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Part B

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Executive Summary

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.

Data Description

The data has and 11 columns.

```
 #   Column             Non-Null Count   Dtype
---  ------             --------------   -----
 0   Date               314 non-null     datetime64[ns]
 1   Infosys            314 non-null     int64
 2   Indian_Hotel       314 non-null     int64
 3   Mahindra__Mahindra 314 non-null     int64
 4   Axis_Bank          314 non-null     int64
 5   SAIL               314 non-null     int64
 6   Shree_Cement       314 non-null     int64
 7   Sun_Pharma         314 non-null     int64
 8   Jindal_Steel       314 non-null     int64
 9   Idea_Vodafone      314 non-null     int64
 10  Jet_Airways        314 non-null     int64
dtypes: datetime64[ns](1), int64(10)
memory usage: 27.1 KB
```

Sample of the dataset:
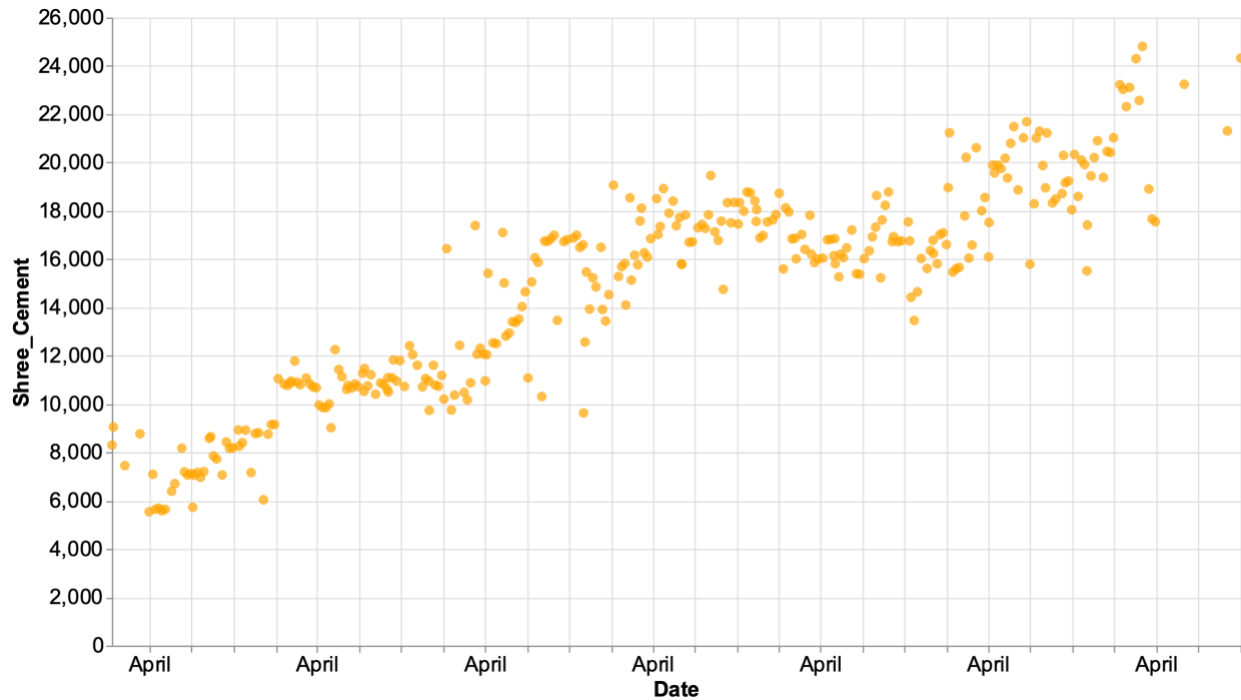
Here are some sample rows of the data below.

