FIS REPORT

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Executive Summary

This report concerns our investment plans for investor xyz who is a moderate to aggressive risk taker and is looking to invest $50,000 in the stock market while getting continuing dividends. This report would take a look into the portfolio we have created for our client, the options chosen and the index we have considered for her. This summary expands upon our choice of stocks, the expected returns and the risks associated with each stock in our selection.

Stock Choices:

While Deciding on our stocks for our investor, we kept in mind that the investor was a moderate to high risk taker and have built a portfolio accordingly. We decided to get stocks from various different industries having low correlation with each other which and distributed our risk between the riskier and more stable stocks to have a balanced portfolio.

Based on the given parameters and the current stock market situation, we decided to go with the following stocks:

- Amazon (AMZN)
- Merck (MRK)
- Exxon Mobil (XOM)
- Procter & Gamble (PG)
- Progressive (PGR)

Index Choice:

When deciding which index to include in our portfolio, we decided to measure out the correlation of each stock we had previously included in our portfolio against all of the main stock indices and based on that, we decided to go with NASDAQ (^IXIC) as our index of choice because it had the least correlation with our stocks in terms of returns and would help us to balance out our risks.

Options Choice:

When it came to options, we decided to go for 2 options, one would be a protective put option on our most volatile stock, which is Amazon. This would be to eliminate the downside of choosing a stock as volatile as Amazon. The other option that we have would be a covered call option to generate steady income. This option would be on our most stable stock (PGR) at a strike price we deem unfeasible in the near future.

Stock Selection Criteria:

Diversification:

When selecting our stocks, we felt the need to diversify our portfolio to eliminate trends of any one industry. To do so, we carefully hand-picked the stocks from 5 major industries as follows:

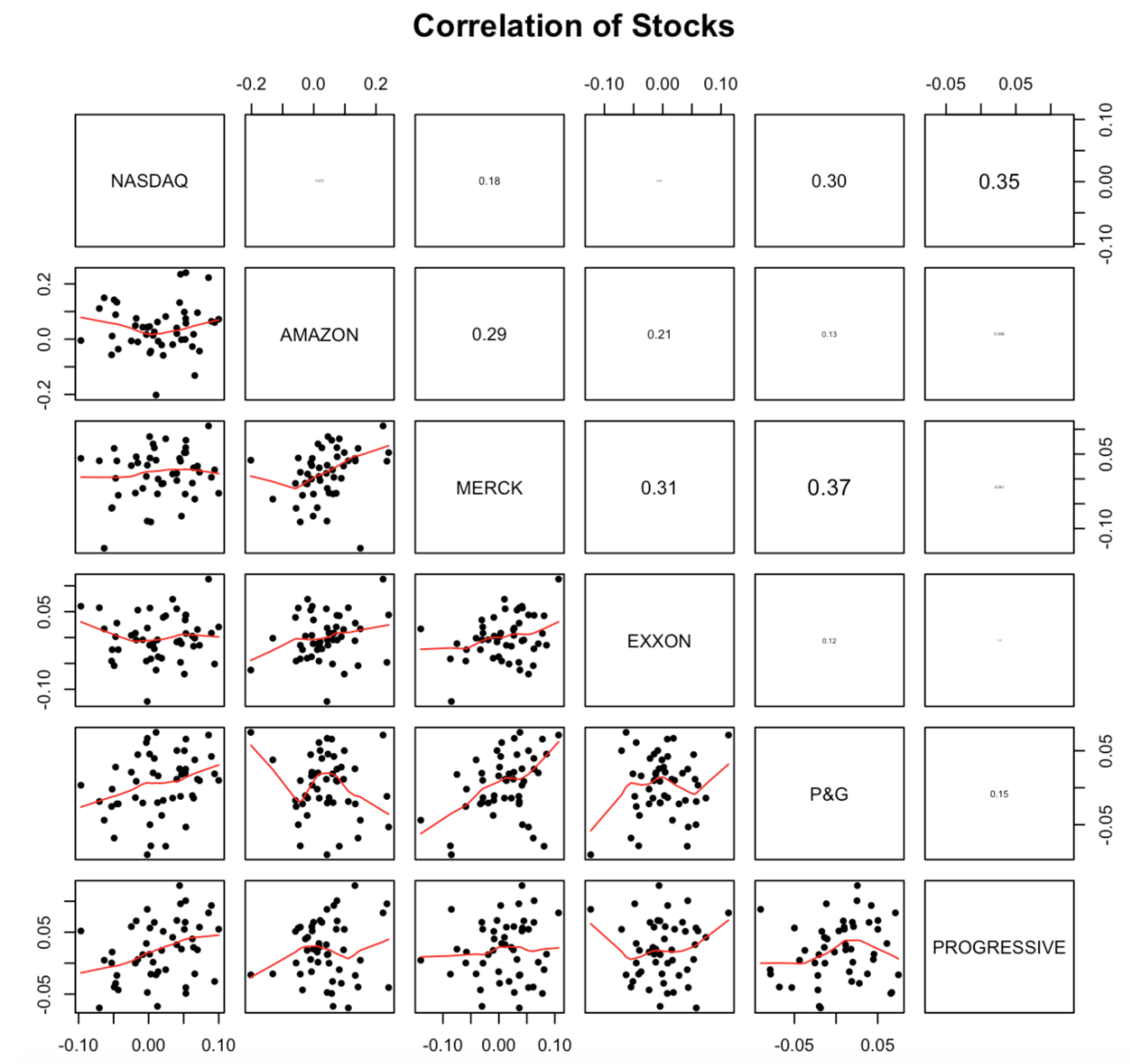
1. Amazon – Online Retail Industry:
    a. One of the largest players in the online retail industry &3rd most valuable company.
    b. Has very high risk and returns.
2. Merck – Pharmaceutical Industry:
    a. Largest pharmaceutical company in the world.
    b. 24% gain in the last year with various new acquisitions.
3. Exxon Mobil – Oil and Gas Industry:
    a. One of the largest refining operations.
    b. Has been outperforming the oil and gas industry consistently.
4. Procter & Gamble – Household Products Industry:
    a. One of the largest consumer packaged goods company.
    b. Has a very strong dividend yield.
5. Progressive – Insurance Industry:
    a. Has been getting very high profits of late.
    b. They are experimenting with increased back-end automation and marketing.

