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# **Finance & Risk Analytics Part (B)**

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# Section B: Financial Analysis

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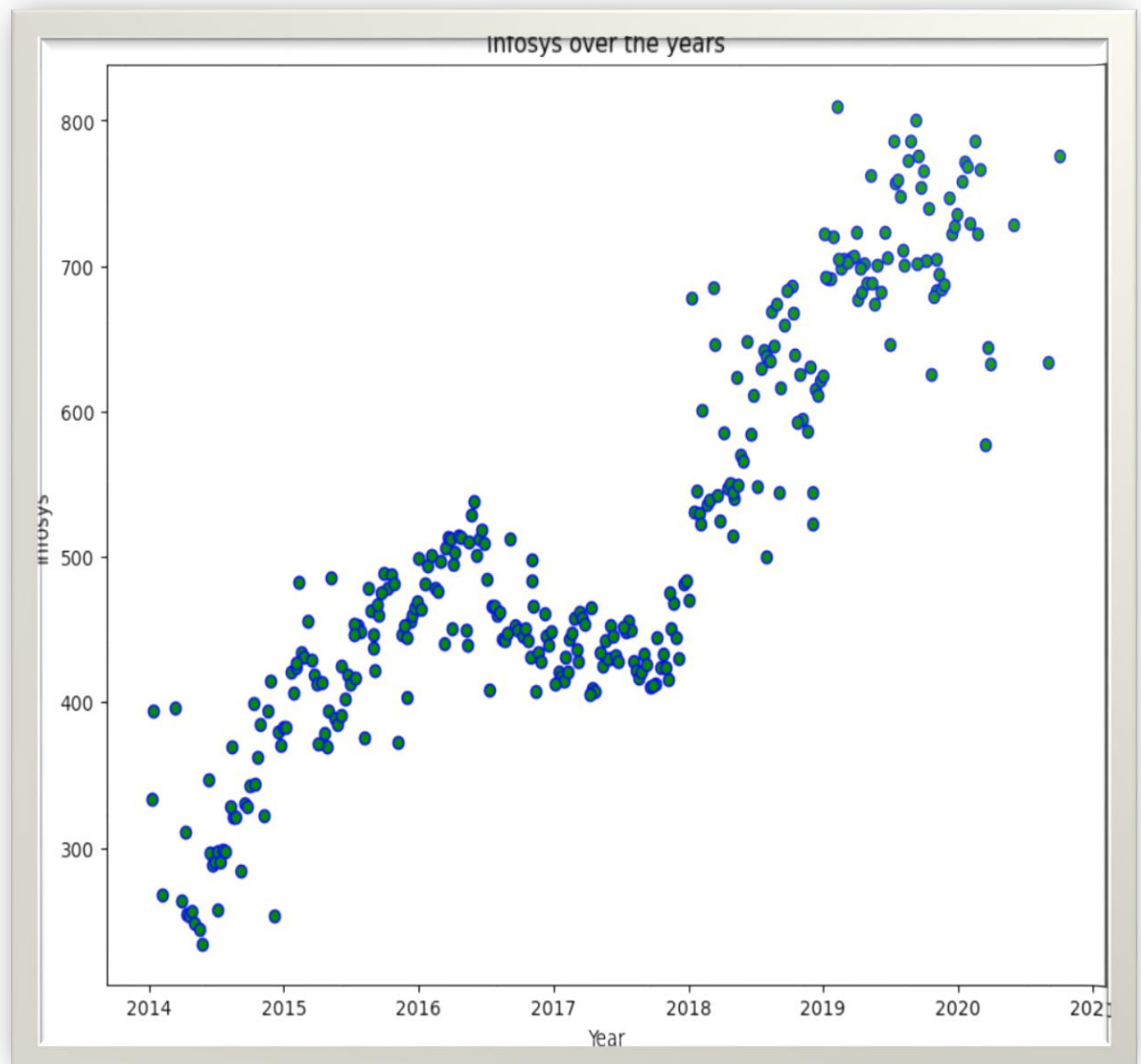
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➤ **Introduction**