Date	Infosys	Indian Hotel	Mahindra & Mahindra	Axis Bank	SAIL	Shree Cement	Sun Pharma	Jindal Steel	Idea Vodafone	Jet Airways
2014-03-31	264	69	455	263	68	5543	555	298	83	278
2014-07-04	257	68	458	276	70	5728	610	279	84	303
2014-04-14	254	68	454	270	68	5649	607	279	83	280
2014-04-21	253	68	488	283	68	5692	604	274	83	282
2014-04-28	256	65	482	282	63	5582	611	238	79	243

Exploratory Data Analysis

We are going to be looking at the stocks of Shree Cement and Idea Vodafone in our EDA.
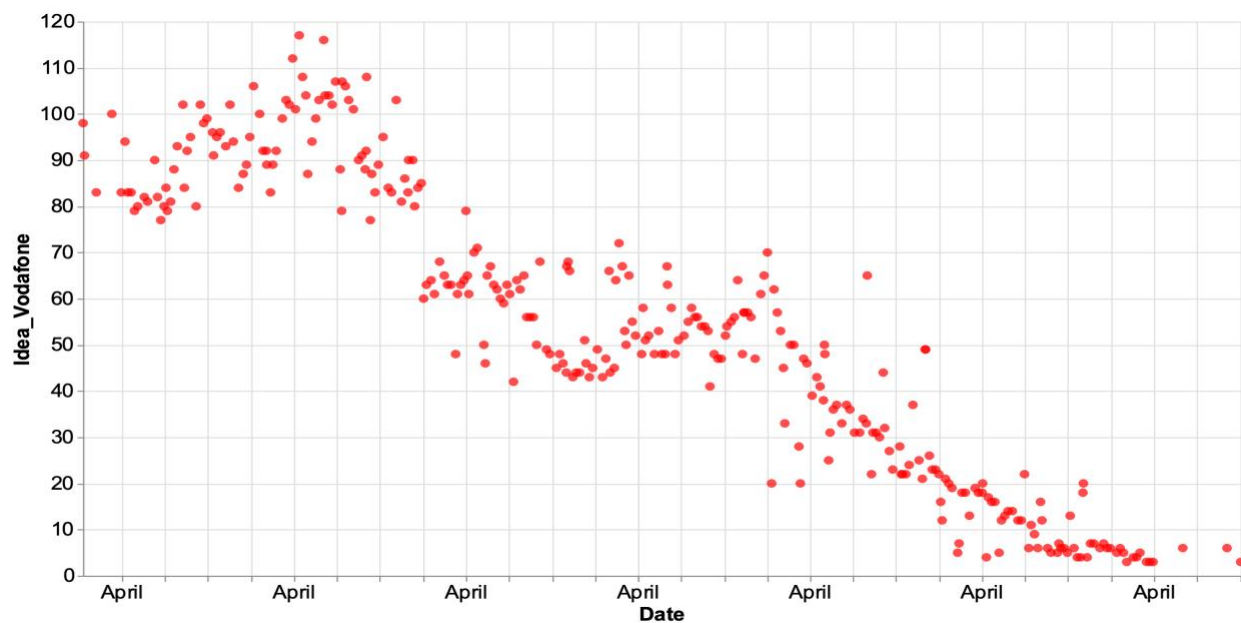
Q1 Draw Stock Price Graph(Stock Price vs Time) for any 2 given stocks with inference
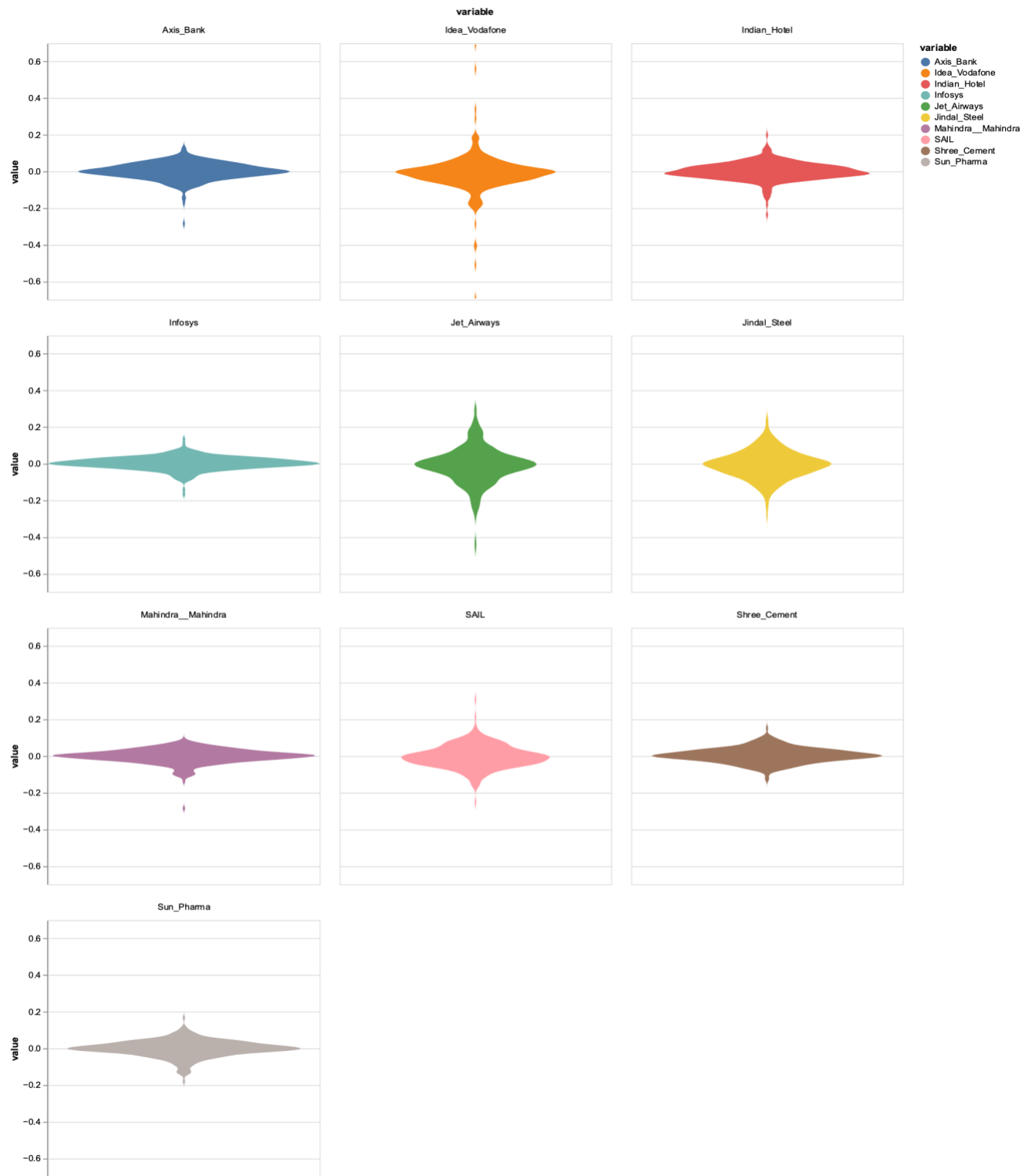
Shree Cement

