CHAPTER ONE

INTRODUCTION
1.1 The Study

The study is taken up with the objective of answering one of the vital questions that haunt the equity investors in India, ie whether the Indian capital market is efficient or not. Because an efficient capital market is indispensable for creating investors' confidence and for a proper allocation of capital among enterprises and sectors.

The word capital market efficiency has got three meanings. These are pricing efficiency, operational efficiency and allocational efficiency.

1.1.1 Pricing Efficiency

The word capital market efficiency is generally used as a synonym for the pricing efficiency or informational efficiency. "... an efficient market is one in which security prices adjust rapidly to the infusion of new information and current stock prices fully reflect all available information including the risk involved" [Reilly (1979) p.163]. Pricing efficiency itself is determined by the quality of information to which the market is responding and the speed at which the same information is discounted by the market (ie adjusted in the security prices).

1.1.2 Operational Efficiency

"Capital markets are operationally efficient if intermediaries, who provide the service of channeling funds
from savers to investors, do so at the minimum cost that provides them a fair return for their services" [Copland and Weston (1988), p. 331].

1.1.3 Allocational Efficiency

"... a market is said to be allocationally efficient when prices are determined in a such a way that equates the marginal rate of return (adjusted for risk) for producers and savers" [Copland and Weston (1988), p. 330].

A research work of this type is critical for a developing nation like India. An efficient capital market plays a very important role in the economic development of the country. This is done by the efficient allocation of the economic resources by channelling house hold savings to productive use. This efficient allocation is done by pricing the securities which are listed in the stock exchanges continuously and disclosing to the investors about the performance of each sector of the economy as well as the performance of each company. For this the capital market has to price securities (ie shares, debentures, government bonds etc) in such a manner that investors can expect return that commensurate with the risk he is bearing. In other words, the expected return on risky securities (shares, debentures etc) must be more than the expected return on risk free investments (government bonds, inter bank call money rates etc). Likewise expected return on equity shares must be more than the expected return on debentures, preference shares etc as the former is more
riskier than the latter. This will be a correct description only if the capital market is allocationally efficient. This allocational efficiency is a must for the development of the capital market, otherwise the rational investors who are risk averse will not venture into the capital market.

The basic questions that haunt equity investors in India are:

a) How much rate of return can he expect from the Indian capital market?

b) Whether this will provide him hedge against inflation or not?

c) Whether he is benefited from bearing the extra risk or not?

d) How much is the rate of return available from the alternate forms of investments? and

e) Whether the technical analysis will help him to increase the return from the capital market or a just buy and hold policy is enough?

The study is aimed at answering these questions.

1.2 An Overview of the Indian Capital Market

1.2.1 Brief History

The American civil war started in 1860-61 and resulted in the stoppage of supply of cotton from USA to Europe. The result was the great demand for Indian Cotton and the pumping of
large amount of money to India. This period (1861-65) witnessed hectic activity in shares of companies and was called "share mania" and it continued till it burst in 1865 [Gupta (1972), pp. 28-29].

The share mania though it burst in 1865 has had certain long lasting effects. The expansion of liquid capital and the establishment of a regular market in securities were the direct results. These helped to make Bombay what it is today the financial capital of India [Gupta (1972), p.29].

During the share mania of 1860-1865 the number of share brokers have greatly increased, to about 200 and they were wealthy, privileged and a respectable class. But the burst of share mania resulted in the change of their status drastically and everybody started treating them as a nuisance. So the police drove them from pillar to post. They had to move from place to place till they found a place where they could conveniently assemble and transact business in securities [Gupta (1972), p. 29].

It was in those troubled days between 1868 and 1875 they organised an informal association and later in 1877 they founded the present Native Stock and Share Brokers Association in Bombay [Gupta (1972), p. 29].

1.2.2 Present Position

The stock Market in India is more than a century old and it had functioned continuously through the medium of organised
stock exchanges. At present there are 23 stock exchanges in India and they are located at Ahmedabad, Bangalore, Baroda, Bhubaneswar, Bombay (BSE), Bombay (NSE), Bombay (OTCEI), Calcutta, Cochin, Coimbatore, Delhi, Gauhati, Hyderabad, Indore, Jaipur, Kanpur, Ludhiana, Madras, Mangalore, Meerut, Patna, Pune and Rajkot. The Stock Exchanges are now regulated by Securities and Exchange Board of India [SEBI], Indian Counterpart of Securities and Exchange Commission [SEC] in USA.

