**STOCK PRICE ANALYSIS**

**ABOUT THE DATA**

-> Data is retrieved from NASDAQ website for few firms containing stock prices for last 5 years

-> Initial data had 6 columns 'date', 'open', 'high', 'low', 'close' and 'volume of stocks'

-> A new column 'Name' was added to keep track of firm names on row level making it 7 columns in total.

-> The datatypes are 'date’: object

'open’: float64

'high': float64

'low’: float64

'close’: float64

'volume’: int64

'Name’: object

-> Changed the datatype of 'date' column to datetime64[ns] for ease of data handling

**DATA ANALYSIS**

-> Analyzing closing prices of the stocks for different firms. We observe that there is a net increase in the stock price for each firm. Whereas, for AAPL (Apple Inc.) there was a decrease in the stock price from 2015 to 2016-2017 and then it started to increase gradually giving us a net increase in the stock price over period of 5 yrs. We also see a spike in the Google stock price during the month of 07-2015. For Microsoft, the growth is more even over the period of 5 yrs whereas for Amazon, the stock prices see a rapid growth from 2016 to 2018.

A graph of growth and stock market

Description automatically generated with medium confidence

-> For this graph, we calculated moving average for 3 different values to make the graph smoother and to find trend in the stock price. We observe that Amazon’s growth was exponential with lowest being around 200 and highest being around 1500, followed by Google.

A group of graphs showing different types of data

Description automatically generated with medium confidence

-> This graph gives an idea about number of stocks being traded for each firm. We see a spike in trading of google around 07-2025 around the same time its stock prices saw a negative spike in the stock price. A graph of blue lines

Description automatically generated with medium confidence

-> To find intraday return, we calculate it by subtracting opening rate from closing rate. We divide this by opening price to get percentage of return. Below figure shows intraday return of Apple over the tenure of 5 yrs. On 24 August, 2015 we see a highest spike of 8.69% in intraday return whereas on the immediate next day 25 August, 2015 we see a intraday return of -6.6 % which means there is a difference of 6.6% between opening and closing price.

A graph showing a sound wave

Description automatically generated

-> Sometimes it is possible to have different opening price than previous day’s closing. Which means the intraday return and daily return will be different. Daily return is calculated by determining percentage change in closing price of two consecutive days. Following figure shows

On 28 Jan, 2014 the return is -7.9% which means the price dropped by around 8% as compared to the prior day’s closing rate.

A graph showing a wave of time

Description automatically generated with medium confidence

-> Resampling the data based on month, year and quarter to determine the stock price trend on a greater level.

A line graph with numbers and a line

Description automatically generated

The above graph plots mean of stock price per month so we have 12 datapoints per year.

A line graph with numbers and a line

Description automatically generated

The above graph plots mean of stock price per quarter, so we have 4 datapoints per year.

A line graph with numbers and a line

Description automatically generated

The above graph plots mean of stock price per year, so we only have one datapoint for a year

-> Now we analyze if any of the firm’s stock prices are correlated. For that initially we plot a pairplot for each firm’s closing stock prices. We see from below graph that amazon and Microsoft show most linear relationship followed by google and microsoft. Let’s verify this by calculated correlation matrix.

A collage of graphs

Description automatically generated

-> Correlation matrix shows similar result. Stating there is 96% change that if amazon stock price rises so will Microsoft’s and vice versa.

A blue squares with white text

Description automatically generated

-> Whereas when daily return is considered, we observe that msft and appl, amzn and msft follow somewhat linear relationship. KDE plot shows distribution of daily returns comparing two firms at a time.

A group of blue dots

Description automatically generated

-> To verify this, we find correlation matrix which proves the above claim true.

A green squares with white text

Description automatically generated

-> For stock market, Value at Risk (VAR) is considered to be a very important factor. It determines the chances to lose money after investing in a particular stock. Higher the VAR higher are the chances that you will be in loss investing in that firm.

VAR is directly proportional to the Standard deviation, so we determine from following table MSFT has least VAR.

A screenshot of a black screen

Description automatically generated

For better understanding, we plot distplot for Apple’s daily return and see most of the times the share price changes between -1 to +1 and very rarely has extreme daily returns, which determine lower VAR.

A blue line graph with white text

Description automatically generated