

# **DETERMINANTS OF INDIAN SHARE PRICES**

**Dissertation submitted to the Jawaharlal Nehru University  
in partial fulfilment of the requirements  
for the award of the Degree of  
MASTER OF PHILOSOPHY**

**PARTHA BASU**

**CENTRE FOR STUDIES IN DIPLOMACY,  
INTERNATIONAL LAW AND ECONOMICS  
SCHOOL OF INTERNATIONAL STUDIES  
JAWAHARLAL NEHRU UNIVERISTY  
NEW DELHI - 110067**

**INDIA**

**1992**



# JAWAHARLAL NEHRU UNIVERSITY

SCHOOL OF INTERNATIONAL STUDIES

Centre for Studies in Diplomacy  
International Law & Economics

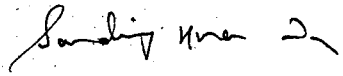
Telegram : JAYENU  
Telex : 031-73167 JNU IN  
Telephones : 667676/ 418,408  
667557/  
Fax : 91-11-686-5886

New Delhi-110067

## C E R T I F I C A T E

This is to certify that the dissertation entitled, "Determinants of Indian Share Prices" submitted by Partha Basu in fulfilment of six out of twenty four credits for the award of the degree of Master of Philosophy of this University, is his own work and may be placed before the examiners for evaluation. This dissertation has not been previously submitted for the award of any other degree of this University or of any other University.

  
(PROF. M.L. AGARWAL)  
CHAIRPERSON

  
(PROF. S.K. DAS)  
SUPERVISOR

## CONTENTS

Page No.

### ACKNOWLEDGEMENT

CHAPTER	I	INTRODUCTION	1-11
		1.1 The Present Scenario of the Indian Stock Market	1
		1.2 Effect of Liberalisation on the Corporate Sector	4
		1.3 <u>Stock Market</u> Efficiency	6
		1.4 Objective of the Study	8
		1.5 Methodology of the Study	9
CHAPTER	II	EFFICIENT MARKET HYPOTHESES AND ASSET PRICING MODELS: A SURVEY	12-57
		2.1 Introduction	12
		2.2 Efficient Market Hypothesis	12
		2.3 Price-Ratio Hypothesis	37
		2.4 Capital Asset Pricing Model	39
		2.5 Present Value Model	42
		2.6 Investment under Uncertainty	47
		2.7 Accounting Information and the EMH Research	48
		2.8 Estimating the Price of <u>Government Bonds</u>	50
		2.9 Indian Studies	52
		2.10 Conclusion	56

CHAPTER III	SOME FEATURES OF THE INDIAN STOCK MARKET : AN APPROACH	58-84
	3.1 Introduction	58
	3.2 Features of the Indian Stock Market	65
	3.3 Methodology	72
	3.4 Specification of the Model	79
CHAPTER IV	EMPIRICAL FINDINGS	85-150
	4.1 Introduction	85
	4.2 A Study of the BSE Companies	88
	4.3 Conclusion	145
CHAPTER V	CONCLUSION	151-161
	BIBLIOGRAPHY	162-168

## ACKNOWLEDGEMENT

I am deeply indebted to my supervisor Dr. Sandwip Kumar Das for guiding me through the entire process of writing my dissertation, with his valuable suggestions, constant encouragement and above all his patience in bearing with me and my lackadaisical attitude.

I owe a special gratitude to Dr. Tapas Sen of NIPFP for providing me with abundant materials on my research topic. In fact most of my second chapter bears testimony to the tremendous amount of cooperation that I have received from him.

I am also grateful to the library staff of NIPFP as also M/s A.P. Computers for astonishingly skillful typing against the heavy odds of my impossible writing.

In this context I would like to thank Prof. Satish Jain of CESP, JNU for allowing me to use their computer when I had to suffer the agony of watching all the computers of our Centre go out of order at the last stages of my computation work.

As concerns my friends, it is not debt that I owe them but a deep sense of gratitude which further strengthens the emotional attachment that I have for each one of them. Krishnenduda, Somnathda (Basu), Somnathda (Mitra), Mannada, Barmanda, Rajkumar, Nabarun, Susanta, Pradyum, Abhay, Sandeep, Atanu, Debasish--I am grateful to all of them for standing beside me during the tough times. However, I would like to acknowledge my sincerest gratitude to Saumenda for the enormous workload that he took onto himself for my sake and almost single handedly helped me complete my work.

I would also like to express my respect and gratitude to my parents, Pishemashai, Laltuda, Didi and my brother Shantu, whose thoughts had always urged me to finish my work as early as possible. No thanks is enough for Tutun for keeping faith in me and hence carrying on with her incessant pestering.

And lastly, my gratitude goes to the astrologer who some four years back had predicted the end of my academic career after graduation. No gratitude is enough for this man but for whose words I would have joined some odd job soon after graduating.

To end it all, I myself bear the responsibility for any mistake in my work.

*Partha Basu*

PARTHA BASU

## **CHAPTER I**

### **INTRODUCTION**

## Section 1.1 The Present Scenario of the Indian Stock Market

The year 1991-92 was historic in the annals of Indian economic development. It has seen far reaching changes in economic and financial policies of the government leading first to an unprecedented boom in the stock markets in india followed by its biggest stock scandal or "scam" involving a stupendous sum of Rs.3542.78 crore of unsecured advances from various banks which is euphemestically referred to, "as a systems failure".

The new policy initiatives started with the devaluation of the rupee in July 1991 followed by a partial freeing of the rupee upto 60 per cent of the export earnings later on. The announcement of a new industrial policy along with the Central Budget in July 1991 boosted the market sentiment. Changes in industrial licensing policy and scrapping of MRTP limits to capital assets and free trade policy have all ushered in a move towards a market oriented free economy. Besides the proposed privatisation of selected public sector units, financial deregulation and greater role given to private sectors in the Eighth plan have also boosted the market morale and created an euphoria.

The importance of stock and capital market is enhanced alongwith that of the private sector in the future economic

scenario. The shackles that are tied around the economy are being broken in stages following the decontrols on cement and then recently on steel industries. Both in quality of fresh capital raised and in the number of new issues, there was an improvement.

All these developments have led to a boom in the stock market, unprecedented in the history of the market due to the unique nature of these reforms. This has created both opportunities and challenges. The Bombay Stock Exchange (BSE) Sensitive Index started the year 1991-92 on 1 April, with 1168 and stood at 1908.85 at end December 1991 and the Price Earnings (P/E) ratio at this level was 24.46. Before the Central budget was presented on 29 February, 1992, the index was 2830.91 but shot up in stages to 4285 at end March and stood at a peak of 4546.58 on 3 April before falling to a low of 2963.49 on 29 May.

The level of P/E ratio at 55 reached on 3 April 1992 was far above that in Japan, at around 40 and also higher than in other developed markets like New York, London and Frankfurt. The question then arises whether the fundamentals in the Indian economy would warrant such a high ratio. If the market is artificial it is a challenge to market analysts. It is at the same time an opportunity for the

efficient and competitive forces to operate for the betterment of the economy. The subsequent decline of index to less than 3000 evidences the unrealistic levels reached earlier due to some (mal)practices of bankers and brokers as revealed by the Harshad Mehta scandal.

A question that is now often been asked is whether the scam was a direct outcome of the process aimed at deregulating the financial sector. While the opinions are varied, the apparent cause seems to lie elsewhere. The bank chiefs were under pressure to show profits, inspite of locking up a major part of their resources in assets whose yields are dismal, besides holding large non-performing assets thanks to the regulatory mechanisms of the government.

The banks, it appears, tried to make these dormant assets work for them and thus earn quick profits. Somewhere on the way they dared to step out of the regulatory framework. Thus it seems to be the precipitation of a lack of "accountability" on the part of certain individuals that has culminated into such a major bungling. It is not just a Harshad Mehta who is responsible. Organisations and agencies, both in the government and outside are equally responsible.

As soon as the manoeuvres of Harshad Mehta were exposed in April 1992, the market plunged into gloom when bears got an upper hand over the bulls who made a quick retreat from the market. The selling pressure continued upto the middle of April after which the volume of trade trickled down to meagre amounts. Investor interest also declined. By early June, 1992, the market capitalisation lost one third of the value touched early in April 1992. The share values shed about Rs.one lakh crores in a couple of months.

#### Section 1.2 Effect of Liberalisation on the Corporate Sector

Any assessment of the liberalisation measures on corporate performance is too early and hence has to be partial. The results are still trickling in, but a whole range of industries from petrochemicals, shipping and cement to engineering, hotels and diamonds have fared well this year. Sample studies of the results of 1000 companies indicate that sales have risen by 20 per cent and net profits too have moved up by 25 per cent over 1990-91. Across a broad swathe of Indian industry, companies are reporting bulging profits for 1991-92.<sup>1</sup>

---

1. Economic Times dated 26 June, 1992.

Many of the country's largest corporations have turned in sterling performances. TISCO, for instance, has notched up a net profit of Rs.214.2 crore, an increase of Rs.55 crore. Some good debt and inventory management by Reliance Industries has sent its net profit climbing to Rs.163 crore from Rs.126 crore. ITC's turnover has risen by more than Rs.700 crore and its net profit to Rs.115.2 crore - a rise of a stupendous Rs.50 crore.<sup>2</sup>

Of course, the figures alone do not tell the whole story. The full truth will be known only when companies bring out their detailed balance sheets. With inflation so high, a lot of companies may have inflated sales. Companies could also have made money simply through financial transactions such as transfers of assets and revaluations. A good part of the profit could also be accounted for by stock profits. In other words, goods produced in the earlier part of the year could have been sold at much higher prices thanks to inflation and devaluation.

The outlook for 1992-93 seems to be mixed. The pessimists say tough times are ahead. A major concern is the raging inflation in the economy which is expected to cross

---

2. Ibid.

16 per cent this year. The biggest cloud, of course, is the monsoon. Many believe that a bad monsoon will spell disaster. But there are others who feel that the worst is over. However, nobody believes it is going to be an easy year. Liberalisation is likely to push up the levels of competition. Even then if companies have been able to tide over 1991-92, there are many who believe that the worst is now behind them.

### Section 1.3 Stock Market Efficiency

Against this backdrop of the present economic scenario as well as that of the capital market, our study on the Indian stock market assumes a special importance. In the last three decades a vast amount of research has been conducted on price movements in capital markets. One of the problems of continuing interest in financial economic analysis is that of evaluating the Efficient Capital Market Hypothesis (EMH). Briefly stated, the hypothesis claims that a market in which prices fully reflect available information is called efficient. This implies that there are no opportunities to make extraordinary profits by exploiting information contained in past price changes, balance sheet accounting figures or some other sources. A large number of

empirical studies have been conducted supporting this hypothesis.

Among the various such studies carried out the independence of successive stock prices was first investigated by Kendall (1953). Using serial correlation coefficient, he found the estimated coefficient to be very close to zero. The Kendall method was extended by Cootner (1962) and Moore (1964) and they found some evidence of correlation. Fama (1965) also produced evidence of dependence in the price changes. Samuelson (1965) and Mandelbrot (1966) have provided a rigorous proof that properly anticipated prices move randomly and that securities market will assuredly be efficient under certain assumptions. Recently Wong and Kwong (1984) examined the behaviour of the daily closing prices of 28 Hong Kong stocks and showed that the successive price changes were dependent random variables. The stock markets in India have been less subjected to intensive research than their counterparts elsewhere. Research that has been conducted on the Indian stock market, though limited, has been varied. Krishna Rao and K. Mukherji (1971) S.N. Kulkarni (1978), O.P. Gupta (1978), J.L. Sharma (1983), Y.B. Yalawar (1985) to name a few have found the Indian stock market to be efficient. Some more research on the Indian stock market have concentrated

on the investigation of the influence of certain financial variables on the equity share prices. This is true of Aggarwal (1963), Desai (1965), Srivastava (1968), Ojha (1973) and Prasanna Chandra (1977). For our study, Srivastava's paper is of particular importance.

#### Section 1.4 Objective of the Study

The main aim of Srivastava's paper has been to study the role of retained earnings in determining the prices of shares in India. In other words, to see whether retained earnings influence the prices of shares or not. His study is based on cross sectional data, confined to six industries, namely cotton, tea, electricity, sugar, coal and paper for the year 1961.

On the basis of his study he concludes that retained earning has no significant influence on share prices in India. Investors buy shares without paying much attention to retained earnings of the firms. To that extent, investment in shares doesnot appear to be growth oriented. He also concludes that the price effect on dividend supply is probably not a serious source of bias in the estimates obtained by regressing to stock prices on dividends and normalised earnings. The use of current earning-price ( $E/P$ )

ratio also seem to give better results than the use of the lagged ratio.

The objective of our study also is to examine the role of the factors which influence the prices of shares of joint stock companies in India. However the basic difference between the two studies is that whereas Srivastava's study deals with cross sectional data for industries as a whole, we would be much more concerned with a company wise analysis using time series data. Alongwith dividend payments net profits (signifying growth potential), the share prices in India, we feel are vastly governed by some others, factors, one of which is definitely the reputation of the firm. Another factor is the political (in) stability as well as extent of economic liberalization. These effects we shall try to capture by using dummy variables. On the whole, our study would try and reason out the price changes for the period 1977-91 (roughly) for a set of 30 companies which are used for computing the Bombay Stock Exchange Index. On the basis of our analysis we would like to indicate whether the Indian stock market is growth oriented.

### **Section 1.5 Methodology of the Study**

The broad methodology involves econometric analysis of share prices through linear and log linear regression

models. In our first chapter we have already introduced the reader to the present Indian Stock market scenario, as also the objective of our study.

The second chapter will deal with the analysis of the existing theoretical and empirical literature. Our study is concerned mainly with the effect of certain variables on share prices. However, attention will also be given to the vast literature on the concept of "efficiency" of a stock market, as any study in stocks will always have to relate the implications of its study to the efficiency of the market.

The third chapter will deal mainly with the methodology of our study after giving a brief analysis of the features of the Indian stock market. On the whole, this chapter will essentially be the preface to our fourth chapter.

The fourth chapter will include the actual model and the empirical study.

The fifth chapter or the conclusion will try to bring about the different results on a common platform and then try and give a proper explanation for the entire study thus carried out.

The necessary data are all secondary and have be collected from the various editions of The Bombay Stock Exchange Official Directory; (Vol. 1- XVIII, 1975-91).

As the methodology as well as the period of study are different, no comparison as such can be made between the two studies. Time itself is a great factor which can significantly explain any such differences of opinion. More than anything else, we hope that a simultaneous analysis of the two studies can help us in understanding better the investor sentiment operating in the Indian stock market.

## **CHAPTER II**

### **EFFICIENT MARKET HYPOTHESES AND ASSET PRICING MODELS : A SURVEY**

## **Section 2.1 : Introduction**

The primary role of the capital market is allocation of ownership of the economy's capital stock. This chapter reviews the various theoretical and empirical studies that have been carried out till date with reference to this aspect of capital market. In the various sections of this chapter we have proceeded from theory to empirical work to allow us to judge which of the empirical results are most relevant from the viewpoint of the theory. The various sections, however, have been assembled, not on the basis of importance, but on the basis of their historical sequence (more or less). Since the relevant literature is voluminous, specific discussion of some studies had to be left out. But the primary goal here will have been accomplished if a coherent picture of the main lines of the work on capital markets is presented, along with an accurate picture of the current state of the arts.

## **Section 2.2 : Efficient Market Hypothesis**

In the last three decades a vast amount of research has been conducted on stock market efficiency and on price movements in capital markets, though it has been of concern to both academicians and professionals world over for quite some time now. The traditional view about the securities

market has been that prices generally fail to reflect the real worth of the securities traded on those markets. This view has been referred to as Inefficient Market Hypothesis. The contrary view is that such markets are reasonably efficient in pricing the securities in that they reflect the real worth of the securities traded on those markets. The Efficient Market Hypothesis (EMH) thus regard the securities markets as incorporating a highly efficient pricing mechanism and believe that the resultant prices are not only good estimates of real worth of securities, but also the best available at any point in time. In such an environment, therefore, one cannot use available information to obtain consistently higher than normal returns on an investment. Thus the Efficient Market theorists cast serious doubts about the usefulness of the traditional security analysis for making investment decisions.

The fundamental ideas behind the concept of efficiency of stock markets are that in a free and competitive market such as a stock market the prices of financial assets should fully reflect all available information and that these prices should adjust very rapidly to new information. The securities market in which stock prices always "fully reflect" available information has been termed as

efficient" by its protagonists. Thus in an efficient market stock prices respond rapidly and accurately to all relevant and available information. Hence in such a market at a given point in time, one would expect the current price of a given security to be a good estimate of its intrinsic value owing to competition among market participants. In an uncertain world however, intrinsic value of a security cannot be determined precisely. There can be differences of opinion among market participants as to the value of each share. As a result, the actual prices wander randomly around the intrinsic value. The Efficient Market Hypothesis however, asserts that competition among investors would ensure that these discrepancies are not too large to be used profitably.

All the empirical work on the theory of efficient markets has been concerned with whether prices "fully reflect" particular subsets of available information. Historically, the empirical work evolved more or less as follows. The initial studies were concerned with what we call weak form tests in which the information subset of interest is just past price (or return) histories. Most of the results here come from what has been termed the Random Walk Hypothesis (RWH). When extensive tests seemed to support the efficiency hypothesis at this level, attention was turned to semi-strong form tests in which the concern is the speed of

price adjustment to other obviously publicly available information (e.g., announcements of stock splits, annual reports, new security issues, etc.). Finally, strong form tests in which the concern is whether any investor or groups (e.g., management of mutual funds) have monopolistic access to any information relevant for the formation of prices. Thus the three forms of EMH that have emerged over the years are:

- (a) The weak form: It states that the current price of a scrip is based on the information of the scrip's past price, volume and return history only.
- (b) The semi-strong form: It states that the current price of a scrip is based not only on the past record of the scrip as implied by the weak form but also on all the publicly available information. These include all published accounting information in financial statements for example, announcement of split of shares, bonus and dividend payments to be made by the company, new issue of shares and similar other such information that can affect the share price of a scrip.
- (c) The strong form: This relates to the ultimate extreme of efficiency. It asserts that a share price is based

not only on all the published financial data (as implied by the semi strong form) but also on relevant information including data not yet publicly available. Thus it refers to the presence of a special group of individuals who have a monopolistic access to all such information.

A market is then said to be efficient in the weak, semi-strong or strong form as the case may be when the share price responds to such information instantaneously and without a lag or bias so that no individual or party can constantly make use of such information to produce superior investment results. We review the empirical research in more or less this historical sequence.

i. Test for the weak form on EMH

In the early treatments of the efficient markets model, the statement that the current price of a security "fully reflects" available information was assumed to imply that successive price changes (or more usually, successive one period returns) are independent. In addition, it was usually assumed that successive changes (or returns) are identically distributed. Together the two hypotheses constitute the Random Walk model. Formally, the model says :

$$f(r_{j,t+1}/Q_t) = f(r_{j,t+1}) \quad \dots(1)$$

where  $r_{j,t+1}$  = the one period percentage return given by

$$(p_{j,t+1} - p_{j,t})/p_{j,t}$$

where  $p_{j,t}$  = the price of security  $j$  at time  $t$ ,

$p_{j,t+1}$  = the price of security  $j$  at time  $(t + 1)$ ,  
(with reinvestment of any intermediate cash  
income from the security)

$Q_t$  = general symbol for whatever set of  
information is assured to be "fully  
reflected" in the price at  $t$ .

$f$  = density function

The above equation is the usual statement that the conditional and marginal probability distribution of an independent random variable are identical. In addition, the density function  $f$  must be the same for all  $t$ . Also in the random walk literature, the information set  $Q_t$  is usually assumed to include only the past return history,

$$r_{j,t}, r_{j,t-1}, \dots$$

All members of the class of "expected return theories" can, however be described notationally as follows :

$$E (\bar{p}_{j,t+1}/Q_t) = [1+E (\bar{r}_{j,t+1}/Q_t)] p_{jt} \dots (2)$$

where  $\bar{p}_{j,t+1}$  = the mean price of security j at time t+1

$\bar{r}_{j,t+1}$  = the mean return of security j at time t+1

and E = the expected value operator.

It is best to regard the random walk model as an extension of the general expected return or "fair game" efficient markets model in the sense of making a more detailed statement about the economic environment. The "fair game" model just says that the conditions of market equilibrium can be stated in terms of expected returns, and thus it says little about the details of the stochastic process generating returns.<sup>1</sup> A random walk arises within the context of such a model when the environment is (fortuitously) such that the evolution of investor tastes and the process generating new information combine to produce equilibria in which return distributions repeat themselves through time.

---

1. For a more rigorous discussion refer to Samuelson (1965) and Mandelbrot (1966).

Research on security prices did not begin with the development of a theory of price formation which was then subjected to empirical tests. Rather, the impetus for the development of a theory came from the accumulation of evidence in the middle 1950's and early 1960's that the behaviour of common stock and other speculative prices could be well approximated by a random walk. Faced with the evidence, economists felt compelled to offer some rationalization. What resulted was a theory of efficient markets stated in terms of random walks, but usually implying some more general "fair game" model.

Historically, the random walk model dates back to the year 1900. In that year, Louis Bachelier (1900) not only developed a theory for the behaviour of commodity prices but also found that these commodity prices followed a random walk. He developed an elaborate mathematical theory of speculative prices and tested it against the French Government bond market. He presented convincing evidence that commodity speculation in France was a "fair game" and that the current price of a commodity was an unbiased estimate of its future price.