1.3 Objectives of The Study

This study aims to evaluate the behaviour and performance of equity investment in India for the last one decade. The objectives of the study include:

1) to find out the historical rate of return available from equity investment in India. This is compared with inflation rate to know whether equity investment is providing hedge against inflation or not. The return available from alternate forms of investments also computed and compared with equity return to know whether the equity investment has provided better return for bearing extra risk or not.

2) to assess the level of pricing efficiency of capital market in India. This is done by testing the Random Walk Hypothesis [RWH] or Efficient Market Hypothesis [EMH] in weak form using the statistical techniques like serial correlation analysis and runs test and also by testing one popularly used but simple mechanical trading rule (moving average analysis).
1.4 Review of Literature

1.4.1 Literature related to Computation of Historical Return

The compilation of historical share prices data at the Center for Research in Security Prices (CRSP), Chicago University has set an unprecedented trend in the empirical research in security prices. These include the studies to see the historical return available on investments in capital market and other alternate investment opportunities. These include the works of Fisher (1965), Fisher and Lorie (1964, 1968), Grauer and Hakansson (1985, 1986), Herbst (1983), Herzog (1964), Ibbotson and Singuefield (1976), Nelson (1986), Robicheck et. al.- (1972), Schlarbaum et. al.- (1978), Schwert (1977), Stein (1977) and Wilson and Jones (1987).

But the number of research work done in this field in India is very scanty. The main works in this regard are reviewed below:

Mayya, M R (1977) :- This study was to assess the extent to which investment in stocks acted as hedge against inflation. The study was for a period of 12 years and 8 months (ie from April 1961 to November 1973). He also compared the return from equity with that of gold and silver. The main findings include:

a) Equities have failed to grant the necessary protection to the investors against the continuously rising trend of prices.
b) Compared to debentures and preference shares equities have fared better.

c) Gold and silver have out performed equity investment. These provided hedge against inflation also.

Gupta, L C (1981):- This study was to compute the rate of return on investment in equity shares and compare them with that of other investment opportunities like debentures, preference shares and company deposits. The sample consisted of yearly high and low quotations of shares listed in the major stock exchanges in India. The study spanned a period of 16 years (1960-76). The main findings include:

a) The mean value of the rates of return on the portfolios of the stocks declines moderately as the length of holding period increases.

b) The equity returns for this period were below the return available from debentures, preference shares and company deposits.

c) The investment in equities in Indian capital market does not provide hedge against inflation.

Yalawar, Y B (1988) :- This study was to find out the risk-return relationship of the equity investment in India. The period of study encompassed 20 years (1963-1982) and the data consisted of monthly closing prices of the 122 common stocks listed in the Bombay Stock Exchange. The main findings include:
a) The rate of return on common stock investments is higher than that of the return on investment in debentures, preference shares and Government of India [GOI] bonds.

b) The investment in Indian capital market provides hedge against inflation.

c) The risk-return relationship as envisaged by the Capital Asset Pricing Model [CAPM] is operative over a majority of active equities.

Prabhakaran, M (1989):- This study reconsidered the result of Mayya (1977) with a different sample period. The study period was from 1970-71 to 1985-86. The main findings include:

a) The equity investment has failed to provide hedge against inflation.

b) Gold and silver have performed much better than equities in this period. These have provided hedge against inflation also.

c) Debentures have fared better than equities.

Rao, N and Bhole, L M (1990):- This study compared the historical equity return and level of inflation for a longer time period. The period of study was 35 years (ie from 1953 to 1987). The main findings include:

a) Equity share holders earned a positive real rate of return over the whole sample period.

b) Over long holding period equity investment provides hedge
against inflation even though over short periods it failed to do so.

1.4.2 Literature Related to Testing of the RWH

The present study is a continuation of various studies from India and abroad in this field. The original work of RWH dates back to the work of Bachelier (1900). The works in the initial period include Cowles (1933), Cowles and Jones (1937), Slutsky (1937) and Working (1934). The major thrust in this field is received with the work of Kendall (1953). He examined the behaviour of stock and commodity prices in search of cycles. Instead of seeing any cycles he found each series to be a "... a wandering one, almost as if once a week the Demon of Chance drew a random number from a symmetrical population of fixed dispersion and added to it to the current price to determine the next week's price" [p. 13]. The later works by Roberts (1959) and Osborne (1959) by and large corroborated the earlier findings.

