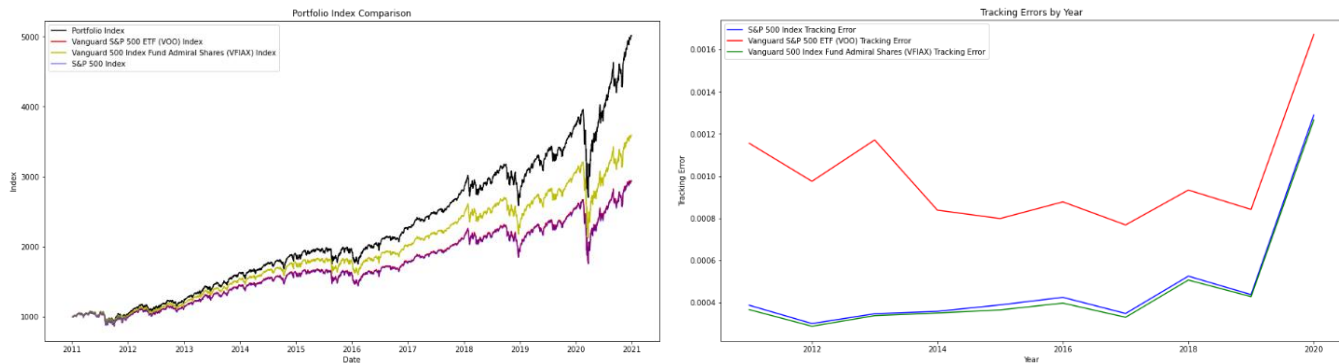


Asset Management HW 1

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Main Steps (S&P 500)

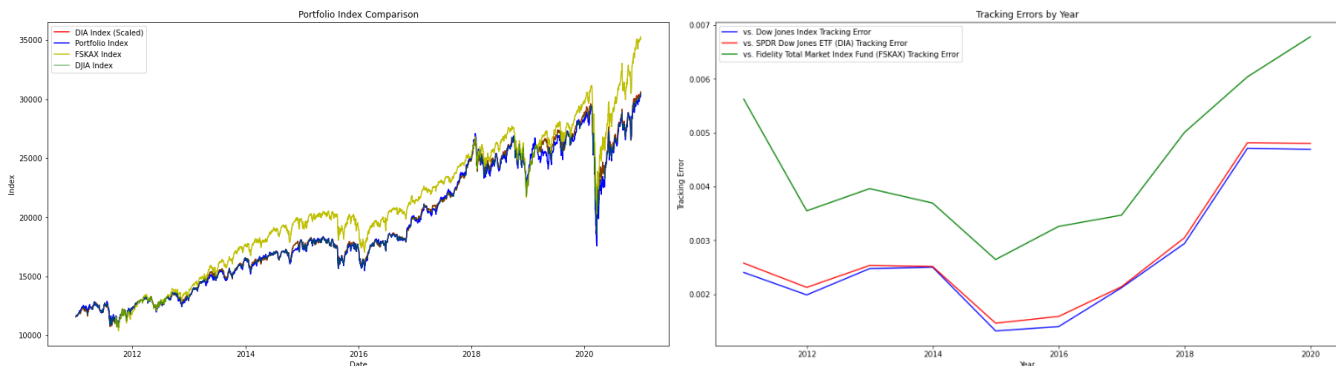
The initial stocks used in the S&P tracking portfolio included the top 500 companies based on their market capitalization. The weights invested into each stock were market cap weighted. Weights were rebalanced each quarter based on the previous quarter's market capitalization. At the end of each year, the stocks were reevaluated to reconstitute the portfolio based on the new top 500 companies.



Over 10 years, the tracking error between the Replication Portfolio and the **S&P 500 index** is **0.0554%**. The error between the portfolio and the **ETF (VOO)** is **0.1034%** and the error between the portfolio and the **mutual fund (VFIAX)** is **0.0538%**. Even though the calculated tracking error is very low, the portfolio value incrementally outperforms the S&P 500 index.

Main Steps (Dow Jones Industrial Average)

The stocks from the Dow Jones the previous year were used to create and reconstitute the portfolio. The weights invested in each stock were price weighted using a quarterly modified divisor. These weights were rebalanced quarterly. The constitution of the portfolio was adjusted at the end of the year.



The tracking error between the Replication Portfolio and the **DJIA index** is **0.2882%**. The error between the portfolio and the **ETF (DIA)** is **0.2976%** and the error between the portfolio and the **mutual fund (FSKAX)** is **0.4498%**. The calculated tracking error is again very low, and in this case the portfolio value closely replicates the DJIA index.

Assumptions

In both portfolios, each position change was made under the assumption that there are no transaction costs. There is also an assumption that we can borrow at no cost and there are no capital gains.