The work of Slutsky (1927) is given the credit of an independent rebirth of the random walk. He showed that

randomly generated price changes look like stock price changes and that they appear to exhibit cycles and other patterns.

The second discovery of the random walk model was attributed to Working (1934). During this stage of the development of stock price theory, the model was supported by considerable empirical evidence. The main contributors were : Working (1934), Cowles and Jones (1937) and Kendall (1953). The test methodologies used by them included principally serial correlation analysis and run tests.

Working (1934) who extensively analysed commodity prices, noted that speculative price patterns might be shown to be random by demonstrating that even artificially generated series of price changes form apparent trends and patterns. In another investigation, Cowles (1933) asked if stock market analysis could predict prices. He found little evidence that they could. By contrast Cowles and Jones (1937) reported that stock prices moved with predictable trends. This gave rise to a common belief in the U.S.A. that they had put the random walk controversy to rest. In fact their findings remained as damning evidence against the random walk hypothesis for more than two decades until they were withdrawn in 1960 after Working (1960) had pointed out

an error in their analysis. After these studies not much was done to study share price behaviour until 1953.

TH-4282

In 1953, Kendall examined the behaviour of weekly changes in nineteen indices of British industrial share prices and in spot prices for cotton (New York) and wheat (Chicago). After extensive analysis of serial correlations, he found the estimated coefficient to be very close to zero. He arrived at the conclusion that "the series looks like 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 it to the current price to determine the next week's price".<sup>2</sup> Kendall's conclusion had in fact been suggested by Working (1934) though his suggestions lacked the force provided by Kendall's empirical results. And the implications of the conclusion for stock market research and financial analysis was later undermined by Roberts (1959).

But the suggestion by Kendall, Working and Roberts that series of speculative prizes may be well described by random walks was based on observation. None of these authors attempted to provide much economic rationale for the hypothesis, and indeed Kendall felt that economists would

---

2. Kendall (1953), p.13.

DISS  
332.632220954  
B299 De



TH4282



generally reject it. Osborne (1959) suggested market conditions, similar to those assumed by Bachelier, that would lead to a random walk. But in his model, independence of successive price changes derives from the assumption that the decision of investors in an individual security are independent from transaction to transaction which is little in the way of an economic model.

It was not until the work of Samuelson (1965) and Mandelbrot (1966) that the role of "fair game" expected return models in the theory of efficient markets and the relationships between these models and the theory of random walks was studied. These papers came somewhat after the major empirical work on random walks. In the earlier work "theoretical" discussions, though normally intuitively appealing, were always lacking in rigor and often either vague or ad hoc. In short, until the Mandelbrot-Samuelson models appeared, there existed a large body of empirical results in search of a rigorous theory.

Samuelson (1965) and Mandelbrot (1966) have provided a rigorous proof that properly anticipated prices vibrate randomly and that securities market will assuredly be efficient under certain assumptions. They include : (a) zero-transaction costs, (b) free access to all available

information for all market participants, and (c) identical time horizon and homogenous expectations of market participants regarding current and future prices. Fama (1970), however, contends that such stringent conditions are not usually the characteristics of the real world market and that they are not necessary for a market to be efficient and for prices to fluctuate randomly. The necessary conditions for market efficiency are less stringent. They include that the information be available to a sufficient number of investors, that transaction costs are reasonable, and that in the absence of agreement about the implications of current information and expectations regarding price movement, there be no evidence of consistent superiority or inferiority by significant participants in the market.

However, the recent empirical research into the random walk hypothesis began in 1959 with the publication of two papers one by Roberts (1959) and the other by Osborne (1959). Roberts conducted simulation tests by comparing the levels of Dow Jones Industrial Average (DJIA) for 52 weeks during December 30, 1955 to December 28, 1956 with a series of numbers created by cumulating random numbers. He found that the latter series produced patterns similar to the patterns of stock price series. Thus, he was the first modern researcher to show that "probably all the classical

patterns of technical analysis can be generated artificially by a suitable roulette wheel or random number table.<sup>3</sup> His work was significant in that he gave a number of methodological suggestion for testing what he calls the chance model. In particular, he suggested runs analysis for testing independence of price changes.

In another study that appeared in 1959, Osborne examined stock prices to see whether they conformed to certain laws governing the motion of physical objects, for example, "Brownian motion".<sup>4</sup> He reported a very high degree of conformity between the movements of stock prices and the law governing "Brownian motion" which, in fact, is a particular type of random walk.

Thus, while confirming the results of earlier investigations, these studies stated definitely that changes in stock prices were random. Hence, with the publication of these papers the controversy over the random walk hypothesis ushered in a boom of research interest in the literature.

---

3. Roberts (1959).

4. Brownian motion describes the movement of particles in solution, where movements of different magnitudes may occur at any time, independent of any prior movements.

The Kendall method was extended to weekly New York Stock Exchange (NYSE) indices by Cootner (1962) and Moore and they found some evidence of correlation. Moore (1964) studied weekly changes in the prices of thirty randomly selected stock for 1951-58 and found an average serial correlation of a  $-0.06$ . This was surely an extremely low value indicating that data on weekly changes were valueless in predicting future price changes. Surprisingly, a market index based on the price changes of twenty five of these stocks, exhibited a faint pattern over time as the first order serial correlation coefficient was  $+0.153$ . This led Moore to conclude that "indices of stock price relatives behave detectably different from individual prices relatives at least on NYSE for the time period covered by this sample."<sup>5</sup>

Cootner examined weekly price data on forty five stocks from the NYSE and tested for their randomness by means of a mean square successive differences test (Van-Neuman ratio). He reported that stock prices appeared to move randomly when studied at one-week interval. However, he found some evidence of trends in the same data at fourteen week interval.

---

5. Moore (1964).

King (1966) investigated the montly changes of 63 selected stocks between 1927 and 1960 and found them to obey the random walk model, the average correlation being + 0.02. He also estimated serial correlation coefficient for each of four periods and obtained average values of 0.102, -0.11, -0.047 and -0.053 respectively.

Eugene Fama's (1965) study is considered to be one of the most definitive studies of the random walk model ever conducted. He examined the daily proportionate price changes of thirty industrial stocks in the Dow Jones Industrial Average for approximately five years, ending in 1962. The serial correlation coefficient for the daily changes reported by him were all very small, the average beng 0.03. He extended his study to test whether lagged price changes show some dependence. Again the serial correlation coefficient did not differ substantially from zero. To examine the possibility whether price changes across longer intervals show stronger evidence of dependence, he estimated serial correlation coefficient for intervals of four, nine and sixteen days. The average coefficients were -0.04, -0.04, and +0.01 recpectively. This led Fama to conclude that the evidence produce by the serial correlation model seems to indicate that dependence in successive price

changes is either extremely slight or completely non-existent. While interpreting his results it should however, be remembered that Fama's sample included only "blue chip" companies. It is quite unlikely that these blue chips behave differently from a more representative set of stocks. In any case, Fama produced substantial evidence in support of the model.

In addition to serial correlation and run tests some researchers have also used spectral analysis to test the random walk hypothesis. Spectral methods enable a price series to be studied in frequency domain rather than in time domain.<sup>6</sup>

In one study, Granger and Morgenstern (1963) applied spectral methods to a number of price series from the New York Stock Exchange. In general, they found that short run movements in stock prices followed a simple random walk model but the long run movements were not adequately explained by this mod. Broadly, the findings of Godfrey, Granger and Morgenstem (1964) study were also on the same line. In yet another study covering more than fifty stock market price series over several time periods with differing

---

6. For a more rigorous discussion refer to Granger and Morgenstern (1963).

sampling intervals, Granger and Morgenstern (1970) found that short term price movements are random walks. However movements within the very short period and within the very long period are not adequately described by the model. It should, however, be noted that the random walk model has been put forward as an explanation of the short term price changes and it is not intended to explain long term trends in price series. In general, they found that their results conform to the Random Walk Hypothesis (RWH).

Other similar studies of the random walk involve Kemp and Reid (1971) who while using British share price data, applied only non-parametric tests.<sup>7</sup> and found some evidence of dependence in the price changes. Conrad and Juttner (1973) applied parametric and non-parametric tests to daily stock price changes in the German stock market. They found that the Random walk Hypothesis is inappropriate to explain the price changes. The serial correlation technique was employed by Dryden (1970), Jennergren and Korsvold (1974, 1975) in their studies of the weak form of EMH.

Similar tests were also carried out in a number of other countries : Practz (1969, 1973, 1979) examined the

---

7. For a more rigorous discussion refer to Kemp and Reid (1971).

behaviour of Australian share prices; Solnik (1973) studied 234 stocks from Belgian, British, Dutch, French, Italian, German, Swiss and Swedish stock markets; Aug and Pohlman (1978) studied 54 stocks from the stock materials of Australia, Hong Kong, Japan, Malaysia and Singapore; and Gandhi (1980) analysed the Kuwaiti stock market.

Cooper (1982) studied world stock markets using monthly, weekly and daily data for 36 countries. He examined the validity of the RWH by employing correlation analysis, run analysis and spectral analysis. With respect to the USA and the UK, the evidence supports the RWH. For all other stock markets, the evidence is less clear.

Recently Wong and Kwong (1984) examined the behaviour of the daily closing prices of 28 Hong Kong stocks. The results of serial correlation coefficient showed that the successive stock price changes were dependent random variables. The authors concluded that the Hong Kong market is not efficient in the weak form.

Over the years, it has been realized that testing the Efficient Market Hypothesis has proven to be more difficult than was originally expected. Whether prices "fully reflect" information cannot be directly observed". For testing EMH, researchers in general have used "fair game" model as

proposed by Fama. A "fair game" denies excess returns to investors on the basis of available information. In order to test for EMH, different trading strategies using various information items were utilised to see whether higher than normal returns could be obtained. If a particular price of information could generate higher than normal returns, EMH was rejected.

One of the earliest proponents of this viewpoint was Alexander (1961). He started by noting the remarkable contradiction between the views held by professional stock market analysts and the academicians on the behaviour of speculative prices. The former believe that there exist certain trend generating factors that will guide the speculator to profit only if he can read them correctly; while the latter believed that nothing can be gained from observing the price changes. In his work he examined several trading rules and compared the profit generated from these rules to the profit that would be obtained from a "buy and hold" strategy. Since several rules generated much higher profits, he concluded that the price changes could not have been generated by a random process.

Cootner (1962) improved upon Alexander's trading rules. He suggested a rule based on varying perception of change in

the trend of price movement, instead of one based on a fixed percentage change in price as suggested by Alexander. Cootner felt that this method was closer to the method actually used by "technicians" operating in the stock market and hence it represented a better test of their hypothesis. He found that some trading strategies resulted in much higher gains than the simple "buy and hold" strategy. Levy (1967) too did extensive work on trading rules. He also obtained results that were identical to results obtained by the other two researchers.

Subsequently, Jensen and Benington (1970) argued that there could be selection bias in the data used by the researchers on trading rules. Unless a trading rule is found to generate higher profits for different sets of data, its superiority over the "buy and hold" strategy cannot be established. They also pointed out that profits should be adjusted for (a) transaction costs, and (b) risk. Using a method which took into account these two factors they showed that several rules that had been highly profitable in the earlier studies could not maintain their superiority over the "buy and hold" strategy. There was thus no reason to refute empirical validity of the theory of random walk.

ii. Test for the Semi Strong Form of EMH:

The semi strong form of EMH assests that current stock prices reflect not only historical price informations but also all publicly available information relevant to a company's security. If markets are efficient in this sense, even an analysis of balance sheet, income statements, announcement of dividend changes, stock split, decontrol or any other public information of a company will not yield abnormal economic profits.

If market is efficient in this sense, then stock price should adjust instantaneously to new information. Clearly, if the adjustment is completed in very short time, then no one can make excess profits based on the information release.

In 1968, Ball and Brown (1968) applied the method of residual analysis as developed by Fama and others (1970) to study the effects of annual earnings announcements on the data of 261 major firms for the period 1946-66. They used the residuals from a time series regression of the annual earnings of a firm on the average earnings of all their firms to classify the firm's earnings for a given year as having "increased" or "decreased" relative to the market. They found that the cumulative average return residuals rose

throughout the year in advance of the announcement for the earnings "increased" category, and fall for the earnings "decreased" category. Thus Ball and Brown conclude that in fact no more than about ten to fifteen per cent of the information in the annual earnings announcement has not been anticipated by the month of the announcement.

On the macro level, Waud (1970) has used the method of residual analysis to examine the effects of announcements of discount rate changes by Federal Reserve Banks. In this case the residuals are essentially just the deviations of the daily returns on the Standard and Poor's 500 Index from the average daily returns. He finds evidence of a statistically significant "announcement effect" on stock returns for the first trading day following an announcement, but the magnitude of the announcement effect is small, never exceeding 0.5 per cent. More interesting from the view point of the EMH is his conclusion that, if anything, the market anticipates the announcement (or information is somehow leaked in advance).

Further evidence in support of the EMH is provided in the work of Scholes (1969) on large secondary offerings of common stock (that is, large underwritten sales of existing common stocks by individuals and institutions) and on new

issues of stock. He finds that, on average, large secondary issues are associated with a decline of between 1 and 2 per cent in the cumulative average residual returns for the corresponding common issues. Since the magnitude of the price adjustment is unrelated to the size of the issue, Scholes concludes that the adjustment is not due to "selling pressure", but rather results from negative information implicit in the fact that somebody is trying to sell a large block of a firm's stock. The thing to be noted is that though this is evidence that prices adjust efficiently to public information, it is also evidence that corporate insiders at least sometimes have important information about their firm that is not yet publicly known. Thus scholes' evidence for secondary distribution provides support for the efficient markets model in the semistrong sense, but also some strong form evidence against the model.

Some other who have tested this model include H.C. Hillmer and P.L. Yu (1979). In 1982, R.J. Rendleman, C.P. Jones and H.A. Lutane in their study found significant abnormal stock returns even two or three months after certain earning announcements, thus implying a substantial deviation from the semistrong form of efficiency.

iii. Tests for the Strong Form of EMH :

The strong form tests of the efficient markets model are concerned with whether all available information is fully reflected in prices in the sense that no individual has higher expected trading profits than others because he has monopolistic access to some information.

The amount of semistrong evidence is voluminous compared to the strong form tests that are available. Still in particular, Niederhoffer and Osborne (1966) have pointed out that specialists on the NYSE apparently use their monopolistic access to information concerning unfilled limit orders to generate monopoly profits, and Scholes' (1969) evidence indicates that officers of corporations sometimes have monopolistic access to information about their firms.

On the basis of abundant literature relating to the weak, semi-strong and strong form of the EMH, it is more or less agreed that we have enough evidence to determine that the model is not strictly valid. On the basis of this, more interesting research has been directed towards finding out the people in the investment community that have access to "special information".

Though this is a fascinating problem, only one group has been studied in any depth - the managements of open end

mutual funds. Several studies are available (e.g. Sharpe (1965, 1966) and Treynor (1965)), but the most thorough is Jensen's (1968,1969).

Thus the general question to be answered is whether mutual fund managements have any special insights or information which allows them to earn return above the normal. But Jensen attacks the question on several levels. At the end of it all, the answer seems to be an emphatic no. As far as net returns to investors are concerned, in 89 out of 115 cases, the fund's risk-return combination for the 10 year period is below the market line for the period, and the average overall funds of the deviations of 10 year returns from the market line is -14.6%. That is, on average the consumer's wealth after 10 years of holding mutual funds is about 15% less than if he held the corresponding portfolios along the market line.

Jensen further argues that though his results apply to only one segment of the investment community, they are nevertheless striking evidence in favour of the efficient markets model.

### Section 2.3 Price-Ratio Hypothesis

Close on the heels of substantial empirical evidence supporting the EMH, recent studies have tended to ignore this bliss concept and have been carrying on empirical research to get around this "fair game" model as proposed by Fama. One such group believes that price-earnings (P/E) ratios are indicators of the future investment performance of a security. While the EMH denies the possibility of earning excess returns, the price-ratio hypothesis asserts that P/E ratios due to exaggerated investor expectations, may be indicators of future investment performance. Proponents of this price-ratio hypothesis claim that low P/E securities will tend to outperform high P/E stocks. In short, prices of securities are biased, and the (P/E) ratio is an indicator of this bias. A finding that return on stocks with low P/E ratios tends to be larger than warranted by the underlying risks, even after adjusting for any additional search and transaction costs, and differential taxes, would be inconsistent with the EMH.

Basu (1977) and Banz (1981) had tried to determine empirically whether the investment performance of common stocks is related to their P/E ratios. Banz found that substantial abnormal (risk adjusted) long run rates of

return could be earned by investing in portfolios of smaller firms. Basu also had a similar conclusion for his study of the period April 1957 - March 1979 for different U.S. Companies.

The results reported in Basu's paper are consistent with the view that P/E ratio information was not "fully reflected" in security prices in as rapid a matter as postulated by the semistrong form of the EMH. Instead, it seems that disequilibria persisted in capital markets during the period studied. Securities trading at different multiples of earning, on average, seem to have been inappropriately priced vis-a-vis one another, and opportunities for earning "abnormal" returns were afforded to investors. On the other hand, transactions and search costs and tax effects hindered traders or speculators from exploiting the market's reaction and earning net "abnormal" returns which are significantly greater than zero. Accordingly, the hypothesis that capital markets are efficient in the sense that security price behaviour is consistent with the semistrong version of the "fair game" model cannot be rejected unequivocally.

Basu thus concludes by pointing out that the behaviour of security prices over the fourteen year period studied is,

perhaps not completely described by the EMH. To the extent that low P/E portfolios did earn superior returns on a risk adjusted basis, the propositions of the price-ratio hypothesis on the relationship between investment performance of equity securities and their P/E ratios seem to be valid. Contrary to the growing belief that publicly available information is instantaneously impounded in security prices, there seem to be lags and frictions in the adjustment process. As a result, publicly available P/E ratios seem to possess "information content" and may warrant an investor's attention at the time of portfolio formation or revision.

#### Section 2.4 Capital Asset Pricing Model (CAPM):

Another field for research that has been taken up lately deals with the capital Asset Pricing Model (CAPM). For testing EMH, researchers in general, have used the "fair game" model which denies excess returns to investors on the basis of available information. The expected returns were estimated by using CAPM, and its derivatives to get an idea about the excess returns being generated by a specific piece of information. Thus CAPM is premised on the notion that the return on a security is related to the risk associated with it, and hence, for an even level of risk, two securities

cannot generate different returns. Following this reasoning, variations in rates of return realised on different securities can be explained by the differing risk character of these securities. The objective of recent studies (W.F Sharpe, 1963) has been to examine whether there is any such relationship between systematic risk and return, return and price and price and the risk.

The CAPM of Sharpe (1964) Lintner (1975) and Mossin (1966) is a model of equilibrium security prices. The CAPM makes the following assumptions :

- 1) All investors are single period, risk averse maximisers of the expected utility of terminal wealth.
- 2) They find it possible to make their optimal portfolio decisions solely on the basis of the mean and standard deviation of the probability distributions of terminal wealth associated with the various portfolios.
- 3) They all have the same decision horizon, and over this period the mean and standard deviation of the probability distribution exists.
- 4) They have homogeneous expectations regarding the mean and standard deviation of the probability distribution.

5) There are perfect capital markets.

The Characteristics of perfect capital markets are:

- a) All buyers and sellers, individually, are price takers.
- b) No external drains on wealth (that is, no taxes)
- c) Equal and costless availability of extant information.
- d) Infinite divisibility of all assets and
- e) Unlimited borrowing and lending at the risk free interest rate.

From these assumptions the CAPM shows that in equilibrium, securities will be priced so that :

$$E(R_{it}) = R_{ft} + [E(R_{mt} - R_{ft}) \frac{\text{Cov}(R_{it}, R_{mt})}{\text{Var}(R_{mt})}]$$

where  $R_{it} = \frac{S_{it+1} - S_{it} + C_{it}}{S_{it}} = \text{return on security } i \text{ in time period } t$

$S_{it}$  = market value of security  $i$  at time  $t$ .

$C_{it}$  = dividends paid on security  $i$  in time period  $t$ .

$R_{ft}$  = Return on the risk free asset.

$R_{mt}$  = Return on the market portfolio in time period  $t$ .

$E$  = Expected value operator

$\text{Cov}$  = Covariance operator

$\text{Var}$  = Variance operator

## Section 2.5      Present Value Model :

A simple model that is commonly used to interpret movements in corporate common stock price asserts that real stock prices equal the present value of rationally expected or optimally forecasted future real dividends discounted by a constant real discount rate. This valuation model is often used by economists and market analysts alike as a plausible model to describe the behaviour of aggregate market analysts and is viewed as providing a reasonable story to tell when people ask what accounts for a sudden movement in stock price indexes. Such movements are then attributed to "new information" about future dividends.

It has often been claimed in popular discussions that stock price indexes seem too "volatile", that is, that the movement in stock price indexes could not realistically be attributed to any objective new information, since movements in the price indexes seem to be "too big" relative to actual subsequent events. Recently, the motion that financial asset prices are too volatile to accord with efficient markets has received some econometric support in papers by Stephen Le Roy and Richard Porter (1981) on the stock market and Shiller (1981) on the bond market as well as on the stock market.

Shiller presents estimates indicating that data on accounting earnings, when averaged over many years, help to predict the present value of future dividends. The data are the real Standard and Poor Composite Index and associated dividends and earnings series from 1871-1987. His estimates indicate as to what extent dividend-price ratios and returns on this index behave in accordance with simple present value models.