We picked stocks in each industry which had either continuously been outperforming their respective industries and had a lot of potential to grow or had been getting a relatively steady growth over the past couple of years and seemed like they would be continuing that trend.

Correlation Between Stocks:

While diversifying our stock industries was definitely of importance, we were also concerned about the correlation between the stocks that we had selected. To ensure that the returns of a stock aren't directly correlated to the others, we plotted out the correlation between all of the stocks to ensure that our stocks were independent of each other.

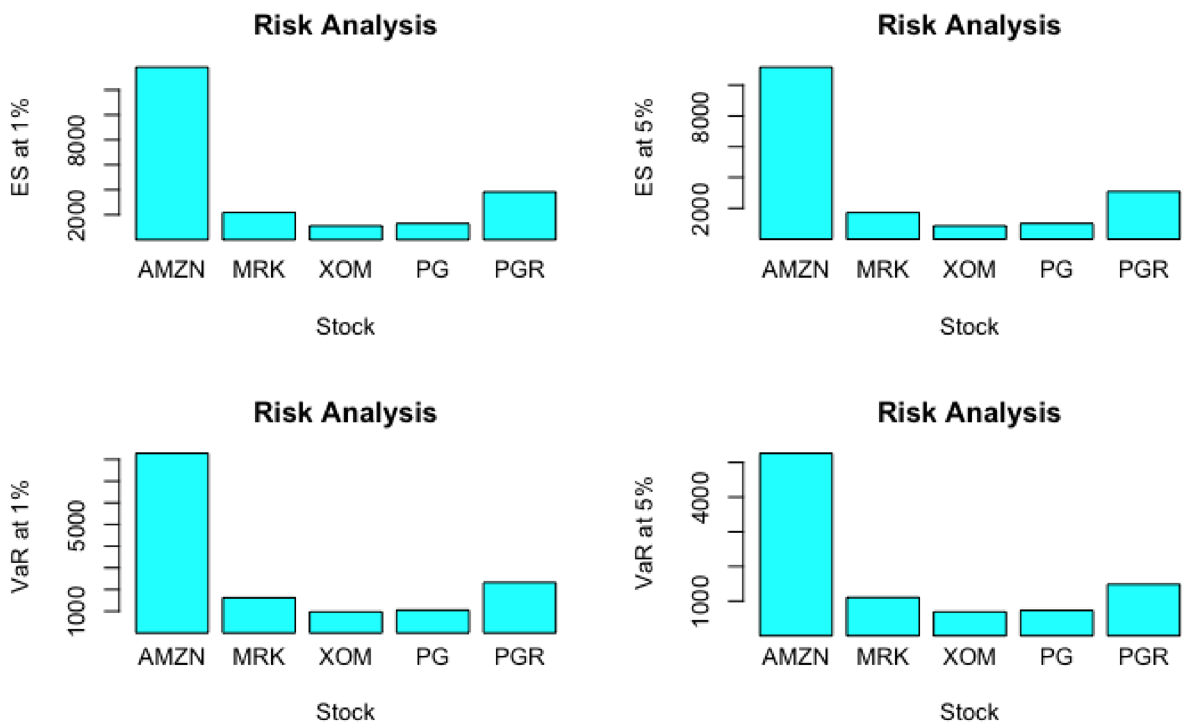
The correlation plot between our chosen stocks and index came out as follows:



As we can see, there is no significant correlation of any one stock with the other

Risks Associated with Each Stock:

Just as there are no easy things in life, similarly, each of these stocks come with a respective risk associated with each stock. To look further into all the risks associated with each of these stocks, we proceeded with the expected shortfall and gaussian VaR and plotted out the maximum loss values associated with each respective stock which are plotted as follows:



As we can see from the plots, most of our stocks have low to moderate risk except for Amazon which has the highest risk out of all our selected stocks. We have included Amazon primarily to drive up our returns.

With this portfolio, we can keep our investment relatively risk free as we are also using a protective put option on the Amazon stocks to keep our downside to a minimum.

