An Analysis of Capital Asset Pricing Model (CAPM) in the Indian Equity Market

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Declaration

I, **<u>Debajit Rabha</u>**, hereby declare that the dissertation entitled "An Analysis of Capital Asset Pricing Model (CAPM) in the Indian Equity Market" is a result of research work carried out by me at Mizoram University, Aizawl Mizoram state, under the guidance and supervision of Dr. Rajkumar Giridhari Singh, Assistant Professor, Department of Management, Mizoram University.

I further declare that this dissertation has not been previously submitted, in part or full, to this University or any other University for the award of any Degree. Due acknowledgements have been made wherever anything has been borrowed or cited from other sources.

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Acknowledgement

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1.1 Introduction:

Capital market is an important aspect under the discipline of finance. A capital market is a platform where all types of financial assets such as long-term debt or equity backed stocks are sold and bought. It plays a very crucial role in the financial system. It provides the aid of capital formation of the nation's industries. Stock market helps in mobilizing the idle resources efficiently to the one who need it. It acts as a channel through which savings are allocated for investment.

The different types of economic reforms undertaken by the government has influenced the functioning and governance of the capital market. Since liberalization Indian capital market also went through transformation. The prime aim of these reforms are to improve the efficiency and performance of the market like curbing unfair trade practices, transparent stock market transactions and match the international standards. Overall there has been constant reforms within Indian capital market especially in the secondary market to meet the latest updates in technology. With the help of modern technology the secondary market introduced online trading which revolutionized the traditional stock market.

Capital market act as a middlemen between the investors and the fund needy people. The capital market provides the long term funds and medium term funds requirements of different individual firms. The capital market basically deals with the shares of various company's stocks, bond and debentures. There are tons of people who are having savings of money without proper utilization, so basically in the capital market this unused funds are mobilized for productive purposes through investment. Ultimately it acts as aid to the economy of a nation for growth and progress rapidly in the way of mobilizing the savings into productive purposes. The investors get return against their investment in the way of interest or dividends.

In the area of financial management asset valuation or pricing have an important place. During the early birth of the discipline, it was concerned with only valuation of individual securities and the market environment. In today's scenario, the subject covers the broader aspects of asset valuation. For an investor asset valuation is very important because it will ultimately lead to determine the true profit. Asset pricing is an important part of the stock market. In the modern financial era various methodologies are developed for valuation of different types of assets which helps investors for better decision making. The Capital Asset Pricing Model (CAPM) is the pioneer

in the area of asset pricing. It was developed in the early 1960's since then the model has been used for valuation of asset.

1.2 Capital Asset Pricing Model (CAPM):

The CAPM is used to determine a theoretically indispensable rate of return of a risky security and to make decisions before adding it in a well-diversified portfolio. The model defined that the probable return of an asset is based on the market factors and the market factor is known as "beta" which determines the volatility of an asset's return that changes according to market environments. According to the model there are two types risks associated with an asset i.e., (i) systematic risk and (ii) unsystematic risk. Systematic risk also known as market risk is related with the market which cannot be eliminated and it is a non-removable risk. The other element of the risk is called unsystematic risk which are company specific. The unsystematic risk can be reduced by diversifying the securities. The model says that the return of an asset solely depends on the market risk which is the "beta" and not on the unsystematic risk or the controllable risk which can be reduced by diversification. This is the main reason for considering "beta" or market risk as the sole factor in CAPM.

1.3 History and Evolution of the Model:

The model was initially introduced by Jack Treynor (1961, 1962). It was further developed by William Sharpe (1964), John Linter (1965) and Jan Mossin (1966). They developed the model independently on the earlier work of Harry Markowitz (1952, 1959) on diversification and modern portfolio management. The Sharpe's (1964) CAPM model is the most important asset valuation model which delivers the correlation among the expected return and the risk associated with capital assets. For the contribution in financial economics Sharpe, Markowitz and Miller were jointly awarded Nobel Prize in 1990.

Markowitz (1959) model proposed that investors prefer a portfolio which will maximize the return of the portfolio or give a precise level of return by reducing the variance of portfolio return. That's why Markowitz model is also called a "mean-variance model". It assumes that investors are well planner, risk-averse and opportunity maximizer who prefer to have minimum variance in the securities return and therefore, selection stocks for building a portfolio totally

depends on the investor's risk bearing capacity. Thus investors pick a portfolio of only one period investment which they look closely in the disparity of their investment yield.

Sharpe (1964) and Linter (1965), on the basis of Markowitz model which depends on the trade-off between risk and return, came up with a new model called CAPM by adding two more additional key assumptions. The first additional assumption is that all investors can withdraw or provide loan of unlimited money at zero risk. The second important assumption is that all investors in the market have homogeneous anticipations, which is due to similar estimation of probability distributions for future return.

1.4 The Assumptions of the Capital Asset Pricing Model:

CAPM is depended on the assumptions introduced by Harry Markowitz (1959).William Sharpe (1964) and John Linter (1965) made addition of two most important assumption to the Markowitz model. All the assumptions are discussed below:

1. All the investors in the market can withdraw or provide loan of unlimited money at zero risk which is similar for all investors irrespective of the sum they withdraw or lend.
2. The investors have similar expectations from their investment which means they estimate the identical allocations for the prospect rates of return;
3. The model assumes that the investors of the capital market invest for similar single period of time;
4. The participants of the capital market can sell or buy their holding stocks at any point of time;
5. CAPM assumes that there are no transactions cost and no taxes on the purchase or selling of securities.
6. The model also assumes that there is no changes or inflation in the interest rates.
7. The model assumes capital market is a balance market where all stocks are impartially valued.

In reality these assumptions seem to be far from reality but to represent reality some of the assumptions may be relaxed, on the basis of financial theory. The model still has been followed by a massive amount of investors and researchers and there is a theoretical solution to the identification of a tangency portfolio. In the 1960's and 70's, CAPM receive very good response

from the academicians. However, few academicians like Reinganum (1981), Lakonishok & Shapiro (1986), Andor, Ormos & Szabo (1999) and so many other academicians found many deviations. The present study intends to empirically analyze the CAPM for the Indian equity market.

The model of CAPM is presented (1.1)

$$R_i = R_f + \beta_i(R_m - R_f) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1.1)$$

Where, R_{it} = stock return

R_{ft} = Risk-free rate of interest

β_i = Beta of the stock

R_m = Market Return of the proxy

1.5   Important Terms under CAPM:

1.5.1   Risk:

Risk can be defined as the difference between the expected return and the actual return. In simple worlds, risk is the variability of return from a security or an investment. There are basically two types of risks for a security i.e. unsystematic risk and systematic risk. The unsystematic risk can be diversified whereas the systematic risk cannot be diversified. The unsystematic risk is company specific and the systematic risk is market pervasive. The systematic risk is represented by beta (β).

1.5.2   Risk-Free Rate of Return:

An asset who has zero volatility in the rate of return is known as risk-free assets. Examples of risk-free rate of return security may be the rate of return on T-Bills (91 Days, 180 Days and 365 Days T-Bills), Bank Rate, Government Bonds, etc. For the present study 91 Days T-Bill is taken as the proxy risk free rate of return.

1.5.3   Realized Rate of Return:

It is nothing but the actual return received from an asset over a specific period of time. In the present study both daily and monthly stock prices of 100 selected companies from BSE S&P

500 have been taken. The realized return for common stocks can be determined at time 't' using the following method:

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}}$$

Where R_{it} = Return of the ith stock.

P_{it} = Today's closing price of stock

P_{it-1} = Yesterday's closing price of stock

1.5.4 The Rate of Return on Market Proxy/Index:

The rate of return from market index is considered as the return on market proxy or index. The return for the market may be like return on NSE-Nifty 50, Nifty100, Nifty 200, Nifty 500, BSE-Sensex, Sensex 50, S&P 100, S&P 200, S&P 250, etc. For the current study the BSE S&P 200 Index return has been chosen as the market proxy.

1.5.5 Risk and Return Relationship:

According to the model, the risk and return of an asset need to be co-related. A higher risky security must provide a higher return compared to a lower risky security.

1.5.6 Trade-off between Risk and Return:

The trade-off between risk and return presume that all the markets are well-organized and no-intercept-profit can be found. If the investors found that there is a higher expected return for a particular stock then there will be a high demand for that particular stock and due to high demand the price of that particular stock will also increase. If an investors buy that particular stock when the price is positioned at high, he can expect a reasonable return at that risk level. Similarly, when a stock positioned at too high risk related to the price, then the investors will try to sell the common stock and ultimately the value of the common stock will fall due to low demand. This position will continue till the return of the stock matches with the risk or reached equilibrium position. In risk and return tradeoff the investors expect higher rate of return for taking risk on stocks.

1.6   The Advantages of Capital Asset Pricing Model:

a. The model considers only one factor of risk i.e. systematic risk, on the basis of which the investors constructs diversified portfolio to eliminate the other risk factor i.e. unsystematic risk. The unsystematic risk is avoidable and can be reduced with the help of diversification of portfolio.

b. It is considered as the better option for calculating cost of equity compared to the Dividend Growth Model (DGM) because the model considers systematic risk of individual stock as a whole in relation to the stock market.

c. The model is also better than Weighted Average Cost of Capital (WACC) in allocating discounting rates for the purpose of venture evaluation.

d. The model can also act as an educational tool for understanding the different phenomena which affect the asset prices in the capital market.

1.7 The Limitations of Capital Asset Pricing Model:

Many researchers have many times evaluated and tested the model and commented that the model is just a theoretical model and not practical in real world. The assumptions of the model itself suggested that it is not applicable in the present business world. Some of the major limitations of the CAPM include the unrealistic assumption of (i) the availability of risk-free securities; (ii) all the securities are perfectly divisible and easily marketable (human capital is not divisible); (iii) the existence of similar or homogenous expectations related to expected return; (iv)the security returns are commonly distributed. The model is also criticized on the ground that it is a one period model; the model cannot be empirically analyzed as we cannot analyzed the investors' expectations; and the model considers only one factor i.e. Beta for determining the mandatory rate of return. The present market have several other factors that affect the securities return like inflation, dividend payout, etc. other than the beta.

1.8   Significance and Scope of the Study:

India is one of the fastest growing economy in the world. For a growing economy, capital market plays an important role to allocate the funds required by different sectors of the economy. There are large number of individuals as well as institutional investors consisting of domestic and international who actively participate in the capital market. All the investors in the market are

investing money in stock market expecting good return out of it. There is always uncertainty of return on investments and the investors are affected by high volatility of the stock market. CAPM helps to reduce the uncertainty or risk on investment. The model price the assets at time of purchase to check whether it is undervalued or overvalued. If it is overvalued then investors are suggested not to purchase the stock whereas if the stock is undervalued they can purchase it. The model also help in constructing a well-diversified portfolio by considering the risk factor. It splits the risk factor into two parts that is market risk i.e. "beta" and avoidable risk or unsystematic risk. The model says that higher the beta value of a stock higher the return of that particular stock and lower the beta value of a stock lower the return of that stock. The present study intends to analyze the validity of the model in the Indian equity market. The study is important to draw a conclusion on the validity of the model in the Indian equity market. The outcome of the study will help the investors in deciding the utility of the model for predicting their returns on investments. Thus, the study is pursued to examine whether in today's scenario the model is able to explain the risk and return factor or not. The outcome of the study shall contribute the effectiveness of the CAPM model in asset pricing and better decision making for the investors. The current study covers the stocks listed in BSE S&P 500 Index of the Bombay stock exchange (BSE). The BSE 200 Index is chosen as the proxy for market return and 91-Days T-Bill as the risk-free rate of return. The study covered 25 years of data from April 1993 to March 2018. For the present study out of BSE S&P 500 Index listed stocks only those stocks are selected whose complete data is available during the study period.

1.9   Research Design:

Research design is the way of conducting a research. It can be also defined as the synopsis for the research work. The following procedure has been followed for conducting the research work.

1.9.1   Statement of the Problem:

Indian stock market is one of the largest stock market in the world. BSE (Bombay stock exchange) and NSE (National Stock Exchange) the two largest stock exchange in the country. BSE has the highest numbers of listed companies around the world with 5749 companies as on January, 2018 and 1696 companies are listed in NSE as on March, 2016. Investors from domestic as well as from around the world is coming up for investment in the Indian equity market. But

investment process is not a simple process. Before investing in a particular company it is important to know the price of a particular company's stock whether it is overvalued or undervalued. If the company's stock is overvalued it is suggested not to buy the stock but if it is undervalued the investors can buy the stock. It is an important necessity for investors to find out the right price for the assets under consideration for investment. CAPM is one of the most widely used model all over the world in determining the stock price. The model was introduced long time back and there have been changes happening in the market scenario. The market scenario of today is far-reaching different from the time when model was first introduced. There are so many factors which affect the stock market. The present study is an attempt to analyze the validity of the CAPM in today's market conditions by finding out whether the model rightly predict the return of a stock against the risk involve in it.

1.9.2   Objectives:

    a.   To measure the market risks of the stocks using beta as a measure of risk.

    b.   To assess the selected companies' stocks are undervalued or overvalued during the study time.

    c.   To examine the validity of the CAPM in the Indian equity market.

1.9.3   Methodology:

1.9.3.1 Data Source:

The present study is based on secondary data. The data is collected from the BSE website, RBI website, etc. The other information relating to the study has been collected from the official websites of the companies, annual reports, books, journals, newspaper and other printed media, etc.

1.9.3.2   Period of the Study:

The data covered for 25 years starting from April 1993 to March 2018.

1.9.3.3   Sample:

For the study both daily and monthly price data of the companies listed in the BSE S&P 500 were collected. Out of 500 stocks only those stocks were taken whose complete data is available for last 25 years. For the present study 113 companies were found to have the data for

the selected years (i.e 25 years) but some of the company's data was missing during the course of time. Finally 100 companies which have the complete data for the 25 years were selected as the sample of the present study. BSE S&P 500 index represent about 90 percent of the free float market capitalization of the stocks listed on BSE as on 31ˢᵗ March, 2018.

1.9.3.4 Tools of Analysis:

The collected data has been used to construct portfolio where first five years data were used to compute the beta or to estimate the variables and the corresponding year data were used to build 10 beta sorted portfolios and their returns. All the constructed 10 portfolios' daily and monthly returns were calculated from April 1998 to March 2018. The portfolios return time period were again divided into four sub-periods to test the results of the portfolios. Each sub-period consists of 5 years data from April 1998 – March 2003, April 2003 – March 2008, April 2008 – March 2013, and April 2013 – March 2018. The BSE 200 Index have been taken as the proxy of the market benchmark for the present study because S&P 500 does not have full data for last 25 years. The BSE200 Index is the top 200 largest companies listed at BSE based on size and liquidity across sectors. 91 days Treasury bill is taken as the proxy of risk free rate of return from RBI database.

a. **Average/Mean:**

The most frequently used average is the arithmetic mean. The procedure to find mean is nothing but adding of all the observation and the same is divided by the total number of years taken. The mean can provide an overview of a large sample group, which gives the basic comparison with different groups. The basic mean is found out by applying the following formula:

$$\bar{X} = \frac{\sum X}{n} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1.2)$$

Where

$\bar{X}$= is the average of sample

$\sum X$= is the addition of all the sampled companies

n= is the total number of sampled companies

b. Regression:

Regression analysis is one of the pioneer tools to analyze the effect of a single variable over the other one. For the current study the researcher analyzed the impact of market risk (or, systematic risk) on the expected return. The regression methodology has been applied on the sampled companies.

Time series Regression Analysis is adopted to analyze the data and interpret the results.

1. Return of the asset is calculated as below:

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} * 100 \quad \text{... (1.3)}$$

Where R_{it} = Return of the ith stock.

P_{it} = Today's closing price of stock

P_{it-1} = Yesterday's closing price of stock

2. Similarly Return of the market portfolio is calculated as below:

$$R_{mt} = \frac{P_{mt} - P_{mt-1}}{P_{mt-1}} * 100 \quad \text{... (1.4)}$$

Where R_{mt} = Return of the market portfolio (BSE 200).

P_{mt} = Today's closing price of market portfolio

P_{mt-1} = Yesterday's closing price of market portfolio.

3. The beta for all the securities are computed using the model (1.5). The excess return of the different stocks and market proxy are computed by subtracting the risk free rate of return from the real return and the beta for all the securities are computed.

$$R_{it} - R_{ft} = \alpha + \beta_i(R_{mt} - R_{ft}) + e_{it} \quad \text{... (1.5)}$$

Where R_{it} = stock return

R_{ft} = Risk-free rate of interest

β_i = Beta of the stock

e_{it} = error term

4. The five years data have been used to compute the beta for the securities. The data from April, 1993 to March, 1998 were used for computation of the first beta. Likewise the next betas were computed from the period April, 1994 to March, 1999 and so on.

5. The computed beta is used for the purpose of portfolio construction. Firstly, all the betas were sorted from high beta value to low beta value each year at the end of March. Then,

10 portfolios were formed by taking 10 stocks for each portfolio beginning from the highest beta securities to lowest beta security. In that way, the study had 10 beta sorted portfolios for 20 years beginning from April, 1998.

6. Both the daily and monthly return data are computed for each portfolio as a simple average of the daily and monthly return of each constituent securities. This gives the portfolio return data for 10 portfolios from April 1998 to March 2018.

7. The portfolio betas were calculated by regressing the daily(or monthly) return for each portfolio on the excess return of market portfolio by using the following method

$$Z_{pt} = \alpha_p + \beta_p Z_{mt} + e_{pt} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(1.6)}$$

Where, Z_{pt}= excess daily (or monthly) return of the portfolio

$\quad\quad\quad \alpha_p$= intercept

$\quad\quad\quad \beta_p$= beta value of the portfolio

$\quad\quad\quad Z_{mt}$= excess daily (or monthly) return of market portfolio

$\quad\quad\quad e_{pt}$= residual term

8. To test the CAPM in India the following regression equation is used:

$$Z_{pt} = \gamma_0 + \gamma_1 \beta_p + e_{pt} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(1.7)}$$

Where, Z_{pt}= average excess return of portfolios over risk free rate for 20 years period,

$\quad\quad\quad \gamma_0$= intercept value

$\quad\quad\quad \gamma_1$= market risk premium which is the regression coefficient for this equation,

$\quad\quad\quad \beta_p$= the beta of the portfolio computed in (1.6)

$\quad\quad\quad e_{pt}$= the residual term or error term

9. The CAPM the expected return can be found through the following formula:

$$R_i = R_f + \beta_i(R_m - R_f) + e_i \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(1.8)}$$

Where R_i= expected return of security i

$\quad R_f$= Risk free rate

$\quad \beta_i$= Beta of the security i

R_m= Market Return of the stock

e_i= error term

1.10   Chapterisation:

The present study is divided into six chapters.

Chapter 1: Introduction

The first chapter is all about introduction of the CAPM and research methodology. In this chapter the history and evolution of the model, the assumptions of the model, some major terms under CAPM, the risk-return relationship under the model, and the benefits & limitations of the model are discussed. The significance and scope of the study, the research design, the statement of the problem, the objective of the study, sample, and tools of analysis forms part of the chapter one.

Chapter 2: Literature Review

Chapter 2 comprises the literature review related to the present study. The literature review covered literature related specifically to the test of the model in the developed countries and developing countries. The review also covered the literature relating to the market proxy selection criteria.

Chapter 3: Overview of Indian Capital Market

In chapter 3, the overview of the Indian capital market are discussed in detail. In this chapter the functioning of the capital market are highlighted. The overview of stock exchange and the history of stock exchange in India as well as in the world are also discussed in this chapter.

Chapter 4: Data Analysis and Interpretation for Daily Return Data

The analysis of data is carried out in this chapter. Data are analyzed for the daily return data of the selected companies. The analysis are done to find out the validity of the CAPM model. The collected data were analyzed using regression.

Chapter 5: Data Analysis and Interpretation for Monthly Return Data

Under this chapter data are analyzed for the monthly return data of the selected companies. The analysis are done to find out the validity of the CAPM model. The collected data were analyzed using regression.

Chapter 6: Conclusion and Suggestions

In the chapter 6, the summary of the findings of the research on the validity test of CAPM in the Indian Equity Market are discussed. The conclusion relating to the model has been drawn and finally the scope of future research are also presented in this chapter.

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Chapter-2

Literature Review

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2.5	Study of CAPM in Developing countries
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2.1   Introduction:

In this chapter literatures related to the CAPM have been reviewed. The current chapter built the background of the present research plan using the existing literature reviewed. A broader view of the existing literature relating to the study of CAPM in India and abroad has been attempted in this chapter.

2.2   Overview of the Literature around the World:

The core theory of all asset valuing model is the Capital Asset Pricing Model (CAPM). It was developed in the early 1960's and during the course of time many researchers have empirically tested the model in many parts of the world and the results of these tests are mixed. Some have affirmatively found the validity of the model in explaining the market return and risk involved (Fama&MacBeth,1973;Modigliani, Pogue & Solnik, 1973; Elsas, El-Shaer & Theissen, 1999; Isa, Puah & Yong, 2009; Zhang & Wihlborg, 2010; Lehmann &Stehle, 2012; Dai, Hu & Lan, 2014; Bruckner &Mohsen, 2017) whereas many researchers question the validity of the model in today's business scenario (Reinganum,1981; Lakonishok & Shapiro, 1986; Andor,Ormos& Szabo, 1999; Agrawal, Mohapatra & Pollak, 2012; Yasmeen, Awan, Ghauri & Waqas, 2012; Karakoc, 2016;Gahe, Hongzhong, Allate & Belinga, 2017). In the Indian context also mixed results are found. Pettingil, Sundaram, & Mathur (1995), Ansari (2000), Dhankar & Kumar (2007), Bajpai & Sharma (2015), Pandey (2016), have found the validity of CAPM model whereas study conducted by Gupta (1981), Gupta & Sehgal (1993), Ray (1994), Sehgal (1997), Madhusoodan (1997), Basu & Chawla (2010), Chaudhari (2016), Hussain & Islam (2017) contradicted the validity of CAPM in India.

