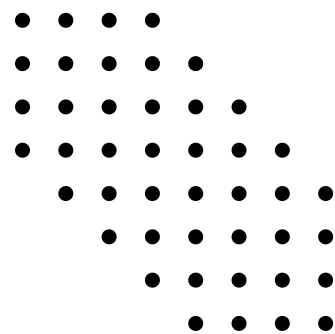# Market Risk Analysis Report

Presented by :

Sanjay Rajan J

TABLE OF CONTENTS

LIST OF FIGURES

1. DATA OVERVIEW

CONTEXT

Investors face market risk, arising from asset price fluctuations due to economic events, geopolitical developments, and investor sentiment changes. Understanding and analysing this risk is crucial for informed decision-making and optimizing investment strategies.

OBJECTIVE

The objective of this analysis is to conduct Market Risk Analysis on a portfolio of Indian stocks using Python. It uses historical stock price data to understand market volatility and riskiness. Using statistical measures like mean and standard deviation, investors gain a deeper understanding of individual stocks' performance and portfolio variability.

Through this analysis, investors can aim to achieve the following objectives:

- Risk Assessment: Analyze the historical volatility of individual stocks and the overall portfolio.

- Portfolio Optimization: Use Market Risk Analysis insights to enhance risk-adjusted returns.

- Performance Evaluation: Assess portfolio management strategies' effectiveness in mitigating market risk.

- Portfolio Performance Monitoring: Monitor portfolio performance over time and adjust as market conditions and risk preferences change.

➢ Shape:

There are 418 rows and 6 columns in this dataset.

➢ Duplicates:

There are no duplicate entries in this dataset.

➢ Basic Info:

Fig.1 Data Info

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 418 entries, 0 to 417
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Date           418 non-null    object
 1   ITC_Limited    418 non-null    int64
 2   Bharti_Airtel  418 non-null    int64
 3   Tata_Motors    418 non-null    int64
 4   DLF_Limited    418 non-null    int64
 5   Yes_Bank       418 non-null    int64
dtypes: int64(5), object(1)
memory usage: 19.7+ KB
```

➢ Null values Check:

Fig.2 Null values check