It seems appropriate to consider earnings data for forecasting dividends, since earnings are constructed by accountants with the objective of helping people to evaluate the fundamental worth of a company. However, the precise economic meaning of earnings data is not clearly defined; accounting definitions are complicated and change through time in ways that are not readily documented. Because of this, many studies of financial time series have avoided the use of earnings data and have thus omitted relevant information about fundamental value from the analysis. Shiller introduces earnings, measured either annually or as an average over a number of years, as an information variable in vector auto regressive (VAR) frame work.

His approach reveals that stock returns and dividend price ratios are too volatile to be accounted for by news

about future dividends. Further, this excess volatility is closely related to the predictability of multiperiod returns. It has recently been shown that stock returns are more highly predictable when they are measured over intervals of several years, rather than over short - intervals of a year or less. Fama and French (1987, 1988) have made this point most forcefully although the result can also be found in Flood, Hodrick, and Keplan (1986) and Poterba and Summers (1987). These papers found that twenty or thirty per cent of the variance of four or five year stock returns can be explained by variables such as lagged multiyear stock returns or dividend - price ratios. The explained variances are higher when dividend price ratios are used than when lagged returns are used.

Shiller and Le Roy and Poster (1981) have tested the present value model of stock prices by examining the implicit restrictions of this model on the variation of stock prices. Their results suggest that actual stock prices vary too much to be consistent with this model. If we examine their results closely, we find that Shiller doesnot construct formal statistical tests of the model and that most of the tests in Le Roy and Poster are not statistically significant because the standard errors of the variance

estimates are quite large. In addition, some critics have argued that the time series used are not stationary, even after the removal of a time trend, and that the variance estimates are unreliable. This argument has been made by Kleidon (1982, 1984) and by Marsh and Merton (1983, 1984). An alternative would be to model the percentage changes in dividends, earnings and stock prices as covariance stationary time series. This implies that the unconditional means, variances, and covariances of the time series must be finite and must not depend on time, Shiller considers this alternative specification, but notes that it does not lead to tractable variance bounds for stock prices.

In the paper of Louis P. Scott (1985), the variance bound tests of the present value model of stock prices are re-examined. A direct test of the model based on ordinary least squares estimation of a simple linear equation is proposed as an alternative and it is shown that this regression approach has several advantages over the variance bound tests. This test is easily adapted to the important case in which the percentage changes in real dividends and real stock prices are covariance stationary. The tests are applied to quarterly data for the Standard and Poor's Index of 500 Common Stocks and the results are much more conclusive than those obtained by previous tests. In a

note, Geweka (1980) has shown that regression tests of expectations models are more powerful than variance bound tests.

There are several competing hypothesis in the literature which attempt to explain the results of the variance bound tests. Blanchard and Watson (1982) interpret Shiller's results as evidence of an arbitrary term in the rational expectations solution for stock prices, specifically a stochastic variable. Another most appealing explanation is that risk aversion and varying real interest rates are responsible for the observed volatility of stock prices. Kleidon (1982, 1984), Marsh and Merton (1983, 1984) have argued that combining the present value model with non-stationary processes for dividends and stock prices is capable of explaining stock price variability, but the results of Scott reject this explanation. These tests donot allow us to pinpoint the causes of stock price volatility but we can conclude that some of the variations in stock prices are due to something other than the variation in dividends or the markets expectations of future dividends. Indeed a casual reading of the financial press suggests that stock prices are quite sensitive to interest rate changes.

## Section 2.6 : Investment Under Uncertainty:

The pioneering work on investment decision making was done by Markowitz (1952, 1959) who suggested a method of efficient allocation of funds to a set of risky assets using a mean-variance framework. Subsequently, Lintner (1975), Mossin (1966) and Sharpe (1965) developed a market equilibrium model for a set of risky assets and one riskless asset. Mossin showed that the results obtained by using mean-variance approach are identical to those obtained under the assumption that investors use quadratic utility function for deciding the composition of their portfolios.

A more general approach to explain individual investment decisions under uncertainty through the use of stochastic dominance was developed by Levy and Kroll (1976, 1978) among others. Unlike the mean-variance framework, the derivation of stochastic dominance rules does not need any restrictive assumptions on the nature of distributions. It also needs very little information on investor preferences. However, the rules are difficult to apply in practice because, it is not always easy to arrive at the distribution of a mix of random variables and also because inclusion of a riskless asset does not yield the neat results obtained under the mean-variance framework.

However, there is a lack of empirical evidence on whether the investor behaviour conforms to the frameworks mentioned above. While some experiments have been conducted to validate the mean-variance framework, no experimental support for conformity with stochastic dominance rules is available.

An experimental investigation of mean-variance framework by Gordon (1972) was conducted on a group of students to conjecture about their utility functions by use of an investment game. The results suggested that the data did not support the hypothesis that investors use any of the well known utility functions (quadratic, logistic or power).

In Cooley's (1976) experiment, on the determinants of the risk perception of investors, each investor was required to rank a set of return distributions in order of preference. At the end of his test, he concluded that the assumption under the mean-variance framework that risk is completely defined by the variance of return of an asset may not be entirely correct.

#### Section 2.7: Accounting Information and the EMH Research:

A review of the financial literature of the last few years indicates an increasing interest within the academic

community in the relationship between accounting information and stock prices. Since about early 1960 there has been an extensive research on the investor evaluation of accounting numbers. It is one accounting area into which statistical testing has been made in ample measure to prove the points raised in the EMH. An impressive body of material has grown over the years prompting many to observe that this study is perhaps the most significant thrust made by accounting researchers in the past decade.

It is the semi strong form of EMH that has been tested empirically by the accounting researchers. Evidence which has been provided tends to support the hypothesis that there is a significant association between the release of corporate financial statements, especially the earnings report, and the stock market movements. As and when an annual earnings announcement is made, a marked increase in "action" in the security is discernible surrounding the weeks of the announcement. But soon it dissipates and prices return to the old equilibrium level. Beaver (1968) bifurcating his study into volume and price and analysing 143 stocks over the period 1961-65 finds that the volume is approximately thirty percent higher in the week of the announcement than during other periods. " In fact, the mean

volume in week 0 is 33% larger than the mean volume during the non-report period, and it is by far the largest volume observed during the 17 weeks."

In respect of equilibrium prices as well, Beaver notices an above normal activity when earnings reports are released. The magnitude of the price changes during week 0, comes accross to be about 67% higher than the average during the non-report period. Although the price activity is the highest in week 0, the next largest values occur in the week immediately prior to the announcement which probably reflects information leakage.

The same temporary effects of accounting periods were noted by Jensen (1969). Using the data with regard to the announcements of stock splits, bonus issues, they concluded that the information reflected in the splits was fully impounded by the end of the month of the split. May (1971) also corroborates these findings who while using the quarterly annual earnings announcements infers that stock prices underwent a definite change thereafter.

#### Section 2.8: Estimating The Price of Government Bonds :

The Government bond market sets prices for individual bonds from moment to moment. In applied macro economic

research however, an estimate of an index of the 'average' price of bonds is often more useful. The yield on bonds is commonly thought to influence the private demand for bonds. However, data on stocks and flows can only be made consistent with data on yields if the same index of the price of bonds is used to construct stocks, flows and yields.

Most recent research on capital markets have all tended to focus on estimating the price of Government bonds. Christopher J.Green (1991) considers the problem of estimating an index for the price of Government bonds. The index is equivalent to a valuation ratio, that is, the ratio of the market value of the bond stock to its par value. The valuation ratio is equivalent to the price of a bond with a par value of unit 1 (be it in Rs. or \$). It is the most useful form of index. When the valuation ratio exceeds unity the market value of bonds is, on an average, above par; when the ratio is less than unity, the stock of bonds stands, on an average, below par. The valuation ratio can therefore be applied directly for the purpose of converting par values to market values or vice - versa.

His methodology has two key advantages. First, the simple assumptions about the maturity structure of the bond

stock, the valuation ratio can be computed entirely from redemption yields. They are far easier to collect and are probably mostly more reliable than data on aggregate interest payments which have often been used in the past as a basis for estimating the market value of the stock of bonds. The second advantage is that this method, relying as it does on redemption yields, can easily be used to compute an index of the valuation ratio of any subset of the bond stock for which appropriate redemption yield data are available. Green also gives a methodology by which the entire stock of bonds can be represented by a single (composite) bond with properties corresponding to a weighted average of the bond stock.

Butkiewicz (1983) and others have proposed an approximate formula for the valuation ratio which has a similar conceptional basis to that proposed by Green. It has been applied to U.S. data. However, the approximation involved in this formula is likely to be rather poor over periods when interest rates changes substantially as occurred in the U.K. during the seventies.

#### Section 2.9: Indian Studies :

The stock markets in India have been less subjected to intensive research than their counterparts elsewhere.

Research that has been conducted on the Indian stock markets has largely concentrated on the investigation of the influence of certain financial variables on the equity share prices. This is true of Aggarwal (1963), Desai (1965), and Ojha (1973). L.C.Gupta (1973) has, however, examined the influence of 'bonus issues' on equity share prices. In a study, Prassanna Chandra (1977), too concentrated on determining the relative importance of selected financial variables on equity share valuation. Srivastava (1968) has shown that retained earnings has no significant influence on the determination of share prices in India. The price effect on dividend supply is also probably not a serious source of bias in the derivation of dividend.

Work on the efficiency of Indian stock market appears to have started after interest on the issue waned in the West. Probably, the first work on testing the hypothesis is by Krishna Rao and Mukherjee (1971). They analysed the weekly averages of daily closing quotations of the Indian Aluminium Company's shares for the period 1955-70. Spectral analysis of the data supported the hypothesis of the randomness of price changes. This study suffers from one serious flaw in the data used for analysis. The averaging process may lead to incorrect conclusion about the basic price series, namely the daily closing quotations.

The second work in this field was done by Ray (1976). He constructed index series for six industries as well as for all industries, and tested the hypothesis of independence on these series. He obtained mixed results, though the tilt was definitely towards rejection of the null hypothesis of independence. This study suffers from one error which first found mention in Moore's work (1962), that is, it studies the behaviour of indices composed of several scrips rather than examining the behaviour of scrips individually.

In another study, Sharma and Kennedy (1977), who examined monthly indices of the Bombay, New York and London Stock Exchanges, during the period 1963-73 by means of runs tests and spectral analysis, found that all the three behave according to the theory of random walk.

In a comprehensive study O.P.Gupta (1978) tested the Random Walk Hypothesis by employing two sets from the Indian market during the period 1971 to March - 1976 by using serial correlation and runs analysis. The empirical results obtained in the study lent support to the applicability of the Random Walk Hypothesis as valid description of equity share price behaviour in India.

In another paper Barua (1981) examines the serial independence of short run changes in the prices of securities and the stock market index to establish the efficiency of the Indian capital markets in assimilating information. The period considered was July 1977 - July 1979. Common statistical techniques have been used to test the hypothesis of serial independence of these changes. While the securities showed independence of price changes, the changes in the market index exhibited statistically significant serial dependence. Despite this difference he argues that the Indian capital market is efficient in incorporating information in the price structure of securities. The results indicate that only market index and one security showed a non-random behaviour of price changes at five per cent level of significance whereas the autocorrelation results showed that price changes are by and large random. Thus it supported the null hypothesis of serial independence of price changes of securities. His results also suggest that prices adjust to new information within one or two periods. On the question of non-randomness of market index Barua opines that this is due to the existence of a "leader follower" relationship among the securities that determine the market index. In more recent studies S.K.Barua and G.Srinivasan (1986) examined

the empirical validity of stochastic dominance rules and the mean-variance framework by analysing data generated through an experiment on individual investment decisions under certainty. The experiment was administered to a set of 15 postgraduate students in business management who had a fair exposure to portfolio theory. The analysis indicated that none of the two approaches provided adequate explanation for the observed pattern of choice. An alternative framework, based on preference for skewness in addition to mean and variance was also examined. This framework provided a significantly better explanation compared to the two parameter framework. The preference for skewness was significant at higher levels of borrowing and at all levels of wealth, possibly as a result of an attempt to minimize the maximum loss.

#### Section 2.10 : Conclusion :

The preceding analysis outlines the major studies that have been carried out with reference to the capital market. As one can notice, the studies on the Efficient Market Hypothesis have been most significant. In particular the weak form tests of the efficient markets model are the most voluminous, and it seems fair to say that the results are strongly in support of the hypothesis. The semi strong form

tests have also supported the EMH. However the strong form efficient markets model is probably best viewed as a benchmark against which deviations from market efficiency can be judged and such deviations have in fact been observed.

At the moment, however, corporate insiders and specialists are the only two groups whose monopolistic access to information has been documented. There is no evidence that deviations from the strong form of the efficient markets model permeate down any further through the investment community. For the purpose of most investors the efficient markets model seems a good approximation to reality.

Recent researches have tended to outdate EMH, more so the Random Walk Hypothesis. More and more research is being carried out on the present value model, the role of accounting of information, and the study of individual investment decision under uncertainty. Hence, it certainly does not appear to leave the impression that all issues are closed. The old aphorism, "much remains to be done", is certainly relevant here.

### CHAPTER III

#### SOME FEATURES OF THE INDIAN STOCK MARKET: AN APPROACH

## Section I        INTRODUCTION

Two major factors which have given stability to the Indian financial system and contributed to its growth are the high levels of saving and a growing trend towards 'financialisation' of household savings. Traditionally, the household sector has accounted for a major share of Net Domestic Savings and has always been a substantial lender of funds to the Government and private corporate sector. The savings of the household sector as a percentage of Net Domestic Product which was 8.5% in 1970-71 hovered around 13.5% on an average over the whole of the eighties. Also, there was a steady growth in the volume of savings in the form of financial assets by the household sector while the percentage of savings in the form of physical assets as a percentage of Net Savings fell from 48.1% in 1970-71 to 42% in 1982-83 to a further 39.8% in 1987-88.<sup>1</sup>

Gross financial assets of the household sector increased almost three fold over the eighties. The trend in favour of financial assets is reflected in the increase in bank deposits, units of Unit Trust of India (UTI), corporate

---

1. Government of India: Reports on Currency & Finance, RBI, Different Issues.

shares and debentures and Provident Fund (PF). Thus, the increased contribution of the household sector to the Net Domestic Savings has been channelised more and more into the financial system and have contributed as a major source of funds both for the Government and the corporate sector. Funds flowing to the corporate sector through the capital market has shown a significant increase, though direct participation by the household sector in equity and debenture is still at a very low level of less than 3% of its financial savings.<sup>2</sup>

The structure of financial assets of the household sector has evolved gradually over time in response to policy interventions. The asset composition underwent change in two phases. The first came in the 1970s when the share of bank deposits in financial asset grew from 35.7% in 1970-71 to 45.8% in 1980-81 in response to a conscious policy on the part of the Government and the banking system after the nationalization of fourteen major Commercial Banks in 1969. One of the objectives of bank nationalization which thus seems to have succeeded was to mobilise savings through the opening of a network of branches in rural and unbanked areas-in short to convert class banking into mass banking.

---

2. Ibid.

The second phase came in the 1980s when the changes were significant in the context of the growth of the securities market. The share of equity, debentures and units in financial assets grew from 3.6% of gross savings in 1980-81 to 6.9% in 1987-88.<sup>3</sup> After the sudden growth in the percentage of Bank Deposits in overall savings of the household sector in 1980-81, such deposits have maintained an average of 42% over the rest of the decade. However, the growth of the share of equity, debentures and units in the financial assets involves the potential risk of bank deposit growth slackening at times of primary capital realization by the private corporate sector. This can be nullified by the corporate sector putting the money thus mobilised back in the banks.

Another notable feature of this growth, however, is the virtual stagnation of the share of direct investment in shares and debentures. This implies that the flow of financial savings into the capital market is coming increasingly by the route of the institutions and the mutual funds. Along with the increasing role of institutions in the capital market, the higher trust and faith of the individual

---

3. Ibid.

Table 3.01 : Pattern of Equity Shareholding in Some Leading Private Sector Companies

Name of the Company	Group	Promoter's Share (%)	Financial Institution's Share (%)
ACC	Tata	11.96	40.70
TISCO	Tata	10.85	44.93
TELCO	Tata	19.26	40.73
Mysore Cement	Birla	20.66	48.07
VXL	Birla	18.54	35.12
Mahindra & Mahindra	Mahindra	8.35	46.35
Mahindra Ugin	Mahindra	23.73	64.11
Kirloskar Pneumatic	Kirloskar	23.53	60.63
Best & Crompton	Mallya	18.38	55.78
Modi Rubber	Modi	26.49	51.08
Calcutta Electric	Goenka	12.19	48.94
Kamani Engineering	Goenka	32.00	41.00
Dunlop	Chhabria	5.39	34.69
Ashoke Leyland	Hinduja	3.46	38.68
Larsen & Toubro	-	-	41.04
S.I. Shipping	Essar	26.43	56.51
Usha Rectifier	Rai	24.63	66.30
SPIC	MA Chidambara	14.36	46.81
Escorts	Nanda	14.39	44.54
Bharat Gears	Raunaq Singh	14.82	42.18
TVS Elecrtonics	TVS	12.14	58.69
India Cements	Sankar	11.65	50.46
SRF	DCM	1.30	56.57
Lakshmi Machines	Lakshmi	20.75	44.49
Premier Tyres	Desai	19.34	51.73

Source : The Economic Times, dated June 19, 1992

investors on the ability of the institutions to manage funds for them as far as the capital market instruments are concerned seem to indicate the risk averseness of the investing public by and large.

Prior to independence, zamindars and ruling princes were the principal sources of investible funds that sustained the stock exchanges, even when the savings of the middle classes was an important element along with the funds of the private life insurance companies. But by the mid 1950s, the picture changed drastically and the zamindars and the ruling princes withdrew from the investment scene and the old middle class were in sore straits as a result of heavy taxation and prolonged inflation. Since the inception of planned economic development in India, and the emphasis on rapid industrialisation ranks of the investors broadened considerably with most of the rich holding their savings in the form of financial assets. Partial land reform measures and the emergence of cooperative credit in the mid 1950s were successful in diverting middle class savings from the traditional forms of personal money lending and investment in gold, land and other physical assets to industrial and government securities. With the generation of new incomes, and greater industrial activity a class of investors emerged

and there was marked diversion of funds from other forms of investment to industrial securities.

In India, much more than in other developing countries, a part of the savings was used for the purchase of precious metals. The motives for the purchase of precious metals were complex being associated with social, political as well as economic factors. The government's financial policies like large scale deficit financing provided all the more incentive for the hoarding of precious metals. Low literacy, lack of banking facilities, political disturbance and religious practices constituted the main factors for people's preference for gold and silver in India. With the spread of literacy and education and the development of banking facilities, the precious metals undoubtedly lost their attraction to a great extent but that too had been a very gradual process. Investment in real estate was also preferred as along with the asset value it brought with it social pride and prestige. However, the greatest problem encountered in the case of investments in land holdings was its immovability and indivisibility. Such investments necessarily blocked up a large proportion of one's savings and along with it rooted its owner to the soil.

Investments in shares which avoided such problems was taken up by the public in increasing numbers once they got over the conservativeness and orthodox views regarding the stock market being similar to a gambling den. The process though partially successful till now is in an upbeat mood with the growing maturity of the economy. The transition had set in with the the growing popularity of bank deposits after nationalisation but since the returns obtained from bank deposits in terms of interests were not too attractive, share and debenture holdings became popular. The psychological attraction that individuals had to gold and real estate underwent a gradual transformation and the process was hastened to some extent by the high prices of the precious metals which took them out of reach of the middle class.

The 1980s has been the only decade when the security prices have grown faster than the wholesale prices and at a rate equal to the bullion prices. In all the previous decades, security prices as reflected in the RBI index, grew at a slower rate than bullion prices and wholesale prices, implying a tendency towards relative depreciation of investment in securities.

It is only in the 1980s that the trend was reversed and the security prices registered higher rates of growth and the investor share also responded positively to the emerging appreciation in capital investments. It is believed that this reversal in the relative price movements marks a watershed for Indian capital markets.

### Section 3.2 : Features of the Indian Stock Market

In India as in other countries, dealings on a recognized stock exchange are permitted only in listed securities, gilt-edged securities do not require any listing formalities to be undergone for being admitted for dealings on the exchanges. They are automatically enlisted as soon as they are issued.<sup>4</sup> However these are unimportant from the point of view of individual. The individual holdings of Government Securities represent hardly one per cent of the total outstanding rupee debt. The market for these securities is a captive one in the sense that the institutional investors like the scheduled commercial banks, the UTI, PFs, the Life Insurance Corporation of India (LIC) and other insurance companies are statutorily required to

---

4. Gilt edged securities represent those securities which are issued by central or state governments or the semi government authorities in the course of their borrowing operation.

invest a significant part of their investible funds in such securities. Corporate securities, on the other hand, are considered to be of great importance from the view point of individuals as also that of the economy.<sup>5</sup> These securities are of two types : (i) proprietorship securities, and (ii) the creditorship securities. The former represent shares of a public limited company whereas the latter include bonds or debentures of such companies. In India under the Companies Act, 1956, a public company can issue two types of shares : (a) preference shares, and (b) equity shares. However, it is the equity shares that constitute the largest of corporate securities traded on the recognised stock exchanges.