Markowitz (1959) found the concept of diversification quoted as "do not put all your eggs in one basket" and started the selection of portfolio on the basis of quantitative techniques. He advocated the portfolio construction by diversification of the securities to reduce the portfolio risk. He found out that with the help of statistical tool investors can choose a portfolio where variance of portfolio return will be low but it'll give specific return or maximum expected return, for a definite level of variation. That's why the model (Markowitz portfolio) is also known as "mean-variance model". Both Sharpe (1964) and Linter (1965) developed the CAPM which is an

improvement of the Markowitz portfolio model. The CAPM explains the relation of risk associated with return of investment. The model explains that the return for a particular stock is related to market risk or in financial term "beta" (β) of a stock which estimate the sensitivity of a stock return to market constraints.

Fama & MacBeth (1973) studied the relationship between average return of common stock and risk associated with the stock. Their study which is one of the leading paper in early 70's uses data from the NSE (New York Stock Exchange) common stocks or equity shares and the data were collected from the Centre for Research in Securities Prices. The time period covered for the study was from January 1926 to June 1968. They have found that there is a direct relationship between the risk of an asset and the return of that particular asset, and beta is a proper evaluator of the risk and the return. Therefore, they concluded that the model is a proper model for valuing the assets which can be applied for constructing a well-diversified portfolio with a certain level of risk adequately calculated by beta.

Modigliani, Pogue & Solnik (1973) test the CAPM using daily stock prices and dividend data for 234 equity shares (or common stocks) of eight key European nations from March 1966 to March 1971. Later security returns were converted into bi-weekly basis which reduces the difficulties of measuring error naturally available in daily return and also sampling inefficiencies related with longer breaks. The eight European countries stocks chosen for test were: France (65), Italy (30), United Kingdom (40), Germany (35), Netherland (24), Switzerland (17), Belgium (17), Sweden (6), and United States (900). The United States data from NYSE were chosen for comparison and collected from Chicago CRSP monthly stock price and dividend for all stocks listed on the NYSE during the period of January 1926 to June 1970. Then portfolios were constructed for four major European market and US market according to their beta value, the highest beta value in the first and lowest in the last. France had five portfolios with 12 stocks each, Italy had three portfolios with ten stocks each, UK had four portfolios with ten stocks each, Germany had three portfolios with eleven stocks each and US had ten portfolios from all available stocks. The grouping criteria for US market was constructed on estimated beta value in the earlier five year period and all the constructed portfolios for the study were updated each year for including new stocks. Approximately 75 stocks on average are in each portfolio for a longer period and from March 1967 to June 1970 it was 100 stocks each. The study found that systematic risk

plays an important factor for pricing the stocks in the European market. The study also showed positive relationship between risk and return in all the European country except Germany.

Reinganum (1981) tested CAPM to find out whether the stock's return differ according to market risk or beta (β) as mentioned in the model. To test the model two set of data sample had been collected from New York Stock Exchange and American Stock Exchange of all stocks which are traded in the exchange. The first set of data were collected from NYSE and AMEX on daily basis for the period of July 1962 to December 1979 and the final part of data set was collected from NYSE for 45 years on monthly basis starting from 1935 to 1979. From the first data set analysis i.e. from 1964 to 1979 it was found that both NYSE-AMEX stock portfolios were having almost similar average returns irrespective of their beta value and the second monthly data of NYSE dated back from 1935 to 1979 also found identical results. The study concluded that there is no significant proof found of high beta value portfolios generating high returns and lower beta value portfolios generating low returns. They observed that beta is not systematically related to the average return. They suggested that the beta value aspect alone is not enough to describe the expected average return of an asset.

Banz (1981) did similar study at New York Stock Exchange. The study was based on data collected from NASDAQ period ranging from 1936 to 1975, the author found that return of small companies were higher compared to bigger size companies. Therefore, the study summarized that the model was not a decent model to describe the asset return as it is unable draw a significant relationship between systematic risk and average return.

Lakonishok & Shapiro (1986) found that there is no significant relationship between market risks or 'beta' and average return. They found that both traditional measure of risk which is 'beta' and alternative measure of risk which is variance or residual standard deviation are not able to explain the cross-sectional variation in returns, only the size appeared to be mattered. They carry forward the study grounded on the work of Banz (1981) and Reinganum (1981). The study covered a time period of 1962 to 1981 and found that it is the size which matter the most. During the course of time some other factors were discovered which are presumed to be the explanatory of the average return.

2.3   Study of CAPM in Developed countries:

Elsas, El-Shaer & Theissen (1999) found positive result of CAPM using monthly returns of Deutschar Aktienforschungs index (DAFOX) domestic stocks for 36 years from 1960 to 1995. The sample period i.e. 36 years were divided into seven 12 years sub-periods in a way that the assessment periods do not edge with one another. Again the 12 years further sub-period divided into a four years portfolio formation period, a four years estimation period and a four years test period. Based on the beta value 20 equally weighted portfolios were constructed. The first portfolio had the highest beta value stocks and last portfolio had the lowest beta value stocks. The study found significant relationship between beta and risk. Therefore, the basic hypothesis of CAPM i.e. high beta stocks generating high return were found significant and the study concludes that CAPM is significant in the German stock market.

Andor, Ormos & Szabo (1999) using daily and monthly stocks returns of 17 Hungarian companies listed in the Budapest, did an empirical test of Capital Asset Pricing Model. The time period of the study were from 1st June 1994 to 31st June 1999. The study found that CAPM in Hungarian capital market acceptably describes the average return of the stocks but compared to highly developed economy it is weak.

Zhang & Wihlborg (2010) tested CAPM in Six European emerging capital market. They have tested the model both for national version and international version. Using two data sets. The first data set consists of monthly stocks prices from the six European emerging markets, i.e. Cyrus, Czech Republic, Hungry, Poland, Russia, and Turkey. The second data set includes monthly macro prices: consumer prices, stock market indices, and risk-free returns for the same six markets, a world market index (Morgan Stanley World Index), and an emerging market index (Morgan Stanley Emerging Market Index). The required data had been collected from three databases namely DataStream, IMF Statistics, and Teuters (EcoWin). The sample period of the study was from January 1996 to December 2006. The sample period were further sub-divided into two sub-periods: January 1996 to December 2001, and January 2002 to December 2006. The first sample from data stream includes a total of 1131 stocks (Cyprus 175, Czech Republic 188, Hungary 93, Poland 245, Russia 74, and Turkey 356 stocks). For testing the model appropriately in the developing markets having high unpredictability and numerous negative surplus market returns, the study differentiate the market into up and down markets. Without this distinction most of the country in the tests reject the CAPM. The study found that the domestic version of the model

remain suitable model for asset valuation in the equity markets and also for the estimation cost of capital for companies in these nations. However, the international version of the model performs better than the domestic version and found valid for all six markets.

Bruckner, Lehmann & Stehle (2012) tested the CAPM model in the German market using the monthly, quarterly, and annual rates of returns of FSE (Frankfurt Stock Exchange) throughout the years 1960 to 2007. The study period were divided into two subset i.e. 1960 to 1990 and 1990 to 2007. From the collected data 10 portfolios were constructed according to their beta value with the lowest beta value stocks in the first portfolio and the highest in the last. During the course of the time i.e. from 1960 to 1990 the number of companies per portfolio reduced from 19 to 16 and from 1990 to 2007, the number of companies per portfolio rises from 16 to 24. The study concluded that the model is valid for the German stock market.

Agrawal, Mohapatra & Pollak (2012) empirically analyzed the CAPM model in the US capital market using daily returns of NYSE S&P 500 index listed stocks for the period of January 1, 1965 to December 31, 2009. Ten portfolios were formed from the collected data according to their beta value. The decile portfolio had been constructed for one year and after one year the betas were again re-estimated, then the ten portfolio rebalance accordingly. After empirical analysis of the collected data the study found that CAPM is invalid in US stock market because it fails to explain the excess return of the selected stocks.

Nwani (2015) found CAPM is insignificant in the UK capital market. He used monthly stocks returns of London Stock Exchange FTSE for 18 years from January 1996 to December 2013. The study randomly selected 100 stocks of UK listed in the London Stock Exchange. These 100 stocks of FTSE comprises of all share index, consisting of companies from the FTSE 100, FTSE 250 and FTSE Small Cap indices. The data had been collected from DataStream 5.0. From the collected data 10 equally weighted portfolios was constructed according to their beta value, the lowest beta value stocks in the first portfolio and the highest beta value stocks in the last portfolio. Each portfolio comprising of 10 stocks. The study concluded that only beta cannot explain the risk factor involve for high return.

Mohsen (2017) tested the CAPM in the USA stock market using Amazon stock monthly return listed in the NYSE S&P 500 for the period of 2009 to 2016. The study used multiple linear regression model to test the collected data. The study found that US stock market return had a

major effect on the expected return of Amazon stock. The study also found that beta is able explain the required rate of return, therefore the study conclude CAPM is valid in the US stock market.

2.4 Study of CAPM in Developing countries:

Isa, Puah & Yong (2009) found that high-beta securities earn higher return than low-beta securities in the Malaysian capital market using weekly data of 60 regularly traded securities in the KLSE from the trading and service sector and these stocks were traded from January 1995 to December 2006. The study found that CAPM is a decent model to predict the future return with the help of beta which represent the market risk.

A study conducted by Yasmeen, Awan, Ghauri & Waqas (2012) in the Pakistan stock market found that CAPM is unable to explain the returns of stocks. The study used KSE 100 Index from 16th December 2008 to 26th February 2010. The model could not be able to explain the excess returns of stocks.

Rehman, et al. (2013) studied the relation between CAPM and the return in Pakistan capital market. They study had selected monthly return data from Karachi Stock Exchange (KSE) from the period of January 2002 to December 2008. Regression analysis was used to analyze the data and the study concluded that CAPM helps to better estimate the return in Pakistan capital market.

Dai, Hu & Lan (2014) tested the validity of CAPM model on the Chinese market (Shanghai Stock Exchange) covering the study period between January 1991 to December 2012. There are only 9 stocks who met the requirement of 200 trading month of all stocks and data were collected on monthly basis. The study found CAPM is valid in the Chinese market.

Nyangara, Nayangara, Ndlovu & Tyavambiza (2016) using cross-sectional stocks returns on 31 stocks listed on Zimbabwe stock market (ZSE) found CAPM is not a good model to predict the risk and return in the ZSE. The study have used the data from March 2009 to February 2014, and concluded that beta value is not helpful in predicting the expected returns for one month time horizon but it is useful for forecasting the expected average monthly returns over a one year horizon.

Karakoc (2016) conducted a validity test of CAPM in the Istanbul stock exchange using seven years data of 25 large companies from BIST 100 index and the time period covers from 2007 to 2014. The study found that CAPM is able to explain the changes in the rate of profits statistically but the model couldn't explain the relationship between beta and return of the stocks.

Gahe, Hongzhong, Allate & Belinga (2017) tested the validity of CAPM for the West African Economic and Monetary Union (WAEMU) stock market. The study used monthly return of twenty Cote d'Ivoire's listed companies from January 2002 to December 2011. The period had been divided into two different sub-period i.e. the first period used for estimation of beta and second one as testing period. Due to small sample size only one portfolio was formed. The basic hypothesis that high beta stocks generate high return is found insignificant. However, the study found significant evidence of non-systematic risk impact on the sub period five. Therefore, the study concluded that CAPM is invalid in the West Africa and Monetary Union.

2.5   Study of CAPM in India:

Gupta (1981) tested beta using a 606 sample companies' equity shares and calculated average annual returns for fifteen years periods from 1961 to 1976. The high and low price of each stock during a year were considered and the data has been collected from three exchanges namely- Bombay Stock Exchange, Calcutta Stock Exchange and Madras Stock Exchange. The study found that the CAPM is not valid in the Indian capital market.

Srinivasan (1988) conducted an empirical test of CAPM on Indian market using two phase regression. He basically tested the relationship and the impact of diversification in the Indian capital market. The first phase of regression comprise of the time series regression of 85 firms traded on the BSE, where securities return is regressed to the market premium. The second phase of regression involves cross sectional regression of portfolio premium to portfolio systematic risk or beta. They found significant relationship between portfolio premium and portfolio beta but he suggested that to draw a proper conclusion about CAPM validity in India a larger sample size was required.

Yalwar (1988) did an empirical analysis on BSE (Bombay Stock Exchange) about the expected rates of returns and efficiency using 122 actively traded companies for 20 years from 1963 to 1982.He used geometric mean monthly return method to determine the required rate of

return for each individual stock for holding periods of 1 year, 5 years, 10 years and 15 years period. The study found that higher beta stocks generate returns more than low beta stocks. Even though Yalwar (1988) had conducted on individual stock return instead of portfolio return he observed that CAPM is a respectable model to describe the stock's returns.

Varma (1988) tested CAPM in the Indian capital market using a database of over 30000 prices on 45 stocks from BSE. The study mainly deals with the condition where the betas may vary over time. The author used three alternative methods to estimate the non-stationary betas: Kaman Filtering, Bayesian Detection of Structural Breaks and Mixed Model. The study found significant proof for nonstationary of betas in the Indian capital market. Apart from statistical significance, he observed changes in the betas are substantial in magnitude. The study does not reject the CAPM. However, the author conclude that a larger sample is required to draw a proper conclusion in favor of the theory.

Gupta & Sehgal (1993) did an empirical analysis of CAPM on the BSE Sensex thirty listed companies' monthly average stocks prices for a period of 10 years from 1979 to 1989. The researchers constructed three well balanced portfolio according to their beta value and size of the stock using portfolio method. The study also clearly talked about the non-linearity as well as the importance of residual risk for describing returns of an asset. The study has found insignificance of the model for describing the asset return in the Indian capital market.

Ray (1994) conducted a test on CAPM using 170 companies which are actively traded scrips on the BSE and the study used monthly return of each stocks over the period 1980-1991. The researcher used three market indices i.e. the RBI index, ET index, and the BSE Sensitive index and to test the collected data he used Fama-MacBeth methodology. The study concluded that CAPM is invalid in the Indian capital market because it is unable to explain the excess return of the stocks.

Pettingill, Sundaram & Mathur (1995) tested CAPM using data collected from CRSP monthly returns for the period starts from 1926 to 1990, the researchers found significant relationship between beta and returns of the stocks. To test the collected data the researchers first separated the sample period into 15 years sub periods, which again further sub-divided for beta calculation and portfolio creation. Twenty portfolios were constructed according to their beta value. The lowest beta stocks were placed in the first portfolio and the second lowest beta stocks

in the second portfolio, and so on. The study found positive trade-off between beta and average portfolio returns, therefore the study concluded that beta is a good predictor for future return.

Sehgal (1997) found that CAPM is not a good model for asset valuation in the Indian stock market. The researcher used the BSE National Index and select 80 securities over the period April 1984 to March 1993. From the collected data ten portfolios were formed randomly of eight stocks each. The researcher found that there is no significant relationship between beta and average return. Further, randomly formed portfolios of eight securities each is also found to significantly deviate from normality. Therefore, the researcher sum-up that CAPM is unable to determine the asset price appropriately.

Madhusoodanan (1997) did an empirical test of CAPM by taking 120 stocks traded on the BSE for a period of January 1987 to March 1995. He created 10 portfolio of 12 stocks in each portfolio. The study found high risky portfolio gave the lowest return whereas the low risky portfolio gave higher returns. So in Indian capital market the CAPM failed to explain the asset prices accurately.

Vipul (1999) analyzed the relationship between beta and size of the firm, industry and liquidity of the stocks by using 114 stocks traded at BSE covering the period from 1986 to 1993. The study found that the systematic risk or beta is influenced by the size of the firm and perceive that stocks liquidity and industry do not influence the beta stability.

Ansari (2000) studied the validity of the CAPM theory in Indian market. For that he did a thorough assessment of empirical performance of the model in India by reviewing different published research papers. Ansari himself conducted research regarding CAPM capability. He conducted the study on 96 stocks monthly returns listed in BSE for the period of January 1990 to December 1996. The researcher than construct five equally weighted portfolio out of those stocks. He used time series regression and cross sectional regression analysis technique to analyze the data. His study has found the validity of CAPM in Indian Equity market.

Sehgal & Tripathi (2005) did an empirical analysis on size effect in the Indian capital market using BSE 500 equity index. From BSE 500 they selected top 482 companies and collected monthly adjusted returns for the same for the period of 1990-2003. The study found strong presence of size effect in the market using six alternative measures of company size. The study

also found the size based investment strategy seems to be economically feasible as it provides extra normal returns on risk adjusted basis.

Sehgal & Tripathi (2007) tested if there was a value effect in the Indian stock market using monthly adjusted returns of 482 companies stocks listed with the BSE S&P500 index for the period of 1990 to 2003. The study found significant value effect on the return of the securities. The study used alternative procedures such as book to market equity (BE/ME), earing to price (E/P), cash flows to price (C/P) and dividends to price (D/P). The study found value effects for the return of a stock.

Dhankar & Kumar (2007) found CAPM to be relevant in India. They have studied using monthly adjusted opening and closing prices of 100 stocks listed on the BSE 100 Index for a time period of 10 years from June 1996 to May 2005. The study was conducted to find out the validity of the CAPM in the Indian stock market in determining the required rate of premium for risky securities. Ten portfolios were constructed according to their beta value. The first portfolio was constructed by those stocks who have least beta value and like that other portfolios were also constructed. The first portfolio is considered as the most defensive portfolio as it has the least beta stocks and the last one is considered as the most aggressive portfolio as it has the high beta stocks. They found that the high risk stocks are generating high returns compared to low risk stocks and hence they concluded that the CAPM is valid in India and investors are benefited for bearing extra risk.

Choudhary & Choudhary (2010) verified the CAPM in the Indian equity market using monthly returns from 278 stocks of BSE 500 Index for the period of January 1996 to December 2009. The study doesn't support the basic hypothesis that higher beta stocks is generating higher level of return. Hence, the researchers concluded that CAPM is not valid in India because beta is unable to explain the expected returns on stocks in Indian equity market.

Basu & Chawla (2010) tested the relevance of CAPM in the Indian Stock market. Their study covered the NSE Nifty 50 stocks weekly returns which he divided into 10 portfolios of 5 stocks each and the data were from 1st January 2003 to 1st February 2008. They used OLS regression model to analyze the data. They found a negative relation between beta and returns for 90 percent of the portfolios. The study concluded that CAPM is invalid because it is completely failed in Indian context.

Diwani & Asgharian (2010) tested the applicability of the CAPM in the Indian capital market. The test had been conducted on data collected from BSE Sensex 30 weekly returns of stocks for a period of 5 years from November 2004 to October 2009. The study found that model isn't able to estimate the return properly, therefore, the researcher concluded that CAPM is invalid in India.

Aziz & Ansari (2014) tested that size and value premiums have effect or not on return of the stocks. For the study the data have been collected from BSE-500 listed stocks monthly returns for the period April, 2000 to March, 2012. They have tested using both Fama-French Model and CAPM. The study found that there is a significance impact of size on the return of a firm. They have concluded that Fama-French three factor model perform better than CAPM in determining the asset price.

Bajpai & Sharma (2015) tested the CAPM with the traditional model in the Indian Equity Market. Their study was conducted on daily returns of NSE CNX 500 listed companies for the period of 10 years ranging from January 2004 to December 2013. Out of 500 stocks the researchers choose those stocks which were traded for ten years uninterruptedly. Then the researchers construct 10 portfolios and each portfolio consist of 29 stocks. To analyze the data the researchers use two rolling regression model one use intercept and other one without intercept. The study found positive result when there was no intercept term and with intercept term the model completely fail the Indian Equity Market. When the rolling regression model exempt intercept term the model was able to describe the correlation between risk and return in the Indian equity market. The concluded that CAPM is valid in India when the intercept term is removed from the model.

Pandey (2016) tested the applicability of CAPM in the Indian capital market. The study covered monthly returns of 5 years of NSE Nifty index. The study randomly selected 21 companies from NSE Nifty. The study found that the model is a good model to describe the security returns in the Indian capital market because the model is able to explain the excess market returns.

Chaudhary (2016) found that CAPM is not able explain properly about the dissimilarities in cross sectional returns for the Indian capital market. For the study data were collected from NSE 500 index monthly returns and the sample size was 250 companies. Out of which he constructed 25 portfolios of 10 companies in all the portfolios. The portfolios were constructed according to

their beta value from highest beta value to lowest beta value stock. He found that CAPM is not significant for the asset valuation in India.

Johri, Maheshwari & Srivastava (2016) studied the validity of CAPM in India using 10 years data of 50 firms for a period from 2003 to 2013. The data were collected from BSE, NSE and Yahoo Finance. Out of the 50 companies 10 companies are from FMCG sector, 10 from IT sector, 10 from Pharma, 10 from Telecom sector and 10 from Auto sector. The study found that CAPM is invalid in the Indian market as the model is unable to make a relationship between asset return & corresponding beta value as proposed. The study also found beta value is stable over a period of time. The study concluded that stock market is volatile hence predicting the market is very difficult. They observe that during the course of time so many theories have been developed among which CAPM has been one of the major achievements which predict the future return through beta value or systematic risk.

Balakrishnan (2016) tested size, value, and momentum effects in stock returns of Indian capital market. It used the data of 484 companies from BSE S&P 500 and the data include month end adjusted stocks prices, market capitalization and price-to-book ratio of the period from January 1997 to August 2014 which were collected from CMIE Prowess. The study used BSE S&P200 as market proxy. The study found that size and value have a strong presence in the Indian stock market and CAPM failed to capture the average returns on size-value and size-momentum sorted portfolios. However, the researcher found that four factor model is more effective for determining average returns on size-momentum sorted portfolios.

Hussain &Islam (2017) found that CAPM is not a good model in explaining risk-return relationship. To determine the asset prices in India they have used stock's monthly returns of 62 companies listed in the NSE Nifty 100 index for the period from January 2003 to December 2015. They used Fama and Macbeth (1973) two-step testing method for asset pricing and time series regression analysis method to test the data. The study found CAPM invalid in India. However, the researcher pointed out that the rejection of the model maybe due to insufficient criteria for the selection of market proxy.

Shrivastav (2017) tested CAPM using monthly closing prices of 15 companies listed in the National Stock Exchange covering a time period of 5 years from January 2006 to December 2010. From the collected data 5 equally-weighted portfolios of 3 stocks each were constructed. Two

methods were adopted for analysis of data i.e. cross sectional analysis and portfolio analysis. The study found both individual as well as portfolio didn't established the philosophy that higher beta stocks generate higher return. Finally the study concluded that CAPM is not valid in India.

