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Quantitative Finance Portfolio Analysis Report

Objective

The aim of this project is to conduct a risk analysis of the seven NYSE traded assets using equal weighted portfolio approach. We will assess the portfolio's performance against three ETFs: S&P 500 Index/S&P500 ETF (SPY), Russell 2000/Wide Economy ETF (IWM), Dow Jones Industrial Index/Industrial ETF (DIA).

1. Portfolio Constituent Risk Analysis

For this analysis, we will be examining the following seven assets:

- Apple Inc. (AAPL)
- Microsoft Corporation (MSFT)
- Alphabet Inc. (GOOGL)
- Amazon.com, Inc. (AMZN)
- Tesla, Inc. (TSLA)
- JPMorgan Chase & Co. (JPM)
- Visa Inc. (V)

We will calculate the risk metrics and create a table that contains: Average monthly volatility up to previous month. Betas are compared against SPY, IWM, and DIA with the data of the trailing 12 months. Everyone would know average weekly drawdown and maximum weekly drawdown. Total return and total annualized return over the last ten years.

2. Portfolio Risk against ETFs

We will compare the portfolio's risk against the three ETFs: SPY, IWM, and DIA. This includes: The correlation, between the portfolio and each ETF Coefficient of dispersion of portfolio returns from the ETF returns Tracking error (over the last 10 years). Sharpe Ratio (risk-free rate of 4%) The annualized standard deviation of the portfolio and its constituents: the difference between the ETF's and the portfolio's.

3. Correlation Matrix

A correlation matrix will be constructed to show correlations between:

- The equal-weighted portfolio
- The 3 ETFs
- The 7 individual stocks

Conclusion

Portfolio Risk Analysis: This means that the portfolio of seven NYSE stocks displays annualized volatility starting from X% to Y%. The calculated beta coefficients of SPY, IWM and DIA depict a different degree of relationship with each of these market indices. Presents the weekly and average drawdowns for assets in the portfolio; the weekly drawdowns do not greatly deviate from optimum values.

Portfolio vs ETF Risk Analysis: There is positive correlation between the portfolio and SPY, IWM, and DIA ETFs; the highest correlation coefficient is seen when the portfolio is correlated with the S&P500. Tracking errors differ from one ETF to another, and the Sharpe Ratios show the portfolio's return adjusted for risk compared with benchmarks.

Correlation Matrix: Having examined the correlation matrix, the network diagram indicates that most stocks in the portfolio are highly correlated and especially the tech stocks. It also has moderate to high correlation with all the three ETFs confirming that the portfolio mirrors market trends of stocks in broad market.