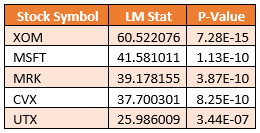
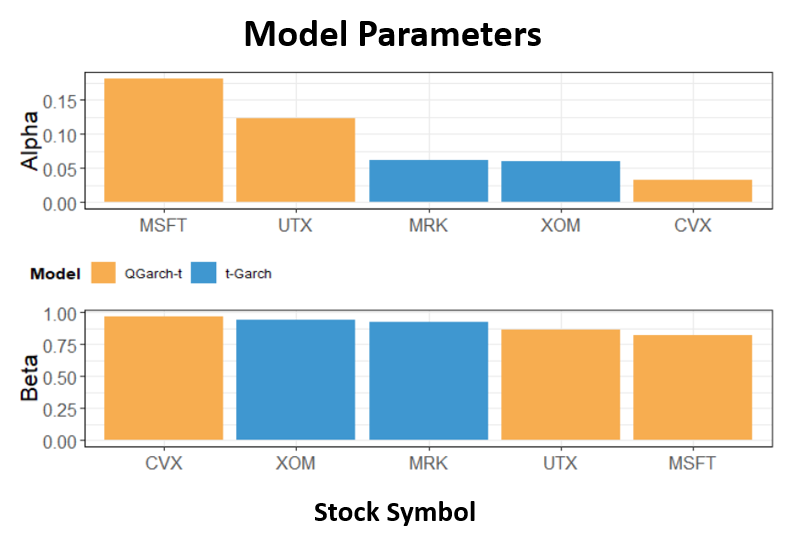
The five stocks with the most predictable volatility are shown in figure 1. Also shown in the table is the resulting p-value and LM test statistic from testing the ARCH effects of stock returns.

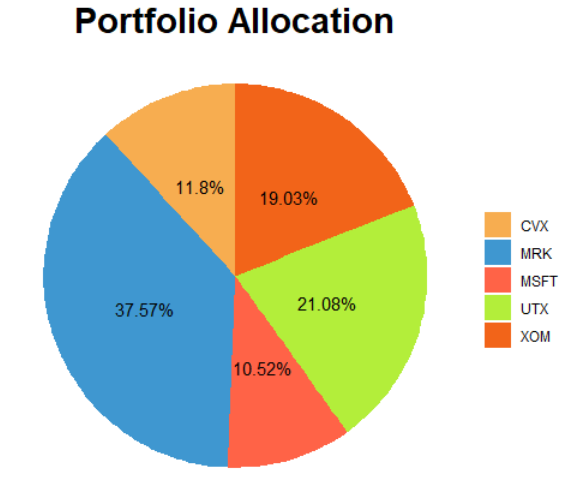


The parameters of the best volatility model for each stock based on lowest AIC value is shown in figure 2.

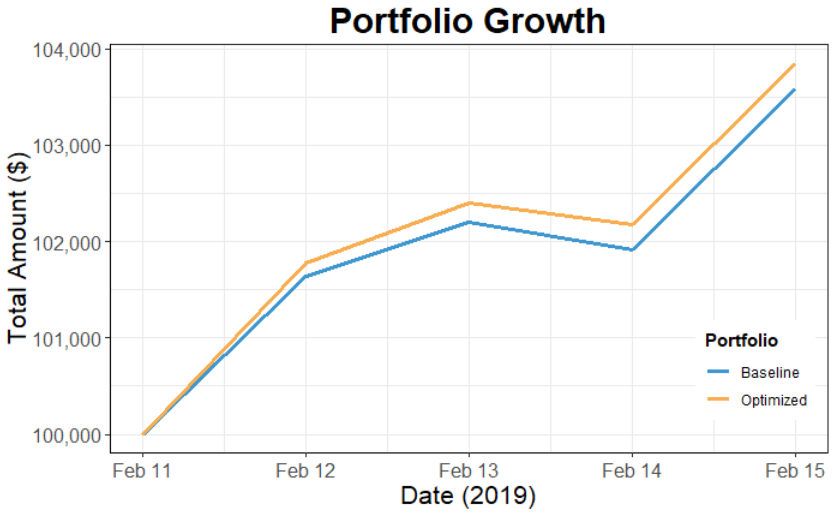


In figure 2 the stocks are ranked and ordered by most likely to be bothered by a shock in the market today in the Alpha plot and ordered by longest effect in price volatility from market events in the Beta plot. For example, Microsoft stock is the most sensitive to market events because it has the highest alpha but it’s effect from market events takes the shortest amount of time to dissipate because it has the lowest beta. The two rankings are inversely related. The stocks that are the most sensitive to market events have the shortest reaction to market events.

The allocation of stocks in an optimized portfolio that minimizes risk while having a return of at least 0.05% is shown in figure 3 below. The expected return is 0.067% and the expected risk is 0.0095 (standard deviation)



For illustrative purposes, figure 4 shows how the value of the optimized portfolio would grow over a five-day period compared to a baseline portfolio that allocated an equal amount of funds in each stock. It’s assumed that the portfolio starts with $100k, stocks are purchased at the closing price on 2/11/19 and purchase of partial shares is possible.  The optimized portfolio would have gained $3,850.1 (3.85% gain) over the five-day period compared to just $3,579 (3.58% gain) for the baseline portfolio.



The tradeoff between the optimal risk and return (efficient frontier) is illustrated in figure 5 below. It shows that as returns increase the minimal risk increases. A portfolio’s return that lies below the orange line would be suboptimal because it wouldn’t provide enough return for the level of risk.

