## CHAPTER – 4

### RESEARCH METHODOLOGY

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4.1 INTRODUCTION

Research is referred to a search for knowledge, it can also be define research as specific systematic search for pertinent information on a specific information on a specific topic, in fact research is an art of scientific investigation, Redman and moray defined research as a systematized effort to gain new knowledge some people consider research as a movement, A movement from the known to unknown.

Research is a diligent enquiry and careful search for new knowledge through systematic scientific and analytical approach in any branch of knowledge. Constant search and research are the guiding factor of research which helps to discover new facts.

Full form of Research includes as below and each has its own significance:

- R - Requirement
- E – Estimation
- S – Searching
- E – Enquiry
- A – Allocation
- R – Raw Data
- C – Creativity
- H – Helpful For Society Welfare

4.2 DEFINITIONS

1. V. P. Michael defined research “Research is a systematic activity directed towards investigating problems and results in an invention or discovery of tools for problem solving and decision – making.”

2. “Research comprises defining and redefining problems, formulating hypothesis or suggested solutions, collecting, organizing and reaching conclusion, and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.”
   - Clifford Woody
3. “Scientific research is a systematic, controlled, empirical and critical investigation of propositions about the presumed relations among natural phenomena.”

- According to Kerlinger, Fred N

4.3 STATEMENT OF PROBLEM

Researcher has chosen this topic on the basis of emerging trend of FII and Domestic investors in Indian Stock market. BSE-SENSEX is one of the main indicators of the Indian economic growth and the scrip is including the 30 top companies from all sectors in India. so the value creation by Indian corporate companies are needed to proper investments in capital market and EVA is as better parameter to study the real value of the corporate in Indian concerned. Furthermore In the present scenario investors are hesitant to invest in risky assets. There has always been a fear of burning hands of oneself in this volatile stock market. To understand the significant relationship between risk and return of securities, and examine the implication of Capital Asset Pricing Model in the Indian stock market in determining the required rate of return of risky securities researcher has chosen this topic.

4.4 TITLE OF THE STUDY

Title of the Study consists:

“EMPIRICAL INVESTIGATION ON CAP MODEL FOR PERFORMANCE EVALUATION OF BSE-30 COMPANIES OF STOCK MARKET”

4.5 PERIOD OF THE STUDY

Present study includes performance evaluation of BSE – 30 companies for five years. The period of the study has been commenting from 1st April 2007 to 31st March 2012.

4.6 RESEARCH DESIGN

Research design is a way to conduct a research work. It also defines as outline of research work. Researcher has been follow following method for conducting research work.
4.6.1 OBJECTIVES OF THE STUDY

1) To examine whether BSE-30 companies has been able to generate value for its shareholders.
2) To compute the performance of BSE-30 companies by applying new corporate performance measure EVA as per CAPM model.
3) To know the required rate of return of BSE – 30 companies during the study period.
4) To know whether CAPM has been applicable in Indian stock market or not.
5) To know undervaluation and overvaluation of BSE – 30 companies during the study period.
6) To give a suitable suggestion for better performance.

4.6.2 HYPOTHESIS OF THE STUDY

Hypothesis is important for evaluating of performance which shows that there is any difference among two variables or not. Hypothesis is mainly two types’ null hypothesis and alternative hypothesis.

4.6.2.1 Null Hypothesis:

If we have to compare method A with method B about its superiority and if we proceed on the assumption that both methods are equally good, then this assumption is termed as null hypothesis. It means that there is no significant difference between methods. Null hypothesis is symbolized by \( H_0 \).

4.6.2.2 Alternative Hypothesis:

As against null hypothesis, we may think that the method A is superior or the method B is inferior, we are then stating what is termed as alternative hypothesis. It means that there is a significant difference between two methods. Alternative hypothesis is symbolized by \( H_1 \).

4.6.2.3 Level of Significance:

This is very important concept in the context of hypothesis testing. It is always some percentage (usually 5%) which should be chosen with great care, thought and reason.
In case we take the significance level at 5%, then this implies that Ho will be rejected when the sampling result (observed evidence) has a less than 0.05 probability of occurring if Ho is true. Thus the significance level is the maximum value of probability of rejecting Ho when it is true and it usually determined in advance before the testing the hypothesis.