Ratra (2017) tested the applicability of CAPM in India. The study used daily adjusted close prices of top 10 companies of NSE with the highest market capitalization for the period from January 1, 2012 to December 31, 2016. The companies were selected from the list of 500 companies according to the survey of Economic Times which is one of the leading financial newspapers. The study found that there was a significant difference in expected returns and actual at normal risk. The study concluded that CAPM is not applicable in Indian capital market.

Cheriyan & Lazar (2017) tested CAPM using 5-minutes returns of 10 most active stocks listed on the BSE S&P Sensex for the period from January 15, 2016 to July 15, 2016. The data had been collected from Bloomberg. The study found validity of a liquidity adjusted CAPM model and it also found evidences that liquidity risk is significantly priced in Indian stock market. It is also found that the expected liquidity plays a vital role in determining the asset prices.

2.6   Market proxy selection:

Market proxy is an important element in determining the return of stock through the CAPM model. Some of observations given on selection of market proxy found in the literatures surveyed are discussed. Roll (1977) observed that the true test of CAPM can be done only when true market portfolio is observable.

Stambaugh (1982) found that choosing a particular market proxy doesn't hamper while considering for investment. The study concluded that irrespective of market proxy whether it is a stock-based proxy, a stock-and-bond proxy, or stock-bond and real-estate proxy the result will be same.

Grinold (1992) tested whether benchmark portfolio are efficient or not using five major market such as USA, UK, Germany, Japan and Australia. The study found that value-based investing is the best for the investors which will give them maximum return. Therefore the study concluded that while choosing a market proxy for investing it is better to consider value-weighted index and while investing value-weighted index should be considered in choosing a market proxy.

2.7   Research Gap:

Studies have been carried out throughout the globe to validate the CAPM. From the above literature review it was found that those study who had been carried out for a very short period of time ranging from 5 to 10 years found CAPM to be invalid whereas studies like Fama & MacBeth (1973), Banz (1981), Lakonishok & Shapiro (1986), Bhandari (1988), Avadhanam, Manjunatha & Mallikarjunappa (2009), and Mamidi & Mishra (2014) who studied by taking data of 20 years or more found model valid for explaining systematic risk and market return. Another important aspect found from the literature review is that market proxy selection plays a very crucial role in portfolio construction. The review tell us maximum of the study had been conducted on large firms from small broad market index such as BSE Sensex, BSE 100, NSE Nifty 50, Nifty 100. Therefore, the present study attempts to analyze the robustness of the CAPM using BSE S&P 500 firms which is a broad representative of the Indian capital market and the larger sample size shall reveal us better to draw a proper conclusion.

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Chapter-3

Overview of Indian Capital Market

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3.1   Introduction:

Since the economic liberalization, the Indian stock market played an important role for financing the corporate sector. In the financial system stock market plays a crucial and vibrant role which make significant contribution for the economic development of the nation. Apart from mobilizing the funds for investment purposes straight from the individual or institutional investors, the stock market also provide liquidity to the stockholders, monitor and maintain discipline inside the firm's management. The prime function of the stock market is to provide a platform to the governments and entrepreneurs a means of mobilizing the funds directly from investors and to provide liquidity to the investors. The stock market also enhance the long-term economic growth through improving the liquidity market which ultimately helps to allocate the funds properly. The stock market is a platform where the buyer and the sellers of securities or assets can become a part of transactions for buying and selling of financial assets such as shares, debentures, bonds, etc. In simple word it is a place for trading in various derivatives and securities. The stock market acts as a mediator for the entrepreneurs, corporates to raise funds for their business ventures and companies with the help of public issues. In today's scenario the long-term investors prefer to invest in stock market rather than conventional investment like fixed deposit. In India at present there are 23 regional stock exchanges where the BSE (Bombay Stock Exchange) and the NSE (National Stock Exchange) are the two key exchanges within the country.

3.2   Concept of Investment:

According to Bejamin Graham, "An investment operation is one which, upon through analysis, promises safety of principal and an adequate return. Operation not meeting these requirements are speculative" (Chandra, 2012). So, the investment is nothing but the application of funds or any other assets with the hope that it will generate income or appreciate the value of the assets in near future. The term investment can be also defined as the sacrifice of present money or other monetary resources for near future profits. The term investment is frequently used in the area of finance, business management and in economics which is associated with savings or deferring consumption. In economics, an investment means the purchase of goods which is not utilized today but it is used in the near future to generate wealth. For finance, the term investment represent the purchase of any monetary assets which will earn profit in the later period or it will be sold at a premium price in the future at a profit. Investment is the choice of the investor who

risk his saving with the expectation of gain or profit. There are two characteristics of any investment i.e. risk and time. The cost bearing now is definite but the benefit expected in the forthcoming tend to be unclear. An investor can lend or use a goods or its equivalent money to create another consumer durable or intermediate goods with the aim of earning a profit or interest for the same. The investing process in different forms assets is a very interesting activity that everyone is allured irrespective of their family background, economic status, education, and occupation. Any people having extra money or saving after fulfilling the basic needs can be treated as a potential investor. These fund-surplus people can invest in securities or stock market or in other type of assets such as real-estate or gold or in bank account as fixed deposit. In case of firms or companies they may use their extra earning for the expansion of the company or go for new venture or for acquiring another company. In broad way, all of these combined activities mean investment.

3.3 Investment Alternatives:

There are bewildering range of investment alternatives. Some of the important investment options for an individual investors are discussed below:

a. **Deposits:** The deposits are nothing but an amount deposited in a financial institution. A decent share of the financial assets of individuals is held in the way of deposits with various financial institutions. They can be broadly classified as:
- Bank deposits
- Post office deposits
- Company fixed deposits

b. **Government Savings Schemes:** The Government of India (GOI) offers a number of small savings schemes to individual investors. All of these policies are provided with the help of post office and selected financial institutions. The essential savings schemes are:
- PPF (Public Provident Fund)
- SCSS (Senior Citizens Saving Scheme)
- NSE (National Savings Certificate)

c. **Money Market Instruments:** The debt instruments which have an expiry period of less than one year at the time of issue are comes under money market instruments – these

instruments are highly liquid and have negligible risk. Some of the major money market instruments are:

- Certificate of deposit
- T-Bills (Treasury bills)
- CP (Commercial paper)

d. **Bond or Debenture:** A bond or a debenture is a debt instrument which is issued for a long period of time. It is a loan agreement between the issuer and the investor, where the bond issuer is bound to pay back the specified money on a specified future day. The interest paid on this agreement is called 'coupon rate'. There are different types of bonds such as fixed rate bonds, floating rate notes, zero-coupon bonds, high-yield bonds, convertible bonds, exchangeable bonds, etc.

e. **Equity Shares:** An equity share is a share which represent a fraction of a company's capital. The equity share holder has the right to vote in the general meeting which makes it distinct from preference shares. An equity shareholder is also called the owners of the company because the holder of this share has right in the profit as well as in the property in case of winding up. In the American market, equity share is called 'common stock' and in the United Kingdom and other countries it is called either 'equity shares' or 'ordinary shares'. An investor can invest in blue chip shares, income shares, growth shares, cyclical shares, etc.

f. **Mutual Funds:** It is type of investment where money has been collected from different investors in a pool and the same money are invested and managed by highly professional people. The money are invested in securities like stocks, money market instruments, bonds and few other assets. There are generally two types of mutual funds i.e. open-ended mutual funds and close-ended mutual funds.

g. **Life Insurance:** A life insurance is a scheme for safeguarding the future between two parties i.e. insurer and the policy holder. It can be also considered as an investment. Some of the major kinds of insurance policies in the country are as follows:

- ULIP
- Endowment Plan
- Money back
- Whole life plan

- Term Plan

h. Retirement Products: The major retirement products are:

- Employees' Provident Fund (EPF) Scheme, 1952

- Employees' Pension Scheme (EPS), 1952

- New Pension Scheme, 2004

- Pension schemes of insurance companies and mutual funds

i. Non-Marketable Assets: A major part of the financial asset come under the non-marketable assets. The non-marketable assets can be banks deposits, company deposits, post office deposits, etc.

The stock market provides the long-term funds to the listed companies in the stock exchange by pooling money from various investors and empower them to enlarge in business and at the same time offer the investors substitute investment opportunities for their surplus funds. The investors take a close eye in the performance of the securities through the compound market index, before any investment of funds. A capital market is place for long-term funds where business houses or enterprises and government used to raise funds for them. So basically it is market where long-term funds are provided for more than a year, the short-term funds are dealt in another market called 'money market'. Today due to the advancement in technology and easy availability of the information related to the stock market, investors are entering in the capital market. The seminars and awareness campaign conducted by the stock exchanges and regulatory bodies has augmented the interest of the investors in investing their money in the stock market.

3.4   Forms of Capital Market:

It is a financial market where long term debt i.e. more than a year or equity-backed stocks are sold and bought. Capital market provides a platform where all the saving of the investors who want to or can put it for long-term productive purposes they can invest in governments securities or company stocks. The capital market is mainly divided into two categories-

A. Primary Market:

The primary market deals with all kinds of new issues of stocks in an exchange for governments, companies and others who want to take financial help through equity-based

or debt-based stocks. These stocks can be issued by the company or the government at face value, at discount or at premium.

- **Face Value:** It is the original value of the stock which is mentioned in the instrument/certificate. Majority of the shares (equity) bear a face value of Rs. 100, or Rs. 10, or Rs. 5 and most of the equity shares don't carry the original market price of the security. Whenever shares are issued, they are issued either at a discount or at a premium.
- **Discount:** In this case the stocks are issued at a lower price than the original value or face value.
- **Premium:** Whereas in this case stocks are issued at a higher price than the original value or face value.

This market is run by underwriting groups which consist of merchant banks who set a starting price range for a particular stock and oversee its sell to investors. As soon as initial sale is done, the secondary market took over the charges for further trading where large numbers of exchange trading occurs every day.

B. **Secondary Market:**

It is a market where all the secondary stocks are sold and bought by investors which are preowned. The secondary market facilitates liquidity to the investors who participate in the primary market. That is why the secondary market is also called 'aftermarket'. Both market are related to each other because the primary market deal with the new issues of stocks whereas in the secondary market shares already issued in the new issue market are resold and bought for the second time or many times. Stock exchange plays a vital role in the secondary market because all the trading in this market are done through it. It is the place where the sellers and the buyers meet to trade in stocks in a well-organized manner. There are so many important functions performed by stock exchange. A few of them are mentioned below:

    i.   It helps in determining the fair price of different stocks.

    ii.   It provides long term finance facility to the industries or company.

    iii.   It regulates the corporate sector.

iv.   It provides education to the investors for better performance and encouraging investment.

v.   It also acts as a channel for mobilizing the saving of individuals and institutions.

3.5 Functions of Capital Market:

The most important functions of capital markets are discussed below:

i.   The first important function of the stock market is mobilization of funds for long-term investment.

ii.   Secondly, provide the mobilized funds as a loans to the borrowers such as companies or entrepreneurs.

iii.   Motivate broader ownership for the efficient assets.

iv.   Facilitate liquidity to the investors for their holdings so that they can sell their assets.

v.   Provide facilities at low transaction cost as well as the information.

vi.   Better capital allocation with the help of aggressive pricing mechanism.

vii.   Provide market information and suggestions to the market participants for their holdings.

viii.   Empower fast valuation of financial instruments for both equity and debt.

ix.   The stock market provide insurance facility for the market risk through trading in derivatives.

x.   Facilitate operational efficiency in the way of:

- Easy transaction procedures;
- Reducing settlement timing;
- Reducing the transaction cost

xi.   Enlarge integration among.

- Financial and real-estate sectors;
- Debt and Equity instruments;
- Short-term and long-term funds
- Short-term and long-term investment costs;
- Government and private sectors; and
- Domestic and foreign funds

3.6   History and Development of Capital Market

In this section the history and the development of capital market in the world as well as in India are discussed below:

3.6.1   History of Capital Market in the World Scenario:

In stock market the financial instruments are originated from the companies who require money to finance their projects. The company may be a joint stock company or a corporation. In the history of companies the 'Dutch East India Company' is the first company which was established in 1617 as a joint stock company by 954 shareholders. Since then many companies were established by the state.

The Amsterdam Stock Exchange of Netherland is known as the world's first formal stock exchange which was established in 1602. Few other oldest exchanges are Frankfurt Stock Exchange (1585), London Stock Exchange (1571), and New York Stock Exchange (1792). The idea of loan or debt can be traced back to ancient times with the evidence of recording interest-bearing loans found from the ancient Mesopotamian city clay tablets. Another oldest stock exchange in Europe is the 'Frankfurt Stock Exchange' established on 1585 at Frankfurt am Main.

Some of the oldest and largest stock exchanges in the world are discussed below:

Amsterdam Stock Exchange (ASE):

The Amsterdam Stock Exchange is considered as the first stock exchange in the word setup in the year 1602 by the Dutch East India Company. Presently it is known as Euronext Amsterdam. The exchange merged with Brussels Stock Exchange and Paris Stock Exchange on 22nd September 2000. They form together Euronext (www.aex.nl).

Frankfurt Stock Exchange (FST):

The 'Frankfurt Stock Exchange is one of the oldest stock exchange in the world founded in 1585 as a place to fix the exchange rates for currency and it is considered as the birth mark for the stock exchange. Currently, it is the 10th largest stock exchange in the world in terms of market capitalization. Out of the total turnover around 90 percent it generated from Germany (www.en.boerse-frankfurt.de/).

New York Stock Exchange (NYSE):

The NYSE is the largest and one of the oldest exchange in the world. It is based in New York, America. It was established on 17th May 1792. The NYSE is considered as the biggest stock exchange in the world with a market capitalization of US$ 21.3 trillion by June 2017. The exchange traded daily on an average of US$169 billion in the year 2013 (www.nyse.com).

London Stock Exchange (LSE):

The 'London Stock Exchange' is one of the pioneer exchange in the world. It was formed in 1571 which makes it one of the oldest stock exchange globally. It is one of the largest exchange with a market capitalization of US$ 4.59 trillion. The exchange merged with Milan Stock Exchange in October 2007 (www.londonstockexchange.com).

Borsa Italiana:

It is the only stock exchange in Italy which was started from 1808. There are total 353 companies listed with it which has market capitalization of EUR 2370 billion. The London Stock exchange group is the owner of the exchange (www.borsaitaliana.it).

Tokyo Stock Exchange (TSE):

The Tokyo Stock Exchange is fourth largest stock exchange in the world and the largest in the Asia. The exchange had 2292 companies listed with it and had a total overall market capitalization of US$4.09 trillion by April 2015. The exchange merged with Osaka Securities Exchange in July 2012 and they form together the 'Japan Exchange Group' (www.jpx.co.jp).

B3 (Brasil Bolsa Balcao):

The B3 is also known as the Brazil Stock Exchange and it is the second oldest stock exchange in the country founded on August 23, 1890. It is the 13th largest stock exchange in the world with a market capitalization of R$ 2.37 Trillion by 2011 (www.b3.com.br).

Indonesia Stock Exchange (ISE):

The Indonesia Stock Exchange is based in Jakarta, Indonesia. Before 2007 the ISE was known as Jakarta Stock Exchange (JSE). The stock exchange was established in December, 1912.

The ISE with total 566 listed companies listed had a total market capitalization of IDR 7,052.39 Trillion by the end of 2017 (www.idx.co.id).

Mexican Stock Exchange (MSE):

The MSE is also known as Mexican Bolsa, Mexbol which is the second major stock exchange in the Latin America after B3 of Brazil. It was established on 5th September 1933. It has a total market capitalization of USD 402.99 billion by February 2016. The exchange has total 140 companies listed with it. The important indices of the exchange are IPC, INMEX RT, IRT Large Cap, and IRT Comp Mx (www.bmv.com.mx).

NASDAQ Stock Exchange:

It is a stock exchange from America. In terms of market capitalization it is the second largest stock exchange after the NSYE in the global market scenario. The exchange was started on 4th February 1977. There are total 3321 companies listed with the exchange. It is based at New York City, USA (www.nasdaq.com).

Hong Kong Stock Exchange (SEHK):

The SEHK was found in the year 1891. It is placed in the 3rd position according market capitalization in Asia and 6th in the world scenario. It has total 2062 stocks listed with the SEHK. The Hang Seng Index is the main index of the exchange (www.hkex.com.hk).

Shanghai Stock Exchange (SSE):

The SSC was started in November 1990. It has 1041 companies listed with the exchange. The exchange with a market capitalization of US $5.5 trillion stand in 4th place around the world as on May 2015 (www.ssc.com.cn).

3.6.2   Overview of Indian Stock Exchanges:

The history Indian stock market can be traced back during the British East India Company's ruling time. Indian share market is considered as one of the oldest share market in Asia. From 18th century it was started when the British company used to trade on loan stocks. The corporate shares and shares in cotton presses and Bank were traded on Bombay during 1830s.

During the year 1840 and 1850 there were only few brokers although the trading was broad. The major stock exchanges in the country are discussed below:

Bombay Stock Exchange (BSE):

A group of 22 informal share brokers started trading at Bombay opposite to the Town Hall of Bombay under a banyan tree in the mid-1850s with an investment of Rupee 1 (then princely) each. The banyan tree is still alive and presently it is under a park called Horniman Circle Park, Mumbai. Soon the exchange grow with total 60 brokers by the end of 1860. When American civil war broke Indian cotton market boom period started due to supply stopped to Europe from America. During that period the number of brokers increase to 250. Very soon the informal group of brokers organized themselves to form The Native Share and Stockbrokers Association formally recognized now as Bombay Stock Exchange in 1875. Later the BSE was shifted to a building closed to the Town Hall. The present standing building plot bought in the year 1928 and building constructed and occupied in the year 1930. The BSE is the first stock exchange in India to get official recognition from the Government of India on 31st August, 1957. Today, with 6 micro seconds per transaction the BSE is considered as the fastest stock exchange in the whole world. BSE is the 10th largest stock exchange in the world with greater than 2.3 trillion market capitalization till April 2018. Currently the exchange provides trading facilities for equities, derivatives, currencies, debt instruments, and mutual funds. The SME of BSE is the largest in India where more 250 companies are listed and still growing at a steady rate. The exchange also have the country's largest mutual fund (Online) platform where more than 27 lakhs of transactions are done per month and every month 2 lakhs new SIP's are added. It owned 'Indian Clearing Corporation Limited' a subsidiary of the stock exchange which provide facilities for trading and provides whole novation and settlement guarantee of all executed trade. There is also an institute on education of capital market for the investors i.e. "BSE Institute Ltd." (www.bseindia.com).

National Stock Exchange (NSE):

This is one of the important and leading stock exchange in India situated at Mumbai. It was established as the first demutualized modern electronic stock exchange in the nation on 1992. The exchange was fully equipped with modern electronic systems of trading such as automated TV screen-based trading system that help for easy trading platform to the investors spread in the whole country. The exchange is the 11th largest stock in the world in terms of market capitalization i.e.

US $2.27 trillion as of April, 2018. Another important achievement for the NSE is that it is placed 2nd in the world in terms of numbers of equity securities traded from January to June 2018, as per World Federation of Exchanges (WEF) report. There are around more than 1600 companies listed with NSE (www.nseindia.com).

Ahmedabad Stock Exchange (ASE):

The Ahmedabad Stock Exchange is the second oldest stock exchange in India as well as in the Asia continent to be established. The stock exchange was established as a public charitable trust in 1894. It is now considered as a premier national equities exchange which plays an important role in the Indian stock markets. It provides trading facilities for both individual as well as institutional investors around the world. The exchange currently trading around 2000 nationally listed equity stocks and apart from that it also trade approximately 200 high growth securities or companies which are solely listed to the Ahmedabad Stock Exchange or maybe dually listed with another stock exchange. In the preliminary stage the stock exchange was functioning under the framework of "Bombay Securities Contract Act, 1925" but later it was replaced by the "Securities Contract Act, 1956". Under this act all the stock exchanges in India need to get recognition from the 'Ministry of Finance' (www.aselindia.co.in).

Calcutta Stock Exchange (CSE):

The Calcutta Stock Exchange is the third oldest organize stock exchange in the country but it was started way back in 1830s under a 'Neem Tree'. During the preliminary days the exchange used to deals in loan security market and the first transaction of dealings in stocks in India was the 'East India Company's loan security. Since the inception of the stock exchange the volume of transactions increased and in the local newspaper quotation of the 'East India Company' loans available at 4%, 5% and 6% widely circulated in 1836. After East India Company's stock, the Bank of Bengal stock were traded at a high premium. Shares of the Agra Bank, Union Bank and few other commercial banks undertakings such as Bengal Bonded Steam Tug Company and Warehouse Docking Company were also traded. The Companies Act 1850 and later initiation of limited liability had a great positive impact in the stocks and shares market. Though the Calcutta Stock exchange started trading since 1836 but the members of the exchange had no proper code of conduct to guide them, neither any payment place for congregation. In the year 1908 the exchange got recognition with 150 members. Presently, the number of members increase to more than 900

combined with institutional and several corporate members and the number of companies listed with the exchange is exceeded 3500. During the year 1997-98 the annual turnover of the exchange was Rs.178779 crores. In the year 1980 April 14, the Calcutta Stock Exchange got the permanent recognition from the central government of India under the provision of the Securities Contract Act 1956. To coup up with the modern electronic era the exchange changed its old traditional manual trading model to new advance computerized mode of trading in the year 1997 (www.cse-india.com).

Madhya Pradesh Stock Exchange (MPSE):

It is one of the oldest stock exchange in the country which was established on 1919 by more than 150 stock broking members. In the year 1957 it got recognition as regional stock exchange and in 1988 Ministry of Finance gave permanent recognition. On 2006 the exchange was converted into a limited company. The exchange came to an agreement with National Stock Exchange in 2012 and with Bombay Stock Exchange in 2013 to provide independent trading facilities to its members. It was the only regional exchange to do so. SEBI de-recognized it in the year 2015(www.mpseindia.in).

