KEY TERMS

**Abnormal return or AR** measures the difference between the actual return a stock earns over a certain period and the return normally one expects to earn. A positive abnormal return means a stock performed better than the market, while a negative one indicates that the stock underperformed the market. It is the difference between the actual return of a security and the expected return. Abnormal returns are triggered by "events." Events like dividend announcements, bonus issues, rights issues, mergers, company’s earnings announcements, etc. contribute to abnormal return.

**Cumulative Abnormal return or CAR** is the sum of all abnormal returns. Cumulative Abnormal Returns are usually calculated over small windows, often only days. This is because evidence has shown that compounding daily abnormal returns can create bias in the results.

**Dividend pay-out ratio** is the percentage of earnings paid to shareholders as dividends. It is calculated as Dividend per share/Earnings per share

**Dividend policy** is the policy used by a company to decide how much it will pay out to shareholders in dividends.

**Event study** is a statistical method to assess the impact of an event on the value of a firm. It is an empirical study performed on a security that has experienced a significant catalyst occurrence, and has subsequently changed dramatically in value as a result of that catalyst. The event can have either a positive or negative effect on the value of the security. Event studies reveal important information about how a security is likely to react to a given event.

**Dividend signalling** is a theory which asserts that announcement of increased dividend payments by a company gives strong signals about the bright future prospects of the company. An announcement of an increase in dividend pay-out is taken positively by the market which helps building a positive image of the company regarding the growth prospects and stability in the future.

**Final dividend** is a payment made by companies to their shareholders, as a distribution of profits. Dividends are corporate earnings that companies pass on to their shareholders. It is the division of after tax profits amongst shareholders. Dividends are allocated in proportion to the shareholders’ holding in the firm. Many investors consider dividend distribution as an
indicator of the company’s financial well-being and they purchase a company’s stock for receiving steady income associated with dividends. Dividend paying companies are viewed favourably by investors.

**Shareholders’ value** is the value delivered to shareholders by the management’s strategic decisions like growth in earnings and dividends which affect the firm’s ability to use the amount of free cash flows.

**IMPORTANT STATISTICAL TERMS USED IN THE THESIS**

**Alpha** is a measure of the “excess return” or “abnormal rate of return” one receives over and above what is expected based on the volatility of the sector. It is a measure of an investment’s performance on a risk-adjusted basis. It takes the volatility (price risk) of a security and compares its risk-adjusted performance to a benchmark index. The excess return of the investment relative to the return of the benchmark index is its alpha.

The alpha parameter is the intercept of the fitted line and indicates what the return of the security or portfolio will be when the market return is zero. If a security has an α of +5%, it would earn 5% even when the market return is zero and would earn an additional 2% at all levels of market return. Conversely, if a security has an α of -5%, it would earn a negative 5% return. The positive α thus represents a sort of bonus return and would be a highly desirable aspect of a portfolio or security while a negative α represents a penalty to the investor.

The value of alpha shows how better or worse a stock has performed relative to its benchmark index. A positive alpha of 1 indicates that the stock has outperformed its benchmark index by 1%. A negative alpha of 1 indicates an underperformance of 1%.

An alpha is generated by regressing the security’s excess return on the benchmark’s excess return. It is the intercept.

Alpha can be used to by investors to understand how to get the highest return possible for the least amount of risk. Investors use both alpha and beta to judge an individual stock's performance. They prefer a high alpha and a low beta. However, if a stock has a high alpha and a high beta, conservative investors may not be happy. This is because the beta might make them withdraw their money when the investment is doing poorly—due to the increased volatility and possible risk of losses indicated by the high beta.
An investor’s strategy should be to buy securities with positive alpha as these stocks may be undervalued. If an investment has outperformed the benchmark ($\alpha > 0$), it means that there is more reward for a given amount of risk. If an investment has underperformed the benchmark ($\alpha < 0$), it means the investment has earned too little for its risk. For efficient markets, the expected value of the alpha is zero, i.e $\alpha = 0$ and the investment earns a return adequate for the risk taken.

While Alpha relates to factors affecting the performance of an individual stock, beta measures to market risks.