Corporate securities can be dealt in on the stock exchanges only when the issuing company complies with the listing requirements. Private limited companies are prohibited under the Companies Act, 1956 to issue their shares to the public. Only public limited companies can get its securities listed on an exchange. Even in their case, it is not obligatory for every public company to have its shares quoted in a stock exchange. However, if a company declares in its prospectus its intention to apply for an official quotation, it becomes incumbent upon that company

---

5. Corporate securities represent investment in shares and debentures of public limited companies.

to do so within the prescribed time limit. If the company fails to secure stock exchange permission for listing, it is required to refund the application money to the subscribers. Further, under the Securities Contracts (Regulation) Act (SCRA) 1956, the Government is empowered to compel a public company to seek listing of its shares. However, recent amendment in Companies Act has made listing of share compulsory if the company desires to 'go' public.<sup>6</sup>

Further, in terms of the Securities Contracts (Regulation) Act, 1956, only members of the stock exchange are permitted to transact business in securities on a recognised stock exchange in India. Therefore, a person interested in buying or selling a security has to put his order through a member of the exchange. The rules and regulations governing the admission of members of the exchange are uniform under the Securities Contract (Regulation) Rules, 1957. It is noteworthy that the rules, bye-laws and regulations of the Indian stock exchanges do not specify any functional distinction between members. On Bombay Stock Exchange (BSE) however, there appears to be a fairly well established specialisation. Such a

---

6. According to the SCRA Rule 19(2) B, a company has to have 60 percent public shareholding before it can be listed.

specialisation appears in varying degrees on other stock exchanges too.

For purpose to dealings on stock exchanges, listed shares are classified under two categories: (i) specified shares (also called 'A' group shares) and (ii) non-specified shares (also called 'B' group or cash securities). The former is also known as the forward list since forward trading is allowed while the latter as cash list where immediate payment is required. Only equity shares are included in the specified list provided they satisfy certain conditions as prescribed by the exchange.

According to the regulations of the Indian stock exchanges, four types of contracts can be carried out on the floor of the exchange. They are: (a) spot delivery transactions, that is, for delivery and payment on the same day of the contract or the next day; (b) hand delivery contract, that is for delivery and payment within fourteen days following the date of the contract; (c) Trading for settlement business in specified shares, that is, for delivery and payment through the clearing house, and (d) special delivery, that is, delivery and payment being completed within any time after fourteen days following the date of the contract.

In the case of specified shares, business is generally done on a settlement trade basis. It is noteworthy that about 90 percent of the trading activity on most of the Stock Exchanges in the country is of a purely speculative nature and said to be concentrated in the specified shares. Also even though the maximum period for carry over of transactions in case of specified shares is now fixed at ninety days, as the Patel Committee (1985) observes, "still the transactions can be virtually carried over indefinitely, as was being done in the past". The carry over changes namely Cantango or Backwardation are generally determined by the prevailing rates of interests.

At present, the stock market in India comprises of twenty one recognised Stock Exchanges with the major ones being at Bombay, Calcutta, Madras, Delhi and Ahmedabad, all operating under the rule, bye-laws and regulations duly approved by the Government. Till 1991 (End March) the number of listed companies on the exchange was around 6500 having a total paid up capital of over 30,000 crores and a market-capitalisation of 80,836 cr. The number of listed companies on all Stock exchanges increased from 1125 in 1946, 1,203 in 1961, 2114 in 1980, and further to around 6500 in 1991. The paid up capital of the listed companies increased from

Rs.270 cr. in 1946, Rs.675 cr. in 1961, Rs. 3,972 cr. in 1980 and lately to over Rs. 30,000 cr. in 1991. Simultaneously market capitalisation of the listed companies also rose from Rs. 971 cr. in 1946, Rs. 1,216 in 1961 Rs.6,749 in 1980 and further Rs. 80,836 cr. in 1991. Turnover too has increased. Average daily volume in the country's securities market in 1990 wa Rs. 135 crores as against less than Rs. 20,000 in 1961.<sup>7</sup> It is evident from above that capital appreciation was higher in 1980s than before. Moreover, the national-level figures show that the greater part of it came in the latter half of the 1980s. However, in relation to national income, market capitalisation accounts for only around 13% of Gross Domestic Product which is relatively low compared to the size of the Indian Economy and also in comparison to similar ratios for more mature markets and some of the emerging markets such as Malaysia, Hongkong and Singapore. Also, it is the five major exchanges at Bombay, Delhi, Calcutta, Ahmedabad and Madras that account for more than 90 per cent of listed stock and market capitalisation. It is interest to note in this context that India has the largest number of investors (around 15 million) in the world, next only to U.S. (50 million) and Japan (25 million).

---

7. All figures quoted from BSE official directory.

The Stock Exchange, Bombay, in its continuing endeavour to make available as much information as possible on the stock market to the investing community and the stock brokers, launched the BSE sensitive Index in January 1986 (Base 1978-79 = 100) and the BSE National Index in January 1989 (Base 1984-85=100).

The BSE Sensitive Index comprises of thirty scrips selected from the specified and non-specified groups of shares listed on the Bombay Stock Exchange. The index for a day represents the percentage relationship of the aggregate market value of the equity shares of all the thirty companies in the sample as on that day to the average market value of the equity shares of the same companies during the base year. The BSE Sensitive Index is in essence, a weighted arithmetic average of the price relatives of the thirty shares selected and the weighting is done on the basis of the no. of shares issued so that it will influence the index in proportion to the respective market importance of each individual item. Since weighting is done on the basis of the no. of shares increase because of issues of bonus or rights shares, subdivision into shares of lower par value, consolidated, conversion of debentures into equity or conversion of institutional loans, mergers and other such changes.

The BSE National Index comprises of hundred companies from the specified and Non specified group of shares listed on the country's five major stock exchanges, viz. Bombay, Calcutta, Delhi, Ahmedabad and Madras. A similar weighting, exercise is also involved in the computation of this index.

Both these indices have been well received and they are updated at two minute intervals and displayed through the PTI stock scan service. The Exchange launched in February 1990 two sets of Price Earnings (P/E) ratios one for the thirty scrips comprising the BSE sensitive Index and the other for the hundred scrips comprising the BSE National Index. These ratios are calculated on the basis of closing prices on each trading day. The P/E ratio for a group of Co. is computed as the ratio of the overall market capitalization (based on current prices) of the companies to the overall earnings of these companies. The Exchange has adopted the universal practice of excluding loss making companies. from the purview of this calculate.

### **Section 3.3 : Methodology**

As mentioned in the previous chapter, there has been quite an endeavour to study the role of factors which influence the prices of shares of joint stock companies. Our

study represents one such endeavour of proceeding with a time series study with the focal point of reference being the Indian Stock Market.

One initiatively feels that the price of the ordinary shares of a company at a point of time will be governed by its past earnings and its future growth potential. The former, we feel would be represented by the dividend payment of the company and the latter by net profit. Net profit which is given by the value of gross profit less depreciation, interest and tax is a suitable economic indicator of growth. One can all the same feel that other variables like retained profits could also be a suitable proxy for growth. It is not our endeavour to demean their claim in any way. Our only contention is that we feel net profit is a better approximation from the point of the investor (more Specifically Indian Investor!).

However, these do not represent all the factors that influence share prices in India. Indian market on many occasions tend to become quite irrational. This is because the Indian market is quite company specific in its outlook. Poor performance by one or some companies tend to depress the market and likewise when these some companies register good results, the market tends to be quite bullish in its

outlook. For this reason we feel that a micro study of the Indian Stock market with its focal point being assessment of individual companies is more in order than a study which looks at the overall market index as a possible area of research. As we have already discussed early on in this chapter, the various market indices (for example - BSE Sensitive Index, BSE National Index) suffer from various loopholes stemming generally from their process of weightage afforded to various companies and thus never seem to give a proper picture. This could be rectified in some sense, if we deal with various companies specifically and try to reason out the various factors influencing them. Our presumption is that a common framework can be worked out.

Among the various other factors influencing the price of a share, one is the price-earnings ratio, denoted by (P/E). In fact it is one of the two important indicators for an investor to watch out for in a share. The other is EPS or the earnings per share.

(P/E) ratio is one of the most powerful tools available in assessing the price of a share vis-a-vis the earnings capacity of the company. The ratio shows as to how many times the current price is as compared to the earnings per share. The other most popularly used quantitative measure

to reflect the past performance of a company is EPS. Its computation is simple; divide profits after tax by the number of outstanding equity shares. However the (P/E) ratio of a share is considered a more reliable measure of investment value than straight EPS. This is because P/E ratio reflects how investors perceive the prospects of the concerned company.

The market price of an equity share represents a valuation of the future based on the earnings available per share and the risk factors involved in the business and the industry in which the company is engaged. The relationship of the price of the share to the EPS is therefore valuable in assessing the current level of prices and to determine whether the shares are under priced or over priced. The market price of a share is influenced by many factors. A high P/E ratio reflects a high rate of growth and investment confidence. The shares of a well established company normally sell at a higher multiple of current earnings.

During 1986-87 the average P/E ratio of stocks listed on the Stock Exchanges in India was in the low range of 9 and 12. In recent years it has moved up quite appreciably. In fact the BSE P/E (1990-91) shows it at a high 39.89. In countries like Japan it is even higher at over 50. However,

it is to be noted that P/E ratios depend to a large extent on local conditions and practices also. International comparison is thus subject to several limitations and warrants careful analysis. Nevertheless, it remains true that P/E ratios for the listed stocks in India are low given the vast potential for growth of the capital markets.

Another important influence comes from the reputation of the firm which has seemingly led to the coinage of the term 'Blue Chip' companies. The goodwill of a company is always an important economic indicator to the success of the company. In Indian markets, it is all the more so, mainly because individuals are still quite risk averse which is fuelled by very little knowledge of the working of individual companies and the stock market as such. This goodwill or reputation of a firm could be because of many factors such as the history of the company, the success rate of the company, its dividends and earnings record; stability and the rate of growth of past earnings and sales; credit rating and financial strength; kind of management and competitive position of the company in the industry, its future prospects and most important of all, the political clout enjoyed by the company. As such any or all of them can influence the perspective of an individual investor. However, since most of these are qualitative attributes, it

would be quite difficult to quantify them. Hence, for our purpose of quantifying the reputation of the firms, we have considered its financial strength as an index. Now the question arises as to what should indicate the financial strength. One obvious solution is the value of the total asset strength of the firm. However, this suffers from the obvious malady of not considering the liabilities along with the asset strength. Thus networth that is, the deduction of the total liability from the total asset of the company is a better quantifier. However since we are considering the price of a single share, the average networth would rule off the scale effect, which would have occurred had we considered the total networth. This average value is quantified by BVS or the Book Value Per Share. In our study, BVS occurs as an important determinant of the individual share prices. As we will see, all the so called blue chip companies tend to have high BVS values. It is thus one way of quantifying this reputation bias.

As we have referred to before, political influence is an important determinant share price variations in the Indian Stock Market. In order to quantify its effect we would need to take recourse to dummy variable. A dummy is a binary variable which we construct to describe the

discontinuous development or variation of the variable under consideration, in this case external influence in general and political influence in particular. We assign to it arbitrary units in such a way as to approximate as best we can the variations in the factor which we want to express quantitatively.

Dummy variables are thus commonly used as proxies for quantitative factors which cannot be quantified as also quantitative factors when no observation on these factors are available or when it is convenient to do so. In our case, it is solely because of the fact that external influence is a qualitative factor whose effect in the Indian Stock Market is beyond any doubt. In order to quantify this effect we use dummy variables which are constructed as per the general outlook that the indian economy was supposed to enjoy during our fifteen years of study. In fact the selection of the period of study was made from the year 1977 only to avoid the years of Emergency which would have given a very skewed result. The dummy variable thus constructed is based on the political outlook that the economy enjoyed for each individual year. Hence the dummy variable 'd' is given as

$$d = \begin{cases} 1 & \text{if political/economic outlook was} \\ & \text{supposedly optimistic for the year} \\ 0 & \text{otherwise} \end{cases}$$

As an example we can site the case of the year 1984 which saw the return of the Congress Government to power under the leadership of Mr. Rajiv Gandhi with a record mandate. The economic outlook for that year was definitely very positive. Hence, the dummy variable d is 1 in our model for the year 1984. Similarly d has been constructed for all the years from 1977 to 1991. The added assumption is that these dummies tend to affect the net profit of a company.

#### Section 3.4 : Specification of the Model

The above section outlines the various variables which in our consideration seemingly affect the price variation of share prices of the joint stock companies in India. We would be testing it as per our sample of the thirty companies which affect the BSE Sensitive Index. A more comprehensive study of the these thirty companies is given in the next chapter. In this section, we would outline the model which we would be testing as per each individual company.

The general model would be given as :

$$(1) \quad (ASP) = C + \alpha_2(BVS) + \alpha_3(DIV) + \alpha_4(NP) + \alpha_5(DUM) + \alpha_6(PE) + u$$

$$(2) \quad (ASP) = C + \alpha_2(BVS) + \alpha_3(DIV) + \alpha_4(NP) + \alpha_5(DUM) + \alpha_7(EPS) + u$$

ASP = Average share price  
 BVS = Book Value per share  
 DIV = Dividend per share  
 NP = Net Profit  
 DUM = Dummy  
 Pe = Price-Earning Ratio  
 EPs = Earnings per share  
 u = Error term  
 c = Constant

and DUM = (1,1,0,1,1,10,0,1,1,1,0,0,0,1) for the entire range 1977-1991

We obtained two equations since PE and EPS together would have meant multicollinearity in the model. The above two equations give us a rough indication of what our actual study is supposed to be. However, since we consider the dummy to specifically affect the net profit of a company, we would also like to see the effect of the dummy on the company net profit.

Hence we would have :

$$(3) \quad (ASP) = C + \alpha_2(BVS) + \alpha_3(DIV) + \alpha_8(DUMP) + \alpha_5(DUM) + \alpha_6(PE) + u$$

$$(4) \quad (ASP) = C + \alpha_2(BVS) + \alpha_3(DIV) + \alpha_8(DUMP) + \alpha_5(DUM) + \alpha_7(EPS) + u$$

Where  $DUMP = DUM \times NP$

In addition to the above four equations we would be having four more. This is mainly because of the fact that the share price of a company could be affected by PE and EPS with a time lag. Hence this lag effect is sought to be explained by the following four equations.

$$(5) \quad (ASP) = C + \alpha_2(BVS) + \alpha_3(DIV) + \alpha_4(NP) + \alpha_5(DUM) + \alpha_9(PT) + u$$

$$(6) \quad (ASP) = C + \alpha_2(BVS) + \alpha_3(DIV) + \alpha_4(NP) + \alpha_5(DUM) + \alpha_{10}(EPSL) + u$$

$$(7) \quad (ASP) = C + \alpha_2(BVS) + \alpha_3(DIV) + \alpha_8(DUMP) + \alpha_5(DUM) + \alpha_9(PT) + u$$

$$(8) \quad (ASP) = C + \alpha_2(BVS) + \alpha_3(DIV) + \alpha_8(DUMP) + \alpha_5(DUM) + \alpha_{10}(EPSL) + u$$

Where  $PT =$  PE with a one year lag

and  $EPSL =$  EPS with a one year lag

The above eight linear equations would predominantly solve our problem of locating the determinants which significantly affect share prices. However since there is no uniformity in the units of the different determinants, we need also to specify the log linear form of these eight equations. Inspection of these log linear equations would help us in finding out the determinant which has the most

significant influence in the determination of share prices of various companies thus studied. Thus the log linear form of these eight equations would be given as :-

$$(9) \quad (LASP) = C + \beta_2 (LBVS) + \beta_3 (LDIV) + \beta_4 (LNP) + \beta_5 (DUM) + \beta_6 (LPE) + u$$

$$(10) \quad (LASP) = C + \beta_2 (LBVS) + \beta_3 (LDIV) + \beta_4 (LNP) + \beta_5 (DUM) + \beta_7 (LEPS) + u$$

$$(11) \quad (LASP) = C + \beta_2 (LBVS) + \beta_3 (LDIV) + \beta_8 (DUMN) + \beta_5 (DUM) + \beta_6 (LPE) + u$$

$$(12) \quad (LASP) = C + \beta_2 (LBVS) + \beta_3 (LDIV) + \beta_8 (DUMN) + \beta_5 (DUM) + \beta_7 (LEPS) + u$$

$$(13) \quad (LASP) = C + \beta_2 (LBVS) + \beta_3 (LDIV) + \beta_4 (LNP) + \beta_5 (DUM) + \beta_9 (LPT) + u$$

$$(14) \quad (LASP) = C + \beta_2 (LBVS) + \beta_3 (LDIV) + \beta_4 (LNP) + \beta_5 (DUM) + \beta_{10} (LEPSL) + u$$

$$(15) \quad (LASP) = C + \beta_2 (LBVS) + \beta_3 (LDIV) + \beta_8 (DUMN) + \beta_5 (DUM) + \beta_9 (LPT) + u$$

$$(16) \quad (LASP) = C + \beta_2 (LBVS) + \beta_3 (LDIV) + \beta_8 (DUMN) + \beta_5 (DUM) + \beta_{10} (LEPSL) + u$$

where	LASP	=	Log ASP
	LBVS	=	Log BVS
	LDIV	=	Log DIV
	LNP	=	Log NP
	LPE	=	Log PE
	LEPS	=	Log EPS
	DUMN	=	DUM X LNP
	LPT	=	Log PT
and	LEPSL	=	Log EPSL

As obvious from the basic properties of logarithmic application, the log of negative values is not possible. In our study where we have faced such situations, we have substituted these negative figures with very marginal positive figures having no significant difference from zero. The number of such companies reporting negative figures is however quite limited. Only in the case of Great Eastern Shipping Corporation Ltd., have we been unsuccessful in using the log linear form since over and above such negative figures it also reported some figures which were missing from the original data source. In this context we would like to specify that the data for our study have been compiled from the various editions of the BSE official directory.

As per our model, the thing to be noted is that we are limiting our enquiry to an annual trend in the average price (between 'high' and 'low' prices for the year) for all the companies in our sample, which is hence given an ASP. The above sixteen equations form the backbone of the study. Our endeavour has been to study the effects of the various determinants of the share prices through the above sixteen equations. Hence the determinants studied are BVS, DIV, NP, DUM, PE, EPS, PT and EPSL. In the case of the dummy variable, we could have had company specific dummy variables

but then it would have affected our endeavour of bringing all these companies together under a common umbrella. The external effect has to be equal for all, otherwise an element of bias would creep in. However only in the case of Kirloskar Cummins Ltd. have we experimented with a specific dummy variable. This dummy has been so constructed so as to alienate the effects, if any, of the splitting of shares in 1986. Thus the dummy in this case is given by the set of binary numbers (1,1,1,1,1,1,1,1,1,1,0,0,0,0,0). In our next chapter, we would study the result of our exercise and thus find out how different companies seem to have been affected by different factors. As we will see, auto correlation and multicollinearity have also been checked for and hence corrected. As concerns some data which were missing even in the original data source we have interpolated these values in order to get an approximation of the Durbin-Watson (D-W) value and then subsequently have run the auto regression test, if so required, to rule out any auto correlation. The error, though marginal, is hereby accepted.

## CHAPTER - IV

### EMPIRICAL FINDINGS

## Section 4.1 INTRODUCTION

The previous chapter introduces us with the basic features of the Indian stock market as also the methodology adopted in our study. In this chapter we will inspect the detailed behaviour of the movements of the individual scrips over the period concerned and enquire about the possible determinants affecting such a movement.

For a start we need to undertake a statistical study to identify the group of pivotal shares in the market. This is done by identifying a small group of companies with no more than twenty per cent weight in the Bombay Stock Exchange (BSE) Sensitive Index that can be used to explain more than eighty per cent variation in that index.

For our purpose of analysis of the share markets via the price movements we have chosen a sample comprising the thirty scrips that constitute the BSE Sensitive Index. These companies constitute a considerable share of the market activity and also give due representation to the major industrial groups. Some of these scrips belong to the specified category (in which forward trading is permitted) while others belong to the Non-specified or Cash Category. However, it may be mentioned that these categories are not mutually exclusive and the Stock Exchange authorities keep

on bringing shares back and forth from one category to the other in order to regulate the market as and when necessary. The chosen sample should give a good indication of the market movements as it includes shares for both groups.

The companies comprising the sample have been growing quite steadily over the years as will be discussed shortly in detail. The scrips are quoted at the BSE which is the premier Stock Exchange of the country but are traded in most of the leading exchanges also.

The data on prices used for our study relates to the average of the high and low prices that had prevailed in the market during each year (not financial year) for the various companies concerned. It if had been a more detailed study which would have involved monthly surveys, than the prices quoted at the end of the month could have been a better measure. However, the time period to be studied would then, needless to say, have been of a shorter range. For our study, the average share price thus calculated presents itself as a suitable representation of the average price of a share that had governed the market during each year of our study. It also satisfies our purpose of bringing out a relation between the share price movements and the various factors guiding an investor/speculator towards a share.

In section II we have a closer look at the sample of the thirty companies included in our study, while giving the company profiles we have a detailed look at the overall performance and price movements of the share of these companies. We then try and explain the price movements of these various shares vis a vis certain factors which have already been outlined in the previous chapter.

We conclude this chapter in Section III by summarising the results of these various companies categorised on the basis of ownership.