Madras Stock Exchange (MSE):

The fifth stock exchange of India is Madras Stock Exchange which was established on September 04, 1937. The exchange was converted into a limited company under the provision of Companies Act 1956. On 14th May 2015, SEBI gave exit permission to the exchange (www.msefsl.com).

Hyderabad Stock Exchange (HSE):

The HSE was established in the year 1941. It was established by few leading brokers and bankers as a stocks and shares Brokers Association. The then finance minister Mr. Gulab Mohammed in 1942 constitute a committee for setting the rules and regulations of the exchange. The exchange start functioning under the Hyderabad Securities Contract Act of No. 21 of 1352 as limited company. Later the Government of India recognized it under Securities Regulation Act on 29th September 1958. The HSE's recognition was revoke on 29th August 2007 by SEBI (www.wikipedia.org/wiki/Hyderabad_Stock_Exchange).

Delhi Stock Exchange (DSE):

The DSE was incorporated on 25th June 1947. The Delhi Stock Exchange got recognition on December 1957 from Securities Contract (Regulation) Act on 1956. The exchange got the permanent recognition on March 1982 under Securities Contract (Regulation) Act, 1956 and the exchange started computerized trading from February 1987. In January 2017 Delhi Stock Exchange exit from the market with permission from SEBI (www.dseindia.org.in).

Bangalore Stock Exchange (BgSE):

The BgSE was founded on 1957 with a vision for trading in government stocks. The exchange began with one lakh initial capital which was divided into 400 shares of Rs.250/- per share. The exchange got recognition on 17 March 1963 from the Ministry of Finance for a period of 5 years. During the initial period of the BgSE it had 17 members later increased to 241 members. The Bangalore Stock Exchange exit from the market on October 8 2013 (www.bgse.co.in).

Cochin Stock Exchange (CoSE):

The CoSE is considered as one of the important exchange in the country which was established in the year 1978. During the initial period the CoSE started with 5 companies listed and had 14 members only. Later the number increase to 508 members and numbers of companies listed increased to 240. The CSE upgraded its facilities in 1980 by using computers in its offices. The stock exchange discontinue trading in the year 2005 and finally closed in 2014 (www.cochinstockexcahnge.com).

Apart from the above mentioned stock exchanges there are few other regional stock exchanges viz. Pune Stock Exchange (1982), Uttar Pradesh Stock Exchange (1982), Ludhiana Stock Exchange (1981), The Guwahati Stock Exchange (1983), Magadh Stock Exchange (1986), Mangalore Stock Exchange (1984), Jaipur Stock Exchange (1989), Saurashtra Kutch Stock Exchange (1989), Bhubaneshwar Stock Exchange (1989), OTCEI (1989), Vadodara Stock Exchange (1990), Coimbatore Stock Exchange (1991), Inter Connected Stock Exchange of India (1999). But almost all of the regional stock exchanges either close or about to close down. The NSE and BSE are the two major and largest stock exchange in India today.

The table 3.1 gives the list of stock exchanges in India. The Government of India enacted an act to regulate the secondary market i.e. Securities Contract Act (SCRA) 1956. Bombay Stock Exchange was the first stock exchange in the nation to get recognition of the Government of India under the Securities Contracts Act.

Table 3.1: Stock Exchanges in India

Name of the Stock Exchange	Year of Establishment	Date of Recognition
Bombay Stock Exchange (BSE) Ltd.	1875	31st August 1957
Ahmedabad Stock Exchange (ASE) Ltd.	1894	16th October 1957
Calcutta Stock Exchange (CSE) Ltd.	1908	10th October 1957
Madhya Pradesh Stock Exchange Ltd.	1919	4th December 1958
Madras Stock Exchange (MSE) Ltd.	1937	15th October 1975
Hyderabad Stock Exchange (HSE) Ltd.	1941	29th September 1958
Delhi Stock Exchange (DSE) Ltd.	1947	December 1957
Bangalore Stock Exchange Ltd.	1957	17th March 1963
Cochin Stock Exchange Ltd.	1978	10th May 1979
Pune Stock Exchange Ltd.	1982	2nd September 1982
Uttar Pradesh Stock Exchange Ltd.	1982	3rd June 1982
Ludhiana Stock Exchange Ltd.	1981	29th April 1983
The Guwahati Stock Exchange Ltd.	1983	1st May 1984
Magadh Stock Exchange Ltd	1986	11th December 1986
Mangalore Stock Exchange Ltd	1984	9th September 1985
Jaipur Stock Exchange Ltd.	1989	9th November 1989
Saurashtra Kutch Stock Exchange Ltd.	1989	10th July 1989
Bhubaneshwar Stock Exchange Ltd.	1989	5th June 1989

OTCEI Ltd.	1990	23th August 1989
Vadodara Stock Exchange Ltd.	1990	5th November 1990
Coimbatore Stock Exchange Ltd.	1991	18th September 1991
National Stock Exchange Ltd.	1992	10th April 1993
Interconnected Stock Exchange of India Ltd	1999	26th February 1999

Source: Compiled from the official websites of the exchanges and other sources

3.7 Regulatory Body of Capital Market:

i. **SEBI (Securities and Exchange Board of India):** The SEBI is the primary regulatory body of the capital market. It was setup on 12th April 1992. The board was established under the provisions of the Securities and Exchange Board of India Act, 1992. The primary function of the SEBI is "to protect the interests of investors in securities and to promote the development of and to regulate the securities market and for matters connected therewith or incidental thereto." Some of the regulatory functions of SEBI are:

    a. To provide registration certificate to the brokers, to the sub-brokers & different other participants

    b. To registrar the various mutual investment schemes of financial institutions like mutual funds schemes.

    c. To regulate the functioning of the merchant banks, stock exchanges and the portfolio managers of collective schemes.

    d. Prevention of unfair trade practices and stop kinds of fraud within the market

    e. To prevent and control of takeover proposals, no inside trading policy and penalties for obeying the rules.

ii. **Reserve Bank of India (RBI):** The RBI is an apex institute to regulate the banking sector of the economy as well as a banker to the government. It also looks after the money market and set interest rates for the banks. The apex organization was set up in 1935 by the British which was later recognized by the Government of India as the national bank in 1949.

3.8 Overview of few Important Indices of BSE:

Index or indices are the market representative of an economy. The indices are the combination of group of stocks listed in a particular stock exchange. When the value of the stocks change the indices value also changed. Some of the indices are discussed below (www.bseindia.com):

a) **Sensex:** The Sensex or BSE 30 is the broad market index that comprises the most active and largest 30 stocks listed in the BSE. The index was started on 1st January 1986. As on September 25th 2017 the BSE Sensex have a total market capitalization of US$760 billion or Rs.54637.0878 billion which represent 37 percent GDP of the country.

b) **Dollex-30:** It is a dollar linked version of the Sensex which was launch on 25th July 2001. This index was started to match with the international standard of the exchange where securities are traded in dollar.

c) **BSE S&P 100 Index:** This particular index was designed to measure the top 100 highly liquid companies listed with the exchange. Most of the companies in this index comes from large midcap.

d) **BSE S&P 200 Index:** The S&P 200 index is constructed to measure the performance of top 200 companies listed with BSE. The companies are selected based on the size and liquidity across sectors.

e) **BSE S&P 500 Index:** The BSE S&P 500 Index was started from 9th August 1999. This index was formed to be as the broad representation of the Indian capital market. The top 500 companies listed under the Bombay stock exchange limited were included in the BSE S&P 500 Index. This particular index alone represent around 92 percent of the overall market capitalization on the Bombay Stock Exchange. The S&P 500 covers all the major industries i.e. 20 sectors such as Finance, IT, FMCG, Oil & Gas, Transport Equipment, Healthcare, Capital Goods, Metal, Metal Products & Mining, Housing Related, Chemical & Petrochemical, Power, Consumer Durables, Telecom, Miscellaneous, Transport Services, Agriculture, Media & Publishing, Textile, Tourism, and Diversified of the economy. From 16th August 2005 the calculation methodology of the index was changed to 'free-float methodology' like other indices of the exchange.

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Chapter-4

Analysis and Interpretation of Daily Return Data

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4.1	Introduction
4.2	The Computed Beta Value of Daily Return Data of 100 Companies of BSE S&P 500 Index
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4.7	Testing of Relevance of Beta Factor for various Sub-periods

4.1 Introduction:

In this chapter the data analysis of the study based on the daily return data of the companies are conducted. The computed beta value for all the selected companies are presented. The validity or applicability of the CAPM model in the Indian equity market are being tested. The analysis have also been conducted for the sample period by dividing into four different sub periods to test the robustness of the model in different time periods.

4.2   The Computed Beta Value of Daily Return Data of 100 Companies of BSE S&P 500 Index:

The beta value which have been obtained by running the equation 1.5 (chapter 1) are presented in the table 4.1(a) and 4.1(b). In table 4.1(a) the beta value of the daily return data for 11 years i.e. 1998-99 to 2008-09 are presented. In table 4.1 (b), the beta value of the daily return data for 9 years i.e.2009-10 to 2017-18 as well as the average beta for the 20 years for each stock are presented. The average yearly beta for all the 100 stocks are also presented in the tables 4.1(a) and 4.1(b).

Table 4.1a

Computed Beta Value of Daily Return Data of 100 Companies of BSE S&P 500 Index

Company Name	98-99	99-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
3M	0.77	0.75	0.70	0.44	0.27	0.30	0.50	0.55	0.53	0.25	0.32
Aarti	0.82	0.78	0.70	0.35	0.17	0.16	0.36	0.45	0.46	0.29	0.27
Aban	0.76	0.73	0.67	0.38	0.20	0.24	0.47	0.51	0.50	0.16	0.25
ACC	1.08	1.01	0.84	0.60	0.40	0.41	0.52	0.54	0.33	0.36	0.39
Akzo	0.78	0.81	0.73	0.64	0.35	0.33	0.45	0.56	0.52	0.28	0.27
Ambuja	0.73	0.67	0.42	0.35	0.45	0.60	0.57	0.36	0.37	0.37	0.34
Apollo Ho	0.71	0.73	0.69	0.45	0.27	0.32	0.51	0.60	0.50	0.20	0.34
Apollo Ty	0.77	0.71	0.64	0.37	0.27	0.37	0.52	0.49	0.23	0.19	0.30
Ashok Ley	0.84	0.77	0.66	0.40	0.33	0.40	0.56	0.56	0.32	0.35	0.34
Asian	0.74	0.72	0.66	0.41	0.34	0.44	0.55	0.55	0.31	0.24	0.27
Bajaj Ho	0.82	0.73	0.63	0.35	0.31	0.41	0.57	0.55	0.33	0.32	0.44
Balakri	0.79	0.73	0.79	0.74	0.50	0.30	0.20	0.32	0.42	0.43	0.33
Bayer	0.72	0.76	0.70	0.47	0.29	0.33	0.47	0.51	0.45	0.25	0.23
Berger	0.75	0.78	0.70	0.45	0.27	0.32	0.49	0.55	0.59	0.35	0.40
Bharat	0.76	0.71	0.61	0.32	0.26	0.37	0.54	0.56	0.32	0.25	0.36
Birla	0.91	0.85	0.90	0.83	0.58	0.21	0.27	0.39	0.52	0.53	0.32

Table 4.1a continue

Computed Beta Value of Daily Return Data of 100 Companies of BSE S&P 500 Index

Company Name	98-99	99-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Bliss	0.37	0.25	0.18	0.03	0.45	0.59	0.66	0.59	0.35	0.29	0.26
Bom Bu	0.84	0.84	0.76	0.49	0.23	0.24	0.42	0.59	0.58	0.44	0.20
Bom Dy	0.82	0.78	0.75	0.52	0.38	0.48	0.63	0.62	0.48	0.47	0.43
Bosch	0.77	0.73	0.66	0.40	0.27	0.34	0.56	0.56	0.48	0.21	0.32
Britania	0.73	0.84	0.73	0.63	0.37	0.32	0.41	0.56	0.58	0.34	0.30
CAN Fin	0.77	0.83	0.75	0.54	0.22	0.20	0.29	0.47	0.48	0.47	0.18
Carborun	0.88	0.83	0.85	0.79	0.68	0.26	0.22	0.26	0.44	0.51	0.52
Castrol	1.02	0.98	0.85	0.59	0.45	0.46	0.56	0.53	0.30	0.27	0.30
CEAT	0.89	0.78	0.68	0.38	0.25	0.32	0.47	0.52	0.30	0.32	0.35
Century	1.88	1.75	1.64	1.53	1.22	0.52	0.67	0.62	0.28	0.23	0.34
Chowla	0.82	0.76	0.80	0.75	0.54	0.26	0.25	0.39	0.53	0.51	0.37
Colgate	0.81	0.76	0.65	0.35	0.28	0.37	0.51	0.52	0.33	0.31	0.32
Cummins	0.71	0.75	0.66	0.55	0.25	0.24	0.38	0.56	0.55	0.30	0.32
Deepak	0.82	0.84	0.74	0.50	0.16	0.14	0.32	0.50	0.51	0.32	0.24
Dewan	0.77	0.74	0.67	0.39	0.25	0.17	0.36	0.52	0.56	0.39	0.20
Dhanuka	0.71	0.75	0.72	0.72	0.67	0.45	0.14	0.04	0.07	0.02	0.23
Eicher	0.81	0.79	0.72	0.46	0.27	0.37	0.54	0.54	0.41	0.26	0.35
ELGI	0.71	0.73	0.68	0.54	0.28	0.34	0.51	0.60	0.53	0.31	0.34
Escort	0.78	0.74	0.67	0.43	0.47	0.47	0.64	0.69	0.60	0.48	0.52
Finolex	0.80	0.73	0.61	0.29	0.19	0.32	0.52	0.53	0.30	0.29	0.32
Gilette	0.81	0.76	0.70	0.49	0.30	0.35	0.56	0.60	0.45	0.25	0.36
Glaxo H	0.83	0.76	0.66	0.34	0.26	0.35	0.50	0.53	0.36	0.31	0.34
Glaxo P	0.78	0.73	0.62	0.38	0.26	0.39	0.55	0.55	0.39	0.32	0.37
Grasim	0.81	0.74	0.62	0.33	0.39	0.39	0.54	0.56	0.36	0.26	0.31
Great	1.02	0.97	0.85	0.58	0.45	0.48	0.57	0.53	0.36	0.33	0.35
Greaves	0.79	0.76	0.53	0.45	0.30	0.35	0.56	0.58	0.47	0.17	0.32
Gruh Fin	0.79	0.83	0.83	0.64	0.46	0.53	0.63	0.57	0.48	0.27	0.31
Guja Fe	0.82	0.75	0.67	0.36	0.34	0.43	0.63	0.59	0.44	0.30	0.39
Guja Nar	0.91	0.80	0.70	0.45	0.34	0.42	0.55	0.55	0.30	0.21	0.27
HDFC	0.82	0.71	0.61	0.41	0.33	0.43	0.55	0.52	0.20	0.30	0.31
HEG	0.80	0.77	0.66	0.35	0.24	0.35	0.54	0.56	0.40	0.28	0.33
Himat	0.81	0.89	0.79	0.63	0.36	0.24	0.32	0.53	0.56	0.56	0.28
Hindalco	0.82	0.72	0.63	0.36	0.24	0.35	0.52	0.53	0.36	0.38	0.41
Indian	0.90	0.78	0.67	0.40	0.27	0.34	0.55	0.55	0.39	0.31	0.37
Indo	0.84	0.87	0.82	0.60	0.36	0.26	0.39	0.50	0.50	0.32	0.34
ITC	0.88	0.80	0.69	0.37	0.30	0.39	0.51	0.51	0.24	0.28	0.31
ITD	0.82	0.79	0.71	0.51	0.32	0.28	0.44	0.55	0.52	0.35	0.33

Table 4.1a continue

Computed Beta Value of Daily Return Data of 100 Companies of BSE S&P 500 Index

Company Name	98-99	99-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Jamna	0.81	0.78	0.67	0.44	0.14	-0.04	-0.14	-0.06	-0.57	0.04	0.02
JB Che	0.82	0.79	0.74	0.44	0.21	0.28	0.50	0.53	0.47	0.24	0.31
JB Ind	0.88	0.84	0.74	0.36	0.18	0.21	0.39	0.49	0.50	0.28	0.20
JK Lak	0.82	0.75	0.66	0.40	0.21	0.31	0.50	0.55	0.43	0.20	0.27
JM Fin	0.76	0.95	1.08	1.05	0.60	0.72	0.57	0.36	0.42	0.57	0.53
Johnson	0.82	0.77	0.71	0.49	0.24	0.28	0.52	0.55	0.52	0.28	0.35
Kesoram	0.80	0.78	0.74	0.48	0.28	0.38	0.54	0.51	0.38	0.20	0.34
L&T	0.87	0.77	0.64	0.40	0.41	0.51	0.57	0.58	0.24	0.32	0.37
Linde	0.72	0.77	0.76	0.65	0.36	0.25	0.39	0.53	0.55	0.45	0.35
M&M	0.84	0.79	0.70	0.46	0.43	0.52	0.64	0.63	0.41	0.34	0.41
Mon	0.81	0.80	0.71	0.49	0.27	0.31	0.46	0.59	0.59	0.34	0.26
MRF	-8.44	1.15	0.41	0.67	0.64	0.56	0.30	0.29	0.40	0.54	0.52
Nestle	0.77	0.71	0.63	0.37	0.30	0.38	0.57	0.53	0.31	0.28	0.31
Nilkamal	0.78	0.76	0.66	0.47	0.23	0.30	0.51	0.56	0.44	0.16	0.28
NOCIL	0.97	0.89	0.73	0.40	0.27	0.36	0.55	0.52	0.38	0.31	0.39
Pfizer	0.93	0.83	0.69	0.35	0.27	0.36	0.52	0.51	0.31	0.23	0.27
Phiips	0.66	0.72	0.65	0.57	0.09	0.00	0.14	0.31	0.36	0.39	0.11
Raym	0.74	0.68	0.60	0.32	0.20	0.33	0.53	0.52	0.40	0.35	0.38
Relia Ind	0.89	0.76	0.62	0.36	0.36	0.48	0.45	0.34	0.27	0.29	0.28
Relia Inf	0.79	0.69	0.63	0.32	0.28	0.39	0.56	0.55	0.39	0.35	0.36
Schaeff	0.80	0.78	0.68	0.46	0.23	0.28	0.48	0.55	0.53	0.27	0.34
Shriram	0.80	0.80	0.67	0.38	0.13	0.15	0.33	0.49	0.54	0.39	0.30
Siem	0.79	0.73	0.69	0.49	0.44	0.55	0.67	0.63	0.41	0.32	0.39
Sintex	0.73	0.77	0.75	0.55	0.24	0.24	0.33	0.48	0.56	0.57	0.33
SKF	0.83	0.73	0.64	0.39	0.31	0.43	0.61	0.65	0.50	0.36	0.35
SRF	0.82	0.86	0.79	0.51	0.31	0.33	0.46	0.54	0.54	0.25	0.33
Suda	0.85	0.89	0.86	0.86	0.50	0.30	0.23	0.06	0.10	0.25	0.46
Supre	0.81	0.73	0.63	0.31	0.25	0.38	0.58	0.58	0.40	0.34	0.31
SWAN	0.90	0.83	0.65	0.67	0.49	-0.18	-0.84	-0.62	0.09	0.26	0.23
TATA C	1.03	1.04	0.90	0.70	0.55	0.58	0.59	0.59	0.36	0.33	0.34
TATA G	0.81	0.75	0.66	0.38	0.31	0.41	0.58	0.60	0.43	0.31	0.34
TATA I	0.67	0.71	0.71	0.62	0.33	0.16	0.19	0.39	0.52	0.50	0.19
TATA M	0.81	0.66	0.60	0.35	0.34	0.47	0.63	0.58	0.30	0.35	0.37
TATA P	0.49	0.42	0.33	0.32	0.27	0.37	0.53	0.48	0.29	0.28	0.34
TATA S	0.85	0.79	0.66	0.36	0.26	0.37	0.54	0.55	0.45	0.18	0.24
TATA St	0.92	0.78	0.66	0.38	0.32	0.45	0.58	0.58	0.30	0.38	0.39

Table 4.1a continue
Computed Beta Value for Daily Return Data of 100 Companies of BSE S&P 500 Index

Company Name	98-99	99-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Tmken	0.72	0.68	0.61	0.34	0.25	0.37	0.55	0.56	0.37	0.28	0.35
TVS	0.76	0.79	0.74	0.53	0.30	0.28	0.41	0.56	0.53	0.41	0.25
Unicen	0.79	0.86	0.78	0.59	0.28	0.24	0.39	0.57	0.55	0.38	0.38
Unitech	0.77	0.82	0.77	0.55	0.21	0.17	0.22	0.40	0.56	0.57	0.34
Venky's	0.80	0.89	0.86	0.74	0.43	0.37	0.44	0.53	0.52	0.32	0.22
Vinati	0.80	0.95	0.84	0.55	0.38	0.34	0.31	0.55	0.56	0.43	0.28
VIP	0.76	0.78	0.69	0.44	0.26	0.33	0.51	0.56	0.52	0.18	0.29
Voltas	0.85	0.78	0.65	0.44	0.31	0.40	0.57	0.56	0.33	0.36	0.33
VST	0.82	0.85	0.78	0.54	0.30	0.22	0.32	0.46	0.55	0.37	0.20
Wel	0.80	0.77	0.72	0.44	0.23	0.31	0.36	0.49	0.51	0.35	0.20
Wipro	0.68	0.68	0.70	0.60	0.41	0.30	0.40	0.57	0.52	0.29	0.31
Mean	0.72	0.79	0.70	0.49	0.33	0.34	0.46	0.50	0.41	0.32	0.32