**Null Hypotheses**

- $H_0$: There is no significance difference in the performance of BSE-30 companies during the study period.
- $H_0$: There is no significance difference in the value creation ability of BSE-30 companies during the study period.
- $H_0$: There is no significance difference in the cost of debt of BSE – 30 companies during the study period.
- $H_0$: There is no significance difference in the required rate of return of BSE – 30 companies during the study period.
- $H_0$: There is no significant difference in the risk return relationship of BSE – 30 companies during the study period.

**Alternative Hypotheses**

- $H_1$: There is significance difference in the performance of BSE-30 companies during the study period.
- $H_1$: There is significance difference in the value creation ability of BSE-30 companies during the study period.
- $H_1$: There is significance difference in the cost of debt of BSE – 30 companies during the study period.
- $H_1$: There is significance difference in the required rate of return of BSE – 30 companies during the study period.
- $H_1$: There is significant difference in the risk return relationship of BSE – 30 companies during the study period.
4.6.3 DATA COLLECTION

This study is based on secondary data. The data has been collected from published annual report of selected companies. Other information related to selected companies has been collected from official website and net sources, annual report, books, journals, news paper and other printed media etc.

4.6.4 SAMPLING DESIGN

The total no. of corporate sector is the universe of the study. The population of the study consists of all the corporate sectors which are listed in BSE. But the number of corporate sector listed in BSE is very large; it is not easy to collect data of all corporate sectors. So, at this stage researcher has decided to take sample of BSE – 30 units for the study. Convenient sampling technique will be used. Here researcher takes The BSE – 30 companies as on 17\textsuperscript{th} February 2012 as given below:

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
<th>Scrip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Development Finance Corporation</td>
<td>Consumer finance</td>
<td>500010</td>
</tr>
<tr>
<td>Cipla</td>
<td>Pharmaceuticals</td>
<td>500087</td>
</tr>
<tr>
<td>Bharat Heavy Electricals</td>
<td>Electrical equipment</td>
<td>500103</td>
</tr>
<tr>
<td>State Bank Of India</td>
<td>Banking</td>
<td>500112</td>
</tr>
<tr>
<td>HDFC Bank</td>
<td>Banking</td>
<td>500180</td>
</tr>
<tr>
<td>Hero Motocorp</td>
<td>Automotive</td>
<td>500182</td>
</tr>
<tr>
<td>Infosys</td>
<td>Information Technology</td>
<td>500209</td>
</tr>
<tr>
<td>Oil and Natural Gas Corporation</td>
<td>Oil and gas</td>
<td>500312</td>
</tr>
<tr>
<td>Reliance Industries</td>
<td>Oil and gas</td>
<td>500325</td>
</tr>
<tr>
<td>Tata Power</td>
<td>Power</td>
<td>500400</td>
</tr>
<tr>
<td>Hindalco Industries</td>
<td>Metals and Mining</td>
<td>500440</td>
</tr>
<tr>
<td>Tata Steel</td>
<td>Steel</td>
<td>500470</td>
</tr>
<tr>
<td>Larsen &amp; Toubro</td>
<td>Conglomerate</td>
<td>500510</td>
</tr>
<tr>
<td>Mahindra &amp; Mahindra</td>
<td>Automotive</td>
<td>500520</td>
</tr>
<tr>
<td>Tata Motors</td>
<td>Automotive</td>
<td>500570</td>
</tr>
</tbody>
</table>
### 4.6.5 SCOPE OF THE STUDY

Scope of the study has including mainly two types:

**Functional Scope:**

Functional Scope has been including Economic Value Added and applicability of CAPM in Indian stock market. For that purpose researcher has calculate EVA as per CAPM approach.

**Geographical Scope:**

Geographical Scope has been including BSE Sensex Companies of Indian Stock Market. For that purpose researcher has collect data from their respective websites, annual reports and other printed media.