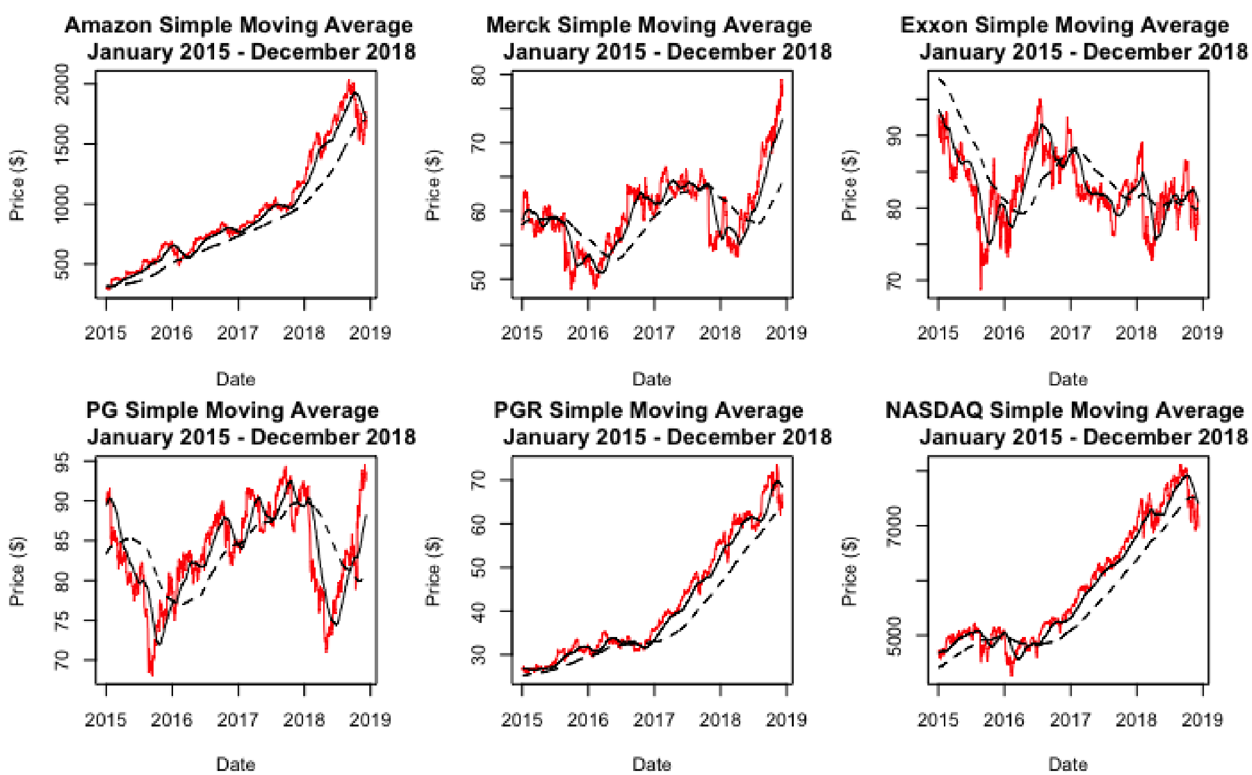
KPIs For Stocks:

While looking at all of our stocks, we wanted to look at some of the key performance indicators that are associated with each of these stocks. To this end, we look at the Simple Moving Average (SMA), Rolling Strength Index (RSI) and the Bollinger Bands for each of our stocks to see how they have been moving over the past couple months.

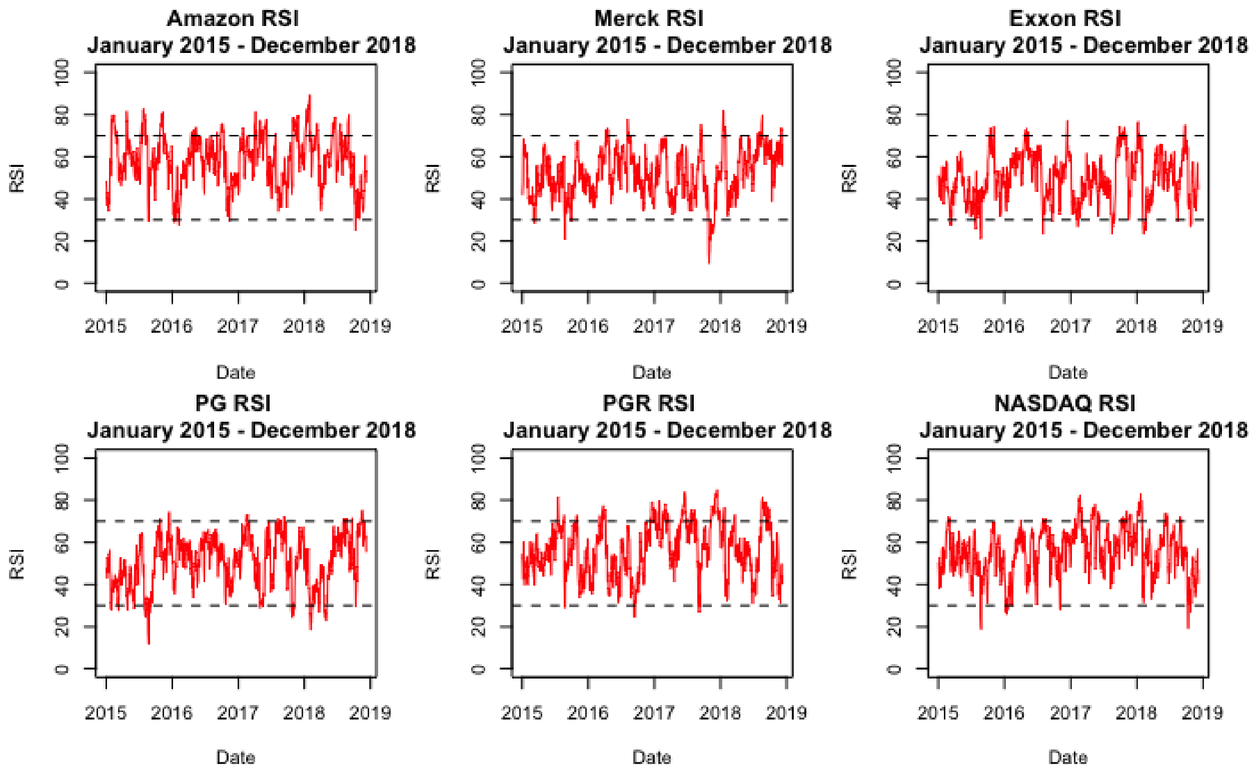
What we found based on these graphs was a positive indicator towards our stock selection and confirmed the stocks further, almost all of our stocks are in the stable zone and have been growing over the past couple of years.