The classic study by Fama (1965) using the 30 stocks comprising the Dow-Jones Industrial Average for a 5 year period has confirmed the random walk hypothesis. Fama's work served as a model for a number of studies which were conducted on different stock exchanges all over the world. These include Barnes (1986), Chua et. al. (1987), Girmes (1975), Meade (1978) and Roux and Gilbertson (1978). These studies threw light on the efficiency levels of the respective Stock Exchanges.
But even with this tremendous increase in the number of works on other stock exchanges, the Indian stock exchanges almost remained unexplored. A few studies were conducted in India on the level of efficiency of the Bombay Stock Exchange [BSE]. A brief review of the major Indian studies in this field is given below:

Kulkarni, S N (1978):- This study presents spectral analysis test for RWH on the Indian Stock Exchange. The sample consisted of 18 series of the RBI share indices. The period covered was from 1946-47 to 1972-73. His study reveals that there is a repeating cycle of four weeks for weekly prices and that the behaviour of the share prices in India is not in conformity with the RWH.

Gupta, O P (1985) :- This study tested the weak form of efficiency of the Indian Capital Market using the serial correlation and runs test. The sample consisted of weekly closing quotations of the 39 "most active" scrips quoted at the 4 stock exchanges (ie Bombay, Calcutta, Delhi and Ahmedabad). The period of study was from January 1971 to March 1976. The main findings include:

a) The share price movements are random and that the Indian capital market is efficient in the weak form.

b) There exists a slight tendency of "lead-lag relationship" between share prices. But the magnitude of this is too small to be of any use to the investors.
Yalawar, Y B (1988) :- This study tested RWH using the Spearman’s rank correlation technique and the runs test. The period of study was 20 years (1963-1982) and the data consisted of monthly closing prices of 122 "actively traded" common stocks listed in the Bombay stock Exchange. He concludes that the actively traded security’s price changes are random and the BSE is efficient in the weak form.

Chaudhari, S K (1991) :- This study tested the weak form of EMH using time series data of successive weekly industrial share price indices published by RBI. The most commonly used statistical tests (auto correlation and runs tests) were used. He rejected the EMH in weak form. The serial correlation analysis as well as the runs test rejected the hypothesis.

Ranganathan, M and Subramanian, V (1993):- This study tested the weak form of EMH using the spectral analysis. The data used is Economic Times (ET) index (All Industries All India) for a period of 7 years (ie 1984-1990). They conclude that the ET series shows the presence of cycles but more research is required on individual share price series to confirm the result.

1.5 Relevance of the Present Study.

The spread of equity cult in India received a boost with the forced dilution of foreign holdings in companies by the Foreign Exchange Regulation Act (FERA) in 1977 [Barua et.al.- (1994), p.16]. Further the liberalisation programmes launched by the successive governments, the easy entry of foreign
capital by allowing Indian companies to list their equities in the foreign capital markets and the entry of Foreign Institutional Investors (FIIs) have further helped in the spread of equity cult in India.

The Indian capital market has seen an unprecedented activity in the last one decade. The volume of transaction and the number of companies listed in BSE have registered a phenomenal increase in the 1980's. The number of listed companies in BSE has gone up from a mere 992 in 1980 to 3,263 in December 1993. The combined market capitalisation has risen from a mere Rs.5,421 crores to around Rs. 3,05,000 crores for the same period [Source : Unpublished data supplied by BSE].

The share owning population in India for the period 1980 to 1990 has also increased at a very fast rate. Share owning individuals have increased from 24 lakhs in 1980 to 90 lakhs in 1990 [Gupta (1991), p.15]. This phenomenal increase in number is followed by the reduction in the median age of the investors. According to Gupta (1991) "In terms of average age, the share owning population of India is becoming younger. We estimate that between 1980 and 1990, the median age of the share owning household heads has come down by about 7 years, from 44 years to 37 years on account of large influx of young people into the share market during the 1980s" [p. 35].

