CHAPTER II

STOCK RETURNS BEHAVIOUR

THEORETICAL ANALYSIS AND EMPIRICAL REVIEW

For most of our lives, we will be earning and spending money. Normally our current money income will not be wiped out exactly by our current consumptions and hence there may be some excess. When there is excess of current money income over current consumption desires, people tend to save the excess. The excess savings are invested which is called Investment. Investments are undertaken with the expectation of some returns in future. Hence, an investment can be defined as "the current commitment of funds for a period of time in order to derive benefit in future". That benefit will compensate the investing unit (1) for the time the funds are committed, (2) for the expected rate of inflation and (3) for the uncertainty involved in the future flow of funds.

2.1 IMPORTANCE OF EQUITY INVESTMENT

There are a variety of investment opportunities. Funds can be invested in Fixed Deposits, Government securities, Corporate Bonds, Real estates, Commodities and Common stock or Equity shares. However, it is the Investment in equity shares that attracted the attention of Investors, Academics, Fund Managers, Corporations, Government, Regulatory Bodies such as Securities and Exchange Commission (USA) and Securities and Exchange Board of India (SEBI). Considering the world-wide importance to equity investment, Euromoney devoted its July '93 issue exclusively to equities - a departure in the 24 years history of that journal.
Investors can be classified into two broad categories, viz., Individual Investors and Institutional Investors. Although individuals are the indirect beneficiaries of Institutional Investors, on a daily basis they are "competing" with these institutions. Both groups of Investors are trying to make intelligent trading decisions about securities.

2.2 HISTORY OF SECURITY ANALYSIS

For a long time in the past and even today, Investors, whether individual or institutional, are interested in finding an answer to the question of how securities are priced. People have been studying the way security prices fluctuate for over a century. In 1841, Charles Mackay\(^1\) assembled a book of readings called 'Extraordinary Popular Delusions and the Madness of Crowds' which dealt about Tulip-Mania and some equally famous market "bubbles". In contrast to Mackay's astonishing stories, in 1900, a French Mathematician named Louis Bachelier\(^2\) set forth formal models in which security prices were random outcome that had probabilities attached to them. Bachelier was one of the first to study security price movements mathematically. Bachelier presented convincing evidence that security speculation in France was a fair game and that the current price of a security was an unbiased estimate of its future price. Thus he showed that recent historical data were useless for predicting future price changes. Thinking took another turn during the 1950's when an econometrician named Holbrook Working\(^3\) and his Colleagues articulated the notion that security prices fluctuated around their intrinsic values. The Study continued and Bachelier's model was independently derived by Osborne\(^4\) over 50 years later. The Bachelier-Osborne model begins by assuming that price changes from transaction to transaction in an individual security are independent,
identically distributed random variables. It further assumes that transactions are fairly uniformly spread across time, and that the distribution of price changes from transaction to transaction has finite variance.

2.3 APPROACHES TO THE STOCK PRICE BEHAVIOUR

The study continued further and as a result of this enquiry, the Academics formulated the following approaches to the securities price behaviour.

(1) *Fundamental or Intrinsic value analysis School* which believes that security prices depend upon certain fundamental factors concerning the Economy, Industry and the specific Company.

(2) *The Chartist or Technical Analysis School* which says that security prices are determined by the supply of and demand for securities while the supply and demand are governed by numerous rational and irrational factors and

(3) *Random Walk or Efficient Market School* which believes that the future path of security prices are unpredictable.

2.3.1 Fundamental School

Fundamental or Intrinsic Value Analysis school believes that it is very important to assess the state of the Economy and its implications for the stock market first. After completing an analysis of the economy and the overall market, industrial analysis should follow. Individual companies and industries tend to respond to general market movements. The next step is to pay great attention to company analysis. Thus the fundamentalist believes that an analysis of the economy, industry and company will help to understand the share price movements.
2.3.2 Technical School

The chartist or Technical Analysis School is entirely different from the fundamental approach. Technical analysis can be defined as the use of specific market data for the analysis of both the aggregate stock market and individual stocks.

Although there are many different Chartist theories, they all assume that the past behaviour of a security's price is rich in information concerning its future behaviour. History repeats itself and it will tend to recur in future. Thus, if through careful analysis of price charts one develops an understanding of these price movements this understanding can be used to predict the future behaviour of prices and any expected gains.

2.3.3 Efficient Market School

An efficient market is defined as one in which the prices of securities reflect all known information quickly and accurately. EMH is concerned with the extent to which security prices fully reflect all available information and, for the expository purposes, is divided into the following cumulative levels.

2.3.3.1 Weak Form:

Weakly efficient market hypothesis stipulates that historical price and volume data for securities contain no information which can be used to earn a trading profit above what could be attained with a naive buy-and-hold investment strategy.
2.3.3.2 Semi-strong Form:

The semi-strong efficient market hypothesis specifies that markets are efficient enough for prices to reflect all publicly available information. Consequently, only those insiders who have access to valuable information could earn a profit larger than what could be earned by using a naive buy-and-hold strategy in a semistrong efficient market.

2.3.3.3 Strong Form:

Strongly efficient market hypothesis claims that no one can earn a profit larger than what could be earned with a naive buy-and-hold strategy by trading on short-term security price movements. Security market can be strongly efficient, if the rates of stock price changes are independent random variables and none of the market participants can use inside information.

The Efficient Market or Random Walk Model is based on certain assumptions such as i) Large number of profit maximizing participants ii) New information regarding securities comes to the market in a Random fashion and iii) Investors adjust security prices rapidly to reflect the effect of new information. Because of this, the price changes are independent and random. In other words, the theory of Random Walk says that the future path of a price level of a security is no more predictable than the path of a series of cumulated random numbers. In statistical terms the theory says that successive price changes are independent, identically distributed random variables. Most simply this implies that the series of price changes have no memory, that is, the past cannot be used to predict the future in any meaningful way.
The above three categories are not clear-cut demarcations, since, Strong form efficiency implies that the market is efficient at weak level and semi-strong level.

Even though many have contributed to the EMH or RWH, it was formalized by Prof. Fama in 1965. Since then, many studies were conducted to find the existence of RWH in stock price movements. Most studies found the existence of random behaviour. The researchers found out that the stock market is efficient at the weak form and thus the RWH was established.

2.4 EMERGENCE OF ANOMALOUS EVIDENCE

The assertion that stock market is efficient was not seriously questioned until recently. But with the growth of a number of literature which brings out the existence of various anomalies, EMH is questioned now. The opposition for EMH arises both from Academics and practitioners, with practitioners disputing it more seriously. If the people believe that market is efficient, they will not be in the business, the practioners claim.

Due to the mounting attack on EMH, Prof. Fama who formalized EMH in 1965, weakened his views on EMH. Keeping in tune with the changes that are taking place in capital market research, Prof. Fama (1991) changed the above form of classification which he did in 1970. Instead of weak form tests, which are only concerned with the forecast power of past returns, the first category now covers the more general area of 'Tests for Return Predictability' which also includes the burgeoning work on forecasting returns with variables like dividend yields and interest rates. Instead of semi strong form tests, the common title now is 'Event studies'. Instead of strong form tests, the more descriptive title could be 'Tests for Private Information'. But he insists that a share price does adjust efficiently to information specific to one company. In his 1965 article, Fama pointed out that "since the empirical evidence
produced by this and other studies in support of the random work model is now so voluminous, the counter arguments of the chart reader will be completely lacking in force, if they are not equally well supported by empirical work”.

Many academics and few practioners put forth their argument that the existence of various seasonal anamolies in stock returns, indicate that the market is not efficient. Thus the debate whether markets are efficient or inefficient goes on. An attempt is made in the present study to test to what extent the Indian Share Market is efficient. In order to understand the implications of this study in the Indian context, a brief review of the Indian Capital Market is presented.