All of the KPIs for the stocks are given in the images below:

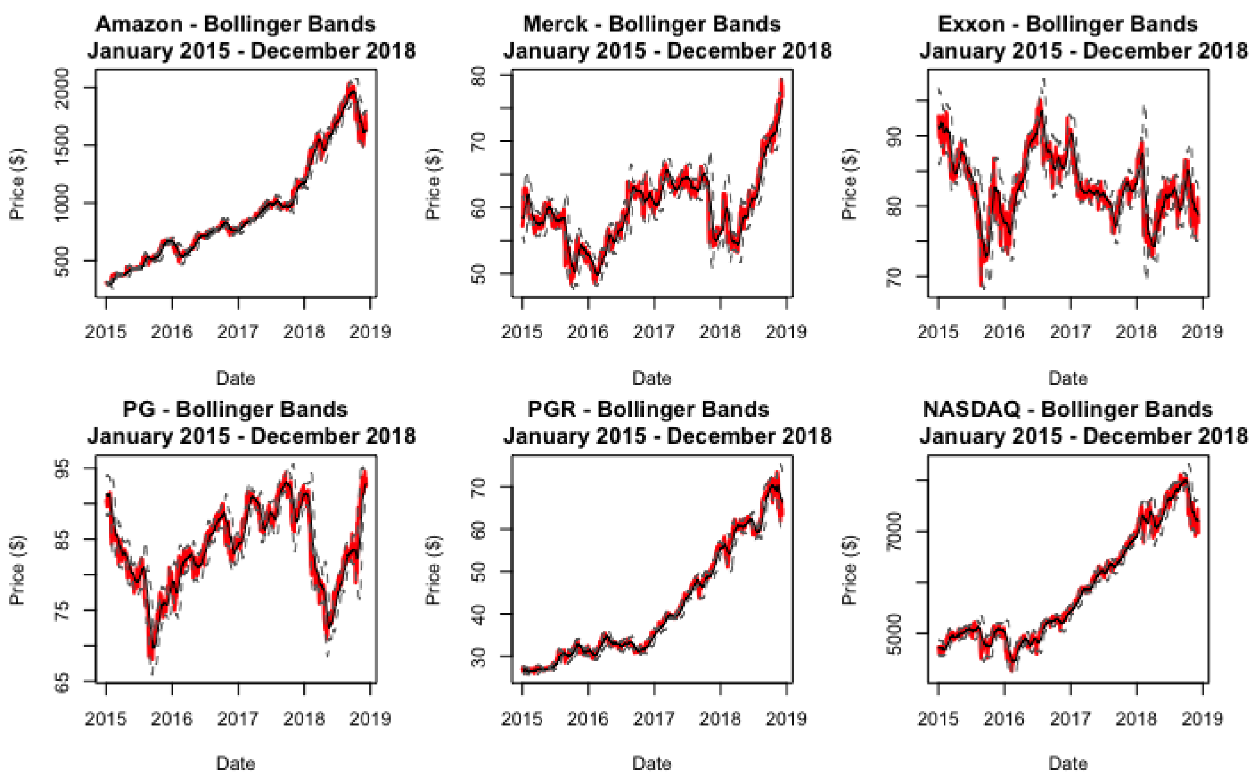
Simple Moving Average



Relative Strength Index (RSI)



Bollinger Bands



Added Benefits (Dividends):

Our client seems to be interested in generating some continuing returns with her investment and to achieve the same, we look at the dividends offered by the stocks.

The dividends offered by each stock is one of the primary criteria for the selection of our stocks and almost all the stocks in our portfolio pay out some dividends.

To visualize the dividends from each stock, we tabulate the data in the following manner:

	Amazon	Merck	Exxon	P&G	Progressive	NASDQ
Weights	14.0%	4.2%	15.5%	24.1%	27.4%	14.8%
Number of Shares	4	28	105	129	(224+5)	87
Dividend per share per month	NA	0.16	0.16	0.298	0.336	0.167
Monthly income	0	4.48$	16.8$	38.4$	76.94$	14.5$