```
Date             0
ITC_Limited      0
Bharti_Airtel    0
Tata_Motors      0
DLF_Limited      0
Yes_Bank         0
dtype: int64
```

> Numerical Statistics:

Fig.3 Numerical Statistics

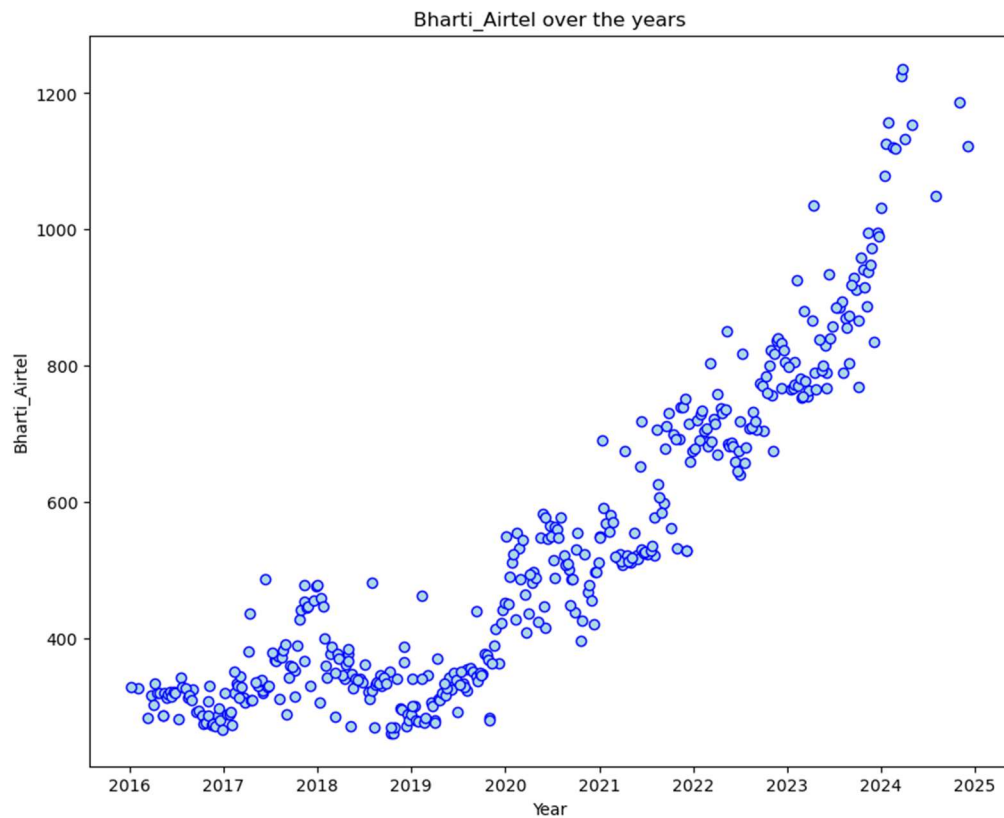|	ITC_Limited	Bharti_Airtel	Tata_Motors	DLF_Limited	Yes_Bank
count	418.000000	418.000000	418.000000	418.000000	418.000000
mean	278.964115	528.260766	368.617225	276.827751	124.442584
std	75.114405	226.507879	182.024419	156.280781	130.090884
min	156.000000	261.000000	65.000000	110.000000	11.000000
25%	224.250000	334.000000	186.000000	166.250000	16.000000
50%	265.500000	478.000000	399.500000	213.000000	30.000000
75%	304.000000	706.750000	466.000000	360.500000	249.750000
max	493.000000	1236.000000	1035.000000	928.000000	397.000000