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

➤ **Draw Stock Price Graph**

- **Infosys Stock Price Performance:**

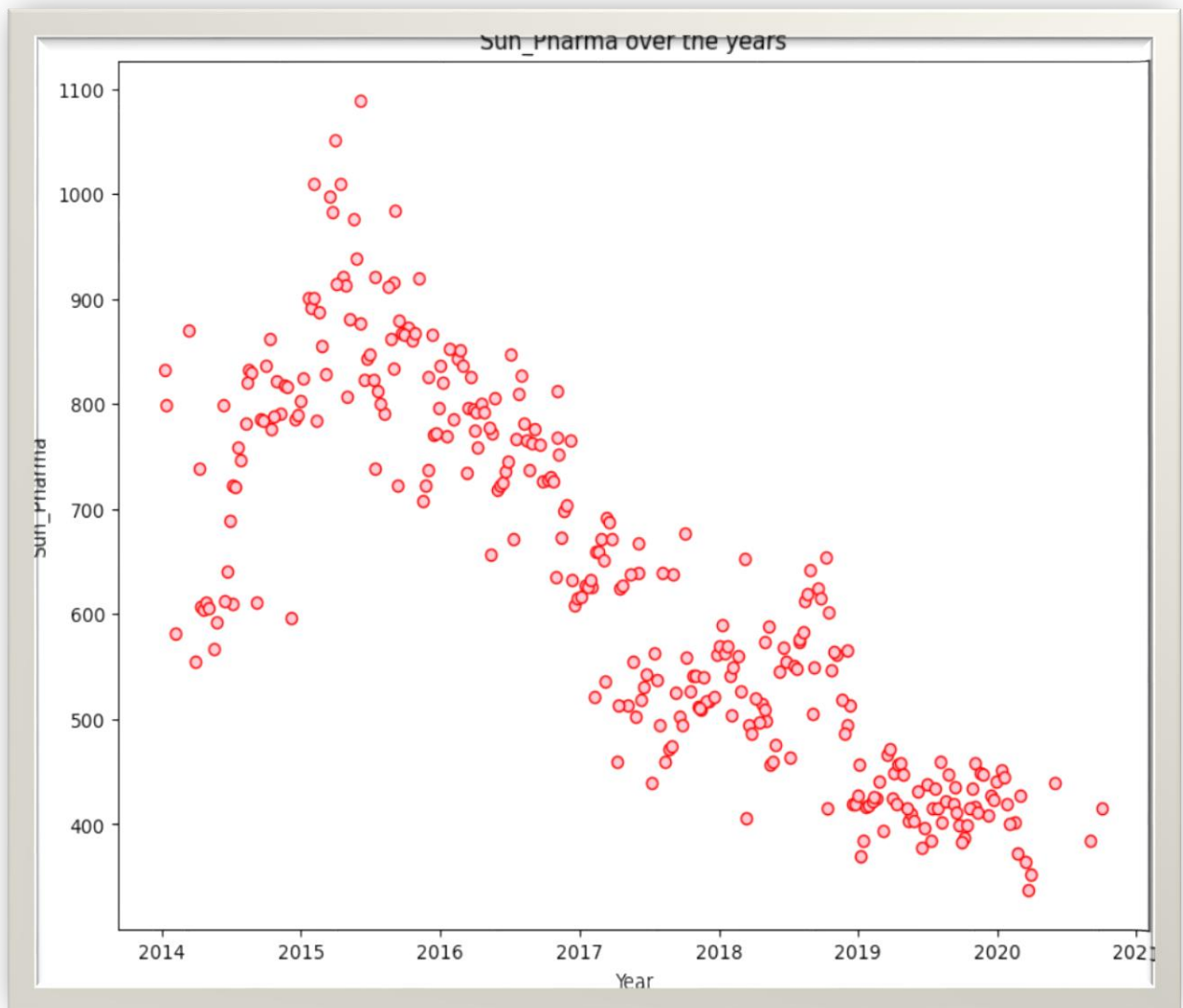


- **Inferences:**

Infosys stocks have consistently provided favorable returns to investors, with a progressive increase in stock prices since 2017.

- **Sunpharma Stock Price Performance:**

In contrast, the analysis of Sunpharma stocks reveals a mixed performance. There was an initial upward trend observed from 2014 to 2015, indicating positive growth in stock prices. However, the graph indicates a significant decline in Sunpharma stock prices after 2015. This decline could be attributed to various factors such as market conditions, industry dynamics, or company-specific issues.



- **Inferences:**

Sunpharma stocks experienced a notable decline in prices after 2015, indicating a challenging period for the company or sector.