## Section 4.2      A STUDY OF THE BSE COMPANIES

In this Section we detail not only the general information of the companies used in our study, but also provide a detailed commentary of the price movements of each scrip, and the immediate and clandestine influences shaping these movements. The discussion is organised in the alphabetical order of each company concerned, and not in the order of their importance.

### 1      Associate Cement Companies Ltd. (ACC):

The Company has a paid up equity capital of Rs.5595 crores (cr.)<sup>1</sup> and is a leading manufacturer of cement plants and other heavy machinery. The nominal value of the company's equity share is Rs.100 and it is an important constituent of the Tata group of Companies. This scrip is one of the leading speculative counters at the BSE and sets as a barometer of the market sentiment.

The performance of this company has been stable all through the period of our study, except in the year 1991. Coming on the heels of the Government announcement of

---

1. All the equity figures for each company relates to 1990 values except for Food Specialities Ltd., which gives the 1988 figure.

decontrol of cement prices, its prices moved up phenomenally, leading to a slightly awkward result in terms of our study. We have tried to alienate this major disturbance by having two periods of study worked out: one refers to the period 1977-1990 and the other refers to the period 1977-1991.

Dividend payments by the Company deteriorated from Rs.20/share in 1985 to Rs.10/share in 1988 with no dividends being announced in 1989. However, dividend picked up soon after and reached a high of Rs.30/share in 1991. The PE ratio has remained more or less mobile in the upward direction with the exception of the two years 1987 and 1988 when they had risen to abnormal levels. The EPS during these two years fell to marginal level with the year 1989 recording a negative figure. The year 1991 again saw EPS jump up. However, BVS has remained constant throughout.

A close look at the regression chart brings out some interesting results. We will split our results under two time frames:

(i) 1977-1991

This fifteen year time period points to net profit (and hence DUMP) as being the supreme determinant of the share

price fluctuations. The other co-determinant is BVS PE does not seem to have quite a significant influence. Dummy in this case is not very significant. A more specific dummy matrix for this company could have been better.

However the log linear points to dividend as being the most significant determinant. One other significant determinant is EPSL. The above difference could be mainly because of the extraordinary rise in net profits in the year 1991. Hence whereas this rise wholly influences the simple linear regression the more steady growth of dividend since 1989 is amply demonstrated in the log linear regression. It is definitely advisable to consider the latter result as a more correct representation.

(ii) 1977-1990

When the colossal effect of the year 1991 in terms of price rise is ruled out, the trend that emerges seem to fall in line with our presumption. The effect of BVS is supreme. The co-determinants now become net profit and surprisingly PE and not EPS. However the coefficient of net profit is negative. The rise in the price of the scrip even at times of a fall in profit seem to be indicated by this fact. The log linear forms also acknowledges the fact that BVS is the most significant determinant.

The conclusion that one can draw from the above two studies point to the basic effect of BVS on the price of ACC shares. Abnormal price hike could well result due to the superior effect of increased net profit as also speculative effects. Once the price falls to a mere realistic level as denoted by a low PE, the effect of BVS would be the real guiding factors. The steep rise in prices is mainly due to investment and speculative sentiments whereas the normal growth is mainly due to the company's reputation as a 'Blue Chip' company.

## 2 Ballarpur Industries Ltd. (BIL):

This company was incorporated in 1945 and belongs to the Thapar Group. The paid up equity capital of the company stands at Rs.2243 cr. The group manufactures all kinds of papers and allied products, vanaspati, chemicals, tin containers and soaps.

The performance of this scrip has been quite consistent. The main characteristic of this scrip is its enviable record in dividend payouts. The market sentiment does not seem to have affected this scrip very much. During the boom years of 1985-86 it registered marginal rise as also marginal fall during the slump year of 1987. Of late,

Table 4.01 : Regression Results for A.C.C.LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	-97.0270		5.528	
	BVS	1.4210	0.951	18.797	
	DUM	10.7150	(0.893)	0.789	1.702*
	NETP	-0.0002		3.619	
	PE	-0.0150		3.939	
1977-1991	C	18.413		0.339	
	BVS	0.973		5.871	
	DUM	-125.853	0.963	2.625	2.139*
	DUMF	0.001	(0.925)	10.078	
	EPS	-1.078		2.372	
1977-1990 (Log Linear)	C	-0.774		0.606	
	LBVS	1.061	0.804	4.514	1.961*
	LNETP	0.033	(0.706)	0.963	
	LEPSL	0.004		0.165	
1977-1991 (Log Linear)	C	7.343		0.629	
	LDIV	0.685	0.918	3.359	2.723*
	DUMN	0.007	(0.882)	0.831	
	LEPSL	0.095		4.886	

Note : \* shows that autoregressive schemes have been run

Table 4.02 : Regression Results for B.I.LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	69.7644		5.149	
	BVS	-0.2981	0.982	3.272	
	DUM	-20.4183	(0.961)	3.272	2.365*
	NETP	0.0001		2.619	
	PT	3.9447		4.961	
1977-1990 (Log Linear)	C	-10.827		3.009	
	LNETP	1.066	0.757	3.948	1.982*
	LPT	1.373	(0.675)	3.929	

Note : \* shows that autoregressive schemes have been run

however, for the past two years, the price of this scrip has really picked up as also its net profitability ratio.

The regression chart brings out clearly the prime effect of PT on the price movements. Net profit alongwith BVS and DUM comes a very close second. Dividend, though a very significant feature of this scrip, is weak as a determining factor. This could well be due to this constancy as also its meagre amounts.

### 3 Bombay Dyeing and Manufacturing Co. Ltd.:

The company's major products include cotton and blended yarn and non-woven fabrics and DMT. Operations undertaken by the company other than spinning and weaving are bleaching, dyeing, printing and other finishings. The paid up equity capital of the company is Rs.1124 cr. and is controlled by the Wadia Group. The shares of the company have been quite speculative. The paid up value of each share was Rs.25 initially which was split up to Rs.10 per share in 1987.

The performance of this scrip has been one of the most erratic. Though its price has maintained a constant upward trend from 1980 onwards, the economic indicators namely net profit and dividend have started looking up from 1987

Table 4.03 : Regression Results for BOMBAY DYEING LTD.

Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	-127.590		6.331	
	BVS	1.749		8.058	
	DIV	-0.912	0.984	1.484	1.839*
	DUM	65.087	(0.968)	10.727	
	NETP	0.001		12.285	
	EPS	0.485		0.891	
1977-1990	C	-68.656		3.301	
	BVS	1.131	0.971	4.829	
	DUMP	0.001	(.957)	12.040	1.810
	DIV	2.694		7.690	
	PE	1.866		2.660	
1977-1990	C	-74.628		3.618	
	BVS	1.575	0.973	6.248	
	DUMP	0.001	(.954)	12.218	2.041*
	DIV	3.501		9.139	
	EPS	-1.984		3.189	
1977-1990	C	-124.134		6.831	
	BVS	1.681		8.470	
	DIV	0.739	0.987	1.946	1.83*
	DUM	63.461	(0.976)	11.526	
	NETP	0.001		15.583	
	EPSI	0.582		1.689	
1977-1990 (log Linear)	C	-7.936		4.021	
	LBVS	1.278	0.876	4.259	1.262*
	DUM	0.639	(0.813)	5.222	
	LNETP	0.598		8.692	

Note : \* shows that autoregressive schemes have been run

onwards. While the dividend paid out was a meagre Rs.1.75 for a Rs.25 paid up share in 1985, it increased to Rs.4.00 for a Rs.10 paid up share in 1990. The other indicators have been more or less constant throughout. A good scrip for the speculators, it is usually kept under control by moving the scrip in and out of the specified list when speculation gets too wild. The share prices have been more influenced by the internal working results of the company and political decisions than by the market sentiment at large.

A look at the regression analysis seem to confirm the story. The primary influence on the share prices of Bombay Dying seem to be that of BVS, net profit and that of the dummy variable. The recent hike in dividend payments could well have resulted in increased speculation leading to a further price rise. The other indicators namely EPS and PE also have some effect but that is marginal. The significance of the dummy variable all the more strengthens the liking that the speculators have for this scrip.

#### 4 Ceat Tyres of India Ltd.:

This company under the Goenkas was incorporated in 1958 at Bombay and has a paid up equity capital of Rs.1476 cr.

The face value of the shares was Rs.100 till February 1987 and subsequently underwent a split-up in March 1987. The objects and activities of the company may be summed up as construction, production, manufacture, press, repair, retread, purchase, sell and generally to deal in tyres, semi-tyres for all types of vehicles and inner tubes, flaps and repairs material in general.

The scrip has had a reasonable performance with its performance really looking up from 1986 onwards. Dividend payment made by the Company has increased steadily over the six years from Rs.15 for a Rs.100 share in 1985 to Rs.3/Rs.10 share in 1989. Market sentiments seem to have negligibly affected this scrip. At the height of the boom period of 1985-86, it started its rise. The bearish period of 1987 saw the scrip being split. Even then the rise was never stymied. 1988 saw a record rise in its profit margin over the previous year. After that the profitability rate seems to have stagnated.

The linear regression results tend to reflect this story. The most significant influence is that of the dummy variable. The failure of the scrip to denote market sentiment of shares is thus reflected by this. The influence of net profit is the next strongest but it seems to affect

the share price with a lag. The constant growth of dividend also has a strong positive influence on the price changes. BVS, EPS also affects price change but with a lag. On the whole, the decent performance of this scrip has its manifestations in almost all the indicators.

The log linear form however shows a different picture. The most significant determinant is dividend and then it is PT. Net profit is significant at a lower level of significance. However all the coefficients are positive. This difference could well be due to the effect of the split of shares. Eventhough this was reflected by the significance of the dummy variable but still it could have perhaps failed to reflect the difference of the fall in the two variables of price and dividend. A more specific dummy variable could have been a better solution.

##### 5 Century Textiles and Industries Ltd.:

The Company has paid up equity capital of Rs.2661 crores with the face value of each equity share being Rs.100. This B.K. Birla Company manufactures textile fabrics, rayon yarn, tyre chord, caustic soda and allied chemicals, salt, cements rayon, gradewood pulp and writing and printing paper. This company also carried on shipping business.

Table 4.04 : Regression Results for CEAT LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1989	C	616.5		1.256	
	BVS	-0.052		2.627	
	DIV	2.314	0.977	1.254	2.521*
	DUM	104.891	(0.930)	5.925	
	NETP	-0.001		5.494	
	EPS	-0.889		3.709	
1977-1989 (Log Linear)	C	0.451		0.251	
	LBVS	-0.085	0.931	1.093	
	LDIV	0.803	(0.873)	5.979	1.715*
	LNETP	0.245		2.139	
	LPT	0.438		3.295	

Note : \* shows that autoregressive schemes have been run

Table 4.05 : Regression Results for CENTURY TEXTILES LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	273.879		2.336	
	BVS	0.314	0.988	4.114	2.379*
	DIV	-16.359	(0.981)	2.802	
	NETP	0.003		9.802	
	PT	23.191		4.649	
1977-1990	C	-270.709		3.676	
	BVS	0.481	0.995	7.529	2.711*
	DUM	185.576	(0.991)	4.692	
	NETP	0.003		15.942	
	PT	13.588		4.451	
1977-1990 (Log Linear)	C	-4.211		4.017	
	LBVS	0.357	0.939	2.553	2.447*
	LDIV	-0.033	(0.896)	0.151	
	LNETP	0.681		7.096	
	LPE	0.257		2.895	
1977-1990 (Log Linear)	C	-2.927		1.951	
	LBVS	0.382	0.916	2.351	2.365*
	LDIV	0.031	(0.856)	0.135	
	LNETP	0.546		5.691	
	LPT	0.239		2.096	
1977-1990 (Log Linear)	C	-3.261		2.248	
	LBVS	0.511	0.913	3.971	2.627*
	LDIV	-0.129	(0.851)	0.473	
	LNETP	0.715		6.286	
	LEPSL	-0.337		2.071	

Note : \* shows that autoregressive schemes have been run

The price of this scrip rose along with the overall market sentiment and reached a peak in January 1986 which coincided with the height of the 1985-86 boom of the Indian Stock Markets. The subsequent fall in prices was temporary and with each passing year it is soaring to new peaks. The dividend payments by the company have been quite constant with the last two years reaching a maximum of Rs.50 per share of Rs.100. Subsequently, EPS has also risen in the last two years. This share is prominent member of the 'specified list'.

The regression analysis for this scrip also gives net profit as the main determinant of the price rise. BVS comes a close second. Both PE and PT are the codeterminants. In the presence of PT, dividend has an inverse relation with price. However this is mainly due to the presence of a lagged factor. In the presence of PE, dividend has a positive influence on the price of the scrip. It is surprising to note that EPS does not affect the share prices to a great extent. May be five year hence, it could have a greater influence. As of now, PT seem to be a bigger factor than EPS. Since there has been no such split of shares as in the previous scrip, the log linear form correlates the above finding. Alongwith it also adds EPSL as a significant determinant at a lower level of significance.

## 6 Food Specialities Ltd.(FSL):

The Company with a paid up equity capital of Rs.19.20 cr. manufactures all kinds of milk and other food products. It was incorporated in 1959 and was promoted by Nestle Alimentana S.A. through a wholly owned subsidiary Nestle Holdings Ltd., Nassam, Bahama Islands.

The study of this scrip could be made only till 1988 since further figures could not be obtained. Though constant, it had a very indifferent showing with dividend payments being bountiful during the period 1982 to 1985. The PE also had continuously risen till 1986 after which it fell but still maintained a high of 24.

The high figures of PE tend to come out openly in the regression analysis. The indifferent showing notwithstanding, the high value of PE seems to indicate the image of the company as a 'sleeping giant'. The other significant determinants are BVS, DUMP and the dummy variable. The insignificant showing of this scrip in recent times is quite amply demonstrated by the negative coefficient of BVS which is also correlated by the log linear form. Also that the external effect are quite strong is justified by the strong significance of both DUM and DUMP

but not net profit. The next few years could really see this company 'wake up'.

**7 Great Eastern Shipping Co. Ltd. (GE SHIPPING):**

The face value of the Company's Share is Rs.10 per share amounting to a total paid up equity capital of Rs.6778 cr. This shipping company operates regular cargo services on the Indian Coast and in adjacent waters and carries mineral oil products on the Indian Coast under charter. In addition, it also carries on overseas liner service between the West Coast of Canada, USA and India. The company also acts as agents for foreign shipping companies owned by Bhindandiwala. It is by far the best managed shipping company. The share is periodically shifted in and out of the forward list.

Share prices of this company have been comparatively stable with the price graph showing 1991, with the highest rise. The range of price variation per share was one of the lowest among scrips. However, its dividend payments have also been one of the lowest among the companies with the highest being Rs.2.40 in 1991, with the result that PE values have remained quite low. The net profit on the other hand have been on the rise since 1988 and given this trend the rise in dividend payments should continue.

Table 4.06 : Regression Results for FOOD SPECIALITIES LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1988	C	34.1930		4.789	
	BVS	-0.8890	0.998	3.244	2.024
	PE	4.9090	(0.997)	29.419	
	DUMP	0.0003		4.063	
	DUM	-16.2280		4.311	
1977-1988	C	38.4130		6.596	
	BVS	-0.7290	0.999	3.455	2.335*
	DIV	-0.0810	(0.998)	1.248	
	PE	4.4190		25.118	
	DUMP	0.0005		6.409	
	DUM	-22.7240		7.696	
1977-1988 (Log Linear)	C	3.301		3.368	
	LBVS	-0.139	0.995	1.184	2.205*
	LPE	0.994	(0.991)	12.262	
	LNETP	-0.095		0.961	
	DUM	-0.057		1.212	

Note : \* shows that autoregressive schemes have been run

Table 4.07 : Regression Results for G.E.SHIPPING LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	27.271		63.956	
	DIV	-8.906	0.996	22.969	2.304*
	EPSL	2.682	(0.991)	41.932	
	NETP	0.0001		31.699	

Note : \* shows that autoregressive schemes have been run

The rise in net profit seems to have led both net profit as well as EPSL to be the main determining factors in the price changes of this scrip. The auto regression analysis of this scrip brings this effect much more clearly. The other determinant is dividend which not surprisingly has a negative coefficient to its quite insignificant amounts. The log linear form of this particular scrip could not be run due to the insufficiency of some data as well as the presence of some negative figures. However since this share has not been split ever, we will consider these results for our further analysis.

#### 8 Glaxo India Ltd. (GLINDIA):

This FERA company had been incorporated in 1924 and is the largest pharmaceutical company in the private sector with a paid up equity capital of Rs.2000 cr. The activities of the company include the manufacture, distribution, and sale of pharmaceutical, medical, chemical, biological and therapeutic preparations, food for infants and invalids, dietetic foods, cereals and foodstuffs of all descriptions and various kinds of chemicals.

The range of price variation of this company too have been relatively small. The dividend payments by this company too have been quite low but with a definite upward

trend, however low it may be. Surprisingly the PE value has been quite generous with 1991 recording a high of 19.34.

The near monopoly position of this company in the pharmaceutical market is clearly brought out by the significance of BVS in its price variation. Also its superior position in the market is represented by the high PE values. The regression analysis too correlates this fact. However, the price changes of this scrip is more strongly affected by the logged effect of PE. In fact both PT and BVS are the main determinants of the price changes of this company. The 'image' the company enjoys in the Indian market is clearly brought out by this fact. The significance of net profit is also quite strong but at a lower level of significance.

#### 9 Grasim Industries Ltd.:

The Company has a paid up equity capital of Rs.4994 cr. It is controlled by the Birla Group of Companies and manufactures products ranging from viscose staple fibre, carbon-di-sulphide, Sulphuric Acid, Sodium Sulphate, Rayon and Cotton Fabrics to Rayon grade paper and pulp and also cement. The company also owns an engineering workshop. It

Table 4.08 : Regression Results for GLAXO INDUSTRIES LTD  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	-47.4770		4.492	
	BVS	1.2990	0.961	1.856	
	NETP	0.0002	(0.945)	2.245	1.961
	DIV	11.9460		1.251	
	PT	1.9910		5.002	
1977-1991	C	-48.5660		6.914	
	BVS	2.3610	0.977	5.629	2.016*
	NETP	0.0002	(0.967)	2.073	
	PT	2.0020		6.411	
1977-1991	C	-5.172		3.647	
	LNETP	0.413	0.961	2.038	1.806*
	LBVS	0.884	(0.943)	2.474	
	LPT	0.611		4.688	

Note : \* shows that autoregressive schemes have been run

Table 4.09 : Regression Results for GRASIM LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	-64.7560		6.201	
	BVS	-0.1140	0.995	2.104	2.038*
	DUMP	0.0007	(0.991)	8.983	
	EPSL	0.6810		1.424	
	DIV	56.6880		15.047	
1977-1991 (Log Linear)	C	2.658		8.827	
	LBVS	-0.097	0.949	1.385	1.926
	DUMN	0.008	(0.928)	1.435	
	LEPSL	0.135		1.764	
	LDIV	1.965		11.124	

Note : \* shows that autoregressive schemes have been run

has a virtual monopoly in its mainline viscose staple fibre and also an excellent exporter for this product.

The company has been one of the very steady performers of the market and its share prices have moved within a comparatively narrow range with 1991 recording a substantial high. The dividend payouts have also been quite constant but with a definite upward bias.

The reputation of the company as also its steady performance seem to have made this scrip into a good investors' scrip. The regression analysis brings out the superior influence of dividend on the price changes of this scrip. The next most important determinant is net profit (and hence DUMP) and then BVS. The reputation of the company seem to be more strongly built on its performance rather than on its image as a "Blue Chip" company. The steady performance of the scrip irrespective of the market sentiment is clearly brought out by the insignificance of the dummy variable. However bullish sentiments seem to affect this scrip quite strongly. This is brought out by the strong significance of DUMP.

The log linear form almost acknowledges this fact. However the growth pattern seems to have been much more

significant for EPSL than for net profit. Dividend, of course, is its most significant determinant.

#### 10 Gujarat State Fertilizers Ltd. (GSFC):

The Company was incorporated in 1962 in the joint sector with a paid up equity capital of Rs.4475 cr. and it manufactures chemical fertilizers, petro-chemicals and other allied products such as urea, ammonium sulphate, ammonia etc. This company is the sole manufacturer of aprotactum but its pricing policy is a politically sensitive matter. The face value of the shares was originally Rs.100 but underwent a split up in May 1986.

The split in shares led to the fall in its price curve since 1986. The year before had seen a quantum leap by this scrip. however, since 1986, it has maintained a constant level. The dividend payouts have also been steady with a slight fall in 1990 to Rs.3/share from Rs.3.75/share the year before.

The public sector giant seem to have made an 'image' for itself. The most important determinant is BVS as shown by the regression chart. The effect of EPS is also quite significant and the insignificant showing of the scrip is brought out by its negative coefficient. The political

sensitiveness of this public sector is clearly brought out by the strong significance of the dummy variable. The negative coefficient seem to indicate a lagged effect with relation to the price of the scrip. With the winds of privatisation blowing more strongly than before, this scrip has to shed its 'image' factor and become more performance oriented.

#### 11 Hindustan Aluminium Corporation Ltd. (HINDALCO):

The Company was incorporated in 1958 and in one of the two primary aluminium manufacturers in the private sector. it belongs to the Birla Group and has a paid up equity capital of Rs.2284 cr. with a face value of Rs.10/share. The objects and activities of the company consists of the manufacture of alumina aluminium and also minimum fabricated items. The company was formed by the House of the Birlas in collaboration with the Kaiser organisation of USA which disinvested all its equity share-holdings of the company in May-June 1988.