But this phenomenal increase in the equity cult in the 1980's did not result in the availability of more number of quality research in this field. The work of Mayya (1977) is till 1973; Gupta (1981) is up to 1976; Gupta (1985) is from 1971 to 1976;
Yalawar (1988) is till 1982; Prabhakaran (1989) is up to 1986; Rao and Bhole (1990) is from 1953 to 1987 and Ranganathan and Subrahmanian (1993) is till 1990. The present study is the latest in this series as the study covers the latest 10 year period. This study has got added significance in the wake of the liberalisation of the economy in the late 1980s and the globalisation in the 1990s.

Over the last one decade there was a substantial increase in the capital market transactions by the Institutional Investors. As many of the Institutional Investors' transactions involve a large number of shares at a time (say 10,000 shares), the behaviour of this decade may vary from that of earlier periods. Hence a detailed study of the latest 10 year period.

The first objective of the study is to find out the actual rate of return available on equity investment and compare it with that of the alternate investment opportunities. This calculation is required as the results of the earlier works fall into two categories which are opposite to each other. Mayya (1977), Gupta (1981) and Prabhakaran (1989) conclude that the long term rate of return available from equity investment is not more than inflation rate. In other words equity investment does not provide hedge against inflation. The return available is also less than the return from debentures and preference shares, company deposit etc. But Yalawar (1988) and Rao and Bhole (1990) dispute this and argue that the return from equity investment provides hedge against
inflation and also outperform other forms of less risky investments in the long run. These differing results may be due to the different sample periods in their studies. So a study covering a different sample period is required.

The second objective of the study is to test the random walk hypothesis or the test of the efficiency of the Indian capital market in weak form. Here also the results of the earlier works fall into two categories which are opposite to each other. While Kulkarni (1978), Chaudhari (1991) and Ranganathan and Subrahmanian (1993) reject the RWH, Gupta (1985) and Yalawar (1988) accept it. All of the above mentioned studies have used pure statistical techniques and nobody has tried to test the actual mechanical trading rules. This study is trying to cover this gap as well.

The present study attempts to cover some of the shortcomings of the earlier studies. These include:

1. Majority of the earlier works [example: Mayya (1977), Kulkarni (1978), Prabhakaran (1989), Rao and Bhole (1990), Chaudhari (1991) and Rangarajan and Subrahmanian (1993)] are based on indices rather than on the actual share prices. The weakness of index is well known while testing the randomness of a time series as the index will show much more pattern or dependency than the constituents of the index [Kendall (1953), p.11].

2. Yalawar (1988) and Gupta (1985) did not consider dividend for computation of the return series. This may not affect the
return series of companies with a very high share price compared to its face value because the percentage of dividend on the current market price will be negligible. But this will twist the return series of companies whose share prices are near the face value. The argument that dividend yield for the whole market is very little (3-4%) and therefore can be ignored is not tenable.

3. The sample data of Gupta (1981) consisted of the average of yearly high and low prices. One year is a very long period for a study like this and the return based on the average of high and low prices may not reflect the true picture as these are extreme values.

1.6 Scope of the Study

The scope of the study is limited to the

a) computation of historical return from equity investment and the comparison of it with the return available from alternate investments and

b) testing of the EMH in weak form.

1.7 Limitations of the Study

As the scope of the study is limited to the above mentioned points, no attempt is made to:

i) test the operational efficiency of the Indian capital market.
ii) test the distribution hypothesis of the RWH.

iii) study the behaviour of preference shares and corporate debentures.

iv) see the "leader-lagged" phenomenon in the equity share prices.

v) test the usefulness of volume of share transactions in the mechanical trading rules.

vi) test the higher level of EMH (ie semi strong form or strong form).

1.8 Research Methodology

1.8.1 Sample

The data for this study consists of weekly closing quotations of the "actively traded" shares listed in Bombay Stock Exchange (for computing the market return and for testing the efficiency of BSE), Wholesale Price Index (WPI) published by RBI (for measuring inflation), the rates of inter bank call money market (for computing rate of return from call money market), Index of the GOI bonds and the running yield from the GOI bonds published by the RBI (for computing rate of return from GOI bonds), weekly closing prices of gold and silver (for computing rate of return from bullion market).