2.5 INDIAN CAPITAL MARKET

"India is an emerging economic tiger" says Mr. Michael Camdessus, Managing Director, IMF.⁷ Such an observation is impossible, but for the march towards development, which India is making now due to liberalization programme.⁸ Economic development of a nation depends to a large extent to the level of capital formation. For an effective use of technology, natural resources and manpower etc., capital is a pre-requisite. When savings are channeled to business and industry, wealth is created, which determines national income. The standard of living of the masses depends upon national income. The countries are also classified as developed, developing and underdeveloped only on the basis of national income.⁹ Thus savings and capital formation play a vital role in the country’s economic development.¹⁰

2.5.1 Recent Developments

Indian capital markets have gone through substantial changes in the recent past.¹¹ It is now a favourite country for International Investors.¹² It is an emerging market.¹³ Delicensing of many industries, abolition of Control of Capital Issues Act,
changes introduced in the Monopolies and Restrictive Trade Practices Act, granting permission even to private sector to start mutual funds, and welcome attitude to foreign investment can be cited as examples. The establishment of Securities and Exchange Board of India (SEBI) on April 12, 1988 is an important landmark in the history of Indian Capital market. Other measures such as the establishment of Discount and Finance Houses of India, several venture capital funds, new mutual funds, two credit rating agencies are few other significant developments.

Indian capital market attracted substantial funds from foreign countries. By the latest count foreign institutional investment in the Indian stock market since June 1993 has crossed the US $1.25 billion mark, which is more than double (US $ 500 million a year) that most analysts were predicting around April 1993. The sea change in foreign attitude is evident from the fact that international institutional investors now look for any sign of political disturbance and bearishness in domestic market sentiment as a buying opportunity. Due to the promising future the Indian Capital market offers, all the eight India country funds were trading at a premium to their NAVs. Morgen Stanley floated its own domestic mutual funds in India. It collected nearly Rs.1000 crores as against Rs.300 crores announced collection. This mutual fund is the first that Morgan Stanley has floated in an emerging market and testifies to the confidence that this highly successful New York investment bank has on India.

Not only the Indian capital markets scenario, but also the International market scenario have undergone changes. Equity Markets both primary and secondary are booming. Market liberalization measures, rapid development of communication technology, computerized trading system and increasing activities by multinational
corporations have contributed 11% global integration. One important aspect of financial market globalisation is that market prices are linked so closely that movements in prices in the national market immediately affect stock prices in foreign market through efficient information sharing and free accessibility to markets by domestic as well as foreign investors. Even certain incidence of international importance will affect the stock prices worldwide. The integrated world equity markets is therefore expected to share a common stochastic trend in the long run movement of national stock prices.

2.6 STOCK EXCHANGES

Stock Exchange means any body of individuals whether incorporated or not, constituted for the purpose of assisting, regulating or controlling the business of buying, selling or dealing in securities. It must be recognized by the Government under Section 4 of the Securities Contracts (Regulations) Act 1956. No exchange can operate legally without recognition. Stock exchanges are given monopoly in certain areas under section 19 of the Act to ensure that the Control and Regulations are facilitated.

Members of recognized stock exchanges are called Brokers. Members can enter into contracts only with other members of recognized stock exchanges. Stock exchange is a place, where the owner of a share can find a buyer for his share. The bargains that are struck by the members of the stock exchanges are at the fairest prices determined by the basic laws of demand and supply.
Stock Exchanges play a vital role in channeling the savings to the wheels of trade and commerce. The institution of stock exchange is the result of the growth of corporate sector. The Stock Exchanges in India have become dynamic and vibrant vehicles for mobilization of resources of the nation and divert the same into constructive channels of investment. But for the growth of corporate sector, large enterprises is not possible. The growth of corporate sector is made possible because of the institution of stock exchanges. Thus the stock exchanges play a vital role in the economic development of any country. Stock exchange is basically an institution of capitalistic economy.

Stock Exchange is an important institution in the capital market. The owner or shareholders provide their savings to the companies in anticipation of income. They expect their investment to have safety, liquidity and profitability. Their primary concern is to have returns - annual income in the form of dividends and capital appreciation in the long run. Investment in shares is preferred instead of keeping cash. Cash will not bring any return, but shares appreciate in value over time. In times of need they can be pledged to borrow money or they can be sold and cash realized. Thus investment in shares provide liquidity. Stock exchange is a place where a share can be bought or sold.

Investment in shares which was hitherto looked after as a gambling now viewed as a best medium of investment. As a result the number of shareholders in India increased. The role of corporate sector in India has also expanded. There has been a significant jump in the amount raised in the primary market. It was Rs.90 crores in 1970s, Rs.4500 crores in 1986-87 and Rs.21670 crores in 1993. To service the growth of various segments of the capital market, the number of stock exchanges have also grown as shown in the following table.
Table No. 2.1

**GROWTH OF STOCK EXCHANGES IN INDIA.**

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*Includes OTC Exchange of India and National Stock Exchange.*

The development of the nation was made possible by the development of the Indian capital market. Thus, India which was hitherto considered as an underdeveloped country is now ranked as a lower middle income country. Thus we have seen spectacular growth of Indian economy over the decade. The IMF survey comments that India is showing improved growth.\(^{32}\)

**2.6.1 Origin of Stock Market**

The earliest record of security dealings in India is meagre and obscure. The loan securities of the East India Company were transacted towards the close of the 18th century. Apart from Loan securities, Corporate stocks and Shares were also transacted in 1830s. At that time there were only half a dozen brokers. Only with the introduction of limited liability by the Companies Act 1850, the era of modern joint stock enterprise and growth of stock market in India commenced.

The *Bombay Stock Exchange is the first*\(^{33}\) *Stock Exchange* to be established in India. The two stock exchanges operating in the 19th Century were at Bombay, (which was set up in 1875),\(^{34}\) and Ahmedabad (which was set up in 1894).\(^{35}\) These
were organized as voluntary non-profit making associations to regulate and protect the interests of brokers. Later, the trading in securities were regulated by *Bombay Securities Contracts (Control) Act of 1925*, under which Act recognition was given to Stock Exchange at Bombay in 1927 and at Ahmedabad in 1937. A number of other stock exchanges were organized at Bombay, Ahmedabad and other places during war boom, but they were not recognized. *In 1956 the Securities Contracts (Regulation) Act* was passed which governs the Stock Exchanges in India at present.

### 2.6.2 Bombay Stock Exchange (BSE)

As mentioned earlier, the BSE was established in the year 1875. At present there are 558 members and they have the right of nomination. The Bombay Stock Exchange is the premier Stock Exchange in India and it is a voluntary, non-profit making association. The Governing Body has wide powers and is the decision making body. The Executive Director appointed by the Government is the Chief Administrator of the exchange.

BSE accounted for 40% of the listed companies on an all India basis. Bombay ranked first in terms of number of listed companies and stock issues listed. The capital listed in Bombay accounted for 77 percent of the overall capital listed in all the stock Exchanges. Its share of the market capitalization was around 91 percent. The paid up capital of equity, debentures/bonds and preference were 78 percent, 77 percent and 48 percent respectively of the overall capital listed in all the stock exchanges.

### 2.6.3 National Stock Exchange

The Government of India started a *National Stock Exchange (NSE)* and it is functioning from Bombay. The NSE is a fully automated screen based exchange dealing at present only in debt securities. But the NSE will have three phases. In
the whole sale debt segment, the first phase of trading started. The second phase will allow the banks to play the call money market. Retail equity trading will start in the third phase. In this phase, Futures and Options will also be introduced. Within two years, NSE will have 1000 brokers. The members will be linked to NSE through VSAT (Very Small Aparture Terminals).

There are certain advantages with the NSE.

1. Since trading is screen based, there is no requirement for the brokers to have proximity with the exchange. This is a boon for the brokers at far away places, since physical presence is not required.

2. Members can access on-screen information regarding the market position in a particular security by order and price.

3. Buyer and seller is not revealed until the completion of the trade. Thus, the influence of big players like Unit Trust of India is kept away.

