FRA
Part B
Project Report

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References: *PreetamSarmah_FRA_PartB.ipynb*

Part B

Problem Statement

The dataset contains 6 years of information (weekly stock information) on the stock prices of 10 different Indian Stocks. Calculate the mean and standard deviation on the stock returns and share insights. You are expected to do the Market Risk Analysis using Python.
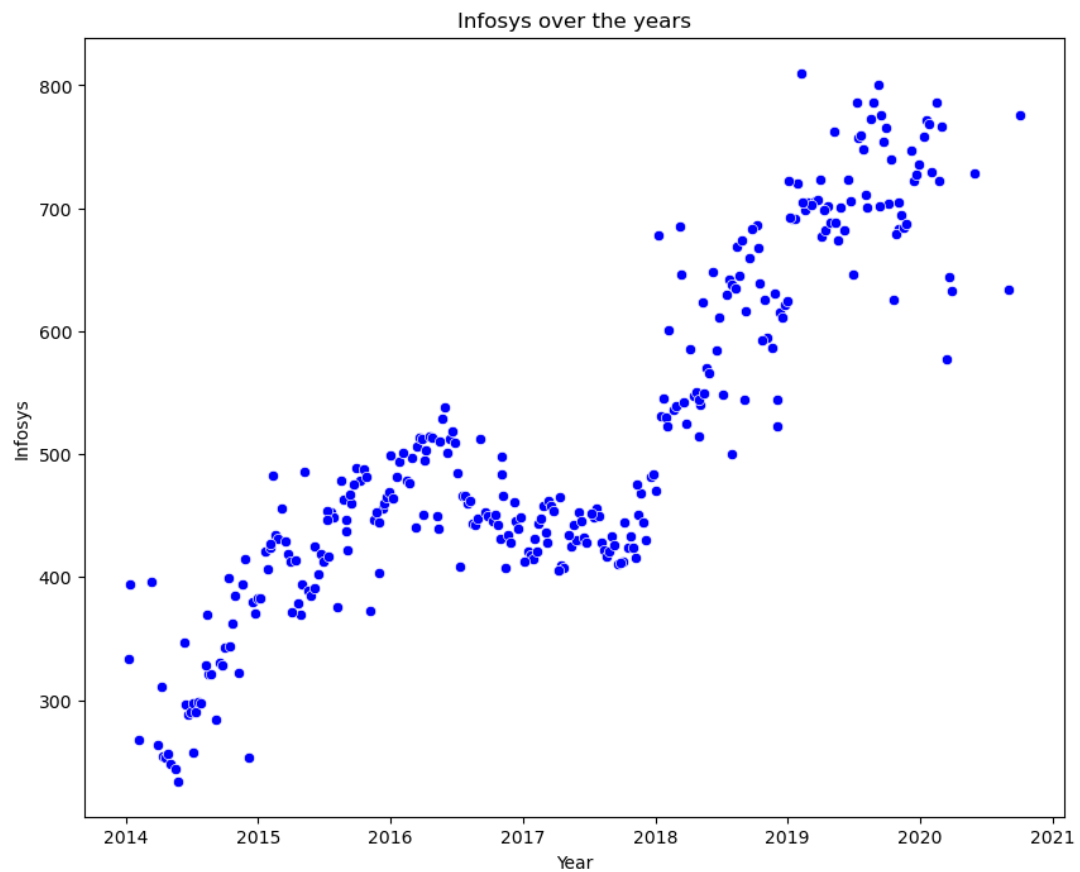
1.1) Stock Price Graph (Stock Price vs Time)

Fig 1 Infosys Stock Price vs Time

Infosys being India's pioneering IT giant shows an overall net positive increase in stock price over the past 6 years.

The stock prices show a slight decline before stabilizing and showing an upward trend again between mid-2016 to 2018.