<table>
<thead>
<tr>
<th>Company</th>
<th>Sector</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindustan Unilever</td>
<td>Consumer goods</td>
<td>500696</td>
</tr>
<tr>
<td>ITC</td>
<td>Conglomerate</td>
<td>500875</td>
</tr>
<tr>
<td>Sterlite Industries</td>
<td>Metals and Mining</td>
<td>500900</td>
</tr>
<tr>
<td>Wipro</td>
<td>Information Technology</td>
<td>507685</td>
</tr>
<tr>
<td>Sun Pharmaceutical</td>
<td>Pharmaceuticals</td>
<td>524715</td>
</tr>
<tr>
<td>GAIL</td>
<td>Oil and gas</td>
<td>532155</td>
</tr>
<tr>
<td>ICICI Bank</td>
<td>Banking</td>
<td>532174</td>
</tr>
<tr>
<td>Jindal Steel &amp; Power</td>
<td>Steel and power</td>
<td>532286</td>
</tr>
<tr>
<td>Bharti Airtel</td>
<td>Telecommunication</td>
<td>532454</td>
</tr>
<tr>
<td>Maruti Suzuki</td>
<td>Automotive</td>
<td>532500</td>
</tr>
<tr>
<td>Tata Consultancy Services</td>
<td>Information Technology</td>
<td>532540</td>
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<tr>
<td>NTPC</td>
<td>Power</td>
<td>532555</td>
</tr>
<tr>
<td>DLF</td>
<td>Real estate</td>
<td>532868</td>
</tr>
<tr>
<td>Bajaj Auto</td>
<td>Automotive</td>
<td>532977</td>
</tr>
<tr>
<td>Coal India</td>
<td>Metals and Mining</td>
<td>533278</td>
</tr>
</tbody>
</table>

(Source: www.bseindia.com)
4.6.6 NATURE OF THE STUDY

This research work has been started in the form of ex-post – facto ‘study in which the researcher tried to study the existing state of affairs as well as factors affecting or causes for contradictory result. After that it is conceptual nature as it measures whether CAPM has applied in Indian stock market or not. And at last this Study is largely Empirical in approach. Since the study is analytical, with certain evidences has been used through proving hypothesis. It is based on secondary data.

4.6.7 TOOLS & TECHNIQUES

TOOLS

1. Average/Mean:

The most commonly used average is the arithmetic mean, briefly referred to as the mean. The mean can be found by adding all the variables and dividing it by total number of years taken. It gives brief picture of a large group, which it represents and gives a basic of comparison with other groups. Simple mean can be found by applying following formula.

\[ \bar{X} = \frac{\sum X}{n} \]

Where as \( \bar{X} \) = Average of sample
\( \sum X \) = summation of sampled companies
\( n \) = number of companies

2. S.D.:

The standard deviation concept was introduced by Karl – Pearson in 1823. It is by far the most important and widely used measure of studying Dispersion. Standard Deviation is also known as root mean square deviation for the reason that it is the square root of the mean of the squared deviation from arithmetic mean. Standard deviation is denoted by small Greek letter “\( \sigma \)” (Read as sigma).

The formula of standard deviation is as under.
3. Coefficient of Variance:

In probability theory and statistics, the coefficient of variance (CV) is a normalized measure of dispersion of a probability distribution. It is defined as the ratio of the standard deviation to the mean. This is only defined for non-zero mean, and is most useful for variables that are always positive. It is also known as unitized risk. The coefficient of variation should only be computed for data measured on a ratio scale. It does not have any meaning for data on an interval scale. The formula of coefficient of variance is as under.

\[ C.V. = \frac{\sigma}{\bar{X}} \times 100 \]

Where C.V. = Coefficient of Variance
\( \sigma \) = Standard Deviation
\( \bar{X} \) = Mean of Sample Company

4. Slope:

Slope is one of the important statistical tools which measure the gradient of two variables. Here in this thesis beta can be computed by applying slope. Beta is the effect of sensex return on stock return. For that purpose researcher collect daily stock prices of BSE – 30 companies and daily Sensex prices during the study period. And it can be calculated by using following formula.

\[ M = \frac{Y_2 - Y_1}{X_2 - X_1} \]

Where as \( M \) = Slope of two variables
\( Y_2 \) = today’s stock price
\( Y_1 \) = yesterday’s stock price
\( X_2 \) = today’s sensex price
\( X_1 \) = yesterday’s sensex price
5. **Return:**