1. "The theory of random walk in stock prices actually involves two separate hypothesis. 1) Successive price changes are independent and 11) the price change conform to some probability distribution." [Fama (1965), p 35]. In this study we will be restricting ourselves to the test of the first hypothesis.
1.8.2 Sample Interval

The data series for a study like this would be usually the daily, weekly or monthly closing prices or the indices thereof. The paucity of time and resources are the main reasons which forced the researcher to select the weekly data instead of the daily data. The other reasons that forced him not to go for daily data include:

a) The problem of "thin trading" is severe with the daily data. This is because on several days, the stocks are not traded even once.

b) As there is no trading in the weekends (Saturday and Sunday), the sample interval will not be "equi-spaced". This may induce some other error in the study like the "day of the week effect".

The month end closing prices were also not considered because it amounts to unnecessary neglect of quality data available. Going for monthly data will result in the number of observations coming down drastically. The researcher's desire to study the sub periods (i.e., compare the result of first 5 year period with the remaining 5 year period) prompted him to take weekly interval.

1.8.3 Selection of Stock Exchange

Bombay Stock Exchange has been selected for study because it is the first and continues to be the premier stock exchange in India. BSE which accounts for nearly two-third of the trading
volume in the country, has one of the highest per hour trading intensities in the world [Rangarajan (1994), p. 25]. Almost all the companies which are listed in other Stock Exchanges are listed in BSE also. A comparison of the market capitalisation of BSE and the all India market capitalisation for the sample period (1984-1993) will reveal this fact. This is given in Table 1.1

Table 1.1
Table showing the BSE and All India market capitalisation (Rupees in Crores).

<table>
<thead>
<tr>
<th>Year End</th>
<th>All India Market Capitalisation</th>
<th>BSE Market Capitalisation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>11635</td>
<td>9769</td>
<td>83.96</td>
</tr>
<tr>
<td>1984</td>
<td>13381</td>
<td>10219</td>
<td>76.37</td>
</tr>
<tr>
<td>1985</td>
<td>25302</td>
<td>20738</td>
<td>81.96</td>
</tr>
<tr>
<td>1986</td>
<td>27572</td>
<td>21636</td>
<td>78.47</td>
</tr>
<tr>
<td>1987</td>
<td>35521</td>
<td>25937</td>
<td>73.02</td>
</tr>
<tr>
<td>1988</td>
<td>51379</td>
<td>45519</td>
<td>88.59</td>
</tr>
<tr>
<td>1989</td>
<td>77000</td>
<td>46000</td>
<td>59.74</td>
</tr>
<tr>
<td>1990</td>
<td>135000</td>
<td>70000</td>
<td>51.85</td>
</tr>
<tr>
<td>1991</td>
<td>225000</td>
<td>123000</td>
<td>54.67</td>
</tr>
<tr>
<td>1992</td>
<td>332000</td>
<td>205000</td>
<td>61.75</td>
</tr>
<tr>
<td>1993</td>
<td>402000</td>
<td>305000</td>
<td>75.87</td>
</tr>
</tbody>
</table>

[Source : Unpublished data supplied by BSE].

1.8.4 Period of study

The period covered in this study is from 1-1-1984 to 31-12-1993. The period selected is such that the latest 10 year
period is available for analysis. The date 31-12-1993 is selected as the end of the sample period because the data collection and analysis have started in the month of March 1994.

1.8.5 Sample Companies

The sample selection was done on the basis of availability of the continuous share price data. The companies were selected on the basis of market activity of the firms as reflected by the number of times it has quoted. All the companies whose weekend quotation was available for at least 245 weeks in the first 5 year period and 240 weeks in the second five year period have been selected. This amounted to 130 companies.

The adoption of the above mentioned selection procedure has resulted in the selection of relatively big and actively traded companies. The number of sample companies in the BSE Sensitive Index (Sensex) is 30 out of 30 and in the BSE National Index, it is 85 out of 100. The total market capitalisation of the sample companies for the sample period is presented in the Table 1.2 along with the market capitalisation of all the companies listed in Bombay. The percentage of market capitalisation of sample companies in the overall market capitalisation of BSE varies between 49.04% and 75.99%.

\[2. These figures are arrived at after deducting 13 from the number of weeks in which actual trading took place in BSE. The figure 13 is 5% of the actual number of weeks in which trading took place. This allowance of 5% is to compensate for the suspension of trading in shares due to book closures.\]
Table 1.2

Table showing the market capitalisation of BSE and the Sample Companies (Rupees in Crores).