Source: Computed based on data from RBI and BSE

Table 4.1b

Computed Beta Value for Daily Return Data of 100 Companies of BSE S&P 500 Index

Company Name	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Means
3M	0.40	0.39	0.46	0.50	0.56	0.64	0.79	0.40	0.39	0.50
Aarti	0.33	0.30	0.40	0.41	0.51	0.58	0.71	0.53	0.39	0.45
Aban	0.40	0.31	0.38	0.42	0.51	0.54	0.70	0.36	0.46	0.45
ACC	0.38	0.46	0.47	0.54	0.62	0.79	0.53	0.37	0.59	0.56
Akzo	0.31	0.31	0.41	0.43	0.51	0.59	0.73	0.56	0.36	0.50
Ambuja	0.45	0.47	0.54	0.61	0.77	0.54	0.36	0.58	0.65	0.51
Apollo Ho	0.40	0.36	0.42	0.47	0.51	0.62	0.72	0.38	0.49	0.48
Apollo Ty	0.31	0.47	0.49	0.57	0.65	0.77	0.57	0.26	0.49	0.47
Ashok Ley	0.33	0.47	0.48	0.55	0.65	0.77	0.55	0.28	0.47	0.50
Asian	0.31	0.43	0.45	0.54	0.62	0.84	0.80	0.60	0.75	0.53
Bajaj Ho	0.43	0.53	0.54	0.61	0.64	0.77	0.59	0.32	0.56	0.52
Balakri	0.25	0.26	0.36	0.38	0.43	0.48	0.55	0.62	0.73	0.48
Bayer	0.26	0.33	0.42	0.47	0.54	0.63	0.75	0.38	0.35	0.47
Berger	0.37	0.33	0.38	0.41	0.47	0.55	0.77	0.47	0.33	0.49
Bharat	0.40	0.51	0.54	0.60	0.68	0.76	0.59	0.27	0.54	0.50
Birla	0.29	0.34	0.33	0.40	0.41	0.49	0.56	0.71	0.62	0.52
Bliss	0.32	0.46	0.43	0.13	0.33	0.34	0.35	0.46	0.48	0.37

Table 4.1b continue
Computed Beta Value for Daily Return Data of 100 Companies of BSE S&P 500 Index

Company Name	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Means
Bom Bu	0.33	0.36	0.35	0.42	0.47	0.53	0.58	0.70	0.22	0.48
Bom Dy	0.40	0.50	0.50	0.54	0.65	0.80	0.52	0.20	0.56	0.55
Bosch	0.36	0.37	0.43	0.48	0.54	0.62	0.73	0.30	0.37	0.47
Britania	0.33	0.33	0.38	0.40	0.49	0.55	0.66	0.54	0.32	0.49
CAN Fin	0.23	0.26	0.30	0.39	0.43	0.49	0.56	0.76	0.48	0.46
Carborun	0.37	0.32	0.35	0.36	0.44	0.44	0.53	0.59	0.75	0.52
Castrol	0.30	0.43	0.44	0.53	0.62	0.77	0.54	0.34	0.54	0.54
CEAT	0.37	0.49	0.52	0.58	0.65	0.81	0.50	0.36	0.55	0.50
Century	0.35	0.47	0.47	0.56	0.63	0.75	0.56	0.34	0.58	0.77
Chowla	0.30	0.36	0.34	0.42	0.43	0.50	0.54	0.69	0.65	0.51
Colgate	0.32	0.42	0.44	0.51	0.59	0.75	0.63	0.35	0.56	0.49
Cummins	0.40	0.33	0.44	0.44	0.52	0.58	0.74	0.51	0.40	0.48
Deepak	0.31	0.30	0.37	0.40	0.46	0.54	0.72	0.66	0.40	0.46
Dewan	0.32	0.32	0.29	0.34	0.40	0.47	0.57	0.75	0.39	0.44
Dhanuka	0.41	0.54	0.54	0.31	0.35	0.32	0.31	0.39	0.41	0.40
Eicher	0.38	0.44	0.48	0.53	0.61	0.72	0.71	0.36	0.48	0.51
ELGI	0.41	0.33	0.43	0.43	0.51	0.57	0.74	0.54	0.42	0.50
Escort	0.50	0.59	0.60	0.68	0.75	0.85	0.74	0.56	0.76	0.63
Finolex	0.34	0.47	0.47	0.57	0.64	0.78	0.56	0.42	0.62	0.49
Gilette	0.40	0.42	0.46	0.52	0.58	0.70	0.73	0.30	0.42	0.51
Glaxo H	0.35	0.46	0.47	0.55	0.60	0.78	0.64	0.38	0.55	0.50
Glaxo P	0.35	0.46	0.46	0.54	0.60	0.75	0.57	0.34	0.53	0.50
Grasim	0.33	0.44	0.44	0.55	0.61	0.74	0.53	0.37	0.49	0.49
Great	0.34	0.47	0.48	0.56	0.64	0.77	0.57	0.31	0.52	0.56
Greaves	0.41	0.39	0.45	0.50	0.56	0.63	0.74	0.34	0.42	0.49
Gruh Fin	0.27	0.38	0.39	0.49	0.59	0.76	0.68	0.40	0.62	0.55
Guja Fe	0.39	0.50	0.51	0.68	0.69	0.78	0.65	0.51	0.55	0.55
Guja Nar	0.31	0.43	0.44	0.54	0.62	0.76	0.60	0.42	0.71	0.52
HDFC	0.35	0.46	0.52	0.57	0.65	0.82	0.48	0.36	0.59	0.50
HEG	0.33	0.46	0.48	0.57	0.67	0.80	0.61	0.39	0.63	0.51
Himat	0.39	0.36	0.31	0.39	0.44	0.49	0.55	0.69	0.36	0.50
Hindalco	0.40	0.55	0.54	0.62	0.68	0.84	0.50	0.33	0.61	0.52
Indian	0.32	0.47	0.47	0.58	0.65	0.81	0.62	0.42	0.58	0.52
Indo	0.42	0.28	0.37	0.36	0.40	0.46	0.59	0.46	0.13	0.46
ITC	0.34	0.45	0.49	0.55	0.62	0.79	0.53	0.38	0.57	0.50
ITD	0.45	0.35	0.43	0.44	0.53	0.59	0.69	0.58	0.28	0.50
Jamna	-0.04	0.32	0.32	0.41	0.40	0.46	0.36	0.43	0.46	0.26
JB Che	0.35	0.36	0.44	0.51	0.57	0.66	0.79	0.40	0.45	0.49

Table 4.1b continue
Computed Beta Value for Daily Return Data of 100 Companies of BSE S&P 500 Index

Company Name	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Means
JB Ind	0.32	0.29	0.40	0.40	0.49	0.58	0.72	0.60	0.35	0.46
JK Lak	0.37	0.33	0.37	0.42	0.48	0.57	0.64	0.21	0.31	0.44
JM Fin	0.33	0.21	0.37	0.42	0.47	0.55	0.59	0.64	0.73	0.59
Johnson	0.43	0.35	0.40	0.43	0.49	0.55	0.67	0.31	0.35	0.47
Kesoram	0.36	0.46	0.47	0.53	0.58	0.72	0.61	0.30	0.50	0.50
L&T	0.37	0.41	0.48	0.54	0.69	0.80	0.37	0.45	0.63	0.52
Linde	0.44	0.39	0.43	0.43	0.50	0.55	0.69	0.67	0.32	0.51
M&M	0.40	0.50	0.50	0.58	0.63	0.75	0.61	0.32	0.53	0.55
Mon	0.28	0.26	0.38	0.41	0.53	0.59	0.74	0.54	0.40	0.49
MRF	0.29	0.22	0.33	0.35	0.44	0.46	0.55	0.62	0.73	0.05
Nestle	0.28	0.42	0.43	0.51	0.60	0.75	0.58	0.31	0.53	0.48
Nilkamal	0.36	0.38	0.44	0.51	0.57	0.64	0.74	0.28	0.33	0.47
NOCIL	0.38	0.54	0.54	0.63	0.69	0.82	0.57	0.57	0.61	0.56
Pfizer	0.30	0.43	0.43	0.53	0.62	0.74	0.58	0.29	0.51	0.49
Phiips	0.38	0.33	0.32	0.40	0.45	0.48	0.55	0.76	0.44	0.41
Raym	0.36	0.50	0.52	0.58	0.67	0.82	0.62	0.36	0.59	0.50
Relia Ind	0.35	0.37	0.46	0.54	0.72	0.64	0.36	0.56	0.65	0.49
Relia Inf	0.36	0.49	0.51	0.57	0.66	0.81	0.61	0.41	0.66	0.52
Schaeff	0.38	0.32	0.41	0.45	0.52	0.60	0.78	0.42	0.37	0.48
Shriram	0.40	0.35	0.42	0.43	0.49	0.56	0.70	0.61	0.35	0.46
Siem	0.35	0.46	0.46	0.56	0.63	0.76	0.55	0.28	0.49	0.53
Sintex	0.45	0.37	0.32	0.39	0.40	0.44	0.52	0.67	0.48	0.48
SKF	0.32	0.41	0.43	0.51	0.62	0.76	0.61	0.29	0.52	0.51
SRF	0.36	0.34	0.43	0.46	0.54	0.61	0.77	0.43	0.39	0.50
Suda	0.46	0.43	0.24	0.36	0.37	0.38	0.45	0.49	0.51	0.45
Supre	0.35	0.47	0.49	0.55	0.65	0.76	0.59	0.33	0.52	0.50
SWAN	0.28	0.34	0.48	0.52	0.44	0.24	0.39	0.43	0.43	0.30
TATA C	0.34	0.47	0.47	0.56	0.64	0.79	0.61	0.38	0.62	0.59
TATA G	0.35	0.44	0.44	0.51	0.62	0.74	0.45	0.31	0.58	0.50
TATA I	0.29	0.30	0.29	0.41	0.42	0.51	0.57	0.74	0.55	0.45
TATA M	0.35	0.49	0.50	0.58	0.66	0.87	0.53	0.36	0.53	0.52
TATA P	0.34	0.47	0.48	0.60	0.66	0.81	0.65	0.45	0.61	0.46
TATA S	0.41	0.39	0.44	0.49	0.57	0.62	0.68	0.27	0.41	0.48
TATA St	0.30	0.44	0.49	0.55	0.64	0.88	0.50	0.44	0.63	0.53
Tmken	0.37	0.45	0.47	0.54	0.62	0.75	0.66	0.29	0.47	0.48
TVS	0.36	0.31	0.36	0.41	0.49	0.54	0.66	0.72	0.38	0.49
Unicen	0.34	0.30	0.39	0.40	0.46	0.55	0.69	0.57	0.36	0.49
Unitech	0.41	0.42	0.33	0.39	0.37	0.46	0.54	0.72	0.54	0.48

Table 4.1b continue
Computed Beta Value for Daily Return Data of 100 Companies of BSE S&P 500 Index

Company Name	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Means
Venky's	0.34	0.33	0.42	0.42	0.49	0.57	0.74	0.64	0.47	0.53
Vinati	0.40	0.42	0.38	0.40	0.47	0.51	0.60	0.71	0.36	0.51
VIP	0.35	0.39	0.47	0.54	0.60	0.67	0.80	0.29	0.40	0.49
Voltas	0.36	0.49	0.50	0.58	0.69	0.83	0.62	0.45	0.61	0.54
VST	0.36	0.34	0.33	0.45	0.50	0.56	0.63	0.81	0.44	0.49
Wel	0.37	0.32	0.35	0.36	0.44	0.50	0.62	0.62	0.38	0.46
Wipro	0.34	0.29	0.37	0.39	0.46	0.52	0.72	0.42	0.33	0.47
Mean	0.35	0.40	0.43	0.48	0.55	0.65	0.61	0.46	0.49	0.49

Source: *Computed based on data from RBI and BSE*

The table no. 4.1(a) and 4.1(b) represent the Beta value of daily return data of the 100 companies during the study period. The average beta value of 100 companies from the BSE S&P 500 Index was 0.49. Beta which is the slope of the regression line describe the relationship between the stock's return and the market index return. A beta (β) value of 1 means the securities' rate of return increase or decrease equally with the market portfolio return. A Beta value (β)>1 means there is a fluctuation of return on the security more than market return fluctuation, this represents more volatile security compared with the market index. Beta value of 0<(β)<1 means the fluctuation of return in the security is less than market return, this represent that the security is less volatile than the market index. Beta value β<0 represent that the return of the security is moving against the market.

As can be observed from the yearly average beta of the stocks in the table 4.1 (a) and (b), during the study period, the average beta was not steady. In the initial period i.e. in the year1998-99 to 2000-01 beta value was high with value ranging from 0.70 to 0.79. From the year 2001-02, the average yearly beta declines. The average beta for the year 2001-02 was 0.33, it is 0.34 for the year 2003-04. The lowest average beta were found in the year 2007-08 and 2008-09 with 0.32. The average beta starts increasing from 2009-10 till 2014-15. In the year 2009-10, the average beta was 0.35 then increases to 0.40 (2010-11), 0.43(2011-12), 0.48 (2012-13, 0.55 (2013-14) and 0.65 (2014-15). The average beta was further decline to 0.61 in 2015-16 and to 0.46 in 2016-17. The beta value was 0.49 in the year 2017-18.

In terms of company wise comparison, the 20 years average beta was highest in the Century Textiles with value of 0.77. The Escort is in the second place with a beta value of 0.63 and Tata Chemical placed in the third with 0.59. With a beta value of 0.05 MRF had the lowest beta among the sampled stocks. As indicated by the average beta given in the table 4.1 (b) all the companies selected for the study were found to be defensive as all the stocks have beta value less than one.

When we observe the beta value of individual stocks year-wise, in the year 1998-99 the beta value ranges between 1.88 to -8.44. In 1998-99, Century Textile Industries Ltd. is found to have the highest beta value whereas MRF has the least beta value of -8.44.

4.3 Evaluation of undervaluation and overvaluation of Stocks:

The evaluation of overvaluation and undervaluation of daily return data of the stocks are presented in the table 4.2. All the stocks are evaluated for 20 years and the summary of the evaluation is presented below:

Table No. 4.2
Undervaluation/Overvaluation of Daily Return Data of 100 Companies of BSE S&P 500

Serial No.	Company Name	Undervalued	Overvalued	Sectors
1	3M India Ltd.	11	9	Consumer Durables
2	Aarti Industries Ltd.	15	5	Chemical & Petrochemical
3	Aban Offshore Ltd.	12	8	Information Technology
4	ACC Ltd.	9	11	Consumer Durables
5	Akzo Nobel India Ltd.	10	10	Consumer Durables
6	Ambuja Cement Ltd.	9	11	Consumer Durables
7	Apollo Hospitals Enterprise Ltd.	11	9	Healthcare
8	Apollo Tyres Ltd.	12	8	Consumer Durables
9	Ashok Leyland Ltd.	10	10	Transport Equipment's
10	Asian Paint Ltd.	11	9	Consumer Durables
11	Bajaj Holdings Investment Ltd.	9	11	Finance
12	Balakrishna Industries Ltd.	12	8	Consumer Durables
13	Bayer Cropscience Ltd.	11	9	Chemical & Petrochemical
14	Berger Paint India Ltd	12	8	Consumer Durables
15	Bharat Forge Ltd.	8	12	Metal, Metal Products & Mining
16	Birla Corporation Ltd.	10	10	Diversified
17	Bliss GVS Pharma Ltd.	11	9	Healthcare
18	Bombay Burmah Trading Corporation Ltd.	13	7	Consumer Durables

19	Bombay Dyeing Manufacturing Company Ltd.	9	11	Consumer Durables
20	Bosch Ltd.	12	8	Information Technology
21	Britannia Industries Ltd.	9	11	FMCG
22	CAN Fin Homes Ltd.	14	6	Finance
23	Carborundum Universal Ltd.	13	7	Utilities
24	Castrol India Ltd.	8	12	Consumer Durables
25	CEAT Ltd.	13	7	Consumer Durables
26	Century Textiles Industries Ltd.	14	6	Consumer Durables
27	Chowlamandalam Investment and Finance Company Ltd.	13	7	Finance
28	Colgate-Palmolive (India) Ltd.	9	11	FMCG
29	Cummins India td.	11	9	Metal, Metal Products & Mining
30	Deepak Spinners Ltd.	12	8	Transport Equipment's
31	Dewan Housing Finance Corporation Ltd.	12	8	Finance
32	Dhanuka Agritech Ltd.	11	9	Agriculture
33	Eicher Motors Ltd.	11	9	Transport Equipment's
34	ELGI Equipemnts Ltd.	9	11	Chemical & Petrochemical
35	Escorts Ltd.	8	12	Agriculture
36	Finolex Industries Ltd.	12	8	Agriculture
37	Gilette India Ltd.	9	11	Consumer Durables
38	Glaxosmithkline Consumer Healthcare Ltd.	7	13	Healthcare
39	Glaxosmithkline Pharmaceuticals Ltd.	8	12	Chemical & Petrochemical
40	Grasim Industries Ltd.	11	9	Consumer Durables
41	Great Estern Shipping Company Ltd.	11	9	Transport Services
42	Greaves Cotton Ltd.	11	9	Metal, Metal Products & Mining
43	Gruh Finance Ltd.	13	7	Finance
44	Gujarat State Fertilizers Chemicals Ltd.	7	13	Chemical & Petrochemical
45	Gujarat Narmada Valley Fertilizers Chemicals Ltd.	12	8	Chemical & Petrochemical
46	HDFC	10	10	Finance
47	HEG Ltd	11	9	Miscellaneous
48	Himatsingka Seide Ltd.	12	8	Metal, Metal Products & Mining
49	Hindalco Industries Ltd.	6	14	Metal, Metal Products & Mining
50	Indian Hotels Company Ltd.	7	13	Consumer Durables
51	Indo Count Industries Ltd.	11	9	Consumer Durables

52	ITC Ltd.	8	12	FMCG
53	ITD Cementation India Ltd.	10	10	Consumer Durables
54	Jamna Auto Industries Ltd.	8	12	Metal, Metal Products & Mining
55	JB Chemicals Pharmaceutical Ltd.	11	9	Chemical & Petrochemical
56	JB Industries Ltd.	13	7	Other
57	JK Lakshmi Cement Ltd.	12	8	Consumer Durables
58	JM Financial Ltd.	14	6	Finance
59	Johnson Control-Hitachi Air Conditioning India Ltd.	15	5	Consumer Durables
60	Kesoram Industries Ltd.	9	11	Consumer Durables
61	Larsen Turbo Ltd.	10	10	Miscellaneous
62	Linde	10	10	Other
63	Mahindra Mahindra Ltd.	11	9	Transport Equipment's
64	Monsanto India Ltd.	10	10	Chemical & Petrochemical
65	MRF Ltd	13	7	Consumer Durables
66	Nestle India Ltd.	10	10	FMCG
67	Nilkamal Ltd.	12	8	Consumer Durables
68	NOCIL Ltd.	10	10	Chemical & Petrochemical
69	Pfizer Ltd.	6	14	Chemical & Petrochemical
70	Phiips Carbon Black Ltd.	9	11	Chemical & Petrochemical
71	Raymond Ltd.	9	11	Consumer Durables
72	Reliance Industries Ltd.	11	9	Diversified
73	Reliance Industrial Infrastructure Ltd.	8	12	Other
74	Schaeffler India Ltd.	14	6	Metal, Metal Products & Mining
75	Shriram Transport Finance Ltd.	16	4	Finance
76	Siemens Ltd.	9	11	Other
77	Sintex Industries Ltd.	10	10	Consumer Durables
78	SKF India Ltd.	10	10	Metal, Metal Products & Mining
79	SRF Ltd	10	10	Diversified
80	Sudarshan Chemical Industries Ltd.	11	9	Chemical & Petrochemical
81	Supreme Industries Ltd.	12	8	Consumer Durables
82	SWAN Energy Ltd.	10	10	Utilities
83	Tata Chemical Ltd.	10	1	Chemical & Petrochemical
84	TATA Global Beverages Ltd.	10	10	Consumer Durables
85	TATA Investment Corporation Ltd.	12	8	Finance
86	Tata Motors Ltd.	12	8	Transport Equipment's
87	TATA Power Corporation Ltd.	9	11	Utilities

88	TATA Sponage Iron Ltd.	13	7	Metal, Metal Products & Mining
89	TATA Steel Ltd.	9	11	Metal, Metal Products & Mining
90	Tmken India Ltd.	9	11	Metal, Metal Products & Mining
91	TVS Shricakra Ltd.	13	7	Consumer Durables
92	Unicen Laboratories Ltd.	9	11	Chemical & Petrochemical
93	Unitech Ltd.	13	7	Other
94	Venky's (India) Ltd.	11	9	Other
95	Vinati organics Ltd.	12	8	Chemical & Petrochemical
96	VIP Industries Ltd.	10	10	Utilities
97	Voltas Ltd.	14	6	Utilities
98	VST Industries Ltd.	10	10	FMCG
99	Welspun India Ltd.	11	9	Consumer Durables
100	Wipro Ltd.	11	9	Information Technology

Source: *Computed based on data from RBI and BSE*

The table no. 4.2 depicts the undervaluation/overvaluation of daily return data of 100 companies of BSE S&P 500. For determining the under/overvaluation, the expected return was calculated using the CAPM model and the actual return was calculated using simple return model as per (1.3). Furthermore the study had attempted to find out whether the stocks were overvalued or undervalued. The undervaluation and overvaluation of stocks are determined to see whether in the real-world scenario a security's given price is contradicted to the expected return in comparison to what it should be in accordance to the CAPM model. The stocks above the Security Market Line (SML) are underpriced contrast to the CAPM, because the stocks have too high expected return which mean the stock's price are too low as compared to the fair CAPM value. Stocks below SML are overpriced contrast to the CAPM due to the too low expected return value of the stocks, this means the stock's price are too high compared to the fair CAPM value.

The above analysis as shown in table 4.2 indicates that majority of the stocks selected for the study were underpriced where Shriram Transport Finance Company is found to be the most underpriced stock. Out of 20 years of daily return data in16 years the stock is found to be underpriced. Few other top stocks which are found to be underpriced are Aarti Industries (15 years out of 20 years), Johnson Control-Hitachi Air Conditioning India (15 years out of 20 years), Can Fin Homes (14 years out of 20 years), Century Textile and Industries (14 years out of 20 years),

JM Financial (14 years out of 20 years), Schaeffler India ltd. (14 years out of 20 years), Voltus Ltd. (14 years out of 20 years).

From the analysis of the table no. 4.2 it can be seen that one third of the stocks are also found to be overpriced during the study period. Some of the stocks like the Hindalco Industries have as much as (14 years out of 20 years) are overpriced, Pfizer India (14 years out of 20 years), Gujarat State Fertilizers Chemical (13 years out of 20 years) and ITC (12 years out of 20 years) found to be mostly overpriced stocks.

