MBA939-Assignment-2 -Observations

Q1) Selected Stocks

1. **Infosys Ltd: IT Services**

   Infosys is a well-established IT services company with a global presence. It has a strong reputation for innovation, quality, and client relationships. The company's business strategy focuses on digital transformation, cloud services, and AI-driven solutions.

2. **Larsen & Toubro Ltd: Construction**

   L&T is a key player in India's infrastructure development. Its diversified portfolio includes engineering, construction, and infrastructure projects. The company's strategic focus on large-scale projects and technological advancements is noteworthy.

3. **SBI Life Insurance Company Ltd: Insurance**

   SBI Life is a joint venture between SBI and BNP Paribas Cardiff. The insurance sector benefits from India's growing middle class and increasing awareness about financial protection. The company's distribution network and product offerings matter.

4. **Adani Ports and Special Economic Zone Ltd: Transport Infra**

   Adani Ports operates crucial ports and logistics infrastructure. India's trade growth and government initiatives favor the logistics sector. The company's expansion plans and competitive advantages are relevant.

5. **Reliance Industries: Oil, Gas & Fuels**

   Reliance is a conglomerate with interests in diverse sectors. Its oil and gas business benefits from vertical integration and global reach. Strategic investments in technology, retail, and telecom enhance its resilience.

6. **State Bank of India: Banks**

   SBI is India's largest public sector bank. It has an extensive branch network and a trusted brand. The banking sector's role in economic growth and stability is critical.

7. **Hindustan Unilever: Personal Products**

   HUL dominates the personal care and consumer goods market. Its strong brand portfolio, distribution channels, and focus on sustainability matter. Defensive nature during economic downturns is an advantage.

8. **Bharti Airtel: Telecom Services**

   Bharti Airtel is a major telecom operator. The telecom industry is evolving with 4G/5G adoption and data services. The company's competitive position and network quality are crucial.

9. **Mahindra & Mahindra Ltd: Auto Manufacturers**

> Mahindra is a well-known auto manufacturer. Its strategic shift toward electric vehicles (EVs) and rural markets is noteworthy. Consider the cyclical nature of the automotive sector.

10. **Dr Reddy's Laboratories: Pharmaceutical**

> Dr Reddy's is a leading pharmaceutical company. Its focus on research, development, and global markets is crucial. The healthcare sector's defensive nature is an advantage.

The selection of these stocks from various sectors is to avoid specific or diversifiable risk by creating a well-diversified portfolio.