4. All the trades are automatically recorded and an instant print-out is received by both parties. This lessens chances of objections.

**2.6.4 Over The Counter Exchange of India (OTC)**

The OTC exchange was jointly promoted by the Industrial Finance Corporation of India (IFCI), Industrial Credit and Investment Corporation of India (ICICI), the Industrial Development Bank of India (IDBI), the Unit Trust of India (UTI), SBI Capital Markets Ltd., Canbank Financial Service Ltd., the General Insurance Corporation of India and Life Insurance Corporation of India. It was set up in October 1990 with a paid up Capital of Rs. 5 crores.

Two way quotes will be offered by Market makers every day for securities listed at OTC. The bid and offer prices depend upon many factors. Small Companies shares are listed in the OTC exchange. They should have a paid-up Capital of more than
Rs. 30 lakhs, but less than Rs.3 crores. Even companies with paid-up Capital of more
than Rs.3 crores, but less than Rs. 25 crores can get listed in OTC if they are not
listed on a regular stock exchange.

2.7 REGULATORY BODIES AND ENACTMENTS

Stock Exchanges in India were governed by various enactments earlier. At
present it is governed by Securities Contracts (Regulation) Act 1956.

2.7.1 Securities Contracts (Regulation) Act 1956

This Act was enacted in 1956 to prevent undesirable transactions in securities
by regulating the business of dealing therein. Securities for the purpose of this Act
include (Sec. 2(h)(i)) shares, scrips, stocks, bonds, debentures, debentures stock or
other marketable securities, Government securities including Rights and interest in
securities.

Any Stock exchange, which is desirous of being recognized for the purpose of
this Act should make an application to the Central Government. If the Central
Government is satisfied, it may grant recognition to the Stock exchange under
section 4 of this Act. The Central Government is also having the power to withdraw
recognition if there is any violation of any provisions of this Act. As per Section 6 of
this Act, all recognized stock exchanges should submit various periodical returns to
the Securities and Exchange Board of India. The Securities Contracts (Regulation)
Rules 1957 was promulgated by the Central Government for helping the implementa-
tion of various provisions of the Act.
2.7.2 Securities and Exchange Board of India (SEBI)

The securities and Exchange Board of India (SEBI) was established by an Act in Parliament on 30th January 1992 "to protect the interest of Investors in securities and to promote the development of and to regulate the securities Market and for matters connected therewith or incidental there to." The Board (SEBI) has its head office at Bombay and it can establish offices at other places in India.

2.7.2.1 Functions of the Board

In order to protect the interest of investors in Securities and promote the development of, and to regulate the securities Market by such measures as it thinks fit, the Board performs certain functions. It includes

(i) Regulating the business in Stock exchanges and any other securities Market,

(ii) Registering and Regulating the working of stock Brokers, sub-brokers, Share transfer agents etc.,

(iii) Registering and Regulating Mutual funds,

(iv) Promoting Investors Education and Training,

(v) Prohibiting insider trading in securities,

(vi) Conducting inquiries and Audits of Stock Exchanges and (vii) Conducting Research for the above purposes. The Board shall have power to carry out the above functions.
2.8 REVIEW OF LITERATURE

There are large number of studies undertaken both in developed and developing capital markets for testing the various forms of Efficient Market Hypothesis, especially Random Walk Hypothesis. However, there are few studies undertaken recently which brought out certain anomalies which go against the concept of RWH. A brief review of those studies are presented here. For convenience, they are categorized into studies which tested the RWH and those studies which brought out various anomalies.

2.8.1 Studies which tested Random Walk Hypothesis

The development of Random Walk Hypothesis (RWH) was initiated by a French Mathematician Louis Bachelier in the year 1900 in his doctoral dissertation in which he analyzed and found that the French Government Bonds and their options followed Random Walk, even though he did not specifically use that term. He presented convincing evidence that security speculation in France was a "fair game"\textsuperscript{38} and the current price of a security was an unbiased estimate of its future price. Thus he showed that historical data were useless for predicting future prices.

Cowles’s (1933)\textsuperscript{39} investigation of the forecasting ability of professional investors and forecasters reveals that the forecasters had no special forecasting skills since their forecasts were indistinguishable from results which could have arisen merely by chance. Thus his study supported the RWH. His another study (Cowles, 1944)\textsuperscript{40} which included the testing of forecasting ability of financial periodical and financial services indicated the absence of predictability power.
Working (1934)\textsuperscript{41} with the help of artificially generated series of price change found that they behaved like a cumulative sum of Random numbers.

Kendall's (1953)\textsuperscript{42} study gave a direction for the analysis of random character of price changes. He analyzed index numbers of stock prices in UK and commodity prices in USA. He observed that "not only is it impossible to predict a series from its own internal behaviour, but it seems equally impossible to predict a series from the behaviour of the other price series".

The study made by Harry Roberts (1959),\textsuperscript{43} may probably be a notable contribution. After analyzing Dow Jones index for 52 weeks and comparing them with the simulated Random numbers, he found the simulated ones and actuals exhibit unmistakable resemblance.

Another notable study was made by Osborne (1959).\textsuperscript{44} He examined logarithms to of price changes to find out whether their movements conformed the motion of physical objects. He found a high degree of conformity between the movements of stock prices and the law governing Brownian motion.\textsuperscript{45} Thus he found that the logarithms of price changes are independent.

Prof. Alexander (1961)\textsuperscript{46} applied a mechanical trading rule called filter technique on the closing prices of Dow-Jones Industrials and Standard and Poors Industrials. An X percent filter is defined as follows: "If the daily closing price of a particular security moves up at least X percent, buy and hold the security until its price moves down at least X percent from a subsequent high, at which time simultaneously sell and go short. The short position is maintained until the daily closing price rises at least X percent above a subsequent low, at which time one should
simultaneously cover and buy. Moves less than X percent in either direction are ignored. He calculated filter profits for filters ranging from 5 percent to 50 percent. He reported that profits are significantly greater than those earned by a simple buy-and-hold policy. Hence he concluded that the independence assumption of the Random Walk Model was not upheld by his data. However, Mandelbrot discovered a flaw in Alexander's computations. In a later paper, Alexander derived a bias factor and used it to correct his earlier work. Filter technique was not proved to be better than a buy-and-hold policy. He also tested other mechanical trading techniques which provide better profits than his filter technique and buy-and-hold profit. Again he overturned the Random Walk Model.

Cootner (1962) analyzed weekly price data of stocks listed on Newyork Stock Exchange. He used Mean square Successive Difference Test and found out that stock prices appeared to move Randomly. He also found some trends. When the differing intervals were increased from 1 week to 14 weeks there was a shift from excessive tendency for reversals to an excessive tendency for trends.

Moore (1964) examined weekly price changes of 30 stocks listed on New York Stock Exchange. He found price changes for individual stocks were random but the price changes in the index which consists 25 of the stocks exhibit positive serial correlation which is significantly different from Zero.

In a classic study Fama E.F. (1965) analyzed the behaviour of stock market prices by taking daily prices for each of the 30 stocks of the Dow-Jones Industrial Average. He performed various tests on the first difference of their natural logarithms. Apart from analyzing the frequency distribution, he conducted various tests for dependence such as serial correlation, Runs test and Filter Rules.
He found that all the sample serial correlation co-efficients are quite small in absolute value. The largest is only 0.123. Although eleven of the co-efficients of lag=1 are more than twice their computed standard errors, this is not regarded as important. Even though the sample serial correlation co-efficients for the daily changes are all very small, it is possible that price changes across longer differencing intervals would show stronger evidence of dependence. For testing this, serial correlation co-efficients for lags upto 10 were computed for each stock for non-overlapping differencing intervals of four, nine, and sixteen days. All these sample serial correlation co-efficients are quite small. Fama found 23 out of 30 of the first order auto correlation co-efficients are positive while 21 and 24 of the co-efficients for the four and nine day differences are negative.