4. 4   Analysis of CAPM on Daily Return Data:

The study empirically tested the significance of CAPM in the Indian equity market. Two stages of regression method were used to test the relevance of the model (CAPM) in the Indian context i.e. First Pass Regression and Second Pass Regression. Beta of the portfolios were computed using the first pass regression on the time series data and the second pass regression equation is used to test CAPM.

In the table 4.3, the first pass regression equation results are shown. The first pass regression is the time series regression run on the data. The intercept i.e. alpha (α_p) and slope i.e. beta (β_p) for 10 portfolios are sorted according to beta value with their significance. The result of the regression equation, $Z_{pt} = \alpha_p + \beta_p Z_{mt} + e_{pt}$ computed on the basis of daily return data are presented in the table no. 4.3. The duration of the study is from April 1998 to March 2018. The significance level for the analysis are tested at 5 percent and 1 percent level.

Table 4.3
Result of the First pass Regression of Equation using daily data

Portfolios	Average Return	α_p	β_p
P-1	-6.87933	-6.5197*	-2.4826
P-2	-6.67002	-6.6876*	-1.2801
P-3	-6.58099	-6.4757*	-2.0962
P-4	-6.69638	-6.6910*	-1.5796
P-5	-6.67106	-6.6811*	-1.3952
P-6	-6.65723	-6.7502*	-0.6877
P-7	-6.67595	-6.8085*	-0.5326
P-8	-6.661	-6.6571*	-1.328

P-9	-6.64709	-6.5194*	-1.3591
P-10	-6.66492	-6.6031*	-1.8726

Source: Computed based on data from RBI and BSE
Significance level at 5% represented as * and at 1% represented as **

The above table no. 4.3 is the first pass regression analysis result of daily data which shows the intercept (α_p) term is found to be significant at 5 percent for all portfolios. But the Beta (β_p) terms are not significant at both 5 percent and I percent significance level for all the portfolios. Another important finding of the analysis is that both the intercept and the beta value were found to have negative value. Thus for daily return data beta doesn't help in capturing the market risk or systematic risk. From the above table 4.3 it is clear that due to negative beta value all the portfolios are giving negative return. Portfolio 1 is having the highest negative beta value and it gave the highest negative return, whereas portfolio 3 has the second highest negative beta value but it has the lowest negative return. So from the analysis it reveals that beta value is unable to determine the return of a security. There is a mismatch between beta value and return of an asset.

4.5   Testing of Relevance of Beta Factor of Daily Return Data:

The next task is to run the second pass regression equation and test whether the risk premium indicated by the beta is positive and significant or not. This is a cross section regression analysis with beta calculated in the first pass regression as independent variable. This step will tell us whether the beta value have any validity in the Indian market context or not. In the table 4.5 the result of the cross sectional regression equation, $Z_{pt} = \gamma_0 + \gamma_1 \beta_p + e_{pt}$ is presented to verify the relevance of 'Beta' test on the basis of daily stock return.

Table 4.4

Regression result of the test of Relevance of beta factor on the basis of daily return data

	Coefficient	**t-stat**	**P-Value**
γ_0	-6.60347	-101.673	0.00
γ_1	0.052643	1.268995	0.24
R-square	0.167564		

Adjusted R Square	0.06351		

In the table 4.4, we can see that for the daily return data the intercept term is significant whereas risk premium is positive but statistically not significant. The R-square and adjusted R-square value also suggest that the model is unable to explain the stocks return. The value of R-square and adjusted R-square in the model is only 0.17 and 0.06 which means the beta is not a good predictor of the return of the portfolio. Thus, it can be concluded that beta factor or market risk is not valid in the Indian equity market.

4.6 Analysis of CAPM for Various Sub-Periods for Daily Return Data:

Under this section the test has been conducted for various sub-periods using the daily return data of the stocks. The sample period is divided into four sub-periods viz. SP1 (April 1998 – March 2003,), SP2 (April 2003 –March 2008), SP3 (April 2008 – March 2013), & SP4 (April 2013 - March 2018). The sub-periods are studied to examine the applicability of the model in different time periods.

In the table 4.5 the first pass regression of the equation, $Z_{pt}=\alpha_p + \beta_p Z_{mt} + e_{pt}$, of the various sub-periods based on daily stock return are shown for 10 beta sort listed portfolios with their significance.

Table 4.5

The Result of the first pass regression based on daily return data for the different sub-periods.

	SP1		SP2		SP3		SP4	
	α_p	β_p	α_p	β_p	α_p	β_p	α_p	β_p
P-1	-9.21*	11.14	-4.72*	-8.24	-6.27**	-1.41	-7.17*	-3.21
P-2	-8.31*	4.40	-5.01**	-6.11	-6.56**	0.42	-7.19*	-2.83
P-3	-9.14*	11.23	-4.24**	-9.89	-6.17**	-1.55	-7.40*	-2.08

	-7.08**	-4.67	-5.29*	-3.25	-6.19**	-1.67	-7.61*	-1.30
P-4	-7.08**	-4.67	-5.29*	-3.25	-6.19**	-1.67	-7.61*	-1.30
P-5	-7.75*	0.21	-4.22**	-12.60	-6.55**	0.75	-7.45*	-2.16
P-6	-8.31*	5.83	-4.37*	-11.40	-6.55**	0.69	-7.49*	-1.47
P-7	-8.31*	4.13	-4.78*	-7.70	-6.83**	1.95	-7.50*	-2.29
P-8	-8.93**	7.41	-5.01*	-4.84	-6.14**	-1.16	-7.49*	-1.88
P-9	-8.75*	10.31	-5.15*	-5.52	-5.60**	-3.73	-7.51*	-1.47
P-10	-8.10*	3.58	-5.28*	-3.95	-5.85**	-3.30	-7.60*	-0.61

Source: *Computed based on data from RBI and BSE*

*significant at 5% , ** significant at 1%

   As can be seen from the table 4.5, all the sub-period intercept term are found significant at 5 percent and 1 percent level. For the sub-period 3 all the intercept terms are found to be significant at 1%. However the 'Beta' are found to be insignificant for all the sub-periods at 5 percent and 1 percent significant level. Thus from analysis it can be concluded the beta doesn't helped in capturing the market risk for all the sub-periods.

4.7   Testing of Relevance of Beta Factor for various Sub-periods of Daily Return Data:

   The next step is to test the relevance of 'Beta' for different sub-periods for both daily stock return data. This analysis is going to give us a clear picture of 'Beta' whether it is valid or not in the Indian equity market. The test has been done with the help of the equation, $Z_{pt} = \gamma_0 + \gamma_1\beta_p + e_{pt}$. Table 4.6 shows the result of the second pass regression on the basis of daily return data for the four sub-periods.

Table 4.6: Regression Result of the Test of Relevance of Beta Factor for

Daily Return Data

		Coefficient	t-stat	P-Value
SP1	γ_0	-7.20684	-8.08799	0.00
	γ_1	0.207525	1.673819	0.13

	R-square	0.259374		
	Adjusted R Square	0.166796		
SP2	γ_0	-4.63446	-6.22813	0.00
	γ_1	0.09351	0.99838	0.34
	R-square	0.110791		
	Adjusted R Square	-0.00036		
SP3	γ_0	-6.43952	-315.126	0.00
	γ_1	-0.0104	-0.99676	0.34
	R-square	0.110471		
	Adjusted R Square	-0.00072		
SP4	γ_0	-7.74291	-394.346	0.00
	γ_1	-0.0098	-1.02809	0.33
	R-square	0.116702		
	Adjusted R Square	0.00629		

Source: Computed based on data from RBI and BSE

The results of the analysis as can be seen from the table 4.6 indicate that for all the four sub-periods the intercept term are found to be significant whereas the risk-premium i.e. beta are not significant. The risk-premium of the first two sub-periods are found to be positive but statistically it is not significant. The rest of the two sub-periods had negative risk-premium and statistically insignificant. The value of R-square and adjusted R-square for all the sub-periods indicates that CAPM is unable to explain the variables for determining future stock returns. Therefore, it can be concluded that the 'Beta' is not relevant in the Indian market for explaining the return of an asset.

4.7   Summary:

The beta value of the stocks were analyzed and the result suggested that all stocks were defensive. The analysis of overvaluation and undervaluation of the stocks was found that it had mostly underprice stocks. Next validity test of the CAPM concludes that beta term is not significant for capturing the market risk. The analysis also found that the model is unable to explain the relationship between risk and return. The second pass regression results of R-Square and adjusted R-square values confirmed that the model is not able to explain the variables. Similar results were also found for the different sub-periods where the model is unable to explain the relationship between risk and return.

Chapter 5

Analysis and Interpretation of Monthly Return Data

Serial No.	Contents
5.1	Introduction
5.2	The Computed Beta Value of Monthly Return Data of 100 Companies of BSE S&P 500 Index
5.3	Evaluation of undervaluation and overvaluation of Stocks
5.4	Analysis of CAPM on Monthly Return Data
5.5	Testing of Relevance of Beta Factor for Monthly Return Data
5.6	Analysis of CAPM for Various Sub-Periods
5.7	Testing of Relevance of Beta Factor for various Sub-periods

5.1   Introduction:

In this chapter the data analysis of the study based on the monthly return data of the companies are conducted. The validity or applicability of the CAPM model in the Indian equity market are being tested by running regression. The analysis are also conducted for the sample period by dividing into four different sub periods to test the robustness of the model in different time periods.

5.2   The Computed Beta Value of Monthly Return Data of 100 Companies of BSE S&P 500 Index:

The beta value which have been obtained by running the equation 1.5 (chapter 1) are presented in the table 5.1(a) and 5.1(b). In table 5.1(a) the beta value of the daily return data for 11 years i.e. 1998-99 to 2008-09 are presented. In table 5.1 (b), the beta value of the daily return data for 9 years i.e.2009-10 to 2017-18 as well as the average beta for the 20 years for each stock are presented. The average yearly beta for all the 100 stocks are also presented in the tables 5.1(a) and 5.1(b).

Table 5.1a
Computed Beta Value for Monthly Return Data of 100 Companies of BSE S&P 500 Index

Company Name	98-99	99-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
3M	0.89	1.13	0.85	0.54	0.52	0.46	0.27	0.32	0.25	0.23	0.33
Aarti	0.83	1.04	0.86	0.66	0.71	0.64	0.56	0.07	-0.23	0.23	-0.35
Aban	1.02	0.93	0.88	0.72	0.86	0.86	0.88	0.60	0.70	0.74	1.21
ACC	1.15	1.02	1.08	0.61	0.43	0.45	0.22	-0.22	-0.15	-0.07	-0.06
Akzo	0.03	-0.16	-0.20	-0.21	-0.20	-0.12	0.01	-0.08	-0.02	0.05	0.17
Ambuja	0.97	0.69	0.76	0.67	0.69	0.40	0.53	0.28	0.15	0.08	0.23
Apollo Ho	0.75	1.23	1.24	1.00	0.99	0.77	0.53	0.27	-0.01	0.06	0.16
Apollo Ty	1.08	1.20	0.93	0.67	0.69	0.48	0.30	0.23	0.07	0.26	0.10
Ashok Ley	1.05	1.07	0.84	0.53	0.38	0.19	0.01	-0.26	-0.23	-0.01	0.17
Asian	0.99	0.72	0.29	0.00	-0.13	-0.11	-0.01	-0.03	0.04	0.04	0.07
Bajaj Ho	0.51	0.41	0.13	-0.04	-0.02	-0.09	-0.06	-0.11	-0.17	-0.23	0.06

Company											
Balakri	0.70	0.75	0.50	0.49	0.54	0.94	0.98	1.10	1.16	1.06	1.11
Bayer	0.80	0.80	0.65	0.64	0.68	0.59	0.50	0.38	0.32	0.45	0.21
Berger	1.53	1.45	0.96	0.51	0.30	0.13	-0.11	0.05	0.03	0.10	0.26
Bharat	0.93	1.07	0.67	0.85	0.99	0.93	0.91	0.99	0.82	0.96	1.01
Birla	0.31	0.08	-0.03	-0.20	-0.19	0.13	0.06	-0.03	-0.04	-0.28	-0.16

Table 5.1a continue

Computed Beta Value for Monthly Return Data of 100 Companies of BSE S&P 500 Index

Company Name	98-99	99-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Bliss	0.48	-0.16	-0.34	-0.67	-0.24	0.01	0.30	0.45	0.35	1.05	0.53
Bom Bu	1.43	1.20	0.58	0.18	0.08	0.29	0.07	-0.16	-0.22	0.03	0.06
Bom Dy	1.07	0.89	0.27	-0.04	-0.16	-0.13	-0.15	0.36	0.19	0.02	-0.38
Bosch	0.55	0.25	0.23	0.10	0.16	0.26	0.30	0.18	0.21	0.22	0.09
Britania	0.02	-0.15	-0.24	-0.12	-0.13	0.01	-0.04	-0.02	-0.25	-0.15	0.00
CAN Fin	0.66	0.57	0.42	0.23	0.15	0.21	0.22	0.10	0.10	0.09	-0.10
Carborun	0.27	0.36	0.27	0.22	0.16	0.23	0.03	-0.08	-0.21	-0.06	0.04
Castrol	0.74	0.72	0.54	0.26	0.16	0.23	0.20	0.22	0.25	0.19	0.24
CEAT	0.87	1.07	1.03	1.04	1.03	0.75	0.52	0.34	0.07	-0.11	0.08
Century	1.45	1.20	1.21	1.13	0.92	0.69	0.79	0.62	0.61	0.38	0.23
Chowla	0.76	1.00	0.71	0.47	0.60	0.73	0.59	0.64	0.78	0.95	1.40
Colgate	0.70	0.75	0.52	0.40	0.27	0.14	0.03	0.05	0.04	0.01	0.04
Cummins	0.41	0.21	-0.03	0.18	0.15	0.27	0.31	0.43	0.16	0.05	-0.04
Deepak	0.78	0.91	0.64	0.38	0.44	0.47	0.29	0.26	0.08	-0.02	0.18
Dewan	0.80	0.86	0.61	0.56	0.42	0.55	0.38	0.49	0.20	0.19	0.15
Dhanuka	0.30	-0.04	-0.35	-0.50	-0.34	-0.02	-0.01	0.01	0.32	0.22	-0.29
Eicher	1.16	0.91	0.77	0.41	0.29	0.08	-0.12	-0.37	-0.66	-0.32	-0.01
ELGI	0.47	0.68	0.63	0.60	0.69	0.86	0.67	0.46	0.21	0.24	0.13
Escort	1.01	1.08	0.90	0.41	0.35	0.14	-0.07	-0.25	-0.04	-0.14	0.01
Finolex	0.87	0.70	0.29	0.23	0.06	0.10	0.08	0.18	-0.15	-0.05	0.06
Gilette	0.53	0.28	0.22	0.10	0.19	0.10	0.12	0.01	-0.08	-0.12	-0.03
Glaxo H	1.05	0.84	0.51	0.32	0.21	0.16	0.14	-0.01	0.03	-0.06	0.17
Glaxo P	0.72	0.76	0.52	0.39	0.43	0.35	0.38	0.24	-0.03	0.01	0.00
Grasim	1.01	0.74	0.55	0.40	0.07	-0.04	0.05	-0.21	-0.20	-0.25	-0.35
Great	0.49	0.32	0.09	0.06	0.22	0.55	0.54	0.58	0.23	-0.02	-0.23
Greaves	0.62	0.64	0.93	0.80	0.81	0.61	0.57	0.03	-0.26	-0.41	-0.07
Gruh Fin	1.19	0.89	0.96	0.57	0.47	0.36	0.41	0.07	0.02	0.11	0.24
Guja Fe	1.01	0.93	0.68	0.21	0.03	-0.06	-0.05	-0.23	-0.35	-0.18	0.24
Guja Nar	0.88	0.57	0.61	0.53	0.37	0.28	0.35	-0.05	-0.20	-0.17	0.07
HDFC	0.85	0.76	0.45	0.17	0.13	0.32	0.04	-0.02	0.18	0.12	-0.33
HEG	0.49	0.42	0.23	0.03	0.03	0.30	0.34	0.03	-0.22	-0.23	-0.11
Himat	1.07	0.76	0.34	0.06	0.00	-0.17	0.23	-0.01	-0.12	-0.14	0.23

Hindalco	0.30	0.11	-0.01	-0.06	-0.13	0.14	0.31	0.30	0.01	-0.05	-0.25
Indian	0.95	1.09	0.97	0.97	1.11	1.05	0.86	1.00	0.81	0.73	0.92
Indo	1.29	0.87	0.65	0.46	0.33	0.25	0.28	0.13	-0.02	0.11	0.13
ITC	1.20	0.94	0.70	0.48	0.15	0.00	-0.16	-0.24	-0.52	-0.02	0.03
ITD	1.22	0.99	0.07	-0.12	-0.18	-0.42	-0.27	-0.15	-0.43	0.17	0.29

Table 5.1a continue

Computed Beta Value for Monthly Return Data of 100 Companies of BSE S&P 500 Index

Company Name	98-99	99-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Jamna	1.17	1.23	0.95	0.64	0.65	0.46	0.36	0.23	0.01	-0.05	0.09
JB Che	0.77	0.80	0.47	0.43	0.61	1.01	1.23	1.43	1.49	1.56	1.15
JB Ind	0.91	1.36	0.64	0.50	0.41	0.12	-0.41	-0.03	-0.36	-0.09	0.40
JK Lak	0.88	1.57	1.32	1.27	1.34	1.20	0.92	0.89	0.79	0.63	1.44
JM Fin	1.58	1.25	1.11	0.63	0.59	0.41	-0.02	-0.12	-0.32	-0.34	-0.13
Johnson	1.15	1.68	1.43	1.23	1.23	0.93	0.42	0.16	-0.06	-0.15	0.35
Kesoram	0.89	0.53	0.22	0.18	0.05	-0.13	-0.05	0.16	-0.18	-0.16	0.12
L&T	1.33	1.27	1.06	0.73	0.77	0.54	0.35	0.26	0.46	0.21	0.26
Linde	0.94	0.88	0.61	0.50	0.37	0.24	0.27	0.30	-0.15	-0.15	0.05
M&M	1.02	0.95	0.46	0.21	0.22	0.24	0.13	0.22	0.17	0.25	0.00
Mon	0.41	0.31	0.27	0.24	0.21	0.24	0.41	-0.05	-0.15	-0.08	-0.10
MRF	0.41	0.31	0.27	0.24	0.21	0.24	0.41	-0.05	-0.15	-0.08	-0.10
Nestle	1.06	0.93	0.65	0.36	0.26	0.13	0.07	0.04	0.02	-0.09	0.04
Nilkamal	0.92	0.79	0.62	0.48	0.43	0.52	0.43	0.38	0.19	0.18	0.04
NOCIL	1.74	1.31	0.97	0.61	0.43	0.23	0.23	0.12	0.46	0.42	0.30
Pfizer	1.22	0.78	0.39	0.18	0.06	-0.04	-0.04	0.01	-0.19	-0.20	-0.12
Phiips	1.18	1.04	0.68	0.42	0.71	0.79	0.42	0.30	0.05	-0.17	-0.10
Raym	0.99	0.62	0.35	-0.06	-0.18	-0.27	-0.10	-0.18	-0.04	-0.19	-0.09
Relia Ind	1.08	0.78	0.49	0.27	0.00	0.07	-0.04	-0.03	-0.06	0.10	-0.09
Relia Inf	1.02	0.57	0.12	-0.07	-0.22	-0.31	-0.14	0.07	-0.10	-0.14	-0.32
Schaeff	1.07	1.13	0.67	0.38	0.30	0.23	0.07	0.06	0.25	0.17	0.45
Shriram	0.37	0.35	0.03	-0.07	0.01	0.18	-0.01	0.04	-0.20	-0.18	-0.18
Siem	0.76	0.69	0.62	0.40	0.39	0.16	0.17	-0.02	-0.13	0.31	0.52
Sintex	0.68	0.42	0.22	0.10	0.15	0.25	0.45	0.29	0.15	0.20	0.14
SKF	0.54	0.57	0.55	0.49	0.44	0.64	0.55	0.35	0.11	0.03	-0.02
SRF	0.60	1.07	0.86	0.54	0.42	0.60	0.45	0.45	0.55	0.76	0.47
Suda	0.63	0.69	0.41	0.47	0.24	0.27	0.22	0.14	-0.16	0.14	-0.20
Supre	0.86	0.82	0.75	0.83	0.83	0.74	0.58	0.42	0.18	0.30	0.21
SWAN	-0.28	-0.06	-0.59	-0.61	-0.74	-0.59	-0.46	0.58	0.97	1.37	0.63
TATA C	1.08	0.64	0.62	0.40	0.36	0.21	0.24	-0.03	-0.18	-0.23	0.11
TATA G	0.98	0.82	0.84	0.76	0.72	0.77	0.73	0.52	0.24	0.03	-0.28
TATA I	1.07	0.76	0.57	0.24	0.26	0.41	0.35	0.25	0.25	0.17	0.10

Company Name	98-99	99-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
TATA M	0.96	0.71	0.47	0.36	0.20	0.29	0.35	0.28	-0.01	0.05	-0.06
TATA P	0.88	0.67	0.25	0.04	-0.10	-0.14	-0.21	-0.13	-0.23	-0.20	-0.19
TATA S	1.02	0.87	0.60	0.32	0.25	0.31	0.21	0.10	-0.18	0.17	-0.12
TATA St	1.08	0.64	0.51	0.30	0.08	0.04	0.16	0.21	0.14	0.27	0.31
Tmken	0.72	0.81	0.67	0.47	0.31	0.37	0.27	0.07	0.05	0.06	-0.03

Table 5.1a continue

Computed Beta Value for Monthly Return Data of 100 Companies of BSE S&P 500 Index