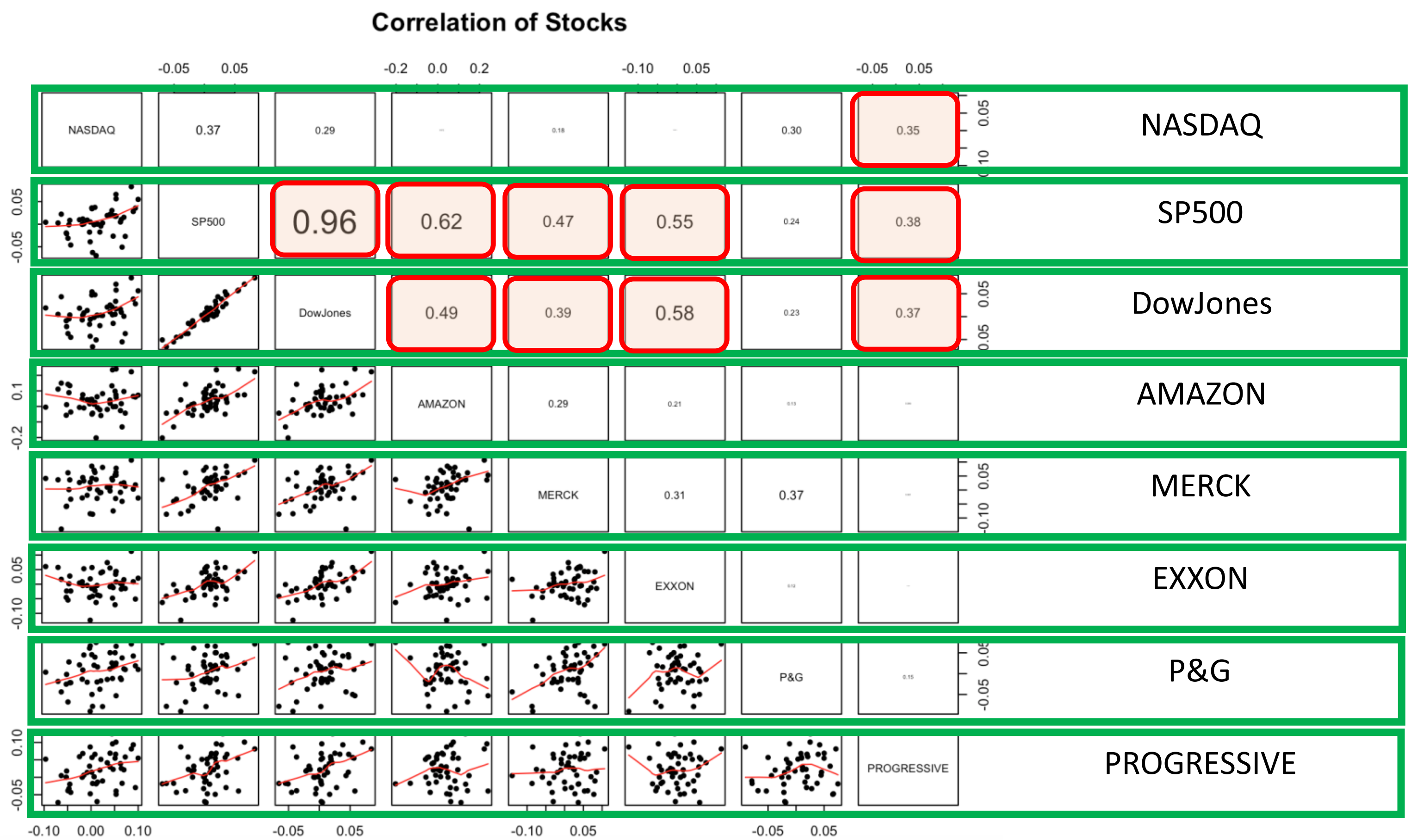
As we can see from the table above, we are able to generate maximum dividends from Progressive, which is a prime reason why we chose to buy 5 extra shares of the same when we had around $300 unused so that we could increase our dividends.

Bases on all of the dividends from our stocks, we observe that we achieve a monthly dividend of $151.12 on average. This is part of the daily expenditure that our client wanted and combined with the other sources of generating daily income, she should be able to manage her daily activities based on the same.

Index Choice

While looking at the possible indexes that we could go with to include in our portfolio, we were primarily considering the three most well-known indexes. Namely, we were considering SP500, NASDAQ and Dow Jones.

To help us choose between the three indexes, we plotted a correlation matrix between the returns of all of the indexes under consideration and the stocks we were considering for our portfolio. Based on this we would be able to choose the index with the least correlation to our portfolio in aims of stabilizing our portfolio.



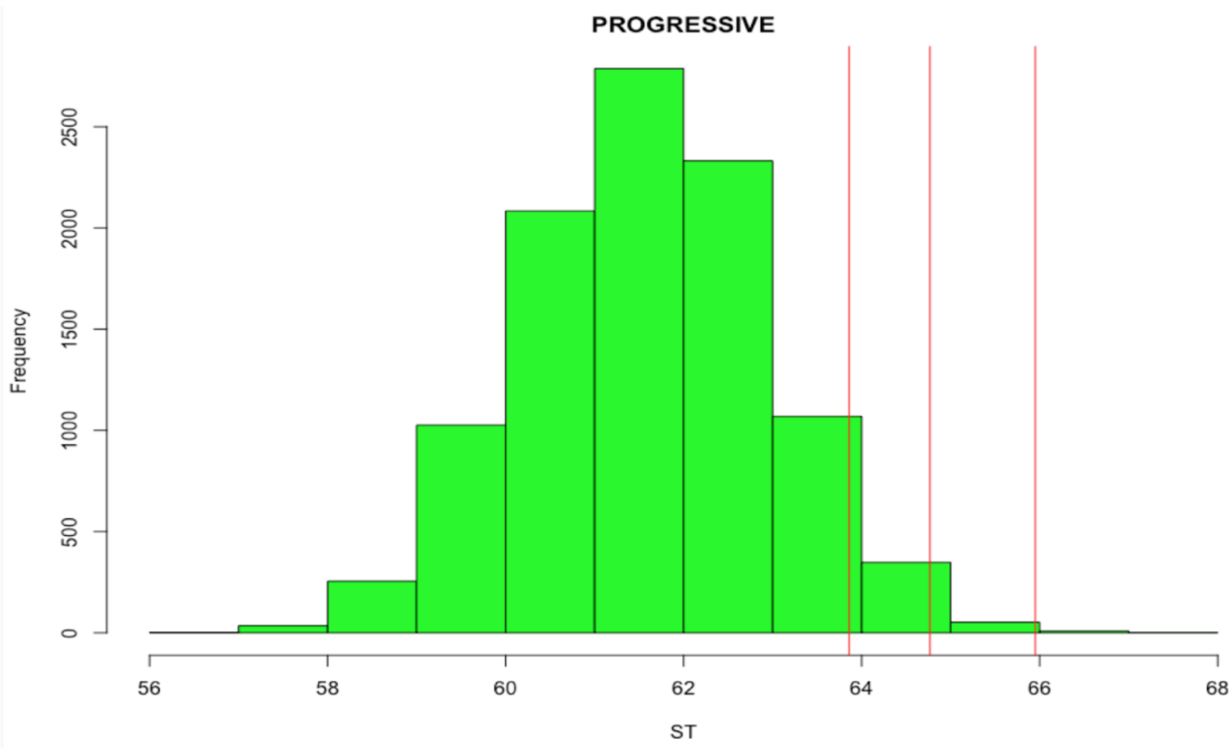
As we can see from the matrix, SP500 and DowJones would have been bad candidates for the index as the correlation between them and some of the stocks is pretty high. Also, NASDAQ is relatively a more stable index than the other two, so we chose to go ahead with NASDAQ as our index.