**Beta** values are tools used to determine a stock’s levels of risk. It is a measure of the stock’s volatility, or systematic risk, of a security relative to the market as a whole. Beta measures the degree to which a stock’s price fluctuates in relation to the overall market. The volatility measure gives an investor some information as to how the market will take a leap or a dive and what the security return would be.

The beta describes how the return on a stock can be predicted by a benchmark. This benchmark is generally the overall financial market and is often estimated with the help of the stock’s representative indices, such as the BSE SENSEX or NIFTY or BSE Auto index. It measures the systematic risk based on how returns co-move with the overall market.

The beta $\beta_j$ parameter is the slope of the regression relationship and measures the responsiveness of the security or portfolio to the general market and indicates how extensively the return of the portfolio or security will vary with changes in the market return. The beta coefficient of a security is defined as the ratio of the security’s co-variance of return with the market to the variance of the market. This is calculated as follows:

$$B_j = \frac{\text{Cov}(K_j, K_m)}{\text{Var}(K_m)}$$

Where $B_j$ is the beta of security $j$

$\text{Cov}(K_j, K_m)$ is the covariance of security $j$ return and the market return

$\text{Var}(K_m)$ is the variance of the market return

A beta of 1 indicates that the stock is exactly as volatile as the stock market and that the security’s prices will move with the market. The representative indices have a beta of 1. The stock moves in the same direction—upwards or downwards and in the same quantity as the
index. A high beta indicates that the security is very risky. A beta of more than 1 indicates that the stock is more volatile than the market. The security’s prices moves at a faster pace than the market. For example, if a stock’s beta is 1.4, it means that the stock is 40% more volatile than the market. The stock will outperform the market by 40% when the market is up and if the market moves downward, the stock will fall by 40%. A beta less than 1 means stock is less volatile or has fewer price swings than the aggregate market. Stocks with beta of less than 1 are safer investments, though the returns are low. A beta of less than 0 indicates an inverse relation of the stock with the index. A beta of 0 indicates that there is no correlation between the security and the market and the value of the stock remains unchanged whichever way the market moves.

**Coefficient of Determination or RSQ** is a statistical measure that represents the percentage of a security’s movements that can be explained by movements in a benchmark index. It is a statistical measure which determines how closely a certain function fits into a set of particular set of experimental data. It helps us understand how close the data are to the fitted regression line. It is the percentage of response that is explained by a linear regression model and conveys how good one term is at predicting another.

$R^2$ is calculated as Explained variation / Total variation.

$R^2$ values range from 0 to 1, with 1 representing a perfect fit between the data and the line drawn through them, and 0 representing no statistical correlation between the data and a line. The higher the value of $R^2$, predicting one variable from another is easier. An $R^2$ of 1 indicates that a stock’s movements can be explained by the benchmark’s movements. If $R^2$ is 1, then we can perfectly predict the value of one variable given the other variable. On the other hand, if $R^2$ is 0, it means that one variable cannot help predict the other variable. A person wanting to move like the benchmark would like to a have a high $R^2$. An $R^2$ measure of 76, for example, means that 76% of the security's movements can be explained by movements in the benchmark index. In general, the higher the $R^2$, the better model fits our data.

The general range for $R^2$ is as follows:
- 70-100% = good correlation between the portfolio's returns and the benchmark's returns
- 40-70% = average correlation between the portfolio's returns and the benchmark's returns
- 1-40% = low correlation between the portfolio's returns and the benchmark's returns

**Standard error** ($\epsilon$) is a statistical term that measures the accuracy with which a sample represents a population. The smaller the standard error, the more representative the sample will be of the overall population.

The standard error is also inversely proportional to the sample size; the larger the sample size, the smaller the standard error because the statistic will approach the actual value. Standard error is calculated as follows:

$$\sigma_{est} = \sqrt{\frac{\sum(Y - Y')^2}{N}}$$

Where $\sigma_{est}$ is the standard error of the estimate, Y is an actual score, $Y'$ is a predicted score, and N is the number of pairs of scores.

**Significance Test**

The result values of the data analysis should be tested to see whether it is statistically significant. Generally, 95% significance level is used and the acceptance region ranges between -1.96 to +1.96. If the result value lies between -1.96 to +1.96, the result is not considered to be statistically significant. Alternatively, if the result values are beyond this range, the results are statistically significant.