The evidence produced by his serial correlation model seems to indicate that dependence in successive price changes is either extremely slight or completely non-existent. He also analyzed the data by Runs test. For all the stocks the expected and the actual distributions of Runs by length turnout to be extremely similar. He tested the data by using Alexanders filter technique. The results produced by the filter technique do not seem to overturn the independence assumption of the Random Walk Model.

He concluded that there is no evidence at all, however, that there is any dependence in the stock price series that would be regarded as important for investment purposes. That is the past history of the price series cannot be used to increase the investors’ expected profits. Thus Random Walk Hypothesis is established for the US Stock Market.
Dryden Myles (1970) examined the question whether or not statistical dependence is displayed in the behaviour of UK share price changes by taking Two Financial Times Actuaries Share Index and one Daily Mail Industrial Share Price Index for a period of 4 years.

He found, all three sets of data generate filter rates-of-return which tend to decrease with increasing filter size. Around 2.5 percent filter size, filter rates-of-return are approximately zero and beyond this the rate of return tends to fluctuate in an erratic fashion. For each of the three price series the most profitable filter is the smallest one. The most significant feature of the results, however, is the complete absence of the pattern of rates which would be expected if prices followed random walks. Clearly, his data generated filter returns, both long and short, well in excess of the buy-and-hold rate-of-return, when transaction cost is not considered. He observed that the higher rates of return and absence of pattern may suggest the existence of dependence for UK share prices and this would appear to suggest sufficient divergence from the random walk hypothesis to justify a more extensive analysis of the behaviour of individual shares quoted in the London stock exchange.

Granger and Morgenstern (1970) analyzed daily, weekly and monthly prices of shares and indices with help of spectral analysis and found strong support for random walk hypothesis.

In an Indian study, Krishna Rao. N. (1971) analyzed weekly average share price data for 16 years from 1955 to 1970 by employing spectral methods. The company analyzed was Indian Aluminium Company and data were taken from the Calcutta Stock Exchange. He concluded that the random walk hypothesis is valid for the Indian Aluminium Company's weekly average share prices.
Conrad and Juttner (1973)\textsuperscript{53} investigated the market efficiency for German stock prices by taking individual stock prices for a period of nearly 4 years. Their test suggested that the random walk hypothesis, was inappropriate in describing the Behaviour of share prices in Germany. However Ronning (1975) found out a flaw in their computations which resulted in the rejection of random walk hypothesis. Even though his results do not establish RWH, he called the result of the test inconclusive.

Sharma and Kennady (1977)\textsuperscript{54} analyzed the three indices of India, USA and UK. with the help of Runs test and spectral analysis. Their analysis indicated randomness in the data. On the basis of their analysis they observed that "It is evident that stocks on the Bombay stock exchange obey a Random Walk and are equivalent in this sense to the behaviour of stock prices in the markets of advanced industrialized countries examined in this article.

John C.B.Cooper (1982)\textsuperscript{55} collected data on various stock markets scattered throughout the world. The tests consist of a time domain test, a non-parametric test and a frequency domain test (i.e., serial correlation analysis, runs analysis and spectral analysis). Each of these tests was applied to samples of monthly, weekly and daily data of the stock markets covered.

The serial correlation results indicate that almost all the stock markets with the exception of Japan exhibit some serial correlation up to a lag of 25, which are statistically significantly different from zero, thus indicating some degree of linear dependence. They are almost certainly too small to be of any real value for forecasting purposes.
The results of runs tests conducted on 36 stock exchanges, exactly 18 produce a negative standardized variable Z indicating positive dependence. Only eight Z values indicated a departure from randomness. The spectral analysis of the 36 stock market indices produced only ten series with ordinates outside 95 percent confidence bands.

He concluded that the random walk hypothesis is supported by the findings related to USA and UK. For all other stock markets the evidence is less clear. It is reported that in several instances an index has appeared to follow a random walk, but some of the market’s constituents shares displayed some degree of non-randomness.

Sharma J.L. (1983) tested informational efficiency criteria of a capital market of a developing country namely India. He specifically tested whether the Random Walk model is applicable to 23 individual stocks, traded on the Bombay Stock Exchange for the 6 year period of 1973 to 1978. The 23 stocks represent the leaders in the respective industries; these shares are actively traded. Each series consists of 288 weekly observations. He employed 'Integrated Moving Average' form of the Random Walk model suggested by Box and JenKins.

He found the Random Walk model appears to be an adequate representation of the price behaviour of individual stocks traded on the Bombay stock exchange. In conclusion his study suggests that price changes of stocks listed on the Bombay Stock Exchange - reflecting a less developed country - conform to the general Random Walk behaviour of Stock price changes observable in other leading Stock markets of the World.
Kanagasabapathy P. (1990) examined the behaviour of equity prices in the 1980s to test the applicability of the theory of Random Walk in Indian Stock Market by analyzing closing quotations of 75 equity shares and 25 indices. By conducting runs test and auto correlation analysis, he concluded that the successive price changes are independent. Thus the Random Walk Hypothesis was established for Indian stock market.

Subramanian V. (1993) tested to what extent share price behaviour in India exhibits weak level efficiency by taking closing prices of 40 stocks and each and every transaction for that scrip traded in Bombay Stock Exchange. He concluded that the statistical evidences produced by the study, reject (both for closing prices data and transactions data) the weak form of EMH and its applicability to the Indian Stock Market.

Patricia Cerrito, Dennis O. Olson and Krzysztof Ostaszewski (1993) tested Robinson’s non-parametric test for independence in time series data which is, two random variables, such as current and past stock returns, are independent if and only if their joint probability density equals the product of their marginal densities. They introduced a variant of Robinson’s test statistic that is not degenerate under the null hypothesis and propose another test statistic that two random variables are identically distributed if and only if their marginal densities are equal. They examined monthly US stock returns from the Dow-Jones Industrial Average for 1982-1992 and dividend inclusive monthly returns from the CRSP value-weighted index from 1964-1989. Also, daily returns from Dow-Jones Industrials for 1982-1992 and Canadian Daily Returns from the Toronto Stock Exchange Index for 1982-1987 were used.
They randomly selected 75 observations for graphical representations. Visual inspections suggest that the distributions are not identical and a test for equality of the marginal distributions rejects the null hypothesis that the returns distributions are identical. They have shown that daily and monthly stock returns do not follow a random walk. Instead, they follow a Markov Chain and further testing is necessary to determine the order of the Markov process. The rejection of random walk are more decisive for low frequency data and their results may be unique in that they also reject the random walk for noisy high frequency data.

2.8.2 Studies Relating to Stock Market Anomalies

Even though most of the studies lend support for the Random Walk Hypothesis, there are few studies which brought out various seasonal anomalies. They are as follows:

L.H. Fritzemeier (1936) has shown one of the first evidence of anomaly against the pricing efficiency of common stocks. Through various hand calculations (In those days there was no computer) he showed that low priced common stocks tended to earn higher rates of return than high priced stocks.

In an important study on "Day of the week effects and asset returns", Michael R. Gibbons and Patrick Hess (1981) analyzed S&P 500 and the value and equal weighted portfolios of CRSP for a period from July 2, 1962 to December 28, 1978. They found that negative return for Monday is remarkably uniform across individual stocks and that treasury bills earn a below average return on Monday. They observe that, it is interesting to note that market adjusted returns exhibit day of the week effects, but the effects are not concentrated on a particular day of the week. Because
of this the power of market efficiency tests should be improved by accounting for day
effects on raw and market-adjusted returns. The most notable evidence is for
Monday's returns where the mean is unusually low or even negative. The results of
their analysis are puzzling. Imagining why expected returns for stocks vary accord­
ing to the weekday is difficult and they state that they are unaware of any theory
which would predict negative Monday returns. They broadened their analysis to
include not only indexes but also individual securities that are actively traded.