Options

When it comes to protecting our investments and generating income, we opt for two different kinds of options to achieve both goals. The first option is a covered call to generate regular income from Progressive while the second option is a protective put to protect us against the market volatility of Amazon.

Covered Call:

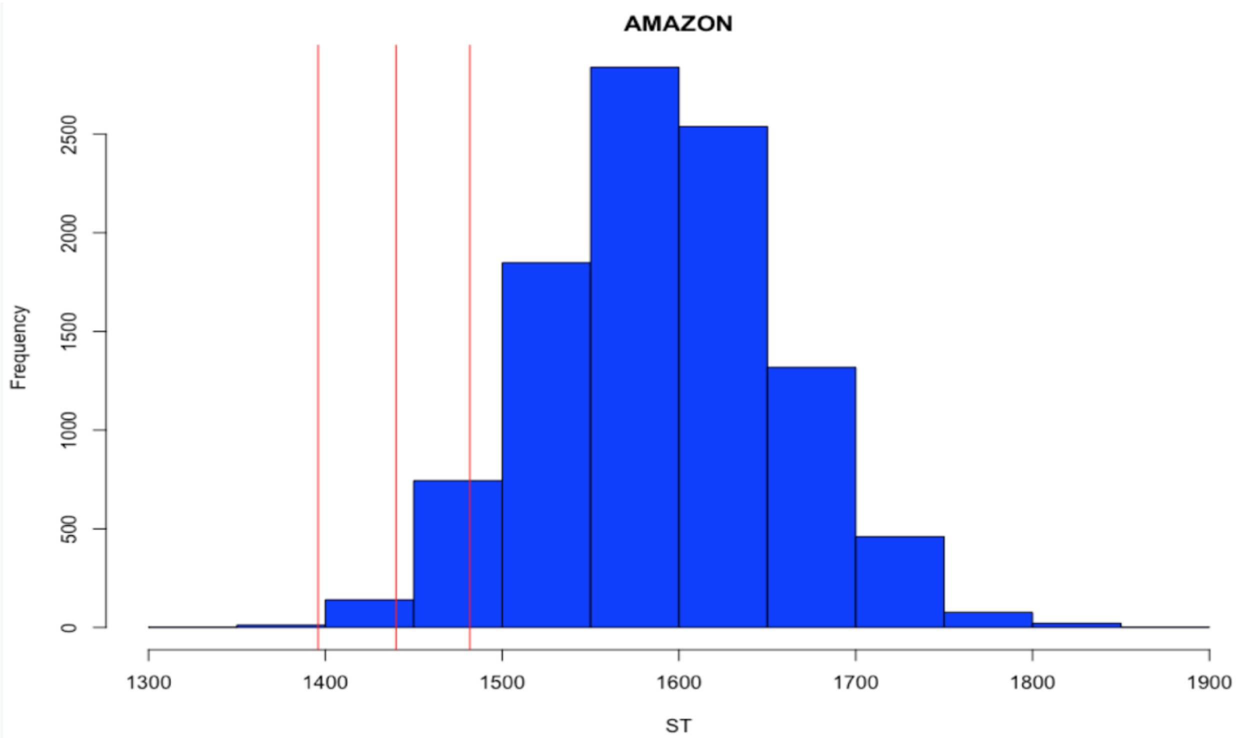
We are aiming to generate consistent income by offering a covered call on our stocks for our least volatile stock which is Progressive. We ran 100,000 simulations to come up with expected value of the Progressive stock in the next 2 months which is as follows:



As we can see from the following graph, the expected values of the Progressive stock have a 99.99% probability of having a value lesser that 67 dollars. So, we use this value as our covered call value and set a covered call at $67 with the call value at 1.55. Using this call, we would be able to generate $354.95 for this quarter.

Protective Put:

With a protective put, we are aiming to minimize the downside associated with our most volatile stock which is Amazon. First, we plot out the most expected values for Amazon in the next 3 months which is done using 100,000 Monte Carlo simulations as follows:



As we can see, there is a potential for the price going below $1395, as we do not want our Amazon stock prices to go lower than this, we place a protective put on the stock at the strike price of $1395 for a premium of $86.9 for the 4 shares that we are buying from Amazon.