The price of this scrip has been on the rise since 1985 with its dividend payments also maintaining a similar trend. However, since 1987, the dividend payments have been quite

Table 4.10 : Regression Results for S.S.F.C. LTD  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1989	C	4513.579		0.181	
	BVS	1.233	0.979	8.089	
	NETP	-0.0005	(0.958)	1.787	1.952*
	DUM	-47.713		2.159	
	EPS	-2.805		3.775	
1977-1989 (Log Linear)	C	-0.239		0.105	
	LBVS	0.968	0.974	3.695	
	LNETP	0.167	(0.952)	1.178	2.099*
	LEPS	-0.349		1.478	
	DUM	-0.174		1.516	

Note : \* shows that autoregressive schemes have been run

Table 4.11 : Regression Results for HINDALCO LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	-4.75		0.37	
	BVS	0.529		5.3	
	DIV	-10.259	0.994	1.445	2.216*
	NETP	0.001	(0.990)	19.552	
	EPS	-3.94		4.835	
1977-1990	C	15.234		1.442	
	BVS	0.378		4.201	
	DIV	-22.569	0.996	4.516	2.098*
	NETP	0.001	(0.991)	9.873	
	EPSL	3.331		6.042	
1977-1990 (Log Linear)	C	-7.014		6.921	
	LBVS	0.483	0.967	2.371	2.079*
	LNETP	0.686	(0.951)	15.009	
	LPE	0.456		6.134	
1977-1990 (Log Linear)	C	-13.426		5.422	
	LBVS	0.894	0.962	3.345	2.248*
	LNETP	1.319	(0.943)	7.543	
	LEPS	-0.895		4.803	

Note : \* shows that autoregressive schemes have been run

handsome which is primarily due to a substantial increase in the net profit graph also from 1987 onwards.

The superior influence of net profit finds adequate representation in the regression analysis carried out. It is by far the most important determinant. The co-determinants include BVS, dividend as also EPS. Both dividend and EPS suffer from a lagged effect. The steady performance of this scrip, has also led to a steady PE ratio. Overall, the superior showing of this scrip has led to the improvement of almost all economic indicators as amply demonstrated by the log linear form also.

## 12 Hindustan Lever Ltd.:

This company came into the limelight mostly after the substantial dilution of foreign holdings in the 1970s. It has a paid up equity capital of Rs.9332 cr. with the nominal value of each share being Rs.10. The company manufactures soaps and detergents, toilet preparations, vanaspati, animal feeding stuff, glycerin and nickel catalysts, chemicals and chemical products.

This scrip has a very sketchy performance. Share prices of this company rose with occasional reactions over the period 1985 to 1987. Thereafter, prices fell and

recovered only since 1989. Dividend payouts reached a high of Rs.3.40 in 1986. Thereafter it again reached that mark in 1989 after which it recorded its highest dividend payouts of Rs.4.20/share in 1990. The overall performance of the company has been quite satisfactory over the last five to six years and this is one of the widely traded 'specified list' shares involving a huge turnover. This had led the PE ratios to maintain a steady growth.

The regression analysis shows the main determinant of the price changes to be net profit. The steady but definite growth of the dividend payments has also influenced the price changes as also PE and BVS. The previous sketchy performance as well as the speculative effects of the market seem to have influenced the price changes of this scrip. This is clearly brought out by the significance of PE. However the recent steady performance of this scrip and the fact that it is one of the most hotly traded shares has led to the superior influence of net profit. Of course the other economic indicators have also been giving good results.

### 13 Hindustan Motors Ltd. (HINDMOTORS):

The paid up value of the Company amounts to Rs.2633 cr. with a face value of Rs.10/share. The company was incorporated in 1942 and is under the G.P. Birla Group. Its

Table 4.12 : Regression Results for HINDUSTAN LEVER LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	-36.5140		1.605	
	DUMP	0.0002	0.933	3.174	2.053
	PT	3.1999	(0.904)	3.093	
	DUM	-28.7008		1.771	
	DIV	25.0310		2.887	
1977-1990	C	-8.3560		0.541	
	DUMP	0.0002	0.924	2.307	1.798
	PE	5.7780	(0.899)	5.685	
	DUM	-25.6090		1.239	
	BVS	0.2210		2.121	
1977-1990	C	-109.6830		2.763	
	BVS	4.8920	0.919	2.074	1.424
	DIV	58.0540	(0.869)	4.734	
	DUM	-83.0620		3.661	
	DUMP	0.0004		5.348	
	EPS	-20.144		2.017	
1977-1990 (Log Linear)	C	-6.346		3.708	
	LBVS	0.521	0.921	2.396	2.001
	DUM	0.195	(0.886)	1.488	
	LPE	0.527		2.672	
	LNTP	0.593		3.339	

Table 4.13 : Regression Results for HINDUSTAN MOTORS LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	1.7820		0.521	
	BVS	0.7710	0.962	9.501	1.501
	DUM	6.1220	(0.946)	2.056	
	NETP	0.0002		4.255	
	PT	-0.9880		4.077	
1977-1990 (Log Linear)	C	-0.439		0.615	
	LBVS	0.812	0.914	3.566	1.723*
	LNTP	0.108	(0.872)	1.554	
	LEPSL	-0.027		1.083	

Note : \* shows that autoregressive schemes have been run

activities include the manufacture and assembly of Hindustan Ambassador Cars, Bedford Trucks, Lion Diesel Engines, Marion Shovels, Scrappes and Bull Dozers and all kinds of Steel Fabrication works.

Prices of this scrip moved along with the market sentiment during the initial years of 1985 and early 1986 but has subsequently moved in a very narrow range. The latter half of 1988 onwards, the overall market was bullish but the company failed to recover lost grounds. The company's performance has not been too bright especially over the last two or three years and dividend payouts have also steadily deteriorated from Rs.2 in 1985 to Re.0.75 in 1989. As a result the EPS has also fallen and recorded two successive negative figures for the years 1988 and 1989. The 1990 figure is over the red mark but at a marginal 0.77.

As expected, the supreme determinant of this scrip is the BVS. On all the other fronts, this scrip has fared miserably. The other determinants include net profit, PT as well as the dummy variable. PT shows a negative relation with that of price. PE on the other hand a positive relation with the price. However, the price has maintained a minimum level mainly due to the importance of this Birla Company in the automobile market. This once blue chip company is

living on its past records. Hopefully, the new economic measures taken by the Government will see this company making a volte face on its dimming economic credentials.

#### 14 Indian Hotels Corporation Ltd. (IHCL):

This is the largest and the oldest hotel chain in the country with a substantial equity holding by the Tatas. The company was incorporated in Bombay in 1958. Its paid up equity capital is Rs.1478 cr.

Share prices of this company have been relatively stable and though its peaked in January 1986 along with the overall market index, during the lean phase of the stock market in 1987 and early 1988 this scrip ruled firmly and lost very little ground. However, the price of this scrip was unable to attain the heights reached by the market during the boom of 1988-89 and maintained its steady movement around the range of Rs.125 to Rs.150. Dividend payments made by the company to its share holders have also been quite stable in the range of Rs.2.50 to Rs.3.00/share. The company working results have been improving over the recent years as reflected by higher profitability ratios.

The regression results of this scrip has given some very interesting results. Just like the steady performance

which the Tata company has registered throughout the period our study, the chief determining factors of the price changes of this scrip have also been very steady. BVS and EPS account for more than seventy per cent of the price variations. In fact they are the ones who are primarily responsible for the price changes both as major and as minor determinants which are significant.

#### 15 Indian Organic Chemicals Ltd. (IOCL):

The paid up equity capital is Rs.1840 cr. with a nominal value of Rs.10/share. The main activities of this company comprise of the manufacture of heavy organic chemicals such as acetic acid, ester solvents, benzyl products, plasticides and polyester fibres and computer softwares.

The share price of this scrip continued to fall even during the booming phase of the market during 1986 and this was aggravated in 1987 and early 1988 when share prices reached a low of Rs.15/share. Market indices moved up since 1988 but such a movement found little match in the price movement of this scrip. The profitability ratios of this company has also been deteriorating since 1987 with some improvements in 1988 and 1990. Dividend payments decreased

Table 4.14 : Regression Results for IND.HOTELS.LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	140.561		14.804	
	BVS	1.296	0.944	7.406	2.153*
	NETP	0.0002	(0.859)	1.518	
	EPS	13.875		11.515	
1977-1990 (Log Linear)	C	4.681		5.519	
	LBVS	0.588	0.764	2.975	2.432*
	DUMM	-0.003	(0.647)	0.338	
	LEPS	1.135		3.109	

Note : \* shows that autoregressive schemes have been run

Table 4.15 : Regression Results for INDIAN ORGANIC CHEMICALS LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	-264.129		5.016	
	BVS	0.412	0.965	5.999	2.299*
	DIV	229.578	(0.931)	5.899	
	DUMF	-0.006		11.146	
	DUM	353.816		11.994	
1977-1991 (Log Linear)	C	10.457		7.135	
	LBVS	-0.288	0.929	2.062	2.164*
	LDIV	-0.582	(0.884)	1.409	
	LNETP	0.562		4.779	
	LEPSL	0.709		6.396	

Note : \* shows that autoregressive schemes have been run

from Rs.1.80/share in 1985 to Re.1.00/share in 1991 with dividends being skipped in 1988.

The almost dismal performance is perfectly brought out by the regression analysis. The auto regression carried out show the superior effect of DUM and DUMP in the price changes of this scrip. It seems that external effects, be it political or economic or natural, have greatly affected the performances of this scrip. The log linear form however brings out EPSL as the most significant determinant. The other determinants are net profit and BVS which expectedly have negative coefficients signifying the almost dismal performance of this scrip. is the BVS which is a must, given the abysmal showing of all the other indicators. That this scrip still controls sufficient market is mainly due to the latter influence.

#### 16 Indian Rayon and Industries Ltd. (IRIL):

This is a Birla Group having a paid up equity capital of Rs.2562 cr. Manufacture of viscose rayon yarn and fabrics, chemical products, high and low tension insulators and Portland Cement comprise of the company's activities.

Share prices of this scrip had moved upwards during the booming months of 1985-86 and declined to some extent over

1987. However, when the recovery phase of the market set in from the latter half of 1988, the share prices of Indian Rayon moved up only moderately and failed to attain the previous peak of Rs.141. The company however had maintained a dividend payout of Rs.2.80/share from 1986 to 1989 with 1990 finding it increased to Rs. 3.00/share. The working results of the company have not been too encouraging in the recent years and this might be one possible explanation of the comparatively subdued price movements of the scrip.

This Birla company also enjoys the 'image' factor and this is adequately brought out by the regression analysis. However net profit is still the most significant factor. External effects also have affected the performance of this company to a significant level. This is all the more indicated by the fact that EPS as well as EPSL have a negative coefficient, which would mean that inspite of the company not showing good results, price has gone up.

#### 17 Indian Tobacco Corporation Ltd. (ITC):

The company incorporated in 1910 in India to acquire and carry on the business of certain British and American tobacco concerns has a paid up equity capital of Rs.6634 cr. with a face value of Rs.10/share. Objects and activities of

Table 4.16 : Regression Results for IND.RAYON LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	10.439		0.199	
	BVS	1.041		11.007	
	DIV	30.07	0.956	1.547	1.813
	DUM	-45.047	(0.929)	1.656	
	DUMP	0.001		2.426	
	EPS	-1.23		2.869	
1977-1990	C	-50.195		0.807	
	BVS	1.536		6.986	
	DIV	54.783	0.983	1.794	2.017*
	DUMP	0.0004	(0.962)	2.072	
	EPSL	-2.178		2.289	
1977-1990 (Log Linear)	C	-3.032		1.123	
	LBVS	0.367		5.766	
	LDIV	0.063	0.903	0.006	1.865
	DUM	0.138	(0.823)	2.766	
	LNETP	0.592		2.714	
	LPT	0.261		0.931	

Note : \* shows that autoregressive schemes have been run

Table 4.17 : Regression Results for INDIAN TOBACCO CO. LTD  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	17.9520		4.035	
	BVS	0.6390	0.984	4.559	2.071*
	NETP	0.0002	(0.973)	7.349	
	DIV	-9.9080		2.301	
	EPS	-1.542		1.705	
1977-1991	C	10.0250		3.811	
	BVS	0.4890	0.995	8.207	2.367*
	NETP	0.0002	(0.991)	16.064	
	DIV	-9.2340		4.175	
	PE	0.779		5.715	
1977-1991 (Log Linear)	C	-7.759		4.115	
	LBVS	0.338	0.974	3.311	2.071*
	LDIV	-0.829	(0.958)	2.049	
	LNETP	0.871		5.393	
	LPE	0.317		3.509	

Note : \* shows that autoregressive schemes have been run

the company include tobacco and leaf processing, printing and packaging, hotels, food and exports.

The working results of this company has been going up steadily mainly due to diversification and expansion. Compared to this, the price variation of this scrip has not been all that volatile. It is only in the last two years that the peak has crossed Rs.100 and gone up to a high of Rs.180 in 1991. The dividends paid have also seen a steady rise from Rs.1.80 in 1982 to Rs.3.00 in 1987 and finally to Rs.5.40 in 1991.

The impressive performance of this 'Blue Chip' company leads obviously to net profit as being the main determinant of the price changes of this scrip alongwith PE. This implies that the reputation of the company is also responsible for the price variation. Dividend is the other determinant having a significant influence, however, at a lower level of significance. The coefficient seems to indicate that dividend affects prices with a lag. This is quite true since dividend is generally announced at the end of the year and hence would affect the prices of the next year. Overall we can say that the company's price graph is dictated more by its performance than anything else. With

diversification, this scrip would become all the more attractive.

18 Kirloskar Cummins Ltd.:

71-152  
The paid up equity capital is of Rs.2640 cr. and its activities include the manufacture of internal combustion engines in particular, diesel engines of all sizes and captives, reciprocating piston engines, gas turbine engines etc. It was incorporated in 1962 at Pune and was jointly promoted by Kirloskar Oil Engines Ltd. and the Cummins Company Inc., USA. The shares of this company originally had a nominal value of Rs.100 which was split up to Rs.10/share in March 1987.

The price movement of this share has not been very much in conjunction with the overall market movement. During end 1985 - early 1986 when the market was generally booming, prices of this scrip had a downward trend and this pattern was reversed at a time when the index was falling. The peak was reached in February 1987 when the bear phase had already set in to the market. After the split, prices have been more stable and the range of variation has decreased remarkably. The profitability ratio also has been increasing since 1987 with the exception of 1989 with the



result that dividend payouts have been quite steady in the range of Rs.2.00/share.

The above analysis implies a lagged effect. This is true in as much as the fact that the regression analysis has indicated EPSL as the main determinant in the price variations. The other determinant is DUMMD which is the dividend value in conjunction with the effect of the dummy. The reputation of the company also has influenced the price variation significantly. It is to be noted that dummy is also quite significant implying the fact that company specific dummies can be quite an important explanatory variable. However the log linear form does away with dividend and shows net profit as the other most significant determinant alongwith EPSL. This is mainly due to the fact that the growth of dividend has been practically nill. Hence even if the dummy properly recounts the effect of the split of shares, it fails to bring out the growth aspect significantly which is much more recognize in the trend of net profit than that of dividend payments.

#### 19 Larsen and Toubro Ltd. (L & T):

This general engineering company carries on business as civil, mechanical, electrical, chemical and agricultural engineers; as manufacturers; as importers and exporters and

Table 4.18 : Regression Results for KIRLOSKAR CUMMINS LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	83.917		2.375	
	BVS	0.610	0.901	2.451	2.074*
	EPSL	5.187	(0.852)	6.111	
	DUMMD	-19.868		5.547	
1977-1991 (Log Linear)	C	0.412		0.295	
	LBVS	-0.067	0.953	0.711	1.919
	LEPSL	0.714	(0.935)	9.512	
	LNETP	0.287		2.596	
	LDUMM	-0.144		2.073	

Note : \* shows that autoregressive schemes have been run

Table 4.19 : Regression Results for LARSEN & TOUBRO LTD  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	26.3972		1.927	
	NETP	0.0002	0.915	4.181	2.348*
	DIV	-10.9766	(0.812)	1.213	
	BVS	1.1408		4.101	
	EPS	-3.7578		3.466	
1977-1990 (Log Linear)	C	-2.2070		2.599	
	LBVS	0.7790	0.907	3.213	1.862
	LNETP	0.3870	(0.879)	3.076	
	LEPS	-0.6160		7.978	

Note : \* shows that autoregressive schemes have been run

as contractors. The company with a total paid up equity capital of Rs.6808 cr. is now under Ambani control and has been the centre of a lot of controversies in recent times, especially since the takeover of Larsen and Toubro.

The share prices of this scrip had been quite steady till 1984 when suddenly the next two years saw it respond wholeheartedly to the bullish trend in the market, thereby reaching its peak of Rs.204 in 1986. Thereafter, it has slipped with 1991 again taking it up to a high of Rs.178. However, it still fell short of its 1986 peak. The sketchy performance of this scrip could be attributed to the controversy involving the take over by the Ambanis that made the investors apprehensive. However, 1991 saw it recording its highest ever net profit and this could be the start of its upward mobility. The dividend payout have been steady since 1986 within the range of Rs.2.00 to Rs.3.00/share.

The controversies notwithstanding, this company has still maintained a good price. This leads to the implication of the superior effect of the reputation of the firm. The recent steady performance has been an added fillip. The regression analysis has likewise brought out both BVS and EPS as being the chief determinants of its price. The other significant determinant is net profit. EPS

once again enjoys a lagged effect on price. Dividend though important has quite a marginal influence on the price of this scrip. Thus it seems to indicate that once it gets rid of the controversies that has surrounded it lately, the sole determining factor will be its performance. Overall it is a very good scrip to hold on to.

## 20 Mahindra and Mahindra Ltd. (M & M):

The products of this company are Jeep type vehicles, petrol industrial engines, industrial process control instruments and also trading in steel and manufacture of professional grade electronic components. The company commenced production in 1948 and has had a good track record ever since. It has a totally captive market in many of its product lines especially for the Jeep among the military, police plantations etc. The nominal value of each share of the company is Rs.10 amounting to a total paid up equity capital of Rs.1926 cr.

Price movements of this share has been quite steady and has not been greatly influenced either by the boom or by the slump. It first reached a high of Rs.124 in 1989 and thereafter rose to Rs.130 in 1991. However, the rise in price after 1989 started falling after that. This led the

dividend payouts also to fall since 1989 with 1991 recording a low of Rs.1.80/share, same as in the year 1984 whereas 1989 had seen it reach its peak at Rs.3.50/share. The EPS has likewise fallen since 1989 whereas PE has risen may be due to expectations of a possible turn-around as also due to the company's monopoly position in the market.

The regression results have also brought out this optimistic outlook that this scrip enjoys in the Indian market. PE has by far the strongest influence in the price variations. The next strongest influence is that of net profit along with DUM and BVS, both affecting the price of the scrip inversely. This could be mainly because of the scrip's recent dismal performance. Thus it seems that the monopoly position of the company has affected speculation quite strongly. This is all the more so due to demand constraints that the industry is facing today. The expectation of better results seem to have led to such speculative activities.

#### 21 Mukand Ltd.:

The company has a paid up equity capital of Rs.1473 cr. with a face value of Rs.10/share. The company is engaged in general engineering work and manufactures iron and steel products, steel castings, steel structurals and various

Table 4.20 : Regression Results for MAHINDRA & MAHINDRA LTD  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	8.3551		1.383	
	NETP	0.0001	0.983	3.281	2.425*
	BVS	-0.6570	(0.953)	4.639	
	PE	8.2281		6.921	
	DUM	-14.5666		4.141	
	DIV	7.1869		2.705	
1977-1990 (Log Linear)	C	-1.381		0.979	
	LBVS	-0.411	0.972	2.472	2.031
	LPE	0.867	(0.959)	5.987	
	LNETP	0.471		4.008	
	DUM	-0.258		2.185	

Note : \* shows that autoregressive schemes have been run

Table 4.21 : Regression Results for MUKAND LTD  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	-53.1370		10.045	
	NETP	0.0004	0.988	8.996	2.628*
	DIV	20.0070	(0.981)	4.581	
	BVS	-0.1640		2.641	
	PE	5.688		11.032	
1977-1991 (Log Linear)	C	0.479		0.591	
	LBVS	0.454	0.925	2.118	1.910
	LDIV	1.054	(0.883)	2.663	
	DUMN	-0.015		0.862	
	LPE	0.529		1.917	

Note : \* shows that autoregressive schemes have been run

kinds of industrial machinery. The company's name was changed from Mukund Iron and Steel Works Ltd. to Mukand Ltd. in 1989 to reflect the company's corporate identity in view of its diverse operations.

This is one of the steadily behaving companies of our sample whose price behaviour reveals a distinct uptrend since 1983. The rising prices of this company have been in the face of the overall market depression and the bear phase setting in around 1987. The range of price variation of the share of this company have been comparatively small and the scrip has not been very speculative. However, 1991 saw a quantum leap in the price, pushing it to a high of Rs.275. It is also surprising to note that 1991 had been the year when its net profit had fallen from the mark achieved during the previous year which till then had also revealed a distinctly upward mobility. The dividend payout had also been quite steady reaching a high of Rs.3.00/share in 1990 as also in 1991.