Jeffrey Jaffe and Randolph Westerfield (1985) analyzed day-to-day stock
market returns for Japan and analyzed the interaction between returns in Japan
and US. They used Nikkei-Dow Index, the Tokyo Stock Exchange (TSE) Index and
the Standard and poor's composite 500 stock price index.

They found a pattern different from the one in US. The lowest mean returns
for the Japanese stock markets occur on Tuesday. There is some weak evidence that
the Japanese seasonal is closer to the US seasonal led by one day. They could not
find that either measurement error or settlement procedures can explain the weekly
seasonal in Japanese returns.

Miguel Santesmasès (1986) analyzed daily mean returns of the i) Madrid
Stock Exchange Index and ii) daily returns of 40 sample stocks (January 2, 1979 to
December 13, 1983) of three sectors i.e., (1) Banks and Investment (17 companies),
(2) Utilities (8 companies) and (3) Industrial stocks (15 companies).

Analysis indicated that, the returns on the first trading day, both for the index
and stocks of Banks and Investment are negative and lowest of the week; whereas
stocks of utilities and industrial stocks reach highest returns on that day. However
the difference between mean returns is not significant at 1% level. It is concluded
that the presence of 'the day of week effect' is not confirmed in Spanish stock market.
Regarding January effect the analysis indicated the presence of high returns not only in January, but also for the whole of the first quarter of the year except for industrial stocks which only have higher returns in January. On the other hand, returns are not only lower in December, but throughout the last quarter of the year. These results seem to witness the presence of a 'change of year effect' in the Spanish stock market; The returns go down in the last month of the year and go up during the first month of the following year.

Miguel Santesmases says that one possible explanation of this phenomenon could be the realization of capital losses at the end of the year, in order to obtain the corresponding tax reduction which could cause a fall in the prices and returns. Once the losses have been realized investor would buy again at the beginning of the following year. To the extent the time series data used are rather short, this should not be taken as a conclusive test of this type of seasonality in the Spanish stock returns. He concluded that the 'Day of the week effect' is not found in Spanish stock market. Hence EMH cannot be rejected. The results show, however, a 'Turn of the year effect' that results in higher returns for the first quarter of the year and lower ones for the last quarter.

Robert A. Ariel (1987)\(^{64}\) found the mean return for stocks is positive only for days immediately before and during the first half of calendar months and indistinguishable from zero for days during the last half of the month. This 'monthly effect' is independent of other known calendar anomalies such as the January effect, documented by others and appears to be caused by a shift in the mean of the distribution of returns from days in the First half of the month relative to days in the last half.
He found that during the 19 years span studied, all of the markets cumulative advance occurred around the first half of the month, the second half contributed virtually nothing to the cumulative gain. The impact of this effect on stock returns is not subtle; its impact is of the same order of magnitude as the well-known weekend effect documented by French (1980) and Gibbons and Hess (1981).

Edward M. Miller (1988) found that returns tend to be negative from Friday close to Monday close. This regularity has lasted for decades. It applies to NYSE, OTC, Dow Jones Industrials and in Canada, UK, Singapore, Japan and Australia with foreign effect being more than just a reflection of the US effect.

The low return over the weekend must mean that sell orders are more frequent on Mondays than buy orders, and that this reverses later in the week. The most likely reason for a weekly pattern in the difference between buy and sell orders is that both selling and buying vary with the day of the week, but the factors affecting the day on which buying is done are different from the factors affecting the day when selling is done. The hard part is to explain why buying and selling should occur on different days of the week. The amount of time devoted to investment decision making almost certainly varies with the day of the week; presumably institutional investors and most advisers work primarily Monday to Friday while individuals take many of their decisions over the weekend.

Sun-Woong Kim (1988) compiled daily closing prices on Stock indexes of six countries namely US, UK, and Canada (Group 1), Korea, Japan and Australia (Group 2). Regarding the day of the week effects he found the lowest mean returns on Monday for the countries in the I Group. The other group exhibits lowest mean returns on Tuesdays. Hence he is of the view that this day of the week trading strategy generally outperforms a naive buy-and-hold strategy.
Robert A Connoly (1989) analyzed the robustness of the day-of-the-week (DOW) and weekend effects using daily return data of CRSP (S&P 500, Equal weighted and value weighted CRSP index) for a period of 21 years. After accounting for the impact of very large sample sizes, he had shown the sample evidence quite often favours the null hypothesis of equal returns across days of the week. He is of the view that finding an anomaly may be due to statistical flaws in the regressions used for weekend effect tests. From a finance theory perspective, the evidence of a weekend anomaly is clearly dependent on the estimation method and a sample period. When transaction costs are taken into account, the probability that arbitrage profits are available from weekend-oriented trading strategies seems very small. This conclusion is obviously consistent with an efficient markets approach.

Joseph D. Vu (1990) provide an anomalous evidence regarding market efficiency. In an efficient capital market, security prices reflect all available information and adjust quickly to new information. Therefore, no trading strategy using public information can provide an investor with positive abnormal return. Hence he presents the net current asset value rule (NCAV), a simple trading strategy that uses only publicly available information and results in positive abnormal returns even after adjusting for risk. Thus the evidence is consistent with the semi strong form of the efficient market hypothesis. He analyzed the data of 107 stocks that were selling at discount from NCAV per share between April 1977 and December 1984 published by Value Line Investment Survey.

He concluded that the NCAV criterion developed by Ben Graham in 1930 was still profitable in the 1970s and early 1990s. A possible explanation for this anomaly
is that the financial market does not seem to pay much attention to this selection criterion. The NCAV Portfolio substantially outperforms the market benchmark in both raw and excess returns during the two year period subsequent to the first publication in Value Line. The evidence seems to be inconsistent with the semi-strong form of the efficient market hypothesis because the NCAV rule is an ex-ante strategy using only publicly available information, yet providing investors with positive abnormal returns.

In a paper on "Why a weekend effect? Comment", Edward A. Dyl and Clyde W. Holland (1990) noted that a puzzling aspect of the weekend effect is that average returns are actually negative over the weekend. The most plausible explanation of this phenomenon offered to date is that an inordinate amount of bad news is announced after the stock market closes on Friday. They exclaimed why investors at the margin don't take account of this in timing purchases and sales thereby eliminating any weekend effect on stock returns is however, unclear.

In another study which investigated the presence of seasonality and tax-loss selling in the emerging Indian Stock Market Dilbaugh S. Broca (1990) used monthly values of the Reserve Bank of India (RBI) Index number of ordinary share prices from December 1959 to December 1989. He tested seasonality which implies that month-to-month average returns exhibit statistically significant differences.

This study reveals that April (the beginning of the tax year) had the fourth highest monthly return for the entire 30 years and the second highest return for periods 1970-1979 and 1970-1989. Despite some presence, the April seasonal is not so highly differentiated from average returns of other months as observed in capital markets around the world. Hence he explored the reasons for the relatively weak April effect and overall lack of seasonality in the Indian Stock Market.
Small Investor participation and activity in financial markets has intensified only after 1984 owing to broad economic liberalization measures, favourable shifts in taxation policy, relaxation of capital issue controls, curbs on issue expenses, broad basing financial instruments, modification of issue/listing guidelines, protection of investor interests and streamlining market operations through new legislation. Prior to this, market players chiefly comprised brokerage houses, speculative business and Corporations. Unlike individual investors, such assesses could until very recently choose an accounting year different from the tax year. Thus tax loss selling being synchronized with the close of the accounting year, was well spread out diluting any April effect. This is in contrast to developed markets where a strong base of individual investors causes selling activity to be heavily skewed towards the close of the tax year with consequent high January returns.

