App Write Up

SYE 489 with Dr. Higham

Liam Reiner

Purpose:

* The purpose behind this Shiny App is how to properly teach young retail investors on how to properly structure a portfolio of equities for favorable returns over time.
  + One issue many retail investors face when investing is that they do not know how to invest properly for long term growth.
  + Even though it is easier to invest in an ETF that mimics the S&P 500, a stock market index tracking the performance of 500 large companies listed on stock exchanges in the United States, which will return 14% annually, it is better for young investors to learn how to diversify their portfolio to receive favorable yet risk adverse returns.
* By educating young investors, this will allow for a more financially literate generation.
  + One thing I have seen out of these types of investors is that they are only investing in “hot stocks”, companies who are being published in the news consistently, and stocks that they read on Reddit
    - Although individuals may have good reason to invest in these companies, the issue that I see is that individuals are not doing their research on the companies, and these companies may have terrible P/E ratios or are over-valued.
* By creating this app, I hope to show young investors that they too can earn money by doing their research and minimizing their risk at the same time.
  + This app will not utilize how trading options will affect a portfolio because this is a very advanced form of investing that retail investors will not understanding, and it is very dangerous for individuals who do not understand how they work.

Structure of the App:

* Input of the Ticker Symbol
  + Must be listed as the ticker symbol on whatever stock exchange the company is listed
    - Since the data is being scraped from Yahoo Finance, this means you can look at any equity on any stock exchange such as:
      * TSX/TSX-V
      * Nasdaq
      * NYSE
      * LSE Mainboard
      * Tel Aviv SX
      * Etc.
  + Function to add more ticker symbols
    - Will serve as an addition button, hopefully, to add in these symbols
* Function to add different types of investing tools/parameters such as:
  + Bollinger Bands
    - Bollinger Bands are a type of statistical chart characterizing the prices and volatility over time of a financial instrument or commodity, using a formulaic method.
    - Financial traders employ these charts as a methodical tool to inform trading decisions, control automated trading systems, or as a component of technical analysis.
  + Double Exponential Smoothing
    - Double exponential smoothing employs a level component and a trend component at each period.
    - Double exponential smoothing uses two weights, (also called smoothing parameters), to update the components at each period.
      * Optimal ARIMA weights
        + Autoregressive Integrated Moving Average (ARIMA) purpose:  an ARIMA model might seek to predict a stock's future prices based on its past performance or forecast a company's earnings based on past periods.
      * Specified weights
        + Fits a linear regression model to time series data (y variable) versus time (x variable).
        + The constant from this regression is the initial estimate of the level component, the slope coefficient is the initial estimate of the trend component.
  + Smoother
    - This a statistical approach of eliminating outliers from datasets to make the patterns more noticeable.
    - The use of data smoothing can help forecast patterns, such as those seen in share prices.

Execution:

* Left Panel:
  + Will have the ticker symbol input.
    - The panel will be able to add more ticker symbols as your “portfolio” increases.
      * Maybe figure out how to weight each stock differently in the portfolio.
  + Panel will have checkboxes to apply functions such as the following:
    - Bollinger bands
    - Double Exponential Moving Average
    - Smoother
  + Panel will have something for the days required for the double exponential moving average function.
* Graphic Panel:
  + This panel will show how your portfolio would have historically done as well as how your portfolio will do in the future.
  + This may help to forecast future values to determine the value of your portfolio, or give you a good idea when to buy or sell certain stocks.
    - Under the graphic will be a display of the value of the portfolio as well as a display of the Sharpe Ratio.
      * The ratio describes how much excess return you receive for the extra volatility you endure for holding a riskier asset.
      * You need compensation for the additional risk you take for not holding a risk-free asset.