➤ **Stock Returns**

- Returns Analysis:

	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	-0.028873	-0.014599	0.008572	0.048247	0.028988	0.032831	0.094491	-0.065882	0.011976	0.088112
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	-0.078373	-0.019515	0.011523	-0.140857	-0.049393	-0.148846

```

Infosys          0.874521
Indian_Hotel     0.083382
Mahindra_&_Mahindra -0.471323
Axis_Bank        0.365382
SAIL             -1.084013
Shree_Cement     1.152290
Sun_Pharma       -0.455337
Jindal_Steel     -1.290374
Idea_Vodafone    -3.320228
Jet_Airways      -2.988564
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```

The table presents the returns calculated for various stocks over the specified time period. The returns are expressed as percentages, representing the change in stock prices relative to their initial values.

- Key Observations:

- **Infosys:** Infosys has demonstrated significant positive returns, with an overall return of 87.45% over the analyzed period. This indicates favorable performance and potential profitability for investors.
- **Indian Hotel:** Indian Hotel has also exhibited positive returns, albeit at a lower rate compared to Infosys, with an overall return of 8.34%. While the returns are positive, they are relatively modest compared to other stocks.
- **Mahindra & Mahindra:** This stock has experienced negative returns, indicating a decline in value over the analyzed period. The overall return stands at -47.13%, suggesting challenges or underperformance in the company's performance.
- **Axis Bank:** Axis Bank has shown positive returns, indicating growth in value over time. The overall return for Axis Bank stands at 36.54%, highlighting favorable performance relative to other stocks.
- **SAIL:** SAIL has incurred significant negative returns, with an overall return of -108.40%. This indicates substantial loss in value over the analyzed period, potentially reflecting challenges or downturns in the steel industry.
- **Shree Cement:** Shree Cement stands out with exceptionally high positive returns, boasting an overall return of 115.23%. This indicates strong performance and potential profitability for investors in Shree Cement stocks.
- **Sun Pharma:** Sun Pharma has experienced negative returns, with an overall return of -45.53%. This suggests challenges or declines in value for Sun Pharma stocks over the analyzed period.
- **Jindal Steel:** Jindal Steel has incurred significant negative returns, with an overall return of -129.04%. This indicates substantial loss in value over time, potentially reflecting challenges in the steel industry or company-specific issues.

- **Idea Vodafone:** Idea Vodafone has shown substantial negative returns, with an overall return of -332.02%. This indicates a significant decline in value over the analyzed period, potentially reflecting challenges in the telecom sector or company-specific issues.
- **Jet Airways:** Jet Airways has also experienced significant negative returns, with an overall return of -298.86%. This indicates a substantial decline in value over time, potentially reflecting challenges or difficulties faced by the company in the aviation industry.
- **Inferences:**
- Stocks like Infosys, Axis Bank, and Shree Cement have demonstrated favorable performance, with positive returns indicating potential profitability for investors.
- Conversely, stocks like SAIL, Jindal Steel, Idea Vodafone, and Jet Airways have shown substantial negative returns, suggesting challenges or declines in value over the analyzed period.

➤ Stock Means and Standard Deviation

	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

- **Stock Performance Analysis:**  
The table presents the average returns (means) and volatility (standard deviation) calculated for various stocks over the specified time period. These metrics provide insights into the performance and risk associated with each stock.

- **Key Observations:**

Infosys:

- Average Return: 0.28%
- Volatility (Standard Deviation): 3.51%
- Infosys exhibits a relatively low volatility, indicating stable performance with modest average returns.

Indian Hotel:

- Average Return: 0.03%
- Volatility (Standard Deviation): 4.71%
- Indian Hotel also demonstrates low volatility, albeit with slightly lower average returns compared to Infosys.

Mahindra & Mahindra:

- Average Return: -0.15%
- Volatility (Standard Deviation): 4.02%
- Mahindra & Mahindra shows negative average returns, coupled with moderate volatility, indicating mixed performance and moderate risk.

**Axis Bank:**

- Average Return: 0.12%
- Volatility (Standard Deviation): 4.58%
- Axis Bank exhibits moderate volatility with modest average returns, suggesting stable but moderate performance.

**SAIL:**

- Average Return: -0.35%
- Volatility (Standard Deviation): 6.22%
- SAIL demonstrates high volatility with negative average returns, indicating high risk and potential challenges in performance.

**Shree Cement:**

- Average Return: 0.37%
- Volatility (Standard Deviation): 3.99%
- Shree Cement exhibits relatively high average returns with moderate volatility, indicating favorable performance with moderate risk.

**Sun Pharma:**

- Average Return: -0.15%
- Volatility (Standard Deviation): 4.50%
- Sun Pharma shows low volatility with slightly negative average returns, suggesting stable but modest performance.

**Jindal Steel:**

- Average Return: -0.41%
- Volatility (Standard Deviation): 7.51%
- Jindal Steel demonstrates high volatility with negative average returns, indicating high risk and potential challenges in performance.

**Idea Vodafone:**

- Average Return: -1.06%
- Volatility (Standard Deviation): 10.43%
- Idea Vodafone exhibits high volatility with significantly negative average returns, indicating high risk and substantial challenges in performance.

**Jet Airways:**

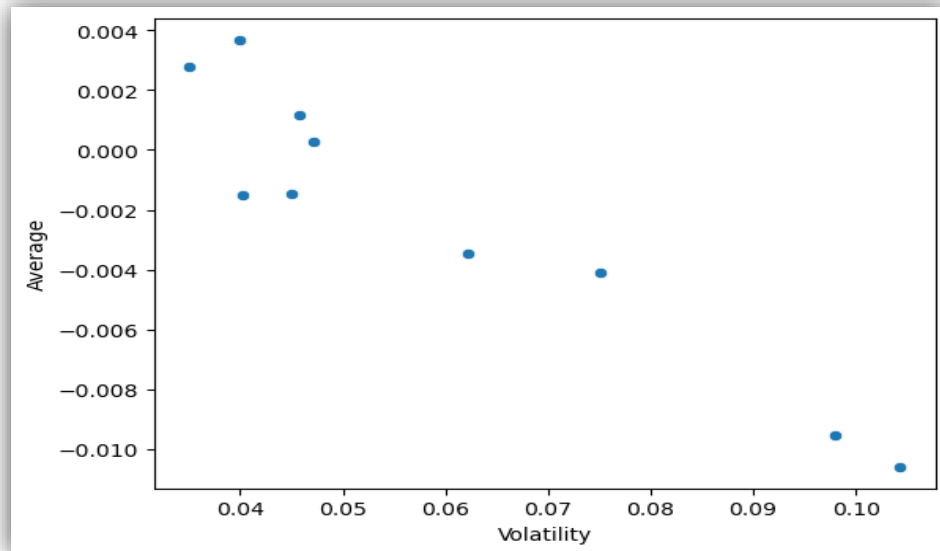
- Average Return: -0.95%
- Volatility (Standard Deviation): 9.80%
- Jet Airways demonstrates high volatility with negative average returns, suggesting high risk and significant challenges in performance.

• **Inferences:**

- Stocks like Infosys, Indian Hotel, and Sun Pharma exhibit relatively low volatility with modest average returns, indicating stable but moderate performance.
- Stocks like SAIL, Jindal Steel, Idea Vodafone, and Jet Airways show high volatility with negative average returns, suggesting high risk and potential challenges in performance.
- Stocks like Shree Cement and Axis Bank demonstrate moderate volatility with relatively favorable average returns, indicating stable performance with moderate risk.

- Relationship between Average Returns and Volatility

Plot Analysis:



The plot illustrates the relationship between the average returns (means) and volatility (standard deviation) for the provided stocks over the specified time period. Each point on the plot represents a stock, with its position indicating its average return and volatility.

- Key Observations:

- **Inverse Relationship:** There appears to be an inverse relationship between average returns and volatility. Stocks with higher average returns tend to have lower volatility, and vice versa. This observation is evident from the general trend of the data points on the plot.
- **Risk-Return Tradeoff:** The plot highlights the risk-return tradeoff inherent in investing. Stocks offering higher average returns often come with higher volatility, indicating greater risk. Conversely, stocks with lower volatility typically offer lower average returns, suggesting lower risk.
- **Outliers:** Some stocks deviate from the general trend observed in the plot. Notably, stocks such as Shree Cement and Axis Bank exhibit relatively higher average returns with moderate volatility, positioning them as potential outliers with favorable risk-return profiles compared to other stocks in the dataset.

- Inferences:

Investors seeking higher returns may need to accept higher levels of volatility and risk. Conversely, those prioritizing stability and lower risk may need to settle for lower returns.

It's crucial for investors to assess their risk tolerance and investment objectives carefully. Understanding the risk-return profile of each stock can help investors build diversified portfolios that align with their financial goals and risk preferences.



- **Conclusion:**

The plot of stock means vs. standard deviation provides valuable insights into the risk-return characteristics of various stocks. By analyzing this relationship, investors can make informed decisions regarding portfolio construction and asset allocation to achieve their investment objectives while managing risk effectively.