2014,2018 were best years to purchase the stock, 2016 and 2020 were best years to sell the stock for a net profit.
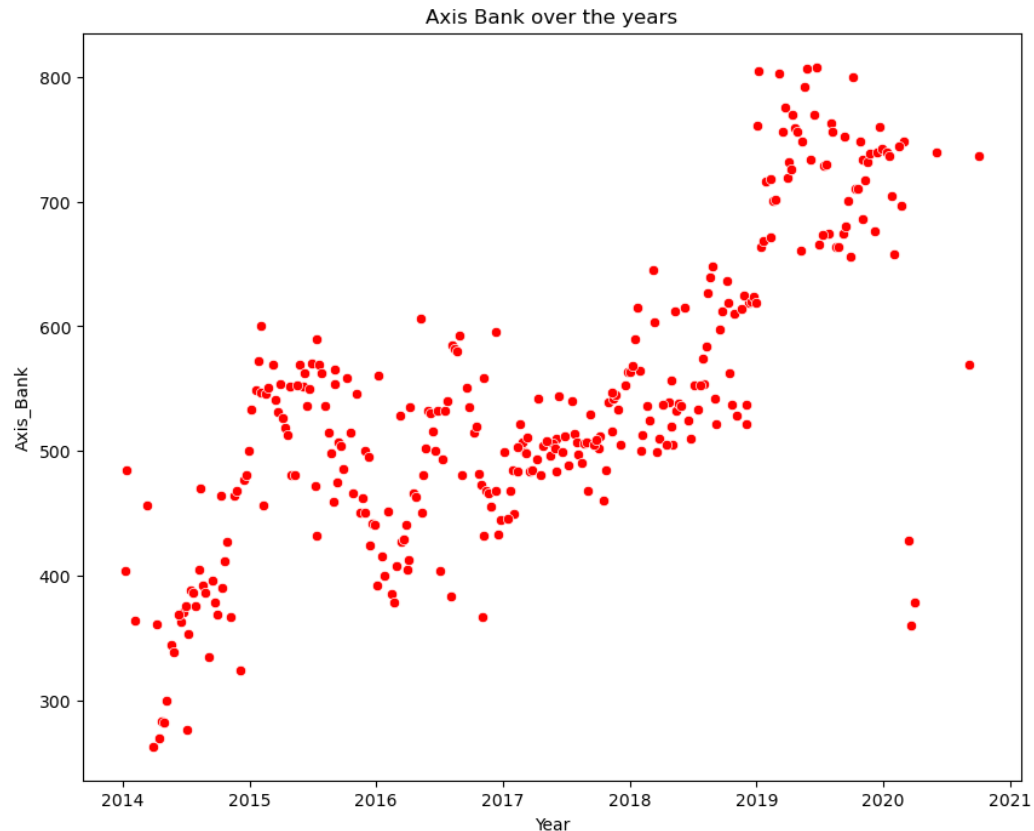

Fig 2 Axis Bank Stock Price vs Time

Axis Bank is among the top private banks of India.

The stock prices show an overall net positive increase over the last 6 years.

There is sharp increase in stock price from 2014 to mid-2015.There is dip in stock price between Mid-2015 to 2016 and the stock price gradually increases from 2016 to 2020.