Other reasons for the absence of seasonality is as follows. Till 1985, Indian Capital markets have been subject to a galaxy of constraints which typify an underdeveloped market. Some of the important ones include a predominantly agrarian economy; the managing agency system (abolished since 1970) Preference of middle income groups to landed property, bullion, fixed deposits etc., which provide security and social status; investment policies of institutions favouring government and semi-government securities which comprised nearly half of the total volume of issues; absence of activity in a large number of securities, with speculators dealing in short list of specified shares; high rates of personal and corporate taxes, discouraging flow of savings to industrial investment; unhealthy practices by brokers; and lack of reliable information owing to paucity of rating agencies. The presence of these features inhibits the price-mechanism, so as to move within relatively narrow bands, with insignificant period-to-period fluctuations.
He concluded that the RBI Index over a 30 year period does not yield evidence of seasonality or month-to-month fluctuations. April, which marks the turn of the tax year, does show high returns in some sub-periods, but these are not significantly differentiated from returns of other months. The lack of seasonality in the Indian Capital Market could possibly be due to its underdeveloped state owing to numerous constraints, paucity of individual investors and securities, volume of trading, tax provisions, extensive government ownership of economic assets, and the aggregate nature of data. He suggested further research using individual stock return data, especially in respect of small firms.

*Joseph Lakonishok and Edwin Maberly (1990)* documented regularities in trading patterns of individual and institutional investors related to the day of the week. It was found that a relative increase in trading activity by individuals on Mondays. In addition there is a tendency for individuals to increase the number of sell transactions relative to buy transactions which might explain at least part of the weekend effect.

An analysis of trading activity by individuals and institutions by the day of the week indicates that individual investors are most active in the market on Monday. On Monday, the relative activity of individuals increases by about 15%. The day with the lowest activity by institutional investors is Monday. He concluded that Monday is the day with the lowest trading volume; that the propensity of individuals to transact on Monday is highest relative to other days of the week and that of the Institutions lowest; and that the propensity of individuals to sell on Monday is higher than their propensity to buy.
Joseph P. Ogden (1990)\textsuperscript{72} tested a hypothesis that the standardization of payments in the US at the turn of each calendar month generally induces a surge in stock returns at the turn of each calendar month. The hypothesis also asserts that returns generally will be greater following the month of December and will vary inversely with the stringency of monetary policy.

In an Indian study, S.K. Chaudhury (1991)\textsuperscript{73} used Bombay Stock Exchange Sensitive Index from June 1988 to January 1990 and tested the null hypothesis that the mean return for each day (Monday through Friday) is equal to the mean return for every other day. He also calculated correlation co-efficient between returns on different days.

He found that the average return on Monday is negative. Tuesday marks still higher level of mean negative price change. The loss trend then wanes out through Wednesday resulting in positive returns on the next two days. The fact that average loss is minimum on Wednesday possibly suggests that a price reversal begins on that day which gains momentum on Thursday through Friday. The highest average returns are obtained on Friday. Thus he found the prevalence of day-of-the-week effect in Indian Stock Market.

Turning to return volatility as measured by standard deviations of return series, it appears that return volatility is highest on Monday. This may imply that price/trading uncertainty looms large since the last trading on Friday in the previous week. However, with the experience of trading on Monday, the price fluctuations (and hence, the return volatility) tend to get contained for rest of the days due to the lower values of standard deviation.
He also checked whether returns are correlated over days of the week. He found significant correlation between returns on Monday and Wednesday; Tuesday and Friday; and Wednesday and Thursday.

He is of the view that if market anomalies turnout to be the fact of life, no longer can share price changes be viewed as following a random walk. He also warns that there is no guarantee that ex-post effects, even if they are persistently observed will continue to exist in the future.

In a second study on Indian Stock Market, Dilbaugh Broca (1992) probes the adequacy of the randomness assumption for Indian Share returns. He used Bombay Stock Exchange National Index from 1st April 1984 to 31st December 1989. He found that the mean daily returns are lowest (negative) on Wednesday, thereafter rising to peak on Friday. The standard deviation is highest on Monday. The skewness coefficient is close to zero for all days, an indicator of high degree of symmetry in stock return series. Since the kurtosis coefficient is positive, lying approximately between two and three on four days out of five days, the data clearly exhibits leptokurtosis which typifies many stock return series.

He concluded that BSE National Index over a period of five years and nine months shows evidence of significant variations according to the day of the week. This contradicts the Random Walk hypothesis, investigated by previous researchers, as a descriptive model for common stock price movement in India. Wednesday consistently earns lowest (negative) returns; thereafter the market rises peaking on Friday. However, a simple trading strategy designed to exploit these empirical regularities could not outperform a naive-buy-and-hold policy over the same period.
A benefit, however accruing to investors from knowledge of the day to day variations is that by altering the timing of routinely scheduled transactions, they could increase the expected return on investments.

In an unpublished paper, *Dennis O. Olson and Nan-Ting Chou (1993)* tested the two popular explanations for the 'Weekend effect' such as (1) the negative information flow hypothesis and (2) the tendency of individual investors to sell stocks on Mondays. They used daily returns data from three major US stock exchanges from 1972 to 1991 and found that negative Monday returns have persisted over time and are more pronounced on the American Stock Exchange and Over the Trade Counter Exchanges than on the New York Stock Exchange. Since the weekend effect is stronger on the exchanges with smaller institutional ownership, the results suggest that *the behaviour of individual investors is the more likely cause of the weekend effect.*

They split the data set into half. (1) 1972 to 1981 and (2) 1982 to 1991. They found Monday returns are negative and statistically significant across all exchanges for 1972 to 1981. The Magnitude of positive Friday and negative Monday returns generally is smaller across all exchanges in the later period. The weekend effect is statistically significant for the OTC and AMEX but not for NYSE returns during the later time period when investors are more aware of the weekend effect. Deleting the observations for October 1987 and 1989, reduces the magnitude of the weekend effect for 1982 to 1991 but again *the weekend effect is statistically significant for the AMEX and OTC but not for NYSE.*
By comparing the Monday returns across exchanges they found that the weekend effect was generally larger on the AMEX and OTC exchanges for 1972 to 1981 but not always significant in a statistical sense. After 1981 the weekend effect has diminished on all exchanges but to a lesser extent on AMEX and OTC. The weekend effect may continue to exist because it is not large enough for institutional investors to exploit, nor important enough to individual investors to alter their selling patterns.

They concluded by attributing the cause of the weekend effect to the behaviour of individual investors. Following the publication of numerous articles about the weekend effect, its magnitude has diminished on the NYSE. On the exchanges with smaller institutional ownership, the AMEX and OTC exchanges, negative Monday returns persists over the entire time period for 1972 to 1991.

In another paper, Neural Network was used to forecast Daily stock returns by Dennis O. Olson and Nan-Ting Chou (1993). They examined the Cross Correlation patterns in Index returns for NYSE, AMEX and OTC. If Cross Correlations are measured with a lag from the large stocks on the NYSE to the smaller AMEX and OTC stocks, lagged NYSE returns and lagged squared NYSE returns should help predict future AMEX and OTC returns, but not vice versa. This hypothesis is examined using the notion of Granger and Simms Casualty.

To further test the Cross Correlation hypothesis, out of sample tests of predictability are conducted. Since the Cross Correlation relationships may be non-linear, a Neural Network is used to examine the same data involving lagged returns and lagged squared returns. Three Neural Network models are constructed for each
exchange using only data on its own index returns. These results are compared to models which include own returns plus Cross Correlation information from other exchanges. The forecasting properties of these models are compared out of sample tests.

They concluded that regression results show that Cross Correlations have significant within sample explanatory power. Volatility stocks on one exchange appear to affect returns on the other exchanges. NYSE returns affect AMEX and OTC returns as predicted by Lo and Mackinlay (1990), but AMEX and OTC returns also affect future NYSE returns.

Such results seem to suggest the possibility of arbitrage profits, but the regression models do not forecast well out of sample. Neural Network models also did not forecast well out of sample, suggesting that non-linearities in the lagged return and Cross Correlation relationships are not reason for poor forecasting performance. Instead, it may be that the lagged relationships continuously change and evolve over time defying accurate prediction.