Q2) Visualization of stocks over last 5 years


Price Movement of Selected Stocks over 5 Years
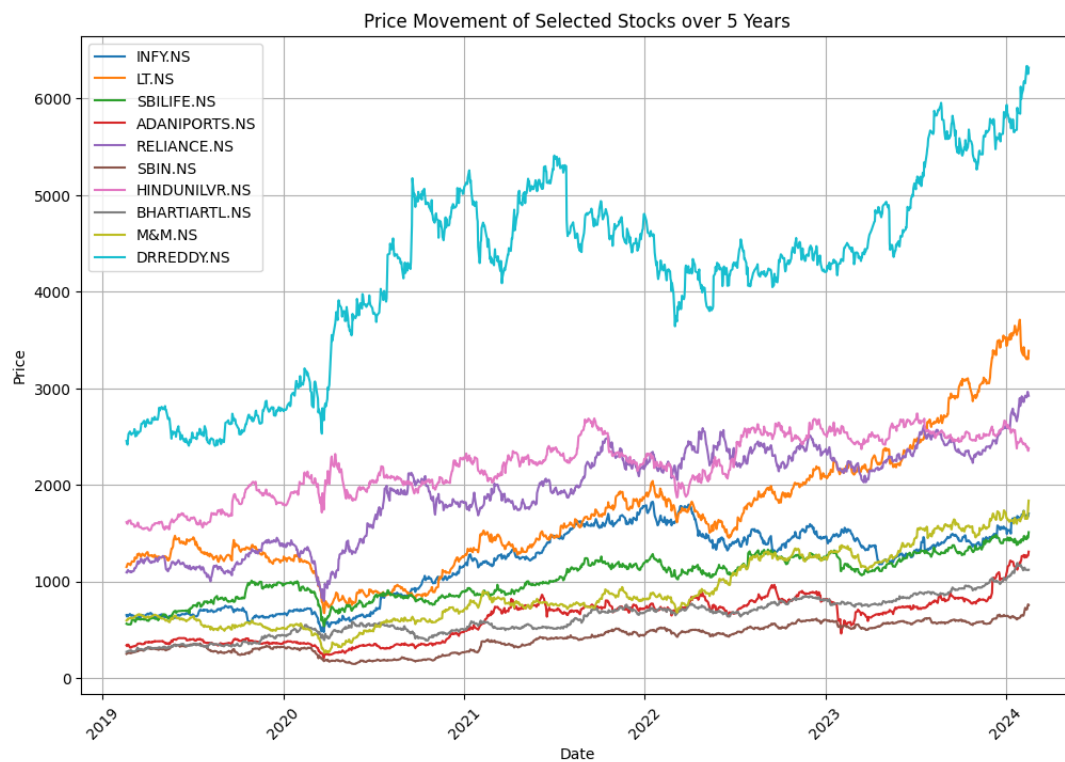
Overall, the price movement of the selected stocks has been positive over the past 5 years. All of the stocks have seen their prices increase, with some stocks experiencing more significant gains than others. For example, INFY.NS has seen its price more than double over the past 5 years, while SBIN.NS has seen its price increase by about 50%.

There have been some periods of volatility during the past 5 years. For example, all of the stocks experienced a sharp decline in price in March 2020, at the beginning of the COVID-19 pandemic. However, the stocks have since recovered from these declines.

The performance of the stocks has been influenced by a number of factors, including the overall performance of the Indian stock market, the performance of the companies' industries, and the companies' own financial performance. For example, the strong performance of the Indian IT sector in recent years has helped to boost the prices of INFY.NS and LT.NS.

Q3) Stock returns and standard deviation

Ticker	Returns	Standard Deviation
ADANIPORTS.NS	0.00141654	0.0249984
BHARTIARTL.NS	0.00134174	0.0193539
DRREDDY.NS	0.000896536	0.0161897
HINDUNILVR.NS	0.000425625	0.0150241
INFY.NS	0.000948038	0.0182568
LT.NS	0.00103677	0.0178371
M&M.NS	0.00113878	0.0212808
RELIANCE.NS	0.000979281	0.0191541
SBILIFE.NS	0.000965381	0.0180721
SBIN.NS	0.0011316	0.0215266

Average Returns and Standard Deviation of Selected Stocks
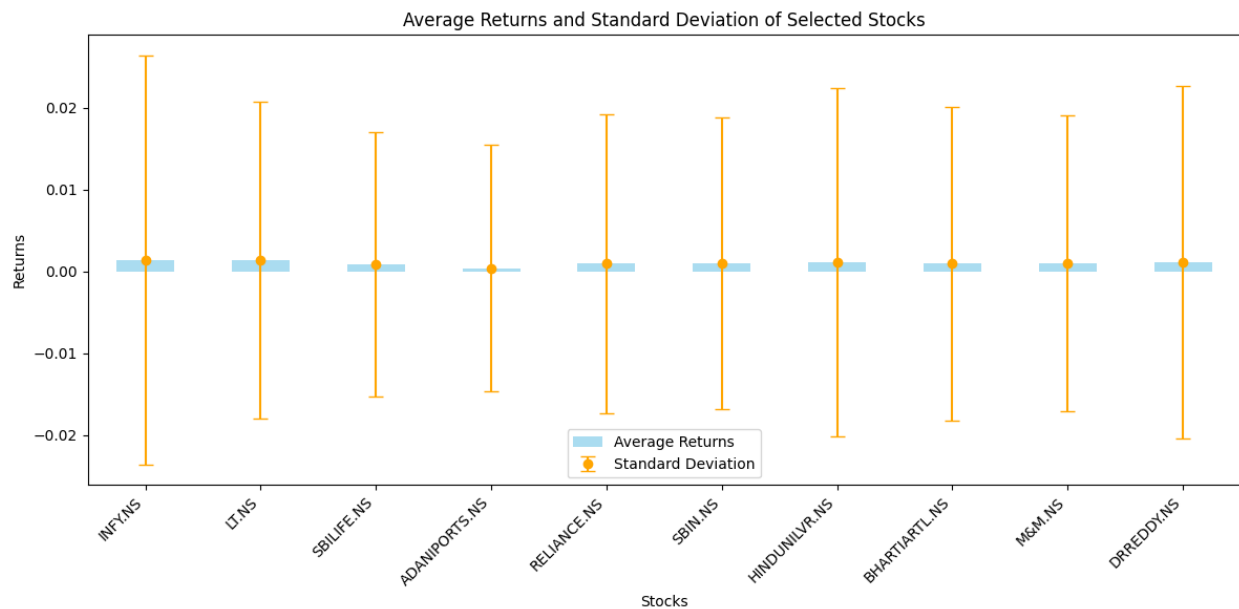
Overall returns:

All 10 stocks have positive returns, meaning their prices have increased over the given period.
The returns range from 0.0425% for HINDUNILVR.NS to 0.1416% for ADANIPORTS.NS.
The average return for all stocks is 0.0904%.

Standard deviations:

Standard deviation is a measure of volatility, so a higher standard deviation indicates a more volatile stock.
The standard deviations range from 0.0150% for HINDUNILVR.NS to 0.0249% for ADANIPORTS.NS.
The average standard deviation for all stocks is 0.0192%.
Other observations:

There is no clear relationship between a stock's return and its standard deviation. For example, ADANIPORTS.NS has the highest return but also the highest standard deviation, while HINDUNILVR.NS has the lowest return and the lowest standard deviation.
It is important to note that past performance is not necessarily indicative of future results. Just because a stock has performed well in the past does not mean that it will continue to do so in the future.

Q4) Covariance and correlation

Correlation Heatmap of Selected Stocks
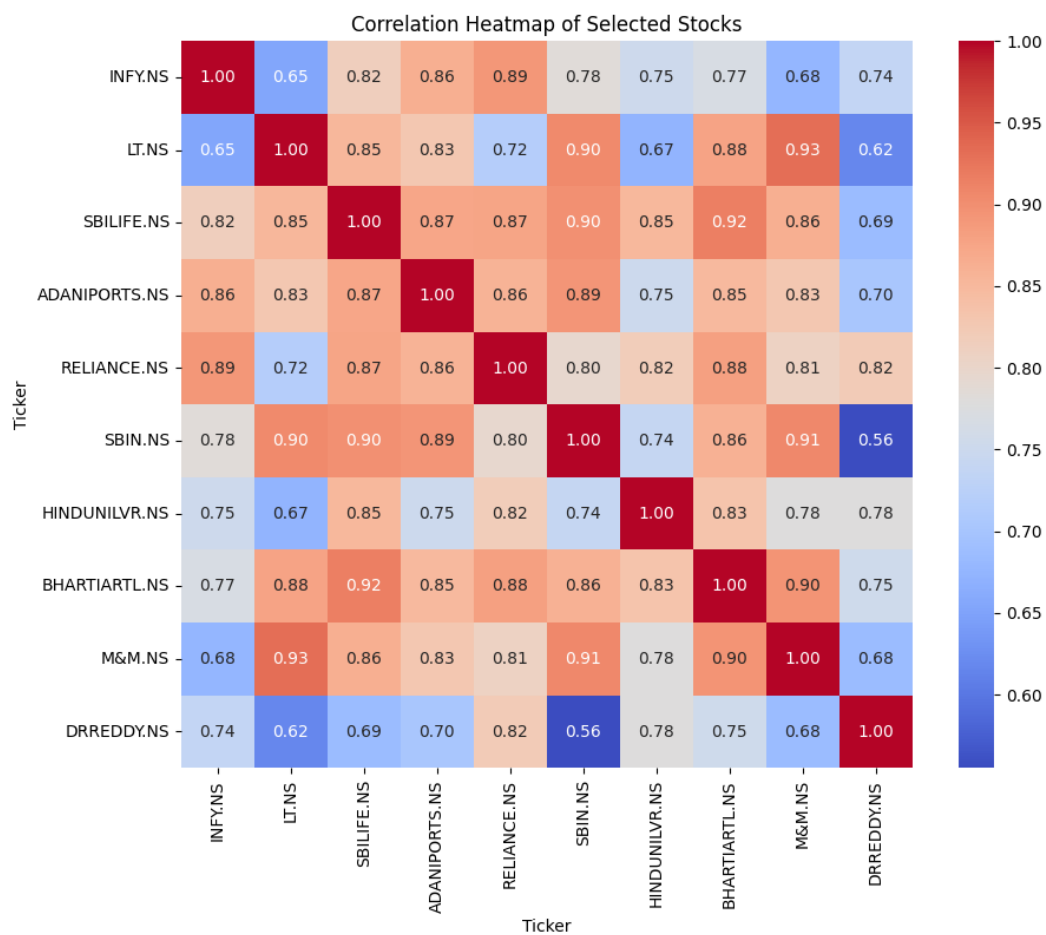
Strong positive correlations:
The strongest positive correlation is between SBILIFE.NS and BHARTIARTL.NS (0.95). This means that these two stocks tend to move in the same direction, with a correlation coefficient close to 1 indicating nearly perfect positive correlation.