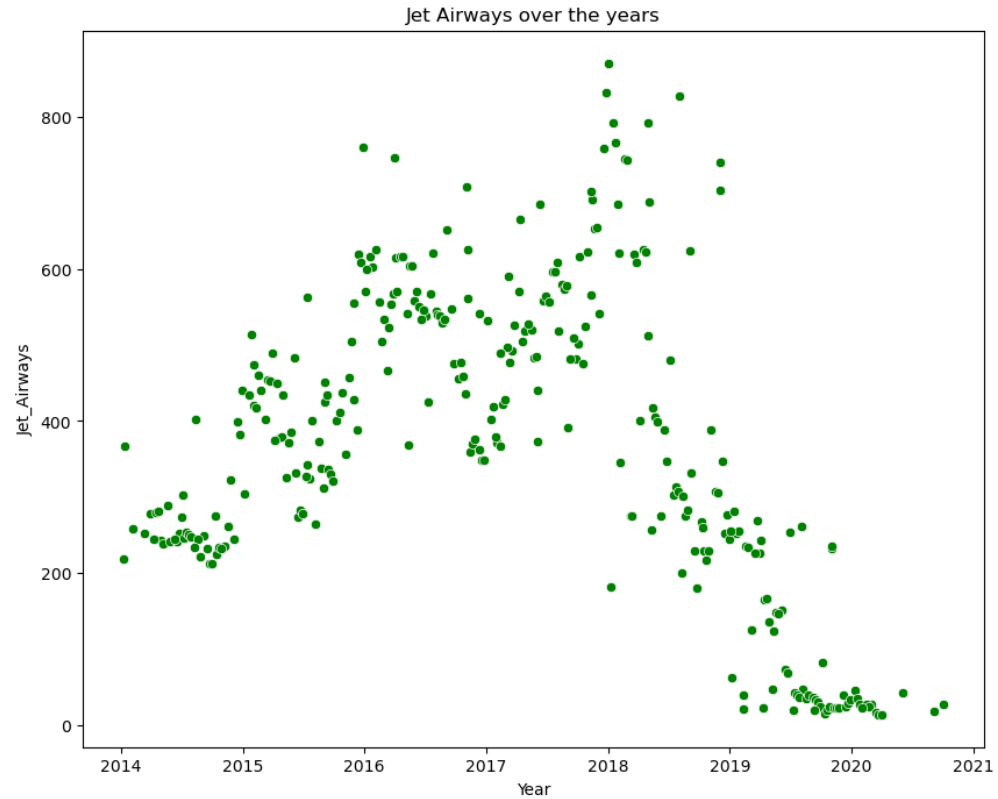The price of stock more than doubles between 2014 and 2020.

Fig 3 Jet Airways Stock Price vs Time

Jet Airways is temporarily suspended Indian Airline provider.

The stock price shows a gradual increase from 2014 to mid-2018.

The stock price shows a gradual decline from mid-2018 onwards, this can be attributed to the company facing bankruptcy and finally ceasing operations in Q2 of 2019.

1.2) Returns for all stocks with inference.

The returns for all the stocks can be calculated, by following the below operations.

- Take logarithms
- Take differences

The below are the stock returns for the first few weeks for all stocks.

	Infosys	Indian_Hotel	Mahindra_&_Mahindra	Axis_Bank	SAIL	Shree_Cement	Sun_Pharma	Jindal_Steel	Idea_Vodafone	Jet_Airways
0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1	-0.026873	-0.014599	0.006572	0.048247	0.028988	0.032831	0.094491	-0.065882	0.011976	0.086112
2	-0.011742	0.000000	-0.008772	-0.021979	-0.028988	-0.013888	-0.004930	0.000000	-0.011976	-0.078943
3	-0.003945	0.000000	0.072218	0.047025	0.000000	0.007583	-0.004955	-0.018084	0.000000	0.007117
4	0.011788	-0.045120	-0.012371	-0.003540	-0.076373	-0.019515	0.011523	-0.140857	-0.049393	-0.148846

Table 1 Stock Returns

Since we have the data at a weekly level, the above table represents a weekly difference in stock prices of various stocks

The First week, has Nans as there is no prior week to calculate net returns.

1.3) Stock Means and Standard Deviation for all stocks with inference.

- Stock Means: Average returns that the stock is making on a week-to-week basis
- Stock Standard Deviation: It is a measure of volatility of the stock i.e., the more a stock's returns vary from the stock's average return, the more volatile the stock.

The following is the Tabular description of Average Returns and Volatility for all the stocks.

	Average	Volatility
Infosys	0.002794	0.035070
Indian_Hotel	0.000266	0.047131
Mahindra_&_Mahindra	-0.001506	0.040169
Axis_Bank	0.001167	0.045828
SAIL	-0.003463	0.062188
Shree_Cement	0.003681	0.039917
Sun_Pharma	-0.001455	0.045033
Jindal_Steel	-0.004123	0.075108
Idea_Vodafone	-0.010608	0.104315
Jet_Airways	-0.009548	0.097972

Table 2 Stock Average – Volatility

It is always beneficial to check the Average and volatility as it indicates how much return is expected at what risk.

