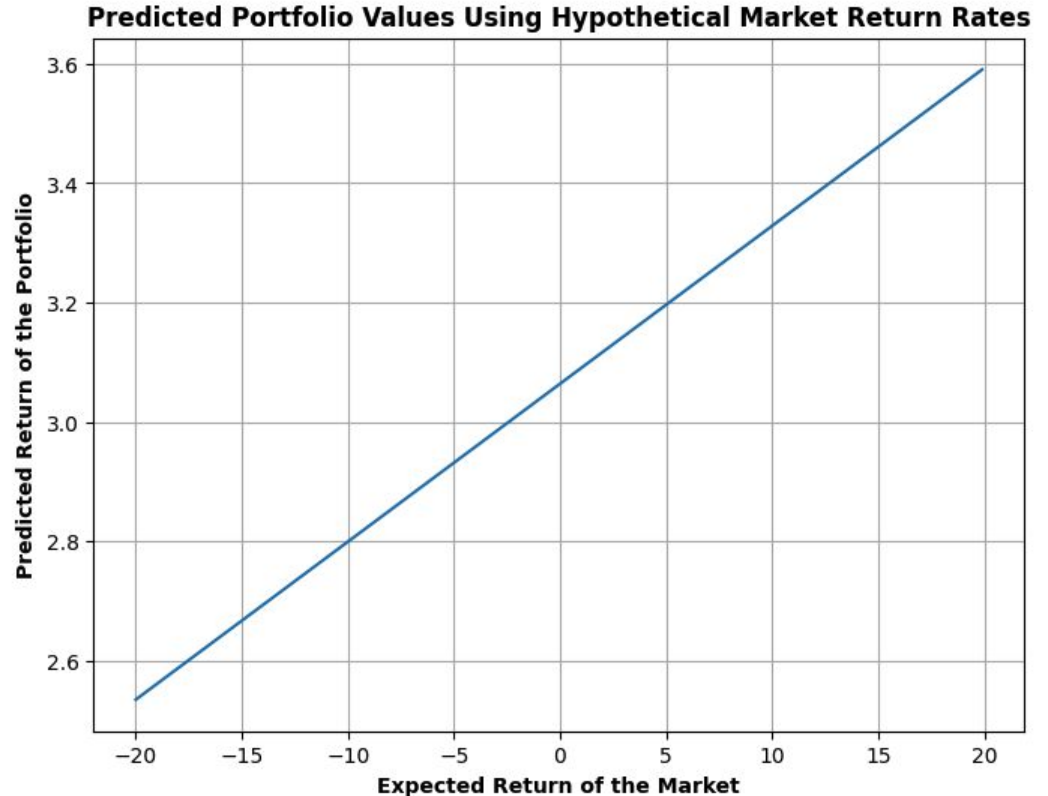


# Reallocation?

- The overall performance of the portfolio is not too much of a concern given recent global events and the performance of the market as a whole.
- Portfolio will likely pay off in the long term as the market continues to grow.
- Performance could be improved using sharpe ratio to drop selected assets - would likely increase the rate of growth.

# Reallocation?

- Uses CAPM model to predict portfolio value at different market returns, if portfolio only included those assets with Sharpe Ratios  $\geq 1$
- Much better performance, outpaces market.



# Appendix



# Appendix

- [Google sheet detailing the investment portfolio](#)
- Notebook used to get portfolio performance
- [Notebook used to calculate VAR - includes more detailed analysis](#)
- [Notebook used for pricing models \(VWAP, Sharpe Ratio, CAPM\) - includes more detailed analysis](#)