



ANLY 515-50-B-2021 Instructor:

Dr. Martin A. Negron

Final Project Proposal

By:

Sougandh Kohli

Saurav Mawandia

Introduction

Where to invest money?? Is investing in financial institutions still risky?? Are tech stocks the new “it” stocks??

These are some of the questions we have attempted to answer in this paper. We will be analyzing industries to see which has a better performance, stocks to determine which has a higher average return and lower volatility before, during the Pandemic, for us to build an optimized portfolio.

Table of Content

- Executive Summary.....3
- Project Summary.....3
- Project Plan.....3-4

Executive summary

Through this paper, we are attempting to look at the performance of our portfolio before, during and after the credit crisis, comprising of six stocks across three industries.

We have picked a diversified set of industries namely, **Financial Institutions** that saw the biggest fall in decades during the crisis, **Utilities** which are long term players and can be looked as value stocks rather than growth stocks and finally **Tech** which has seen a big boom because of the remote working setup.

We will be analyzing the performance using various tools and models learned in the class to create an optimized portfolio by maximizing return and minimizing the risk.

Project Background

The project will be based on real stock performance. In this project, we will be looking into two stocks in three sectors in the span of five years.

Financial Services - JP Morgan (JPM), Goldman Sachs (GS) -

Utilities- DTE energy co(DTE) and AES corp.(AES)

Tech: Amazon(AMZN) and Apple(AAPL)

are the stocks we will be looking into in this paper. We will be analyzing the data in the span of five years starting from May 01, 2006 – July 01, 2012. We will be importing this data from Yahoo finance.

Project Plan

The project plan needs to be more specific in terms of the tools that you plan to use, how you plan to use them and the questions that you plan to answer, make sure you include modeling, simulation and optimization

1. **Merging Data:** We will start by merging the data for the 6 stocks that we are going to analyze.
2. **Data Cleaning:** We will cleanse our data by removing any missing values and formatting the dates as a factor variable.
3. **Plots:** We will then use various descriptive plots such as Bollinger plots and candlestick charts to compare the performance of the stocks, industry and the overall portfolio during our selected observation window.
 - a. Value of \$1 investment in performance window for each stock
 - b. Calculate gross returns and log returns and plot showing the difference

4. **Portfolio return:** We will compare the weights for our portfolio to optimize our return (equally vs value weighted). Then, using past performance, we will attempt to predict the financial performance of our stocks and our portfolio.
5. **Value at Risk:** Calculate variance and average return for each stock and then the portfolio in the performance window
 - a. We will calculate Var of the portfolio at 1% and 5%
 - b. We will Plot PnL density and Var for the historical data
 - c. We will then calculate the expected shortfall, which is a better measure of expected losses.
6. **Fit Model - GHT, HYP, NIG (Probability distribution)** . We will evaluate our prediction using above model and find the best model for our use-case by plotting Q-Q plot and distributions chart.
7. **Simulation:** We will use GARCH model to forecast the volatility of our stocks post performance period.
8. **Optimization:** We will use Markovitz Garch optimization optimize the results.
9. And finally, with all this information we will make an informed decision regarding which stock and industry has the best performance amongst the selected ones.