The results of the regression analysis indicates the most important determinant for the whole fifteen year period to be the dividend payments. The next most significant influence is that of BVS as also PE, however, at lower levels of significance. While the coefficient of BVS is

negative in the case of linear regression, once we consider its growth trend through the log linear form it becomes positive. Thus the growth of BVS has had a positive influence in the growth of its price.

## 22 Peico Electronics and Electricals Ltd.:

The paid up equity capital is Rs.3332 cr. with a face value of Rs.10/share. The products of this company range from radio, tape-recorders and television sets to varied electronic components like water heaters, cinema projections and sound equipment, X-ray, electromedical, hospital and dental equipments.

This company has always suffered from labour management problems which could be one reason for its scrip never really responding to the market sentiment. Though upward mobile till 1986 it had always remained a low priced scrip except for the two boom years of 1985 and 1986 when it achieved its high of Rs.105. After that it nose-dived to reach Rs.31 in 1990 has once again seen a revival in its price trend. However, all through, the price range had been quite small except for those two exceptional boom years. May be 1991 could be the year of its turn-around with the company recording its highest ever net profit. All through

the profitability ratio has been very uneven. The company has been paying very low dividend which culminated in it skipping its dividend payments in the two years of 1988 and 1989. 1991 has however seen it pay a dividend of Rs.2.00/share.

The 'image' factors of the company has been brought out clearly by the regression analysis. Both BVS and net profit enjoy superior influence over the price changes. The other significant determinant is PE denoting the rise in speculative activities. The optimism of a creditable performance by this company, if allowed to do so bereft of its labour management and other similar problems, have kept the price changes to be in an upward direction. Though the recent showing by this company has been impressive, the controversy regarding takeover of this company by the Tatas could again lead this scrip to register indifferent showings.

#### 23 Premier Automobiles Ltd.:

This Walchand group company manufactures passenger cars, trucks and bus chasis, industrial and marine engines and air conditioners. The company has a paid up equity capital of Rs.2252 cr. with the nominal value of each share

Table 4.22 : Regression Results for PEICO INDUSTRIES LTD  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin- Watson Stat.
1977-1990	C	-30.3720		1.837	
	NETP	0.0004	0.684	0.946	1.993
	BVS	1.7630	(0.544)	2.558	
	DUM	12.7170		1.959	
	PE	0.863		2.102	
1977-1990 (Log Linear)	C	-3.299		2.487	
	LBVS	0.877	0.781	3.249	1.871
	LNETP	0.297	(0.699)	3.074	
	LPE	0.301		2.009	

Table 4.23 : Regression Results for PREMIER AUTOMOBILES LTD  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin- Watson Stat.
1977-1990	C	27.2020		1.589	
	DUMP	-0.0009	0.976	2.024	2.104
	BVS	0.2280	(0.966)	7.659	
	DUM	28.5690		1.054	
	EPS	2.173		6.361	
1977-1990 (Log Linear)	C	-5.639		0.738	
	LBVS	0.856	0.891	4.866	2.021
	LDIV	-0.122	(0.754)	0.366	
	LNETP	0.744		1.119	
	LPE	-1.217		2.001	
	DUM	-0.628		1.195	

being Rs.10 since November 1986. Prior to the splitting up, the shares of this company had a face value of Rs.100.

The price trend of this scrip displayed a prominent upward trend till 1986 just before the split of its shares. However, after the split, the share prices have been relatively more stable and prices fluctuated within quite a narrow range. The upward mobility has remained but the rise has been in a subdued manner. The excellent performance of the company could be ascertained from the trend of its profitability curve which has always been upward mobile except for the year 1987. This has led to a fall in the dividend payment for that year. However the company soon made amends by reaching a high of Rs.3.00/share in 1990.

In spite of the recession in the automobile industry, the steady performance of this scrip has found adequate representation in that the regression analysis has shown both BVS and EPS as being the chief determinants of the price variation of this scrip. Nevertheless the present recession in the industry has led to some speculative activities about its nearest future and this optimism finds adequate representation in the significance of PE at a bit lower level of significance.

## 24 Reliance Industries Ltd.:

Incorporated in 1966 by Dhirubhai Ambani, the paid up equity capital is of Rs.15790 cr. The company has one of the largest number of share holders and its activities include the manufacture of synthetic blended yarns and fibres, polyester filament yarn, polyester staple fibre, chemicals and allied products, coloured television glass shells and picture tubes.

Share price of this company have moved quite erratically. It could be mainly because of the fact the operations of this company has been clouded by a number of controversial decisions taken by the Board of Directors. On the profitability side, however, it has always been strong with profits increasing in every corresponding year except for the year 1986 when it fell drastically. The price trend could be divided into three sections: 1982-84, 1984-86 and 1986-90. The first saw its price fall, the second saw its price rise keeping with the bullish sentiments of the market and the last again saw a continuous fall in its prices. The dividend payments have also been quite erratic with only the last three years 1989-91 achieving a constant Rs.3.00/share.

The linear regression analysis likewise shows BVS as the chief determinant to the price changes. Irrespective of

its recent dismal showing, this company has kept its market mainly because of its reputation as a blue chip company. It is, in fact, the company with the second largest equity capital as also asset holdings. Net profit along with PE are the other co-determinants. However net profit seems to suffer from a lag effect. It is surprising that inspite of increasing profits throughout, its performance is still so erratic. The significance of PE seems to indicate such an optimism of the scrip registering higher prices in the years to come. This optimism find adequate representation in the log linear form where PE is the most significant determinant along with BVS.

#### 25 Siemens India Ltd.:

Incorporated in 1957 with German collaboration, the company has a paid up equity capital of Rs.2067 cr. and mainly produces electric motors, switchgear and switchgear items and switch board and control panels.

The company has been a steady performer and its share prices have not been affected to crucially either by the boom of 1985-86 or by the bear period of 1987. Keeping with this trend, it has been one of the low priced scrips with a small price margin. 1991 saw it go out of its trend path

Table 4.24 : Regression Results for RELIANCE INDUSTRIES LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	-44.617		1.538	
	NETP	-0.0002	0.819	3.641	1.915
	BVS	5.169	(0.764)	5.502	
	EPSL	2.257		1.052	
1977-1990 (Log Linear)	C	4.158		2.647	
	LBVS	0.209	0.913	1.781	1.976*
	LNETP	-0.066	(0.869)	-0.641	
	LPE	-0.333		2.987	

Note : \* shows that autoregressive schemes have been run

Table 4.25 : Regression Results for SIEMENS INDUSTRIES LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	-19.701		1.023	
	BVS	1.073	0.922	1.702	
	DIV	9.974	(0.872)	1.268	1.885
	DUM	-13.934		1.519	
	DUMP	0.0004		3.556	
	PE	1.716		3.526	
1977-1990	C	30.498		1.101	
	BVS	0.869		1.191	
	DIV	-36.876	0.913	2.534	2.177
	DUM	15.778	(0.859)	2.713	
	NETP	0.0007		3.159	
	PT	1.562		3.163	
1977-1990	C	107.988		2.378	
	BVS	0.743		0.977	
	DIV	-58.835	0.933	3.013	2.198*
	DUM	18.409	(0.866)	3.199	
	NETP	0.001		3.722	
	EPSL	-8.441		4.035	
1977-1990 (Log Linear)	C	-2.759		3.166	
	LBVS	0.122		0.417	
	LDIV	-0.202	0.939	0.744	2.091
	DUM	0.229	(0.902)	3.295	
	LNETP	0.491		3.649	
	LPE	0.427		5.101	

Note : \* shows that autoregressive schemes have been run

and record its highest ever price of Rs.162.50. The comparatively steady performance of this scrip could be attributed to its steady profit margin since 1986. However, the dividend payments made by the company have been quite meagre. Only the last two years have recorded a relatively high dividend payout.

The regression analysis also shows net profit as having the greatest influence over its price variations. The other significant determinant is PE alongwith EPS as also EPSL and PT. The steady performance of the company has allowed it to be independent of its reputation and depend solely on its performance. This is what all 'good' scrips should end up to. However this has also made it a good scrip for the speculators.

#### **26 Tata Power Company Ltd.:**

This company was incorporated in 1919 at Bombay and is controlled by the Tata Group. It has a paid up equity capital of Rs.2125 cr. with the face value of each share being Rs.100. Activities of this company include electricity generation and supply.

Price movements of this scrip have been quite misleading which was associated with a very uneven profit

curve also. However the price movement of the scrip seem to be very closely related with the market sentiment. The boom years of 1985 and 1986 was this scrip rise to attain its peak of Rs.410 which again fell in 1988 due to the bearish tendencies of the market to a low of Rs.245. Since then the scrip has maintained a steady growth path. However the margin between the high and low of price each year have also been increasing ever since. The dividend payment shave been quite low but have maintained an upward bias rising from Rs.15/share in 1980 to Rs.20/share in 1991.

From the above it is clear that speculative tendencies leading to high price variations each year have taken over quite significantly. The linear regression analysis also correlates this by showing PE as the main determinant to the price changes. However, this has been mainly due to a steady growth path that the company has enjoyed for the last three to four years. The growing profitability rate has also been a significant determinant. BVS as well as dividends have also influenced the price changes. The log linear form however finds the growth of BVS to be the most significant determinant. PE as also net profit are the other important influences on its price.

## 27 Tata Engineering and Locomotive Company Ltd. (TELCO)

The paid up equity of this giant general engineering company is Rs. 10387 cr. with a face value of Rs. 100/share. Given its very size of operation, its performance affects the market sentiment. Manufacture of the company include diesel vehicles for commercial use, excavators, industrial shunters, high quality steel and alloy iron castings and a variety of heavy forgings and machine tools.

The profit curve of this scrip had shown a more or less downward swing since 1983 which ended in 1987. The company has a poor productivity per employee record which leads to high costs. This could be the reason for the very erratic showing of the price graph of this scrip. Keeping in line with the market sentiment, 1986 saw the scrip reach its peak. The next year similarly saw its decline given the bearish sentiments of the market. However with the splitting of the share in 1990, the performance of the company seems to have improved. As with every Tata company, this company also shows a steady dividend growth graph with the exception of 1987, which was mainly due to very poor working results.

As given by the regression results, the most significant influence is enjoyed by net profit. BVS alongwith PE comes a close second. It is a bit surprising

Table 4.26 : Regression Results for TATA POWER LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	-475.765		3.913	
	BVS	0.964	0.896	1.655	2.134
	PE	66.895	(0.868)	2.650	
	NETP	0.001		2.313	
1977-1991	C	-1101.678		2.358	
	DIV	58.306	0.896	1.675	2.107
	PE	83.969	(0.868)	3.989	
	NETP	0.002		2.495	
1977-1991 (Log Linear)	C	-5.924		4.727	
	LBVS	1.078	0.912	2.623	1.992
	LPE	0.583	(0.888)	3.369	
	LNETP	0.384		2.731	

Table 4.27 : Regression Results for TELCO LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	85.302		0.382	
	BVS	1.618	0.738	3.651	2.068*
	DIV	-38.728	(0.513)	2.859	
	DUM	42.159		0.741	
	NETP	0.001		4.232	
	PE	28.029		4.356	
1977-1991 (Log Linear)	C	-5.821		3.266	
	LBVS	0.989	0.766	6.508	2.104*
	LDIV	-1.366	(0.621)	1.916	
	LNETP	1.035		4.253	
	LEPS	-0.663		7.113	

Note : \* shows that autoregressive schemes have been run

but then the improved performance of the company since 1989 could have led to this result. Incidentally it is the company with the third largest asset holding as well as equity capital. The other co-determinants are dividend and EPS, the latter with a negative coefficient and significant at a lower level of significance.

28 Tata Iron and Steel Company Ltd. (TISCO):

The paid up equity capital is of Rs.22943 cr. It was incorporated in 1907 at Bombay. The objects and activities of the company is to carry on business as iron masters, steel converters, manufacturers, miners, smelters, engineers, and tin plate makers. The face value of TISCO shares which have been Rs.100 since inception went about a split in September 1989.

This is one of the most volatile scrips of our sample and is a prominent member of the specified list. Turnover and profits of the company registered a substantial improvement during 1985-86 over that of the previous year mainly due to the rise in steel prices since June 1984. There has been a more or less steady improvement in the operations of this company allowing it to consistently produce above its rated capacity and also because a good

chunk of its output is price controlled and price increases are related to losses incurred by Steel Authority of India Limited (SAIL). Dividend payments of this company have continuously increased from Rs.17/share in 1982 to Rs.25.00/share in 1986 and ending up with Rs.3.10/share (Rs.10 share after the split in 1989) in 1991.

The most significant influence to the price changes as shown by the regression results is enjoyed by BVS. This is mainly due to the sketchy performance of the company belying its status as a private sector giant. In fact the price changes of this scrips have been not because of its indifferent showing but rather the dismal showing of SAIL. Hence prices have always been upward mobile. The superior influence of BVS is all the more significant due to the fact that it is the company with the largest asset holding as well as equity capital. The other significant determinants are net profit as also EPS at a slightly lower level of significance. With the decontrol of steel prices in recent times (January 1992) may be the subsequent results will give a more authentic picture.

## 29 Voltas Ltd.:

The activities of this company include manufacture,

sale and distribution of a variety of products in the engineering, chemical and pharmaceutical industries such as agricultural; earth-moving, air conditioning and refrigeration, textile machinery, machine tools, electrical and mechanical equipment as well as chemicals, pharmaceutical and consumer products. The paid up equity capital is Rs. 1983 cr. with the nominal value of the shares being Rs. 100.

This is one of the most volatile scrips of the chosen sample whose price movement was seldom in close conjunction with the market trends. This was especially so during 1986 when the price of this scrip fell continuously as opposed to the overall upward market trend. The performance of the company seems to have improved with the splitting of the scrip in 1990. The rise in profitability has led to higher dividend payments, which till then was quite meagre.

The regression result shows the greater influence of net profit in the price variations of this scrip. The other significant determinant as per the log linear form is PE implying the forces of speculation at work. At a bit lower level of significance dividend is significant with a definite inverse relation thus implying a lagged effect. The recent turn around by the company thus seems to have made an

adequate impact in the market. This is one of the companies in the lower ring of the equity capital ladder. Hence the price variation of the scrip of this company would be much more influenced by economic indicators rather than by the reputation of the firm as is correctly indicated by the determinants of its share price.

30 Zenith Ltd.:

Incorporated in 1960 at Bombay, the company has a paid up equity capital of Rs. 914 cr. with a face value of Rs. 10. share. Manufacturers of the company include steel pipes of all descriptions, steel ingots and billets, rerolled products, H-acid, T-acid, writing and printing paper, tool bits etc.

This is one of the scrips which never reflected the market sentiment in any great proportion. The boom and depression did affect it but very marginally. Overall, it was one of the very low priced scrips with very meagre price variations. The price has been falling steadily from 1987 onwards with the company skipping dividend payments for the last two years of our study. However with higher profit margins, this scrip could be far a turn around.

Table 4.28 : Regression Results for TISCO LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	-273.9990		1.472	
	BVS	2.0450	0.872	2.799	1.951
	DIV	11.6270	(0.801)	0.668	
	NETP	0.0001		1.397	
	EPS	-4.5320		1.643	
	DUM	141.8170		1.278	
1977-1991 (Log Linear)	C	-4.739		3.155	
	LBVS	0.717	0.943	2.808	1.812
	LDIV	0.747	(0.919)	1.529	
	LNETP	0.487		3.304	
	LEPS	-0.492		1.961	

Table 4.29 : Regression Results for VOLTAS LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1991	C	911.771		1.509	
	BVS	-0.828	0.865	4.057	2.584*
	DUMP	-0.004	(0.781)	7.046	
	DUM	145.738		2.752	
	PE	-3.699		1.985	
1977-1991 (Log Linear)	C	-1.223		0.859	
	LBVS	0.282		2.866	
	LDIV	-0.756	0.774	2.602	2.487*
	LNETP	0.604	(0.581)	5.754	
	LPE	0.529		6.031	
	DUM	-0.203		1.211	

Note : \* shows that autoregressive schemes have been run

Table 4.30 : Regression Results for ZENITH LTD.  
Dependent Variable : ASP

Period	Independent Variables	Coefficients	R Square (Adjusted R Square)	T Stat. (Absolute)	Durbin-Watson Stat.
1977-1990	C	-23.5390		7.046	
	BVS	0.5010	0.965	8.903	
	DIV	9.6380	(0.923)	8.321	2.674*
	DUM	27.9180		8.952	
	NETP	0.0003		21.186	
1977-1990 (Log Linear)	C	-0.671		0.678	
	LBVS	-0.011	0.679	0.075	
	LDIV	0.201	(0.666)	1.883	1.717
	LNETP	0.398		4.949	
	LEPSL	0.214		1.504	

Note : \* shows that autoregressive schemes have been run

This is the company with the lowest equity capital. Coupled with it, is its dismal performance of late. However, the regression results show the significant effect of net profit in its price variations. The co-determinants are dividend BVS and DUM. Dividend has been significant only because of the fact that at times of its good performance, the company has most often come out with bountiful dividends. However, unless and until the company reverses its dismal performance, this scrip could die an untimely death.

#### Section 4.3 CONCLUSION

The aim of this chapter has been to study the determinants of share prices in India on the basis of the study of a sample of thirty companies that comprise the BSE Sensitive Index. It would be in order to conclude by summarizing the results of these companies categorised on the basis of ownership. The different categories in which we shall divide them are: (i) Tata Group of Companies (ii) Birla Group of Companies (iii) Reliance Group of Companies (iv) (Ex) Foreign companies (v) Others.

We shall proceed serially.

(i) Tata Groups of Companies:

Keeping with its reputation of being one of the biggest industrial houses in India, the Tatas Control six of these thirty companies included in our sample. They are ACC Ltd. India Hotels Ltd., Tata Power Ltd, TISCO Ltd., TELCO Ltd., and Voltas Ltd. Among these TISCO Ltd., TELCO Ltd., and ACC Ltd. are ranked way up in terms of equity capital. If we compare these six companies we will find that only Voltas Ltd. does not indicate BVS as one of its significant determinants. All the others show BVS as either its significant determinant or as its coderminant. The primary reason could be Voltas's insignificant showing which belies the expectations of the investors investing in a Tata Group of Company. However net profit is a significant determinant in all the cases. Thus it seems to indicate that expectation and performance have gone hand in hand in case of the Tata Group of Companies. It is because of its steady performance that these scrips are the most sought after in today's market and the performance of these groups have most often lived up to their expectations.

**(ii) Birla Group of Companies**

Second to the Tatas in terms of importance comes the Birlas owning five of these thirty companies. They are Grasim Ltd., Century Ltd., Hindustan Motors Ltd., IRIIL, and Hindalco Ltd. The significant factor about these companies is that they all are included within the group of first sixteen companies ranked in terms of equity capital. Similar to the Tatas, but in a more stronger sense, their performance seems to be their biggest asset. Except for Hindustan Motors Ltd. and Grasims Ltd., all the others show net profit as their most significant determinant. In case of Grasim Ltd., it is dividend which is the most significant again implying performance as opposed to reputation. Hindustan Motors Ltd., on the other hand is constrained by the plight of the automobile industry in general and hence has failed to keep its profitability rate up to the expected mark. However, it still significantly shows net profit as one of its determinants. The thing to be noted along with the above is that on the basis of the consistent performance of the Birla Group of companies, there has been a definite enhancement in its reputation which is indicated by the significance of BVS in almost all these companies.

(iii) Reliance Group of Companies :

It controls two of these thirty companies namely Reliance Industries . Ltd. and L&T Ltd. The takeover of L&T Ltd. in quite controversial manners seems to have affected the performance of this scrip. Reliance Industries also on the other hand has performed quite indifferently. On the whole both these scrips still enjoy the goodwill of the investors significantly on the basis of their huge equity holdings which has affected the BVS favourably.

(iv) (Ex) foreign companies :

The companies included in this section are the present FERA companies and the companies which were once owned by foreign companies. These include companies like FSL, Glaxo Industries Ltd., Hindustan Lever Ltd., ITC Ltd., Kirloskar Cummins Ltd., Peico Ltd., and Siemens Ltd. All of these companies have had steady performance though in case of almost all these companies, the expectations seem to be much higher. The high expectations (belied!) are indicated by the high significance of PE (or PT) in the share price of all these other scrips. This group of companies thus comprise the bulk of the speculators' scrips and are

thus in more ways than one responsible for the volatility of the market index.

(v) Others:

This category consists of the remaining ten companies which are owned by Groups like Thapar, Wadia, Goenka, Bhindandiwali, Walchand among others. Except for Great Eastern Shipping Ltd. & Gujarat State Fertilizers Ltd. all the others are in the bottom half of the equity ladder. Of these GE shipping, Ceat and Mukand have been the most steady performers. Premier Automobiles Ltd. and M&M Ltd. have had common problems. However, except for GE shipping Ltd, GSFC, Mukand Ltd., Zenith Ltd., Bombay Dyeing Ltd., and IOCL, all the others have been speculatively quite volatile. Companies like GE shipping and Mukand have not been quite speculative because of the nature of their respective industries. Bombay Dyeing is in fact one of the most volatile scrips. But it is generally kept in and out of the specified list of shares to control the volatility of the market index. GSFC, Zenith and IOCL have had quite insignificant performances and hence are naturally not good scrips for speculation. Of the others only BIL and Ceat Ltd. have experienced speculation on the basis of

their superior performances. All the others have had speculation on the basis of expectation of better days being ahead. On the whole this comprise a very erratic cluster of companies.