The authors attribute the following reasons to the disappointing results regarding forecasting with Neural Networks. Perhaps, we should not try to forecast actual returns, but only the sign of returns. Perhaps, markets are efficient and attempts to beat the market using Neural Networks or any other tool are doomed to failure? However, as recommended by White (1993), Neural Network should be trained and evaluated using profits and losses rather than forecast error. They feel that future research will be geared towards using Neural Networks to maximize trading profits rather than to minimize forecast error. Such an approach has more practical applications.
In yet another paper, Dennis O. Olson, John Nelson and Craig Witt (1993) examined the informational content of two items of proprietary information published in 'Investor's Daily' (a daily business newspaper in US), the earnings per share (EPS) and relative strength (RS) rankings of all stocks. They found that the rankings provide investors with useful information. The strategy of buying stocks ranked highly by earnings per share and relative strength criteria provides excess returns that are significant enough to offset transaction costs. They attribute the reason for the existence of this anomaly in a reasonably efficient market may be due to investors' general predilection to buy low and sell high, rather than to buy high and sell higher. Excess returns found for their data sets may be compensation for risk, they feel.

Allen B Atkins and Edward A. Dyl (1993) observed that the studies on the over-reaction issue assume that investors could actually buy or sell at the closing prices shown on the CRSP tapes. Since this assumption is invalid, then the conclusions of these studies are also invalid. Hence these authors examined the abnormal returns on common stocks whose prices rose or fell by a large percentage in a single trading day. A list of these percentage winners and losers published daily in 'The Wall Street Journal' and hence Investors could have also traded based on this information on the day following the large change in price.

300 trading days are selected at random between January 1975 and December 1984. 3 Stocks that had the largest percentage increase in price and 3 stocks that had the largest decrease in price on each day were identified and finally 729 winners and 693 losers were selected.
In their analysis, they concluded, that although no compelling evidence of market inefficiency is found, one finds reversals in stock prices in the days following large one day changes in price. Price reversals were found following both favourable and unfavourable events. Hence it can be said that investors behave irrationally, placing too much weight on recent information.

*Louis K.C. Chan, Yasushi Homao and Josef Lakonishok (1993)* say that fundamental analysis of US securities has a long history. But can the same fundamentals that help explain US stock prices, affect stock prices in Japan with its very different environment? Various methods were used to estimate the effects of earnings yield, company size, book to market ratio and cash flow yield in Japanese stock prices over the period 1971 - 1988.

They concluded that their findings reveal a significant relation between returns in the Japanese market and four fundamental variables - earnings yield, size, book to market ratio and cash flow yield. The performance of the book to market ratio is especially noteworthy; This variable is statistically and economically the most important of the four variables investigated. Cash flow yield also has a positive and significant impact on returns.

*William T. Ziemba (1993)* investigated the week-end hypothesis for the Japanese market using daily data from 1949 to 1988. He found that Tuesdays tend to have negative returns following a one day week-end and Mondays decline after two day week-end. He reported the Saturday effects as follows: First, Saturdays are extremely positive. Second, Saturdays are even more positive if the previous month had Saturday trading during the first week of the month in the sample period. Third, Mondays were negative if the previous Saturdays were not a trading day (the third
and fourth weeks) and even more negative if the third had no Saturday trading. However, Mondays were positive if the previous Saturday had a trading, especially so if the second week of the month had no Saturday trading. From February 1989, there was no trading on Saturday. Afterwards the result is consistent with the US.

Charles R. Nelson and Myung J. Kim (1993) used annual returns since 1872 and monthly returns since 1927 and found predictive regressions coefficient estimate is biased that the predictor is endogenous, and asymptotic standard errors in the case of overlapping periods are biased downward. Both biases work in the direction of making t-ratios too large so that standard inference may indicate predictability even if none is present. The estimated biases are large enough to affect inference in practice, and should be accounted for when studying predictability. They concluded from their experiment, that valid inference cannot be drawn from predictive regressions using conventional tests that are appropriate in the case of classical regression.

In a study conducted on the Indian stock market, R.K. Mittal (1994) analyzed the index numbers of Bombay Stock Exchange. He found Tuesdays have negative mean return with largest standard deviation. Friday has the highest (positive) mean return and lowest standard deviation. The hypothesis of equal mean return across all week days is rejected at 10% level of significance. This asymmetry in the distribution of daily stock returns is further confirmed by the degree of skewness and kurtosis. Wednesday shows the highest degree of skewness and kurtosis, Friday reveals the lowest degree of kurtosis. It suggest that Friday returns are more normally distributed than those of other week days.
He decomposed the return results and found most of the positive returns arise during trading period as mean trading returns are positive for four out of five days and most of the negative returns occur during non-trading period. The hypothesis of equal mean return across all week days for non trading period as well as trading period is rejected at 5% and 1%. The varying degree of skewness and kurtosis indicates that the returns are not normally distributed according to the days of the week.

He also observed some implications for investment decisions. The significant variations in returns appears to be the evidence of market inefficiency which is contrary to RWH. BSE National Index Composite portfolio can be purchased on non trading period of Tuesday to sell them on Friday afternoon. An investor could increase the expected returns on his investments by altering the timing of transactions. Purchases planned for Thursday or Friday might be delayed until Tuesday while sales planned for Tuesday might be delayed until the end of the week. He concluded that there is evidence of the day of the week effect.
NOTES AND REFERENCES


[8] India suddenly looks attractive as a place to do business in. Flights to India are packed with businessmen and fund managers seeking to reap the benefits of the India's three year long liberalization programme. Foreign capital is finally making an impact in this country - both in the stock market which has gone through the roof, and within industry - *Business India*, Issue No. 414, Jan. 17-30, 1994, p.54.
India, according to the New IMF calculations is now a lower middle income country with a GNP of US $1 trillion and a per capita GNP at US $1150.

The economic success of Japan has generated considerable interest. How is that Japan has become so successful? Can Japan’s success be duplicated by other countries? Moreover Japanese have high saving propensities which have allowed Japan to have high rates of capital formation. Principles of Economics, by Roy J. Ruffin, Paul R. Gregory, McGrah Hill, Fourth Edition, p.844.

For a very long time, the capital market in India was considered to be an Underdeveloped one. But the situation have changed recently, thanks to the policy of liberalization initiated by the Govt. of India. As a result Indian capital market have gone through substantial changes, both qualitatively and quantitatively.

In its annual survey of where to Invest in 1994, the American business Magazine FORTUNE put India as one of the five hot markets around the globe for investors to look at this year. It forecasts India’s prospective return at 30% to 50% much higher than any of the other four countries mentioned in the survey - Business India, Issue No. 414, Jan. 17-30, 1994, p.56.

An emerging market has (i) securities that trade in a public market (ii) Is not a developed market (as defined by countries covered within MSCI Indices or Financial Times Indices. (iii) Is of interest to global institutional investors (iv) has a reliable source of data. Emerging Market: A Quantitative perspective by Arjun B. Divecha, Jaime Drach and Dan Stefek, The Journal of Portfolio Management.
SEBI was constituted by the Government of India on April 12, 1988 as a non-statutory body to promote orderly and healthy development of the securities market and to provide adequate investor protection. SEBI was given statutory recognition through an ordinance on March 31, 1992 and later by an Act on April 4, 1992 (SEBI Act 1992).

Already there is CRISIL (Credit Rating and Information Services of India Ltd.) The other two newly established are (i) iCRA - Investment Information and Credit Rating Agency of India and (ii) CARE - Credit Analysis and Research Ltd.

Looking at the Indian House Hold Saving Rate of a phenomenal 22 percent, one can see the gleam in the eyes of overseas fund managers. Already Pioneer of U.S. has tied up with Kothary, Kempers with 20th century and James Capel with Batliwala & Karani. Business India, Issue No. 427, July 18-31, 1994, p.57.

"The last time Harshad Mehta created a furore, the stock market fell, we went in and bought some stocks. The next time Harshad Mehta says something stupid, we'll go in and buy some more" - Madhav Dhar, Managing Director, Morgan Stanley in New York, Business India, Issue No.414, op cited.