The rate of return actually received on an investment over a specific holding period. For proposed study daily stock prices of BSE – Sensex companies have been taken from authenticated database of capitaline.com. For common stock, realized rate of return at time \( t \) is measured by:

\[
R_t = \frac{P_t - P_0}{P_0}
\]

Where \( R_t \) = Rate of Return

\( P_t \) = Today’s Stock Price

\( P_0 \) = Yesterday’s Stock Price

6. **Trend:**

Trend analysis is immensely helpful in marking comparative study of the changed in an item of groups of items over a period of time and to make conclusions regarding the change in date. For this purpose, a base year is selected and the amount of the item – relating to the base year is taken equal to a hundred and Index number are computed for other years based on the amount of item relating to the base years based on the amount of that item in those years.

7. **Beta:**

Beta measure the systematic risk, it shows how prices of securities respond to the market forces. Beta is calculated by relating the return on a security with return for market. Market will have beta1. If beta is greater than 1 the stock is said to be riskier than market and vice-versa. If the value of beta is zero than the risk is same as of the market. Negative beta is rare. Beta can be found by following formula.

\[
\beta = \frac{\text{Cov}_{jm}}{\sigma_j^2}
\]

Where \( \beta \) = risk coefficient/ Systematic risk

\( j \) = Stock return

\( m \) = Sensex return

\( \sigma_j^2 \) = Variance of stock return
TECHNIQUES

1. Economic Value Added:
The term ‘Economic Value Added (EVA)’ is a registered trademark of Stern Stewart & Co. of New York City (USA). Bennett Stewart in his book, “The Quest for Value”, used the term EVA with a symbol ™ as super script, which is the normal practice of referring to any registered trademark whenever the term is used. Thus EVA is actually Stern Stewart & Co.’s trademark for a specific method of calculating economic profit. “The Quest for Value” was published in 1991. Peter Drucker claimed that he discussed EVA in 1964 in his book, “Managing for Results”. It cannot be denied; however, without going into argument as to who invented EVA first that the concept became popular only after Stern Stewart & Co. marketed it.

Maximizing shareholder’s value has become the new corporate performance measurement tool in recent years. Traditionally the methods of measurement of corporate performance are many i.e., EPS, ROCE, ROI and Ratio analysis. But EVA is one of the modern techniques for performance measurement of corporate unit. EVA focuses on clear surplus in contradiction to the traditionally used profit available to the shareholder.

\[ \text{EVA} = \text{ADJUSTED NET PROFIT} - \text{WACC} \times \text{Capital Employed}. \]

Where WACC = weighted average cost of capital

\[ \text{WACC} = \text{weight to Ke} \times \text{Ke} + \text{weight to Kd} \times \text{Kd} \]

2. Capital Asset Pricing Model:
Capital Asset Pricing Model is one of the most important techniques to evaluate the corporate sector unit. Capital Asset Pricing Model as the name suggests, is a theory that explain how asset prices are formed in the market place. It is a logical and major extension of the portfolio theory of Markowitz by William sharpen (1964), John Lintner (1965) and Jan Mossin (1967).

CAPM has been used to calculate cost of equity capital by applying following formula:

\[ R_j = R_f + \beta_j \times (R_m - R_f) \]

Where \( R_j \) = the expected rate of return on security \( j \)
### 3. ANOVA:

Analysis of variance (abbreviated as ANOVA) is an extremely useful technique concerning researches in the field of economics, biology, education, psychology, sociology, business/industry and in researches of several other disciplines. When researches are conducted any field of knowledge it has a variability in the set of data. Variability exists within group and between groups. Is this variability significant, or merely by chance? The significance of the difference between the means of two samples can be judged through either Z-test or the T-test, but the difficulty arises when we happen to examine the significance of the difference amongst more than two sample means at the same time.

Professor R. A. Fisher was the first man to use the term ‘variance’ and in fact, it was he who developed a very elaborate theory concerning ANOVA, explaining its usefulness in practical field.

There are two types of analysis of variance

1) One – way ANOVA.
2) Two – way ANOVA.