<table>
<thead>
<tr>
<th>Year End</th>
<th>BSE Market Capitalisation</th>
<th>Sample Market Capitalisation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>9769</td>
<td>6476</td>
<td>66.29</td>
</tr>
<tr>
<td>1984</td>
<td>10219</td>
<td>7546</td>
<td>73.84</td>
</tr>
<tr>
<td>1985</td>
<td>20738</td>
<td>15760</td>
<td>75.99</td>
</tr>
<tr>
<td>1986</td>
<td>21636</td>
<td>15828</td>
<td>73.16</td>
</tr>
<tr>
<td>1987</td>
<td>25937</td>
<td>14158</td>
<td>54.59</td>
</tr>
<tr>
<td>1988</td>
<td>45519</td>
<td>26359</td>
<td>57.91</td>
</tr>
<tr>
<td>1989</td>
<td>46000</td>
<td>30397</td>
<td>66.08</td>
</tr>
<tr>
<td>1990</td>
<td>70000</td>
<td>47459</td>
<td>67.80</td>
</tr>
<tr>
<td>1991</td>
<td>123000</td>
<td>89661</td>
<td>72.89</td>
</tr>
<tr>
<td>1992</td>
<td>205000</td>
<td>100536</td>
<td>49.04</td>
</tr>
<tr>
<td>1993</td>
<td>305000</td>
<td>188311</td>
<td>61.74</td>
</tr>
</tbody>
</table>

1.8.6 Source of Data

The share price data has been collected from BSE Daily Official List (DOL). While collecting the data, the week end (Friday) closing quotation was taken. If there is no quotation on that day the previous day’s closing quotation was taken. The use of interpolated prices for non transaction days as an alternate was ruled out for the following reasons:

1) There was no logic in assuming that the interpolated price would have occurred if there was a transaction on that date.
2) The linearly interpolated prices will increase the dependence and reduce the randomness.

3) Interpolating with random change as done by Yalawar (1988) will increase the randomness and reduce the dependency, if any, existed.

Hence the use of actual quotation prices even one day earlier and not the interpolated prices.

These data are not available in the electronic media as in the developed countries and the researcher was forced to write it down manually from the BSE Daily Official List. This resulted in the wastage of a lot of time of the researcher. Then these data were fed into the computer and later verified with the original source to avoid any error.

The data about dividend, right and bonus issues by the companies had been taken from the BSE Official Directory. The details about the ex-dividend (xd), ex-bonus (xb) and ex-right (xr) dates were taken from the BSE Daily Official List.

The index of price movements (WPI), the index of GOI bonds, current yield on GOI bonds, call money rate and Friday closing prices of gold and silver have been collected from the RBI Bulletin.

1.8.7 Computation of Return Series

The realised return on equity investments at the end of each holding period includes cash dividend and capital gain/loss
arising out of the price fluctuations and/or any issue of bonus/right shares by the company during the holding period. The realised return at the end of each holding period was found out by using the following formula.

\[ R_t = \frac{P_t - P_{t-1}}{P_{t-1}} \]  

(1.a)

where \( R \) represents realised return at the end of the holding period, \( P \) represents price of the security at the end of each holding period and \( t \) represents the holding period in which the computation is done.

1.8.8 Adjustments in the Return Series

The share price series may change abruptly due to the following factors.

(a) Calling up of the unpaid balance.

(b) Issue of dividends.

(c) Bonus/right issues by the company.

(d) Change in the face value of the shares.

The return series computed as per the above mentioned formula (1.a) will not give correct values under the above mentioned circumstances. So the return series have been adjusted for these factors.

(a) Since all the shares included in the sample were fully
paid up, there is no need to adjust the return series for the factor (a) mentioned above.

(b) On ex-dividend week, other things being equal, the share price should fall by the exact amount of the dividend per share [Fama (1965) p. 46]. To adjust for this, the return for ex-dividend week has been computed as

\[
R_t = \frac{(P_{t+d}) - P_{t-1}}{P_{t-1}} \quad (1.b)
\]

where \(d\) represents the dividend per share.