- We can see that the stock price for Shree cement is increasing over the 6 year period and has a general upward trend during the duration of study indication growth in its market value. This suggests a strong market position and consistent performance over the years.
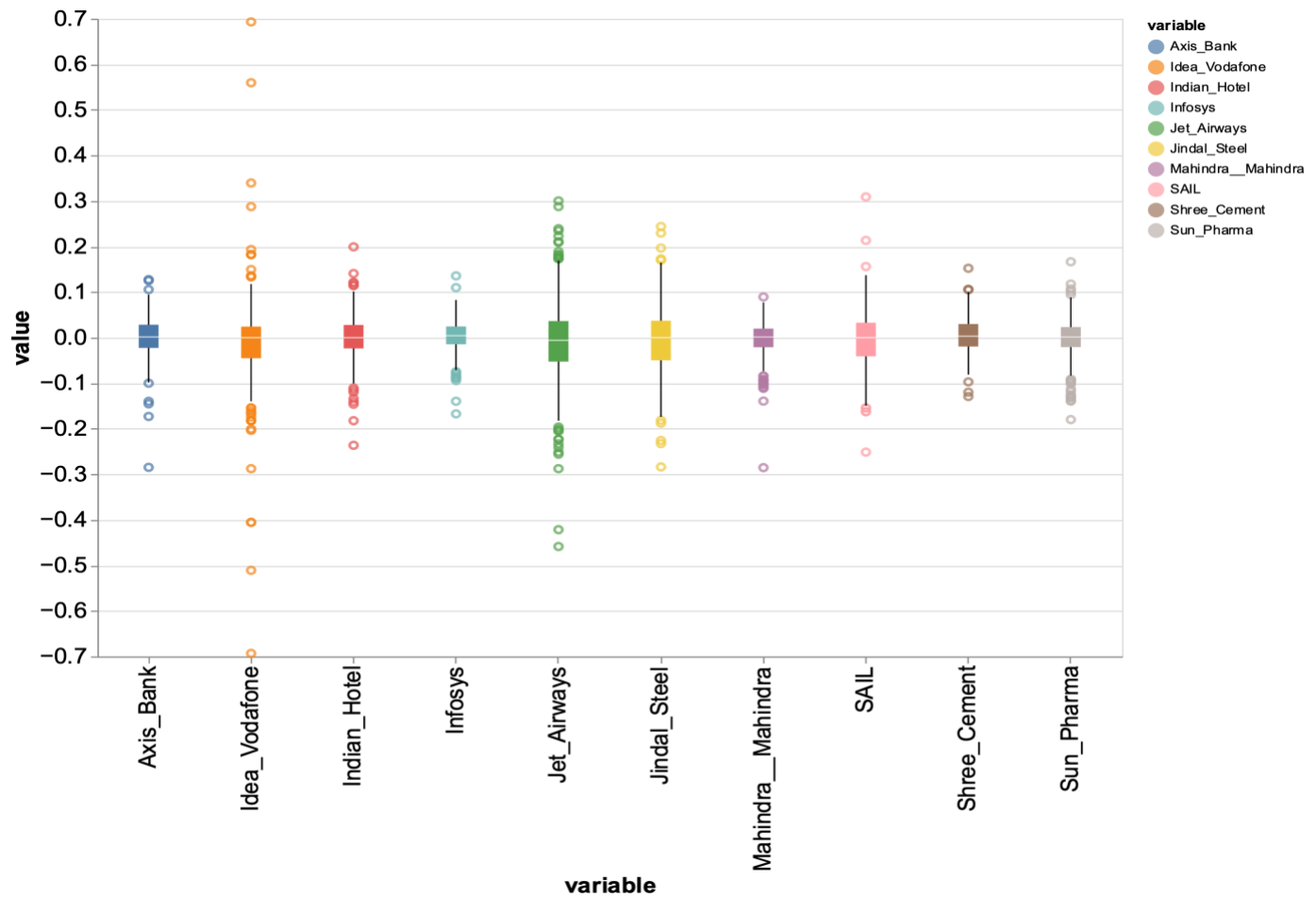- There are periods of volatility, but the overall trajectory is positive