Based on these prices, we are spending a total of $347.6 on protecting our potential downside from the Amazon stocks.

Portfolio Weights:

Stock & Index Weights, Number of Shares & Investment Strategy:

Once we finalize our stocks, Index and options we then look to find the optimal portfolio that gives us a projected average return of the mean return from each stock. We use the optimization function to generate the portfolio which would give us a return that averages out to 1.47% per month.

Looking at the weights, number of shares and amount invested for each of the stocks in our portfolio, we come up with the following table.

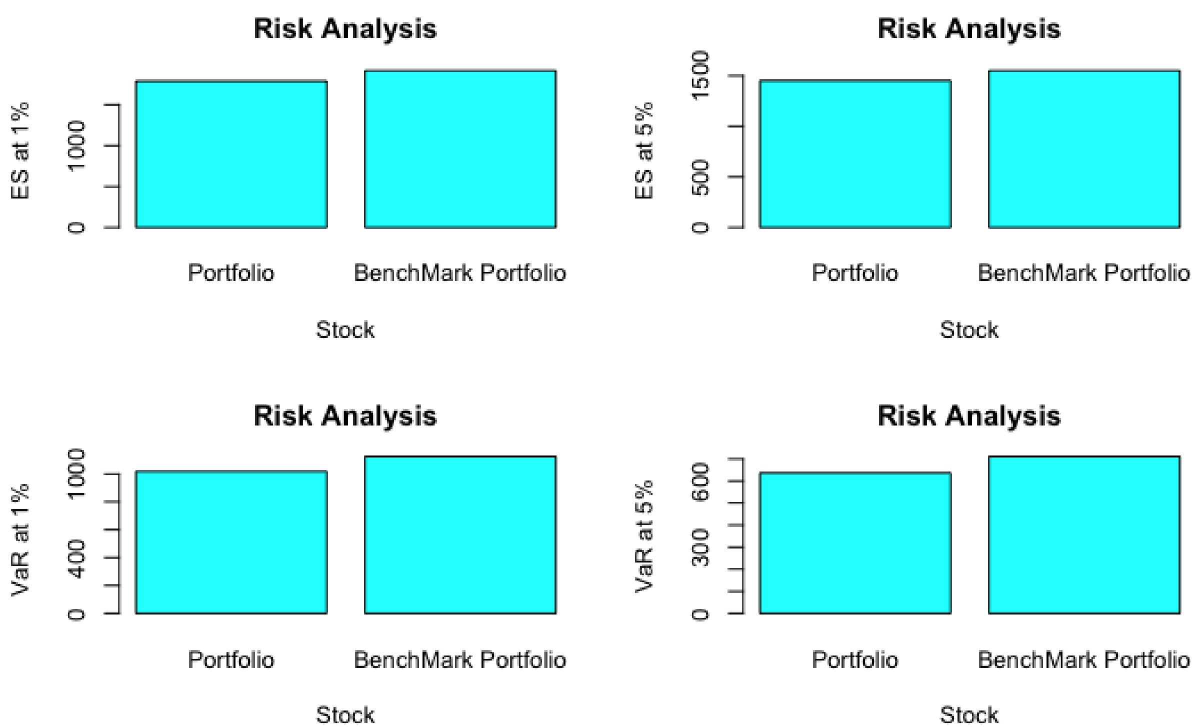
	Amazon	Merck	Exxon	P&G	Progressive	NASDQ
Weights	14.0%	4.2%	15.5%	24.1%	27.4%	14.8%
Number of Shares	4	28	105	129	(224+5)	87
Amount Invested	$6,324	$2,103	$7,762	$12,006	$13,670+$305.15	$7,427

As we can see from the table, we are spending a total of $49,597.15 on our stocks and index which are weighed out as shown in the table. The portfolio has been optimized based on portfolio.optim function and should give us a return of 1.47% or $730 per month just based on the fluctuations on the stock prices.

Maximum Expected Loss

Value at Risk & Expected Shortfall Models:

To figure out the maximum loss that our portfolio could get, we run the Value at Risk and Expected shortfall models in comparison to our benchmark portfolio which is the SP500 stock index. The results of the same are as follows:

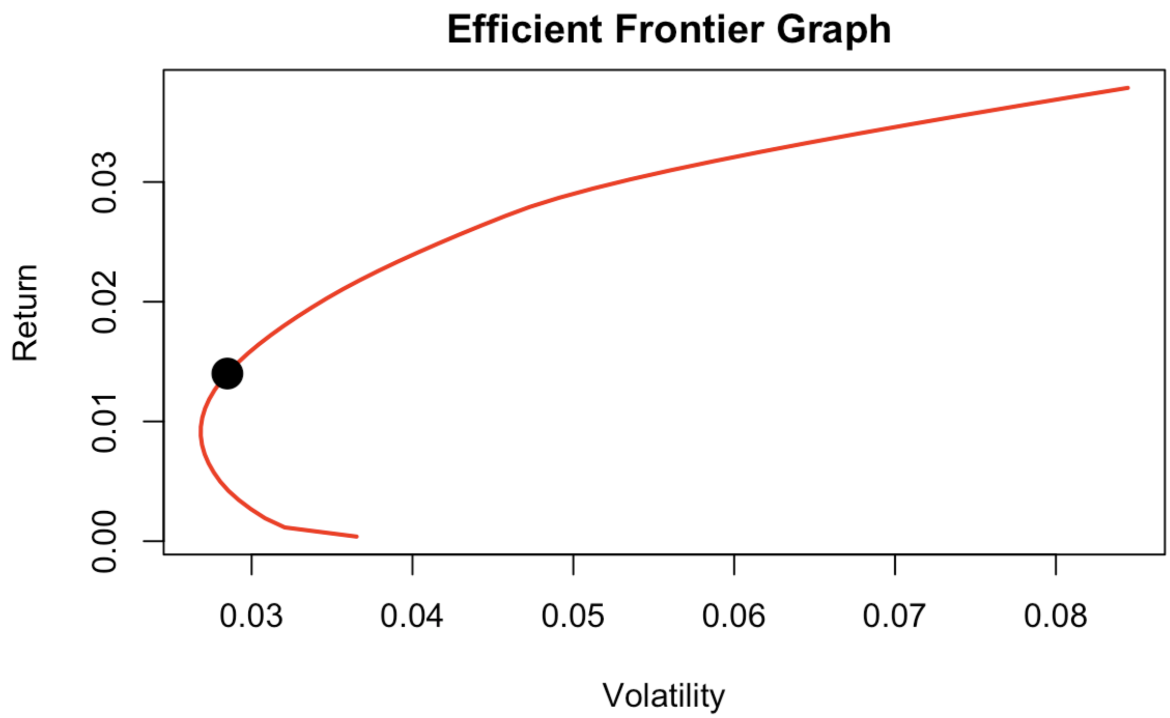


As we can see, our risk is lesser than the market risk, which assures us about our decision to be a moderate risk taker.

Projected Portfolio Returns

CAPM Model:

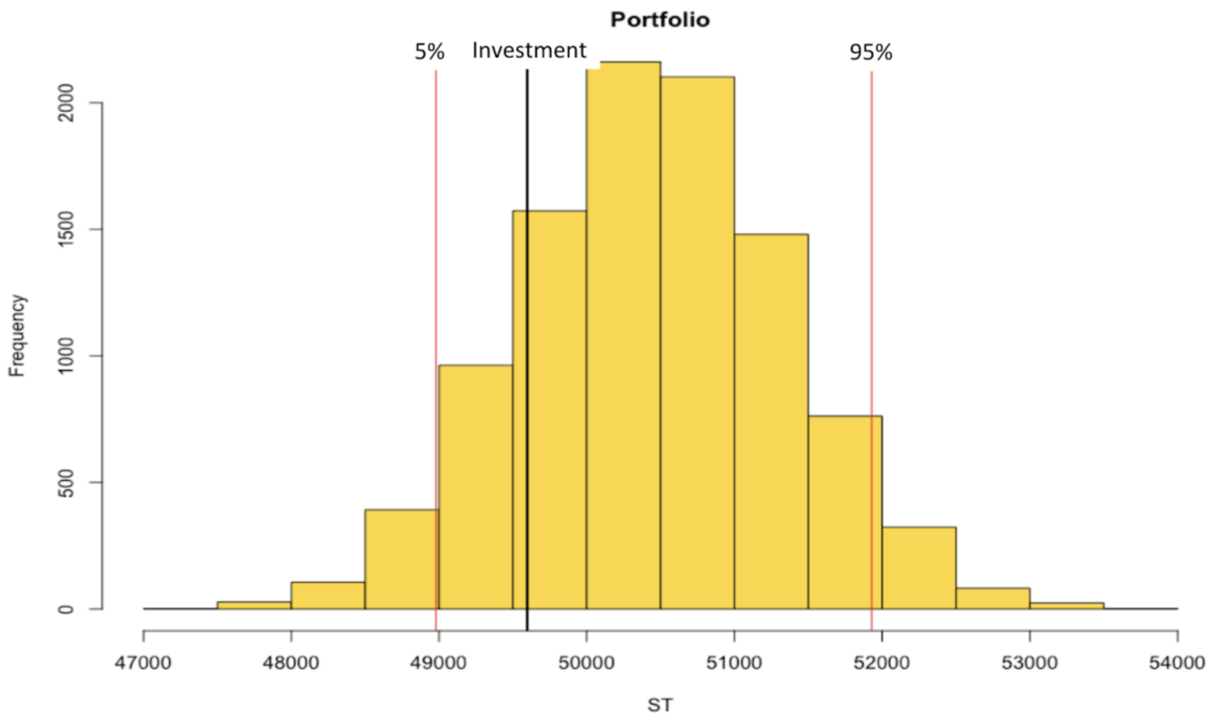
In order to see the projected portfolio returns, we first had to identify the target return percentage. To do so, we ran the CAPM model to simulate the risk v/s return and we obtain the following graph:



Looking at the graph, we are looking to go with a moderate risk of getting 1.47% monthly return on our investment. To further look into this, we also run Monte Carlo Simulations to visualize the potential 3 month returns.

Monte Carlo Simulation:

Based on this value, we have run Monte Carlo simulations on the portfolio to come up with the expected returns and we obtain the following distribution:



We can see that most of the scenarios have us coming up with a profit with rare cases of us getting a loss.

Total Returns:

So now, we have calculated all of our expenditures and returns, and we come up with the following returns in the next 3 months:

- Portfolio return is 1.4% monthly i.e. 4.2% quarterly (On Average) which comes out to be $2083
- Return from Dividends is $453.36 for the quarter
- Returns from our covered call is $354.95
- Our Expenditure on our protective put is $347

Based on all of these Factors, our estimated return on an investment of $50,000 comes out to be $52,488 in 3 months which is a return of approximately 5%