In One – way ANOVA, all of the variability in the data can be divided into two types: within-groups variability and between-groups variability. Within-groups variability is the degree to which the scores of subjects in the same treatment group differ from one another. Between-groups variability is the degree to which the scores of different treatment groups differ from one another.

Two-way ANOVA technique is used when the data are classified on the basis of two factors. The technique involves the following steps:

1) Calculate total source of variance.
2) Calculate source of variance between columns.
3) Calculate source of variance within columns.
4) Calculate degree of freedom.
5) Calculate mean square.
6) Calculate F – ratio.
8) When F – calculate is lower than F – table H₀ is accepted.

4. Regression:
Regression is one of the important techniques to study effect of one variable over another. In the present study researcher studied the impact of systematic risk on expected return, the regression analysis is also carried out on sampled companies.

4.7 CHAPTER PLAN

1. Sample Profile of BSE-30:
Chapter one is about overview of BSE Sensex companies. This chapter includes history and evaluation of capital market at world level as well as at domestic, functions of capital market, history and evaluation of Indian stock market, types of capital market (Primary & secondary). Furthermore researcher has been attempting to disclose number of stock market in India with special reference to Bombe Stock Exchange. Researcher also discloses profile of BSE – 30 companies as on 17th Feb. 2012.

2. Conceptual Framework of CAPM Model & EVA:
In the second chapter of the study researcher discloses theoretical aspect of capital asset pricing model and economic value added. In this chapter researcher mention origin of EVA, history & evolution of EVA, assumptions under EVA, Advantages & Limitations of EVA, how to calculate EVA and different types of methods for cost of capital. Furthermore researcher also discloses History & evolution of CAPM, assumptions under CAPM, important meaning under CAPM, risk return relationship under CAPM and Advantages & Limitations of CAPM.

3. Review of Literature:
Literature Review is a body of text that aims to review critical as well as favorable points of research papers, books and thesis including substantive findings as well as theoretical and methodological contributions on a particular topic. In this study
researcher has been attempt to review on Economic Value Added as well as Capital Asset Pricing model with review of performance evaluation. For that purpose researcher has review literature through various books & thesis, various research papers regarding EVA, CAPM and Performance Evaluation. Among them researcher tried to review foreign study as well as domestic study regarding EVA, CAPM and Performance Evaluation.

4. **Research Methodology:**
Chapter on Research methodology indicates research plan of the researcher. This chapter shows introduction of research, title of the study, objectives of the study, scope of the study, nature of the study, hypothesis of the study, research design, significance of the study, outline of chapter plan and limitation of the study.

5. **Data Analysis & Interpretation:**
Data is the blood for the research. But after the collection of data proper tabulation, analysis, interpretation and presentation of data are needed for converting them in meaningful manner. In the chapter five data analysis and interpretation researcher has been tried to find out EVA statement of BSE – 30 companies during the study period. For that purpose researcher calculate cost of debt, cost of equity as per CAPM, beta value, weight to Ke, weight to Kd and WACC of BSE – 30 companies during the study period. Furthermore researcher also tried to find out whether CAPM is applicable in Indian stock market or not, which securities are undervalued and overvalued during the study period.

6. **Findings, Suggestions & Conclusion:**
This chapter includes summary of each chapter and findings of the study, and last but not the least suggestions for increase shareholder’s value creation, where and how investors invest their money in the securities.

4.8 **SIGNIFICANCE OF THE STUDY**
The Empirical findings of this study have been useful to financial analysis in Indian Capital Market. Through this study manager has been obtain better information – and
Research Methodology

has been more motivated – to make decision that has create the greatest shareholder wealth in corporate sectors. It is universally accepted that the goal of financial management is to maximize the shareholder’s value. EVA as per CAPM Model is modern performance evaluation technique which has help to the shareholder in evaluating the company’s ability for creating shareholder’s wealth.

4.9 LIMITATION OF THE STUDY

1) This study is based on secondary data taken from published annual report and websites. The reliability and the finding are contingent upon the data published in annual report.

2) Present study is undertaken for a particular period of time. So findings cannot be applicable for a very long period of time.

3) The individual efforts is limited so it also limitation of the study.

4) Personal view from person to person may be differed.
REFERENCES

Books & Theses


Research Papers