India is a unique place in the developing world with a vibrant capital market, and wide investor participation which, along with its institutional and legal framework, makes it look like a market in a developed country - Mr. Vinod Sethi, Vice-President, Morgan Stanley, Business India, Issue No.414, p.57.
[21] If Paris and Germany succeed in linking their markets, other European
exchanges with order matching systems Madrid, Milan and even Switzerland
which will go to an electronic Central Order Book system in 1995 - might
also hook up together - *Euromoney*, July 1993, p.48.

[22] London Shares climbed to a record, led by hopes for lower interest rates.
Stocks in Frankfurt, Amsterdam, Stockholm and Hong Kong hit highs. US
Investors are buying foreign securities at a record pace, spurred by low
interest rates in the US and booming overseas stock markets - *The Wall

[23] European share prices scored big gains yesterday, as bullish market factors
piled up following the restoration of political calm in Russia. London shares'
momentum spilled over from the previous session and trading in the futures
buoyed equity prices. Frankfurt Stocks surged to new highs, after the violent
political clash in Moscow was put down by President Boris Yeltsin late
Monday. Tokyo stock prices ended with a moderate gain Tuesday, but the
resolution of the Russian armed conflict did little to pry investors from the
sidelines in Japan. Worldwide stock prices rose in Dollar terms. The Dow
Jones World Stock Index was at 112.26 up 0.32 reflecting higher Asia/Pacific
and European markets and lower markets in the Americas - *The Wall Street


[26] By corporate sector we mean, normally companies in which the liability of
members are limited. They are called by various names in various countries.
For eg. in India, they are companies limited by shares, in USA they are called
as corporations.
Previously the ownership and management of business rests with the same persons and hence expansion of business on a large scale cannot be done due to limitations of capital and management. Corporate sector removes both these difficulties by separating ownership and management. The companies are owned by people who provide capital (called as shareholders) and managed by people who have the competency to manage large businesses. Because of this, undertaking business on a large scale is possible (For example, Largest 5 companies in India on the basis of Assets are as follows:

1. Tata Iron and Steel Rs. 4107.64 crores. 2. Reliance Rs. 3367.84 crores, 3. Essar Gujarat Rs. 1472.82 crores. 4. Gujarat State Fertilizers Rs. 1042.48 crores. 5. Nagarjuna Fertilizers Rs. 1041.98 crores - Business India, No. 409, November 8-21, 1993.

Under Gorbachev's restructuring program, employees of certain enterprise are allowed to purchase shares in the enterprise, Moscow News reported on Oct. 10, 1988 that the employees of Hotel National would be permitted to buy shares in Hotel National the next day. The shares sales took place in one of the banquet halls of the hotel. A number of confused employees turned up to buy shares with their savings. They were told that employees could buy only one quarter of the value of the hotel and that their shares would pay them guaranteed dividends of 5% (A rate above the interest paid in savings bank). It was not clear what would happen if the profits of the hotel improved. If they wanted to sell their shares, they would have to sell them back to the hotel management and then other employees would be allowed to purchase the shares. Quoted in Principles of economics, Roy J. Ruffin etc.

Capital of a joint stock company limited by shares is divided into many small parts, called shares. In India we are having only two types of shares - Equity shares and Preference shares.
For example, the following were the value of shares of the following companies against various dates.

<table>
<thead>
<tr>
<th>Dates</th>
<th>ACC</th>
<th>Apollo Tyres</th>
<th>Baroda Rayon</th>
</tr>
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<tbody>
<tr>
<td>04.01.88</td>
<td>155</td>
<td>34.5</td>
<td>150</td>
</tr>
<tr>
<td>02.01.89</td>
<td>351</td>
<td>74.5</td>
<td>332.5</td>
</tr>
<tr>
<td>01.01.90</td>
<td>347.5</td>
<td>65</td>
<td>717.5</td>
</tr>
<tr>
<td>02.01.91</td>
<td>1475</td>
<td>46</td>
<td>400</td>
</tr>
<tr>
<td>01.01.92</td>
<td>3330</td>
<td>174</td>
<td>585</td>
</tr>
<tr>
<td>04.01.93</td>
<td>2450</td>
<td>193.75</td>
<td>510</td>
</tr>
<tr>
<td>24.12.93</td>
<td>2850</td>
<td>195</td>
<td>1020</td>
</tr>
</tbody>
</table>

For the primary market, the year 1993 was marked by hectic activity with the money raised by the corporate sector crossing the Rs.20,000 crores mark i.e., Rs. 100 crore being raised every working day. There were 1090 public and rights issues during the year 1993 almost 4 issues every day - as against 873 issues in the previous year. The major increase was recorded on the public issue format. While the number of issues grew from 405 to 666 (64% increase) the amount raised showed an even more significant jump of 1004%. The year was also marked by a string of mega issues, with as many as 34 Rs.100 crore plus issues. These mega issues accounted for Rs. 11967 crores representing 55% of the total capital raised during the year. SBI which made the largest ever issue in the history of the capital market (Rs. 2532 crores) also heralded the entry of banks into the capital market arena. In addition, IDBI, ICICI and IFCI tapped the investors purse for an aggregate of Rs. 925 crores. Indian Express, Hyderabad Jan. 20, 1994, p.13.
South Asia: The Economies of this region recovered strongly averaging 4.7% in 1992, compared with 2.1% in 1991. India's economy, saw improvements in many sectors as the growth rate climbed to 4.2% in 1992 from 1.2% in the crisis year of 1991. The Asian Development Outlook comments that India's sharply improved growth "was attributable partly to increased agricultural production because of a normal monsoon and partly to the reform measures adopted to increase the international competitiveness of the economy - IMF survey - June 28, 1993, Asian development outlook 1993 - by Asian Development Bank - quoted by IMF survey.

At present there are twenty three stock exchanges recognized under the Securities Contracts (Regulation) Act 1956. They are located at Ahmedabad, Bangalore, Bhubaneswar, Bombay, Calcutta, Cochin, Coimbatore, Delhi, Guwahati, Hyderabad, Indore, Jaipur, Kanpur, Ludhiana, Madras, Mangalore, Meerut, Patna, Pune, Rajkot & Vadodara. Apart from this OTC exchange of India and National stock Exchange are functioning.

The Indenture constituting the Articles of Association of the Exchange, "On or about ninth day of July 1875 a few native brokers doing brokerage business in shares and stocks resolved upon forming in Bombay an Association for protecting the character, status and interest of native Share and Stock brokers and for providing a hall or building for the use of the members of such association." - History, Regulation and Organization of the Stock Market in India. The Stock Exchange, Bombay, 1992, p.4.

The Ahmedabad Share and Stock Brokers Association was organized as a voluntary non-profit making association with a trust deed.

The value of the right of nomination - called a "Seat" on the London and New York Stock Exchanges and locally known as "Card" - has fluctuated according to the ebb and flow of market activity. The price was Rs.1,800 in 1910,
Rs.48,111 in 1920, Rs.6,700 in 1932, during the great world depression, Rs.64,000 in 1946 during Second World War boom, Rs.14,000 in 1954 during the Slump and ten years latter, it was around Rs.32,000. History, Regulation and Organization of the Stock market in India, The Stock Exchange, Bombay 1992, p.5


[38] It is a market in which the participants cannot earn more or less than a fair return.


[45] Brownian Motion describes the irregular movement of particles suspended in solution or liquid. The movements may be of different magnitude and may occur at any time. One movement will be independent of any other prior movements.


[75] Dennis O. Olson and Nan-Ting Chou (1993), *Some evidence about the cause of the Weekend Effect*, University of Louisville, USA.
[76] Dennis O. Olson and Nan-Ting Chou (1993), *Cross Correlation and Neural Network Forecast of Daily Stock Returns*, University of Louisville, USA.

[77] Dennis O. Olson, John Nelson and Craig Witt (1993), *A Test of the Investor’s Daily Stock Ranking System*, University of Louisville, USA.