## CHAPTER FIVE

## CONCLUSION

The whole purpose of our research has been to find out the determinants affecting share prices in India. The paraphernalia of the different shares being traded in India gives us an indication of the investor sentiment. Of the various determinants affecting share prices in India, we have also tried to find out the various determinants which affect different share prices most significantly by comparing the elasticity coefficients of the different significant determinants revealed by the log linear form of equations. We now try and arrange them in order to find any pattern that emerges out of it. The companies will also be ranked on the basis of their equity capital so that we can distinguish features if any of the top fifteen or the bottom fifteen companies of that ladder. Essentially our purpose is to see whether we can rationalize our findings in a common framework which will help us in assessing the Indian market better.

If we look at the chart that summarizes our findings we obviously find a pattern. The purpose of this chapter is to highlight these findings.

- (1) On the question of main determinants affecting share prices in India, the effect of net profit is definitely the strongest. In eleven of the thirty companies

included in our sample, net profit is significantly the most important determinant. BVS is a very close second. In nine of these companies it is the most significant determinant. Of the remaining ten companies, PE (or PT) is the most significant determinant in four, EPS (or EPSL) in three and dividend also in three of the companies. The superior significance of net profit and BVS thus implies the fact that though the Indian investors look for the growth aspect in each scrip (denoted by net profit as has been explained before), the price of some of these important scrips (including the blue chip companies) are never allowed to fall to very low levels due to the presence of optimism (denoted by BVS which is an indicator of the reputation of the firm) on the part of the investors.

- (2) The scrips of the top fifteen companies indicate a very biased picture. Net profit and BVS together explain the price changes of twelve companies with the former having the greater influence. The important thing to be noted is that only in the case of of Reliance industries Ltd., PE has been the most significant. Also only in the case of four other companies like Hindustan Lever Ltd., ITC Ltd., Peico Ltd. and Century Ltd. has PE been quite significant. On the whole it indicates

Table 5.01: Analysis of Determinants Affecting Share Prices in India  
(According to Ranking of Companies on the basis of Equity Capital)

Sl.No. (Rankwise)	Name of the Company	Most Significant Determinant	Other Significant Determinant(s)
1	TISCO	LBVS	LNETP
2	RELIANCE	LPE	LBVS
3	TELCO	LNETP	LBVS
4	HIND.LEVER	LNETP	LPE/LBVS
5	L&T	LBVS	LEPS/LNETP
6	G.E.SHIPPING	NETP	EPSL
7	ITC	LNETP	LBVS/LPE
8	ACC	LBVS	LDIV
9	GRASIM	LDIV	LEPSL
10	GSFC	LBVS	LEPS
11	PEICO	LBVS	LNETP
12	CENTURY	LNETP	LBVS
13	KIR.CUMMINS	LEPSL	LNETP
14	HIND.MOTORS	LBVS	LNETP
15	IRIL	LNETP	LBVS

Table 5.01 Contd.: Analysis of Determinants Affecting Share  
Prices in India  
(According to Ranking of Companies on the basis of Equity Capital)

Sl.No. (Rankwise)	Name of the Company	Most Significant Determinant	Other Significant Determinant(s)
16	HINDALCO	LNETP	LBVS/LPE/LEPS
17	PREMIER	LBVS	LPE
18	B.I.L.	LPT	LNETP
19	TATA POWER	LBVS	LPE/LNETP
20	SIEMENS	LNETP	LPE
21	GLINDIA	LBVS	LPT/LNETP
22	VOLTAS	LNETP	LPE/LDIV
23	M & M	LPE	LNETP
24	FSL	LPE	LBVS
25	IDCL	LEPSL	LNETP/LBVS
26	IHCL	LEPS	LBVS
27	CEAT	LDIV	LPT/LNETP
28	MUKAND	LDIV	LBVS/LPE
29	BOMBAY DYEING	LBVS	DUM/LNETP
30	ZENITH	LNETP	LDIV

the lack of rampant speculative activities on the top half of the equity ladder.<sup>1</sup>

- (3) Now if we consider the second most important determinant along with the most important determinant both showing either net profit or BVS, we find that except for Grasims Ltd., all the others show a significance of net profit or BVS. Thus on the grounds of these facts we can assert that whatever the level of speculation involved in the case of companies in the top half of the equity ladder, it most often had some basis in either the net asset value of the firm or its growth potential. Incidentally Grasims Ltd. show dividend and EPSL as its two most significant determinants. Whereas dividend is an indicator of the past records of the firm, EPS (and thus EPSL) is a very important growth indicator. Thus our conclusion is all the more strengthened.

- (4) The scrips of the bottom fifteen companies show a more skewed result in terms of the most significant determinant. All the determinants considered namely net

---

1. One can refer to Srivastava's study in this context. profit, BVS, PE (or PT), EPS (or EPSL) and dividend are

profit, BVS, PE (or PT), EPS (or EPSL) and dividend are more or less equal in importance explaining the price patterns of four, four, three, two and two companies respectively. On the other hand if we consider the general significance of these various determinants, we find a different picture. In all, net profit and PE are significant in eleven of these fifteen companies whereas BVS is significant in eight of these companies. Thus we can conclude that speculation is much more rampant in the bottom half of the equity ladder than in the top half.

- (5) Now if we consider the number of companies which show either net profit or BVS as explaining quite significantly the price patterns of the various companies included in the bottom half we find that in all the cases net profit or BVS is significant. As has been already indicated that PE is also quite significant in the case of these companies. Thus the previous conclusion that we had endorsed for the companies included in the top half is also true for all the companies in general, that is speculation in the Indian stock market has its basis in either the networth of the company or in its growth potential.

- (6) An important thing to note for all the companies in general is the almost complete absence of the dummy variable in explaining significantly the price patterns of the different companies. Only in the case of Bombay Dyeing Ltd. is it quite significant. Hence whatever the political or market compulsion, these scrips have ruled the market either because of their reputation or because of their growth potential.
- (7) Another significant point is that dividend is not quite such a significant factor in the Indian market. Only in the case of three companies namely Grasim Ltd., Ceat Ltd, and Mukand Ltd, is it the most significant determinant. The reputation of the firm does not seem to depend on its past record (dividend payment). Rather, it points to the asset holding of the firm (signified by BVS). This is mainly due to the fact the dividend payment's have either been quite stagment or quite meagre in amount. As the national figures show, shares as percentage of individual financial asset holdings is still quite insignificant in the case of India. In such a situation, the risk averse Indian public tends to find banks more safe than investing on shares. This could be one reason for the insignificance

of dividends. However, given the fact that in cases of companies like Grasim Ltd, Ceat Ltd. and Mukand Ltd. where dividend was bountiful and hence significant, the "mark up" of dividend on shares over and above the bank interest has to be quite high. This is also due to the fact that at times companies tend to skip dividend payments which tends to cast a shadow over the comparative advantage that a share enjoys over the bank interest. However, given the stupendous growth rate of mutual funds in recent times, it could be a way out for the risk averse public in shifting to investing more in the stock market.

- (8) If we consider the scrips where BVS or net profit is either the most important or the second most important determinant, then we find that except for Grasims Ltd., all the other scrips satisfy our condition. Now, if we consider the same eventuality for net profit only, we find that in twenty two of these thirty companies net profit is a significant determinant. Companies like Premier Automobiles Ltd. or GSFC have quite a dismal performance and hence are traded solely on the ground of reputation of the firm or expectation of a turnaround. Hence we can infer that the Indian market is predominantly growth oriented with the reputation of

Table 5.02: List of Companies with NETP as a Significant Determinant  
(According to Ranking of Companies on the basis of Equity Capital)

Sl.No. (Rankwise)	Name of the Company	Most Significant Determinant	Second Best Determinant
1	TISCO		LNETP
3	TELCO	LNETP	
4	HIND.LEVER	LNETP	
5	L&T		LNETP
6	G.E.SHIPPING	NETP	
7	ITC	LNETP	
11	PEICO		LNETP
12	CENTURY	LNETP	
13	KIR.CUMMINS		LNETP
14	HIND.MOTORS		LNETP
15	IRIL	LNETP	
16	HINDALCO	LNETP	
18	B.I.L.		LNETP
19	TATA POWER		LNETP
20	SIEMENS	LNETP	
21	GLINDIA		LNETP
22	VOLTAS	LNETP	
23	M & M		LNETP
25	IOCL		LNETP
27	CEAT		LNETP
29	BOMBAY DYEING		LNETP
30	ZENITH	LNETP	

the firm acting a ratchet effect (as similar to Dusenbery's Ratchet Effect of consumption) in case of dismal performance of a firm. This is also an indication of the "optimistic" outlook of the market.

- (9) If we consider the economic rationale behind the facade of the 'image bias' it also seems to have a reason. More than anything else, it signifies the risk averseness and also acts as an insurance cover to such investing public. In case of bankruptcy of the company, it is the asset holding of a company which will be distributed among the share holders. Hence the larger the total asset value, the larger will be BVS and hence a larger insurance cover will be granted to its shareholders. Of course it also depends on the total number of shareholders of the company but still then BVS is quite a correct indicator of the insurance cover thus granted.

#### Shortcomings of the Study

- (1) As we have already pointed out, it would have been much better had we used company specific dummy variables. This would have helped in pointing out the effect of a split of shares on its price. However as most of these splits took place on or around 1988 our general dummy

variable has been quite successful in negating any abnormal effects. But still the advantage of a more specific dummy cannot be refuted.

- (2) Along with the determinants that we have chosen some other determinants could also have been used, for example, net sales to ascertain the demand of the product. Other macro variables like the growth of industrial production, money supply among other such many variables could also have been used. Though we except our dummy variable to adequately represent all such variables, it is evident that it may not be so. However some such limitations are bound to arise in every study and we acknowledge any such lack of effort on our part.

## BIBLIOGRAPHY

- Agarwal, K.P. (1963): "Share Prices and Corporate Dividends", Indian Journal of Economics, vol.43, no.177, 347-362.
- Alexander S.S (1961): "Price Movements in Speculative Markets : Trends or Random Walks", Industrial Management Review, vol.2, no.2, 7-26.
- Bachelier Louis (1900) : Theorie de la Speculation, Paris : Cauthiers-Villurs, Translation by A. James Boness, reprinted in Cootner (1964), 17-78.
- Ball R. and Brown, P. (1968) : "An Empirical Evaluation of Accounting Income Numbers", Journal of Accounting Research, Autumn, 1968, 176-177.
- Barua S.K. (1981) : "The Short Run Price Behaviour of Securities : Some Evidence on Efficiency of Indian Capital Market", Vikalpa, vol.6, no.2, (April).
- Barua S.K. and Srinivasan G. (1986) : "Investigation of Decision Criteria for Investment in Risky Assets", Omega, vol.15, no.3, (December)
- Basu, S (1977), "Investment Performance of Common Stocks in relation to their price earnings ratios : A test of the efficient market hypothesis", Journal of Finance.
- Beaver W.H., (1968) : "The Information Content of Annual Earnings Announcement", Journal of Accounting Research, 67-92.
- Blanchard, O.J. and Watson M.W., (1982), "Bubbles, Rational Expectations, and Financial Markets", in Paul Wachtel (ed.), Crisis in the Economic and Financial Structure, Health and Company, Lexington.
- Chandra Prassana (1977), "Valuation of Equity Shares in India, New Delhi, Sultan Chand and Sons.
- Cooley (1976), "A multidimensional analysis of institutional investor perception of risk", Journal of Finance, 32(1), 67-78.

- Cooper, J.B., (1982), "World Stock Markets : Some Random Walk Tests", *Applied Economics*, 14.
- Cootner, P.H. (1962), "Stock Prices : Random vs. Systematic changes", *Industrial Management Review*, Vol.3, 24-45.
- \_\_\_\_\_, Ed., (1964), "The Random Character of Stock Market Prices", Cambridge, Mass : M.I.T, Press.
- Cowles A. and Jones H.E., (1937), "Some a Posteriori probabilities in Stock Market Action", *Econometrica*, vol.5, no.3, 280-294.
- Desai M., (1965), "Stock Prices, Earnings, and Dividends in India : A quantitative Analysis", *Indian Economic Journal*, vol.12, no.4, 432-436.
- Dryden M.M (1970), "Filter Tests of United Kingdom Share Prices", *Applied Economics*, vol.7, 265-275.
- Fama, Eugene F. (1965), "Random Walks in Stock Market Prices", *Financial Analysts Journal*, vol.21, no.5, 55-59.
- Fama, E.F. (1965), "The Behaviour of Stock Market Prices: Journal of Business", vol.38, 34-105.
- \_\_\_\_\_, (1970), "Efficient Capital Markets : A Review of Theory and Empirical Work", *Journal of Finance*, vol. 25, no.2, 383-417.
- Fama E.F. and French K.R. (1988), "Permanent and Temporary Components of Stock Prices", *Journal of Political Economy* 96, 256-273.
- Geweka, J. (1980), "A note on the Testable Implications of Expectations Models", *University of Wisconsin-Madison, SSRI Workshop Series*.
- Godrey M.D., Granger C.W.J. and Morgenstern, O. (1964), "The Random Walk Hypothesis of Stock Market Behaviour", *Kyklos*, vol.17, 1-30.
- Gordon, M.J. et al. (1972), "Experimental Evidence on Alternative portfolio Decision Rules", *American Economic Review*, 62(1), 107-118.

- Government of India Publications : Report on Currency and Finance, RBI.
- Granger, C.W.J and Morgenstern, O. (1963), "Spectral Analysis of New York Market Prices" *Kyklos*, vol.16, 1-27.
- Green Christopher, (1991), "Quick Methods of Estimating the Price of Government Bonds", *Oxford Bulletin of Economics and Statistics*, August 1991.
- Gupta L.C. (1972), "Net Present Value versus Internal rate of Return : A Comment", *Economic and Political Weekly*, February, M43-44.
- Gupta L.C., (1973), "Bonus Shares, Bombay, MacMillan India.
- Gupta L.C., (1981), "Rates of Return on Equities : The Indian Experience", New Delhi, Oxford University Press.
- Gupta O.P. (1978), "The Random Walk Theory of Stock Market Prices Behaviour - A Survey", *Review of Commerce Studies*, vol. VIII, March 1979, 51-75.
- Gupta O.P. (1985), "Behaviour of Share Prices in India : A Test of Market Efficiency", National Publishing House, New Delhi.
- Jennergren and Korsvold (1975), "The non-random character of Norwegian and Swedish Stock Market Prices", in Elton and Gruber, 37-54.
- Jensen, M. (1968), "The Performance of mutual funds in the period 1945-64", *Journal of Finance*, 23, May 389-416.
- Jensen, M. (1969), "Risk, the pricing of capital assets and the evaluation of investment portfolios, *Journal of Business*, 42, April, 167-247.
- Jensen, M. and Benington, G.A., (1970), "Random Walks and Technical Theories : Some Additional Evidence", *Journal of Finance*, (May), 469-82.
- Johnston J. "Econometric Methods, 2nd ed. New York, McGraw Hill Book Company (1972).
- Kemp, A.G. and Reid G.C. (1971), "The Random Walk Hypothesis and the Recent Behaviour of Equity Prices in Britain",

vol.38, *Economica*, 28-51.

Kendall, M.G. (1953), "The Analysis of Economic Times Series - Part - I : Prices", *Journal of the Royal Statistical Society*, vol. 96, Part I, 11-25.

King, B.F. (1966), "Market and Industry Factors in Stock Price Behaviour", *Journal of Business*, January.

Kleidon, A.W., (1982), "Bias in Small Sample Tests of Stock Price Rationality", *Stanford University*.

\_\_\_\_\_, (1984), "Variance Bounds Tests and Stock Price Valuation Models", *Journal of Political Economy*, 94, 953-1001.

Kulkarni, S.N., "Share Price Behaviour in India : A Spectral Analysis of Random Walk Hypothesis", *Sankhya*, vol.40, Series D, pt - 2, 135-162.

LeRoy and Porter Richard (1981), "The present -Value Relation : Tests Based on Implied Variance Bounds", *Econometrica*, 49 (May), 555-74.

Levy, R.A. (1967), "Random Walk : Reality or Myth", *Financial Analysts Journal*, vol.23, no.6, 69-77.

Levy, H., (1973), "The Demand for Assets under conditions of risk", *Journal of Finance*, 28(1), 79-96.

Levy H. and Kroll Y., (1976), "Stochastic dominance with riskless assets", *Journal of Financial Quantitative Analysis*. 11(5), 743-777.

\_\_\_\_\_, (1978), "Ordering Uncertain option with borrowing and lending", *Journal of Finance*, 33(2), 553-574.

Lintner, J. (1975), "Security Prices risk and maximal gains from diversification", *Journal of Finance*, 20(4), 587-616.

Markowitz, H. (1952), "Portfolio selection", *Journal of Finance* 7(1), 7-9.

- \_\_\_\_\_, (1959), "Portfolio selection : efficient diversification of investment, New York, John Wiley and Sons.
- Mandelbrot, Benoit, (1966), "Forecasts of Future Prices, Unbiased Markets, and Martingale Models", Journal of Business, vol.39, 242-55.
- Marsh, T.A. and Merton, R.C. (1983), "Aggregate Dividend Behaviour and Its Implications for Tests of Stock market Rationality", M.I.T., September.
- \_\_\_\_\_, (1984), "Earnings variability and variance Bound Tests for the rationality of Stock Market Prices", M.I.T., March.
- May, Robert (1971) , "Robert (1971), "The Influence of Quarterly Earnings Announcements on Investor Decisions and Reflected in Common Stocks Price Changes", Empirical Research in Accounting, Selected studies, 1971, 119-63.
- Moore, A. (1962), "A Statistical Analysis of Common Stock Prices", Unpublished Ph.D. Thesis, Graduate School of Business, University of Chicago.
- \_\_\_\_\_, (1964), "Some Characteristics of Changes in Common Stock Prices", in Cootner (1964), 39-161.
- Mossin, J. (1966), "Equilibrium in a Capital Asset Market", Econometrica, 34 (October), 768-783.
- Neiderhoffer V. and Osborne, M.F.M. (1966), "Market making and reversal on the stock exchange", Journal of the American Statistical Association 61, December 897-916.
- Ojha, P.R. (1973), "Corporate Dividend Policy in Indian Cotton Textile Industry", Unpublished Ph.D. Thesis, University of Rajasthan.
- Osborne, M.F.M. (1959), "Brownian Motion of Stock Market", Operations Research, vol.7, no.2, 145-173.
- Practz, P.D. (1969), "Australian Share Prices and the Random Walk Hypothesis", Australian Journal of Statistics, vol.II, 123-139.

- Ray, D. (1976), "Analysis of Security Prices in India", Sankhya, Series C, vol.38, Part 4, (December).
- Rao, Krishna N. and Mukherjee, K. (1971), "Random Walk Hypothesis : An Empirical Study", Arthaniti, vol.14, no.1&2.
- Roberts H.V. (1959), "Stock Market 'Patterns' and Financial Analysis", Journal of Finance, vol.14, no.1-10. Reprinted in Cootner (1964), 7-16.
- Samuelson, Paul A. (1965), "Proof that Properly Anticipated Prices Fluctuate Randomly", Industrial Management Review, vol.6, no.2, 41-49.
- Scholes, M. (1966), "The Market for Securities Substitution versus Price Pressure and the Effects of Information on Share Prices", Journal of Business, April 1972, 179-211.
- \_\_\_\_\_, (1969), "A Test of the Competitive Market Hypothesis : The Market for new issues and secondary offerings", Unpublished Ph.D. Thesis, Graduate School of Business, University of Chicago.
- Scott L.P. (1985), "The Present Value Model of Stock Prices: Regression Tests and Monte Carlo Results", The Review of Economics and Statistics (February), 599-605.
- Sharma J.L. and Kennedy R.E., (1977), "A Comparative Analysis of Stock Price Behaviour on the Bombay, London and New York Stock Exchanges", Journal of Financial and Quantitative Analysis, September, 391-413.
- Sharma J.L., (1983) "Efficient Capital Markets and Random Character of Stock Price Behaviour in a Developing Economy", Indian Economic Journal, vol.31, no.2, 53-70.
- Sharpe, W.F. (1963), "A Simplified Model for Portfolio Analysis", Management Sciences, January.
- \_\_\_\_\_, (1964), "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk", Journal of Finance, September, 425-42.
- \_\_\_\_\_, (1965), "Risk aversion in the Stock Market", Journal of Finance, 20, September, 416-22.

- \_\_\_\_\_, (1966), "Mutual Fund performance", Journal of Business, 39, (Special Supplement, January), 119-38.
- Shiller R. (1981), "Do Stock Prices move too much to be justified by subsequent changes in Dividends", American Economic Review, 71, (June), 421-36.
- Srivastava (1968), "Share Prices, Dividends and Earnings", Economic and Political Weekly, (November), M89-M95.
- The Stock Exchange official Directory (vol.1 to 18), The Stock Exchange, Bombay (1975-1991).
- Treynor, J.L. (1965), "How to rate management of investment funds", Harvard Business Review, 43, January-February, 63-85.
- Waud, R.N., (1970), "Public interpretation of discount rate changes : evidence on the 'Announcement effect'", Econometrica, 38, March, 231-50.
- Working, H. (1934), "A random difference series for use in the analysis of time series", Journal of the American Statistical Association, 29, March, 11-24.
- Yalawar, Y.B. (1985), "Bombay Stock Exchange : Rates of Returns and Efficiency", Indian Institute of Management, Bangalore, Research Paper (August, 1985).



1849