Company Name	98-99	99-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
TVS	0.68	0.63	0.65	0.61	0.62	0.64	0.53	0.32	0.24	0.23	0.23
Unicen	0.99	1.19	1.19	0.89	0.79	0.70	0.54	0.12	0.18	0.30	0.02
Unitech	0.58	0.57	0.65	0.66	0.62	0.57	0.55	0.28	-0.93	-1.08	-0.20
Venky's	0.94	1.07	0.95	0.72	0.75	0.57	0.40	0.17	0.14	0.03	0.14
Vinati	1.37	1.65	1.25	1.07	0.81	0.74	0.48	0.50	0.33	0.23	-0.07
VIP	0.64	0.79	0.61	0.54	0.53	0.60	0.41	0.26	0.14	0.07	0.16
Voltas	1.12	0.73	0.46	0.23	0.19	0.14	0.26	0.20	0.17	0.21	0.05
VST	1.27	1.01	0.88	0.52	0.47	0.32	0.23	0.12	0.05	0.08	0.18
Wel	0.07	0.29	0.23	0.23	0.29	0.57	0.69	0.87	1.19	1.00	1.15
Wipro	0.75	0.31	0.28	0.54	0.53	0.33	0.35	0.41	0.08	-0.19	0.07
Mean	0.85	0.77	0.56	0.39	0.34	0.33	0.27	0.20	0.09	0.12	0.15

Source: Computed based on data from RBI and BSE

Table 5.1b

Computed Beta Value of Monthly Return Data of 100 Companies of BSE S&P 500 Index

Company Name	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Mean
3M	0.32	0.26	0.25	0.22	0.15	-0.30	-0.43	-0.21	-0.10	0.30
Aarti	-0.16	-0.04	0.10	-0.04	0.29	0.36	0.31	0.24	0.47	0.33
Aban	1.72	1.93	1.90	1.94	2.25	1.73	1.78	1.76	1.51	1.30
ACC	-0.06	-0.02	0.04	-0.07	-0.08	-0.08	-0.23	-0.21	-0.27	0.17
Akzo	0.12	0.10	0.13	0.11	0.19	0.08	0.07	0.30	0.58	0.05
Ambuja	0.07	0.01	0.00	-0.08	-0.18	-0.07	-0.14	-0.15	-0.02	0.24
Apollo Ho	0.16	0.15	0.23	0.20	0.23	0.03	0.06	-0.13	-0.15	0.39
Apollo Ty	0.03	0.00	0.10	0.07	0.13	0.46	0.44	0.11	0.32	0.38
Ashok Ley	0.15	0.13	0.12	0.19	0.04	0.33	0.41	0.53	0.18	0.29
Asian	-0.05	-0.04	-0.06	-0.03	-0.07	0.07	-0.01	0.01	0.07	0.09
Bajaj Ho	-0.15	-0.14	-0.14	-0.13	-0.28	0.30	0.13	0.17	0.29	0.02
Balakri	1.35	1.37	1.28	1.36	1.29	0.63	0.68	0.91	0.68	0.94
Bayer	0.35	0.35	0.39	0.38	0.47	0.13	-0.22	-0.19	-0.30	0.37
Berger	0.36	0.23	0.19	0.20	0.06	-0.16	0.01	0.27	0.24	0.33

Company Name									
Bharat	1.19	1.28	1.28	1.29	1.27	1.11	1.17	0.98	1.14	1.04
Birla	0.09	0.07	0.12	0.26	0.38	0.39	0.30	0.70	0.80	0.14
Bliss	0.28	0.18	0.25	0.01	-0.14	-0.09	-0.34	-0.22	-0.80	0.04
Bom Bu	0.52	0.64	0.53	0.40	0.69	-0.18	-0.58	-0.34	0.23	0.27

Table 5.1b continue

Computed Beta Value of Monthly Return Data of 100 Companies of BSE S&P 500 Index

Company Name	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Mean
Bom Dy	-0.49	-0.55	-0.41	-0.38	0.05	0.66	0.51	0.31	0.60	0.11
Bosch	0.21	0.22	0.18	0.18	0.18	-0.15	-0.27	-0.31	-0.32	0.12
Britania	0.20	0.19	0.26	0.20	0.38	0.29	0.30	0.21	0.31	0.06
CAN Fin	0.02	0.06	0.15	0.23	0.43	0.54	0.36	0.15	0.07	0.23
Carborun	0.25	0.24	0.33	0.28	0.38	0.11	0.07	-0.14	0.15	0.15
Castrol	0.29	0.27	0.34	0.33	0.25	-0.10	-0.45	-0.45	-0.19	0.20
CEAT	-0.05	-0.07	0.00	0.01	0.06	0.47	0.24	0.47	-0.13	0.38
Century	-0.11	-0.16	-0.16	-0.13	-0.11	0.34	0.39	-0.19	-0.03	0.45
Chowla	1.60	1.67	1.71	1.67	1.55	1.41	1.23	1.11	0.94	1.08
Colgate	0.09	0.04	0.03	0.06	0.14	0.13	0.11	-0.15	-0.06	0.17
Cummins	0.06	0.10	0.17	0.12	0.34	0.15	0.02	-0.35	-0.16	0.13
Deepak	0.17	0.15	0.19	0.25	0.22	0.09	-0.13	-0.21	-0.09	0.25
Dewan	0.37	0.24	0.39	0.41	0.60	0.18	0.04	-0.18	-0.04	0.36
Dhanuka	-0.32	-0.42	-0.40	-0.35	-0.25	0.05	0.20	0.19	-0.30	-0.11
Eicher	0.15	0.15	0.11	0.14	0.17	0.39	0.41	0.69	0.63	0.25
ELGI	0.29	0.33	0.39	0.39	0.44	0.16	-0.04	-0.04	0.04	0.38
Escort	0.21	0.16	0.28	0.33	0.52	0.10	0.18	0.02	0.28	0.27
Finolex	0.10	0.14	0.17	0.14	0.11	0.15	-0.12	0.08	0.35	0.17
Gilette	0.02	0.01	0.02	0.04	0.14	0.12	-0.13	-0.29	-0.44	0.04
Glaxo H	0.18	0.20	0.22	0.20	0.21	0.32	0.14	0.13	0.36	0.27
Glaxo P	-0.09	-0.01	0.10	0.02	0.14	0.23	-0.03	-0.07	-0.07	0.20
Grasim	-0.20	-0.23	-0.26	-0.24	0.14	-0.40	-0.24	-0.21	-0.36	-0.01
Great	-0.36	-0.36	-0.17	-0.13	0.03	0.89	0.47	0.14	0.06	0.17
Greaves	-0.10	-0.11	-0.05	0.00	0.20	0.50	0.36	0.47	0.58	0.31
Gruh Fin	0.37	0.32	0.36	0.35	0.39	-0.11	-0.13	0.23	0.60	0.38
Guja Fe	0.39	0.29	0.28	0.36	0.45	-0.24	0.11	0.46	0.66	0.25
Guja Nar	0.04	0.19	0.22	0.23	0.14	0.11	-0.32	-0.08	0.08	0.19
HDFC	-0.27	-0.38	-0.32	-0.35	-0.11	0.23	0.06	0.13	0.78	0.12
HEG	0.15	0.30	0.30	0.26	0.28	-0.22	-0.32	-0.38	-0.11	0.08
Himat	0.11	0.10	-0.06	-0.07	-0.36	-0.85	-0.57	0.04	0.27	0.04
Hindalco	-0.31	-0.28	-0.15	-0.08	0.05	0.57	0.28	0.14	0.29	0.06
Indian	1.16	1.04	1.12	1.15	0.91	0.69	0.89	0.86	0.93	0.96
Indo	0.13	0.16	0.11	0.05	0.01	-0.12	-0.17	0.10	0.22	0.25

ITC	0.11	0.06	0.25	0.29	0.57	0.77	0.68	0.32	0.50	0.31
ITD	-0.03	0.15	0.15	0.25	0.26	-0.01	-0.43	-0.72	-0.92	-0.01
Jamna	0.15	0.19	0.30	0.29	0.16	-0.08	-0.15	-0.35	-0.12	0.31
JB Che	1.19	1.20	1.26	0.61	1.29	1.27	1.20	1.43	1.70	1.11

Table 5.1b continue

Computed Beta Value of Monthly Return Data of 100 Companies of BSE S&P 500 Index

Company Name	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Mean
JB Ind	0.23	0.03	0.07	0.00	-0.14	-0.11	0.04	-0.11	-0.04	0.17
JK Lak	1.65	1.65	1.77	1.87	2.00	1.85	2.14	2.16	2.19	1.48
JM Fin	0.50	0.43	0.46	0.46	0.79	0.15	-0.06	-0.20	0.17	0.37
Johnson	0.16	0.17	0.16	0.27	0.21	0.70	0.87	0.97	0.50	0.62
Kesoram	0.09	0.00	0.02	-0.02	0.00	-0.53	-0.28	-0.36	-0.32	0.01
L&T	0.20	0.14	0.07	0.08	0.02	-0.03	-0.08	0.18	0.31	0.41
Linde	-0.15	-0.12	0.04	-0.01	-0.05	0.44	-0.02	-0.05	0.04	0.20
M&M	-0.01	0.02	0.13	0.02	0.16	0.04	-0.14	-0.46	0.03	0.18
Mon	-0.12	0.09	0.16	0.06	0.18	0.24	0.17	-0.05	-0.21	0.11
MRF	-0.12	0.09	0.16	0.06	0.18	0.24	0.17	-0.05	-0.21	0.11
Nestle	0.04	0.06	0.09	0.15	0.12	0.26	0.08	0.04	-0.07	0.21
Nilkamal	-0.02	-0.11	-0.14	-0.18	-0.08	-0.04	-0.18	-0.17	-0.17	0.19
NOCIL	0.13	0.10	0.09	0.13	0.10	0.27	-0.09	-0.40	-0.32	0.34
Pfizer	-0.07	-0.11	-0.02	0.00	0.10	0.33	0.15	-0.05	-0.04	0.12
Phiips	-0.06	-0.03	0.05	0.01	-0.02	0.31	-0.03	0.07	0.08	0.28
Raym	-0.23	-0.19	-0.25	-0.22	-0.27	-0.10	-0.40	-0.18	-0.23	-0.06
Relia Ind	0.06	0.03	0.08	-0.02	0.18	0.05	-0.09	0.04	0.54	0.17
Relia Inf	-0.49	-0.52	-0.35	-0.31	-0.11	0.63	0.18	0.04	-0.06	-0.03
Schaeff	0.29	0.27	0.16	0.21	0.03	-0.02	-0.05	0.19	0.19	0.30
Shriram	-0.02	-0.01	0.14	0.01	0.10	-0.01	-0.28	-0.24	0.12	0.01
Siem	0.33	0.28	0.22	0.10	-0.12	0.05	0.22	0.38	0.34	0.28
Sintex	0.03	0.02	0.08	-0.11	-0.04	-0.35	-0.45	-0.70	-1.00	0.03
SKF	-0.13	-0.09	-0.02	-0.04	-0.11	0.31	0.22	0.37	0.42	0.26
SRF	0.43	0.31	0.27	0.23	0.32	0.01	0.01	0.05	0.20	0.43
Suda	-0.14	-0.19	-0.06	-0.08	-0.06	-0.43	-0.19	-0.74	-0.92	0.00
Supre	0.48	0.56	0.50	0.51	0.64	0.17	-0.15	-0.25	-0.24	0.44
SWAN	0.37	0.05	0.00	0.02	0.09	-0.22	-0.12	-0.36	-0.39	-0.02
TATA C	-0.04	-0.07	-0.02	0.00	-0.22	0.26	0.15	-0.22	-0.11	0.15
TATA G	-0.24	-0.23	-0.13	-0.08	0.12	0.24	0.23	0.16	0.14	0.32
TATA I	0.26	0.20	0.25	0.26	0.35	-0.03	-0.06	-0.04	0.07	0.28
TATA M	-0.11	-0.11	-0.09	-0.11	-0.03	0.34	0.38	0.47	0.29	0.23
TATA P	-0.20	-0.20	-0.12	-0.20	-0.05	-0.16	-0.49	-0.54	0.05	-0.06
TATA S	-0.08	-0.03	0.13	0.13	0.49	0.82	0.48	0.47	0.45	0.32

TATA St	0.34	0.30	0.10	0.08	0.05	-0.52	-0.33	0.26	0.31	0.22
Tmken	0.05	0.04	0.05	0.06	0.11	-0.10	-0.01	-0.03	0.17	0.21
TVS	0.35	0.41	0.38	0.40	0.44	0.35	0.28	0.16	0.30	0.42
Unicen	0.06	0.13	0.17	0.22	0.38	0.45	0.15	-0.02	-0.09	0.42

Table 5.1b continue

Computed Beta Value of Monthly Return Data of 100 Companies of BSE S&P 500 Index

Company Name	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Mean
Unitech	-0.10	-0.10	0.23	0.24	0.38	-0.07	-0.17	-0.20	-0.17	0.12
Venky's	0.01	0.00	-0.01	0.00	-0.07	0.45	-0.01	-0.79	-0.46	0.25
Vinati	0.02	-0.04	0.06	0.09	0.37	0.19	0.33	0.32	0.29	0.50
VIP	0.15	0.17	0.32	0.25	0.23	0.17	-0.21	-0.35	0.41	0.29
Voltas	-0.15	-0.24	-0.25	-0.17	-0.05	0.45	0.49	0.40	0.24	0.22
VST	0.25	0.22	0.16	0.20	0.24	0.16	0.14	0.45	0.31	0.36
Wel	1.27	1.33	1.39	1.50	1.38	1.34	1.65	-0.18	-0.77	0.78
Wipro	0.08	0.02	0.05	0.03	-0.15	-0.32	-0.50	-0.59	-0.34	0.09
Mean	0.17	0.17	0.21	0.20	0.25	0.22	0.12	0.08	0.14	0.28

Source: Computed based on data from RBI and BSE

The table no. 5.1(a) and 5.1(b) represent the beta value of monthly return data of the 100 companies during the study period. The average beta value of 100 companies was 0.28. Beta which is the slope of the regression line describe the relationship between the stock's return and the market index return. A beta value (β) of 1 means the securities rate of return increase or decrease equally with the market portfolio return. A Beta value (β)>1 means there is a fluctuation of return on the security more than market return fluctuation, this represents more volatile security compared with the market index. Beta value of 0<(β)<1 means the fluctuation of return in the security is less than market return, this represent that the security is less volatile than the market index. Beta value β<0 represent that the return of the security is moving against the market.

From the table 5.1(a) and 5.1(b) it can be observed that the yearly average beta of the stocks, during the study period, the average beta was not steady. The beta value was highest in the year 1998-99 with value of 0.85 whereas the lowest average beta value was found in 2016-17 with a value of 0.08. All the average beta value was lower than 0.4 other than the first three years of the study period. For monthly data it can be observed that a few stocks were showing negative beta value throughout the study period. It was found that JK Lakshmi Cement Ltd. had the highest beta

value during the study period with 1.48 among the sampled companies, which suggest that it is an aggressive stock (highly volatile). Few other companies which are found to be aggressive are Aban Offshore Limited (1.30), JB Chemical & Pharmaceutical Limited (1.11), Cholamandalam Investment & Finance Corporation Limited (1.08), and Bharat Forge Limited (1.04), chronologically standing in 2nd, 3rd, 4th and 5th position according to their average beta value. Dhanuka Agritech Limited is having the least average beta with -0.11. There are few other companies which are found to be have negative average beta value viz. ITD Cementation India Limited(-0.01), Grasim Industries Limited (-0.01), Swan Energy Limited (-0.02), Reliance Infrastructure Limited (-0.03), Raymond Limited (-0.06), and TATA Power Corporation Limited (-0.06). Thus, all of the negative beta value companies are going against the market return. It is found that 88 companies are defensive while only 5 companies are found to be aggressive and the rest 7 companies going opposite direction from the market.

5.3   Evaluation of undervaluation and overvaluation of Stocks:

The evaluation of overvaluation and undervaluation of monthly return data of the stocks are presented in the table 5.2. All the stocks are evaluated for 20 years and the summary of the evaluation is presented below:

Table No. 5.2
Undervaluation/Overvaluation of Monthly Return Data of 100 Companies of BSE S&P 500

Serial No.	Company Name	Undervalued	Overvalued	Sectors
1	3M India Ltd.	4	16	Consumer Durables
2	Aarti Industries Ltd.	6	14	Chemical & Petrochemical
3	Aban Offshore Ltd.	13	7	Information Technology
4	ACC Ltd.	12	8	Consumer Durables
5	Akzo Nobel India Ltd.	2	18	Consumer Durables
6	Ambuja Cement Ltd.	2	18	Consumer Durables
7	Apollo Hospitals Enterprise Ltd.	4	16	Healthcare
8	Apollo Tyres Ltd.	5	15	Consumer Durables
9	Ashok Leyland Ltd.	6	14	Transport Equipment's
10	Asian Paint Ltd.	1	19	Consumer Durables
11	Bajaj Holdings Investment Ltd.	2	18	Finance
12	Balakrishna Industries Ltd.	10	10	Consumer Durables
13	Bayer Cropscience Ltd.	3	17	Chemical & Petrochemical
14	Berger Paint India Ltd	3	17	Consumer Durables

15	Bharat Forge Ltd.	12	8	Metal, Metal Products & Mining
16	Birla Corporation Ltd.	6	14	Diversified
17	Bliss GVS Pharma Ltd.	7	13	Healthcare
18	Bombay Burmah Trading Corporation Ltd.	6	14	Consumer Durables
19	Bombay Dyeing Manufacturing Company Ltd.	8	12	Consumer Durables
20	Bosch Ltd.	2	18	Information Technology
21	Britannia Industries Ltd.	1	29	FMCG
22	CAN Fin Homes Ltd.	4	16	Finance
23	Carborundum Universal Ltd.	3	17	Utilities
24	Castrol India Ltd.	1	19	Consumer Durables
25	CEAT Ltd.	7	13	Consumer Durables
26	Century Textiles Industries Ltd.	8	12	Consumer Durables
27	Chowlamandalam Investment and Finance Company Ltd.	14	6	Finance
28	Colgate-Palmolive (India) Ltd.	1	19	FMCG
29	Cummins India td.	14	16	Metal, Metal Products & Mining
30	Deepak Spinners Ltd.	3	17	Transport Equipment's
31	Dewan Housing Finance Corporation Ltd.	8	12	Finance
32	Dhanuka Agritech Ltd.	7	13	Agriculture
33	Eicher Motors Ltd.	7	13	Transport Equipment's
34	ELGI Equipemnts Ltd.	7	13	Chemical & Petrochemical
35	Escorts Ltd.	5	15	Agriculture
36	Finolex Industries Ltd.	3	17	Agriculture
37	Gilette India Ltd.	2	18	Consumer Durables
38	Glaxosmithkline Consumer Healthcare Ltd.	1	19	Healthcare
39	Glaxosmithkline Pharmaceuticals Ltd.	3	17	Chemical & Petrochemical
40	Grasim Industries Ltd.	3	17	Consumer Durables
41	Great Estern Shipping Company Ltd.	8	12	Transport Services
42	Greaves Cotton Ltd.	6	14	Metal, Metal Products & Mining
43	Gruh Finance Ltd.	8	12	Finance
44	Gujarat State Fertilizers Chemicals Ltd.	4	16	Chemical & Petrochemical
45	Gujarat Narmada Valley Fertilizers Chemicals Ltd.	7	13	Chemical & Petrochemical
46	HDFC	4	16	Finance
47	HEG Ltd	3	17	Miscellaneous

48	Himatsingka Seide Ltd.	2	18	Metal, Metal Products & Mining
49	Hindalco Industries Ltd.	4	16	Metal, Metal Products & Mining
50	Indian Hotels Company Ltd.	11	9	Consumer Durables
51	Indo Count Industries Ltd.	1	19	Consumer Durables
52	ITC Ltd.	5	15	FMCG
53	ITD Cementation India Ltd.	6	14	Consumer Durables
54	Jamna Auto Industries Ltd.	6	14	Metal, Metal Products & Mining
55	JB Chemicals Pharmaceutical Ltd.	13	7	Chemical & Petrochemical
56	JB Industries Ltd.	3	17	Other
57	JK Lakshmi Cement Ltd.	17	3	Consumer Durables
58	JM Financial Ltd.	7	13	Finance
59	Johnson Control-Hitachi Air Conditioning India Ltd.	9	11	Consumer Durables
60	Kesoram Industries Ltd.	6	14	Consumer Durables
61	Larsen Turbo Ltd.	6	14	Miscellaneous
62	Linde	3	17	Other
63	Mahindra Mahindra Ltd.	2	18	Transport Equipment's
64	Monsanto India Ltd.	3	17	Chemical & Petrochemical
65	MRF Ltd	3	17	Consumer Durables
66	Nestle India Ltd.	1	19	FMCG
67	Nilkamal Ltd.	7	13	Consumer Durables
68	NOCIL Ltd.	5	15	Chemical & Petrochemical
69	Pfizer Ltd.	1	19	Chemical & Petrochemical
70	Phiips Carbon Black Ltd.	5	15	Chemical & Petrochemical
71	Raymond Ltd.	5	15	Consumer Durables
72	Reliance Industries Ltd.	3	17	Diversified
73	Reliance Industrial Infrastructure Ltd.	4	16	Other
74	Schaeffler India Ltd.	4	16	Metal, Metal Products & Mining
75	Shriram Transport Finance Ltd.	6	14	Finance
76	Siemens Ltd.	5	15	Other
77	Sintex Industries Ltd.	5	15	Consumer Durables
78	SKF India Ltd.	5	15	Metal, Metal Products & Mining
79	SRF Ltd	8	12	Diversified
80	Sudarshan Chemical Industries Ltd.	5	15	Chemical & Petrochemical
81	Supreme Industries Ltd.	3	17	Consumer Durables
82	SWAN Energy Ltd.	8	12	Utilities
83	Tata Chemical Ltd.	2	18	Chemical & Petrochemical
84	TATA Global Beverages Ltd.	5	15	Consumer Durables

85	TATA Investment Corporation Ltd.	2	18	Finance
86	Tata Motors Ltd.	3	17	Transport Equipment's
87	TATA Power Corporation Ltd.	3	17	Utilities
88	TATA Sponage Iron Ltd.	6	14	Metal, Metal Products & Mining
89	TATA Steel Ltd.	4	16	Metal, Metal Products & Mining
90	Tmken India Ltd.	5	15	Metal, Metal Products & Mining
91	TVS Shricakra Ltd.	5	15	Consumer Durables
92	Unicen Laboratories Ltd.	4	16	Chemical & Petrochemical
93	Unitech Ltd.	7	13	Other
94	Venky's (India) Ltd.	6	14	Other
95	Vinati organics Ltd.	8	12	Chemical & Petrochemical
96	VIP Industries Ltd.	6	14	Utilities
97	Voltas Ltd.	5	15	Utilities
98	VST Industries Ltd.	4	16	FMCG
99	Welspun India Ltd.	9	11	Consumer Durables
100	Wipro Ltd.	3	17	Information Technology

Source: Computed based on data from RBI and BSE

The table no. 5.2 represent the analysis on undervaluation and overvaluation of 100 companies of BSE S&P 500. The analysis results for the daily stock return data showed that it had mostly underpriced stocks whereas for the monthly data most of the companies' stocks are found to be overpriced. This shows that when the stock return changed from daily to monthly the result also come out differently. During the analysis the Asian Paint Ltd. (19), Castrol India Ltd. (19), Britannia Industries Ltd. (19), Colgate-Palmolive (India) Ltd. (19), GlaxoSmithKline Consumer Healthcare Ltd. (19), Indo Count Industries Ltd. (19) and Nestle India Ltd. (19) found to have highest numbers of overpriced years. Whereas JK Lakshmi Cement Ltd. (17) have the highest numbers underpriced years.