> First Few rows:

Fig.4 First 5 rows

|	Date	ITC Limited	Bharti Airtel	Tata Motors	DLF Limited	Yes Bank
0	28-03-2016	217	316	386	114	173
1	04-04-2016	218	302	386	121	171
2	11-04-2016	215	308	374	120	171
3	18-04-2016	223	320	408	122	172
4	25-04-2016	214	319	418	122	175

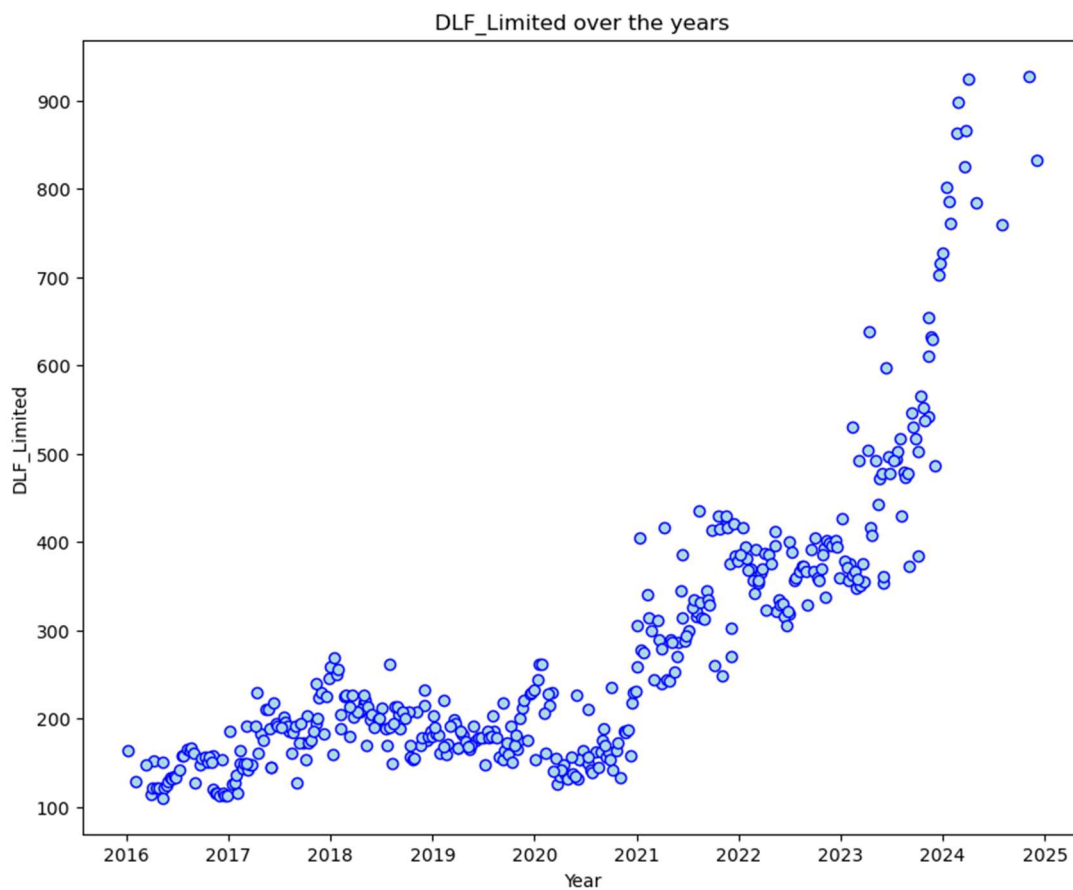# 2. EXPLORATORY DATA ANALYSIS

Fig.5 Stock Price graph of ITC_Limited
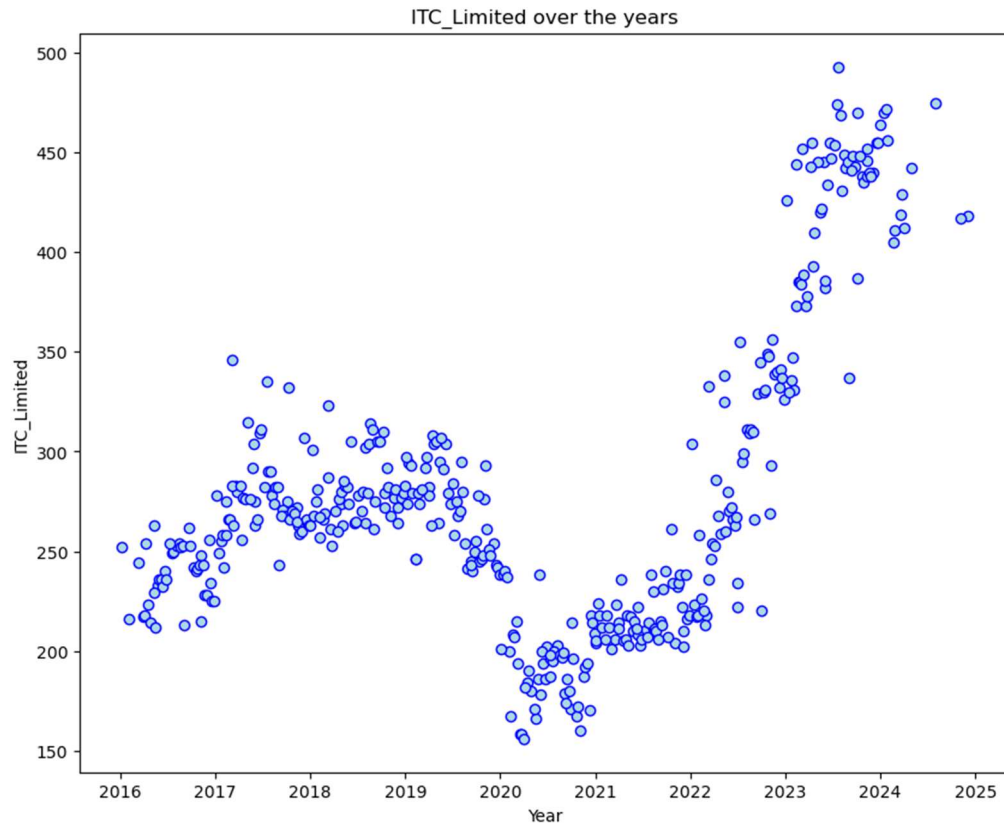
Fig.6 Stock Price graph of Bharati_Airtel
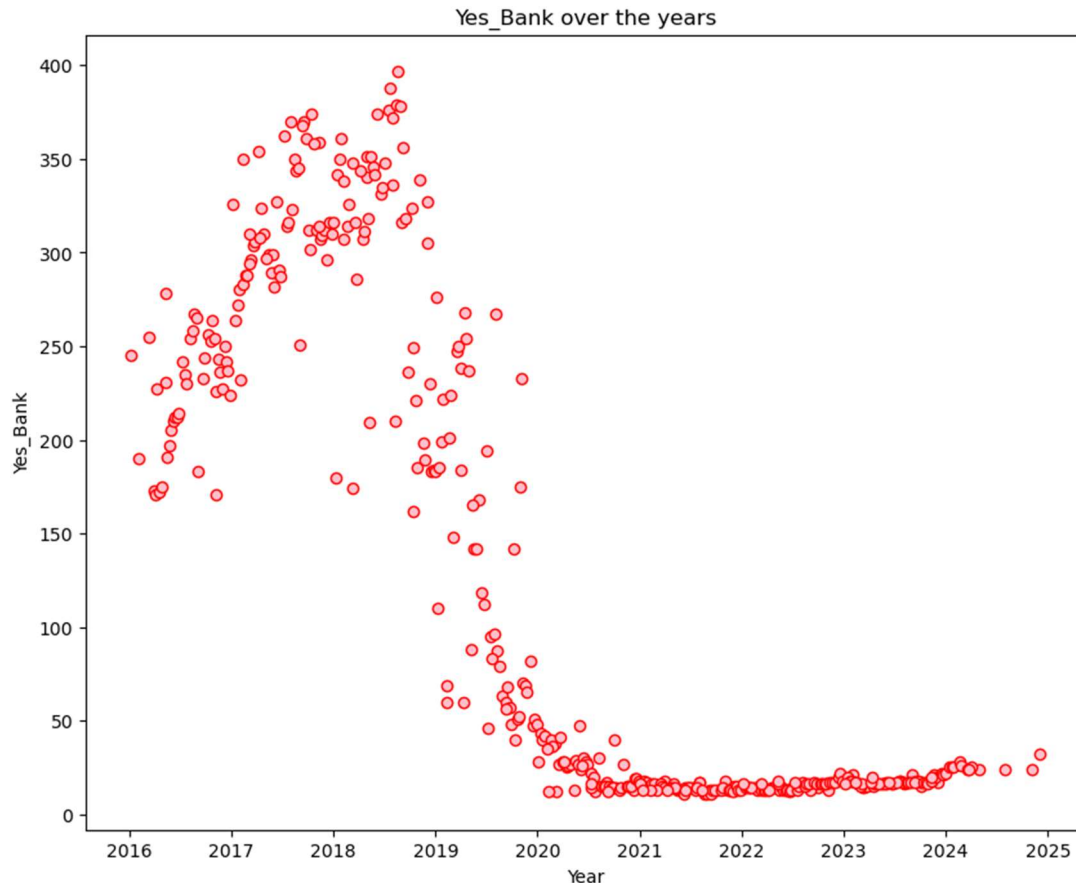
Fig.7 Stock Price graph of Tata_Motors

Tata_Motors over the years
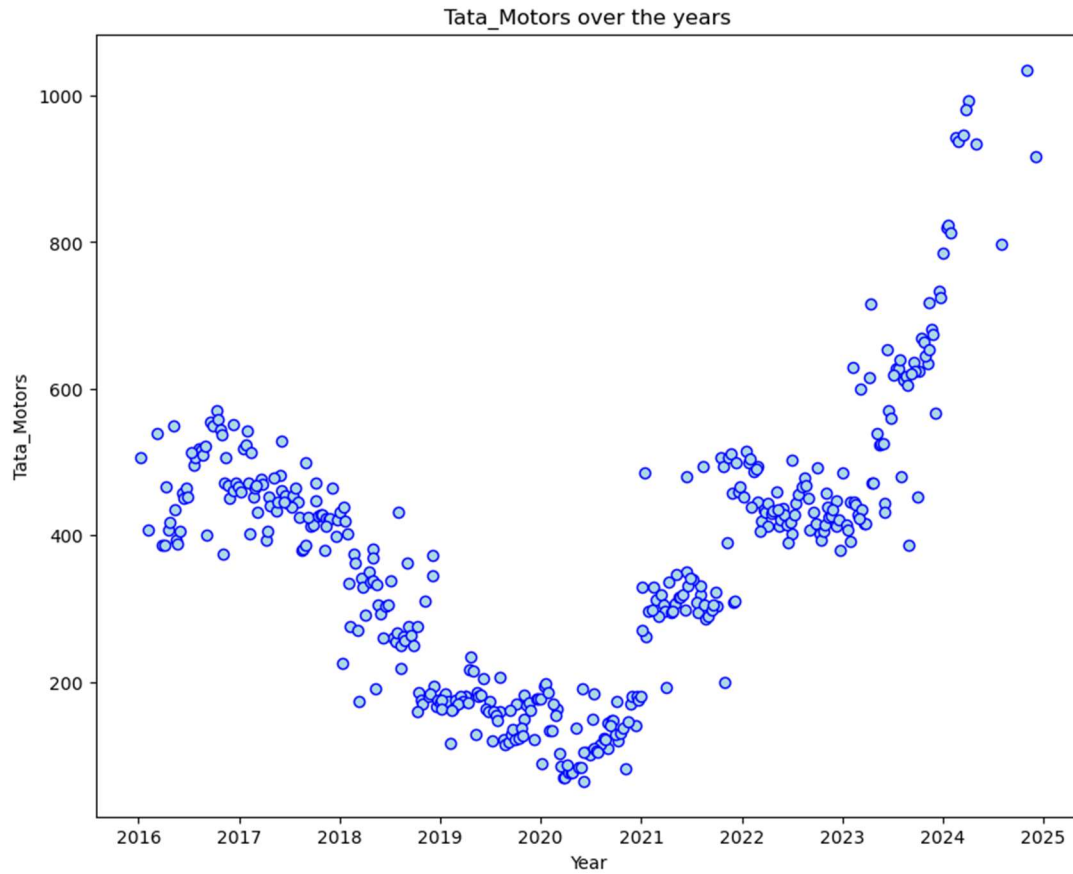
Fig.8 Stock Price graph of DLF_Limited

DLF_Limited over the years

Fig.9 Stock Price graph of Yes_bank

INFERENCES:

- Yes Bank stock price is significantly reduced from 2018 – 2020

- DLF limited has a sharp upward trend from 2021

- Bharti Airtel shows consistent and strong upward growth over the time period.

- Tata Motors shows a declining trend till 2020 and shows a steep climb after 2020. Stock price maybe reduced due to the COVID pandemic.

- ITC limited shows a gradual increase in stock price over the time period except the drop in pandemic period. It has a good recovery and consistent growth.

3. STOCK RETURNS CALCULATION AND ANALYSIS

Fig.10 Top 5 rows of stock returns

	ITC_Limited	Bharti_Airtel	Tata_Motors	DLF_Limited	Yes_Bank
0	NaN	NaN	NaN	NaN	NaN
1	0.004598	-0.045315	0.000000	0.059592	-0.011628
2	-0.013857	0.019673	-0.031582	-0.008299	0.000000
3	0.036534	0.038221	0.087011	0.016529	0.005831
4	-0.041196	-0.003130	0.024214	0.000000	0.017291

Fig.11 Average and Volatility of each stock

	Average	Volatility
ITC_Limited	0.001634	0.035904
Bharti_Airtel	0.003271	0.038728
Tata_Motors	0.002234	0.060484
DLF_Limited	0.004863	0.057785
Yes_Bank	-0.004737	0.093879

Fig.12 Average vs Volatility plot
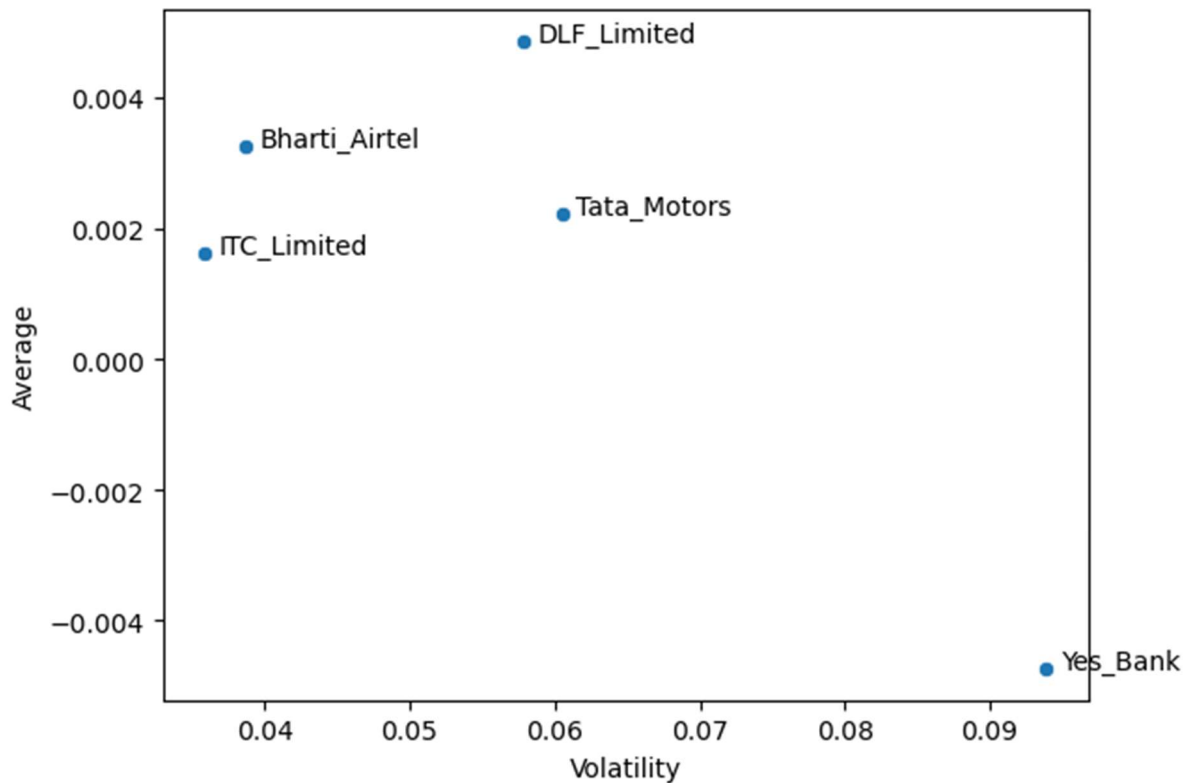
INFERENCES:

➢ The Return table shows the log returns of the stock prices for 5 different companies over the time period.

➢ The log returns of the first day has NaN values, due to the absence of the previous day returns.

➢ ITC limited have very low returns, but have the lowest volatility.

➢ From the given data, it is clearly evident that "Yes Bank" is the most volatile stock having negative return.

➢ DLF limited has the highest return and have high volatility.

➢ Tata Motors have moderate returns, but fairly volatile.

➢ Bharati Airtel have high returns with moderate volatility.

4. ACTIONABLE INSIGHTS & RECOMMENDATIONS

INSIGHTS:

- ➢ **Best Performer:** Bharti Airtel

- ➢ **Highest Return Stock:** DLF limited

- ➢ **Most stable stock:** ITC limited

- ➢ **Worst Performer:** Yes Bank

PORTFOLIO RECOMMENDATIONS:

- ➢ **Majority of the Holdings:** Bharati Airtel, ITC limited (Low-Risk)

- ➢ **Growth Potential:** DLF Limited (High risk, High reward)

- ➢ **Long Term Stocks:** Tata Motors (Moderate returns)

- ➢ **Stocks to Avoid:** Yes bank (High Risk and Negative Returns)