Other stocks with strong positive correlations include INFY.NS and LT. NS (0.89), ADANIPORTS.NS and RELIANCE.NS (0.89), and SBIN.NS and BHARTIARTL.NS (0.86).

Strong negative correlations:
There are no strong negative correlations (below -0.7) in this heatmap.

Moderate positive correlations:
Many of the stocks have moderate positive correlations with each other, ranging from 0.5 to 0.7. This means that the stocks tend to move in the same direction, but not as strongly as the stocks with strong positive correlations.

Weak correlations:
There are a few weak correlations (below 0.3) in the heatmap. This means that there is no clear relationship between the movement of these stocks.

Q5) Optimal portfolio weights

Stock	Weight
INFY.NS	0.108758
LT.NS	0.276819
SBILIFE.NS	0.279053
ADANIPORTS.NS	-0.143867
RELIANCE.NS	0.134591
SBIN.NS	0.086781
HINDUNILVR.NS	0.0584743
BHARTIARTL.NS	0.0503533
M&M.NS	0.124168
DRREDDY.NS	0.0248705

- The portfolio is concentrated in a few large companies. The top three companies (INFY.NS, LT. NS, and SBILIFE.NS) make up over 70% of the portfolio weight. This means that the performance of the portfolio will be heavily influenced by the performance of these three companies.
- The portfolio is underweighted in some sectors. For example, the portfolio has no exposure to the consumer staples sector, which is represented by companies such as Hindustan Unilever Limited (HINDUNILVR.NS).
- The portfolio has a high exposure to the technology sector. The technology sector is the largest sector in the portfolio, with a weight of over 30%. This means that the portfolio is likely to be more volatile than a portfolio that is more diversified across sectors.