(c) For bonus issues also, other things being equal, the share price should fall by the bonus proportion on the ex-bonus week. To adjust for this the return for ex-bonus week return were computed using the following formula.

\[
R_t = \frac{(P_t (1+b)) - P_{t-1}}{P_{t-1}} \quad (1.c)
\]

where \(b\) stands for the ratio of bonus shares.

Illustration:- If the cum-bonus price is 125, ex-bonus price is Rs 90 and bonus ratio is 1:2, then the return for that week will be

\[
\frac{(90(3/2)) - 125}{125} = \frac{10}{125} = \frac{2}{25}
\]

The right issues are similar with bonus issues except the cash outflow involved in it. So the above mentioned formula has
been adjusted for the cash out flow and the return for the ex-right week will be

\[ R_t = \frac{(P_t(1+r)) - P_{t-1}}{P_{t-1} + c} \]  \hspace{1cm} (1.d)

where \( r \) stands for the ratio of right issue and \( c \) stand for the cash out flow per holding share.

**Illustration:**- If the cum right price is Rs 125, ex right price is Rs 90, right ratio is 1:2 and the right issue is at par, the return for the ex right week will be

\[
\frac{(90\times\frac{3}{2}) - 125}{125 + 5} = \frac{10}{130}
\]

(d) Share split or the change in the face value of the share is similar with the bonus issues and the formula followed for the computation of the return for the week in which the share split took place is given below

\[ R_t = \frac{(P_t \cdot s) - P_{t-1}}{P_{t-1}} \]  \hspace{1cm} (1.e)

where \( s \) stands for the share split rate.

**Illustration:**- If one share with the face value of Rs 50 is split in to five shares of Rs 10 each and the prices before and after share split were Rs 220 and Rs 50 respectively, the return for the week will be
The computation of return series for GOI bonds was done using the formula (1.4) given above. The return series of GOI bonds was adjusted for the interest received during the holding period. This is done by adding current yield divided by 52 to the return series of that week under the assumption that the interest payments are made throughout the year.

The computation of return series for gold and silver were also done using the formula (1.4) given above. The adjustments are not required here as the above mentioned factors are not applicable for the bullion market.

The inflation rate for the week is also computed using the formula (1.4) given above. The call money rate data collected is in the form of annual return. This rate is divided by 52 to get weekly return for each week.

1.8.9 Research Questions

The study is designed to answer some of the fundamental questions that haunt the equity investors in India. Taking this into consideration we have formulated the following research questions:

a) How much rate of return is available from the equity investment in India?

b) Whether the equity investment in India provides hedge
against inflation or not?

c) Whether the equity investment in India fares better than the alternate forms of investments like risk free investments (GOI bonds) and short term interest rates (call money rate) or not?

d) Whether the equity investment in India provides better return than the bullion market which the Indians consider almost risk free or not?

e) Whether it is beneficial to use the technical analysis to reshuffle the equity portfolio or a simple buy and hold strategy is enough?

1.8.10 Analysis of the Data

The answer to the first research question is obtained by computing the rate of return available from the sample companies. The rate of return from each sample share is computed as geometric mean of the weekly return series. The return available from the capital market is assumed to be the return available from the equally weighted portfolio of sample companies.

The answer to the second research question is obtained by comparing the market return with the inflation rate during the period. The answers to the third and fourth research questions are obtained by comparing the market return with the return available from the alternate forms of investments.
Test of the EMH in weak form is done to answer the last question. This is done by using three methods. The first will make use of a parametric test (serial correlation test), the second a non parametric test (runs test) and the third will involve the test of a mechanical trading rule (moving average analysis).

1.9 Overall Study plan

The study is organised in 4 chapters including the present one. The II chapter deals with the first objective of the study (ie answering the first four research questions). It includes the theoretical background of allocational efficiency of the capital market, computation of return and risk of the individual shares. This chapter also carries the computation of market return and the comparison of it with that of alternate investments and also with inflation rate.

Chapter III deals with the second objective of the study (ie answering the last research question). It gives the theoretical background of the EMH and the results of the tests of the EMH in weak form.

The last chapter incorporates the summary of the work done, main findings and conclusions. This chapter also points to the scope for further research.
REFERENCES