5. 4   Analysis of CAPM on Monthly Return Data:

The study empirically tested the significance of CAPM in the Indian equity market. Two stages of regression method were used to test the relevance of the model (CAPM) in the Indian context i.e. First Pass Regression and Second Pass Regression. Beta of the portfolios were computed using the first pass regression on the time series data and the second pass regression equation is used to test CAPM.

In the table 5.3 the result of the regression equation, $Z_{pt} = \alpha_p + \beta_p Z_{mt} + e_{pt}$, computed on the basis of monthly return data are shown. The duration of the study is from April 1998 to March 2018. The significance level for the analysis are tested at 5 percent and 1 percent level.

Table 5.3

Result of the First pass Regression of Equation using monthly data

Portfolios	Average Return	α_p	β_p
P-1	-3.22632	1.604602	-4.28909
P-2	-3.38984	-2.69964	-0.63192
P-3	-3.34444	-4.98073	1.624339
P-4	-3.83772	-4.40747	0.660994
P-5	-3.74385	-3.15681	-0.64685
P-6	-3.89985	-5.40241	1.762576
P-7	-3.80858	-3.54539	-0.25827
P-8	-3.74196	-0.862	-2.75101
P-9	-3.60491	1.020043	-4.77625
P-10	-3.7246	-1.66786	-2.06115

Source: Computed based on data from RBI and BSE

As can be seen from the table 5.3, both the intercept (α_p) term and the beta (β_p) of all the portfolios are found to be insignificant at both 5 percent and 1 percent significance level which indicates that beta doesn't help in capturing the market risk or systematic risk. The intercept term was found significant at 5 percent for the daily data but for the monthly return data it is found to be insignificant at both 5 percent and 1 percent. The study also was found three portfolios to have positive beta value i.e. P-3, P-4 and P-6. Another important finding of the analysis is that against the two highest negative beta value the intercept term are found to have positive value i.e.P-1 and P-9. From the table no. 5.3 we can also show that for monthly return data all the portfolios betas are not negative. The portfolio 3, portfolio 4 and portfolio 6 are having positive beta value. Other than these three portfolio rest of the portfolios are showing negative beta. Thus, the results suggest that most of the portfolios returns are going against the market direction. From table 5.3 it can be further observed that all the portfolios are giving negative return even though three portfolios have

positive beta value. In this monthly return data also, contradictory results are found between the beta value and the average return. The portfolio 6 is having the highest positive beta value but it gave the highest negative return, portfolio 3 has the second highest positive beta value but it has the second lowest negative return. So there is a contradiction between return of a stock and the risk measured by beta.

5.5   Testing of Relevance of Beta Factor for Monthly Return Data:

The next step is to check the relevance of beta factor in the Indian capital market. This step will tell us whether the beta value have any validity in the Indian market context or not. The test has been conducted for monthly return data.

In table 5.4 the result of the regression equation, $Z_{pt} = \gamma_0 + \gamma_1 \beta_p + e_{pt}$, is presented to verify the relevance of 'Beta' test on the basis of monthly stock return.

Table 5.4

Regression result of the test of Relevance of beta factor on the basis of monthly return data

	Coefficient	t-stat	P-Value
γ_0	-3.66966	-44.1509	0.00
γ_1	-0.03295	-0.97188	0.35
R-square	0.105601		
Adjusted R Square	-0.0062		

Source: Computed based on data from RBI and BSE

The table 5.4 shows the result of the test of beta relevance for monthly stock return data using the equation, $Z_{pt} = \gamma_0 + \gamma_1 \beta_p + e_{pt}$. The table shows us that for the monthly data also the intercept term is found significant but risk premium is insignificant with negative value. The regression value of R-square and adjusted R-square tell us that the model is unable to explain the beta value. Thus, from the regression analysis result of both daily and monthly data it can be

concluded that beta factor or market risk is not valid in the Indian equity market. Therefore, there is a need to search for alternative model for asset pricing in the Indian market.

5.6   Analysis of CAPM for Various Sub-Periods for Monthly Return Data:

In the table 5.5 the first pass regression of the various sub-periods based on monthly stock return are shown for 10 beta sort listed portfolios with their significance.

Table 5.5: The Result of the First pass regression based on monthly return data for the different sub-periods.

	SP1		SP2		SP3		SP4	
	α_p	β_p	α_p	β_p	α_p	β_p	α_p	β_p
P-1	17.88	-19.73	22.38	-27.95	-17.51	11.55	-22.09	12.08
P-2	8.35	-9.79	14.34	-19.00	-29.35	21.47	-10.40	5.09
P-3	-5.87	4.33	-19.67	14.33	-7.71	3.53	-2.74	-0.85
P-4	-5.87	4.33	-1.29	-3.48	-6.42	2.82	-3.31	-1.52
P-5	3.18	-3.84	0.76	-8.02	-4.04	-0.54	-3.04	-1.56
P-6	-12.69	14.51	-2.10	-4.37	1.02	-6.00	-4.63	-0.89
P-7	2.88	-4.62	-13.96	9.41	-5.85	1.81	-5.71	0.79
P-8	12.59	-16.40	-1.85	-4.04	-5.93	0.92	-3.34	-0.25
P-9	-4.92	5.53	0.75	-5.73	11.60	-14.74	-2.90	-1.93
P-10	-0.76	0.35	4.64	-9.22	-9.71	3.45	-9.93*	3.75**

Source: Computed based on data from RBI and BSE

*significant at 5%, ** significant at 1%*

As presented in the table 5.5, the results of the first pass regression analysis for monthly return data reveal that there are no significance of both alpha and beta for the three sub-periods except for the sub-period 4 i.e. SP4 portfolio. The portfolio 10 in the SP4 is the only portfolio where the both intercept and beta are significant while rest of the portfolios irrespective of the sub-period are found to be insignificant both for the intercept as well as the beta. The intercept term of the P10 is found significant at 5 percent whereas 'Beta' is found significant at 1 percent. Thus we

can conclude that beta doesn't help in capturing the market risk or systematic risk for both daily and monthly stock return data in the sub-periods studied.

5.6   Testing of Relevance of Beta Factor for various Sub-periods of Monthly Return Data:

The next step is to test the relevance of 'Beta' for different sub-periods for monthly stock return data. This analysis is going to give us a clear picture of 'Beta' whether it is valid or not in the Indian equity market. The test has been done with the help of the equation, $Z_{pt} = \gamma_0 + \gamma_1 \beta_p + e_{pt}$. Table 5.6 shows the result of the second pass regression on the basis of monthly return data for the four sub-periods.

Table 5.6: Regression result of the test of Relevance of beta factor for Monthly Return Data

		Coefficient	t-stat	P-Value
SP1	γ_0	-0.68616	-3.52019	0.00
	γ_1	-0.00887	-0.47076	0.65
	R-square	0.026955		
	Adjusted R Square	-0.09468		
SP2	γ_0	-4.30428	-7.53568	0.00
	γ_1	-0.03569	-0.80663	0.44
	R-square	0.075214		
	Adjusted R Square	-0.04038		
SP3	γ_0	-4.57659	-24.8291	0.00
	γ_1	0.01005	0.51277	-0.62
	R-square	0.031822		

	Adjusted R Square	-0.0892		
SP4	γ_0	-4.50165	-21.3808	0.00
	γ_1	0.053342	1.123607	0.29
	R-square	0.136302		
	Adjusted R Square	0.028339		

Source: Computed based on data from RBI and BSE

The result of the analysis of the sub-periods for monthly return data also shows similar result as the result of the daily return data. As can be seen from the table 5.6, all the intercept term are found significant whereas the risk premium is statistically insignificant for all the sub-periods. Again, the third and fourth sub-periods have positive risk-premium but statistically insignificant. The values of R-square and adjusted R-square also indicate that the model is not capable of explaining the variables. Thus, it can be concluded that beta factor is unable to explain the relationship between risks and return hence CAPM is invalid in India.

5.7   Summary:

From the beta value analysis it is found that maximum numbers of the company were defensive (88 companies out of 100) and only few companies (5 companies) were aggressive and rest 7 companies were going against the market. The undervaluation and overvaluation analysis of the selected companies suggest that majority of the company stocks were overpriced. The first pass regression and second regression result are showed that the beta is unable to capture the market risk and the model also couldn't able to explain the relationship between risk and return. The results for the different sub-periods after running first and second pass regression also concluded the model is invalid in India.

Chapter-6

Findings and Conclusions

Serial No.	Contents
6.1	Introduction
6.2	Findings on Daily Data
6.3	Findings on Monthly Data
6.4	Conclusion
6.5	Future Scope of Research
6.6	Limitations of the Study

6.1   Introduction:

In this chapter the important findings of the study as well as summation of the major observations are presented.

6.2   Findings on Daily Return Data:

1. The average beta value of daily return data of 100 companies was 0.49. During the study period the average beta value was not steady. In the initial i.e. in the year1998-99 to 2000-01 beta value was high with value ranging from 0.70 to 0.79. For the daily return data all the companies are found to be defensive and none of them were aggressive stock.

2. The analysis of the undervaluation and overvaluation of the stocks for the daily return data was found to be mostly undervalued or underpriced. During the analysis the Shriram Transport Finance Company Limited was found to have the highest numbers of years to be underpriced i.e. 16 years out of 20 years. Whereas Hindalco Industries Limited (14 years out of 20 years) and Pfizer India Limited (14 years out of 20 years) were found to be mostly overpriced stocks.

3. After running the first pass regression equation for daily return data it is found that the intercept (α_p) term is significant at 5 percent for all portfolios. But the Beta (β_p) term is found to be insignificant at both 5 percent and 1 percent significance level for all the portfolios. Another important finding of the analysis is that both the intercept and the beta value are found to have negative value. Thus for daily return data beta doesn't help in capturing the market risk or systematic risk. The study also observed that for the daily return data all the portfolios are giving negative return due to negative beta value of all the portfolios. Portfolio 1 has the highest negative value and it gave the highest negative return, whereas portfolio 3 has the second highest negative beta value but it has the lowest negative return. So from the analysis it reveals that beta value is unable to determine the return of a security. There is a mismatch between beta value and return of an asset.

4. Test has been conducted for checking the beta relevance for the daily return data where the intercept term is found significant and the risk premium is positive but statistically not significant. The R-square and adjusted R-square value also suggest that the model is unable to explain the stocks return. The value of R-square and adjusted R-square in the model is only 0.17 and 0.06 which means the beta is not a good predictor of the return of the

portfolio. Thus, it can be concluded that beta factor or market risk is not valid in the Indian equity market.

5. The data was divided into four sub-periods to check whether beta help in capturing the market risk or not using the first pass regression for daily return data. The analysis found that for all the sub-period intercept term are significant at either 5% or 1%. For the sub-period 3 all the intercept terms are found to be significant at 1%. However the 'Beta' are found to be insignificant for all the sub-periods. Thus the beta value is unable to capture the market risk for the daily return data.

6. The next step is to test the relevance of 'Beta' for different sub-periods for the daily stock return data. The intercept term of all the four sub-periods are found to be significant whereas the risk-premium i.e. beta factor were found to be insignificant. The risk-premium of the first two sub-periods were positive but statistically it was not significant. The rest of the two sub-periods had negative risk-premium and statistically insignificant. The value of R-square and adjusted R-square for all the sub-periods indicates that CAPM is unable to explain the variables for determining future stock returns. Therefore, it can be concluded that the 'Beta' is not relevant in the Indian market for explaining the return of an asset.

6.3   Findings on Monthly Return Data:

1. The average beta value for the monthly return data of companies was 0.28. Almost all of the selected companies are found to be defensive except a few companies. The JK Lakshmi Cement Limited was found to have the highest beta value of 1.48 and Dhanuka Agritech Limited is having the least average beta of -0.11. It is observed that 88 companies are defensive while only 5 companies are aggressive and the rest 7 companies going opposite direction from the market.

2. The monthly return data analysis reveal that it had mostly overpriced stocks in comparison to daily return data which found mostly overvalued stocks. During the analysis the Asian Paint Limited, Castrol India Limited, Britannia Industries Limited, Colgate-Palmolive (India) Limited GlaxoSmithKline Consumer Healthcare Limited, Indo Count Industries Limited, and Nestle India Limited were having the highest numbers of overpriced years i.e. 19 years out of 20years. Whereas JK Lakshmi Cement Ltd. (17 years out of 20years) have the highest numbers underpriced years.

3. For monthly return data both the intercept and the beta values for all the 10 portfolios were insignificant at 5 percent and 1 percent significant level. The monthly return data also showed negative for all the portfolios except three portfolios beta values. Thus for the monthly return data also beta is unable capture the market risk or systematic risk. The study also found that all the portfolios are giving negative returns due to negative beta value. There were three portfolios of monthly return data which are having positive beta value, however, those three portfolios are giving negative return.

4. From the cross sectional analysis of the monthly data observed that the intercept term to be significant but risk premium is found insignificant with negative risk-premium value. The regression value of R-square and adjusted R-square tell us that the model is unable to explain the beta value. Thus, from the regression analysis result of both daily and monthly data it can be concluded that beta factor or market risk is not valid in the Indian equity market.

5. The first pass regression analysis of the four sub-periods for the monthly return data reveal that there are no significance of both alpha and beta for the three sub-periods except for the sub-period 4 i.e. SP 4 portfolio. The portfolio 10 in the SP4 is the only portfolio where the both intercept and beta are significant while rest of the portfolios of the sub-period are found to be insignificant. The intercept term of the P10 is found significant at 5 percent whereas 'Beta' is found significant at 1 percent.

6. From the cross sectional regression test of monthly return data for beta relevance it was observed that all the intercept term were found significant but the risk premium is statistically insignificant for all the sub-period. Whereas, the third and fourth sub-periods were having positive risk-premium but statistically insignificant. The values of R-square and adjusted R-square also indicate that the model is not capable of explaining the variables.

6.4 Conclusion:

In the area of financial literature asset pricing found a central place. The first asset pricing model was introduced by Sharpe (1964) based on the work of Markowtiz (1952) portfolio management. Since the introduction of the model by Sharpe (1964) other authors introduced so many different types of asset pricing model but still CAPM is pioneer in this area. According to

the model, beta or systematic risk or market risk is the single component for determining the expected return of an asset. The sensitivity of the stock's return is measured through beta according to the changes in the market conditions. The risk of an asset is divided into two part by the model i.e. systematic risk and unsystematic risk.

The study tested the validity of the asset pricing model in the Indian equity market. The present study used daily data of 100 stocks listed in BSE 500 index from April 1993 to March 2018. From the collected data 10 portfolios were constructed according to their beta values using the equations given in the methodology part. The study found that CAPM unable explain the return of stocks in the Indian equity market. According to CAPM, high beta high return and low beta low return but in the current study it is contradicting. Thus, it can be concluded that beta factor is unable to explain the relationship between risks and return hence CAPM is invalid in India.

6.4   Future Scope of Research:

In this study we found that CAPM is not valid in the Indian equity market so there is a need to search for alternative models. The CAPM has limitation regarding the usability in the current scenario because it consider only one factor i.e. beta. Whereas, in the recent time so many researchers developed different models for asset pricing which are more flexible and usable in the present market conditions. The most famous one in the recent time is the Fama-French 3 factor model. So, the current study can be extended to cop up with the new models of asset pricing.

6.5   Limitation of the Study:

I.   The study has been carried for a particular time period which may not be applicable for other time period.

II.   Present study is carried on a particular stock exchange i.e. BSE. There are other exchanges in the country like NSE (National Stock Exchange) and CSE (Calcutta Stock Exchange). Therefore, the result may vary from exchange to exchange.

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Appendix

The Selected 100 Companies from BSE S&P 500 Index

No.	Companies Name in Short	Company Name	No.	Companies Name in Short	Company Name
1	3M	3M India Ltd.	51	Indo	Indo Count Industries Ltd.
2	Aarti	Aarti Industries Ltd.	52	ITC	ITC Ltd.
3	Aban	Aban Offshore Ltd.	53	ITD	ITD Cementation India Ltd.
4	ACC	ACC Ltd.	54	Jamna	Jamna Auto Industries Ltd.
5	Akzo	Akzo Nobel India Ltd.	55	JB Che	JB Chemicals Pharmaceutical Ltd.
6	Ambu	Ambuja Cement Ltd.	56	JB Ind	JB Industries Ltd.
7	Apo Ho	Apollo Hospitals Enterprise Ltd.	57	JK Lak	JK Lakshmi Cement Ltd.
8	Apo Ty	Apollo Tyres Ltd.	58	JM Fin	JM Financial Ltd.
9	Ash Ley	Ashok Leyland Ltd.	59	Johnson	Johnson Control-Hitachi Air Conditioning India Ltd.
10	Asian	Asian Paint Ltd.	60	Keso	Kesoram Industries Ltd.
11	Bajaj H	Bajaj Holdings Investment Ltd.	61	L&T	Larsen Turbo Ltd.
12	Balakri	Balakrishna Industries Ltd.	62	Linde	Linde
13	Bayer	Bayer Cropscience Ltd.	63	M&M	Mahindra Mahindra Ltd.
14	Berger	Berger Paint India Ltd	64	Mon	Monsanto India Ltd.
15	Bharat	Bharat Forge Ltd.	65	MRF	MRF Ltd
16	Birla	Birla Corporation Ltd.	66	Nestle	Nestle India Ltd.
17	Bliss	Bliss GVS Pharma Ltd.	67	Nilkamal	Nilkamal Ltd.
18	Bom Bu	Bombay Burmah Trading Corporation Ltd.	68	NOCIL	NOCIL Ltd.
19	Bom Dy	Bombay Dyeing Manufacturing Company Ltd.	69	Pfizer	Pfizer Ltd.
20	Bosch	Bosch Ltd.	70	Phiips	Phiips Carbon Black Ltd.
21	Britania	Britannia Industries Ltd.	71	Raym	Raymond Ltd.
22	CAN	CAN Fin Homes Ltd.	72	Relia Ind	Reliance Industries Ltd.
23	Carbo	Carborundum Universal Ltd.	73	Relia Inf	Reliance Industrial Infrastructure Ltd.

24	Castrol	Castrol India Ltd.	74	Schaeff	Schaeffler India Ltd.
25	CEAT	CEAT Ltd.	75	Shriram	Shriram Transport Finance Ltd.
26	Century	Century Textiles Industries Ltd.	76	Siem	Siemens Ltd.
27	Chowla	Chowlamandalam Investment and Finance Company Ltd.	77	Sintex	Sintex Industries Ltd.
28	Colgate	Colgate-Palmolive (India) Ltd.	78	SKF	SKF India Ltd.
29	Cummi	Cummins India td.	79	SRF	SRF Ltd
30	Deepak	Deepak Spinners Ltd.	80	Suda	Sudarshan Chemical Industries Ltd.
31	Dewan	Dewan Housing Finance Corporation Ltd.	81	Supre	Supreme Industries Ltd.
32	Dhan	Dhanuka Agritech Ltd.	82	SWAN	SWAN Energy Ltd.
33	Eicher	Eicher Motors Ltd.	83	TATA C	Tata Chemical Ltd.
34	ELGI	ELGI Equipemnts Ltd.	84	TATA G	TATA Global Beverages Ltd.
35	Escort	Escorts Ltd.	85	TATA I	TATA Investment Corporation Ltd.
36	Fino	Finolex Industries Ltd.	86	TATA M	Tata Motors Ltd.
37	Gilette	Gilette India Ltd.	87	TATA P	TATA Power Corporation Ltd.
38	Glaxo H	Glaxosmithkline Consumer Healthcare Ltd.	88	TATA S	TATA Sponage Iron Ltd.
39	Glaxo P	Glaxosmithkline Pharmaceuticals Ltd.	89	TATA St	TATA Steel Ltd.
40	Grasim	Grasim Industries Ltd.	90	Tmken	Tmken India Ltd.
41	Great	Great Estern Shipping Company Ltd.	91	TVS	TVS Shricakra Ltd.
42	Greav	Greaves Cotton Ltd.	92	Unicen	Unicen Laboratories Ltd.
43	Gruh F	Gruh Finance Ltd.	93	Unitech	Unitech Ltd.
44	Guja Fe	Gujarat State Fertilizers Chemicals Ltd.	94	Venky's	Venky's (India) Ltd.
45	Guja Na	Gujarat Narmada Valley Fertilizers Chemicals Ltd.	95	Vinati	Vinati organics Ltd.
46	HDFC	HDFC	96	VIP	VIP Industries Ltd.
47	HEG	HEG Ltd	97	Voltas	Voltas Ltd.
48	Himat	Himatsingka Seide Ltd.	98	VST	VST Industries Ltd.
49	Hind	Hindalco Industries Ltd.	99	Wel	Welspun India Ltd.
50	Indian	Indian Hotels Company Ltd.	100	Wipro	Wipro Ltd.