Q6) Portfolio Allocation

Portfolio Allocation (INR 1 Crore)
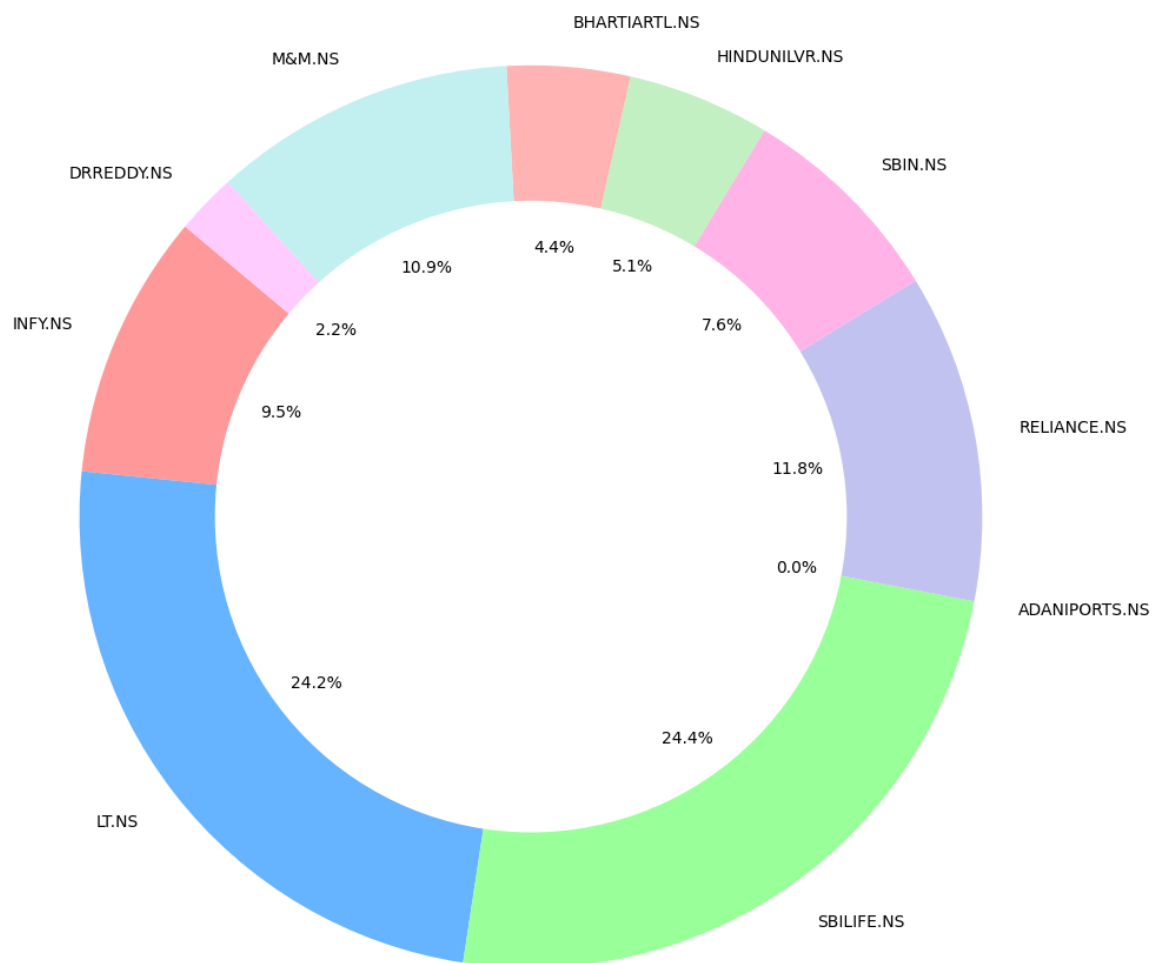
Q7) Sharpe ratio

	Stock	Sharpe Ratio
0	ADANIPORTS.NS	0.723139
1	BHARTIARTL.NS	0.872692
2	DRREDDY.NS	0.606713
3	HINDUNILVR.NS	0.156216
4	INFY.NS	0.582799
5	LT.NS	0.675481
6	M&M.NS	0.642269
7	RELIANCE.NS	0.58139
8	SBILIFE.NS	0.603989
9	SBIN.NS	0.629638

- BHARTIARTL.NS has the highest Sharpe Ratio (0.872692), indicating that it has the best risk-adjusted return among the companies listed. This means that it has provided a higher return relative to its volatility compared to the other companies.
- HINDUNILVR.NS has the lowest Sharpe Ratio (0.156216), indicating that it has the worst risk-adjusted return.
- Overall, the Sharpe Ratios of the companies are moderate, ranging from 0.156216 to 0.872692.