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Assessment: CA One

Data of the companies chosen:

Sr. No.	S&P500 Sector	Company Name	Company Ticker
1	Technology	IBM	IBM
2	Healthcare	Thermo Fisher Scientific	TMO
3	Financials	Bank of America	BAC
4	Real Estate	American Tower	AMT
5	Energy	Halliburton	HAL
6	Materials	Air Products & Chemicals	APD
7	Consumer Discretionary	Best Buy	BBY
8	Industrials	3M	MMM
9	Utilities	AES	AES
10	Consumer Staples	General Mills	GIS
11	Communications	Dish Network	DISH

Question: Comment on the results and any differences observed between the daily and monthly observation.

Answer: It can be clearly seen that the mean calculated, which means the average return over the period of time is considerably low in daily return calculation. Whereas, when we calculate the mean as per the monthly data, the returns are much higher. This can prove to be an inaccurate measure for the investor.

When we compare the standard deviation on a daily basis with the monthly basis, it can be seen that the deviation is a lot more in the monthly calculation, but when the data is taken as daily, the deviation is considerably lesser.

As per statistics, more frequent the data, more accurate the measure is. Accordingly, the daily measure is more accurate. However, it is to be noted that for convenience purpose, monthly data has been chosen for all other calculations.

It is important to mention that these calculations are done on historical data, which may depict a pattern for the future, but are not an absolute measure for calculation of the future performance of a stock.

Question: The rationale for choosing the sample period:

Answer: I have chosen the sample period 1st January, 2000 to 1st September, 2022. The reason for choosing this period is that, firstly, the requirement was for a period of at least fifteen years, so this is the most appropriate time. Secondly, it covers two significant events: the 2008 global recession and the 2019-2020 COVID period. This will give us a more accurate view, as to how the stocks have performed during the usual period, during these events, and post-event. It can help us study the correlation between the event and the stock's performance.

Question: The individual Stock Beta and comments:

Answer:

1. IBM: 0.84; The stock price is less volatile than the overall market.
2. TMO: 0.88; The stock price is less volatile than the overall market.
3. BAC: 1.09; The stock price is more volatile than the overall market.
4. AMT: 0.93; The stock price is less volatile than the overall market.
5. HAL: 1.83; The stock price is more volatile than the overall market.
6. APD: 0.74; The stock price is less volatile than the overall market.
7. BBY: 1.29; The stock price is more volatile than the overall market.
8. MMM: 0.47; The stock price is less volatile than the overall market.
9. AES: 1.98; The stock price is more volatile than the overall market.
10. GIS: 0.18; The stock price is less volatile than the overall market.
11. DISH: 1.59; The stock price is more volatile than the overall market.

Question: Rationale for making individual selections with respect to the correlation matrix:

Answer: All the stocks in the sample are positively correlated with each other, as well as the S&P500 index. Therefore, it means the stocks have a direct relationship with one another. If one increases, the other also increases. There is only one stock that is negatively correlated, and that is HAL with GIS. HAL is an Energy sector Company, whereas GIS is a Consumer Staple sector Company. One of the reasons for the negative correlation is that Energy sector has no general relation with the consumer staples, since consumer staples is an indispensable sector, whereas, Energy is not.

The reason for choosing these company stocks from the eleven S&P500 sectors is to get a broad overview of how the stocks from various industries has performed in the last twenty-two years.

Question: Are the returns normally distributed?

Answer: Yes, the returns are normally distributed. As it can be seen in the graphs in the sheet named "Normal Distribution" of the Excel Workbook. The distribution is in "bell-shape" curve. This implies that the data is normally distributed.

Summary of Statistical Analysis:

There are in all eleven sectors in the S&P500 index. A sample of eleven companies, one each from the eleven sectors was chosen. The sectors are, Technology, Healthcare, Financials, Real Estate, Energy, Materials, Consumer Discretionary, Industrials, Utilities, Consumer Staples and Communication. The Companies that are chosen from each industry have their historical data from at least 1st January, 2000. All the company data (historical data) has been taken up from Yahoo! Finance. The data for S&P500 is taken from the sheet provided by the faculty on DBS Moodle. All the companies are highly reputed and trusted in the world market. The time period chosen is from the first of January of 2000, to the first of September of 2022. Although the more frequent the data is, the more accurate the information is. The calculations are done on a monthly basis for the sake of convenience. The mean for each Company is calculated on a monthly as well as annual basis.

The mean is actually the average return. Standard deviation is calculated for the stock over the years. The standard deviation shows the extent of deviation for the stock on an average over the period of the sample chosen. The risk-free rate on an annual basis is assumed as 2%, making the monthly return as 0.17%. The Sharpe Ratio helps investors identify mutual funds' risk and return rate. This shows investors if their risk is paying off. It shows investors a fund's performance. The Sortino Ratio measures return relative to risk. It may also compare investments' returns and risks. It levels the risk playing field.

The Beta of the stock is also calculated. It shows the volatility of the stock. The Beta generally for the market is assumed to be 1. So, when the Beta is less than one, we believe the Beta is less volatile, less sensitive to the market. So, the stocks of IBM, TMO, AMT, APD, MMM, GIS, are less correlated with the market. When the Beta for a stock is more than one,

even a slight increase in the market, will provide a magnitude increase in the stock. It also signifies higher risk than average risk. So, the stocks of BAC, HAL, BBY, AES and DISH are positively correlated with the market.

Finally, the returns on all stocks are normally distributed and, if represented in a histogram, would be similar to a bell-shaped curve.