**Introduction:**

The portfolio was constructed based on Core –Satellite approach. Based on our risk appetite we have decided to keep 60% of investment as satellite portfolio and rest as core portfolio. For the satellite portfolio, 16 stocks were selected based on criteria which will be discussed later. After that we selected one ETF as Goldman-Sachs based on least tracking error. For historical data the timeline that we have selected was from January, 2008 till December, 2014. Out of sample period was taken as 1st January 2014 till 4th December 2014. Returns were calculated based on monthly data. Benchmark was taken as NIFTY 50.

**Stock Selection Criteria:**

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| --- |
| * ROCE>20 |
| * Net Profit>0 |
| * CFO>0 |
| * M Cap>5000 cr |
| * Profit Margin>20% |

These criteria were selected based on our risk appetite. For safe investment we took the ROCE as greater than 20 and profit margin greater than 20.

**ETF Selection:**

For our initial research, we had selected SBI, HDFC, JP Morgan, UTI, ICICI Prudential, Goldman Sachs, Kotak, Reliance and Motilal Oswal. For each fund, we calculated the least tracking error based on the Index that it announced to be the benchmark.

It was found out that Goldman Sachs had the least tracking error as 0.88 and therefore this mutual fund was selected as our core portfolio.

**MVP Method:**

For MVP method we have used the Merton’s formula to derive the weightages. Then we calculated the portfolio returns for both with short and without short weightages. Then these weightages were used to calculate out of sample performance and these were combined with core portfolio to derive the Information Ratio and Sortino Ratio.

**Black-Literman Method:**

For Black-Literman method the initial proportions were taken based on market capitalization. Then we estimated the analyst opinion for Ajanta Pharma, Crisil Ltd. and Divi Labs Ltd. The opinion confidence was taken as 90%. Based on the analyst opinion adjusted weights were calculated for without shorting. Again this calculated portfolio was combined with core portfolio to calculate Information ratio and Sortino ratio.

**Elton Gruber Method:**

For Elton Gruber method, we did not calculate projected beta based on AR(1). Rather since we were taking 2015 data as out of sample period, we simply calculated the beta based on market data. Similarly we came up with without short weightages to calculate Information and Sortino Ratio.

**Analysis:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Portfolio 1** | **Portfolio 2** | **Portfolio 3** |
| **Downside Risk** | 2.455053358 | 2.100132127 | 4.124845045 |
| **Risk Free Rate** | 0.526169428 |  |  |
| **Information Ratio** | 0.340900292 | 0.454145234 | 0.010441375 |
| **Sortino Ratio** | -0.457142165 | -0.076493556 | -0.265677576 |
| **Return** | -0.596138979 | 0.365522853 | -0.569709404 |



Based on the data it can be observed that Sortino ratio was highest for portfolio 1 (MVP portfolio) while Information ration was highest for portfolio 2(Black Literman). However, based on the overall performance of the portfolio including return, we have decided to follow MVP method and create a portfolio according to this method.