Shree cement has the Highest Average returns where as Idea-Vodafone has the lowest returns. Infosys has the lowest stock volatility , whereas Idea – Vodafone as the highest stock volatility.

1.4) Plot of Stock Means vs Standard Deviation with inference.
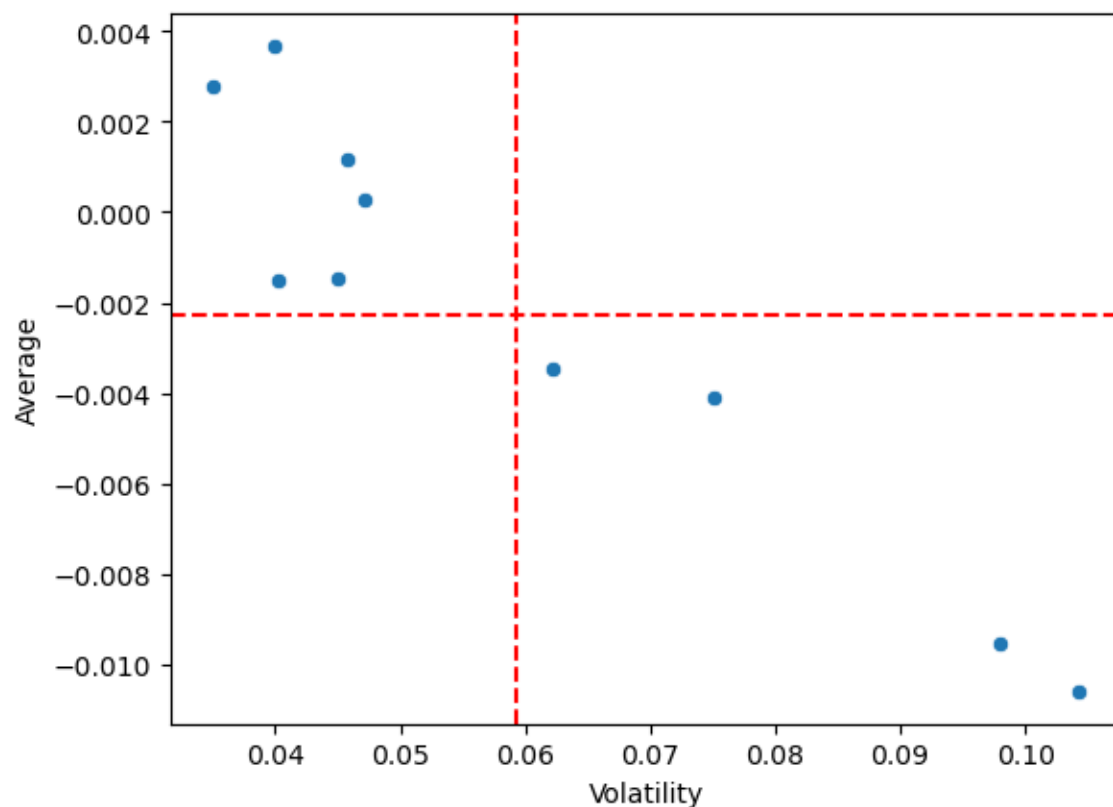

Fig 4 Stock Means vs Std Deviation

Stock with a lower mean & higher standard deviation do not play a role in a portfolio that has competing stock with more returns & less risk. Thus, for the data we have here, we are only left few stocks:

- Ones with higher return for a comparative or lower risk are considered better

The stocks in the upper left quadrant are a better choice, where as it is advisable to avoid stocks in the bottom right quadrant.

1.5) Conclusions and Recommendations.

- From the above findings its clear that, stocks with a higher average with relatively low volatility i.e., risk, are considered better and are must haves in the portfolio.
- Infosys, Shree cement are must haves in the portfolio as they have a positive stock average and lowest risk among all stocks.
- Idea-Vodafone and Jet Airways have the most negative stock average and also the highest risk, and as such are better to be excluded from the portfolio.