Idea Vodafone

- We can see that the stock price to Idea Vodafone is decreasing to almost zero during the 6 year period.
- There is volatility in the data and the trajectory of the. Share price could indicate challenges faced by the company or sector leading to a decrease in investor confidence and the market valuation.

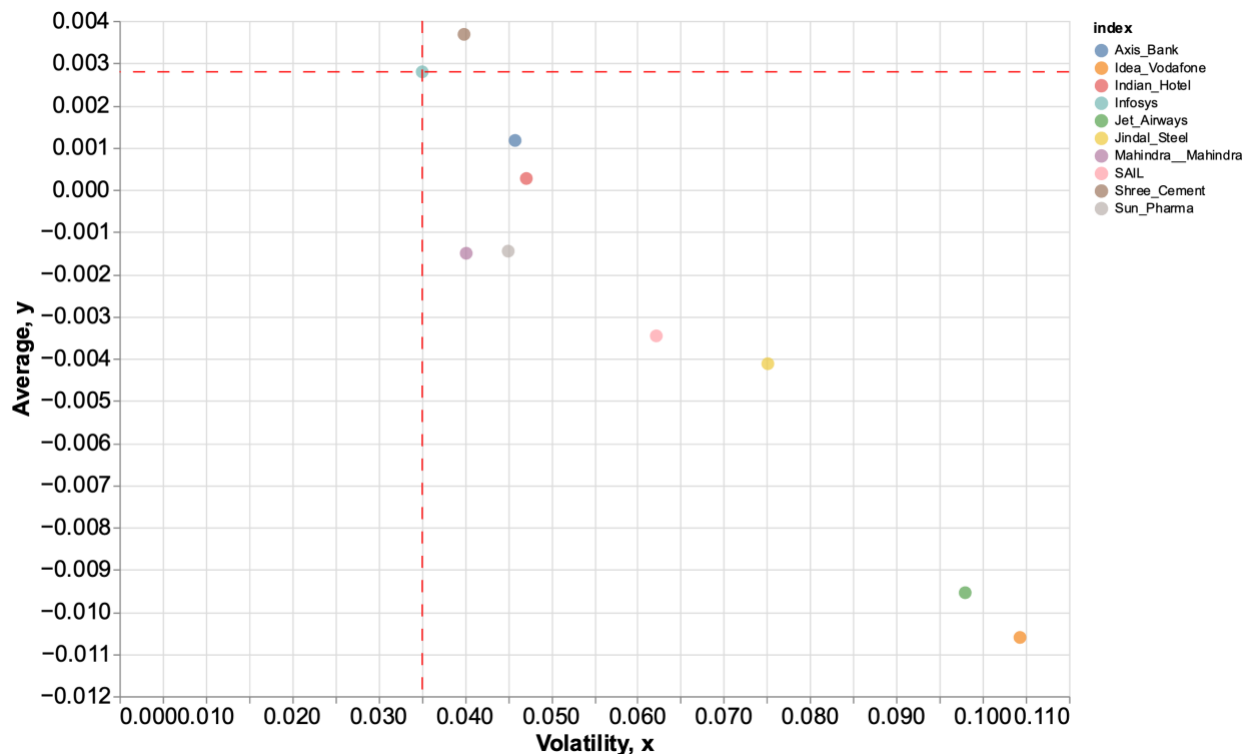# Q2 Calculate Returns for all stocks with inference

The graphs above shows the distribution of returns for each stock. The graph highlights the following features:

- **Idea Vodafone and Jet Airways**: These stocks show long violins with a wide range of returns, indicating high volatility. Particularly, Idea Vodafone exhibits a significant spread of negative returns, highlighting its risky nature.
- **Infosys**: Exhibits a more compact and symmetrical distribution, suggesting more stable and consistent returns compared to others.
- **Shree Cement**: Shows a relatively balanced distribution but with some skewness towards positive returns which shows the
- **Risk and Stability**: Stocks with shorter and narrower violins (like Infosys) are generally considered more stable with less variability in returns, while those with longer and wider violins (like Idea Vodafone and Jet Airways) are seen as more volatile and risky.

Q3. Calculate Stock Means and Standard Deviation for all stocks with inference

	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

Q4. Draw a plot of Stock Means vs Standard Deviation and state your inference

	Average	Volatility
Shree_Cement	0.003681	0.039917

We can see from the scatter plot that Shree Cement is the only stock that has low volatility and high return and is worth investing in as well as Inforsys.

Q12. Conclusions and Recommendations

Given the analysis we provide the following insights:

- Stocks like **Shree Cement** and **Infosys** have higher mean returns, indicating better average performance over the period.
- **Idea Vodafone** and **Jet Airways** have negative mean returns, suggesting a decline in their value over time.
- The standard deviation is a measure of volatility. A higher standard deviation, as seen in **Idea Vodafone**, **Jet Airways**, and **Jindal Steel**, indicates higher price volatility and, thus, higher risk.
- Comparatively, stocks like **Infosys** and **Shree Cement** have lower volatility, suggesting more stability in their stock prices.

We would therefore recommend that we invest in Infosys and Shree Cement and focus on these sectors as they provide better returns.