Beating Indices by developing a financial portfolio

Objective - The primary objective of this project is to develop a portfolio of top 10 shares that would provide better results compared to S&P 500 or NASDAQ in terms of long run investment.

Methodology - We hope to achieve our goal in two phases. At first, we choose top 20 shares from S&P 500 and NASDAQ combined based on their current market value. We also obtain the historical data of PE ratio, ROE for these stocks. Next we perform a time series analysis of these data to understand their trend, seasonality and cyclical behaviours. Based on the findings we fit various time series models such as ARIMA, SARIMA and GARCH to each historical data taken from 2010 to 2021. We validate our models on the left out year to date data and select best model. Depending on the forecasts we rank each shares for a particular metric and use a joint ranking approach to rank all the shares. From there we select top 10 shares. In the second phase we invest an amount of money first as a lumpsum in every stock and then in installments depending on their 'state' at each quarter/year. We create two portfolios of top 10 shares corresponding to these two types of investments depending on our return. Finally we compare these three portfolios and choose the one that would give us maximum return in the long run. The final portfolio is expected to perform better than the popular indices.

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Objective:

Develop, measure and assess the long term performance of an US equity portfolio consisting of 20 US stocks based on market capitalisation and other primary stock/corporate financial metrics (Price to Earnings Ratio (PE), Return on Investments (ROI) and Compounded Annual Growth Rate (CAGR)) against the performance of S&P 500 and Nasdaq 100 indices over a time period of five years on the hypothesis of the constructed equity portfolio producing stronger results than the relative indices during that period.

Methodology:

First phase:

1. Select the top common 20 US equity stocks from the S&P 500 and Nasdaq 100 indices based on the current market capitalisation of the stocks as well as the PE of the stocks, ROI of the respective corporate and the CAGR of the stock performances for a period of the previous ten years from the date of starting the investments from the portfolio (1/2010 - 1/2021).
2. Perform a time series analysis of the data to understand their trend, seasonality and cyclical behaviors.
3. Based on the findings, a number of time series models such as ARIMA, SARIMA and GARCH are applied to each historical data taken from 1/2010 to 1/2021. Validate the findings of the models on the left out year to date data and select the best model.
4. Based on the forecasts, rank each stock for a particular metric and apply a joint ranking approach to rank all the shares.
5. Based on the joint ranking, the top 20 stocks are selected for the portfolio investment performance experiment.

Second phase (follow on):

1. Two portfolios of the same 20 stocks each will be created.
2. Investments in each stock of the two portfolios will be made as follows so that each portfolio will have identical overall invested amounts over the five year investment period:

- Portfolio A: One time identical lump sum investment period to be made in each stock at the beginning of the investment period for a period of five years

- Portfolio B: Periodic investments of an equal fixed sum of money in each stock at the beginning of each of the five investment periods

1. The outcome of the two types of investments in the two portfolios will be measured on the following lines:

- The final market value of each stock at the end of the invested period will be measured between the two portfolios to assess which type of investment (one time lump sum versus periodic investments) is better for each stock and also for the overall portfolio construction, and management.

- Risk Adjusted Returns (RAR) of each stock and overall investment returns will be measured for each of the portfolios to assess the following:

- RAR results of each stock between the two portfolios

- Overall RAR results of the two portfolios

- Comparison between the non RAR and RAR results of each stock between the two portfolios

- Comparison between the non RAR and RAR overall result between the two portfolios

1. The S&P 500 and Nasdaq 100 index performances will also be calculated for the same five year investment period.
2. All the outcomes as per item no. 3 will be compared with the index performances.
3. The outcomes will be eventually measured and assessed based on the hypothesis that the portfolios created as per the research will perform better than the index performances over the same investment period of five years.